Europe Edition

B KKUSU

1588

1.

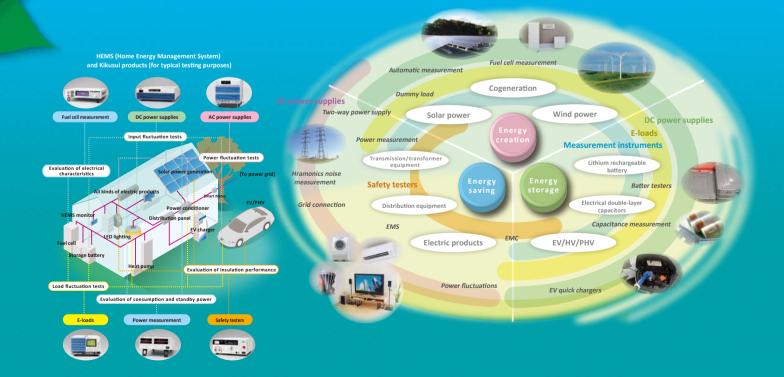
Electronic Test & Measurement Instruments, Power Supplies

KIKUSUI PRODUCTS CATALOGUE 2021/2022

www.kikusui.co.jp/en/

These are energy energy storage and energy and we a Our pri as we and c our el that au and lar of Society.

Kikusui has identified three areas of solutions for Smart Cities technologies in the environmental and energy saving fields. These are energy creation (power generation technologies), energy storage (power storage technologies), and energy saving (technologies for greater efficiency), and we are providing products for each of these purposes. Our primary products include DC power supplies, as well as electronic loads that absorb and consume electrical energy. In particular, our electronic loads are used as evaluation instruments that are essential for energy creation and energy storage, and large growth in sales of these products is expected. In the energy saving field, we provide AC power supplies that are key equipment for standard evaluations and grid connection (two-way connections for power supply and receiving) tests, as well as withstanding voltage testers for testing the safety of electrical and electronic devices and EMC testers for testing electromagnetic safety.



Company Profile



Head Quarters

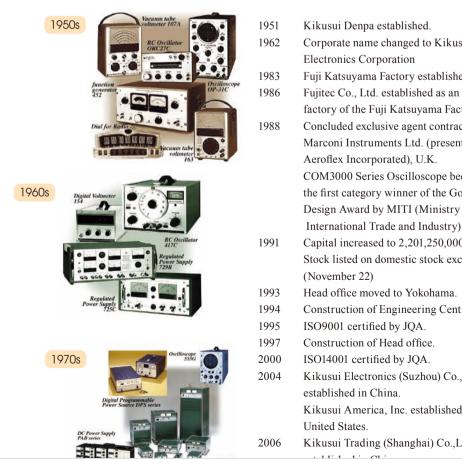


Kikusui Innovation Creation Center



Fuji-Katsuyama Factory

History



Corporate name	Kikusui Electronics Corp.
Founded and Incorporated	August 8, 1951
Capital	2,201 million yen
President & C.E.O	K. Kobayashi
Main activities	Manufacture, sale, and export & import of electronic test and measuring
	instruments, power supplies and software.
Headquarters	Southwood 4F, 6-1 Chigasaki-chuo, Tsuzuki-ku, Yokohama, Kanagawa,
	224-0032, Japan
Affiliate companies	FujiTEK Corp. (Japan)
	Kikusui Trading (Shanghai) Co., Ltd. (China)
	Kikusui America, Inc. (U.S.A)
Main customers	Self-Defense Force Agency / Ministry of Education, Culture, Sports,
	Science and Technology / Japan Atomic Energy Research Institute /
	Nippon Telegraph and Telephone Corp. / Hitachi, Ltd. / Toshiba Corp. /
	Mitsubishi Electric Corp. / NEC Corp. / Fujitsu Ltd. / Panasonic Corp. /
	Sony Corp. / Pioneer Electric Corp. / Kyo-cera Corp. /
	ALPS Electric Co., Ltd. / Murata Manufacturing Co., Ltd. / Toyota Co., Ltd. /
	Denso Corp. / Nissan Motor Car Co., Ltd. / Honda Motor Co., Ltd.
Main products	Power Supplies, Electronic Loads, Telecommunication Measuring
	Instruments, Withstanding Voltage Testers, Insulation Testers, Earth
	Continuity Tester, Calibrators, Signal Generators

1	Kikusui Denpa established.	1980s	
2	Corporate name changed to Kikusui		THE REAL PROPERTY AND ADDRESS OF
2	Electronics Corporation		Digital Oscilloscope COM7000 series
3	Fuji Katsuyama Factory established.		
6	Fujitec Co., Ltd. established as an affiliated		Compact Digital Oscilloscope CON13000 series
0	factory of the Fuji Katsuyama Factory.		COM3000 series
8	Concluded exclusive agent contract with		Factory
0	Marconi Instruments Ltd. (presently		AC Regulated Power Supply
	Aeroflex Incorporated), U.K.		PCR series
	COM3000 Series Oscilloscope becomes		
	the first category winner of the Good	1	Vithstanding Voltage Tester Dividal Oscilloscope OS5009 series
	Design Award by MITI (Ministry of	1990s	
	International Trade and Industry)		
1	Capital increased to 2,201,250,000 yen.		Headquarters and Engineering Centre
	Stock listed on domestic stock exchanges		
	(November 22)		The second second
3	Head office moved to Yokohama.		
4	Construction of Engineering Centre complete	ted.	The Prover Same
5	ISO9001 certified by JQA.	1	DC Power Supply PMC/PMC-A Series
7	Construction of Head office.		Regulated DC Power Supply
0	ISO14001 certified by JQA.	200	OOS DC rower supply PAS series
4	Kikusui Electronics (Suzhou) Co.,Ltd.		AC Power Supply PCR-LA series
	established in China.		JItter Meter KJM series
	Kikusui America, Inc. established in the		Electronic load PLZ-U series
	United States.		And
6	Kikusui Trading (Shanghai) Co.,Ltd.		-manuel

INTERNET

KIKUSUI WEB www.kikusui.co.jp/en/

We at the Kikusui Electronics Corporation would like to offer you information through our web site including about Company Profile of Kikusui, Full line of Kikusui products, Overseas distributors, services, new technologies, and an introduction of latest products. We also uploaded for your convenience some popular instrument drivers, which can be used with Lab VIEW or Visual Basic as Download Service.

Electronic catalogues in PDF format are also available for each product on our web site, including detailed specifications.



CONTENTS

Index & Selection	6
CE Marking Product List	7
DC Power Supplies	10
AC Power Supplies	44
Electronic Loads	56
Battery Test System	71
Safety Testers	76
Measuring Instrument	103
Software	104
Rack Assemblies	105

NOTE:

- * All products contained in this catalogue are equipment and devices that are premised on use under the supervision of qualified personnel, and are not designed or produced for home-use or use by general consumers.
- * Specifications, design and so forth are subject to change without prior notice to improve the quality.
- * Product names and prices are subject to change and production may be discontinued when necessary.
- * Product names, company names and brand names contained in this catalogue represent the respective registered trade name or trade mark.
- * Colors, textures and so forth of photographs shown in this catalogue may differ from actual products due to a limited fidelity in printing.
- Although every effort has been made to provide the information as accurate as possible for this catalogue, certain details have unavoidably been omitted due to limitations in space.
- * If you find any misprints or errors in this catalogue, it would be appreciated if you would inform us.
- * Please contact us to confirm specifications, price, accessories or anything that may be unclear when placing an order or concluding a purchasing agreement.

NOTE: Markings



LAN

Identifies new products appearing in this years catalog.





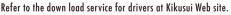




Products optionally available with these interfaces.



Products supporting instrument drivers for VisualBasic, LabVIEW, LabWindows/CVI and IVI-COM.





CE marked products



LXI

UKCA marked products

LXI(LAN eXtention for Instrumentation)

LXI is a type of interface standard extended to an instrumentation platform based on industry standard Ethernet (LAN) technology. The LXI Consortium is an industry consortium with over 50 of the top T&M companies such as Agilent Technology, VXI Technology sponsoring and developing this technology. (We, Kikusui Electronics Corp, are also a member of this consorthium)

INDEX

	2
2P05-PCR-LE	
3P05-PCR-LE	ى
	Α
AC5.5-1P3M-M5C-4	S 45
AC5.5-1P3M-M5C-5	S 45, 51, 54
AC5.5-1P3M-M6C-3	S 10, 45
	/CTF 10, 24
	S 45, 51, 54
	S 45
	S 51, 54
AC22-1P3M-M5C-58	S 45
AC22-1P3M-M8C-38	S 51
	S 45
	S 45
AC60-1P3M-M8C-48	S 45
PIM1020	B
. ,	102
	С
CC01-PAV	
CH01-PWR	17 D
DD-3 5P	
	E
EC05-PCR	
EX05-PCR-LE	
EX06-PCR-LE	
EX08-PCR-MA	
HP01A-TOS	
HP01A-TOS HP02A-TOS	
HP01A-TOS HP02A-TOS	
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8	
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE	
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22	H 102 102 61 I 51
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING	
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING	H H 102 102 102 102 10 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING	H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KBP3-2	H H 102 102 102 102 10 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KBP3-2 KRA2-PAV KRA3	H 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KBP3-2 KRA2-PAV KRA3 KRA4-TOS	H 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE ISO PROGRAMING ISO PROGRAMING KBP3-2 KRA2-PAV KRA3 KRA4-TOS KRA150	H H 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22. ISO PROGRAMING ISO PROGRAMING KBP3-2. KRA2-PAV KRA4-TOS. KRA150. KRA200-TOS	H H 102 102 102 102 102 102 102 10 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KBP3-2 KRA2-PAV KRA3 KRA4-TOS. KRA150 KRA150 KRA200-TOS KRB1-PWX SUPPO	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KBP3-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA150 KRA20-TOS KRB1-PWX SUPPO KRB2-TOS	H 102 102 102 102 102 102 102 102 10 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS. KRA4-TOS. KRA4-TOS. KRA150 KRA200-TOS. KRB1-PWX SUPPO KRB2-TOS. KRB3-PLZ-30F	H H 102 102 102 102 102 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB1-PWX SUPPO KRB2-TOS KRB3-PLZ-30F KRB3-PLZ-50F	H 102 102 102 102 102 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB3-PLZ-30F KRB3-PLZ-30F KRB3-TOS	H H 102 102 102 102 102 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB1-PWX SUPPO KRB2-TOS KRB3-PLZ-SOF KRB3-TOS KRB4	H H 102 102 102 102 102 10 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA3-PAV KRA3 KRA4-TOS KRA3 KRA4-TOS KRA50-TOS KRB1-PWX SUPPO KRB2-TOS KRB3-PLZ-30F KRB3-PLZ-50F KRB3-TOS KRB4 KRB6	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB93-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB1-PWX SUPPO KRB1-PWX SUPPO KRB3-PLZ-SOF KRB3-PLZ-SOF KRB3-TOS KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB9 KRB13	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB3-PLZ-30F KRB3-PLZ-30F KRB3-PLZ-30F KRB4 KRB4 KRB4 KRB6 KRB13 KRB100-TOS	H H 102 102 102 102 102 102 102 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-20-70S KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB3-PLZ-30F KRB3-PLZ-30F KRB4 KRB4 KRB6 KRB9 KRB13 KRB100-TOS KRB150-PLZ-30F	H H 102 102 102 102 102 102 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-0-70S KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB4-TOS KRB3-PLZ-30F KRB4 KRB4 KRB13 KRB13 KRB10-TOS KRB150-PLZ-30F KRB150-PLZ-30F	H H 102 102 102 102 102 102 102 102 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA20-TOS KRA4-TOS KRA4-TOS KRB3-PLZ-30F KRB3-PLZ-30F KRB3-PLZ-30F KRB4 KRB6 KRB4 KRB6 KRB13 KRB100-TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-50F KRB150-PLZ-50F	H 102 102 102 102 102 102 102 102 102 10
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB1-2 KRA2-PAV KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA50-TOS KRB1-PWX SUPPO KRB2-TOS KRB3-PLZ-30F KRB3-PLZ-30F KRB4 KRB4 KRB4 KRB4 KRB4 KRB9 KRB130TOS KRB150-PLZ-30F KRB150-TOS KRB150-TOS KRB150-TOS KRB150-TOS KRB150-TOS KRB150-TOS KRB150-TOS	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRB1-PWX SUPPO KRB3-PLZ-30F KRB3-PLZ-30F KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB13 KRB130TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-TOS KRB100-T	H 102 102 102 102 102 102 102 102 102 10
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2- KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB1-PWX SUPPO KRB2-TOS KRB3-PLZ-30F KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB4 KRB130TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-TOS KRB200 KRB300 KRB400-PCR-LE	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS	H H 102 102 102 102 102 102 102 102 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 IB05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING ISO PROGRAMING KRB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB150-TOS KRB4 KRB100-TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-50F KRB150-PLZ-50F KRB150-TOS KRB400 KR	H H 102 102 102 102 102 102 102 1 1 1 1 1 1
HP01A-TOS	H H 102 102 102 102 102 1 1 1 1 1 1 1 1 1 1
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 B05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB150-PLZ-30F KRB130-TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-TOS KRB100-TOS	H H 102 102 102 102 102 102 102 102 102 102
HP01A-TOS HP02A-TOS HV22-2P3M-M12M8 B05-PCR-LE IB07-PCR-WE IB22 ISO PROGRAMING ISO PROGRAMING KB2-2 KRA2-PAV KRA3 KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRA4-TOS KRB150-PLZ-30F KRB130-TOS KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-PLZ-30F KRB150-TOS KRB100-TOS	H H 102 102 102 102 102 102 102 102 102 102

KRC1603
KRC1603L 105
KRO900105
KRO1250 105
KRO1600
L
LC01-PCR-LE
LN05-PCR-LE
LP02-TOS 102
0
OP01-BIM103
OP01-KRC 105
OP01-PAS 17
OP01-PBZ-A
OP01-PCR-WE 45
OP01-PMX
OP01-PFX
OP01-PWR-0110
OP02-KRC105
OP02-PCR-WE 45
OP02-PFX
OP02-PWR-0110
OP03-KRC
OP03-PFX
OP03-PWR-01
OP04-KRC 105
Р
PAV10-2018, 110
PAV10-4018, 110
PAV10-6018, 110
PAV10-72
PAV20-10
PAV20-20
PAV20-20
PAV20-30
PAV36-12
PAV36-1818, 110
PAV36-2418, 110
PAV60-3.518, 110
PAV60-718, 110
PAV60-1018, 110
PAV60-1418, 110
PAV100-218, 110
PAV100-418, 110
PAV100-618, 110
PAV100-818, 110
PAV160-1.3
PAV160-2.6
PAV160-4
PAV160-5
PAV320-0.65
PAV320-1.3
PAV320-2
PAV320-2.5
PAV650-0.3218, 110
PAV650-0.64
PAV650-1
PAV650-1.25
PBZ20-20
PBZ20-20
PBZ20-60 SR43, 112
PBZ20-80 SR43, 112
PBZ20-100 SR43, 112
PBZ40-10
PBZ40-30 SR43, 112
PBZ40-40 SR43, 112
PBZ40-50 SR43, 112
PBZ60-6.737, 112
PBZ60-20.1 SR43, 112
PBZ60-26.8 SR43, 112
PBZ60-33.5 SR43, 112
PBZ80-5
PBZ80-15 SR43, 112
PBZ80-20 SR43, 112
PBZ80-25 SR43, 112
PC01-PCR-LE 51
PC01-PCR-WE
PC01-PLZ-4W
PC01-PLZ-5W 58, 61
PC01_P\//Y 24

D000 DL 7 4144	07
PC02-PLZ-4W	
PC02-PLZ-5W	61
PC02-PWX	24
PC03-PWX	24
PCR500LE	50 115
PCR500MA	.48, 114
PCR1000LE	50 115
	-
PCR1000MA	.48, 114
PCR1000WEA	.44. 113
PCR2000LE	.50, 115
PCR2000MA	48 114
PCR2000WEA	-
PCR2000WEA	.44, 113
PCR3000LE	.50, 115
PCR3000WEA2	44 110
	, -
PCR4000MA	.48, 114
PCR4000LE	.50, 115
PCR6000LE	.50, 115
PCR6000LE2	.54. 115
PCR6000WEA2(R)	.44, 113
PCR9000LE	.50. 115
PCR9000LE2	-
PCR12000WEA2(R)	.44, 113
PCR18000WEA2(R)	
PCR24000WEA2(R)	.44, 113
PCR30000WEA2(R)	44 113
PCR36000WEA2(R)	
PD05M-PCR-LE	51
BRASO BOD I F	54
PD05S-PCR-LE	
PFX2511	
PFX2512	71
PFX2532	71
PIA5100	58 61
PK01-PBZ	38
PK02-PBZ	
PK03-PBZ	
PL01-TOS	102
PL02A-TOS	
PLZ-30F	.67, 118
PLZ-50F	.67. 118
PLZ70UA	.67, 118
PLZ150U	.67. 118
PLZ205W	.57, 116
PLZ334WL	.65. 116
PLZ405W	.57. 116
	-
PLZ1005WH2	.61, 117
PLZ1205W	.57. 116
PLZ2005WH2	-
PLZ2405WB	.58. 116
PLZ4005WH2	
	-
PLZ12005WH2	.61, 117
PLZ12005WH2	
PLZ12005WH2 PLZ20005WH2	.61, 117
PLZ12005WH2	.61, 117
PLZ12005WH2 PLZ20005WH2 PMX18-2A	.61, 117 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A	.61, 117 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX18-5A PMX32-2QU	.61, 117 .29, 110 .29, 110 .33, 111
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-3A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-3A PMX70-1A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A PMX250-0.25A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A PMX250-0.25A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A PMX250-0.25A PMX350-0.2A PMX500-0.1A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A PMX250-0.25A PMX500-0.2A PMX500-0.1A PWR401H	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX110-0.6A PMX250-0.25A PMX350-0.2A PMX500-0.1A	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR. PMX35-1A PMX35-1A PMX35-1A PMX70-1A PMX10-0.6A. PMX10-0.6A. PMX250-0.25A PMX350-0.2A PMX500-0.1A PMX500-0.1A PMX601H.	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .20, 100, 100 .20, 100 .20, 100 .20, 100 .20, 10
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR PMX32-3TR PMX35-1A PMX35-3A PMX70-1A PMX10-0.6A PMX10-0.6A PMX250-0.25A PMX350-0.2A PMX350-0.2A PMX500-0.1A PWX401H PWR401L PWR401L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .10, 108 .10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR. PMX35-1A PMX35-1A PMX35-1A PMX70-1A PMX10-0.6A. PMX10-0.6A. PMX250-0.25A PMX350-0.2A PMX500-0.1A PMX500-0.1A PMX601H.	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .10, 108 .10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A. PMX35-1A. PMX35-3A PMX70-1A. PMX110-0.6A. PMX250-0.25A PMX350-0.2A PMX350-0.2A PMX500-0.1A PWX401H. PWR401L PWR401ML	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .10, 108 .10, 108 .10, 108 .10, 108 .10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX10-0.6A PMX250-0.25A PMX350-0.2A PMX350-0.2A PMX500-0.1A PWX401H PWR401ML PWR401ML PWR401ML	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .10, 108 .10, 108.10, 108 .10, 108 .10
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-3QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-0.25A PMX70-1A PMX250-0.25A PMX500-0.1A PMX500-0.1A PWX401H PWR401L PWR401ML PWR401ML PWR401ML PWR400M	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .29, 110 .29, 110 .108 .10, 108 .10, 10
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-3QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-0.25A PMX70-1A PMX250-0.25A PMX500-0.1A PMX500-0.1A PWX401H PWR401L PWR401ML PWR401ML PWR401ML PWR400M	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .29, 110 .29, 110 .108 .10, 108 .10, 10
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401L PWR401ML PWR401ML PWR400H PWR800H PWR800H	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .29, 110 .29, 110 .10, 108 .10, 108.10, 108 .10, 108.10, 108 .10, 108.10, 108 .10, 108.10
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-0.25A PMX50-0.25A PMX500-0.2A PMX500-0.1A PWX401H PWR401L PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML PWR401ML	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .30, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401L PWR401ML PWR401ML PWR400H PWR800H PWR800H	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .30, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX250-0.25A PMX50-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401ML PWR401ML PWR400H PWR800H PWR801L PWR801L PWR801L PWR801L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR. PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX70-1A PMX10-0.6A. PMX250-0.25A PMX500-0.1A PMX500-0.1A PMX500-0.1A PWX401H PWR401H PWR401H PWR401ML PWR800H PWR801H PWR801L PWR801L PWR801L PWR801L PWR801L PWR801L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX250-0.25A PMX50-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401ML PWR401ML PWR400H PWR800H PWR801L PWR801L PWR801L PWR801L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX10-0.6A PMX250-0.25A PMX350-0.2A PMX500-0.1A PWX401H PWX401H PWR401H PWR401ML PWR401ML PWR80H PWR80H PWR801H PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-3QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX350-0.25A PMX500-0.25A PMX500-0.25A PMX500-0.25A PMX500-0.1A PWX401H PWR401H PWR401H PWR401H PWR401ML PWR401ML PWR801H PWR801H PWR801H PWR801H PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML PWR801ML	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401H PWR401L PWR401ML PWR401ML PWR401ML PWR800H PWR800H PWR801H PWR8	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401H PWR401L PWR401ML PWR401ML PWR401ML PWR800H PWR800H PWR801H PWR8	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-0.25A PMX500-0.1A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401L PWR401L PWR401H PWR401L PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR800H PWR801H PWR	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .30, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX250-0.25A PMX50-0.25A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401L PWR401L PWR401ML PWR401ML PWR800M PWR801H PWR801H PWR801H PWR801H PWR801HL PWR801HL PWR801HL PWR1201H PWR1201H PWR1201ML PWR1201ML PWR1600H	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108
PLZ12005WH2 PLZ12005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-0.25A PMX500-0.1A PMX500-0.2A PMX500-0.1A PWR401H PWR401L PWR401L PWR401L PWR401H PWR401L PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR401H PWR800H PWR801H PWR	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 108
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR. PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX350-0.2A PMX500-0.1A PWX401H. PWR401H. PWR401L PWR401L PWR401L PWR401L PWR401L PWR401HL PWR401H PWR401H PWR401H PWR401H PWR401H PWR800H PWR801H PWR801H PWR801H PWR801H PWR801H PWR2011 PWR1201H PWR1201H PWR1201H PWR1201M PWR1600H PWR1600L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 109 16, 109
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-3QU PMX32-3DU PMX32-3TR PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX350-0.2SA PMX50-0.2SA PMX500-0.1A PMX250-0.2SA PMX500-0.1A PWX401H PWR401H PWR401H PWR401H PWR401ML PWR401ML PWR800H PWR801H PWR801H PWR801H PWR801H PWR801H PWR801ML PWR801ML PWR801ML PWR801ML PWR1201L PWR1201L PWR1201ML PWR1201ML PWR1201ML PWR1600L PWR1600L PWR1600L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .10, 108 .10, 108 .10, 108 .10, 108 .10, 108 <t< td=""></t<>
PLZ12005WH2 PLZ20005WH2 PMX18-2A PMX18-5A PMX32-2QU PMX32-3TR. PMX35-1A PMX35-1A PMX35-1A PMX35-1A PMX35-3A PMX70-1A PMX250-0.25A PMX350-0.2A PMX500-0.1A PWX401H. PWR401H. PWR401L PWR401L PWR401L PWR401L PWR401L PWR401HL PWR401H PWR401H PWR401H PWR401H PWR401H PWR800H PWR801H PWR801H PWR801H PWR801H PWR801H PWR2011 PWR1201H PWR1201H PWR1201H PWR1201M PWR1600H PWR1600L	.61, 117 .29, 110 .29, 110 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .33, 111 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .29, 110 .10, 108 10, 109 16, 109

PWR2001L	. 10, 108
PWR2001MH	. 10, 108
PWR2001ML	. 10, 108
PWX750LF	24 111
PWX750MLF	
PWX750MHF	'
PWX750HF	24, 111
PWX1500H	24, 111
PWX1500L	24. 111
PWX1500MH	
PWX1500ML	24, 111
R	
RC01-TOS	102
RC02-TOS	102
RD-8P/9P	
S	10, 24
SC05-PFX	
SC07-PFX	
SD002	
SD007-PFX	71
SD009-PCR-LE/WE	
SD011-PCR-LE(WAVY for PCR-LE)	
SD012-PCR-LE/WE	
SD013-PWX(WAVY for PWX)	. 24, 104
SD023-PLZ-5W(WAVY for PLZ-5W)	.58.104
SD024-PAV(WAVY for PAV)	
SD025-PMX(WAVY for PMX)	
SD027-PWR-01(WAVY for PWR-01)	
SD032-PCR-WE(WAVY for PCR-WE)	. 45, 104
SD033-PLZ-5WH2(WAVY for PLZ-5WH2).	. 61, 104
SL01-PFX	
т	
•	400
TL01-BIM	
TL01-PLZ	65
TL01-TOS	102
TL02-BIM	103
TL02-PLZ	
TL02-TOS	
TL03-PLZ	65
TL03-TOS	102
TL08-PFX	71
1200117(
TI NO DEV	71
TL09-PFX	
TL10-PFX	
TL10-PFX	71 71
TL10-PFX TL11-PFX	71 71 102
TL10-PFX TL11-PFX TL11-TOS TL12-PFX	71 71 102 71
TL10-PFX	71 71 102 71 102
TL10-PFX	71 71 102 71 102 102
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS	
TL10-PFX	
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS	
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS	71 71 71
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL32-TOS TL33-TOS TL33-TOS	71 71 102 71 102 102 102 102 102 102
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL22-TOS TL31-TOS TL32-TOS TL33-TOS TL33-TOS TL34-TOS TL	
TL10-PFX TL11-PFX TL11-TOS TL12-PFX. TL12-TOS TL13-TOS TL3-TOS TL31-TOS TL32-TOS TL32-TOS TL33-TOS TL41 TL42	
TL10-PFX TL11-PFX TL11-TOS TL12-PFX. TL12-TOS TL13-TOS TL31-TOS TL31-TOS TL31-TOS TL32-TOS TL33-TOS TL33-TOS TL41 TL42 TOS5200	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX. TL12-TOS TL13-TOS TL3-TOS TL31-TOS TL32-TOS TL32-TOS TL33-TOS TL41 TL42	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX. TL12-TOS TL13-TOS TL31-TOS TL31-TOS TL31-TOS TL32-TOS TL33-TOS TL33-TOS TL41 TL42 TOS5200	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL33-TOS TL32-TOS TL33-TOS TD35-TOS TOS5300 TOS5301	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL33-TOS TL41 TL41 TOS5200 TOS5300 TOS5301 TOS5302	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS6200A	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS6200A TOS6210	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL41 TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS6200A	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL22-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS6200A TOS6210	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL22-TOS TL31-TOS TL32-TOS TL32-TOS TL33-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS6210 TOS9300	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL41 TC42 TOS5200 TOS5301 TOS5302 TOS6200A TOS6210 TOS9301 TOS9301 TOS9301PD	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL31-TOS TL31-TOS TL32-TOS TL41 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9301 TOS9302	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TCS5300 TOS5301 TOS5302 TOS6200A TOS6200A TOS9301 TOS9301 TOS9301 TOS9302 TOS9303	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL31-TOS TL32-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TCS5300 TOS5301 TOS5302 TOS6200A TOS6200A TOS9301 TOS9301 TOS9302 TOS9303 TOS9303LC	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TCS5300 TOS5301 TOS5302 TOS6200A TOS6200A TOS9301 TOS9301 TOS9301 TOS9302 TOS9303	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL31-TOS TL32-TOS TL31-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TCS5300 TOS5301 TOS5302 TOS6200A TOS6200A TOS9301 TOS9301 TOS9302 TOS9303 TOS9303LC	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL3TOS TL32-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TL32-TOS TC35200 TOS5300 TOS5301 TOS5302 TOS6200A TOS6200A TOS6200A TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303_ TOS9303_ TOS9320 TU01-PMX	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL32-TOS TL32-TOS TL41 TC42 TOS5200 TOS5301 TOS5302 TOS6200A TOS6200A TOS6200 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9320 TU01-PMX TU01-PWR-01	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL32-TOS TL31-TOS TL31-TOS TL32-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9304 TOS9305 TOS9305 TOS9305 TOS9305 TOS9305 TOS9306 TOS9307	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL31-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TU42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS6200A TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9303 TOS9305 TOS9305 TOS9307	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL31-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TU42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS6200A TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9303 TOS9305 TOS9305 TOS9307	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL22-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS6200A TOS6200A TOS6200A TOS9301 TOS9301 TOS9301 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9305 TOS9305 TOS9305 TOS9307 TOS	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-PFX TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL42 TOS5200 TOS5301 TOS5302 TOS6200A TOS6200A TOS62010 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TU01-PMX TU01-PWR-01 TU01-PWR-01 U US05-PCR-LE V VS01	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL3-TOS TL3-TOS TL31-TOS TL32-TOS TL31-TOS TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5302 TOS5302 TOS5302 TOS5300 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9302 TOS9305 TOS9302 TOS9305 TOS9302 TOS9302 TOS9303 TOS9302 TOS9303 TOS9304 TOS9305 TOS9305 TOS9305 TOS9307 TOS9307 TOS9307 TOS9307 TOS9307 TOS9307 TOS9308 TOS9308 TOS9308 TOS9308 TOS9308 TOS9307 TOS9307 TOS9308 TOS930	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL3-TOS TL3-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5301 TOS5302 TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9305 TOS9305 TOS9305 TOS9307	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL3-TOS TL3-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TL42 TOS5200 TOS5300 TOS5300 TOS5301 TOS5302 TOS5302 TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9302 TOS9303 TOS9305 TOS9305 TOS9305 TOS9307	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL12-TOS TL3-TOS TL3-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TL42 TOS5200 TOS5300 TOS5301 TOS5302 TOS5301 TOS5302 TOS6210 TOS6210 TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9303 TOS9304 TOS9305 TOS9305 TOS9305 TOS9307	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TU41-TOS TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9302 TU01-PWX-01 TU01-PWR-01 TU01-PWR-01 U US05-PCR-LE V VS01 WAVY for PAS&PWR <t< td=""><td>71 71 102 71 102 102 102 102 102 102 102 102 102 10</td></t<>	71 71 102 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TL31-TOS TL41 TQS5200 TOS5300 TOS5300 TOS5301 TOS5302 TOS5302 TOS6200A TOS6200A TOS6200A TOS6200A TOS9301 TOS9301 TOS9301 TOS9302 TOS9303 TOS930 TOS9	71 71 102 102 102 102 102 102 102 102 102 10
TL10-PFX TL11-PFX TL11-TOS TL12-PFX TL12-TOS TL13-TOS TL22-TOS TL31-TOS TL32-TOS TL31-TOS TL32-TOS TU41-TOS TOS9301 TOS9302 TOS9303 TOS9303 TOS9303 TOS9302 TU01-PWX-01 TU01-PWR-01 TU01-PWR-01 U US05-PCR-LE V VS01 WAVY for PAS&PWR <t< td=""><td>71 71 102 71 102 102 102 102 102 102 102 102 102 10</td></t<>	71 71 102 71 102 102 102 102 102 102 102 102 102 10

ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

DC Power Supply

Series	Model	Reference page	
PWR-01 Series	All models	10	*1
PWR Series	All models	16	*1
PAV Series	All models	18	*1
	PWX750LF	24	*1
	PWX750MLF	24	*1
	PWX750MHF	24	*1
DWX Corico	PWX750HF	24	*1
PWX Series	PWX1500L	24	*1
	PWX1500ML	24	*1
	PWX1500MH	24	*1
	PWX1500H	24	*1
PMX-A Series	All models	29	*1
PMX-Multi Series	All models	33	*2
PBZ Series	All models	37	*1
PBZ20-20A		41	*1
PBZ SR Series	All models	43	*1

Battery Test System

Series	Model	Reference page	
PFX2500 Series	All models	71	*1

Safety Tester

Series	Model	Reference page	
TOS Series	TOS9300	78	*1
	TOS9301	78	*1
	TOS9301PD	78	*1
	TOS9302	79	*1
	TOS9303	79	*1
	TOS9303LC	80	*1
	TOS9320	80	*1
	TOS5300	90	*1
	TOS5301	90	*1
	TOS5302	90	*1
	TOS5200	95	*1
	TOS6210	99	*1
	TOS6200A	99	*1

AC Power Supply

Series	Model	Reference page	
PCR-WEA/WEA2 Series	All models	44	*1
PCR-MA Series	All models	48	*1
PCR-LE Series	All models	50	*1
PCR-LE2 Series	PCR6000LE2	54	*1
PCR-LEZ Series	PCR9000LE2	54	*1

Electronic Load

Series	Model	Reference page	
PLZ-5W Series	All models	57	*1
PLZ-5WH2 Series	All models	61	*1
PLZ-4WL Series	PLZ334WL	65	*1
PLZ-U Series	All models	67	*1

Measuring Instrument

Series	Model	Reference page	
BIM1000 Series	BIM1030	103	*1
DIMITOOD Series	BIM1100	103	*1

Option

Model	Reference page
OP01-PFX	71
OP02-PFX	71
OP03-PFX	71
SL01-PFX	71

ORDERING INFORMATION

*1 CE Marked model is available at all standard input voltage as specified in each specification. *2 CE Marked model is available only for the unit equipped with Input voltage of 234 V.

* Please indicate 'CE Marked Products' when ordering or request for the quote.

Selection

DC Power Supply Compact Wide Range DC Power Supply (CV/CC) Multi Range DC Power Supply (CV/CC) Compact Variable Switching Regulated DC Power Supply GPIB PWR-01 Series PWR Series **PAV Series** USB New flagship bench-top DC power Three types of wide-range power High power density up to 800 W in USB RS232C USB supplies covering 80 V to 650 V palm-size with high performance supply switching system. RS485 BS232C LAN LAN LXI Innr 1250 DRIVERS SWITCHING SYSTEM SWITCHING SYSTEM SWITCHING SYSTEM P.10 P.16 P.18 DC Power Supply 1U Wide Range Programmable DC Power Supply Compact DC Power Supply(CV/CC) Compact Multi-Output DC Power Supply (CV/CC) **PWX Series** USB PMX-A Series GPIB PMX-Multi Series USB New standard of rack mount power Network function equipped as Three models with 2, 3 and 4 out-RS232C RS232C USB standard for the standard test puts. Optimal for R&D as well as supply LAN power supply. manufacturing lines. LAN LXI I XI LAN DRIVERS LXI DRIVERS SWITCHING SYSTEM LINEAR SYSTEM LINEAR SYSTEM P.24 P.29 P.33

DC Power Supply







Compact Wide Range DC Power Supply (CV/CC)



Dimensions / Weight

400 W model: 71(2.80")W×124(4.88")H×350(13.78")Dmm(inch)/ 3 kg(6.61 lb) 800 W model: 142.5(5.61")W×124(4.88")H×350(13.78")Dmm(inch)/ 5.5 kg(12.13 lb) 1200 W model: 214(8.43")W×124(4.88")H×350(13.78")Dmm(inch)/ 7.5 kg(16.53 lb) 2000 W model: 428.5(16.87")W×128(5.04")H×350(13.78")Dmm(inch)/13 kg(28.66 lb)

Accessories

Chassis connection short bar, Output terminal M4 screws (2 pcs.), Output terminal bolt set (2 sets) *Only L type and ML type included., Output terminal cover, Packing list. Safety Information, Quick Reference (Japanese/English), CD-ROM 400 W/800 W model: Power cord *1 *2

1200 W model: Input terminal cover, Ferrite core set

- *1 Power cord is not included for the 1200 W model. Please purchase the optional accessory separately (AC5.5-3P3M-M4C-VCTF). Not CE certified product. Power cord is not included for the 2000 W model. Please purchase the optional accessory
- separately (AC5.5-1P3M-M6C-3S)

Options

AC power cord for 1200 W model AC5.5-3P3M-M4C-VCTF *Not CE certified product

AC power cord for 2000 W model AC5.5-1P3M-M6C-3S

■ J1/ J2 connector plug kit **OP01-PWR-01**

A plug kit for externally controlling the PWR-01 through the J1/J2 connector. $30\ pin\ pieces,\ Housing\ for\ the\ J1$ connector and J2 connector. 1 piece each

Parallel-operation cable (for 2 units in parallel) **OP02-PWR-01**



11111 THE DEEP



External-control cable and connector set **OP03-PWR-01**

Cables 20 pcs., length; approx, 500 mm (Crimped on one end) Housing for the J1 connector and J2 connector: 1 piece each Core: 1 piece





RD-8P/9P

RS232C control-conversion cable



Terminal unit TU01-PWR-01

New flagship bench-top DC power supply

The PWR-01 is a series of high-performance, multifunctional, compact, wide-range DC power supplies. It consists of 16 models in total with 4 maximum voltage outputs (L, ML, MH, and H) and 4 maximum power outputs (400 W, 800 W, 1200W and 2000 W). With the PWR-01 series you can set sequences with an embedded CPU as well as analog control. The series is equipped with LAN (LXI), USB, and RS232C as standard interfaces that are essential for system integration. The PWR-01 also features front-facing output terminals, variable internal resistance, bleeder ON/OFF functions, a CC/CV priority switching function, synchronized operation, various protections, and programmable internal memory.

Features

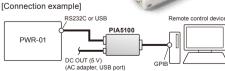
- Sequence function (supports triggered synchronization)
- Variable internal resistance function
- LAN (LXI compliant) /USB/RS232C as standard interface
- A virtual multi-channel bus (VMCB) function makes multichannel operation more efficient
- A wide range of voltage and current settings can be combined within its output power rating (3 to 4 times)
- All models are equipped with front-facing output terminals as standard (maximum 10 A)
- Supporting universal input voltage (85 V to 265 V)
- CONFIG setting shortcut function and display (Up to three parameters can be registered.)
- Setting preset memory function (3 combinations of settings for voltage, current, OVP, OCP, and UVL)
- Bleeder (sink) can be turned ON/OFF, with an even stronger bleeder mode setting available
- Output ON/OFF delay function
- Soft start/stop function
- Operating temperature guaranteed up to 50 °C (122 °F). (Storage temperature is -25 °C to +60 °C (-13 °F to 140 °F).)

GPIB Converter PIA5100

This converter converts RS232C or USB of the PWR-01 to GPIB, enabling connection of a remote controller using GPIB. [Accessories: Power cord set, Magnetic sheet] *Not CE certified product

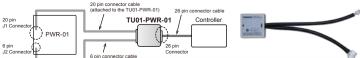
*DC 5 V (power supply with commercially-available universal AC adapter etc.) is required to operate the PIA5100.





Sequence creation software SD027-PWR-01 (Wavy for PWR-01)

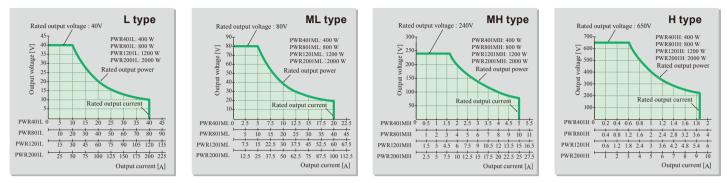
A terminal unit for converting the J1 and J2 connectors of this product to the J1 connector of the Kikusui PWR Series Regulated DC Power Supplies



Operation Area

3 to 4 times ratio-power operation

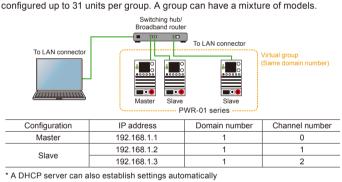
This operating range covers a wide variety of voltage and current-setting combinations. For example, the 1200 W model PWR1201ML is capable of seamless operation within ranges of 80 V/15 A to 20 V/60 A.

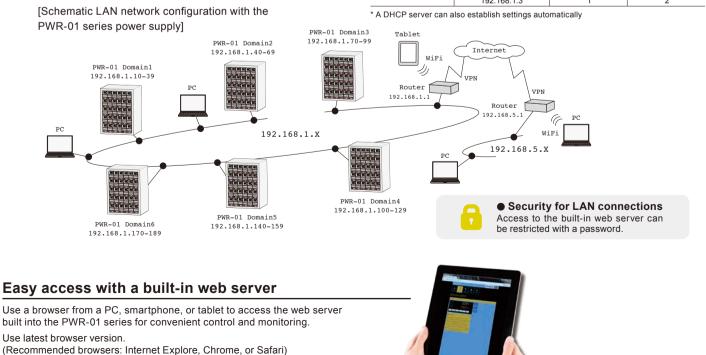


Equipped with standard LAN interface and VMCB function to support network-based remote control and monitoring

The PWR-01 series is equipped with LAN, USB, and RS232C interfaces as standard features. The virtual multi-channel bus (VMCB) feature allows for remoto control and monitoring for 1-to-N as well as N-to-M in large-scale networks. In particular, the LAN interface is LXI compliant, enabling you to easily control and monitor the power supply through a browser on a PC, smartphone, or tablet by accessing the web server built into the PWR-01 series.

• Basic configuration with LAN interface and VMCB (example) As shown in the figure below, it is possible to connect a PC and the PWR-01 series with a hub to create a virtual group using a LAN connection. A maximum of 254 virtual groups can be set, and the maximum number of units can be





* Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).

PWR-01 Series 400 W Type Specifications

Item/Mo	del		PWR401L	PWR401ML	PWR401MH	PWR401H
AC inpu						
Nomina	input rating		100 Vac	to 240 Vac, 50 H	Iz to 60 Hz, singl	e phase
Input vo	ltage range			85 Vac to	265 Vac	
Input fre	quency range			47 Hz t	o 63 Hz	
Current	(TYP) <mark>*1</mark>	100 Vac		5.6	6 A	
		200 Vac		2.8	3 A	
Inrush c	urrent (MAX) *	2			or less	
Power (MAX) *3			560	VA	
Power fa	actor (TYP) *1		0.99 (inpu	t voltage: 100 V),	0.97 (input volta	ge: 200 V)
	cy (MIN) *1			75 %	(TYP)	
<u> </u>	old time *3			20 ms (or more	
Output						
Rating	Output voltag		40 V	80 V	240 V	650 V
	Output currer	-	40 A	20 A	5 A	1.85 A
	Output power			400) W	
Voltage	Maximum settal	0	42 V	84 V	252 V	682.5 V
	Setting accur	асу	± (0.05 % of set +0.05 % of rating)			
	Resolution		200 mV	400 mV	1000 mV	2500 mV
		E, OUT OFF	10 mV	10 mV	100 mV	100 mV
		E, OUT ON	1 mV	1 mV	10 mV	10 mV
	When usin communic	ig a ation interface	0.1 mV	0.1 mV	0.1 mV	0.1 mV
	Line regulatio		±6 mV	±10 mV	±26 mV	±67 mV
	Load regulation		±6 mV	±10 mV	±26 mV	±67 mV
	Transient resp		1 ms or less	2 ms or less	2 ms or less	3 ms or less
	Ripple noise	p-p *10	50 mV	50 mV	100 mV	300 mV
	*9	rms *11	5 mV	5 mV	20 mV	50 mV
	Rise time	At full load	50 ms	or less	100 ms	or less
		No load		or less		orless
	Fall time *12	At full load	50 ms	or less	150 ms	250 ms
		No load	500 ms	or less	1200 ms	2000 ms
	Maximum remote pensation voltage		1.5 V	4 V	5 V	5 V
	Temperature co	pefficient *13		100 p	pm/°C	

At the rated output power for the rated output current.

Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms). *2

100 Vac, at the rated output power

PWR-01 Series 800 W Type Specifications

Item/Mo	del		PWR801L	PWR801ML	PWR801MH	PWR801H	
AC inpu	t						
Nomina	input rating		100 Vac	to 240 Vac, 50 H	Iz to 60 Hz, singl	e phase	
Input vo	ltage range			85 Vac to	265 Vac		
Input fre	quency range			47 Hz t	o 63 Hz		
Current	(TYP) *1	100 Vac		11.	2 A		
		200 Vac		5.6	6 A		
Inrush c	urrent (MAX) *	2		50 A d	or less		
Power (I	MAX) *3			1120) VA		
Power fa	actor (TYP) *1		0.99 (inpu	t voltage: 100 V),	0.97 (input volta	ge: 200 V)	
Efficiend	cy (MIN) *1			75 %	(TYP)		
Output h	old time *3			20 ms (or more		
Output							
Rating	Output voltag	e *4	40 V	80 V	240 V	650 V	
	Output currer	t *4	80 A	40 A	10 A	3.70 A	
	Output power		800 W				
Voltage	Maximum settal	ole voltage *5	42 V	84 V	252 V	682.5 V	
	Setting accur	асу	± (0.05 % of set +0.05 % of rating)				
	Resolution		200 mV	400 mV	1000 mV	2500 mV	
	Using FINI	E, OUT OFF	10 mV	10 mV	100 mV	100 mV	
		, OUT ON	1 mV	1 mV	10 mV	10 mV	
	When usin communic	g a ation interface	0.1 mV	0.1 mV	0.1 mV	0.1 mV	
	Line regulatio	n * <mark>6</mark>	±6 mV	±10 mV	±26 mV	±67 mV	
	Load regulation	on *7	±6 mV	±10 mV	±26 mV	±67 mV	
	Transient resp	oonse *8	1 ms or less	2 ms or less	2 ms or less	3 ms or less	
	Ripple noise	p-p *10	50 mV	50 mV	100 mV	300 mV	
	*9	rms *11	5 mV	5 mV	20 mV	50 mV	
	Rise time	At full load	50 ms	or less	100 ms	or less	
		No load	50 ms	or less	100 ms	or less	
	Fall time *12	At full load	50 ms	or less	150 ms	250 ms	
		No load	500 ms	or less	1200 ms	2000 ms	
	Maximum remote pensation voltage		1.5 V	4 V	5 V	5 V	
Temperature coeff		pefficient *13		100 p	pm/°C		

At the rated output power for the rated output current

*2 Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms)

Item/Model			PWR401L	PWR401ML	PWR401MH	PWR401H
Output						
Current	Maximum set	table current *5	42 A	21 A	5.25 A	1.9425 A
	Setting acc	uracy *14		± (0.5 % of set	+0.1 % of rating)	
	Resolution		200 mA	100 mA	20 mA	10 mA
	Using F	NE, OUT OFF	10 mA	10 mA	1 mA	1 mA
	Using F	NE, OUT ON	1 mA	1 mA	0.1 mA	0.1 mA
	When u commu	sing a lication interface	0.1 mA	0.1 mA	0.1 mA	0.1 mA
	Line regula	ion	±6 mA	±4 mA	±2.5 mA	±2.2 mA
	Load regula	tion	±13 mA	±9 mA	±6.0 mA	±5.4 mA
	Ripple noise*	5 rms *11	80 mA	40 mA	12 mA	6 mA
	Rise time (TY	P) At full load	50 ms		100 ms	
	Fall time (TYP) At full load	50 ms		100 ms	
	Temperature	coefficient *13	100 ppm/°C			
Maximum	internal resistar	ce that can be set	1.000 Ω	4.000 Ω	36.00 Ω	263.5 Ω
Display	function					
Voltage	Maxim	um display	99	.99	99	9.9
display	Displa	y accuracy		± (0.2 % of rea	ading + 5 digit)	
Current	Maxim	um display	99	.99	9.9	99
display	Displa	y accuracy		± (0.5 % of rea	ading + 8 digit)	
Power			The PWR DSPL LED lights in red.			
display	Maxim	um display		99	99	
	Display accuracy		Displays the result of multiplying the current and voltage. The display is toggled with the voltage or current display.			

*4. The maximum output voltage and maximum output current are limited by the maximum output power. *5 Can be limited to approximately 95 % of the OVP trip point or OCP trip point.

*6 85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load

The amount of change that occurs when the load is changed from no load to full load (rated output *7. power/rated output voltage) with rated output voltage. The value is measured at the sensing point.

*8. The amount of time required for the output voltage to return to a value within "rated output voltage \pm (0.1 % +10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage

Measured using an RC-9131C probe that conforms to the JEITA specifications. At the rated output *9 current.

*10. When the measurement frequency bandwidth is 10 Hz to 20 MHz.

*11. When the measurement frequency bandwidth is 10 Hz to 1 MHz.

*12. When the bleeder circuit is set to bleeder normal.

*13. When the ambient temperature is within 0°C and 50 °C
*14. Applies to the range of 1 % to 100 % of the rated current. TYP (0.1 % of rating) for 0 % to 1 %.

*15. When the output voltage is 10 % to 100 % of the rating. At the rated output current.

Item/Mo	Item/Model			PWR801ML	PWR801MH	PWR801H
Output						
Current	Maximum setta	ible current *5	84 A	42 A	10.5 A	3.885 A
	Setting accu	racy *14		± (0.5 % of set	+0.1 % of rating)	
	Resolution		400 mA	200 mA	40 mA	20 mA
	Using FIN	IE, OUT OFF	10 mA	10 mA	10 mA	1 mA
	Using FIN	IE, OUT ON	1 mA	1 mA	0.1 mA	0.1 mA
	When usi communi	ng a cation interface	0.1 mA	0.1 mA	0.1 mA	0.1 mA
	Line regulati	on	±10 mA	±6 mA	±3 mA	±2.4 mA
	Load regulat	ion	±21 mA	±13 mA	±7 mA	±5.7 mA
	Ripple noise*1	5 rms *11	160 mA	80 mA	24 mA	12 mA
	Rise time (TYP)	At full load	50 ms		100 ms	
	Fall time (TYP)	At full load	50 ms		100 ms	
	Temperature of	coefficient *13		100 ppm/°C		
Maximum	internal resistanc	e that can be set	0.500 Ω	2.000 Ω	18.00 Ω	131.8 Ω
Display	function					
Voltage	Maximu	m display	99	.99	99	9.9
display	Display	accuracy		± (0.2 % of rea	ading + 5 digit)	
Current	Maximu	m display		99.99		9.999
display	Display accuracy			± (0.5 % of rea	ading + 8 digit)	
Power				The PWR DSPL	LED lights in red.	
display	Maximu	m display		99	99	
	Display	accuracy		e result of multipl is toggled with the		

The maximum output voltage and maximum output current are limited by the maximum output power.
 Can be limited to approximately 95 % of the OVP trip point or OCP trip point.

85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load *6

The amount of change that occurs when the load is changed from no load to full load (rated output power/rated output voltage) with rated output voltage. The value is measured at the sensing point. *7.

*8. The amount of time required for the output voltage to return to a value within "rated output voltage ± (0.1 % +10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage.

*9. Measured using an RC-9131C probe that conforms to the JEITA specifications. At the rated output current.

*10. When the measurement frequency bandwidth is 10 Hz to 20 MHz.

*11. When the measurement frequency bandwidth is 10 Hz to 1 MHz.

*12. When the bleeder circuit is set to bleeder normal.

*13. When the ambient temperature is within 0°C and 50 °C

*14. Applies to the range of 1 % to 100 % of the rated current. TYP (0.1 % of rating) for 0 % to 1 %.

PWR-01 Series 1200 W Type Specifications

Item/Mo	odel		PWR1201L	PWR1201ML	PWR1201MH	PWR1201H	
AC inpu							
	l input rating		100 Va	100 Vac to 240 Vac, 50 Hz to 60 Hz, single phase			
	Itage range			· · · · · ·	265 Vac		
Input fre	equency range			47 Hz t	o 63 Hz		
Current	(TYP) *1	100 Vac		16.	8 A		
		200 Vac		8.4	4 A		
Inrush c	urrent (MAX) *	2		75 A d	or less		
Power (MAX) *3			168	0 VA		
Power fa	actor (TYP) *1		0.99 (inpu	t voltage: 100 V),	, 0.97 (input voltag	ge: 200 V)	
Efficien	cy (MIN) *1		· · · · · ·	75 %	(TYP)		
Output I	nold time *3			20 ms	or more		
Output							
Rating	Output voltag	e *4	40 V	80 V	240 V	650 V	
	Output currer	nt *4	120 A	60 A	15.0 A	5.55 A	
	Output power		1200 W				
Voltage	Maximum settal	ble voltage *5	42 V	84 V	252 V	682.5 V	
	Setting accur	± (0.05 % of set +0.05 % of rating)					
	Resolution		200 mV	400 mV	1000 mV	2500 mV	
	Using FIN	E, OUT OFF	10 mV	10 mV	100 mV	100 mV	
		E, OUT ON	1 mV	1 mV	10 mV	10 mV	
	When usin communic	ig a ation interface	0.1 mV	0.1 mV	0.1 mV	0.1 mV	
	Line regulation	n *6	±6 mV	±10 mV	±26 mV	±67 mV	
	Load regulati	on *7	±6 mV	±10 mV	±26 mV	±67 mV	
	Transient res	ponse *8	1 ms or less	2 ms or less	2 ms or less	3 ms or less	
	Ripple noise	p-p *10	50 mV	50 mV	100 mV	300 mV	
	*9	rms *11	5 mV	5 mV	20 mV	50 mV	
	Rise time	At full load	50 ms	or less	100 ms	or less	
		No load	50 ms	or less	100 ms	or less	
	Fall time *12	At full load	50 ms	or less	150 ms	250 ms	
		No load	500 ms	or less	1200 ms	2000 ms	
	Maximum remote pensation voltag		1.5 V	4 V	5 V	5 V	
	Temperature c	pefficient *12		100 p	pm/°C		

At the rated output power for the rated output current.

Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms). *2

100 Vac, at the rated output power

PWR-01 Series 2000 W Type Specifications

Item/Mo				PWR2001L	PWR2001ML	PWR2001MH	PWR2001H
AC input	uei			TWIC200TE	T WIC200 TIME	1 WI(2001WII)	1 11(200111
Nominal	innut rat	ina		100 Vac to 240 Vac, 50 Hz to 60 Hz, single phase			
Input volt	<u> </u>	<u> </u>		100 140		265 Vac	e phase
Input free	<u> </u>	<u> </u>				o 63 Hz	
Current (unge	100 Vac		-	0 A	
ourion (••••		200 Vac		-	0 A	
Inrush cu	rrent (M	AX)	200 100			or less	
Power (N	· · · ·	,			-	0 VA	
Power fa		P) *1		0.99 (inpu	t voltage: 100 V)	, 0.97 (input volta	ge: 200 V)
Efficience	<u>``</u>	,				%	3
Output he					20 ms (or more	
Output							
Rating	Output	volta	ge *3	40 V	80 V	240 V	650 V
Ŭ	Output	curre	ent *3	200 A	100 A	25.0 A	9.25 A
	Output power		2000 W				
Voltage	Maximur	m setta	able voltage *4	42 V	84 V	252 V	682.5 V
	Setting accuracy ± (0.05 % of set +0.05 % of rating))		
	Resolu	tion		200 mV	400 mV	1000 mV	2500 mV
	[Using F	INE, OUT OFF	10 mV	10 mV	100 mV	100 mV
	[Using F	INE, OUT ON	1 mV	1 mV	10 mV	10 mV
		When u commu	sing a nication interface	0.1 mV	0.1 mV	0.1 mV	0.1 mV
	Line re	gulati	ion *5	±6 mV	±10 mV	±26 mV	±67 mV
	Load re	egula	tion *6	±6 mV	±10 mV	±26 mV	±67 mV
	Transie	ent re	sponse *7	1 ms or less	2 ms or less	2 ms or less	3 ms or less
	Ripple		p-p *9	50 mV	70 mV	120 mV	350 mV
	noise *	8	rms *10	5 mV	5 mV	20 mV	50 mV
	Rise tir	ne	At full load	50 ms	or less	100 ms	or less
			No load	50 ms	or less	100 ms	or less
	Fall tim	ie	At full load	50 ms	or less	150 ms or less	250 ms or less
	*11		No load	500 ms	or less	1200 ms or less	2000 ms or less
			te sensing com- ge (single line)	1.5 V	4 V	5 V	5 V
	Tempera	ature o	coefficient *12		100 p	pm/°C	

Item/Model				PWR1201L	PWR1201ML	PWR1201MH	PWR1201H
Output							
Current	Maxir	mum settal	ole current *5	126 A	63 A	15.75 A	5.8275 A
	Setti	ng accur	acy *14		± (0.5 % of set -	+0.1 % of rating)	
	Reso	olution		600 mA	300 mA	60 mA	30 mA
		Using FINE	E, OUT OFF	100 mA	10 mA	10 mA	1 mA
		Using FINE	E, OUT ON	10 mA	1 mA	1 mA	0.1 mA
		When usin communic	g a ation interface	0.1 mA	0.1 mA	0.1 mA	0.1 mA
	Line	regulatio	n	±14 mA	±8 mA	±3.5 mA	±2.6 mA
	Load	l regulation	on	±29 mA	±17 mA	±8.0 mA	±6.1 mA
	Ripple	e noise*15	rms *11	240 mA	120 mA	36 mA	18 mA
	Rise t	ime (TYP)	At full load	50 ms		100 ms	
	Fall ti	me (TYP)	At full load	50 ms 100		ms	
	Temp	perature co	pefficient *13	100 ppm/°C			
Maximum	interna	l resistance	that can be set	0.333 Ω	1.333 Ω	12.00 Ω	87.84 Ω
Display	functi	on					
Voltage		Maximur	m display	99	.99	99	9.9
display		Display a	accuracy		± (0.2 % of rea	ading + 5 digit)	
Current		Maximur	m display	999.9	99	.99	9.999
display	Display accuracy		± (0.5 % of reading + 8 digit)				
Power					The PWR DSPL	LED lights in red.	
display		Maximur	m display		99	99	
		Display a	accuracy		e result of multipl is toggled with th		

*4. The maximum output voltage and maximum output current are limited by the maximum output power *5. Can be limited to approximately 95 % of the OVP trip point or OCP trip point.

*6 85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load

*7 The amount of change that occurs when the load is changed from no load to full load (rated output power/rated output voltage) with rated output voltage. The value is measured at the sensing point.

*8 The amount of time required for the output voltage to return to a value within "rated output voltage \pm (0.1 % +10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage.

*9. Measured using an RC-9131C probe that conforms to the JEITA specifications. At the rated output current.

*10. When the measurement frequency bandwidth is 10 Hz to 20 MHz.

*11. When the measurement frequency bandwidth is 10 Hz to 1 MHz.

*12. When the bleeder circuit is set to bleeder normal

*13. When the ambient temperature is within 0°C and 50 °C *14. Applies to the range of 1 % to 100 % of the rated current. TYP (0.1 % of rating) for 0 % to 1 %.

*15. When the output voltage is 10 % to 100 % of the rating. At the rated output current.

Item/Model				PWR2001L	PWR2001ML	PWR2001MH	PWR2001H
Output							
Current	Maximum	settal	ole current *4	210 A	105 A	26.25 A	9.7125 A
	Setting a	ccur	acy *13		± (0.5 % of set -	+0.1 % of rating)	
	Resolutio	on		1000 mA	500 mA	100 mA	50 mA
	Usin	ng FIN	E, OUT OFF	100 mA	100 mA	10 mA	10 mA
	Usin	ng FIN	E, OUT ON	10 mA	10 mA	1 mA	1 mA
		n usin munic	g a ation interface	0.1 mA	0.1 mA	0.1 mA	0.1 mA
	Line regu	ulatio	n	±22 mA	±12 mA	±4.5 mA	±2.9 mA
	Load reg	ulatio	on	±45 mA	±25 mA	±10.0 mA	±6.9 mA
	Ripple nois	e*14	rms *10	400 mA	200 mA	60 mA	30 mA
	Rise time (TYP)	At full load	50 ms		100 ms	
	Fall time (T	TYP)	At full load	50 ms		100 ms	
	Temperat	ure co	pefficient *12		100 p	pm/°C	
Maximum	internal resis	stance	that can be set	0.200 Ω	0.800 Ω	7.200 Ω	52.70 Ω
Display [·]	function						
Voltage	Max	ximu	m display	99	.99	99	9.9
display	Dis	play a	accuracy		± (0.2 % of rea	ading + 5 digit)	
Current	Max	ximu	m display	99	9.9	99.	99
display	Display accuracy		accuracy	± (0.5 % of reading + 8 digit)			
Power					The PWR DSPL	LED lights in red.	
display	Max	ximu	m display	9999			
	Dis	Display accuracy		Displays the result of multiplying the current and voltage. The display is toggled with the voltage or current display.			

*4. Can be limited to approximately 95 % of the OVP trip point or OCP trip point.

85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load

The amount of change that occurs when the load is changed from no load to full load (rated output *6. power/rated output voltage) with rated output voltage. The value is measured at the sensing point. The amount of time required for the output voltage to return to a value within "rated output voltage

± (0.1 % +10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage

Measured using an RC-9131C probe that conforms to the JEITA specifications. At the rated output current.

When the measurement frequency bandwidth is 10 Hz to 20 MHz.

*10. When the measurement frequency bandwidth is 10 Hz to 1 MHz. *11. When the bleeder circuit is set to bleeder normal.

*12. When the ambient temperature is within 0°C and 50 °C

*13. Applies to the range of 1 % to 100 % of the rated current. TYP (0.1 % of rating) for 0 % to 1 %.

*14. When the output voltage is 10 % to 100 % of the rating. At the rated output current.

At the rated output power for the rated output current.

*2 100 Vac, at the rated output power

*3 The maximum output voltage and maximum output current are limited by the maximum output power.

PWR-01 Series Specifications

Item/Mod	del	Common
Protection	n functions	
Overvolta	age protection (OVP)	Turns the output off *1, displays OVP, and lights ALM
	Setting range	10 % to 112 % of the rated output voltage
	Setting accuracy	± (1.5 % of rating)
Overcurre	ent protection (OCP) *2	Turns the output off *1, displays OCP, and lights ALM
	Setting range	10 % to 112 % of the rated output current
	Setting accuracy	± (3 % of rating)
	nel output terminal ent protection (FOCP) *3	Turns the output off *1, displays FOCP, and lights ALM
	Value (fixed)	11 A (TYP)
Undervol	tage limit (UVL)	Cannot be set to a value less than or equal to the set voltage
	Setting range	0 % to 105 % of the rated output voltage
Overheat	protection (OHP)	Turns the output off, displays OHP, and lights ALM
	sensing connection n (SENSE)	Turns the output off, displays SENS, and lights ALM
Low AC in (AC-FAIL	nput protection .)	Turns the output off,*4 displays AC, and lights ALM
Shutdown	n (SD)	Turns the output off *1, displays SD, and lights ALM
Power lin	nit (POWER LIMIT)	ALM blinking
	Value (fixed)	Approx. 105 % of the rated output power
Commun (watchdo	ication monitoring g)	Turns the output off, displays WDOG, and lights ALM
	ave parallel operation n (PRL ALM)	Turns the output off *1, displays PRL, and lights ALM

*1. Output off or breaker trip on the 2000 W model.

*2. This does not protect against the discharge current peak that is generated from the capacitors inside the PWR-01 output section when the load is changed suddenly.

Available on models with a maximum settable current of 11 A or more. If the OCP value is less than the FOCP value, the OCP value takes precedence. Auto recovery after eliminating the cause of the alarm is selectable. *3

*4.

Item/Mo	del		Common
Signal o	utput ar	nd input	
Monitor	Voltage	e monitor (VMON)	Selectable monitor voltage range: 0 V to 5 V or 0 V to 10 V
signal		Setting accuracy	2.5 % of f.s. *5
output	Curren	t monitor (IMON)	Selectable monitor voltage range: 0 V to 5 V or 0 V to 10 V
		Setting accuracy	2.5 % of f.s. *5
Status	OUTO	N STATUS	On when output is on.
signal	CV ST.	ATUS	Turns on during CV operation
output	CC ST	ATUS	Turns on during CC operation
*6	ALARI	M STATUS	Turns on when an alarm has been activated
	POWE	R ON STATUS	Turns on when the power is turned on
Trigger	Input (TRG IN)	Logic selectable: LOW (0 V to 1.5 V), HIGH (3.5 V to 5 V)
signal	al		Input impedance: 10 kΩ (TYP)
	Output	(TRG OUT)	Logic selectable: LOW (0 V to 0.6 V), HIGH (4.2 V to 5 V)
			Pulse width: 100 µs (TYP)

*5. f.s. is the full scale at the selected range. It is 10 V for the 10 V range and 5 V for the 5 V range.

Photocoupler open collector output; *6

maximum voltage 30 V, maximum current (sink) 8 mA; isolated from the output and control circuits; status commons are floating (withstand voltage of less than or equal to 60 V); and status signals are not mutually isolated.

Item/Mo	del		Common				
Control 1	function						
External	Output voltage control		0 % to 100 % of the rated output voltage				
control	(VPGN	1)	Selectable control voltage range: 0 V to 5 V or 0 V to 10 V				
	Accuracy		5 % of rating				
	Output current control (IPGM)		0 % to 100 % of the rated output current				
			Selectable control voltage range: 0 V to 5 V or 0 V to 10 V				
		Accuracy	5 % of rating				
	Output	on/ off control	Logic selectable:				
		JT ON/OFF	Output on when set to LOW (0 V to 0.5 V) or shorted; output				
	CONT		off when set to HIGH (4.5 V or 5 V) or open				
			Output on when set to HIGH (4.5 V to 5 V) or open; output off when set to LOW (0 V or 0.5 V) or shorted				
		shutdown control DOWN	Output on when set to LOW (0 V to 0.5 V) or shorted				
	Alarm (CLR	clear control ALM	Alarm cleared when set to LOW (0 V to 0.5 V) or shorted				

Item/Mo	del	400 W model	800 W model	1200 W model	2000 W model		
Other fur	nctions						
Output-o	n/ off delay	Setting range: 0.0 s, 0.5 s to 99.9 s *7 setting resolution: 0.1 s					
Soft start	and soft stop	Setting range: 0.0 s, 0.5 s to 10.0 s *7 setting resolution: 0.1 s					
Overcurr activation	ent protection (OCP) n delay	Setting range: 0.0 s to 2.0 s *7 setting resolution: 0.1 s					
Preset m	emory	Up to three sets of the following settings can be saved: the set voltage, the set current, the set OVP, the set OCP, and the set UVL.					
Key lock		Locks the opera	ation of all keys	other than the O	UTPUT key.		
CONFIG	shortcut	Up to three CO SC2, and SC3		rs can be registe	ered to the SC1,		
Sequenc	e	Number of programs: 1					
		Number of step	s: 64				
		Repetition cour	nt: 1 to 99998, IN	VFinity			
		Number of configurable interval loops: 16					
		Number of inter	val loops: 2 to 9	9998			
		Step time: 0.1 s	to 100 h				
		(common to ste	p transition and	ramp transition)			
Synchror	nized Operation			current settings in a sequence p			
Master-sl *8	lave parallel operation	Up to three units including the ma		Up to two units including the m			
Series op	peration *9	Two units (the s	ame model)				
Multi- channel	Connection bet-ween the master unit and PC	LAN, USB, RS2	232C				
(VMCB)	Connection with slave units	LAN					

*7. Factory default is 0.0 s.

*8. Current difference between the master and slaves is 5 % (TYP).

*9. H type is excluded

Item/Model	Common
Operation display	
OUTPUT ON/ OFF	OUTPUT LED lights green when the output is on.
Output-on/ off delay	"DLY" lights when it is set and blinks when it is in effect.
	OUTPUT LED blinks orange while output-on delay is in effect.
	OUTPUT LED blinks green while output-off delay is in effect.
Soft start and soft stop	"SS" lights when it is set and blinks when it is in effect.
	OUTPUT LED lights green when soft start is in effect.
	OUTPUT LED blinks green when soft stop is in effect.
CV operation	CV LED lights in green.
CC operation	CC LED lights in red.
Alarm operation	ALM LED lights in red when a protection function has been
	activated.
	ALM LED blinks red when the power limit (POWER LIMIT) is
	activated.
	OUTPUT LED blinks orange when a protection function is
	activated when the output is on.
Preset memory	PRESET A, B, or C LED lights green when a preset memory
	entry is being recalled or saved.
Key lock operation	LOCK LED lights green when the keys are locked.
Remote operation	REMOTE LED lights green during remote control.
LAN operation	LAN LED lights or blinks depending on the status.
	No fault status: Lights green.
	Fault status: Lights red.
	Standby status: Lights orange.
	WEB identify status: Blinks green.
Bleeder circuit	"HB" lights when the hyper bleeder is set.
Variable internal resistance (VIR)	"VIR" lights when it is set.
Sequence	"SEQ" lights when a sequence is being executed and blinks the PWR-01 is waiting for a trigger.
	3

ant or 1 V whichover is higher

PWR-01 Series Specifications

Item/Model		Common
Interface		
Common	Software protocol	IEEE Std 488.2-1992
specifications	Command language	Complies with SCPI Specification 1999.0
RS232C	Hardware	Complies with the EIA232D specifications (excluding the connector)
		RJ-45 connector (male) *10
		Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
		Data length: 8 bits, Stop bits: 1 bit, Parity bit: None
		No flow control
	Program message terminator	LF during reception, CR/LF during transmission
USB	Hardware	Complies with the USB 2.0 specifications; data rate: 480 Mbps (HighSpeed)
		Socket B type
	Program message terminator	LF or EOM during reception, LF + EOM during transmission
	Device class	Complies with the USBTMC-USB488 device class specifications
LAN	Hardware	IEEE 802.3 100Base-TX/10Base-T Ethernet
		Complies with LXI Specification2011 Ver.1.4, Complies with LXI HiSLIP Extended Function Rev.1.01
		IPv4, RJ-45 connector *11
	Communication protocol	VXI-11, SCPI-RAW, HISLIP
	Program message terminator	VXI-11, HiSLIP: LF or END during reception, LF + END during transmission SCPI-RAW: LF during reception, LF during transmission.

*10. The RD-8P/9P adapter cable is an option.

*11. Category 5; use a straight cable

Item/Model		400 W model	800 W model	1200 W model	2000 W model				
General									
Weight (main unit	only)	Approx. 3 kg (6.61 lb)	Approx. 5.5 kg (12.13 lb)	Approx. 7.5 kg (16.53 lb)	Approx. 13 kg (28.66 lb)				
Dimensions		See the outline drawing.							
Environmental	Operating environment	Indoor use, overvoltage category	/ 11						
conditions	Operating temperature	0 °C to +50 °C (32 °F to +122 °F)							
	Operating humidity	20 %rh to 85 %rh (no condensati	on)						
	Storage temperature	-25 °C to +60 °C (-13 °F to 140 °F	F)						
	Storage humidity	90 %rh or less (no condensation))						
	Altitude	Up to 2000 m							
Cooling method		Forced air cooling using fan							
Grounding polarity		Negative grounding or positive grounding possible							
Isolation voltage		L/ML/MH type: ±500 Vmax, H type: ±800 Vmax							
Withstanding	Across the primary circuit and chassis	No abnormalities when 1500 Vac is applied for 1 minute							
voltage	Across the primary and secondary	L/ ML/ MH type: No abnormalities when 1650 Vac is applied for 1 minute							
	circuits	H type: No abnormalities when 1900 Vac is applied for 1 minute							
	Across the secondary circuit and	L/ ML/ MH type: No abnormalities when 2300 Vdc is applied for 1 minute							
	chassis	H type: No abnormalities when 2640 Vdc is applied for 1 minute							
nsulation	Across the primary circuit and chassis	100 MΩ or more (70 % or less) at 500 Vdc							
resistance	Across the primary and secondary	LL/ ML/ MH type: 100 MΩ or more (70 % or less) at 500 Vdc							
	circuits	H type: 100 MΩ or more (70 % or less) at 1000 Vdc							
	Across the secondary circuit and	L/ ML/ MH type: 40 MΩ or more (70 % or less) at 500 Vdc							
	chassis	H type: 40 M Ω or more (70 % or I	ess) at 1000 Vdc						
Electromagnetic c	ompatibility (EMC) *12 *13			ndards. EMC Directive 2014/30/E	U				
		EN61326-1 (Class A *14), EN 55		N 61000-3-2, EN 61000-3-3					
		Applicable under the following co The maximum length of all cablin		oduct must be less than 3 m					
Safety *12		Complies with the requirements of	0 0 1						
Salety 12		Low Voltage Directive 2014/35/E							

*12. Does not apply to specially ordered or modified products.

*13. Limited to products that have a CE mark. Does not apply unless a core is attached to the J1 connector cable.

*14. This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts

*15. This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose.

*16. This is a Class I instrument. Be sure to ground this product's protective conductor terminal. The safety of this product is guaranteed only when the product is properly grounded.

*17. Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

Unless specified otherwise, the specifications are for the following settings and conditions.

· Loads are pure resistive loads.

- The product is warmed up for at least 30 minutes (with current flowing).
 After warm-up, the product must be calibrated correctly in a 23 °C ± 5 °C environment according to the appropriate calibration procedure.
- Values indicated by "TYP" are typical values. They are not guaranteed performance values.
- Values indicated by "rating" are ratings.
 Values indicated by "reading" are readings.

· Values indicated by "f.s." are full scale values

• The PWR-01 operates over a wide range of output voltage and output current within rated output power. However, the current that can be output with rated output voltage and the voltage that can be output with rated output current are limited by the rated output power.

- The current that can be output with rated output voltage and the voltage that can be output with rated output current are as follows
- Maximum output current with rated output voltage = Rated output power/ rated output voltage. Maximum output voltage with rated output current = Rated output power/ rated output current.

• Rated load and no load are defined as follows:

In constant-voltage mode (when the output current is set to a value greater than or equal to the maximum output current with rated output voltage)

Rated load: Refers to a resistive load that, when the rated output voltage is applied, makes the flowing current 95 % to 100 % of the maximum output current with rated output voltage

Refers to a load through which no output current flows. In other words, refers to an open load (no load being connected). No load:

In constant-current mode (when the output voltage is set to a value greater than or equal to the maximum output voltage with rated output current) Rated load: Refers to a resistive load that, when the rated output current flows, makes the voltage drop to 95 % to 100 % of the maximum output voltage with rated output current.

Including the voltage drop in the load cables, the PWR-01 output voltage must not exceed the maximum output voltage with rated output current. No load

DC POWER SUPPLY

Wide Range DC Power Supply (CV/CC) * While Supplies Last



Dimensions / Weight

Type II : 214(8.43")W \times 124(4.88")H \times 400(15.75")Dmm / 8kg(17.64 lbs.) Type III : 428.5(16.87")W \times 128(5.04")H \times 400(15.75")Dmm / 15kg(33.07 lbs.)

Accessories

Operation manual, TP-BUS connector, Output terminal screws (M4, M8), Output protection cover

Type II : 3 m power supply cable with 3-pin plug

Type III: 3 m power supply cable with no plug, Cable clamp

Functions

Seamless five times variable voltage/current range (Note: For H type, 3.25-time variable voltage/current range)

A single PWR Series power supply supports an extensive operation range, covering an output range equivalent to what is provided by several conventional single range DC power supplies. Also, the maximum output powers of the power supplies of this series are 800 W and 1600 W - slightly higher than those of their predecessors. You can conduct tests without worrying about power limits.

Best for testing a wide variety of high-voltage devices including margin tests

The maximum output voltage of L type is 80 V. For example, 150 % of 42 V (63 V) can be supplied for testing vehicular electrical components, or 150 % of 48 V (72 V) can be supplied for testing communication equipment. In addition, the M type (320 V) is suitable for checking designs of energy-saving circuits for flat display panels and the development of new materials, while the H type (650 V) can be used to test various components and devices that use high voltages such as automotive devices, photovoltaic inverters, and many more.

Two extended operation areas where up to 160 % of the output current rating can be output (L type only)

In the extended operation areas, the power supply can output up to 160 % of the output current rating. This feature is convenient when testing an automobile motor or other load device that requires high current at startup time. Since the power supply can output continuous current up to 120 % of the output current rating with the restricted ambient temperature range and current up to 160 % of the output current rating with the restricted output time tests can be conducted with a power capacity one rank lower. This feature also helps you cut equipment costs and save floor space.

Three types of wide-range power supplies covering 80 V to 650 V

The PWR Series offers constant voltage (CV)/constant current (CC) automatic crossover DC power supplies that enable you to combine a wide range of voltages and currents within the output power rating. For example, the model that has an output power rating of 1600 W (PWR1600L) provides a seamless operation range from 80 V to 20 A to 16 V to 100 A. With a single PWR Series power supply alone, you can cover an extensive output range equivalent to what is provided by three to six conventional single range DC power supplies. L type can output up to 160 % of the output current rating (in the continuous and intermittent extended operation areas).

PWR1600L supports a maximum output of 10 V to 160 A.

Features

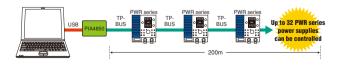
- Supports a digital communication function (TP-BUS) as standard.
- Analog external control functions are available, providing voltage and resistance-based output voltage and current controls.
- Comes standard with the remote monitoring function. External analog monitoring can be done with respect to the output voltage, output current, and operation mode.
- A built-in power factor correction circuit (with power factor 0.98) for harmonic current suppression, as well as a highly efficient switching circuit (efficiency 70 %).
- A four-digit display can display the voltage, current, and power (W).
- Front-side output terminals (up to 30 A) for desktop use.
- A universal AC input supports a range of voltages from 100 V to 240 V.

Parallel or serial operation

Parallel operation enables multiple power supplies of the same model to operate in parallel, offering a large capacity of up to 8 kW (when five 1600-watt models are connected in parallel). In a serial operation, the voltage can be increased up to 160 V.

- (Note: Parallel and serial operations cannot be done at the same time. • Serial operations are not possible for the M and H types.)
- Up to 32 PWR Series power supplies can be controlled with one GPIB address

The PWR Series supports a digital communication function (TP-BUS) as its standard feature. When used with a power supply controller (PIA4850*) to be purchased separately, the function enables up to 32 PWR Series power supplies to be controlled using USB interface. In addition, the sequence generation software (Wavy for PAS & PWR), also to be purchased separately, allows even those users who have no knowledge of any programming language to exert output control over the PWR Series power supplies with sequence patterns of their choice and to read resultant data through the use of a PC. *Not CE certified product

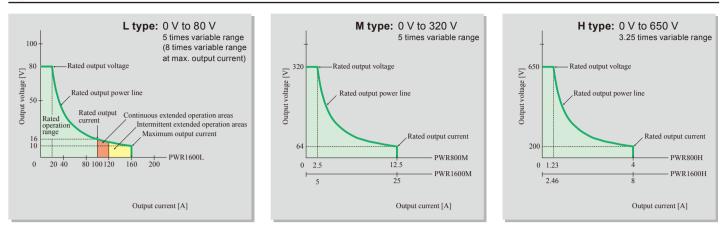


[NOTICE]

Because a noise filter is used for the primary input for the PWR Series, the leakage breaker, etc. may be activated, depending on the environment of the input power, when using multiple quantities of them at the same time. Therefore, we provide models for customers who are planning to use multiple devices at the same time. If

DC POWER SUPPLY





Options

Accessory kit **OP01-PAS** (used for the connection of J1 connector

on the rear panel when operating by external control) • Connector, Semi-cover, Pin 10 pcs. Ground cable



Carrying handle (for 400 W model) CH01-PWR

Sequence creation software Wavy for PAS & PWR

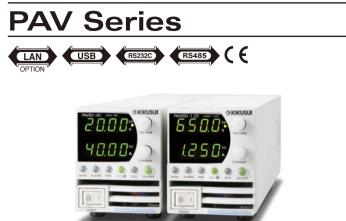
PWR Series Specifications

			Output		Constant voltage (CV) characteristics				Constant of	current (CC) cl	naracteristics	Power input/Miscellaneous		
ı	Model	CV	СС	Rated power	Ripple	Line regulation	Load regulation	Transient response	Ripple	Line regulation	Load regulation	Input current	Inrush current	Weight
		V	А	w	mVrms	0.05 % + mV	0.05 % + mV	ms	mArms	0.1 % + mA	0.1 % + mA	AC (100/200 V) A	Apeak (Max)	kg/lb (approx.)
L type	PWR1600L	0 to 80	0 to 100 MAX 160*	1600	20	3	5	2	160	10	10	26.0/13.0	140	15/33.07
Mauna	PWR800M	0 to 320	0 to 12.5	800	20	3	5	8	35	10	10	12.5/6.25	70	817.64
M type	PWR1600M	0 10 320	0 to 25	1600	25	3	5	12	50	10	10	25.0/12.5	140	15/33.07
11 Aurona	PWR800H	0.40.650	0 to 4	800	30	3	5	7	20	10	10	12.0/6.0	70	8/17.64
H type	PWR1600H	0 to 650	0 to 8	1600	40	3	5	8	40	10	10	24.0/12.0	140	15/33.07

*The L type offers extended operation areas equivalent to up to 160 % of the output current rating. Some of the specifications may not be satisfied in the extended operation areas. •Continuous extended operation area (up to 120 % of the output current rating): Continuous current output is enabled. However, derating occurs at an ambient temperature 30 °C or higher. Intermittent extended operation area (120 % of the output current rating): Continuous current output is enabled for 10 minutes or less. However, a nonoperating period more than twice the output period must be taken.

 Power factor Efficiency Temperature coefficient Measuring meters Voltmeter		ype), 999.9 (M and H types)	conditions Cooling system Ground polarity	 Operating ambient temperature range: 0 °C to + 50 °C Derating occurs on output current at 45 °C or higher for the L type and 40 °C or higher for the M/H types. Operating ambient humidity range: 20 % to 85 %rh (non-condensing) Storage temperature range: -25 °C to +70 °C Storage humidity range: 90 %rh or less (non-condensing) Forced air cooling (thermal control: Fan control function attached) Four of was for the L and M types
(23 °C ±5 °C)	Maximum output current	Maximum display digits		±1000 Vmax for the H type
	Models supporting 10 A or less	9.999		Complies with the requirements of the following directives and standards.
	Models supporting 10 to less than 100 A	99.99	compatibility	EMC Directive 2014/30/EU EN61326-1: Class A, EN55011: Class A, Group 1
	Models supporting 100 A or greater	999.9		Immunity: Minimum immunity test requirements
Protection function.	Display error: ±(0.5 % of rdg* + 5 digits) * • Over voltage protection (OVP): Setting range (10 % to 110 % of the rat Over current protection (OCP): Setting range: (10 % to 110 % of the rat	ted output voltage)	■ Safety	EN61000-3-2, EN61000-3-3 *Not applicable to custom-made modified products. *Only those models with CE marking provided on their panel. Complies with the requirements of the following directives and standards. Low Voltage Directive 2014/35/EU
	for the M and H types		D imensions	EN61010-1: Class I, Pollution Degree 2
	Setting range: (10 % to 176 % of the ra for the L type Over power protection (OPP): Approx. 110 % of the rated output pow Over heat protection (OHP): Operates due to an internal temperatu	er or greater	■ Dimensions	800-watt type: 214(8.43") W × 124(4.88") (155(6.1")) H × 400(15.75") (470(18.5")) D 1600-watt type: 428.5(16.87") (450(17.72")) W × 128(5.04") (150(5.91")) H × 400(15.75") (470(18.5")) D *Enclosed in parentheses are maximum dimensions.
	Power limit (POWER LIMIT):		Accessories	● Instruction manual
 Serial operation Digital control 	Power limit imposed at approx. 105 % Up to 5 units including master (of same m Up to 2 units including master (of same m TP-BUS (directly controllable from PIA48 VMON (at rated voltage output), IMON (at maximum current output): 10 00	nodel) nodel, for the L type only) 310/PIA4830)	(mm(inch)) (maximum)	 Power cord (800-watt type: Approx. 3 m in length, with a plug 1600-watt type: 3 m in length, without a plug) Rear side output terminal protection cover TP-BUS connector I.I dummy connector

Compact Variable Switching Regulated DC Power Supply



Dimensions

 $70(2.76'')W \times 83(3.27'')H \times 350(13.78'')Dmm(inch)$

Accessories

Setup Guide, Quick Reference (1 English copy, 1 Japanese copy), Safety Information, Power cord, RS485 link cable, CD-ROM. Models whose rated output voltage is 10 V to 100 V : Bus bar screw set, Bus bar cover (top and bottom), PT screws, J1, J2, and J3 connector cover, Connector housing 12P, Connector housing 8P, Connector housing 4P, Contact pins. Models whose rated output voltage is 160 V to 650 V : Output terminal plug 4P, Output terminal cover (top and bottom), PT screws, Connector housing 12P, Connector housing 8P, Connector housing 5P, Contact pins.

Functions

USB/RS232C/RS485 Control

The PAV series employs USB/RS232C/RS485 interfaces as a standard. Up to 31 PAV series power supplies can be connected and controlled. The USB/RS232C/RS485 interfaces are integrated in the PAV series main body.



Control using serial communication (USB/RS232/RS485) The following items can be controlled through the serial ports.

- Output voltage setting
- · Output current setting
- · Output voltage measurement
- · Output current measurement
- · Output on/off
- · Foldback protection setting
- Overvoltage protection (OVP) setting and readout
- · Undervoltage protection (UVP) setting and readout
- · Undervoltage limit (UVL) setting and readout
- Start mode setting (auto or safe)

Control and monitoring using analog signals

The output voltage and current can be controlled by applying analog voltage or external resistance through the external control terminal on the rear panel. In addition, the output voltage and current can be monitored by monitoring the terminal voltage.

Further, the output on/off state can be controlled, and the operating status and constant voltage/constant current (CV/CC) operation mode can

High power density up to 800 W in palm-sized power supply with high performance switching system.

The PAV series is a compact, high power density, high performance constant voltage (CV) / constant current (CC) variable switching power supply. The PAV consists of 64 models total^{*1} with 4 types of maximum power outputs at 200 W, 400 W, 600 W and 800 W and output voltages from 10 V through 650 V. All models are standardized to the same size with 2U height (approximately 88 mm) and have high power density for bench-top use. The PAV series allows sequence settings with an embedded CPU as well as analog control. Parallel operation (up to 6 units)*2 and synchronized operation features are employed to allow extended output current. The PAV series is equipped standard with USB, RS232C and RS485*3 as communication interfaces which are essential for system upgrades. LAN*4 interface is also available as an option. A harmonic current control circuit is embedded with a power factor of 0.99 to take power environment into account.

*1 LAN model included (with LAN) *2 The PAV series with the same rating

*3 An RS232C to RS485 conversion cable (sold separately) is required. *4 Factory option

Features

- 2U bench-top type
- Palm-sized, portable power supply
- Output power: 200 W / 400 W / 600 W / 800 W 4 models
- Output voltage: 10 V to 650 V 8 models
- USB/RS232C/RS485 as standard interface *LAN is a factory option
- 64 models total (LAN model included)

Options

Sequence creation software SD024-PAV (Wavy for PAV)

Parallel operation/Synchronized operation

Parallel operation (PAV series with the same rating) and synchronized operation (trigger synchronization) are available. Use of optional rack-mount adapter KRA2-PAV (allows up to 6 units) and half-size integrated chassis cover CC01- PAV (allows up to 3 units) allows integration for smart rack mounting and transportation.

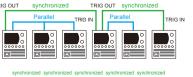
* Parallel operation and synchronized operation can be achieved without the optional KRA2-PAV and CC01-PAV



(e.g. 6 units are mounted) *Vacant slot without a power supply allows the

mounting of an optional blank panel (KBP2-6-PAV).

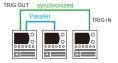






CC01-PAV (e.g. 3 units are mounted)



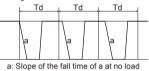




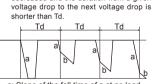
PAV Series 200 W Type Specifications

Item/Model										
Item/wouer		PAV10-20	PAV20-10	PAV36-6	PAV60-3.5	PAV100-2	PAV160-1.3	PAV320-0.65	PAV650-0.3	
Output										
Rated output voltage	e *1	10 V	20 V	36 V	60 V	100 V	160 V	320 V	650 V	
Rated output current	t *2	20 A	10 A	6 A	3.5 A	2 A	1.3 A	0.65 A	0.32 A	
Rated output power		200 W	200 W	216 W	210 W	200 W	208 W	208 W	208 W	
AC input				<u> </u>						
Nominal input rating			100 \	Vac to 240 Vac	continuous in	put, 50 Hz to	60 Hz, single p	ohase		
Input voltage range					85 Vac to	265 Vac				
Input frequency range		47 Hz to 63 Hz								
	(100 Vac/200 Vac)	2.65 A/1.31 A	2.62 A/1.29 A	2.76 A/1.37 A	2.69 A/1.33A	2.55 A/1.26 A		2.64 A/1.30 A		
Power factor (typ) (1					0.99/	0.98				
the rated output pow	/er)	700/ / 77 50/	770/ / 700/	700/ / 00 50/	79% / 80.5%	700/ / 040/	1	700/ / 040/		
Efficiency (typ) *3	(ac /200) (ac) *4	76% / 77.5%	77% / 79%	5 A / 30 A or le		79% / 81%		79% / 81%		
Inrush current (100) Constant voltage mo	· ·	<u> </u>	10	SA7 SUA UNE	55		2:	5 A / 25 A UI IE	55	
Maximum line regula										
(for the rated output										
Maximum load regul				0.01% + 2 mV				0.01%		
(for the rated output										
Dipplo poico *7	20 MHz, p-p	50 mV	50 mV	50 mV	50 mV	80 mV	100 mV	150 mV	250 mV	
Ripple noise *7	5 Hz to 1 MHz, rms	5 mV	6 mV	6 mV	7 mV	8 mV	10 mV	25 mV	60 mV	
Temperature coeffic	ient		30 PP	M /°C (after a	30 minute war	m-up, for the	rated output v	oltage)		
Aging drift *8 (for the	e rated output voltage)				0.0	2%				
Initial drift *9 (for the	rated output voltage)			0.05% + 2 mV				0.05%		
	ensing compensation	1 V	1 V	2 V	3 V	5 V		5 V		
	positive or negative))									
Rise time *10		15 ms	30 ms	30 ms	50 ms	50 ms	110 ms	170 ms	170 ms	
	At full load *10	12 ms	25 ms	30 ms	40 ms	50 ms	180 ms	270 ms	270 ms	
Fall time	Td (typ) *11	210 ms	250 ms	320 ms	380 ms	1200 ms				
an unie	No load a *12	40 ms	65 ms	85 ms	100 ms	250 ms				
	No load b *13	200 ms	200 ms	290 ms	310 ms	1100 ms	2000 ms	2500 ms	3000 ms	
Transient response t	time *14			1 ms or less				2 ms or less		
Output hold time (typ	p) *15	15 ms		16	ms		16 ms	16 ms	15 ms	
Constant current mo	ode									
Maximum line regula	ation *5			0.01% + 2 mA				0.02%		
(at the rated output of				0.01 /0 + 2 IIIA		0.02 /0				
Maximum load regul				0.01% + 5 mA	0.09% 0.15%					
(at the rated output cu										
	to the temperature drift of the rated output current)		0.05%	6 or less (for 30	0 minutes after	the load con	ditions are cha	anged)		
Ripple noise *17 (5 F		25 mA	15 mA	8 mA	4 mA	3 mA	1.2 mA	0.8 mA	0.5 mA	
Temperature coeffici		23114		PM /°C (after a			I		0.0 111A	
	rated output current)		10011		0.0			unenty		
	rated output current)				0.0					
Protection functions					0.1	70				
		Turns off the	output when t	he operation s	witches from c	onstant volta	ne mode to co	nstant current	mode or vi	
Foldback protection		versa. Can be					ge mode to co		mode of vit	
					put voltage from	m being set hi	gher than the	OVP value.		
Overvoltage protecti		Also shuts off	Inverter shutoff system. Prevents the output voltage from being set higher than the OVP value. Also shuts off the output when an output overvoltage (exceeding the OVP value) occurs.							
Overvoltage protection	n voltage setting range	0.5 V to 12 V 1 V to 24 V 2 V to 40 V 5 V to 66 V 5 V to 110 V 5 V to 176 V 5 V to 353 V 5 V to 717 V								
Overvoltage protection voltage setting range			1 V to 24 V	2 V to 40 V	5 V to 66 V	5 V to 110 V $$	5 V to 176 V	5 V to 353 V		
Undervoltage limit (l	0 0 0		1 V to 24 V		5 V to 66 V	5 V to 110 V $$	5 V to 176 V	5 V to 353 V		
<u> </u>	JVL)	Prevents the	1 V to 24 V output voltage	2 V to 40 V	5 V to 66 V et lower than th	5 V to 110 V ne UVL value.	5 V to 176 V Disabled duri	5 V to 353 V		
Undervoltage protec	JVL) ction (UVP)	Prevents the of Shuts off the of	1 V to 24 V output voltage output when t	2 V to 40 V e from being se	5 V to 66 V et lower than th age falls below	5 V to 110 V ne UVL value. the UVP valu	5 V to 176 V Disabled duri le.	5 V to 353 V ng external co	ntrol.	
Undervoltage protection	JVL) ction (UVP)	Prevents the of Shuts off the of Shuts off the of	1 V to 24 V output voltage output when t output before t	2 V to 40 V e from being se the output volta	5 V to 66 V et lower than th age falls below	5 V to 110 V ne UVL value. the UVP valu	5 V to 176 V Disabled duri ie. exceeds the s	5 V to 353 V ng external co safe operation	ntrol. temperature	
Undervoltage protection Overheat protection Setting and readbac	JVL) etion (UVP) k (USB, RS232, RS48	Prevents the of Shuts off the of Shuts off the of	1 V to 24 V output voltage output when t output before t .N interface)	2 V to 40 V e from being se he output volta the temperatur	5 V to 66 V et lower than th age falls below re of the interna	5 V to 110 V ne UVL value. the UVP valu	5 V to 176 V Disabled duri le. s exceeds the s 0.05% of th	5 V to 353 V ng external co safe operation ne output voltage	ntrol. temperatur ge + 0.05%	
Undervoltage protect Overheat protection Setting and readbac Output voltage	JVL) Stion (UVP) k (USB, RS232, RS48 Accuracy	Prevents the of Shuts off the of Shuts off the of	1 V to 24 V output voltage output when t output before t N interface) 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp	5 V to 66 V et lower than th age falls below re of the interna	5 V to 110 V ne UVL value. the UVP valu	5 V to 176 V Disabled duri le. exceeds the s 0.05% of th of the	5 V to 353 V ng external co safe operation ne output voltag rated output v	ntrol. temperaturo ge + 0.05%	
Undervoltage protect Overheat protection Setting and readbac Output voltage	JVL) stion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits	Prevents the of Shuts off the of Shuts off the of	1 V to 24 V output voltage output when t output before t N interface) 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits	5 V to 66 V et lower than th age falls below re of the interna out voltage	5 V to 110 V ne UVL value. the UVP valu al components	5 V to 176 V Disabled duri le. exceeds the s 0.05% of th of the 2 di	5 V to 353 V ng external co safe operation ne output voltage	ntrol. temperaturo ge + 0.05%	
Undervoltage protect Overheat protection Setting and readbac Output voltage	JVL) stion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution	Prevents the of Shuts off the of Shuts off the of 5, optional LA	1 V to 24 V output voltage output when t output before t N interface) 0.05% of 3 di	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro	5 V to 66 V et lower than th age falls below re of the interna ut voltage ox. 1/60000 of f	5 V to 110 V he UVL value. the UVP valu al components	5 V to 176 V Disabled duri le. exceeds the s 0.05% of th of the 2 di oltage	5 V to 353 V ng external co safe operation ne output voltae rated output vo igits	ntrol. temperature ge + 0.05% oltage	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when t putput before I N interface) 0.05% of 3 di	2 V to 40 V e from being se the output volta the temperatur the rated outp igits	5 V to 66 V et lower than th age falls below re of the interna ut voltage ox. 1/60000 of f	5 V to 110 V ne UVL value. the UVP valu al components rated output v current	5 V to 176 V Disabled duri le. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t	5 V to 353 V ng external co safe operation ne output voltag rated output v	ntrol. temperature ge + 0.05% oltage	
Undervoltage protec Overheat protection Setting and readbac Output voltage setting Output current	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits	Prevents the of Shuts off the of Shuts off the of 5, optional LA	1 V to 24 V output voltage output when t putput before I N interface) 0.05% of 3 di	2 V to 40 V e from being se he output volta the temperatur the rated outp igits Appro nt + 0.1% of the	5 V to 66 V et lower than th age falls below re of the interna ut voltage 	5 V to 110 V ne UVL value. the UVP valu al components rated output v current 4 di	5 V to 176 V Disabled duri e. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t	5 V to 353 V ng external co safe operation ne output voltae rated output vo igits	ntrol. temperature ge + 0.05% oltage	
Undervoltage protec Overheat protection Setting and readbac Output voltage setting Output current	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when t putput before I N interface) 0.05% of 3 di	2 V to 40 V e from being se he output volta the temperatur the rated outp igits Appro nt + 0.1% of the	5 V to 66 V et lower than th age falls below re of the interna ut voltage ox. 1/60000 of f	5 V to 110 V ne UVL value. the UVP valu al components rated output v current 4 di	5 V to 176 V Disabled duri le. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits	5 V to 353 V ng external co safe operation he output voltar rated output vo gits he rated output	ntrol. temperatur ge + 0.05% oltage	
Undervoltage protec Overheat protection Setting and readbac Output voltage setting Output current setting	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when ti output before to N interface) 0.05% of 3 di f output curren gits	2 V to 40 V e from being se he output volta the temperatur the rated outp igits Appro nt + 0.1% of the	5 V to 66 V et lower than th age falls below re of the interna- uut voltage ix. 1/60000 of i e rated output o ox. 1/60000 of o	5 V to 110 V ne UVL value. the UVP valu al components rated output v current 4 di	5 V to 176 V Disabled duri e. exceeds the s 0.05% of th 01tage 0.2% of 1 gits urrent 0.05% of th	5 V to 353 V ng external co safe operation ne output volta; rated output vo igits he rated output ne output volta;	ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05%	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage	JVL) stion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when ti output before to N interface) 0.05% of 3 di f output curren gits	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro nt + 0.1% of the Appro the rated outp	5 V to 66 V et lower than th age falls below re of the interna- uut voltage x. 1/60000 of i e rated output of x. 1/60000 of i uut voltage	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th	5 V to 353 V ng external co safe operation he output voltar rated output vo gits he rated output	ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05%	
Undervoltage protec Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage readback	JVL) tition (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when ti output before 1 N interface) 0.05% of 3 di f output currer gits 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro th + 0.1% of the Appro the rated outp Appro	5 V to 66 V et lower than th age falls below re of the interna ut voltage inx. 1/60000 of r e rated output of ox. 1/60000 of r ut voltage int. 1/60000 of r	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the of the	5 V to 353 V ng external co safe operation the output voltag rated output voltag the rated output rated output voltag rated output voltag	ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05%	
Undervoltage protection Setting and readbac Dutput voltage Setting Dutput current Setting Dutput voltage readback Dutput current	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when ti output before 1 N interface) 0.05% of 3 di f output currer gits 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro the rated outp Appro 0.1% of output	5 V to 66 V et lower than th age falls below re of the interna- uut voltage ix. 1/60000 of i e rated output of ox. 1/60000 of i uut voltage ix. 1/60000 of i t current + 0.3%	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output v % of the rated	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the of the of the gits urrent 0.05% of th of the of the gits urrent	5 V to 353 V ng external co safe operation the output voltag rated output voltag the rated output rated output voltag rated output voltag	ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05%	
Undervoltage protectoverheat protection Setting and readbactoverheat protection Setting and readbactoverheat protection Dutput voltage Setting Dutput current setting Dutput voltage eadback Dutput current eadback	JVL) tition (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution	Prevents the o Shuts off the o Shuts off the o 5, optional LA 0.1% of	1 V to 24 V output voltage output when ti output before 1 N interface) 0.05% of 3 di f output currer gits 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro the rated outp Appro 0.1% of output	5 V to 66 V et lower than th age falls below re of the interna ut voltage inx. 1/60000 of r e rated output of ox. 1/60000 of r ut voltage ix. 1/60000 of r	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output v % of the rated	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the of the of the gits urrent 0.05% of th of the of the gits urrent	5 V to 353 V ng external co safe operation the output voltag rated output voltag the rated output rated output voltag rated output voltag	ntrol. temperature ge + 0.05% oltage ut current ge + 0.05%	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage readback Output current readback Front panel	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Prevents the e Shuts off the o Shuts off the o Shuts off the o Shuts off the o Sophies of t	1 V to 24 V output voltage output when ti output before I N interface) 0.05% of 3 di f output currer gits 0.05% of 0.05%	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro the rated outp Appro 0.1% of output	5 V to 66 V et lower than the age falls below re of the interna- but voltage ax. 1/60000 of it e rated output of ax. 1/60000 of it ut voltage ax. 1/60000 of it current + 0.3? ax. 1/60000 of it current + 0.3? and U/L. ● Baudrate, ternal voltage	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output c w% of the rated rated output c age and output Protection fur wn) © Comm address settir e (5 V or 10 V)	5 V to 176 V Disabled duri e. exceeds the s 0.05% of th of the 2 di oltage 0.2% of ti 0.2% of ti 0.05% of th of the oltage output current urrent urrent t current (sett ctions (OVP, t unication func- og or external re	5 V to 353 V ng external co safe operation ee output voltag rated output v igits the rated output v igits the rated output v t t ing resolution JVP, UVL, fold tions: Standar sistance (5 kΩ	ntrol. temperaturu ge + 0.05% oltage ut current ge + 0.05% oltage switchable) back) d equipped	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control function	JVL) tition (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18 Resolution	Prevents the e Shuts off the o Shuts off the o Shuts off the o Shuts off the o Sophies of t	1 V to 24 V output voltage output when ti output before I N interface) 0.05% of 3 di f output currer gits 0.05% of 0.05%	2 V to 40 V e from being se the output volta the temperatur igits Appro nt + 0.1% of the Appro 0.1% of output Appro 0.1% of output Appro 0.1% of setting t titing OVP,UVP, LAN optional. LAN optional.	5 V to 66 V et lower than the age falls below re of the interna- but voltage ax. 1/60000 of it e rated output of ax. 1/60000 of it ut voltage ax. 1/60000 of it current + 0.3° ax. 1/60000 of it curre	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output c w% of the rated rated output c age and outpu Protection fur wn) \oplus Comm address settir (5 V or 10 V) out on/off, fror	5 V to 176 V Disabled duri e. exceeds the s 0.05% of th of the 2 di oltage 0.2% of ti gits urrent 0.05% of th of the oltage output curren urrent urrent urrent st current (sett ctcions (OVP, t unication func- or external rent t panel operar	5 V to 353 V ng external co safe operation ee output voltag rated output v igits the rated output v igits the rated output v t t ing resolution JVP, UVL, fold tions: Standar sistance (5 kΩ	ntrol. temperatur ge + 0.05% oltage it current ge + 0.05% oltage switchable) back) d equipped	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control function Output voltage	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Prevents the e Shuts off the o Shuts off the o Shuts off the o Shuts off the o Sophies of t	1 V to 24 V output voltage output voltage output when ti output before I N interface) 0.05% of 3 di foutput currer gits 0.05% of 0.05% of	2 V to 40 V e from being se the output volta the temperatur igits Appro nt + 0.1% of the Appro 0.1% of output Appro 0.1% of output Appro 0.1% of setting t titing OVP,UVP, LAN optional. LAN optional.	5 V to 66 V et lower than the age falls below re of the interna- but voltage ax. 1/60000 of it e rated output of ax. 1/60000 of it ut voltage ax. 1/60000 of it current + 0.3? ax. 1/60000 of it current + 0.3? and U/L. ● Baudrate, ternal voltage	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output c w% of the rated rated output c age and outpu Protection fur wn) \oplus Comm address settir (5 V or 10 V) out on/off, fror	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the oltage output curren urrent ut current (sett tctions (OVP, I unication func ig or external re t panel operal 1 count	5 V to 353 V ng external co safe operation ee output voltag rated output v igits the rated output v igits the rated output v t t ing resolution JVP, UVL, fold tions: Standar sistance (5 kΩ	ntrol. temperaturu ge + 0.05% oltage ut current ge + 0.05% oltage switchable) back) d equipped	
Undervoltage protection Overheat protection Setting and readbac Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control function Output voltage display	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Prevents the e Shuts off the o Shuts off the o Shuts off the o Shuts off the o Sophies of t	1 V to 24 V output voltage output voltage output when ti output before I N interface) 0.05% of 3 di foutput currer gits 0.05% of 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro the rated outp Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro utput on/off c LAN optional. iration using itor output (5 V 0.5% o igits	5 V to 66 V et lower than the age falls below re of the interna- but voltage ax. 1/60000 of it e rated output of ax. 1/60000 of it ut voltage ax. 1/60000 of it current + 0.3° ax. 1/60000 of it curre	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output v % of the rated rated output c age and output wn)	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the oltage 0.2% of th of the oltage output curren urrent ut current (sett tcurrent (sett tcurrent lest traina (sett) tcurrent lest tcurrent lest tcurent lest tcurrent lest tcurrent lest tcurrent lest tcurrent le	5 V to 353 V ng external co safe operation e output volta; rated output volta; rated output volta; rated output volta; rated output volta; rated output volta; rated output volta; sistance (5 kΩ tion lock	ntrol. temperature ge + 0.05% oltage ut current ge + 0.05% oltage switchable) back) d equipped	
Output voltage setting Output current setting Output voltage readback Output current readback	JVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Prevents the e Shuts off the o Shuts off the o Shuts off the o Shuts off the o Sophies of t	1 V to 24 V output voltage output voltage output when ti output before 1 N interface) 0.05% of 3 di coutput currer gits 0.05% of 0.05% of	2 V to 40 V e from being se the output volta the temperatur the rated outp igits Appro the rated outp Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro utput on/off c LAN optional. iration using itor output (5 V 0.5% o igits	5 V to 66 V et lower than the age falls below re of the interna- nut voltage nx. 1/60000 of ri- e rated output of nx. 1/60000 of ri- nut voltage nx. 1/60000 of ri- t current + 0.3% nx. 1/60000 of ri- t current	5 V to 110 V he UVL value. the UVP valu al components rated output v current 4 di rated output c rated output v % of the rated rated output v % of the rated rated output c age and output Protection fur wn) © Comm address settir 9 (5 V or 10 V) (5 (5 V or 10 V) put voltage ± put current ±	5 V to 176 V Disabled duri re. exceeds the s 0.05% of th of the 2 di oltage 0.2% of t gits urrent 0.05% of th of the oltage 0.2% of th of the oltage output curren urrent ut current (sett tcurrent (sett tcurrent lest traina (sett) tcurrent lest tcurrent lest tcurent lest tcurrent lest tcurrent lest tcurrent lest tcurrent le	5 V to 353 V ng external co safe operation e output volta; rated output volta; rated output volta; rated output volta; rated output volta; rated output volta; rated output volta; sistance (5 kΩ tion lock	ntrol. temperature ge + 0.05% oltage ut current ge + 0.05% oltage switchable) back) d equipped	

- The minimum voltage is 0.1 % of the rated output voltage.
- The minimum current is 0.2 % of the rated output current.
- *3. Input voltage 100 Vac/200 Vac, at the rated output power, ambient temperature 25 °C If the LAN option is built in, the efficiency decreases by 0.5 % and the input current increases by 0.5 %.
- *4. Excludes input surge current (duration 0.2 ms or less) applied to the built-in noise filter section.
- *5. 85 Vac to 132 Vac or 170 Vac to 265 Vac, fixed load
- *6. With the input voltage held constant, the sensing point was measured using remote sensing from no load to full load.
- *7. Models with rated output voltages from 10 V to 100 V were measured using an RC-9131 A 1:1 probe that conforms to the JEITA specifications. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *8. When at least 8 hours has passed after a 30 minute warm-up with the input voltage, load, and ambient temperature held constant
- *9. For 30 minutes after turning on the power with the input voltage, load, and ambient temperature held constant
- *10. Between 10 % and 90 % of the rated resistive load and rated output voltage *11. If the output voltage is repeatedly
- 11. If the output voltage is repeatedly decreased, Td is the minimum duration from a given voltage drop to the next voltage drop.
- *12. Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is longer than Td.



*13.Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given



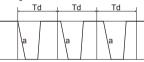
a: Slope of the fall time of a at no load b: Slope of the fall time of b at no load

- *14. The amount of time required for the output voltage to return to a value within 0.5 % of the rated output voltage. The change in the load current is 10 % to 90 % of the rating. The output voltage is between 10 % and 100 % of the rating. During local sensing.
- *15. At the rated output power
- *16. The value when the output voltage is changed from the lower limit to the rated voltage in constant current mode with the input voltage held constant
- *17. For models with a 10 V rated output voltage, this is the value for when the output voltage is 2 V to 10 V at the rated output current. For other models, this is the value for when the output voltage is 10 % to 100 % of the rating at the rated output current. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *18. In output current control, the current, linearity, and monitor accuracies do not include the load variation caused by initial drift and temperature drift of internal components.

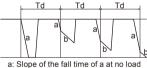
PAV Series 400 W Type Specifications

14		DATE:	BA1/07	DAMAGE 11		DANKE	DALMAS -	DAVIDOC 1	DA1/070 0 -:	
Item/Model Output		PAV10-40	PAV20-20	PAV36-12	PAV60-7	PAV100-4	PAV160-2.6	PAV320-1.3	PAV650-0.64	
Rated output voltag	e *1	10 V	20 V	36 V	60 V	100 V	160 V	320 V	650 V	
Rated output curren		40 A	20 V 20 A	12 A	7 A	4 A	2.6 A	1.3 A	0.64 A	
Rated output power		400 W	400 W	432 W	420 W	400 W	416 W	416 W	416 W	
AC input									-	
Nominal input rating]		100 \	/ac to 240 Va	c continuous ir	put, 50 Hz to	60 Hz, single	phase		
Input voltage range	-				85 Vac to	o 265 Vac		·		
Input frequency ran	ge	47 Hz to 63 Hz								
Input current (typ) *	3 (100 Vac/200 Vac)	5.05 A/2.47 A	4.98 A/2.45 A	5.25 A/2.57 A	5.10 A/2.50 A	4.80 A/2.37 A		5 A / 2.44 A		
Power factor (typ) (1				·	0	99				
the rated output pow	ver)	000/ / 000/	0.001 1.0001	000/ 1050/	1	1	1			
Efficiency (typ) *3 Inrush current (100	Vaa (200) (aa) *4	80% / 82%	81% / 83%	83% / 85% 5 A / 25 A or le	83% / 85%	84% / 88%	2	84% / 86% 5 A / 25 A or le		
Constant voltage m	,		2:	5 A / 25 A 0/ 16	255		Z;	5 A / 25 A 01 le	55	
Maximum line regul										
(for the rated output				0.01% + 2mV	,			0.01%		
Maximum load regu				0.01% + 2111				0.01%		
(for the rated output		50.14	50.14	50.14	50.14		400.14	450.14	050 1/	
Ripple noise *7	20 MHz, p-p	50 mV	50 mV	50 mV	50 mV	80 mV	100 mV	150 mV	250 mV	
T	5 Hz to 1 MHz, rms	5 mV	6 mV	6 mV	7 mV	8 mV	10 mV	25 mV	60 mV	
Temperature coefficient Aging drift *8 (for the rated output voltage)			30 PP	wir C (after a	30 minute wa		rateu output v	uitage)		
				0.05% ± 2		2%		0.05%		
	e rated output voltage) ensing compensation			0.05% + 2 m\						
	(positive or negative))	1 V	1 V	2 V	3 V	5V		5 V		
Rise time *10	<u> </u>	15 ms	30 ms	30 ms	50 ms	50 ms	80 ms	150 ms	150 ms	
	At full load *10	10 ms	10 ms	15 ms	30 ms	50 ms	100 ms	150 ms	150 ms	
Fall time	Td (typ) *11	210 ms	250 ms	320 ms	380 ms	1200 ms				
Fail time	No load a *12	40 ms	65 ms	85 ms	100 ms	250 ms				
	No load b *13	200 ms	200 ms	290 ms	310 ms	1100 ms	2000 ms	2500 ms	3000 ms	
Transient response	time *14			1 ms or less				2 ms or less		
Output hold time (ty	p) *15	15 ms		16	ms		16	ms	15 ms	
Constant current me										
Maximum line regul				0.01% + 2 mA	A			0.02%		
(at the rated output Maximum load regu										
(at the rated output c				0.01% + 5 mA	0.09%					
	to the temperature drift of		0.05%				ditione ere ek.			
	the rated output current)		0.05%	or less (for 3	0 minutes afte	r the load con	ditions are cha	anged)		
Ripple noise *17 (5	Hz to 1 MHz, rms)	70 mA	40 mA	15 mA	8 mA	3 mA	1.5 mA	1 mA	0.6 mA	
Temperature coeffic			100 P	PM /°C (after	a 30 minute wa	arm-up, at the	rated output o	current)		
	rated output current)					15%				
	rated output current)				0.	1%				
Protection functions	5	T	to the section		1 - h					
Foldback protection				e operation swi	tches from con	stant voltage m	lode to constar	nt current mode	or vice versa.	
0	(O) (D)	Can be set as necessary. Inverter shutoff system. Prevents the output voltage from being set higher than the OVP value.								
Overvoltage protect					overvoltage (e					
Overvoltage protection	on voltage setting range	0.5 V to 12 V				1		5 V to 353 V		
Undervoltage limit (UVL)			<u> </u>				ing external co	ontrol.	
Undervoltage prote			-		age falls belov					
Overheat protection				the temperatu	re of the intern	al component	s exceeds the	safe operation	temperature.	
Setting and readbac	ck (USB, RS232, RS48	35, optional LA	N interface)							
	Accuracy		0.05% of	the rated outp	out voltage			ne output volta rated output v		
Output voltage setting	Number of decimal digits		3 d	igits			1	igits	onage	
- 59	Resolution		50	-	ox. 1/60000 of	rated output v				
	Accuracy *18	0.1% 0	f output curre		e rated output			the rated output	ut current	
Output current	Number of decimal digits	0.170 0		igits			1	igits		
setting	Resolution			-	ox. 1/60000 of	rated output o		.9		
			0.05% ef				1	ne output volta	ge + 0.05%	
Output voltage readback	Accuracy		0.05% 01	the rated outp	out voltage		of the	rated output v	oltage	
	Resolution			Appro	ox. 1/60000 of	rated output v	oltage			
Output current	Accuracy *18				t current + 0.3			t		
readback	Resolution			Appro	ox. 1/60000 of	rated output o	urrent			
Front panel Control function		 Knobs (end Output shu with USB, RS External co 	coders) for set toff function (232, RS485, ontrol: Configu	ting OVP,UVF output on/off o LAN optional. Iration using e	P,and UVL. Control, shutdo Baudrate, external voltage	Protection fur wn) Comm address settin e (5 V or 10 V)	nctions (OVP, nunication fund ng or external re	ting resolution UVP, UVL, folo ctions: Standa esistance (5 kΩ	lback) rd equipped	
O da da li	Acouracy				V or 10 V), out			UOLI IOCK		
Output voltage display	Accuracy Number of decimal digits				of the rated out	ipui voitage ±		ligit		
	Accuracy		20	igits	of the rated ou			digit		
Output current display	Number of decimal digits		2 digits	0.5% (ipui current ±	3 digits			
	Traniber of deciliar digits	Green: EINE	· · · · · · ·			V CC Red A		UVP, OTP, FO		
LED display						v. UU NEU. P		UVII. UIF. FU		

- The minimum voltage is 0.1 % of the rated output voltage.
- *2. The minimum current is 0.2 % of the rated output current.
- *3. Input voltage 100 Vac/200 Vac, at the rated output power, ambient temperature 25 °C If the LAN option is built in, the efficiency decreases by 0.5 % and the input current increases by 0.5 %.
- *4. Excludes input surge current (duration 0.2 ms or less) applied to the built-in noise filter section.
- *5. 85 Vac to 132 Vac or 170 Vac to 265 Vac, fixed load
- *6. With the input voltage held constant, the sensing point was measured using remote sensing from no load to full load.
- *7. Models with rated output voltages from 10 V to 100 V were measured using an RC-9131 A 1:1 probe that conforms to the JEITA specifications. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *8. When at least 8 hours has passed after a 30 minute warm-up with the input voltage, load, and ambient temperature held constant
- *9. For 30 minutes after turning on the power with the input voltage, load, and ambient temperature held constant
- *10. Between 10 % and 90 % of the rated resistive load and rated output voltage *11. If the output voltage is repeatedly
- If the output voltage is repeatedly decreased, Td is the minimum duration from a given voltage drop to the next voltage drop.
- *12. Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is longer than Td.



- a: Slope of the fall time of a at no load
- *13.Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is shorter than Td.



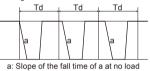
a: Slope of the fall time of a at no load b: Slope of the fall time of b at no load

- *14. The amount of time required for the output voltage to return to a value within 0.5 % of the rated output voltage. The change in the load current is 10 % to 90 % of the rating. The output voltage is between 10 % and 100 % of the rating. During local sensing.
- *15. At the rated output power
- *16. The value when the output voltage is changed from the lower limit to the rated voltage in constant current mode with the input voltage held constant
- *17. For models with a 10 V rated output voltage, this is the value for when the output voltage is 2 V to 10 V at the rated output current. For other models, this is the value for when the output voltage is 10 % to 100 % of the rating at the rated output current. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *18. In output current control, the current, linearity, and monitor accuracies do not include the load variation caused by initial drift and temperature drift of internal components.

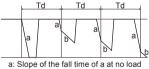
PAV Series 600 W Type Specifications

Item/Model		PAV10-60	PAV20-30	PAV36-18	PAV60-10	PAV100-6	PAV160-4	PAV320-2	PAV650-1
Output									
Rated output voltage	e *1	10 V	20 V	36 V	60 V	100 V	160 V	320 V	650 V
Rated output curren	t *2	60 A	30 A	18 A	10 A	6 A	4 A	2 A	1 A
Rated output power		600 W	600 W	648 W	600 W	600 W	640 W	640 W	650 W
AC input									
Nominal input rating			100 \	/ac to 240 Vac	continuous in	put, 50 Hz to	60 Hz, single p	phase	
Input voltage range					85 Vac to	265 Vac			
Input frequency rang	ge	47 Hz to 63 Hz							
	3 (100 Vac/200 Vac)	7.48 A/3.69 A	7.22 A/3.56 A	7.70 A/3.80 A	7.13 A/3.52 A	7.13 A/3.52 A	7.47 A	/ 3.69 A	7.59 A/3.75
Power factor (typ) (1			1	1	0.00	10.00	1		
the rated output pow	ver)				0.99	0.98			
Efficiency (typ) *3		81% / 83%	84% / 86%	85% / 87%	85% / 87%	85% / 87%	86.5% / 88.5%	87% / 88.5%	86.5% / 88.5
Inrush current (100 V	Vac/200 Vac) *4		30	A / 30 A or le	SS		30	A / 30 A or le	SS
Constant voltage mo	ode								
Maximum line regula	ation *5								
(for the rated output	voltage)			0.01% + 2 mV	,			0.01%	
Maximum load regu				0.01/0 • 2 1110				0.0170	
(for the rated output	1		1			1			
Ripple noise *7	20 MHz, p-p	50 mV	50 mV	50 mV	50 mV	80 mV	100 mV	150 mV	250 mV
	5 Hz to 1 MHz, rms	5 mV	5 mV	5 mV	12 mV	15 mV	10 mV	30 mV	60 mV
Temperature coeffic	ient		30 PP	M /°C (after a	30 minute war	m-up, for the	rated output v	oltage)	
Aging drift *8 (for the	e rated output voltage)			0.05%				0.02%	
Initial drift *9 (for the	e rated output voltage)			0.05% + 2 mV	/			0.05%	
	ensing compensation	1 V	1 V	2 V	3 V	5 V		5 V	
	positive or negative))	1 1 1			-	-		5 V	
Rise time *10		50 ms	50 ms	50 ms	50 ms	100 ms	55 ms	75 ms	75 ms
	At full load *10	25 ms	25 ms	25 ms	25 ms	80 ms	65 ms	85 ms	85 ms
Call time	Td (typ) *11	285 ms	425 ms	450 ms	570 ms	1370 ms			
Fall time	No load a *12	65 ms	110 ms	155 ms	175 ms	375 ms			
	No load b *13	280 ms	470 ms	470 ms	500 ms	1200 ms	2000 ms	2500 ms	3000 ms
Transient response	time *14		1	1 ms or less		1		2 ms or less	
Output hold time (ty		15	ms		20 ms		16	ms	14 ms
Constant current mo									
Maximum line regula									
(at the rated output of				0.01% + 2 mA	1			0.02%	
Maximum load regu				0.040/ . 5				0.00%	
(at the rated output ci				0.01% + 5 mA	`			0.09%	
Change in the load due	to the temperature drift of			0.15% or less				0.05% or less	
internal components (at	the rated output current)	(for 30) minutes afte	r the load con	ditions are cha	inged)	(for 30 minutes at	fter the load condit	ions are change
Ripple noise *17 (5 ł	Hz to 1 MHz, rms)	150 mA	75 mA	25 mA	8 mA	5 mA	2 mA	1.5 mA	1 mA
Temperature coeffic	ient		100 P	PM /°C (after a	a 30 minute wa	arm-up, at the	rated output c	urrent)	
Aging drift *0 (at the	rated output current)				0.0	5%			
rying utile of (at the		0.3%	0.1	5%	0.1	1%		0.1%	
	rated output current)	0.070							
Initial drift *9 (at the		0.070							
Initial drift *9 (at the Protection functions				e operation swi	tches from cons	stant voltage m	ode to constan	nt current mode	or vice vers
Initial drift *9 (at the Protection functions			output when the	e operation swi	tches from cons	stant voltage m	ode to constan	it current mode	or vice vers
Initial drift *9 (at the Protection functions Foldback protection		Turns off the c Can be set as Inverter shute	output when the necessary. off system. Pre	events the out	put voltage fro	m being set hi	gher than the	OVP value.	or vice vers
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect	ion (OVP)	Turns off the c Can be set as Inverter shutc Also shuts of	output when the necessary. off system. Pre f the output wi	events the out nen an output	put voltage fro overvoltage (e	m being set hi xceeding the	gher than the OVP value) oc	OVP value. curs.	
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio	ion (OVP) n voltage setting range	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V	output when the necessary. off system. Pre f the output wi 1 V to 24 V	events the out nen an output 2 V to 40 V	put voltage fro overvoltage (e 5 V to 66 V	m being set hi exceeding the 5 V to 110 V	gher than the OVP value) oc 5 V to 176 V	OVP value. ccurs. 5 V to 353 V	5 V to 717
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio	ion (OVP) n voltage setting range	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V	output when the necessary. off system. Pre f the output wi 1 V to 24 V	events the out nen an output 2 V to 40 V	put voltage fro overvoltage (e	m being set hi exceeding the 5 V to 110 V	gher than the OVP value) oc 5 V to 176 V	OVP value. ccurs. 5 V to 353 V	5 V to 717
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage limit (I	ion (OVP) In voltage setting range UVL)	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the	output when the necessary. off system. Pre f the output wh 1 V to 24 V output voltage	events the out nen an output 2 V to 40 V e from being so	put voltage fro overvoltage (e 5 V to 66 V	m being set hi exceeding the 5 V to 110 V he UVL value.	gher than the OVP value) oc 5 V to 176 V Disabled duri	OVP value. ccurs. 5 V to 353 V	5 V to 717
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage limit (I Undervoltage protect	ion (OVP) in voltage setting range UVL) ction (UVP)	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the	output when the necessary. off system. Pre f the output wh 1 V to 24 V output voltage output when t	events the out nen an output 2 V to 40 V e from being so he output volta	put voltage fro overvoltage (e 5 V to 66 V et lower than ti	m being set hi exceeding the 5 V to 110 V he UVL value. v the UVP value	gher than the OVP value) oc 5 V to 176 V Disabled duri ie.	OVP value. ccurs. 5 V to 353 V ng external cc	5 V to 717 ontrol.
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage limit (I Undervoltage protect Overheat protection	ion (OVP) in voltage setting range UVL) ction (UVP)	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the	output when the necessary. off system. Pre f the output wi 1 V to 24 V output voltage output when t output before	events the out nen an output 2 V to 40 V e from being so he output volta	put voltage fro overvoltage (e 5 V to 66 V et lower than th age falls below	m being set hi exceeding the 5 V to 110 V he UVL value. v the UVP value	gher than the OVP value) oc 5 V to 176 V Disabled duri ie.	OVP value. ccurs. 5 V to 353 V ng external cc	5 V to 717 ontrol.
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage limit (I Undervoltage protect Overheat protection	ion (OVP) in voltage setting range UVL) stion (UVP) sk (USB, RS232, RS48	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the	butput when the necessary. off system. Pref t the output wi 1 V to 24 V output voltage output voltage output when t ooutput before .N interface)	events the out nen an output 2 V to 40 V e from being so he output volta the temperatu	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern	m being set hi exceeding the 5 V to 110 V he UVL value. v the UVP value	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th	OVP value. ccurs. 5 V to 353 V ng external cc safe operation	5 V to 717 ntrol. temperatur ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protect Undervoltage protect Undervoltage protect Overheat protection Setting and readbac	ion (OVP) in voltage setting range UVL) ttion (UVP) k (USB, RS232, RS48 Accuracy	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the	butput when the necessary. off system. Pref t the output wi 1 V to 24 V output voltage output voltage output when t ooutput before .N interface)	events the out nen an output 2 V to 40 V e from being so he output volta	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern	m being set hi exceeding the 5 V to 110 V he UVL value. v the UVP value	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th of the	OVP value. ccurs. 5 V to 353 V ng external cc safe operation ne output volta rated output v	5 V to 717 ntrol. temperatur ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protectio Undervoltage protectio Undervoltage protection Overheat protection Setting and readbace Output voltage	ion (OVP) in voltage setting range UVL) stion (UVP) sk (USB, RS232, RS48	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the	butput when the necessary. off system. Pref f the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of	events the out nen an output 2 V to 40 V e from being so he output volta the temperatu	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern	m being set hi exceeding the 5 V to 110 V he UVL value. v the UVP value	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th of the	OVP value. ccurs. 5 V to 353 V ng external cc safe operation	5 V to 717 ntrol. temperatur ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protectio Undervoltage protectio Undervoltage protection Overheat protection Setting and readbace Output voltage	ion (OVP) in voltage setting range UVL) ttion (UVP) k (USB, RS232, RS48 Accuracy	Turns off the c Can be set as Inverter shutc Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the	butput when the necessary. off system. Pref f the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of	events the out nen an output 2 V to 40 V e from being so he output volta the temperatu the rated outp igits	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern	m being set hi xceeding the 5 V to 110 V he UVL value. v the UVP valu al components	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th of the 2 di	OVP value. ccurs. 5 V to 353 V ng external cc safe operation ne output volta rated output v	5 V to 717 ntrol. temperatur ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protect Undervoltage protect Overheat protection Setting and readbac Output voltage setting	ion (OVP) in voltage setting range UVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output wi 1 V to 24 V output voltage output voltage output voltage output before N interface) 0.05% of 3 d	events the output nen an output 2 V to 40 V e from being so he output volta the temperatu the rated outp igits Appro	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage	m being set hi xceeding the 5 V to 110 V he UVL value. v the UVP valu al components rated output v	gher than the OVP value) oc 5 V to 176 V Disabled duri e. s exceeds the 0.05% of th of the 2 di oltage	OVP value. ccurs. 5 V to 353 V ng external cc safe operation ne output volta rated output v	5 V to 717 ntrol. a temperatur ge + 0.05% oltage
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protectio Undervoltage protectio Undervoltage protection Overheat protection Setting and readbace Output voltage setting	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output wil 1 V to 24 V output voltage output voltage output when t output before .N interface) 0.05% of 3 d	events the output nen an output 2 V to 40 V e from being so he output volta the temperatu the rated outp igits Appro	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage	m being set hi xceeding the 5 V to 110 V he UVL value. v the UVP valu al components rated output v	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1	OVP value. ccurs. 5 V to 353 V ng external ccurs safe operation he output volta rated output v igits	5 V to 717 ntrol. a temperatur ge + 0.05% oltage
nitial drift *9 (at the Protection functions Foldback protection Overvoltage protect Undervoltage protection Undervoltage protection Setting and readbace Output voltage Setting	ion (OVP) in voltage setting range UVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output wil 1 V to 24 V output voltage output voltage output when t output before .N interface) 0.05% of 3 d	events the out hen an output 2 V to 40 V from being si he output volt the temperatu the rated outp igits Appro ht + 0.1% of the igits	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1 4 di	OVP value. ccurs. 5 V to 353 V ang external cc safe operation ne output volta rated output v igits	5 V to 717 ntrol. a temperatur ge + 0.05% oltage
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage protection Undervoltage protection Setting and readbace Output voltage setting Output current setting	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d f output currer 3 d	events the output nen an output 2 V to 40 V e from being so the output volta the rated output igits Appro- Appro- Appro-	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current	gher than the OVP value) oc 5 V to 176 V Disabled duri te. a exceeds the 0.05% of tr of the 2 di oltage 0.2% of 1 4 di urrent	OVP value. ccurs. 5 V to 353 V ang external cc safe operation ne output volta rated output v igits	5 V to 717 introl. Interoperature ge + 0.05% oltage
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protect Undervoltage protect Overheat protection Setting and readbac Output voltage Setting Output current setting Output voltage	ion (OVP) in voltage setting range UVL) totion (UVP) ix (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d f output currer 3 d	events the out hen an output 2 V to 40 V from being si he output volt the temperatu the rated outp igits Appro ht + 0.1% of the igits	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th oltage 0.2% of t 4 di urrent 0.05% of th	OVP value. ccurs. 5 V to 353 V ag external cc safe operation ne output voltar rated output v igits the rated output igits	5 V to 717 ntrol. 1 temperatur ge + 0.05% oltage ut current ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protect Undervoltage protect Overheat protection Setting and readbac Output voltage Setting Output current setting Output voltage	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d f output currer 3 d	events the out hen an output 2 V to 40 V from being si- he output volti- the temperatur the rated outpr igits Appro- Appro- the rated outpr igits Appro- the rated outpr	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output	m being set hi xceeding the 5 V to 110 V he UVL value. the UVP valu al components rated output v current rated output c	gher than the OVP value) oc 5 V to 176 V Disabled duri e. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1 4 di urrent 0.05% of th	OVP value. ccurs. 5 V to 353 V ng external cc safe operation are output volta rated output volta igits the rated output igits are output volta	5 V to 717 ntrol. 1 temperatur ge + 0.05% oltage ut current ge + 0.05%
nitial drift *9 (at the Protection functions Foldback protection Overvoltage protect Divervoltage protection Undervoltage protection Diverheat protection Setting and readback Dutput voltage setting Dutput current setting Dutput voltage readback	ion (OVP) In voltage setting range UVL) ttion (UVP) K (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of	events the output nen an output 2 V to 40 V e from being so the output volts the rated output igits Appro the rated outp Appro	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage ox. 1/60000 of ut voltage	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current rated output c rated output c	gher than the OVP value) oc 5 V to 176 V Disabled duri re. s exceeds the 0.05% of th 0.05% of th 0.05% of th 0.05% of th of the 0.05% of th of the	OVP value. curs. 5 V to 353 V ng external cc safe operation ne output volta rated output v igits he rated output the rated output volta rated output volta	5 V to 717 ntrol. 1 temperatur ge + 0.05% oltage ut current ge + 0.05%
nitial drift *9 (at the Protection functions Foldback protection Dvervoltage protect Dvervoltage protect Jndervoltage protect Jndervoltage protect Duerheat protection Setting and readbac Dutput voltage Putput voltage Putput current setting Dutput voltage eadback Dutput current	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of	events the output here an output 2 V to 40 V from being si he output volta the rated output igits Appro- the rated output Appro- the rated output Appro- 0.1% of output	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output ox. 1/60000 of ut voltage x. 1/60000 of	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current rated output c rated output v % of the rated	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1 4 di urrent 0.05% of th of the of t	OVP value. curs. 5 V to 353 V ng external cc safe operation ne output volta rated output v igits he rated output the rated output volta rated output volta	5 V to 717 ntrol. 1 temperatur ge + 0.05% oltage ut current ge + 0.05%
nitial drift *9 (at the Protection functions Foldback protection Dvervoltage protect Dvervoltage protect Jndervoltage protect Jndervoltage protect Duerheat protection Setting and readbac Dutput voltage eating Dutput current setting Dutput voltage eadback Dutput current eadback	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Turns off the c Can be set as Inverter shutts Also shuts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA	output when the necessary. off system. Prre the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of	events the output here an output 2 V to 40 V from being si he output volta the rated output igits Appro- the rated output Appro- the rated output Appro- 0.1% of output	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage bx. 1/60000 of e rated output bx. 1/60000 of ut voltage bx. 1/60000 of t current + 0.3'	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current rated output c rated output v % of the rated	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1 4 di urrent 0.05% of th of the of t	OVP value. curs. 5 V to 353 V ng external cc safe operation ne output volta rated output v igits he rated output the rated output volta rated output volta	5 V to 717 ntrol. i temperatur ge + 0.05% oltage ut current ge + 0.05%
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protectio Undervoltage protectio Undervoltage protection Overheat protection Setting and readbace Output voltage setting Output current setting Output voltage readback Output current readback Front panel	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% of 0.1% of	nutput when the necessary. off system. Pro- fi fsystem. Pro- fi the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of 0.05% o	events the out ene an output 2 V to 40 V from being sc he output volts the rated output igits Appro the rated output Appro 0.1% of output Appro 0.1% of output Appro sc for setting ting OVP,UVP output on/off c LAN optional.	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern ut voltage bx. 1/60000 of e rated output bx. 1/60000 of ut voltage bx. 1/60000 of t current + 0.3'	m being set hi xceeding the ' 5 V to 110 V he UVL value. I the UVP value al components rated output v current rated output v % of the rated rated output c rated output c rated output c rated output c cage and outpu Protection fur wn) © Comm address settir (5 V or 10 V)	gher than the OVP value) oc 5 V to 176 V Disabled duri e. s exceeds the 0.05% of th of the 2 di oltage 0.2% of f 4 di urrent 0.05% of th of the oltage output curren urrent ut current (sett cctions (OVP, f unication func- or external rec	OVP value. cours. 5 V to 353 V ang external co safe operation reated output volta rated output volta sistance (5 KΩ	5 V to 717 ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable) bback) rd equipped
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protection Undervoltage protection Undervoltage protection Setting and readback Overheat protection Setting and readback Output voltage setting Output current setting Output current readback Front panel Control function	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy Resolution Accuracy *18	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% of 0.1% of	nutput when the necessary. off system. Pro- fi fsystem. Pro- fi the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of 0.05% o	events the out ene an output 2 V to 40 V from being sc he output volt the rated output igits Appro the rated output agits Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro 100 Setting The setting CVP,UVP Soutput on/Off of LAN optional.	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output ox. 1/60000 of t current + 0.3' x. 1/60000 of t current + 0.3' x. 1/60000 of t surrent + 0.3' x. 1/60000 of	m being set hi xceeding the ' 5 V to 110 V he UVL value. I the UVP value al components rated output v current rated output v % of the rated rated output c age and output Protection fur wn) © Comm address settir (5 V or 10 V) put on/off, fror	gher than the OVP value) oc 5 V to 176 V Disabled duri e. s exceeds the 0.05% of th of the 2 di oltage 0.2% of t 4 di urrent 0.05% of th of the oltage output curren urrent ut current (sett ictions (OVP, I unication func- or external re	OVP value. cours. 5 V to 353 V ang external co safe operation reated output volta rated output volta sistance (5 KΩ	5 V to 717 introl. temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable) bback) rd equippeor
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protect Overvoltage protectio Undervoltage protection Setting and readback Output voltage setting Output voltage readback Output current readback Front panel Control function Output voltage	ion (OVP) n voltage setting range UVL) ttion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% of 0.1% of	nutput when the necessary. off system. Price if the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of 0.05%	events the output events the output 2 V to 40 V from being si he output volts the rated output igits Appro the rated output gits Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro cl_AN optional.	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output ox. 1/60000 of t current + 0.3' x. 1/60000 of t current + 0.3' the output volt t, and UVL. • ontrol, shutdo • Baudrate, vternal voltagy (or 10 V), out	m being set hi xceeding the ' 5 V to 110 V he UVL value. I the UVP value al components rated output v current rated output v % of the rated rated output c age and output Protection fur wn) © Comm address settir (5 V or 10 V) put on/off, fror	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of f 4 di urrent 0.05% of th of the oltage output curren urrent (sett tccinns (OVP, I unication func ig or external re t panel operai 1 count	OVP value. curs. 5 V to 353 V ng external cc safe operation the output voltar rated output voltar rated output voltar rated output voltar rated output voltar t ing resolution UVP, UVL, fold ctions: Standa sistance (5 kΩ tion lock	5 V to 717 introl. temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable) bback) rd equipped
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage protectio Undervoltage protection Setting and readback Output voltage setting Output voltage readback Output voltage readback Front panel Control function Output voltage display	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% of 0.1% of	nutput when the necessary. off system. Price if the output will 1 V to 24 V output voltage output voltage output when t output before N interface) 0.05% of 3 d 0.05% of 0.05%	events the output ener an output 2 V to 40 V from being si he output volts the rated output igits Appro the rated output igits Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro class for setting URV, OVF, UVF poutput on/off c LAN optional. eration using output (5 V 0.5% c igits	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern out voltage ox. 1/60000 of e rated output ox. 1/60000 of t current + 0.3' ox. 1/60000 of t current + 0.3' ox. 1/60000 of t aurrent + 0.3' ox. 1/60000 of Baudrate, xternal voltage y. 4 or 10 V), out	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current rated output v current rated output c rated output v % of the rated rated output c age and output protection fur wn) • Comm address setti o (5 V or 10 V) put on/off, fror put voltage ±	gher than the OVP value) oc 5 V to 176 V Disabled duri te. s exceeds the 0.05% of th of the 2 di oltage 0.2% of 1 4 di urrent 0.05% of th of the oltage output curren urrent (sett cctions (OVP, 1 unication func g or external re t panel operai 1 count	OVP value. cours. 5 V to 353 V ang external co safe operation reated output volta rated output volta sistance (5 KΩ	5 V to 717 introl. temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable) bback) rd equipped
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Undervoltage protect Undervoltage protect Overheat protection Setting and readbac Output voltage setting Output current setting Output current readback Output current readback Front panel Control function Output voltage display Output current	ion (OVP) In voltage setting range UVL) totion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% of 0.1% of	not put when the necessary. off system. Pricessary. off system. Pricessary. off system. Pricessary. off system. Pricessary. output voltage output voltag	events the output ene an output 2 V to 40 V from being si he output volt the temperatu igits Appro the rated output igits Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output Appro 0.1% of output 0.5% of igits 0.5% of	put voltage fro overvoltage (e 5 V to 66 V et lower than tl age falls below re of the intern ut voltage x. 1/60000 of e rated output ox. 1/60000 of t current + 0.3' x. 1/60000 of t current + 0.3' the output volt t, and UVL. • ontrol, shutdo • Baudrate, vternal voltagy (or 10 V), out	m being set hi xceeding the 5 V to 110 V he UVL value. I the UVP valu al components rated output v current rated output v current rated output c rated output v % of the rated rated output c age and output protection fur wn) • Comm address setti o (5 V or 10 V) put on/off, fror put voltage ±	gher than the OVP value) oc 5 V to 176 V Disabled duri re. s exceeds the 0.05% of th 0.05% of th 0.12% of th 0.05%	OVP value. curs. 5 V to 353 V ng external cc safe operation a output voltar rated output voltar rated output voltar igits the rated output voltar rated output voltar rated output voltar isistance (5 kΩ tion lock	5 V to 717 ntrol. temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable) bback) rd equipped
Initial drift *9 (at the Protection functions Foldback protection Overvoltage protect Overvoltage protectio Undervoltage limit (I Undervoltage protect Overheat protection	ion (OVP) n voltage setting range UVL) tion (UVP) k (USB, RS232, RS48 Accuracy Number of decimal digits Resolution Accuracy *18 Number of decimal digits Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution Accuracy *18 Resolution	Turns off the c Can be set as Inverter shutts of 0.5 V to 12 V Prevents the Shuts off the Shuts off the 5, optional LA 0.1% o 0.1% o 0.0% o 0.	not put when the necessary. off system. Pre- f the output will 1 V to 24 V output voltage output voltage	events the out men an output 2 V to 40 V from being si he output volt the temperatu igits Appro- the rated outpu igits Appro- 0.1% of outpu Appro- 0.1% of outpu Appro- 0.5% of igits	put voltage fro overvoltage (e 5 V to 66 V et lower than ti age falls below re of the intern out voltage ox. 1/60000 of e rated output ox. 1/60000 of t current + 0.3' ox. 1/60000 of t current + 0.3' ox. 1/60000 of t aurrent + 0.3' ox. 1/60000 of Baudrate, xternal voltage y. 4 or 10 V), out	m being set hi xceeding the 5 V to 110 V he UVL value. The UVL value. The UVP valu al components rated output v current rated output v % of the rated rated output c age and outpu Protection fur w) C Comm address settir e (5 V or 10 V) put on/off, fror put voltage ±	gher than the OVP value) oc 5 V to 176 V Disabled duri ie. s exceeds the 0.05% of th 0.05% of th 0.12% of th 0.12% of th 0.12% of th 0.15%	OVP value. ccurs. 5 V to 353 V ang external cc safe operation rated output volta rated output volta rated output volta igits the rated output volta rated output volta rated output volta rated output volta ing resolution UVP, UVL, fold sistance (5 kΩ tion lock ligits	5 V to 717 ' introl. a temperatur ge + 0.05% oltage ut current ge + 0.05% oltage switchable). dback) rd equipped Ω or 10 kΩ),

- The minimum voltage is 0.1 % of the rated output voltage.
- The minimum current is 0.2 % of the rated output current.
- *3. Input voltage 100 Vac/200 Vac, at the rated output power, ambient temperature 25 °C If the LAN option is built in, the efficiency decreases by 0.5 % and the
- input current increases by 0.5 %.
 *4. Excludes input surge current (duration 0.2 ms or less) applied to the built-in noise filter section.
- *5. 85 Vac to 132 Vac or 170 Vac to 265 Vac, fixed load
- *6. With the input voltage held constant, the sensing point was measured using remote sensing from no load to full load.
- *7. Models with rated output voltages from 10 V to 100 V were measured using an RC-9131 A 1:1 probe that conforms to the JEITA specifications. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *8. When at least 8 hours has passed after a 30 minute warm-up with the input voltage, load, and ambient temperature held constant
- *9. For 30 minutes after turning on the power with the input voltage, load, and ambient temperature held constant
- *10. Between 10 % and 90 % of the rated resistive load and rated output voltage *11. If the output voltage is repeatedly
- 11. If the output voltage is repeatedly decreased, Td is the minimum duration from a given voltage drop to the next voltage drop.
- *12. Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is longer than Td.



*13.Duration for the voltage to change from 90 % to 10 % of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is shorter than Td.



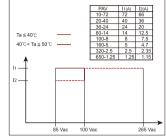
a: Slope of the fall time of a at no load b: Slope of the fall time of b at no load

- *14. The amount of time required for the output voltage to return to a value within 0.5 % of the rated output voltage. The change in the load current is 10 % to 90 % of the rating. The output voltage is between 10 % and 100 % of the rating. During local sensing.
- *15. At the rated output power
- *16. The value when the output voltage is changed from the lower limit to the rated voltage in constant current mode with the input voltage held constant
- *17. For models with a 10 V rated output voltage, this is the value for when the output voltage is 2 V to 10 V at the rated output current. For other models, this is the value for when the output voltage is 10 % to 100 % of the rating at the rated output current. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *18. In output current control, the current, linearity, and monitor accuracies do not include the load variation caused by initial drift and temperature drift of internal components.

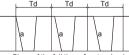
PAV Series 800 W Type Specifications

Item/Model Output		PAV10-72	PAV20-40	PAV36-24	PAV60-14	PAV100-8	PAV160-5	PAV320-2.5	PAV650-1.2
Rated output ve	oltage *1	10 V	20 V	36 V	60 V	100 V	160 V	320 V	650 V
	100 Vac ≤ Vin*3 Ta*4 ≤ 50°C	72 A	40 A	24 A	14 A	8 A	5 A	2.5 A	1.25 A
Rated output current *2	Vin < 100 Vac Ta ≤ 40°C	72 A	40 A	24 A	14 A	8 A	5 A	2.5 A	1.25 A
	Vin < 100 Vac 40°C < Ta ≤ 50°C	66 A	36 A	20 A	12.5 A	7.5 A	4.7 A	2.35 A	1.15 A
Rated output	100 Vac ≤ Vin Ta ≤ 50°C	720 W	800 W	864 W	840 W	800 W	800 W	800 W	812.5 W
power	Vin < 100 Vac Ta ≤ 40°C	720 W	800 W	864 W	840 W	800 W	800 W	800 W	812.5 W
	Vin < 100 Vac 40°C < Ta ≤ 50°C	660 W	720 W	720 W	750 W	750 W	752 W	752 W	747.5 W
AC input									
Nominal input r	÷		100 \	/ac to 240 Vac	continuous in		60 Hz, single	phase	
nput voltage ra						265 Vac			
nput frequency	•			40.00 4 / 5 / 0 4		o 63 Hz		0.04.44.50.4	
	yp) *5 (100 Vac/200 Vac)	9.00 A / 4.45 A	9.65 A / 4.75 A	10.30 A / 5.10 A	10.00 A / 4.95 A	9.50 A / 4.70 A	9.34 A / 4.61 A	9.34 A / 4.59 A	9.43 A / 4.66
at the rated out	yp) (100 Vac/200 Vac,				0.99	/ 0.98			
Efficiency (typ)		81% / 83%	84% / 86%	85% / 87%	85% / 87%	85% / 87%	86.5% / 88.5%	86.5% / 89%	87% / 89%
	100 Vac/200 Vac) *6					A or less			
Constant voltag									
Maximum line regula	tion *7 (for the rated output voltage)			0.049(+ 0)				0.04%	
	tion *8 (for the rated output voltage)			0.01% + 2 mV				0.01%	
Ripple noise	20 MHz, p-p	50 mV	50 mV	50 mV	60 mV	80 mV	100 mV	150 mV	250 mV
9	5 Hz to 1 MHz, rms	5 mV	5 mV	5 mV	12 mV	15 mV	10 mV	30 mV	60 mV
Femperature co	oefficient		30 PP	M /°C (after a	30 minute war	m-up, for the	rated output v	oltage)	
	for the rated output voltage)			0.05%				0.02%	
	or the rated output voltage)			0.05% + 2 mV				0.05%	
	ote sensing compensation	1 V	1 V	2 V	3 V	5 V		5 V	
	line (positive or negative))						17	r	
Rise time *12	ALC: U.S. SALES	50 ms	50 ms	50 ms	50 ms	100 ms	45 ms	55 ms	55 ms
	At full load *12	25 ms	25 ms	25 ms	25 ms	80 ms	55 ms	65 ms	65 ms
Fall time	Td (typ) *13 No load a *14	285 ms	425 ms	450 ms	570 ms	1370 ms 375 ms			
		65 ms	110 ms	155 ms	175 ms		2000	2500 mg	2000
Franciant room	No load b *15	280 ms	470 ms	470 ms	500 ms	1200 ms	2000 ms	2500 ms	3000 ms
Fransient respo				1 ms or less			12 mg	2 ms or less	mo
Dutput hold tim Constant curre				10 ms			13 ms	11.5	ms
	tion *7 (at the rated output current)			0.01% + 2 mA			1	0.02%	
	ition *18 (at the rated output current)			0.01% + 2 mA				0.02 %	
÷		0.15% or less			or less			0.05% or less	
	d due to the temperature drift of nts (at the rated output current)	3.10 /0 01 1000	l		es after the loa	ad conditions	are changed)	2.0070 01 1035	
	9 (5 Hz to 1 MHz, rms)	180 mA	100 mA	31 mA	28 mA	12 mA	2 mA	1.5 mA	1 mA
Temperature co					a 30 minute wa		1		
	at the rated output current)			. (0.0			/	
	at the rated output current)			0.3%				0.1%	
Protection func									
oldback prote					witches from o	constant volta	ge mode to co	onstant current	mode or vic
Siduador prote	01011		e set as neces						
Overvoltage pr	otection (OVP)				put voltage fro				
• •		Also shuts of 0.5 V to 12 V			overvoltage (e		,	1	5 \/ to 747
Undervoltage li	tection voltage setting range							5 V to 353 V ing external co	
÷	protection (UVP)	1			age falls below			ing external CO	nu ui.
Overheat prote					-			safe operation	temperature
· · ·			· ·	comperatu		a. component		sale operation	sinperatur
Setting and rea	dback (USB_RS232_RS4	1	AN interface)						
Setting and rea	adback (USB, RS232, RS4	1	,	44			0.05% of th	ne output volta	qe + 0.05%
	adback (USB, RS232, RS4 Accuracy	1	,	the rated outp	ut voltage			ne output volta rated output v	
Output voltage			0.05% of	the rated outp	ut voltage		of the		
Output voltage	Accuracy Number of decimal digits Resolution		0.05% of	igits	ut voltage x. 1/60000 of	rated output v	of the 2 d oltage	rated output v igits	oltage
Output voltage setting	Accuracy Number of decimal digits Resolution Accuracy *20	85, optional L.	0.05% of 3 di	igits Appro nt + 0.1% of the	ox. 1/60000 of e rated output		of the 2 d oltage	rated output v igits the rated outpu	oltage
Dutput voltage setting Dutput current	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits	85, optional L.	0.05% of 3 di	igits Appro nt + 0.1% of the 3 di	ox. 1/60000 of e rated output igits	current	of the 2 d oltage 0.2% of	rated output v igits	oltage
Dutput voltage setting Dutput current	Accuracy Number of decimal digits Resolution Accuracy *20	85, optional L.	0.05% of 3 di	igits Appro nt + 0.1% of the 3 di	ox. 1/60000 of e rated output	current	of the 2 d oltage 0.2% of current	rated output v igits the rated outpu 4 digits	oltage ut current
Dutput voltage setting Dutput current setting	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution	85, optional L.	0.05% of 3 di	igits Appro nt + 0.1% of the 3 di	ex. 1/60000 of e rated output igits ex. 1/60000 of	current	of the 2 d oltage 0.2% of urrent 0.05% of th	rated output v igits the rated output 4 digits ne output volta	oltage ut current ge + 0.05%
Dutput voltage setting Dutput current setting Dutput voltage	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy	85, optional L.	0.05% of 3 di	igits Appro at + 0.1% of the 3 d Appro the rated outp	ox. 1/60000 of e rated output igits ox. 1/60000 of ut voltage	current	of the 2 d oltage 0.2% of urrent 0.05% of th of the	rated output v igits the rated outpu 4 digits	oltage ut current ge + 0.05%
Dutput voltage etting Dutput current etting Dutput voltage eadback	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution	85, optional L.	0.05% of 3 di output currer 0.05% of	igits Appro at + 0.1% of the 3 d Appro the rated outp Appro	ex. 1/60000 of e rated output igits ex. 1/60000 of ut voltage ex. 1/60000 of	current rated output o rated output v	of the 2 d oltage 0.2% of current 0.05% of th of the oltage	rated output v igits the rated output 4 digits ne output volta rated output v	oltage ut current ge + 0.05%
Dutput voltage etting Dutput current etting Dutput voltage eadback Dutput current	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20	85, optional L.	0.05% of 3 di output currer 0.05% of	igits Appro at + 0.1% of the 3 d Appro the rated outp Appro 0.1% of output	bx. 1/60000 of e rated output igits bx. 1/60000 of ut voltage bx. 1/60000 of t current + 0.3 ^o	current rated output c rated output v % of the rated	of the 2 d oltage 0.2% of current 0.05% of th of the oltage output current	rated output v igits the rated output 4 digits ne output volta rated output v	oltage ut current ge + 0.05%
Putput voltage etting Putput current etting Putput voltage padback Putput current padback	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution	85, optional L.	0.05% of 3 di output currer 0.05% of	igits Appro at + 0.1% of the 3 d Appro the rated outp Appro 0.1% of output	ex. 1/60000 of e rated output igits ex. 1/60000 of ut voltage ex. 1/60000 of	current rated output c rated output v % of the rated	of the 2 d oltage 0.2% of current 0.05% of th of the oltage output current	rated output v igits the rated output 4 digits ne output volta rated output v	oltage ut current ge + 0.05%
Output voltage setting Output current setting Output voltage readback Output current readback	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 2 digits Knobs (enc Output shu with USB, RS External cc 	0.05% of 3 di output currer 0.05% of 0.05% of 0.	igits Appro- at + 0.1% of the 3 d Appro- the rated output Appro- 0.1% of output Appro- rs) for setting UTP OVP,UVP output on/off c. LAN optional. ration using e	xx. 1/60000 of e rated output igits xx. 1/60000 of ut voltage xx. 1/60000 of t current + 0.3' xx. 1/60000 of	rated output of rated output of % of the rated rated output of age and output Protection fur wn) = Comm address settir 6 (5 V or 10 V)	of the 2 d oltage 0.2% of 0.2% of 0.2% of the of the oltage output current surrent ut current (sett factions (OVP, nunication fund of ng or external re	rated output v igits the rated output 4 digits he output volta rated output volta rated output v t ting resolution UVP, UVL, folo ctions: Standar	oltage ut current ge + 0.05% oltage switchable). iback) rd equipped
Dutput voltage setting Dutput current setting Dutput voltage eadback Dutput current eadback Tont panel Control functio	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 2 digits Knobs (enc Output shu with USB, RS External cc 	0.05% of 3 di output currer 0.05% of 0.05% of 0.	igits Appro- at + 0.1% of the 3 d Appro- the rated output Appro- 0.1% of output Appro- rs) for setting ting OVP,UVP output on/off c LAN optional. LAN optional.	ax. 1/60000 of e rated output igits is x. 1/60000 of ut voltage ix. 1/60000 of t current + 0.3' ix. 1/6000 of t current + 0.3' ix. 1/0' ix.	rated output of rated output of % of the rated rated output of age and output Protection fur wn) © Comm address setti e (5 V or 10 V) put on/off, fror	of the 2 d oltage 0.2% of 0.2% of the oltage output current current ut current (sett ctoins (OVP, nunication funda 9 or external real panel opera	rated output v igits the rated output 4 digits he output volta rated output volta rated output v t ting resolution UVP, UVL, folo ctions: Standar	oltage ut current ge + 0.05% oltage switchable). iback) rd equipped
Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control functio Output voltage	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 2 digits Knobs (enc Output shu with USB, RS External cc 	0.05% of 3 di output currer 0.05% of 0.05% of 0.	igits Appro- at + 0.1% of the 3 d Appro- the rated output Appro- 0.1% of output Appro- 0.1% of output Appro- sting OVP,UVP boutput on/off of LAN optional. Iration using e itor output (5 N 0.5% of	xx. 1/60000 of e rated output igits xx. 1/60000 of ut voltage xx. 1/60000 of t current + 0.3' xx. 1/60000 of	rated output of rated output of % of the rated rated output of age and output Protection fur wn) © Comm address setti e (5 V or 10 V) put on/off, fror	of the 2 d oltage 0.2% of uurrent 0.05% of th oltage output current uurrent ut current (sett coutons (OVP, uunication fun 9 or external re t panel opera 1 count	rated output v igits the rated output 4 digits ne output volta rated output v t t turyP, UVL, folc ctions: Standar sistance (5 kΩ tion lock	oltage ut current ge + 0.05% oltage switchable). iback) rd equipped
Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control functio Output voltage display	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 2 digits Knobs (enc Output shu with USB, RS External cc 	0.05% of 3 di output currer 0.05% of 0.05% of 0.	igits Appro- at + 0.1% of the 3 d Appro- the rated output Appro- 0.1% of output Appro- 0.1% of output Appro- rs) for setting rs) for setting ting OVP,UVP sutput on/off of LAN optional. Iration using e tor output (5 \ 0.5% of igits	ax. 1/60000 of e rated output igits ax. 1/60000 of ut voltage ax. 1/60000 of t current + 0.3' ax. 1/6000 of t current + 0.3' ax. 1/600	rated output of rated output of when a contract output of age and output of age and output of address settin e (5 V or 10 V) put on/off, from toput on/off, from	of the 2 d oltage 0.2% of uurrent 0.05% of th oltage output current uurrent (set to current (set to current (set to current (set uurrent (set to current (set))))))))))))))))))))))))))))))))))))	rated output v igits the rated output 4 digits he output volta rated output volta rated output v t ting resolution UVP, UVL, folo ctions: Standar	oltage ut current ge + 0.05% oltage switchable). iback) rd equipped
Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control functio Output voltage display Output current	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 2 digits Knobs (enc Output shu with USB, RS External cc 	0.05% of 3 di output currer 0.05% of 0.05% of 0.	igits Appro- a d Appro- the rated outp Appro- 0.1% of output Appro- 0.1% of output Appro- 0.1% of output Appro- rs) for setting rs) for setting OVP,UVP Joutput on/off c LAN optional. Irration using e 10.5% co igits	ax. 1/60000 of e rated output igits is x. 1/60000 of ut voltage ix. 1/60000 of t current + 0.3' ix. 1/6000 of t current + 0.3' ix. 1/0' ix.	rated output of rated output of when a contract output of age and output of age and output of address settin e (5 V or 10 V) put on/off, from toput on/off, from	of the 2 d oltage 0.2% of 	rated output v igits the rated output 4 digits ne output volta rated output volta rated output v t t ting resolution UVP, UVL, fold ctions: Standar esistance (5 kΩ tion lock	oltage ut current ge + 0.05% oltage switchable). iback) rd equipped
Output voltage setting Output current setting Output voltage readback Output current readback Front panel Control functio	Accuracy Number of decimal digits Resolution Accuracy *20 Number of decimal digits Resolution Accuracy Resolution Accuracy *20 Resolution	 85, optional L 0.1% of 2 digits 4 4 4 4 5 4 4 5 4 4 5 4 4 5 4 5 4 5 4 4 5 4 4 4 5 4 <	0.05% of 3 di output currer 0.05% of 0.05%	igits Appro- a d Appro- the rated output Appro- 0.1% of output Appro- context of output Appro- rs) for setting vor putput on/off c LAN optional. ration using e itor output (5 N 0.5% c igits 0.5% c	ax. 1/60000 of e rated output igits ix. 1/60000 of ut voltage ix. 1/60000 of t current + 0.3' ix. 1/60000 of t current + 0.3' ix. 1/60000 of the output volt ;and UVL. • ontrol, shutdo • Baudrate, xternal voltag; / or 10 V), out f the rated out	current rated output of rated output of % of the rated rated output of age and outpu Protection fur wn) © Comm address setti e (5 V or 10 V) put on/off, fror tput voltage ±	of the 2 d oltage 0.2% of 	rated output v igits the rated output 4 digits ne output volta rated output v t t turyP, UVL, folc ctions: Standar sistance (5 kΩ tion lock	oltage ut current ge + 0.05% oltage switchable). back) rd equipped t or 10 kΩ),

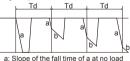
- The minimum voltage is 0.1% the rated output voltage.
- *2. The minimum current is 0.2% of the rated output current.
- *3. Vin: Input voltage *4. Ta: Ambient temperature (performance depending
- Ta: Ambient temperature (performance depending on the input voltage versus rated output current and ambient tempera-ture shown below)



- *5. Input voltage 100 Vac/200 Vac, at the rated output power, ambient temperature 25 °C If the LAN option is built in, the efficiency decreases by 0.5% and the input current increases by 0.5%.
- Excludes input surge current (duration 0.2 ms or less) applied to the built-in noise filter section.
 85 Vac to 132 Vac or 170 Vac to 265 Vac, fixed load
- 7. 85 Vac to 132 Vac or 170 Vac to 265 Vac, fixed load *8. With the input voltage held constant, the sensing point was measured using remote sensing from no load to full load.
- *9. Models with rated output voltages from 10 V to 100 V were measured using an RC-9131 A 1:1 probe that conforms to the JEITA specifications. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe. At an ambient temperature of 0 °C, measurement was performed after at least 1 minute had passed after startup.
- When at least 8 hours has passed after a 30 minute warm-up with the input voltage, load, and ambient temperature held constant.
- and ambient temperature held constant 11. For 30 minutes after turning on the power with the input voltage, load, and ambient temperature held constant
- 12. Between 10% and 90% of the rated resistive load and rated output voltage
- 13. If the output voltage is repeatedly decreased, Td is the minimum duration from a given voltage drop to the next voltage drop.
- 14. Duration for the voltage to change from 90% to 10% of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is longer than Td.



- a: Slope of the fall time of a at no load 15. Duration for the voltage to change from 90%
- 15. Dutation for the voltage to change from 90% to 10% of the rated output voltage when the output voltage is repeatedly decreased and the duration from a given voltage drop to the next voltage drop is shorter than Td.



a: Slope of the fall time of a at no load b: Slope of the fall time of b at no load

- 16. The amount of time required for the output voltage to return to a value within 0.5% of the rated output voltage. The change in the load current is 10% to 90% of the rating. The output voltage is between 10% and 100% of the rating. During local sensing.
 17. At the rated output power
- 18. The value when the output voltage is changed from the lower limit to the rated voltage in constant current mode with the input voltage held constant
- For models with a 10 V rated output voltage, this is the value for when the output voltage is 2 V to 10 V at the rated output current. For other models, this is the value for when the output voltage is 10 % to 100 % of the rating at the rated output current. Models with rated output voltage from 160 V to 650 V were measured using a 10:1 probe.
- *20.In output current control, the current, linearity, and monitor accuracies do not include the load variation caused by initial drift and temperature drift of internal components.

PAV Series All Type Specifications

External control	
Output voltage control using external voltage	0% to 100% of the rated output voltage (application voltage range selectable: 0 V to 5 V or 0 V to 10 V) Accuracy and linearity: ± 0.5% of the rated output voltage
Output current control using external voltage *1	0% to 100% of the rated output current (application voltage range selectable: 0 V to 5 V or 0 V to 10 V) Accuracy and linearity: ± 1% of the rated output current
Output voltage control using external resistance	0% to 100% of the rated output voltage (application resistance range selectable: 0 Ω to 5 k Ω or 0 Ω to 10 k Ω) Accuracy and linearity: ± 1% of the rated output voltage
Output current control using external resistance *1	0% to 100% of the rated output current (application resistance range selectable: 0 Ω to 5 k Ω or 0 Ω to 10 k Ω) Accuracy and linearity: ± 1.5% of the rated output current
Output shutoff (SO) control	External voltage application: 0 V to 0.6 V, 4 V to 15 V, or a contact switch. Positive or negative logic selectable.
Output current monitor *1	Monitor voltage range selectable: 0 V to 5 V or 0 V to 10 V, Accuracy: 1%
Output voltage monitor	Monitor voltage range selectable: 0 V to 5 V or 0 V to 10 V, Accuracy: 1%
Normal operation status signal	Normal (4 V to 5 V), abnormal (0 V), output resistance 500 Ω
Parallel operation *2 *3	Possible up to six power supplies. Master-slave operation with a current balance function.
Series operation *4	Possible up to two power supplies.
Constant voltage/constant current mode (CV/CC) signal	Open collector output (maximum application voltage 30 V, maximum sink current 10 mA) Low level (on) during constant current (CC) mode High level (off) during constant voltage (CV) mode
Output on / off control (ILC)	Output can be shut off using a contact switch or the like (maximum voltage between terminals: 5 V). When open: Output off When shorted: Output on
Local / remote	Output can be shut off using a contact switch or the like (maximum voltage between terminals: 5 V). When open: Output off When shorted: Output on
External control status signal	Open collector output (maximum application voltage 30 V, maximum sink current 10 mA) High level (off) during local mode Low level (on) during external control
Trigger output signal	Maximum low level output signal: 0.8 V, Minimum high level output signal: 3.8 V, maximum high level output signal: 5 V Maximum source current: 16 mA, output trigger signal span: 20 µs (typ)
Trigger input signal	Maximum low level input signal: 1.2 V, Minimum high level input signal: 3.5 V, maximum high level input signal: 5 V Maximum sink current: 16 mA, positive edge trigger span: 10 μ s (min), Tr/Tf: 1 μ s (max)
Program signal output 1 / Program signal output 2	Open collector output (maximum application voltage 25 V, maximum sink current 100 mA)
Environmental conditions	
Operating ambient temperature and humidity	0 °C to 50 °C (32 °F to 122 °F) 20%rh to 90%rh (no condensation)
Storage ambient temperature and humidity	-20 °C to 85 °C (-4 °F to 185 °F) 10%rh to 95%rh (no condensation)
Installation location	Indoor use, Overvoltage category II Altitude: Up to 3000 m (at 2000 m and above, the operating ambient temperature must be reduced), At 2000 m to 3000 m, the operating ambient temperature is 0 °C to 40 °C (32 °F to 104 °F).
Structure	
Cooling method	Forced air cooling using internal fan
Weight	1.9 kg (4.2 lb) or less: 200 W, 400 W types (models whose rated output voltage is 10 V to 100 V and 160 V to 650 V) 2.0 kg (4.4 lb) or less: 600 W, 800 W types (models whose rated output voltage is 160 V to 650 V) 2.1 kg (4.6 lb) or less: 600 W, 800 W types (models whose rated output voltage is 10 V to 100 V)
Vibration resistance	IEC60068-2-64

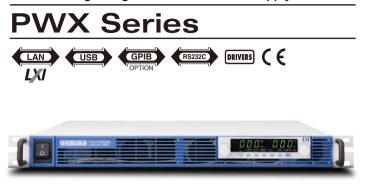
*1. In output current control, the current, linearity, and monitor accuracies do not include the load variation caused by initial drift and temperature drift of internal components. *2. For parallel operation of two or more PAV series power supplies with the same rating, the minimum load current is 5% of the rating or higher. For parallel operation of four or less models with rated output voltage of 160 V to 650 V, the minimum load current is 5% of the rating or higher. For parallel operation of four or less models with rated output voltage of 160 V to 650 V, the minimum load current is 5% of the rating or higher. For parallel operation of the rating or higher. *3. The ammeter's display accuracy when the total orrent is displayed on the master unit is 2% ± 1 count of the total or rated currents. *4. An external protection diode is necessary.

Safety / EMC	
Safety standards	Complies with the requirements of the following directive and standards. Low Voltage Directive 2014/35/EU UL/EN/IEC 61010-1 (Class I *1, Pollution degree 2 *2) (Design to meet UL/EN 60950-1) •Models whose rated output voltage is 10 V, 20 V, 36 V, or 60 V Output terminals and signal terminals produce non-hazardous voltage. •Models whose rated output voltage is 100 V, 160 V, 320 V, or 650 V Output terminals and J1 and J2 terminals produce hazardous voltage (other signal terminals produce non-hazardous voltage).
EMC standards	Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN/IEC 61326-1 (Design to meet EN 55022/EN 55024)
Withstanding voltage *3	 Models whose rated output voltage is 10 V, 20 V, or 36 V. 4242 Vdc: Between input and output (including between signal terminals) 2828 Vdc: Between output (including between signal terminals) and FG Models whose rated output voltage is 60 V or 100 V 4242 Vdc: Between input and output (including between signal terminals) 2828 Vdc: Between signal terminals (excluding J1/J2) and FG 707 Vdc: Between output as well as J1/J2 terminals and FG 707 Vdc: Between output as well as J1/J2 terminals and FG 707 Vdc: Between input and output (including between signal terminals (excluding J1/J2) 1380 Vdc: Between output as well as J1/J2 terminals and FG Models whose rated output voltage is 160 V or 320 V 2970 Vdc: Between input and output (including between signal terminals) 2828 Vdc: Between input and FG 707 Vdc: Between signal terminals (excluding J1/J2) and FG 2424 Vdc: Between signal terminals (excluding J1/J2) 2000 Vdc: Between output as well as J1/J2 terminals and FG Models whose rated output voltage is 650 V 3704 Vdc: Between input and FG 707 Vdc: Between signal terminals (excluding J1/J2) and FG 2424 Vdc: Between input and FG 707 Vdc: Between signal terminals (excluding J1/J2) 2000 Vdc: Between output as well as J1/J2 terminals and FG Models whose rated output voltage is 650 V 3704 Vdc: Between signal terminals (excluding J1/J2) and FG 2424 Vdc: Between signal terminals (excluding J1/J2) and FG 2424 Vdc: Between signal terminals (excluding J1/J2) 2424 Vdc: Between signal terminals (excluding J1/J2) and FG 4242 Vdc: Between signal terminals (excluding J1/J2) and FG 2760 Vdc: Between signal terminals (excluding J1/J2) and FG 2780 Vdc: Between signal terminals (excluding J1/J2) and FG 2780 Vdc: Between signal terminals (excluding J1/J2) and FG
Insulation resistance	100 MΩ or higher (25 °C, 70%rh)
Conducted emission	IEC/EN 61326-1, Class B, FCC part15-B, VCCI-B
Radiated emission	IEC/EN 61326-1, Class A *4, FCC part15-A, VCCI-A

*1. This is a Class I equipment. Be sure to ground the product's protective conductor terminal. The safety of this product is only guaranteed when the product is properly grounded. *2. Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation. *3. Test voltage application time: 1 minute *4. This is a Class A equipment. The product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

DC POWER SUPPLY

1U Wide Range Programmable DC Power Supply



Dimensions / Weight

750 W type: 422.8(16.65")W × 43(1.69")H × 500(19.69")Dmm/ 8 kg(17.64 lbs.) 1500 W type: 422.8(16.65")W × 43(1.69")H × 500(19.69")Dmm/ 9.5 kg(20.94 lbs.)

Accessories

Features

Output terminal cover: 1 pc., Input terminal cover set, Output terminal M8 bolt set ×2 sets Chassis connection wire: 1 wire, J1 connector plug kit: 1 set(Housing: 1 pc., Connector: 1 pc., Plug: 1 pc., Strain relief: 1 pc., Clips: 2 pcs., and two types of Screws: 2 pcs.,), Packing list: 1 copy, Quick reference (1 each for English and Japanese), Safety precautions: 1 copy, China RoHS sheet: 1 copy, CD-ROM: 1 disc

* Power cord is not included for the 1500 W type. Please purchase the optional accessory separately(AC5.5-3P3M-M4C-VCTF).

Ideal for N-to-M network-based remote control and monitoring A next-generation rack-mounted power supply

The PWX series is a CVCC programmable regulated DC power supply designed to optimize for a rack-mounted power supply. To increase its mounting efficiency, it has a 19-inch rack width with a thin shape and intakes and outtakes for cooling on only the front and back surfaces so that it can be mounted flush top and bottom.

The series is equipped standard with USB, RS232C, and LAN interfaces, which are essential for system upgrades. The series also has a virtual multi-channel bus (VMCB) function that allows it to be used efficiently for remote control and monitoring with 1-to-N and as well as with N-to-M in large-scale networks. Moreover, the PWX is an LXI (LAN eXtention for Instrumentation) compliant instrument, so it can be connected easier with the measurement system using LAN interface. You can also manage the power supply in a different building.

Two output power specifications are available: 750 W and 1500 W, and a wide range of voltage and current settings can be combined within its output power rating (3 times). For example, the output power of 1500 W model, the PWX1500ML is capable to operate seamlessly from the range of "80 V-18.75 A" to "26.8 V-56 A". The input voltage has a universal 85 V to 265 V input voltage range, and the unit also has an internal power factor correction (PFC) circuit to control the harmonic current. It also includes an analog external control/monitoring output, master-slave parallel operation function, various protective functions, and memory function.

- outdroo	
 A wide range of voltage and current settings can be combined within its output power rating (3 times) PFC circuit of 0.99 (with 100 V) or 0.97 (with 200 V) at full load *TYP value Supporting universal input voltage (85 V to 265 V) LAN (LXI compliant) /USB/RS232C as standard interface A virtual multi-channel bus (VMCB) function makes multi-channel operation more efficient Emulation setting, Command language setting function A thin and lightweight design with a 1U height for increased rack-mounting efficiency Expandable output capacity by parallel operation 	 External analog control function (Output control based on voltage and resistance; ON/OFF based on contact signals) Analog monitor output (output voltage, output current, and operating mode can be monitored) Various protection functions: overvoltage protection, overcurrent protection, and overheat protection Memory function (3 combinations of settings for voltage, current, OVP, OCP, and UVL) Remote sensing function Blaeder circuit ON/OEE setting (to prevent over-discharging of
 Expandable output capacity by parallel operation Expandable output voltage by series operation 	Bleeder circuit ON/OFF setting (to prevent over-discharging of batteries)
(up to 2 units by the same model)	CV, CC priority start function (prevents overshoot with output ON)

*Excluding the PWX750HF and the PWX1500H.

Options

AC power cord for 1500 W model AC5.5-3P3M-M4C-VCTF * Not CE certified product Parallel operation cable PC01-PWX (for 2 units in parallel) PC02-PWX (for 3 units in parallel) PC03-PWX (for 4 units in parallel)



- Sequence creation software SD013-PWX (Wavy for PWX)
- RS232C control conversion cable RD-8P/9P

Interface ISO PROGRAMI



Equipped with standard LAN interface and optional VMCB function to support network-based remote control and monitoring

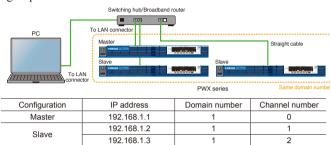
The PWX series is equipped with LAN, USB, and RS232C interfaces as standard features. By using the feature of virtual multi-channel bus (VMCB), it allows you to control remotely and monitoring for 1-to-N as well as N-to-M for large-scale networks. In particular, the LAN interface is LXI compliant, enabling you to easily control and monitor the power supply through a browser on a PC, smartphone, or tablet by accessing the web server built into the PWX series .

Additionally, the optional application software, Wavy for PWX (SD013-PWX), sequence creation and control software, allows you to change settings for specific channels (in individual) on VMCB-connected PWX series power supplies, and lets you perform batch control using global commands*. You can also turn the output ON and OFF on multiple units and adjust the output voltage and current.

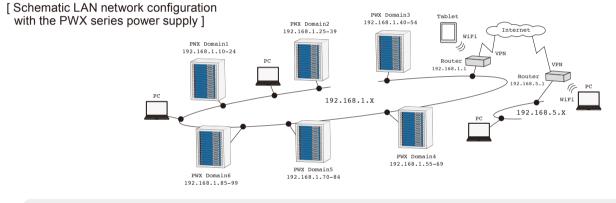
* This is only enabled for "Direct control" on Wavy for PWX. Global commands that can be also used under control with VXI-11, HiSLIP, and SCPI-RAW.

Basic configuration with LAN interface and VMCB (example)

As shown in the figure below, it is possible to connect a PC and the PWX series with a hub to create a virtual group using a LAN connection. A maximum of 254 virtual groups can be set, and the maximum number of units can be configured up to 31 units per group. A group can have a mixture of models.



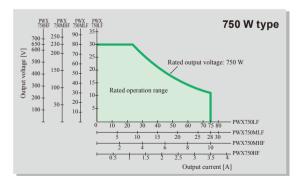
* A DHCP server can also establish settings automatically

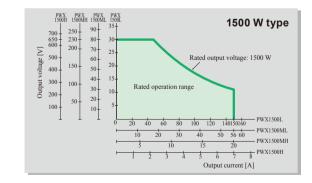


Security for LAN connections

Access to the built-in web server can be restricted with a password. Also, when using VXI-11, HiSLIP, and SCPI-RAW for control, host restrictions can be set with the IP address. It is possible to prevent access from any terminal other than the ones registered as a host (up to 4 hosts can be registered).

Operation Area





Easy access with a built-in web server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PWX series for convenient control and monitoring.

- [Recommended browser]
- Requires for the Internet Explorer version 9.0 or later
 Requires for the firefox 8.0 or later Requires for the firefox 8.0 or later
- Requires for the safari/mobile Safari 5.1 or later
- Requires for the Chrome 15.0 or late
- Requires for the Opera 11.0 or later

O KIKUSU LXI =

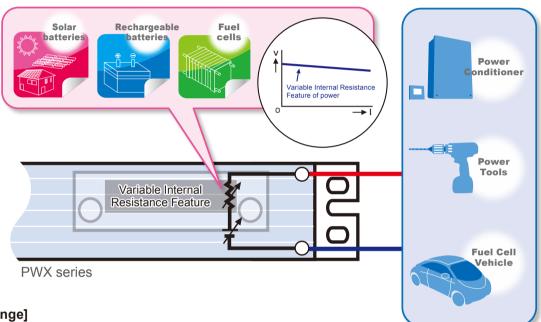
Variable Internal Resistance Feature

The variable internal resistance feature enables you to easily simulate the internal resistance of rechargeable batteries, solar batteries, fuel cells, and the like. By setting the internal resistance value in constant voltage (CV) mode, you can decrease the output voltage according to the output current. You can use a CONFIG setting to set the internal resistance.

• Variable Internal Resistance Feature

model								
PWX750LF	PWX750MLF	PWX1500L	PWX1500ML					
PWX750MHF	PWX750HF	PWX1500MH	PWX1500H					

* Factory option



[Variable range]

Rint: Internal resistance 0 =<Rint =<Rint (max)

	PWX750LF	PWX750MLF	PWX750MHF	PWX750HF	PWX1500L	PWX1500ML	PWX1500MH	PWX1500H
Rint (min) [Ω]	0.0001 *1	0.001	0.01	0.1	0.0001 *1	0.001	0.01	0.1
Rint (max) [Ω]	0.4000 *1	2.857	23.00	185.7	0.2000 *1	1.429	11.50	92.9
Resolution [Ω]	0.0001 *1	0.001	0.01	0.1	0.0001 *1	0.001	0.01	0.1

*1 When the value is set from the front panel, the least significant digit is not shown on the panel display.

The value varies at a higher resolution than what is shown, and the least significant digit is rounded and shown in the next higher digit.

The maximum internal resistance that can be set from the front panel in parallel operation is the value obtained by dividing Rint (max) during standalone operation by the number of units in parallel operation. The resolution is the value obtained by dividing the resolution during standalone operation by the number of units in parallel operation.

[Specifications]

	PWX750LF	PWX750MLF	PWX750MHF	PWX750HF	PWX1500L	PWX1500ML	PWX1500MH	PWX1500H
Maximum internal resistance that can be set Rint (max) $[\Omega]$	0.400	2.857	23.00	185.7	0.200	1.429	11.50	92.9

PWX Series 750 W Type Specifications

Item/Mc	dal		PWX750LF	PWX750MLF	PWX750MHF	PWX750HF	
AC input			PWX/50LF	PWX/50WILF	PWX/50WIHF	PWX/50HF	
			400.)/-	- +- 040 \/ 50			
	l input rati		100 Va	c to 240 Vac, 50 H		e pnase	
· ·	Itage rang				265 Vac		
· ·	quency ra			47 Hz t			
Current	(MAX)	100 Vac		-	5 A		
*1		200 Vac			5 A		
	urrent (M	AX) *2			k or less		
Power (I	MAX) *3			110) VA		
Power fa	actor (TYI	P) *1		(input voltage 10 (input voltage 20		0.98 (input voltage 100 V), 0.96 (input voltage 200 V)	
Efficiend	cy (MIN) *	1		74 % c	r more		
Hold-up ti	me for powe	er interruption (MIN) *3		20 ms o	r greater		
Output							
	Output v	voltage *4	30 V	80 V	230 V	650 V	
Rating	Output o	current *4	75 A	28 A	10 A	3.5 A	
	Output power			750	W		
	Setting range		0 V to 31.5 V	0 V to 84 V	0 V to 241.5 V	0 V to 682.5 V	
	Setting accuracy		± (0.05 % of set +0.05 % of rating)				
	Line regulation *5		±5 mV	± 10 mV	± 25 mV	± 67 mV	
	Load reg	gulation *6	±5 mV	± 10 mV	± 25 mV	± 67 mV	
	-	nt response *7	1 ms (or less	7 ms or less		
	Ripple	(p-p) *9	60 mV	80 mV	120 mV	330 mV	
	noise *8	(rms) *10	8 mV	8 mV	25 mV	60 mV	
Voltage	Rise	Rated load	-				
	time	No load		100	ms		
	Fall	Rated load	100	ms	150 ms	250 ms	
	time*11	No load	450 ms	550 ms	1500 ms	3000 ms	
		remote sensing tion voltage (single line)	1.5 V	4 V	5 V	5 V	
	<u> </u>	re coefficient (MAX) *12	1	00 ppm/°C (durin	a external contro	D	
	Setting r	. ,	0 A to 78.75 A	0 A to 29.4 A	0 A to 10.5 A	0 A to 3.675 A	
		accuracy *13			0.1 % of rating)		
	Line reg		± 9.5 mA	± 4.8 mA	± 3 mA	± 2.35 mA	
Current	Load reg		± 20 mA	± 10.6 mA	±7mA	± 5.7 mA	
	Ripple noise *14	(rmc) *10	150 mA	65 mA	30 mA	15 mA	
		re coefficient (TYP) *12		a 100	pm/°C	1	
	remperature coefficient (TTP) "12						

With rated load

Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms). *2.

- *3 100 Vac with rated load.
- The maximum output voltage and current are limited by the maximum output power 85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load.

*5

- The amount of change that occurs when the load is changed from no load to rated load (rated output *6 power/rated output voltage) with rated output voltage. The value is measured at the sensing point.
- The amount of time required for the output voltage to return to a value within "rated output voltage \pm (0.1 % + 10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set *7 . output voltage
- *8. Measured using an RC-9131 1:1 probe that conforms to the JEITA specifications. At the rated output current
- When the measurement frequency bandwidth is 10 Hz to 20 MHz.
- *10. When the measurement frequency bandwidth is 5 Hz to 1 MHz. *11. When the breeder circuit on/off setting is on.
- *12. When the ambient temperature is within 0 °C and 50 °C

*13. For the PWX750HF, in the range of 0.2 % to 100 % of the rated current. *14. When the output voltage (Rated Power + Rated Current) is 10 % to 100 % of the rating. At the rated output current.

Item/Model		PWX750LF	PWX750MLF	PWX750MHF	PWX750HF	
Display function						
Voltage display	Maximum display	99.99 (fixed o	decimal point)	999.9 (fixed o	lecimal point)	
voitage display	Display accuracy		± (0.2 % of rea	ading +5 digits)		
Current display	Maximum display	99.9	9.999 (fixed decimal point)			
	Display accuracy					
		The PWR DSPL key lights in red.				
Power display *1	Maximum display	9999				
ulapiay i	Display accuracy	Displays th	ne result of multip	lying the current a	ind voltage	
Operation display		OUTPUT ON/OFF, CV operation, CC operation, Alarm operation, Remote operation (LAN operation), Key lock operation, Preset memory				
Protection function	ons					

Overvoltage protection (OVP), Overvoltage protection 2 (OVP2), Overcurrent protection (OCP), Undervoltage limit (UVL), Overhaat protection (OHP), Overheat protection 2 (OHP2), Fan failure protection (FAN), Incorrect sensing connection protection (SENSE), Low AC input protection (AC-FAIL), Shutdown (SD), Power limit (POWER LIMIT)

	Signal or	utput		
Monitor	Monitor	Voltage	monitor (VMON)	Selectable monitor voltage range: 0 V to 5 V or 0 V to 10 V
	signal		Setting accuracy	2.5 % of f.s.
	output	Current monitor (IMON)		Selectable monitor voltage range: 0 V to 5 V or 0 V to 10 V
	*2		Setting accuracy	2.5 % of f.s.
	Ctotuo oi	anal autr	+ +0 +0	OUTON STATUS OV STATUS OG STATUS ALM STATUS DWD ON STATUS

Status signal output *2 *3 OUTON STATUS, CV STATUS, CC STATUS, ALM STATUS, PWR ON STATUS *1.

Press PWR DSPL to display the power on the ammeter. Each time you press this key, the display switches between power and current.

J1 connector on the rear panel.

Photocoupler open collector output; maximum voltage 30 V, maximum current (sink) 8 mA; isolated *3. from the output and control circuits; status commons are floating (withstand voltage of less than or

Item/Me	odel		PWX750LF	PWX750MLF	PWX750MHF	PWX750HF		
Control	features							
	Output v (VPGM)	voltage control	0 % to 100 % of the rated output voltage Selectable control voltage range: 0 V to 5 V or 0 V to 10 V					
		Accuracy		5%0	of f.s.			
External	Output o (IPGM)	current control		% to 100 % of the control voltage ra				
control		Accuracy		5%0	of f.s.			
*1		n/off control T ON/OFF CONT]		elections: turn the				
	Output sl [SHUT D	hutdown control OWN]	Turns	the output off with	n a low TTL level	signal		
	Alarm cle	ar control [ALM CLR]	Clears alarms with a low TTL level signal					
Other fea	atures							
Master-	slave para	allel operation	Including the master unit, up to four units(all the same model) can be connected.					
Series of	operation	*2	Up to two units (all the same model) can be connected.					
Preset r	nemory		Up to three sets of the following settings can be saved: the set voltage, the set current, the set OVP, the set OCP, and the set UVL.					
Key loci	<		Locks the op	peration of all keys	other than the O	UTPUT key.		
Interfac	е							
Internac								
	e protoco	1		IEEE Std 4	88.2-1992			
Softwar	e protoco nd langua		Ha •G	IEEE Std 4 mplies with SCPI s a compatibility r enesys Series ma 00/N8700 made b •PAG Series m	Specification 199 node (switchable) ide by TDK-Lamb by Agilent Techno) *3)da		

Excluding the PWX750HF

This setting does not guarantee compatibility with all measuring instrument application software and drivers.

Item/Model		PWX750LF	PWX750MLF	PWX750MHF	PWX750HF	
General						
	Operating environment	Indoor use, overvoltage category II				
Environmental	Operating temperature/humidity	0 °C to +50 °C/20 %rh to 85 %rh (no condensation)				
conditions	Storage temperature/ humidity	-10 °C to +6	%rh or less			
	Altitude		Up to 2	2000 m		
Cooling metho	bd		Forced air coo	oling using fan		
Grounding po	larity	Negativ	e grounding or po	sitive grounding	possible	
Isolation		± 250	Vmax	± 500 Vmax	± 800 Vmax	
voltage	Isolated analog interface *1		± 60 \	Vmax		
	Input-FG	No	abnormalities at 1	500 Vac for 1 mir	nute	
	Input-Output	No abnorma	lities at 2000 Vac	for 1 minute	No abnormalities at 2250 Vac for 1 minute	
Withstand voltage	Output-FG		s at 1500 Vdc for nute	No abnormalities at 1600 Vac for 1 minute	No abnormalities at 2000 Vac for 1 minute	
ronago	Input-Isolated analog interface *1	No	nute			
	Output-Isolated analog interface *1		s at 2300 Vdc for nute	No abnormalities at 2650 Vac for 1 minute	No abnormalities at 3300 Vac for 1 minute	
Insulation		500 Vdc, 100 M Ω or more(70 % or less)		1000 Vdc, 100 MΩ or more (70 % or less)		
resistance	Output-FG	500 Vdc, 40 M Ω or more(70 % or less)		1000 Vdc, 40 MΩ or more (70 % or less)		
Safety *2		Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU EN 61010-1 (Class I *4, Pollution degree 2)				
Electromagne compatibility (Complies with the requirements of the following directive and standard. EMC Directive 2014/30/EU EN 61326-1 (Class A *4), EN 55011 (Class A *4, Group 1 *5), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the PWX series must be less than 3 m.				
Dimensions(m /Weight	nm(inch)) (maximum)	485(19.09") W × 43(1.69")(44(1.73")) H × 500(19.69")(580(22.83")) D /Approx. 8 kq(17.64 lbs) 485(19.09") W × 43(1.69")(44(1.73")) H × 500(19.69")(580(22.83")) D /Approx. 7.5 kq(16.53 lbs)				
Accessories		AC cable: 1 wire, Output terminal cover: 1 pc., Output terminal M8 bolt set: M8 bolts ×2 sets(Bolt, nut, spring washer, and washer for each bolt), Chassis connection wire: 1 wire, J1 connector plug kit: 1 set (Housing: 1 pc., Connector: 1 pc., Plug: 1 pc., Strain relief: 1 pc., Clips: 2 pcs., and two types of Screws: 2 pcs.,), Packing list: 1 copy, Quick reference (1 each for English and Japanese), Safety precautions: 1 copy, China RoHS sheet: 1 copy, CD-ROM: 1 disc				

Option

*2. Only on models that have the CE marking on the panel. Does not apply to specially ordered or modified PWXs.

*3. This is a Class I equipment. Be sure to ground this product's protective conductor terminal. The

safety of this product is only guaranteed when the product is properly grounded. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the *4 user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

*5 This is a Group 1 equipment. This product does not generate and/or use intentionally radio frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose.

PWX Series 1500 W Type Specifications

Item/Model			PWX1500L	PWX1500ML	PWX1500MH	PWX1500H	
AC input							
Nominal	input rati	ng	100 Vac to 240 Vac, 50 Hz to 60 Hz, single phase				
Input vol	tage rang	je		85 Vac to	265 Vac		
Input fre	quency ra	ange		47 Hz t	o 63 Hz		
Current	(MAX)	100 Vac		21	A		
*1		200 Vac		10.	5 A		
Inrush c	urrent (M	AX) *2		75 Apea	k or less		
Power (I	ЛАХ) <mark>*3</mark>			220	0 VA		
Power fa	ictor (TYF	P) *1		(input voltage 10 (input voltage 20		0.98 (input voltage 100 V) 0.96 (input voltage 200 V)	
Efficienc	y (MIN) *	1		74 % c	or more		
Hold-up tir	ne for powe	r interruption (MIN) *3		20 ms o	r greater		
Output							
	Output voltage *4		30 V	80 V	230 V	650 V	
Rating	Output current *4		150 A	56 A	20 A	7 A	
	Output power			150	0 W		
	Setting range		0 V to 31.5 V	0 V to 84 V	0 V to 241.5 V	0 V to 682.5 V	
	Setting accuracy		± (0.05 % of set +0.05 % of rating)				
	Line regulation *5		± 5 mV	± 10 mV	± 25 mV	± 67 mV	
	Load regulation *6		± 5 mV	± 10 mV	± 25 mV	± 67 mV	
	Transien	it response *7	1 ms or less		7 ms (or less	
	Ripple	(p-p) *9	60 mV 80 mV		120 mV	330 mV	
Voltage	noise *8	(rms) *10	8 mV		25 mV	60 mV	
voltage	Rise	Rated load					
	time	No load		100	ms		
	Fall	Rated load	100) ms	150 ms	250 ms	
	time *11	No load	800 ms	1000 ms	1500 ms	3000 ms	
		emote sensing ion voltage (single line)	1.5 V	4 V	5 V	5 V	
	Temperatur	re coefficient (MAX) *12	1	100 ppm/°C (durin	g external contro	l)	
	Setting r	ange	0 A to 157.5 A	0 A to 58.8 A	0 A to 21 A	0 A to 7.35 A	
	Setting a	accuracy *13		± (0.5 % of set -	+0.1 % of rating)		
	Line reg		± 17 mA	± 7.6 mA	±4 mA	± 2.7 mA	
Current	Load reg	gulation	± 35 mA	± 16.2 mA	± 9 mA	± 6.4 mA	
	Ripple noise *14	(rms) *10	300 mA	130 mA	60 mA	30 mA	
	Temperatu	re coefficient (TYP) *12		100 p	pm/°C		

With rated load

*1. *2 Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms).

- *3 100 Vac with rated load.
- The maximum output voltage and current are limited by the maximum output power. 85 Vac to 135 Vac or 170 Vac to 265 Vac, fixed load.

*5.

- *6. The amount of change that occurs when the load is changed from no load to rated load (rated output power/rated output voltage) with rated output voltage. The value is measured at the sensing point
- *7 The amount of time required for the output voltage to return to a value within "rated output voltage \pm (0.1 % + 10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage. Measured using an RC-9131 1:1 probe that conforms to the JEITA specifications. At the rated output
- *8 current. When the measurement frequency bandwidth is 10 Hz to 20 MHz
- *9

*10. When the measurement frequency bandwidth is 5 Hz to 1 MHz.
*11. When the breeder circuit on/off setting is on.
*12. When the ambient temperature is within 0 °C and 50 °C.

*13

. For the PWX1500H, in the range of 0.2 % to 100 % of the rated current. *14. When the output voltage (Rated Power + Rated Current) is 10 % to 100 % of the rating. At the rated output current.

Item/Mo	del		PWX1500L	PWX1500ML	PWX1500MH	PWX1500H	
Display f	unction						
\/-!!		Maximum display	99.99 (fixed o	decimal point)	999.9 (fixed o	lecimal point)	
Voltage	display	Display accuracy		± (0.2 % of rea	ding +5 digits)		
Current	display	Maximum display	999.9 (fixed decimal point)	99.99 (fixed o	decimal point)	9.999 (fixed decimal point)	
		Display accuracy		± (0.5 % of rea	ading +5 digits)		
				The PWR DSPL	key lights in red.		
Power di	splay *1	Maximum display	9999				
		Display accuracy	Displays the result of multiplying the current and voltage				
Operatio	n display	1	OUTPUT ON/OFF, CV operation, CC operation, Alarm operation, Remote operation (LAN operation), Key lock operation, Preset memory				
Protectic	on functic	ins		<u> </u>		i	
(UVL), Ov	verheat pr	ction (OVP), Overvolt rotection (OHP), Ove ion (SENSE), Low A	rheat protection 2 (OHP2), Fan failure	protection (FAN),	ncorrect sensing	
Signal or	utput						
Monitor	Voltage	monitor (VMON)	Selectable	monitor voltage ra	ange: 0 V to 5 V o	r 0 V to 10 V	
signal		Setting accuracy	2.5 % of f.s.				
output	Current	monitor (IMON)	Selectable	monitor voltage ra	ange: 0 V to 5 V o	0 V to 10 V	
*2		Setting accuracy		2.5 %	of f.s.		
Status si	anal outr	out *2 *3	OUTON STATUS	CV STATUS CC STA	TUS ALM STATUS	PWR ON STATUS	

Status signal output *2 * OUTON STATUS, CV STATUS, CC STATUS, ALM STATUS, PWR ON STATUS Press PWR DSPL to display the power on the ammeter. Each time you press this key, the display

switches between power and current. J1 connector on the rear panel

*3. Photocoupler open collector output; maximum voltage 30 V, maximum current (sink) 8 mA; isolated from the output and control circuits; status commons are floating (withstand voltage of less than or

Item/Model			PWX1500L	PWX1500ML	PWX1500MH	PWX1500H		
Control	features							
	Output v (VPGM)	oltage control	0 % to 100 % of the rated output voltage Selectable control voltage range: 0 V to 5 V or 0 V to 10 V					
		Accuracy		5 % (of f.s.			
External	Output o (IPGM)	current control		% to 100 % of the control voltage ra				
control		Accuracy		5 % (of f.s.			
*1		n/off control [ON/OFF CONT]		ic selections: turn r turn the output c				
	Output sl [SHUT D	nutdown control OWN]	Turns the output off with a low TTL level signal					
	Alarm cle	ar control [ALM CLR]	Clears alarms with a low TTL level signal					
Other fe	atures							
Master-slave parallel operation		Including the master unit, up to four units(all the same model) can be connected.						
Series of	peration	*2	Up to two units (all the same model) can be connected.					
Preset r	nemory		Up to three sets of the following settings can be saved: the set voltage, the set current, the set OVP, the set OCP, and the set UVL					
Key lock	(Locks the operation of all keys other than the OUTPUT key.					
Interfac	е							
Softwar	e protoco			IEEE Std 4	88.2-1992			
			Complies with SCPI Specification 1999.0 Has a compatibility mode (switchable)*3 • Genesys Series made by TDK-Lambda • N5700/N8700 made by Agilent Technologies • PAG Series made by Kikusui					
Comma	nd langua	ige		00/N8700 made l	oy Agilent Techno			

Excluding the PWX1500H

Excluding the inverses.
 This setting does not guarantee compatibility with all measuring instrument application software and drivers.

Item/Model		PWX1500L	PWX1500ML	PWX1500MH	PWX1500H	
General						
	Operating environment		Indoor use, overv	oltage category II		
Environmental	Operating temperature/humidity	0 °C to +50 °C/20 %rh to 85 %rh (no condensation)				
conditions	Storage temperature/ humidity	-10 °C 1	to +60 °C/90 %rh	or less (no conde	nsation)	
	Altitude		Up to 2	2000 m		
Cooling metho	od		Forced air cod	oling using fan		
Grounding po	larity	Negativ	e grounding or po	sitive grounding	oossible	
Isolation volta	ige	± 250	Vmax	± 500 Vmax	± 800 Vmax	
Isolate	ed analog interface *1		± 60 '	Vmax		
	Input-FG	No	abnormalities at 1	500 Vac for 1 mir	nute	
	Input-Output	No abnorma	alities at 2000 Vac	for 1 minute	No abnormalities at 2250 Vac for 1 minut	
Withstand voltage	Output-FG	No abnormalities at 1500 Vdc for No abnormalities at 1600 Vac for 1 minute		No abnormalities at 1600 Vac for 1 minute	No abnormalities at 3300 Vac for 1 minut	
voltage	Input-Isolated analog interface *1	No	nute			
	Output-Isolated analog interface *1		s at 2300 Vdc for inute	No abnormalities at 2650 Vac for 1 minute	No abnormalities a 3300 Vac for 1 minu	
Insulation	Insulation		500 Vdc, 100 M Ω or more(70 % or less)			
resistance	Output-FG	500 Vdc, 4	1000 Vdc, 40 MΩ o more (70 % or less			
Safety *2		Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU EN 61010-1 (Class I *3, Pollution degree 2)				
Electromagnetic compatibility (EMC) *2		Complies with the requirements of the following directive and standard EMC Directive 2014/30/EU EN 61326-1 (Class A *4), EN 55011 (Class A *4, Group 1 *5), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the PWX Series must be less than 3 m.				
Dimensions (maximum) /Weight		43(1.69")(4 500(19.69")(5	09") W × 4(1.73")) H × 580(22.83")) D kg(20.94 lbs)	485(19.09") W × 43(1.69")(44(1.73")) H × 500(19.69")(580(22.83")) D /Approx. 9 kg(19.84 lbs)		
Accessories		Output terminal cover: 1 pc., Input terminal cover set, Output terminal M8 bolt set: M8 bolts ×2 sets(Bolt, nut, spring washer, and washer for each bolt), Chassis connection wire: 1 wire, J1 connector plug kit: 1 se (Housing: 1 pc., Connector: 1 pc., Plug: 1 pc., Strain relief: 1 pc., Clips: 2 pcs., and two types of Screws: 2 pcs.,), Packing list: 1 copy, Quick reference (1 each for English and Japanese), Safety precautions: 1 copy, China RoHS sheet: 1 copy, CD-ROM: 1 disc				
		*A power cord is not included. Please purchase the optional accessory separately (AC5.5-3P3M-M4C-VCTF).				

Option

*2. Only on models that have the CE marking on the panel. Does not apply to specially ordered or modified PWXs.

This is a Class I equipment. Be sure to ground this product's protective conductor terminal. The *3

safety of this product is only guaranteed when the product is properly grounded. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the *4 user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for *5.

DC POWER SUPPLY

Compact DC Power Supply(CV/CC)



Dimensions

107(4.21")W × 124(4.88")H × 315(12.40")Dmm(inch)

Accessories

Power cord: 1 pc (Approximately 2.5 m). Packing list: 1 copy. Quick reference: Japanese:1 copy, English: 1 copy, Chinese: 1 copy.Safety precautions: 1 copy. CD-ROM: 1 disc.

Options

Connector kit
 OP01-PMX
 Terminal unit(for use with the PMC-A series)
 TU01-PMX
 Sequence creation software
 SD025-PMX(Wavy for PMX)

Easy access with a built-in web server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PMX-A series for convenient control and monitoring.

[Recommended browser]

- Requires for the Internet Explorer version 9.0 or later
- Requires for the firefox 8.0 or later
- Requires for the safari / mobile Safari 5.1 or later
- Requires for the Chrome 15.0 or later
- Requires for the Opera 11.0 or later
- * Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).

Network function equipped as standard for the standard test power supply.

The PMX-A series is a compact, high-performance DC power supply that provides constant voltage (CV) and constant current (CC). It is designed to improve working efficiency for benchtop uses. For this purpose, the output terminals are located on the front panel and are ergonomically designed so that wiring harnesses for electrical loads can be connected by moving your fingers naturally. Moreover, a forced air cooling system is used to intake and exhaust of the internal air, so the unit can be rack mounted without space. Furthermore, the PMX-A is equipped with LAN, USB, and RS232C interfaces as standard interfaces required for system operation. In particular, the LAN interface enables you to control and monitor the power supply from Web browsers on PCs, smartphones, tablets, and other terminal devices. Moreover, the PMX-A is LXI(LAN eXtention for Instrumentation) compliant instrument, so it can be connected easier with your measurement system using LAN interface. The PMX-A is also equipped with remote sensing (for 18V, 35V models only), analog external control/monitoring output, various protective functions, memory function, and other functions.

Features

- Series regulator system with excellent noise performance
- High setting resolution Voltage: 1 mV, Current: 0.1 mA (PMX18-2A)
- Wide range of output variations (9 models are available)
- LAN (LXI compliant) / USB / RS232C as standard interface
- External analog remote control
- Monitoring and status signal output
- CV, CC priority start function
- (to prevent overshoot when the output is ON)
- Remote sensing function (18V, 35V models)
- Key lock, 3-point preset memory function



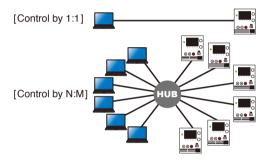
Digital, analog and other various external controls are supported. Remote control and monitoring can also be performed from Web browsers!

The PMX-A series is equipped with LAN, USB, and RS232C interfaces as standard communication interfaces. These interfaces enable remote control and monitoring to be performed efficiently in 1-to-N node configurations as well as in N-to-M node configurations even under large-scale networks. In particular, the LAN interface enables you to control and monitor the power supply through a browser on the PC, smartphone, tablet, or other terminal devices by accessing the built-in Web server of the PMX-A series.

LAN Interface

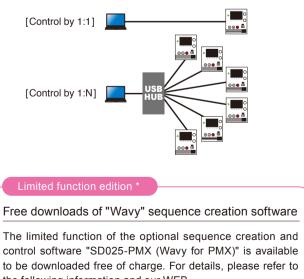
The LAN interface can control the number of devices with high speed, and it's theoretical controllable maximum number is to be calculated by approximately 4.2 billion. (The maximum transmission speed varies by the number of connected devices) In accordance with its applied standard, it is possible to combine the device that is to control or to be controlled, it is also the feature that it can be used with various applications. Also, in computers installed with Apple Bonjour, it is possible to access with a host name instead of the IP address

• AUTO MDIX function: The PMX-A series can automatically identify the type of LAN cable whether straight or cross is connected and it connects using the appropriate method.



■ USB Interface

The USB interface has a feature with high versatility, and ease of a setup. The automatic recognition by the plug and play releases a user from the complex setting operation under the digital control, and it can be suitable interface when control by 1:1. In accordance with the standard, the maximum number of the connected devices can be configured up to 127 units. Moreover, the USB interface of the PWX series complies to USB2.0, and it has realized transmission speed of a maximum of 12 Mbps (es) (Full Speed).



the following information and our WEB. * The number of steps is limited up to 5 steps

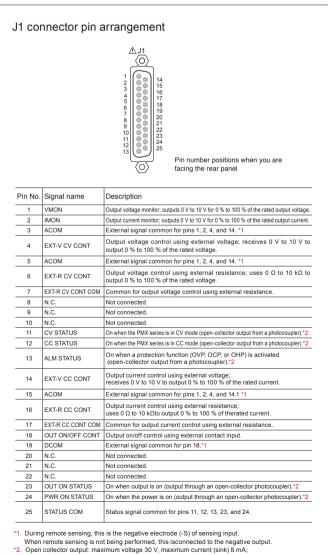
RS232C Interface

It can be used for communication with PCs and programmable logic controller



Analog Interface

The PMX-A series is equipped with external voltage/resistance control, which are interfaces required for analog external control and monitoring applications for test power supply devices. The input external signal and the output status signal can be conducted through the J1 connector on the rear panel.



the status common is floating (isolation voltage or less), it is isolated from the control circuit.

PMX-A Series Specifications

Item/Model			PMX18-2A	PMX18-5A	PMX35-1A	PMX35-3A	PMX70-1A	PMX110-0.6A	PMX250-0.25A	PMX350-0.2A	PMX500-0.1
AC input Nominal inpu	ut rating					100 Vac *1	50 Hz / 60 Hz, s	ingle phase			
Input voltage					-	100 140 1	± 10 %		-		
Input frequer	ncy range						47 Hz to 63 Hz				
Inrush currer			50 Amax or less			60 Amax or less			40 Amax or less	55 Amax or less	40 Amax or les
Power (MAX	() *3		150 VA	310 VA	150 VA	310 VA	230 VA	210 VA	210 VA	230 VA	170 VA
Output	Output voltage		18.00 V	18.00 V	35.00 V	35.00 V	70.00 V	110.0 V	250.0 V	350.0 V	500.0 V
Rating	Output current		2.000 A	5.000 A	1.000 A	3.000 V 3.000 A	1.000 A	0.600 A	0.250 A	0.200A	0.100 A
	Output power		36 W	90 W	35 W	105 W	70 W	66 W	62.5 W	70 W	50 W
	Setting range		0 V to 18.90 V	0 V to 18.90 V	0 V to 36.75 V	0 V to 36.75 V	0 V to 73.5 V	0 V to 115.5 V	0 V to 262.5 V	0 V to 367.5 V	0 V to 525.0 V
	Setting resolution			1	mV		2 mV		10	mV	
	Setting accurac		14	14	10		of setting +0.1 %		145	105	100 1/
	Line regulation		±1 mV ±2 mV	±1 mV ±5 mV	±3 mV ±3 mV	±3 mV ±4 mV	±5 mV ±5 mV	±7 mV ±7 mV	±15 mV ±15 mV	±25 mV ±25 mV	±30 mV ±30 mV
	Transient respo		12 1117		μs	141110	10 111	27 1117	100 µs	120 111	100 1111
Voltage	Ripple noise (rn	ns) <mark>*8</mark>		0.5	mV		1 mV	2 mV	3 mV	5 mV	10 mV
voltage	Rise time *9	Rated load			or less		150 ms or less	120 ms or less	120 ms or less	150 ms or less	120 ms or les
		No load			or less		150 ms or less	120 ms or less	120 ms or less	150 ms or less	120 ms or les
	Fall time *10	Rated load No load	270 ms or less		or less	270 ms or less	50 ms or less 270 ms or less	50 ms or less 120 ms or less	50 ms or less	80 ms or less 220 ms or less	50 ms or less 60 ms or less
	Maximum remote		210 IIIS OF IESS				LIU IIIS ULIESS	120 113 01 1855	120 ms or less	220 113 01 1855	
	compensation vo	Itage(single line)		0.0	6 V						
	Temperature co	pefficient (TYP)		0.0.1 :	0.4.4.5-5		100 ppm / °C				0.4.1. 0.10-
	Setting range Setting resolution	on *4	0 A to 2.1 A	0 A to 5.25 A	0 A to 1.05 A	0 A to 3.15 A	0 A to 1.050 A 0.1 mA	0 A to 0.630 A	0 A to 0.262 A	0 A to 0.210 A	0 A to 0.105 A
	Setting accurac					+ (0.3 %	of setting +0.1 %	of rating)			
Current	Line regulation			±5	mA	_ (0.0 /0	±2 mA	±2 mA	±1 mA	±1 mA	±1 mA
	Load regulation	1		±5	mA		±5 mA	±5 mA	±5 mA	±5 mA	±3 mA
	Ripple noise (rr	,	1 mA	2 mA	1 mA	1 mA			1 mA		
Diaplay fund	Temperature co	pefficient (TYP)					200 ppm / °C				
Display funct Voltage	Maximum displa	av		99.9	9 (fixed decimal	point)		1	999 9 (fixed (decimal point)	
display	Display accurac			00.0		. ,	% of reading +2	digits)			
Current	Maximum displa	ay				9.99	9 (fixed decimal	point)			
display	Display accurac						% of reading +5	• /			
		TPUT ON / OFF		Output on: OUTPUT LED lights in green. Output off: OUTPUT LED turns off. CV LED lights in green.							
	CV operation CC operation		CC LED lights in green.								
		Alarm operation		ALARM LED lights in red when a protection function has been activated.							
Operation display	Remote operati	Remote operation		REMOTE LED lights in green during remote control.							
		LAN operation	N - 6	LAN LED lights or blinks depending on the LAN communication status.							
	Key lock operat	tion	NO T	No fault status: Lights in green.Fault status: Lights in red.Standby status: Lights in orange.WEB identify status: Blinks green. LOCK LED lights in green when the keys are locked.							
	Preset memory			W		mory entry is bei	0	,		en.	
Protection fu	unctions										
		Operation		1		urns the output o				1	1
Overvoltage (OVP)	protection	Setting range	1.8 V to 19.8 V 1.8 V to 19.8 V 3.5 V to 38.5 V 3.5 V to 38.5 V 7 V to 77.00 V 11 V to 121.0 V 25 V to 275.0 V 35 V to 385.0 V 50 V to 550.0 V 10 % to 110 % of the rated output voltage								
(OVP)		Setting accuracy				10 % to 110	± (1 % of rating)	1			
		Operation *12			Т	urns the output o			RM		
Overcurrent	protection	Setting	Turns the output off, displays OCP, and lights ALARM 0.2 A to 2.2 A 0.5 A to 5.5 A 0.1 A to 1.1 A 0.3 A to 3.3 A 0.100 A to 1.100 A 0.060 A to 0.660 A 0.025 A to 0.275 A 0.020 A to 0.220 A 0.010 A to 0.110 A								
(OCP)		range	10 % to 110 % of the rated output current								
Quarter		Setting range				una de 1 - 1	± (1 % of rating)		20.4		
·	otection (OHP) ntrol • Signal outp	Operation			Τι	urns the output o	rr, displays OHP	and lights ALAF			
External Col		At rated voltage output					10.00 V ±0.1 V				
Monitor	(VMON)	At 0 V output					0.00 V ±0.1 V				
signal output *13, *14	Current monitor						10.00 V ±0.1 V				-
	(IMON)	At 0 A output					0.00 V ±0.1 V				
01.1	OUTON STATU	15					on when the outp on during CV op				-
Status signal output	CC STATUS						on during CV op on during CC op				
*14, *15	ALM STATUS						n an alarm has l				
	PWR ON STAT						hen the power i				
	EXT-V CV CONT	Ċ				00 % of the rated	output voltage i	n the range of 0			
	voltage control)			1 % of rati	ng +10 mV	0.0/ 611			1 % of rating		-
	EXT-R CV CONT resistance control)	È		1 0/ of rotio	0 % to 10 ng +10 mV	0 % of the rated	output voltage ir	the range of 0 Ω			
External	EXT-V CC CONT			i % of ratii	-	00 % of the rated	output current i	n the range of 0.	1 % of rating		
control	voltage control)			1 % of rati					1 % of rating		
*16	EXT-R CC CONT					0 % of the rated	output current ir	the range of 0 C	· · · ·		
	resistance control)	Accuracy		1 % of rati	ng +5 mV				1 % of rating		
	OUTPUT ON/O	OFF CONT	т	the output on u			sible logic select		2 HIGH (4 E) (+	5 V/) or open of	rouit
		control)						e output off using			

PMX-A Series Specifications

Item/Model		PMX18-2A PMX18-5A PM	X35-1A PMX35-3A	PMX70-1A	PMX110-0.6A	PMX250-0.25A	PMX350-0.2A	PMX500-0.1A
Other features Preset memory			Save up to 3 combination	s of the voltage	and current set	ing value		
	y	Select from the following three mode		0		<u> </u>	eset memory A,	B, and C keys.
Key lock		Loc2: Locks the operation o	f all keys except than the C	UTPUT key. Lo	c3: Locks the op	peration of all key	s and the rotary	knob.
Interface Common	Software protocol	IEEE Std 488.2-1992						
specifications	Command language			th SCPI Specific				
	Hardware		nplies with the EIA232D sp					
RS232C	Program message terminator	Baud rate: 19	200 bps fixed, Data length	: 8 bits, Stop bits eption, LF during		t: None, No flow	control.	
	Hardware	Complies with	the USB 2.0 specifications		-). Standard Type	B socket	
USB	Program message terminator		LF or EOM during rec					
	Device class		Complies with the USBT	MC-USB488 de	vice class spec	ifications		
	Hardware	IEEE 802.3 100B	ase-TX / 10Base-T Etherne			e Specification 2	011 Rev 1.4	
LAN	Communication protocol			RJ-45 connecto HiSLIP, or SCP				
27.03	· · · · · · · · · · · · · · · · · · ·	VXI-	11 and HiSLIP: LF or END			ng transmission		
	Program message terminator		SCPI-RAW: LF duri					
General specif	fications							
Weight (main u	unit only)		5 kg 6 kg	Approximately 6 kg	Approximately 6 kg	Approximately 6 kg	Approximately 6 kg	Approximately 6 kg
- · ·		(11.02 lbs) (13.23 lbs) (11.	.02 lbs) (13.23 lbs)	(13.23 lbs)	(13.23 lbs)	(13.23 lbs)	(13.23 lbs)	(13.23 lbs)
Dimensions (mi	m(inch))(maximum dimensions)	10	07 (4.21") W×124 (4.88")(15	· //		13.98")) Dmm		
	Operating environment Operating temperature /			e, overvoltage c				
Environmental	Operating humidity	(0 °C to +40 °C / 20 %rh to 8	5 %rh (no conde	ensation) (32 °F	to +104 °F)		
conditions	Storage temperature / Storage	-	-25 °C to +70 °C / 90 %rh c	r less (no conde	ensation) (-13 °F	to +158 °F)		
	humidity Altitude	Up to 2000 m Forced air cooling using fan						
Cooling metho								
Grounding pola	arity		Negative ground		-	le		
Isolation voltage	1	±70 Vdc				±550 Vdc		
Withstand	Between input and FG			ities at 1500 Vac				
voltage	Between input and output Between output and FG	No abnormalities at 1600 V		ities at 2100 Vac		alities at 2000 Va	c for 1 minute	
	Between input and FG							
Insulation resistance	Between input and output Between output and FG	500 Vdc, 30 MΩ or	more		100	0 Vdc, 30 MΩ or	more	
Safety *19			Complies with the requirem					
			oltage Directive 2014/35/E			· · ·	,	
Flootromognot	tic compatibility *19		he requirements of the follo Class A *21) , EN 55011 (C					
Electromagnet		The maximu	Applicable u Im length of all cabling and	nder the followir		must be less the	n 2 m	
Accessories		Power cord: 1 pc (Approximate	ely 2.5 m). Packing list: 1 c	opy. Quick refere	ence: Japanese			: 1 сору.
			Safety precau	tions: 1 copy. CE	0-ROM: 1 disc.			
Unless specified	l otherwise, the specifications are fo	or the following settings and conditions.	*1. 117 Vac, 200 V	ac, 217 Vac and 2	34 Vac are facto	y options.		
	re resistive loads.	wing)	*2. Excludes the c					al EMC filter circuit
 Negative output 	time is 30 minutes (with current flor put is connected to the chassis term	inal using the short bar.	*3. With the rated		witch is turned on	(for approximately	/ T IIIS).	
		ey are not guaranteed performance values.						
	ated by "rating" are rated values. ated by "setting" are setting values.							n SHIFT and turn um digit. If you are
	ted by "reading" are readout values						the value at 1/10t	h the resolution of
	nd no load are defined as follows: oltage mode (when the output curre	nt is set to a value greater than or equal	*5. 100 Vac to 90 V	git, regardless of /ac or 100 Vac to				
	um output current with rated output		*6. The amount of	change that occu ue is measured a			o load to rated loa	d with rated output
Rateu Ioau		en the rated output voltage is applied, 100 % of the maximum output current	*7. The amount of				value within "rat	ed output voltage
No load:	with rated output voltage.	output ourroot flows. In other words	±(0.05 % + 10n *8. When the mea	,		iged from 10 % to	100 % of the rated	l output current
No load.	refers to an open load (no load bei	output current flows. In other words, ing connected).	*9. The time it take	s for the output vo	Itage to rise from	10 % to 90 % of the		
		ge is set to a value greater than or equal	*10. The time it take *11. Ambient tempe			90 % to 10 % of the	e rating when the o	utput is turned off.
to the maximum output voltage with rated output Rated load: Refers to a resistive load that, wh the voltage drop to 95 % to 100 % rated output current.						ent peak that is g	enerated from the	capacitors inside
		of the maximum output voltage with		*12. This does not protect against the discharge current peak that is generated from the capacitors insid the PMX-A output section when the load is changed suddenly. *13. When remote sensing is used, connect the monitor signal's common line to the negative S terminal of the section of the sectio				
		ad cables, the PMX-A output voltage				used, connect it to		
Nelood		tput voltage with rated output current.	*14. J1 connector o		ut movimum ····	tago 20 \/ mayi	im ourront (sint-) 0	mA: isolated from
No load:		en the rated output current flows, makes ximum output voltage with rated output	*15. Photocoupler o the output and					mA; isolated from and status signals
	current or 1 V whichever is higher.		are not mutuall	y isolated.				-
			*16. J1 connector o *17. Use a cross ca		able).			
			*18. Category 5; us	e a straight cable.		nanala D-	annly to and 1 "	related an an 110 1
			*19. Limited to prod PMX-As.	ucts that have the	o⊏ mark on their	paneis. Does not a	apply to specially o	uerea or modified
			*20. This is a Class					rminal. The safety
			*21. This is a Class	A equipment. Thi	s product is inter		industrial environr	ment. This product ess the user takes
			anapial magazi	on to reduce clas	tromognotio omi	alana ta provant i	starforonas to the	recontion of radio

- may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.
- *22. This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the from of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment

DC POWER SUPPLY

Compact Multi-Output DC Power Supply (CV/CC)





Dimensions / Weight

214(8.42")W × 124(4.88")H × 400(15.74")Dmm(inch) / 13kg(28.66 lbs.)

Accessories

Power cord: 1 pc. Output terminal cover set: 1 set. Packing list: 1 copy. Safety Information: 1 copy. CD-ROM: 1 disc.

Application

- Power supply for tests involving transistors, IC circuits and operational amplifiers
- Integration into semiconductor evaluation test systems
- Power supply for research and development and manufacturing line integration

Easy access with a built-in web server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PMX-Multi series for convenient control and monitoring.

[Recommended browser]

- Requires for the Internet Explorer version 9.0 or later
- Requires for the firefox 8.0 or later
- Requires for the safari / mobile Safari 5.1 or later
- Requires for the Chrome 15.0 or later
- Requires for the Opera 11.0 or later
- * Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).



Three models with 2, 3 and 4 outputs. Optimal for R&D as well as manufacturing lines.

The PMX-Multi series is a multi-channel DC power supply with isolated outputs on each channel. The PMX32-3DU (2ch), PMX32-3TR (3ch), and PMX32-2QU (4ch) are all capable of simultaneous output in all channels and come with an output tracking feature. Also, channels 1 & 2 of each model can be easily connected in either series or parallel to increase the output voltage/current at the press of a button. LAN (LXI Compliant), USB, and RS232C are included as standard digital interfaces for easy system integration. The PMX-Multi benefits from a low noise, series regulator design that makes this series the perfect choice for experiments involving transistors, IC circuits, and op amp circuits as well as R&D and production line applications.

Features

- All channels with isolated outputs for maximum safety High level of safety due to each output being completely isolated
- High setting resolution (Voltage: 1 mV, Current: 0.1 mA)
- Independent ON/OFF configuration for all channels
- Simple series/parallel connection between channels (CH1 & CH2)
- Tracking control in all channels
- ON/OFF delay feature in all channels
- Key lock, Preset memory function (3 slots)
- Simultaneous display of all channels
- Remote sensing function
- High quality LCD panel for improved visibility
- LAN (LXI Compliant)/USB/RS232C standard interface

Functions

Tracking feature

The tracking feature allows the operator to control the ratio for increase/ decrease of output among multiple channels within the power rating. This feature can be used freely among all channels with two ratio options: absolute value variation and variation ratio.

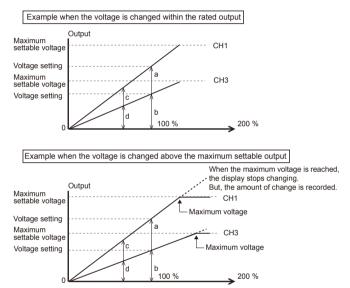
Absolute Value Variation(TRACKING 1)

This mode allows for voltage/current settings in all specified channels to change at the same rate as a selected channel.

Variation Ratio(TRACKING 2)

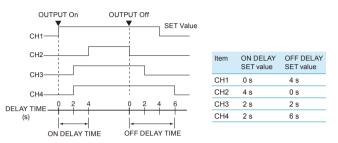
This mode allows for voltage/current settings in all specified channels to change in equal proportion to a selected voltage or current rating. *The variable range is from 0.0% to 200.0%

Example: Here we will use TRACKING 2 on CH1 and CH2 of a PMX32-2QU. When you turn the rotary knob during tracking operation, the outputs change at the same percentage as the preset output percentage (b/a). b/a = d/c This proportional expression is satisfied.



Delay function

The optional setting creates a programmable delay between the OUTPUT switch being activated and the actual output being released. The setting range for DELAY TIME is from 0.1 - 99.9 seconds.





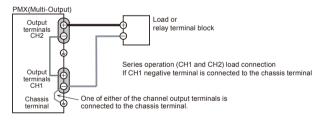
* The actual rise/fall time with output off will vary depending on the output and load conditions. Note that the timing chart above ignores rise and fall time. There are cases where the actual delay time varies by a few tens of milliseconds even when the delay time is set to 0 seconds.

When power supplies are not activated properly, there is the slight risk of damage being caused to the overall system. For this reason ON delay control is a very important feature that is required for power source output. This feature is also necessary when turning output OFF, and is highly convenient for operating circuits.

Series and parallel connection at the press of a button

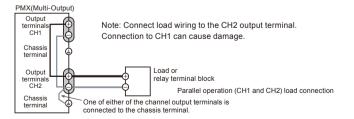
Series Operation

CH1 and CH2 can be connected in series to increase the overall voltage output range. CH2 operates as master and CH1 as slave. The total output voltage will be the sum of CH1 and CH2.



Parallel Operation

CH1 and CH2 can beconnected in parallel to increase the overall current range. CH2 operates as master and CH1 as slave. The total output current will be the sum of CH1 and CH2.



PMX32-3TR

99.999 (fixed decimal point)

PMX32-2QU

PMX-Multi Series Specifications

Unless specified otherwise, the specifications are for the following settings and conditions

- Loads are purely resistive loads.
- The product is warmed up for at least 30 minutes. The negative output is connected to the chassis terminal with a short bar.
- Values indicated by "TYP" are typical values. These values do not guarantee the performance of the PMX seres (multiple-output)
 rating: Indicates the rated.
 set: Indicates a setting.
 reading: Indicates the readout value.
- Rated load and no load are defined as follows:
- In constant-voltage mode (when the output current is set to a value greater than or equal to the maximum output current with rated output voltage)
- Refers to a load through which no output current flows. In other words, refers to an open load (no load being connected). Rated load: No load:

In constant-current mode (when the output voltage is set to a value greater than or equal to the maximum output voltage with rated output current)

Rated load: Refers to a resistive load that, when the rated output current flows, makes the voltage drop to 95 % to 100 % of the maximum output voltage with rated output current.

Including the voltage drop in the load cables, the product's output voltage must not exceed the maximum output voltage with rated output current. No load Refers to a resistive load that, when the rated output current flows, makes the voltage drop to 10 % of the maximum output voltage with rated output current or 1 V whichever is higher.

Item/Model

Display functi

Voltmeter

Maximum display

Item/Model			PMX32-3DU	PMX32-3TR	PMX32-2QU			
AC input								
Nominal in	put rating		234 Vac *1, 50 Hz/ 60 Hz, single phase					
Input voltag	ge range			± 10 %				
Input frequ	ency range		47 Hz to 63 Hz					
Inrush curr	ent (MAX) *2	2	150 A	150 A	150 A			
Power (MAX)			700 VA	900 VA	800 VA			
Output								
		CH1	32.000 V	32.000 V	32.000 V			
	Output	CH2	32.000 V	32.000 V	32.000 V			
	voltage	CH3	_	6.000 V	18.000 V			
Detine		CH4	_	—	18.000 V			
Rating		CH1	3.000 A	3.000 A	2.000 A			
	Output	CH2	3.000 A	3.000 A	2.000 A			
	current	CH3	_	5.000 A	2.500 A			
		CH4	_	_	2.500 A			
		CH1	33.600 V	33.600 V	33.600 V			
	Maximum	CH2	33.600 V	33.600 V	33.600 V			
	voltage setting	СНЗ	_	6.300 V	18.900 V			
	setting	CH4	_	_	18.900 V			
	Resolution			1 mV				
	Voltage set accuracy *		±(0.03 % set +5 mV)					
	accuracy	CH1	3 mV	3 mV	3 mV			
	Input line regulation *4	CH2	3 mV	3 mV	3 mV			
		CH3	51110	1 mV	1 mV			
		CH4		_	1 mV			
		CH1		 4 mV	2 mV			
Constant	Load regulation *5	CH2	4 mV	4 mV	2 mV			
voltage		CH3	4 1110	5 mV	3 mV			
		CH3 CH4	_	51110	3 mV			
	Transient re		_	 50 μs	51110			
	Transient response *6		50 μs 500 μV					
	Ripple noise (rms) *7 Command delay							
	Rise time	uelay	80 ms					
	(at rated load) *8		10 ms ±30 %					
		CH1	350 ms ±30 %	350 ms ±30 %	350 ms ±30 %			
	Fall time	CH2	350 ms ±30 %	350 ms ±30 %	350 ms ±30 %			
	(at no load) *9	CH3	_	220 ms ±30 %	240 ms ±30 %			
		CH4	_	_	240 ms ±30 %			
	Temperatu coefficient		100 ppm/ °C					
		CH1	3.150 A	3.150 A	2.100 A			
	Maximum	CH2	3.150 A	3.150 A	2.100 A			
	current setting	CH3	_	5.250 A	2.625 A			
	Setting	CH4	_	_	2.625 A			
	Resolution			0.1 mA				
	Current set	ting			~)			
Canatant	accuracy *		±	(0.3 % set +0.1 % ratin	g)			
Constant current	Input line re	gulation *4		0.01 % + 0.25 mA				
sanon	Load regula	ation *10		5 mA				
		CH1	1 mA	1 mA	1 mA			
	Ripple	CH2	1 mA	1 mA	1 mA			
	noise			2 mA	1 0			
		CH3	—	ZIIIA	1 mA			
	(rms) *7	CH3 CH4	_		1 mA			
		CH4	_	200 ppm/ °C				

100 Vac. 117 Vac. 200 Vac. and 217 Vac are factory options. (Not CE certified product.) Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms). *2

- At an ambient temperature of 23 °C±5 °C. 90 % to 100 % or 100 % to 110 % of the nominal input voltage rating, rated load.
- The amount of change that occurs when the load is changed from no load to rated load at the rated output voltage. The value is measured at the sensing point. *5

The amount of time required for the output voltage to return to a value within "rated output voltage *6 \pm (0.05 % + 10 mV)." When the load current is changed from 10 % to 100 % of the rated output

current. The value is measured at the sensing point. When the measurement frequency bandwidth is 5 Hz to 1 MHz.

- *8. The time for the output voltage to rise from 10 % to 90 % of the rating when the output is turned

on.
 The time for the output voltage to fall from 90 % to 10 % of the rating when the output is turned off.
 The amount of current change when the load is changed from 10 % of the rated voltage or 1 V,

Display accuracy *1 ±(0.1 % of reading +10 mV) Maximum display 9.999 (fixed decimal point) Ammete Display accuracy * ±(0.2 % of reading +5 mA) OUTPUT ON/OFF Output on: "ON" display (green) Output off: "OFF" display Displays "DELAY SET" when set "DELAY" blinks during output-on delay/ off delay. "DELAY" is displayed after the output-on delay/off delay has Output-on delay/ off dela passed. "CV" display (green) CV operation CC operation "CC" display (red) Alarm operation Displays "ALARM" (red) when a protection function is activated. Displays "PRESET A," "PRESET B," or "PRESET C" when a Operation Memory memory area is in use. display Displays "LOCK" when the keys are locked Key lock Displays "TRACKING 1" or "TRACKING 2" when tracking is in Tracking operation. Remote operation Displays "REMOTE" during remote control. Displays or blinks "LAN" (depending on the status). No fault status: Lights green. LAN operation Fault status: Lights red.
Standby status: Blinks red · WEB identify status: Blinks green Turns the output off, displays "OVP," and displays "ALARM" (red). Action Overvoltage Setting range 10 % to 110 % of the rated output voltage protection Setting ±(1 % of rating) (OVP) accuracy 1 mV Resolution Turns the output off, displays "OCP," and displays "ALARM" (red). Action *2 Setting range 10 % to 110 % of the rated output current Overcurrent Setting protection ±(1 % of rating) (OCP) accuracy Resolution 0.1 mA Overheat Turns the output off, displays "OHP," and displays "ALARM" protection Action (red). (OHP) Communication Turns the output off, displays "WDOG," and displays "ALARM" monitorring Action (red). (WATCHDOG) Alarm Turns the output off, displays "IN," and displays "ALARM' signal input Action (red) (ALARM IN) OUTPUT ON On when output is on STATUS Status Signal output *3 On when an alarm is activated ALARM STATUS (OVP, OCP, OHP, WATCHDOG, ALARM IN) POWER ON STATUS Turns on when the power is turned on Control f Logic selectable: • Negative logic Output on/off control Output on when set to LOW (0 V to 0.5 V) or shorted (OUTPUT ON/OFF CONT) output off when set to HIGH (4.5 V or 5 V) or open Externa Positive logic contro Output on when set to HIGH (4.5 V to 5 V) or open output off when set to LOW (0 V or 0.5 V) or shorted Alarm input The output turns off with an alarm signal input (ALARM IN) (the contact switch shorted for at least 0.5 s). Sensing 0.6 V for a single line (but the output terminals are controlled at the rated voltage) At an ambient temperature of 23 °C±5 °C. This does not protect against the discharge current peak that is generated from the capacitors inside the product's output section when the load is changed suddenly.

PMX32-3DU

*3 Photocoupler open collector output: Maximum voltage 30 V. maximum current (sink) 8 mA Isolated from the output and control circuits. The status common is floating (within the isolation voltage)

PMX-Multi Series Specifications

Item/Mode	el	PMX32-3DU	PMX32-3TR	PMX32-2QU		
Parallel op	eration					
Applicable	channels	Master: CH2, slave: CH1				
	Operating range		0 V to 32 V			
Constant	Setting range		0 V to 33.6 V			
voltage	Setting accuracy *1	C	0.3 % set + 0.1 % rating	9		
	Resolution		1 mV			
	Operating range	0 A te	5 6 A	0 A to 4 A		
Constant	Setting range	0 A to	6.3 A	0 A to 4.2 A		
current	Setting accuracy *1	C	0.4 % set + 0.1 % rating	9		
	Resolution		0.2 mA			
Voltmeter	Maximum display	99.999 (fixed decimal point)				
volumeter	Display accuracy *1	±(0	git)			
Ammeter	Maximum display	9.999 (fixed decimal point)				
Ammeter	Display accuracy *1	±(1 % of reading + 10 digit)				
Series ope	ration					
Applicable	channels	Master: CH2, slave: CH1				
	Operating range	0 V to 64 V				
Constant	Setting range		0 V to 67.2 V			
voltage	Setting accuracy *1 *2	C	9			
	Resolution		2 mV			
	Operating range	0 A te	5 3 A	0 A to 2 A		
Constant	Setting range	0 A to	3.15 A	0 A to 2.1 A		
current	Setting accuracy *1	C	0.4 % set + 0.1 % rating	9		
	Resolution	0.1 mA				
Voltmeter	Maximum display	99.999 (fixed decimal point)				
volunelei	Display accuracy *1 *2	±(0.5 % of reading + 20 digit)				
Ammeter	Maximum display	9.9	999 (fixed decimal poi	nt)		
Ammeter	Display accuracy *1	±(1 % of reading + 5 dig	it)		

Item	/Model		PMX32-3DU	PMX32-3TR	PMX32-2QU		
Othe	r functions						
Outp	ut-on delay/	off delay					
	Applicable	channels		All channels			
	Setup		Set t	ne output on/off delay	time.		
	Setting ran	ge		0.1 s to 99.9 s			
	Resolution			0.1 s			
	Setting acc	uracy *1		±50 ms			
Memory			Saves three combinations of voltage, current, OVP, OCP, and output-on delay/ off delay settings.				
Key lock			Selectable from the following three modes. • Loc1: Lock all keys except the OUTPUT and memory A, B, and C keys. • Loc2: Lock all keys except the OUTPUT key. • Loc3: Lock all keys and the rotary knob.				
Track	king						
	Applicable	channels	All channels				
	Operation	Tracking function 1 *2		Absolute value change	9		
	mode	Tracking function 2 *3	Percentage change				
	Setting	CV setting accuracy	(0.4 % of rating + 40 m	/		
	accuracy	CC setting accuracy	0.7 % of rating + 10 mA				

*1. The difference between the time from when the reference output reaches 5 % of the setting to when the target output reaches 5 % of the setting and the delay time setting. In tracking function 1, the output can be varied within the output range of the reference channel

*2. voltage or current. *3. In tracking function 2, the output can be varied at the same percentage as the reference output in

reference to the output at the start of the tracking function.

*1. At an ambient temperature of 23 °C±5 °C.
*2. The value is measured at the sensing point.

Item/Model		PMX32-3DU	PMX32-3TR	PMX32-2QU					
Interface		·							
Common	Software protocol	IEEE Std 488.2-1992							
specifications	Command language	Complies with SCPI Specification 1990.0							
RS232C	Hardware		ng the terminal block) D-sub 9-pin terminal block (r 57600, 115200 bps Data length: 8 bits, Stop bits:						
	Program message terminator	LF during reception, LF during transmission.							
	Hardware	Standard type B socket. Complies with the USB 2.0	specifications; data rate: 12 Mbps (full speed)						
USB	Program message terminator	LF or EOM during reception, LF + EOM during transmission.							
	Device class	Complies with the USBTMC-USB488 device class specifications.							
	Hardware	IEEE 802.3 100Base-TX/10Base-T Ethernet, IPv4	, RJ-45 terminal block						
	Compliant standards	LXI Device Specification 2016, LXI HiSLIP Extended	ed Function Rev. 1.0, LXI VXI-11 Extended Function	Rev. 1.0					
LAN	Communication protocol	VXI-11, HISLIP, SCPI-RAW, SCPI-Telnet							
	Message terminator	VXI-11, HiSLIP: LF or END during reception, LF + I	END during transmission. SCPI-RAW: LF during re	ception, LF during transmission.					
General specifica	ations								
	Operating temperature range	0 °C to 40 °C (32 °F to 104 °F)							
	Operating humidity range	20 %rh to 85 %rh (no condensation)							
Environmental conditions	Storage temperature range:	-25°C to 70°C (13°F to 158°F)							
conditions	Storage humidity range:	90 %rh or less (no condensation)							
	Installation location	Indoor use, altitude of up to 2 000 m, overvoltage category II							
	Between channels	±70 Vdc							
Isolation voltage	Between the output and chassis	±70 Vdc							
	Between the primary circuit and chassis	No abnormalities at 1500 Vac for 1 minute.							
Withstanding voltage	Between the primary and secondary circuits	No abnormalities at 2600 Vac for 1 minute.							
	Between the secondary circuit and chassis	No abnormalities at 1500 Vdc for 1 minute.							
	Between the primary circuit and chassis								
Insulation	Between the primary and secondary circuits	500 Vdc, 30 MΩ or greater							
resistance	Between the secondary circuit and chassis								
	Between channels								
Cooling method		Forced air cooling using a fan motor							
Common		All channels are independent.							
Grounding polari	ty	Negative grounding or positive grounding possible							
Electromagnetic	compatibility *1 *2	Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU, EN 61326-1(Class A*3), EN 55011(Class A*3, Group 1*4), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions. The maximum length of all cabling and wiring connected to the product must be less than 3 m.							
Safety *1		Complies with the requirements of the following dir Low Voltage Directive 2014/35/EU*2, EN 61010-1(

Does not apply to specially ordered or modified products.

*2. *3. Only on models that have the CE marking on the panel

This product confirms to Class A. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of

*4. This product confirms to Class I. Be sure to ground the protective conductor terminal of this product. If not grounded properly, safety is not guaranteed. Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur

*5. *6.

Programmable Bipolar Power Supply (CV/CC)



Dimensions / Weight

429.5(16.91")W × 128(5.0")H × 550(21.65")Dmm / 22kg(48.5 lbs)

Accessories

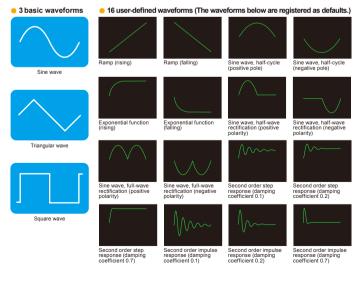
Power cord: 1 pc., J1 connector (Socket: 1 pc., Protection covers: 2 pairs, Pins: 30 pc.), Heavy object warning label: 1 pc., CD-ROM: 1 pc., Operation manual (Setup guide: 1 pc., Safety information 1pc., Quick reference English 1pc., Japanese 1pc.)

Functions

Waveform generation function

In addition to the basic sine, square and triangular waveforms, the PBZ series is equipped with a user-defined waveform generating function that can register up to 16 waveforms. It allows the amplitude, frequency, start phase, frequency sweep and square wave duty to be set as needed.

The 16 user-defined waveforms can be freely edited, and the original created and edited waveforms can be registered and easily recalled for use. The sequence function allows each waveform to be set as a single step, and a maximum of 1024 steps can be set in the 16 programs.



Superior output characteristic by adopting the power amp system

The PBZ series is a bipolar type DC regulated power source that can continuously change both positive and negative polarities passing through 0 without changing the output terminal.

By adopting a "Switching + Linear" system, the PBZ is able to realize 40 % lighter than PBX series while achieving high speed operation with low ripple noise. Since operation covers 4 quadrants, power can be both supplied (source) and absorbed (sink). The PBZ can also drive inductive or capacitive loads. The unit also equips a signal generator function which enables waveform and sequence creation. The PBZ is also capable of synchronized operation which is required for voltage variation tests, and it can also be expanded for large current applications through master-slave parallel operation.

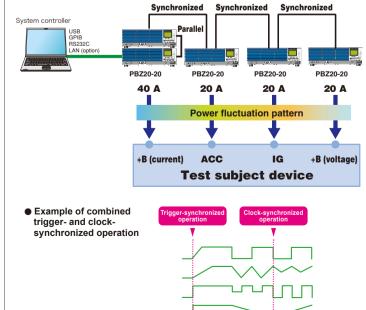
Features

- Waveform generation function
- Low ripple noise
- Synchronized operation function(Trigger-based, Clock-based)
- Sequence function
- Unipolar mode
- Parallel operation function
- High-speed response 100kHz (CV)
- Low ripple and noise (in CV mode) For the Ripple 2 mVrms, Noise 20 mVp-p (PBZ20-20) 4 mVrms, Noise 20 mVp-p (PBZ40-10) 4 mVrms, Noise 30 mVp-p (PBZ60-6.7) 4 mVrms, Noise 30 mVp-p (PBZ80-5)

Synchronized operation function

(Trigger synchronized, Clock synchronization) This function synchronizes the power output when a sequence is executed using multiple PBZ. It prevents time deviations from occurring even when a long sequence is executed. *A delay of up to 1µs occurs at the start.





Functions

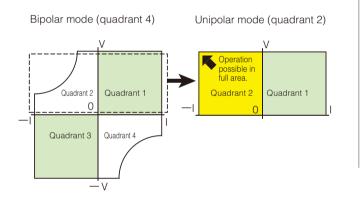
Sequence function

The basic sine, triangular and square waveforms, as well as the 16 userdefined waveforms, can each be set as a sequence step, allowing even complex sequences to be created easily. Sequences are composed of up to 1024 steps. This combination of steps forms a program, and the 1024 steps can be allocated and set in a maximum of 16 programs. When executing sequences, in addition to executing a single program, the script function also allows multiple programs to be combined and executed as needed.

A script is a function that specifies the sequence and number of repetitions for the set programs. A maximum of 50 lines can be set in 1 script for each CV and CC mode.

Unipolar mode

This is a function unique to this product. Because the voltage is unipolar, this function is called "unipolar mode". With unipolar power, although the current flows in a single direction, in unipolar mode it is still possible to apply current in both directions (source and sink). As shown in the diagram, on a graph with perpendicular axes of voltage (vertical) and current (horizontal), operation is possible in quadrant 1 and quadrant 2 (2 quadrants). In bipolar mode, there are power restriction areas (PBZ20-20: 100 W, PBZ40-10: 180 W, PBZ60-6.7, PBZ80-5: 200 W) in quadrants 2 and 4. However in unipolar mode, operation is possible in the full area of quadrant 2.



Options



Parallel operation kit PK01-PBZ PK02-PBZ(EIA) PK03-PBZ(JIS)

M8 terminal connection kit OP01-PBZ-A

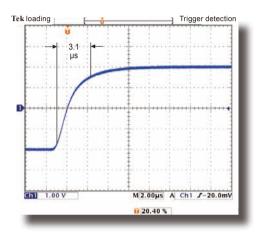
Parallel operation function

This function expands the output current. It allows multiple units to be connected in parallel according to the required current. With 2 units of the same model and the optional parallel operation kit, the user can easily complete the setup. Although up to 5 units can be operated in parallel, if 3 or more units will be used, please consult with us.

High-speed response

100 kHz frequency characteristic (CV)

The superior waveform quality with rise and fall with times of $3.5 \ \mu$ s which makes it possible to reproduce a variety of waveforms with high precision.



▲ Sample of rising waveform When response of 3.5 µs is set

Interface board LAN Interface (factory option)

It applies to control and monitor the power supply from a browser.

■ Sequence creation software Wavy for PBZ

PBZ Series Specifications

Unless specified otherwise, the specifications are for the following settings and conditions The warm-up time is 30 minutes (with current flowing)

- •TYP value: These are typical values that are representative of situations where the PBZ operates in an environment with an ambient temperature of 23 °C. These values do not guarantee the performance of the PBZ
- rating/CF: The rated voltage or rated current divided by CF (crest factor).
- The polarity of the output voltage and current is defined as follows.

Voltage: Using the output's COM terminal as a reference, the voltage is positive (+) when the OUT terminal is positive and negative (-) when the OUT terminal is negative Current Positive (+) when current flows out from the OUT terminal and negative (-) when current flows into the OUT terminal.

• The output specifications apply to the rear panel output terminals under the following conditions: The short bar is used to connect the output's COM terminal and chassis terminal.

Remote sensing is not being performed. The auxiliary output terminals may not meet the specifications.

Loads are purely resistive loads.

• Rated loads are defined as follows:

When the PBZ is generating its rated voltage, the load causes the rated current to flow Or, when the PBZ is generating its rated current, the load makes the voltage drop to the PBZ's rated voltage.

AC input	t, rated output	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5		
	Nominal input voltage		100 V to 240 V	/ AC, 50/60 Hz			
	Voltage and frequency range		90 V to 250 V A0	C, 47 Hz to 63 Hz			
AC	Current		10 A AC or less	s (at rated load)			
input	Inrush current	40 Apeak or less					
	Power	900 VA or less (at rated load)					
	Power factor	0.95 (at input voltage 100 V, rated load) (TYP. value)					
	Output power	400 W		402 W	400 W		
Rated	Output voltage	±20 V	±40 V	±60 V	±80 V		
output	Output current	±20 A	±10 A	±6.7 A	±5 A		
	Voltage to ground	DC 500 V	, grounding perm	itted at COM terr	ninal only		

Constan	t voltage	e (CV mode)	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5	
	Settina	Bipolar mode	0.000 V to ±21.000 V	0.000 V to ±42.000 V	0.000 V to ±63.000 V	0.000 V to ±84.000 V	
	range	Unipolar mode	0.000 V to 21.000 V	0.000 V to 42.000 V	0.000 V to 63.000 V	0.000 V to 84.000 V	
DC		Fine function		±5 % o	f rating		
voltage	Setting	resolution	0.001 V (Fine f resolution	unction setting 0.0001 V)	0.002 V (Fine f resolution		
	Setting	accuracy *2	±(0.05 % of setting	+ 0.05 % of ratin	g)	
	Temp.	coefficient	±	(100 ppm/°C of ra	ating) (TYP. value	e)	
AC	Setting	range *1	0.00 Vpp to 42.00 Vpp	0.0 Vpp to 84.0 Vpp	0.0 Vpp to 126.0 Vpp	0.0 Vpp to 168.0 Vpp	
voltage	Setting	resolution	0.01 V		0.1 V		
	Setting accuracy *3		±0.5 % of rating				
	Setting range		0.01 Hz to 100.00 kHz				
AC	Setting	resolution	0.01 Hz				
frequen-	Setting	accuracy	±200 ppm				
су	Sweep		Linear, log				
	Sweep	time	100 µs to 1000 s (resolution 100 µs)				
AC	Туре		Sine wave, square wave, triangular wave, user-defined waves (16 waves)				
wave-	Start pl	hase	0 ° to 359 °				
form	Square	wave duty	0.1 % to 99.9 % (f < 100 Hz), 1 % to 99 % (100 Hz ≤ f < 1 kHz 10 % to 90 % (1 kHz ≤ f < 10 kHz), 50 % fixed (10 kHz ≤ f)				
	Frequer	ncy characteristic *4		DC to 100 kH	z (TYP. value)		
	Respor	nse *5, *6	3.5	µs, 10 µs, 35 µs,	100 µs (TYP. val	ue)	
Constant	Oversh	oot		5 % or less	TYP. value)		
voltage	Ripple	(p-p) *7	20 mV (T	YP. value)	30 mV (T	YP. value)	
characte- ristic	Noise	(rms) *8	2 mV (TYP. value)	4	1 mV (TYP. value)	
	Load et	ffect *9			etting + 1 mV)		
	Source	effect *10	±(0.005 % of setting + 1 mV)				

*1. The combination of the DC voltage and AC voltage peak values is limited to within the DC voltage setting range.

*2 At ambient temperature of 18 °C to 28 °C

- *3. At ambient temp. 18 °C to 28 °C, 1 kHz sine wave, response 3.5 µs, no load Frequency at which the amplitude ratio of the output voltage relative to the external signal input
- *4. voltage is -3 dB (at standard frequency 1 kHz, response 3.5 µs, rated load) *5 Rise time / fall time (at rated load, excepting output ON/OFF) Frequency characteristic determined
- by the set response (frequency band = 0.35 / Rise time). Rise time: When the output voltage is changed from 0 V to the rated voltage, the rise time is the *6.

time during which output voltage changes from 10 % to 90 % of the rated voltage Fall time: When the output voltage is changed from the rated voltage to 0 V, the fall time is the time during which output voltage changes from 90 % to 10 % of the rated voltage.

Measurement frequency band is 10 Hz to 20 MHz (at the output terminal).

*8 Measurement frequency band is 10 Hz to 1 MHz (at the output terminal).

Change in output voltage (at sensing terminal using remote sensing) in response to a change from 0 % to 100 % of the rated output current

*10. Change in output voltage (at sensing terminal using remote sensing) in response to a ±10 % change from the nominal input voltage

Constan	t current	(CC mode)	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5	
	Octung	Bipolar mode	0.000 A to ±21.000 A	0.000 A to ±10.500 A	0.000 A to ±7.035 A	0.000 A to ±5.250 A	
	range	Unipolar mode	±21.000 A			10.200 A	
DC	<u> </u>	Fine function		±5 % o	U		
current		resolution	0.001 A		tting resolution 0	.0001 A)	
		accuracy *2	-		of rating)		
	Temp.	coefficient			ating) (TYP. value	,	
AC	Setting	range *1	0.00 App to 42.00 App	0.00 App to 21.00 App	0.00 App to 14.07 App	0.00 App to 10.50 App	
current				0.0	1 A		
	Setting	accuracy *3		±0.5 %	of rating		
	Setting	range		0.01 Hz to	100.00 kHz		
AC	Setting	resolution	0.01 Hz				
frequen-	Setting accuracy Sweep		±200 ppm				
су			Linear, log				
	Sweep	time	100 µs to 1000 s (resolution 100 µs)				
AC	Туре		Sine wave, square wave, triangular wave, user-defined waves (16 waves)				
wave-	Start pl	hase	0 ° to 359 °				
form	Square	wave duty			% to 99 % (100 H kHz), 50 % fixed		
	Frequer	ncy characteristic *4	DC to 10 kHz (TYP. value)	DC to 5 kHz (TYP. value)	DC to 10 kHz	(TYP. value)	
Constant current	Respor	ıse	35 μs, 100 μs, 350 μs, 1 ms (TYP. value)	70 μs, 100 μs, 350 μs, 1 ms (TYP. value)	35 μs, 100 μs, 350 μs, 1 ms (TYP. value)		
characte-	Oversh	ioot		5 % or less	(TYP. value)		
ristic	Ripple	noise (rms) *7		3 mA (TY	P. value)		
	Load et	ffect *8		±(0.01 % of se	etting + 1 mA)		
	Source	effect *9	±(0.01 % of setting + 1 mA)				

The combination of the DC current and AC current peak values is limited to within the DC current *1 setting range.

*2 At ambient temperature of 18 °C to 28 °C

*3

At ambient temp. 18 °C to 28 °C, 100 Hz sine wave, response 35 µs, output short circuited Frequency at which the ratio of the external signal input amplitude and output current amplitude is -3 dB (at standard frequency 100 Hz, response 35µs, rated load) The frequency characteristic varies depending on the load impedance. When the load impedance

increases, the frequency characteristic declines *5. Rise time / fall time (at rated load, excepting output ON/OFF) Rise/fall time varies depending on the

load impedance.

*6 Rise time: When the output current is changed from 0 A to the rated current, this is the rise time is the time during which the output current changes from 10 % to 90 % of the rated current Fall time: When the output current is changed from the rated current to 0 A, the fall time is the time during which the output current changes from 90 % to 10 % of the rated current.

*7 The measurement frequency band is 10 Hz to 1 MHz (at 10% to 100% of rated output voltage).

Change in the output current in response to a voltage change from 10 % to 100 % of the rated output voltage

Measurer	nent displa	ay function	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5		
		Measurement range (resolution)		120 % of rating (0.001 V)				
	DC	Accuracy *1	±(0.05 % of reading + 0.05 % of rating)					
		Temp. coefficient	±	(100 ppm/°C of ra	ating) (TYP. value	e)		
	AC	Measurement range (resolution)		120 % of rating/CF (0.001 V)				
Voltage measure- ment	DC + AC	Measurement range (resolution)		120 % of rati	ng (0.001 V)			
ment	40		±(0.5 % c	f reading + 0.1 %	of rating) (5 Hz t	o 10 kHz)		
	AC, DC + AC	Accuracy *1, *2	±(1 % of r	eading + 0.2 % o	f rating) (10 kHz 1	to 50 kHz)		
			±(2% of reading + 0.2 % of rating) (50 kHz to 100 kHz)					
	PEAK	Measurement range (resolution)	120 % of rating (0.01 V)					
	PEAK	Accuracy *1, *3		±(0.5 %	of rating)			
	50	Measurement range (resolution)	120 % of rating (0.001 A)					
	DC	Accuracy *1	±(0.3 % of reading + 0.1 % of rating)					
		Temp. coefficient	±	(150 ppm/°C of ra	ating) (TYP. value	e)		
Current	AC	Measurement range (resolution)		120 % of rating	g/CF (0.001 A)			
measure- ment	DC + AC	Measurement range (resolution)		120 % of rating (0.001 A)				
	AC,	Accuracy *1, *2	±(3 % of	reading + 0.1 %	of rating) (5 Hz to	10 kHz)		
	DC + AC	Accuracy 1, 2	±(10 % of reading + 1 % of rating) (10 kHz to 100 kHz			o 100 kHz)		
	PEAK	Measurement range (resolution)		120 % of rat	ting (0.01 A)			
	PEAK	Accuracy *1, *3		±(0.5 %	of rating)			
Measurer	ment time			100 µs te	o 3600 s			

At ambient temperature of 18 °C to 28 °C

*2. When the input signal is a sine wave with a crest factor of 3 or less within the prescribed frequency

range and the measurement time is the no more than 10 times the period of the input signal

*3. Peak value of a 1 kHz sine wave

<u>DC POWER SUPPLY</u>

PBZ Series Specifications

Protection functions		PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5			
Protection trip *1, *2		OVP or V-LIMI	OVP or V-LIMIT (output restriction) For OVP, select either output OFF or POWER switch OFF.					
Overvoltage protection	Setting range (Bipolar mode)		Select whether (-110 % of rtg \leq -V.LIM \leq +V.LIM \leq +110 % of rtg) or (-110 % of rtg \leq -OVP \leq -1 % of rtg, +1 % of rtg \leq +OVP \leq +110 % of rtg)					
	Setting range (Unipolar mode)	Select whether -1	Select whether -1 % of rtg \leq -V.LIM \leq +V.LIM \leq +110 % of rtg or +1 % of rtg \leq +OVP \leq +110 % of rtg					
	Setting resolution		0.0	1 V				
	Setting accuracy		±1 % o	f rating				
	Protection trip *1, *2	OCP or I-LIMIT (output limit). Select whether output or the POWEI switch turns off when OCP is activated.						
Overcurrent protection	Setting range		Select wheter (-110 % of rtg ≤ -I.LIM ≤ -1 % of rtg ≤+1 % of rtg ≤ +I.LIM ≤ +110 % of rtg) or (-110 % of rtg ≤ -OCP ≤ -1 % of rtg ≤+1 % of rtg ≤ +OCP ≤ +110 % of rtg					
	Setting resolution		0.0	1 A				
	Setting accuracy		±1 % o	f rating				
Overheating protection	Protection trip	Turns	output off when c	overheating is def	lected.			
Power	Bipolar mode	100 W (TYP. value)	180 W (TYP. value)	200 W (T	YP. value)			
restriction (Sink power)	Unipolar mode	400 W (T	YP. value)	402 W (TYP. value)	400 W (TYP. value)			

Control function	ons	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5		
Internal signal source	Control voltage input	Approx 0 V to Approx. ± 10.0 V, 0 % to ± 100 % of rated output					
DC signal control	Control voltage ratio input	0 % to ±108 % of rated voltage by changing the voltage ratio of the internal standard voltage, using 10 kΩ external resistance					
Output ON/OF	FF control input	External contact input for output ON/OFF					
Shutdown inp	Shutdown input		External contact input for POWER switch OFF				
Status output	Status output		CV mode, CC mode, output ON, alarm active				
	dotoctod at the output	it torminal					

Voltage is detected at the output terminal.

*2. OVP is enabled even when V-LIMIT (voltage restriction) is selected. OVP operation point is approx. ±(120 % of rtg).

Signal I/C			PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5	
		CV mode	-20.00 to +20.00	-40.0 to +40.0	-60.0 to +60.0	-80.0 to +80.0	
		CC mode	-20.00 S to +20.00 S	-10.00 S to +10.00 S	-6.70 S to +6.70 S	-5.00 S to +5.00 S	
External	Amplifier gain	Setting resolution	0.01 V (CV mode), 0.01 S (CC mode)	0.1 V (CV	′ mode), 0.01 S (0	CC mode)	
signal input		Setting accuracy *1		±5 % o	f rating		
	Max. allowa voltage	able input		±12 \	/peak		
	Input imped	lance		10 kΩ (T)	YP. value)		
	Terminal		BNC Safety So	cket (Common co	onnects to output	COM terminal.)	
	Output volt	age		2 V at rate	ed current		
Current monitor	Output volta racy	age accu-		±1 % of rating	g (TYP. value)		
Output Output volta			DC to 20 kHz				
	Terminal		BNC Safety So	BNC Safety Socket (Common connects to output COM termina			
	Input voltag	je	0.5 Vpp to 5 Vpp				
	Input imped	lance	1 kΩ (AC coupled) (TYP. value)				
Clock	Lock freque	ency range	10 MHz ± 200 Hz				
input	Lock time			2 s o	rless		
	Terminal		Insulated BNC (Common is insulated from chassis: Voltage to ground Max. 42 V peak)				
	Output volt	age	1 Vpp (with 50 Ω terminal) (TYP. value)				
Clock	Output imp	edance	50 Ω (AC coupled) (TYP. value)				
output	Output freq	uency	10 MHz ± 200 Hz				
	Terminal		BNC (Common connected to chassis.)			s.)	
	Input level		H level: 2 V	/ to 5 V, L level: 0	V to 0.8 V (TTL 0	compatible)	
	Polarity			H level,	, L level		
Trigger	Pulse width	1	1 µs or more				
input	Delay		1 µs or less				
	Input imped	lance	10 kΩ (TYP value) (DC coupled)				
	Terminal		BNC (Common connected to chassis.)				
	Output leve	el .	H level: 2.7 V to 5 V, L level: 0 V to 0.4 V (TTL compatible)				
	Polarity		H level, L level				
Trigger	Pulse width	1		10 µs (T)	(P. value)		
output	Rise/fall tim	ne		100 ns	or less		
	Fan-out		5 PBZ series units				
	i un out		BNC (Common connected to chassis.)				

*1. With DC and amplifier gain at maximum

Interface		PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5	
	Software protocol	IEEEStd 488.2-1992				
specifi- cations	Command language	Command language Conforms to SCPI Specification 1999.0				
RS232C Hardware		Conforms to EIA (male) *1 Baud rate: 1200, Data length: 7 bi Flow control: X-F	2400, 4800, 960 ts or 8 bits, Stop		bps	
	Program message terminator	LF when receiving	ng, CR/LF when s	sending		
GPIB	Hardware	Conforms to IEEEStd 488.2-1987 specifications. SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E1 24-pin connector (receptacle)				
	Program message terminator	LF or EOI when	receiving, LF + E	OI when sending		
	Primary address	1 to 30				
	Hardware		B 2.0 specificatio s speed: 12 Mbps	ns. (full speed) Soc	ket B type	
USB	Program message terminator	LF or EOM wher	receiving, LF +	EOM when sendi	ng	
	Device class	Conforms to US	BTMC-USB488 o	levice class spec	ifications.	
LAN (factory	Hardware	IEEE802.3 100Base-TX/10Base-T Ethernet, IPv4, RJ-45 connector *2 Complies with the LXI 1.4 Core 2011				
option)	Communication protocol	VXI-11				
	Dragram magazara terminator	L C or CND whom	receiving LE L			

Program message terminator LF or END when receiving, LF + END when sending *1. For the cable, use a crossing cable (null modem cable).

*2. Use a category 5 straight type.

Other functions		PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5			
	No. of programs	16						
Sequence function	No. of steps	Total 1024	Total 1024					
Tunction	Step time	100 µs to 1000 H	100 µs to 1000 H (100 µs step) *1					
Preset memory		3 memories						
Setup memory		10 memories						
Key lock		Select from 1 of 3 levels.						
Remote se	nsing	Function ON/OFF, used in CV mode						
Operation s	setting at power ON	Output ON, start sequence function execution						
Soft start /	soft stop	Function ON/OFF						
Son start / son stop		Soft start/stop time 0.1 ms to 1000 s						
Parallel operation		Max. 2 units of same model (using optional parallel operation kit)						
	ne for DC rump, AC an				s. To set a st			

time longer than 1000 s for those items compose several steps every 1000 s.

General s	specifications	PBZ20-20	PBZ40-10	PBZ60-6.7	PBZ80-5	
	Operating environment	Indoor use, over	voltage category	r II		
Environ- humidity range		0 to +40 °C / 20 to 85 % RH (no condensation)				
nem	Storage temp./ humidity range	-25 to +70 °C / M	lax. 90 % RH (no	condensation)		
Groundin	g polarity	Only the output (COM terminal ca	n be grounded.		
/oltage to	o ground	DC 500 V Max.				
Nith-	Between primary side and chassis	4500 \/ 40				
stand voltage	Between primary side and output terminal	1500 V AC, no a	bnormalities at 1	minute		
	Between primary side and chassis	500 V DC 20 M	O or more (of him	midity 70 % DU -	r (000)	
Insula- tion re- sistance	Between primary side and output terminal	500 V DC, 30 M Ω or more (at humidity 70 % RH or less)				
SISTAILCE	Between output terminal and chassis	500 V DC, 1 M Ω or less (at humidity 70 % RH or less)				
Ground continu- ity	Between power cord connector, grounding pin <-> chassis	25 A AC, 0.1 Ω or less				
Cooling n	nethod	Forced air cooling by a temperature-sensitive variable-speed fan				
Safety *1		Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU EN 61010-1 (Class I *2, Pollution degree 2)				
Electromagnetic compatibility (EMC) *1		Complies with the requirements of the following directive and standard. EMC Directive 2014/30/EU EN 61326-1 (Class A *3), EN 55011 (Class A *3, Group 1 *4) EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the PBZ Series must be less than 3 m.				
Dimensions (mm(inch)(muximum)		429.5 (16.91") W × 128 (5.0") (145 (5.7")) H × 550 (21.65") (595(23.4")) D mm				
Weight		Approx. 22 kg (4	8.50 lbs)			
Accessories		Power cord: 1, J1 connector (Socket: 1, Protective covers: 2, Terminals: 30), Heavy object warning label: 1, Instruction manual: 1				

safety of this product is only guaranteed when the product is properly grounded. 3. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the

reception of radio and television broadcasts. *4. This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose

Inteligent Bipolar Power Supply (CV/CC)



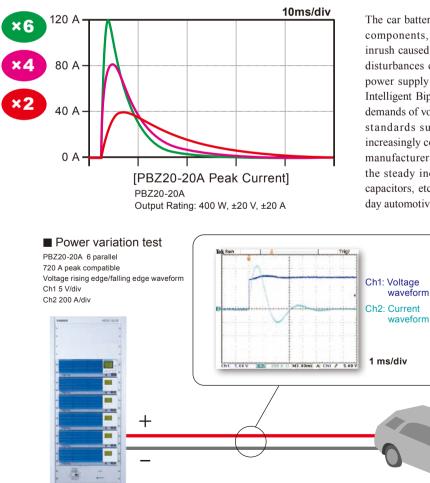
Dimensions / Weight

429.5(16.91")W × 128(5.0")H × 550(21.65")Dmm (inch)/ 22kg(48.5lbs)

Accessories

Power cord: 1 pc., J1 connector (Socket: 1 pc., Protection covers: 2 pairs, Pins: 30 pc.), Heavy object warning label: 1 pc., CD-ROM: 1 pc., Operation manual (Setup guide: 1 pc., Safety information: 1pc., Quick reference English: 1pc., Japanese: 1pc)

Functions



If you want to perform parallel operation with more than two PBZ units total, the units are installed in a smart rack for use.

Ideal for voltage variation testing of automotive electrical components, high power capacitor voltage fluctuation tests and motor evaluation tests!

The PBZ20-20A Intelligent Bipolar Power Supply takes a fresh new look at bipolar power supply design, allowing for peak current up to 6 times that of the rated output. As a result, peak currents exceeding the 20A rating can be easily compensated with a single unit, eliminating the need to connect multiple units in parallel, and greatly cutting costs.

Features

- Peak Current 6x Rating (±120 Apk CV)
- Parallel Operation up to 10 Units (Max 1200 Apk) *Please consult if using 11 units or more.
- CV Frequency: 150 kHz DC
- Waveform generation function
- Sequence function
- Synchronized operation function(Trigger-based, Clock-based)
- Unipolar mode
- Low ripple noise(CV mode)

5.005

The car battery is the primary source of energy for modern-day vehicular components, but factors such as electronic circuit chatter as well as inrush caused by the engine can present various difficulties. Power source disturbances caused by these factors make programming and evaluating power supply fluctuation waveforms an absolute must. The PBZ20-20A Intelligent Bipolar Power Supply has the high speed response to meet the demands of voltage fluctuation tests (Pulse2b, Pulse4, etc.) for international standards such as the ISO16750-2 and ISO7637-2 as well as for the increasingly complicated fluctuation waveform tests required by automotive manufacturers. The PBZ20-20A is also equipped to easily comply with the steady increase of electronic components per vehicle (high power capacitors, etc.) and total current (esp. peak current) required in modern-day automotive testing.

Ch1: Voltage

Ch2: Current

1 ms/div

M1.00ms A Chi 1 5.00 V

waveform

waveform

PBZ20-20A Series Specifications

AC Input					
Nominal inp	out rating		100 Vac to 240 Vac, 50 Hz to 60 Hz		
Input voltag	ge range		90 Vac to 250 Vac		
Input freque	ency range		47 Hz to 63 Hz		
Current			10 Aac or less (when connected to a rated load)		
Inrush curre	ent *1		40 Apeak or less		
Power			900 VA or less (when connected to a rated load)		
Power facto	Power factor		0.95 TYP (when the input voltage is 100 V and when connected to a rated load)		
Leakage cu	urrent *2		1.75 mA or less (input 100 V 60 Hz)/ 3.5 mA or less (input 200 V 60 Hz)		
Rated Outp	out				
Rating	Output powe	er	400 W		
	Output volta	ige	±20 V		
Output current		ent	±20 A		
		Peak current *3	±120 Apeak (-17 V < Output terminal voltage < +17 V) (TYP) ±100 Apeak (-20 V ≤ Output terminal voltage ≤ +20 V) (TYP)		
	Isolation vol	ltage *4	500 Vdc		

1 ms or more

*2 Leakage current flowing through the protective conductor terminal

Set the peak current output time to 10 ms or more, the repetition interval to 1 s or mode, and the CV *3 or CC mode current responseto 1 ms.

Only the output's COM terminal can be grounded.

CV Mode Ou	itput				
DC voltage	Settable	Bipolar mode	0.000 V to ±21.000 V		
	range *1	Unipolar mode	0.000 V to 21.000 V		
		Fine feature	±5 % of rtg		
	Resolution		0.001 V (0.0001 V for the fine feature)		
	Accuracy *2		± (0.05 % of setting + 0.05 % of rtg)		
	Temperatur	e coefficient	±100 ppm/°C of rtg (TYP)		
AC voltage	Settable ra	nge *1	0.00 Vpp to 42.00 Vpp		
	Resolution		0.01 V		
	Accuracy *3		±0.5 % of rtg		
AC	Settable range		0.01 Hz to 200.00 kHz		
frequency	Resolution		0.01 Hz		
H	Accuracy		±200 ppm		
	Sweep		Linear and logarithmic		
	Sweep time		100 µs to 1000 s (resolution of 100 µs)		
AC waveform	Туре		Sine wave, square wave, triangle wave, and 16 user-defined arbitrary waveforms		
	Start phas	е	0 ° to 359 °		
	Square wave duty cycle		0.1 % to 99.9 % (f < 100 Hz), 1 % to 99 % (100 Hz \le f < 1 kHz), 10 % to 90 % (1 kHz \le f < 10 kHz), and fixed to 50 % (10 kHz < f)		
Constant	Frequency I	esponse *4	DC to 150 kHz (TYP)		
voltage characteristics	Response	*5 *6	2.3 μs (TYP)/ 3.5 μs max, 6.7 μs (TYP)/ 10 μs max, 23 μs (TYP)/ 35 μs max, 67 μs (TYP)/ 100 μs max		
	Overshoot		5 % or less (TYP)		
	Ripple	(p-p) *7	20 mV (TYP)		
	noise	(rms) *8	2 mV (TYP)		
	Load effec	t *9	±(0.005 % of setting + 1 mV)		
	Source effect *10		±(0.005 % of setting + 1 mV)		

The peak value of the sum of the DC voltage and AC voltage is limited by the DC voltage's settable range.

*2 At an ambient temperature between 18 °C and 28 °C.

*2 At an ambient temperature between 18 °C and 28 °C, with a 1 kHz sine wave, 3.5 µs response, and no load. A frequency where the amplitude ratio of the output voltage to the external signal input voltage is -3 dB (when the reference frequency is 1 kHz, the response is 3.5 µs, and when a rated load is connected). *4

The rise or fall time (at rated load; excluding when output is turned on and off). The frequency response *5

is based on the specified response setting (frequency bandwidth = 0.35/the rise time). *6. Rise time: The time it takes for the output voltage to rise from 10 % to 90 % of the rating when the output voltage is changed from 0 V to the rated voltage.

Fall time: The time it takes for the output voltage to fall from 90 % to 10 % of the rating when the output voltage is changed from the rated voltage to 0 V.

The measurement frequency bandwidth is 10 Hz to 20 MHz (at the output terminals).

The measurement frequency bandwidth is 10 Hz to 1 MHz (at the output terminals). *8

*9 The change in the output voltage in response to a change in the output current from 0 % to 100 % of the current rating (measured at the sensing terminals when remote sensing is used).

*10. The change in the output voltage in response to a ±10% change in the input voltage in reference to the nominal input voltage (measured at the sensing terminals when remote sensing is used)

CC Mode O	utput							
DC current	Settable range *1	Bipolar mode and unipolar mode	0.000 A to ±21.000 A					
		Fine feature	±5 % of rtg					
	Resolution	1	0.001 A (0.0001 A for the fine feature)					
	Accuracy *	*2	±0.3 % of rtg					
	Temperatur	e coefficient	±100 ppm/°C of rtg (TYP)					
AC current	Settable ra	nge *1	0.00 App to 42.00 App					
	Resolution	1	0.01 A					
	Accuracy *	*3	±0.5 % of rtg					
AC	Settable ra	ange	0.01 Hz to 200.00 kHz					
frequency	Resolution	1	0.01 Hz					
	Accuracy		±200 ppm					
	Sweep		Linear and logarithmic					
	Sweep tim	e	100 us to 1000 s (resolution of 100 us)					

AC waveform	Туре	Sine wave, square wave, triangle wave, and 16 user-defined arbitrary waveforms						
	Start phase	0 ° to 359 °						
	Square wave duty cycle	0.1 % to 99.9 % (f < 100 Hz), 1 % to 99 % (100 Hz \leq f < 1 kHz), 10 % to 90 % (1 kHz \leq f < 10 kHz), and fixed to 50 % (10 kHz < f)						
Constant	Frequency response *4	DC to 15 kHz (TYP)						
current characteristics	Response *5 *6	23 µs (TYP)/ 35 µs max, 67 µs (TYP)/ 100 µs max, 230 µs (TYP)/ 350 µs max, 0.67 ms (TYP)/ 1 ms max						
	Overshoot	5 % or less (TYP)						
	Ripple noise (rms) *7	3 mA (TYP)						
	Load effect *8	±(0.01 % of setting + 1 mA)						
	Source effect *9	±(0.01 % of setting + 1 mA)						

The peak value of the sum of the DC current and AC current is limited by the DC current's settable range *2. At an ambient temperature between 18 °C and 28 °C

*3. At an ambient temperature between 18 °C and 28 °C, with a 100 Hz sine wave, 35 µs response, and shorted output.

*4. A frequency where the amplitude ratio of the output current to the external signal input voltage is $-3 \, \text{dB}$ (when the reference frequency is 100 Hz, the response is 35 µs, and a rated load is connected). The frequency response changes according to the load impedance. When the load impedance increases, the frequency response decreases.

*5. The rise or fall time (at rated load; excluding when output is turned on and off). The rise and fall times change according to the load impedance.

*6. Rise time: The time it takes for the output current to rise from 10 % to 90 % of the rating when the output current is changed from 0 A to the rated current.

Fall time: The time it takes for the output current to fall from 90 % to 10 % of the rating when the output current is changed from the rated current to 0 A.

*7 The measurement frequency bandwidth is 10 Hz to 1 MHz (when the output voltage is in the range of 10 % to 100 % of the rated output voltage).

*8. The change in the output current in response to a change in the output voltage from 10 % to 100 % of the voltage rating.

*9. The change in the output current in response to a ±10% change in the input voltage in reference to the nominal input voltage (when the output voltage is in the range of 10 % to 100 % of the voltage rating).

Interface	
RS232C	Complies with the EIA232D specifications. D-SUB 9-pin connector (male)*1 Baud rate: 1200, 2400, 4800, 9600, 19200, and 38400 bps Data length: 7 bits or 8 bits. Stop bit: 1 bit or 2 bits. Parity bit: None. Flow control: X-flow or none.
GPIB	Complies with IEEE Std 488.1-1987 SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, and E1. 24-pin connector (receptacle)
USB	Complies with the USB 2.0 specifications. Data rate: 12 Mbps(full speed). Socket B type
LAN	IEEE 802.3 100Base-TX/10Base-T Ethernet. Complies with the LXI 1.4 Core 2011

ry option) | IPv (16 Use a cross cable (null modem cable)

*2. Category 5; use a straight cable.

	Approx. 22 kg (48.50 lb; just the PBZ)						
mm(inch)(muximum))	429.5 (16.91")W × 128 (5.04") (145 (5.71"))H × 550 (21.65") (595 (23.43"))D						
Operating environment	Indoor use, overvoltage category II						
Operating temperature	0 °C to +40 °C (+32 °F to +104 °F)						
Operating humidity	20 %rh to 85 %rh (no condensation)						
Storage temperature	-25 °C to +70 °C(-13 °F to +158 °F)						
Storage humidity	90 %rh or less (no condensation)						
Altitude	Up to 2000 m						
larity	Only the output's COM terminal can be grounded.						
ige	500 Vdc max						
Across the primary circuit and chassis	No abnormalities at 1500 Vac for 1 minute						
Across the primary circuit and the output terminals	No abhomailtes at 1500 vac for 1 minute						
Across the primary circuit and chassis	500 Vdc, 30 M Ω or greater (at 70 %rh humidity or less)						
Across the primary circuit and the output terminals	Sou vac, so miss of greater (at 70 %in humidity of less)						
Across the output terminals and chassis	500 Vdc, 1 M Ω or greater (at 70 %rh humidity or less)						
Power cord inlet, across the earth pin and chassis	25 Aac, 0.1 Ω or less						
od	Forced air cooling using variable-speed, heat-sensitive fan						
	Complies with the requirements of the following standards. Low Voltage Directive 2014/35/EU EN 61010-1 (Class I*2, Pollution degree 2*3)						
etic compatibility	Complies with the requirements of the following standard. EMC Directive 2014/30/EU EN 61326-1 (Class A*4) EN 55011 (Class A*3, Group 1*5) EN 61000-3-2 EN 61000-3-3 Applicable condition All of the cables and wires connected to the PBZ are less than 3 m in length.						
	Operating environment Operating temperature Operating humidity Storage temperature Storage humidity Altitude larity ge Across the primary circuit and chassis Across the primary circuit and the output terminals Across the primary circuit and chassis Across the primary circuit and chassis Across the primary circuit and chassis Across the output terminals and chassis Power cord inlet, across the earth pin and chassis od						

Does not apply to specially made or modified PBZs

*2. This is a Class I equipment. Be sure to ground this product's protective conductor terminal. The safety of this product is only guaranteed when the product is properly grounded.

*3. Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielec-tric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

*4. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

*5. This is a Group I equipment. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment

High Power Intelligent Bipolar Power Supply



Dimensions / Weight

Three parallel: 432.6(17.03″)W \times 579.4(22.81″)H \times 700(27.56″)Dmm(inch)/ 110kg(242.5lbs)

Four parallel:	432.6(17.03")W × 712.1(28.04")H × 700(27.56")Dmm(inch)/
	130kg(286.6lbs)

Five parallel: 432.6(17.03")W × 844.8(33.26")H × 700(27.56")Dmm(inch)/ 160kg(352.7lbs)

Accessories

J1 connector kit (Socket: 1 pc., Protection covers: 2 pairs, Pins: 30 pc.), Heavy object warning label: 1 pc., CD-ROM: 1 pc., Setup Guide: 1 pc., Quick Reference (Japanese/English): 1 pc., Safety Information: 1 pc.

High-speed response with even higher power

The PBZ SR series is a series of high-power bipolar DC stabilized power supplies. Based on the PBZ Intelligent Bipolar power supply series, this model supports large currents (up to ± 100 A) and is assembled with exclusive rack parts (Smart Rack). 4-quadrant oper ation allows power to be supplied (source) or absorbed (sink), making this series suitable for driving inductive loads or capacitive loads. Also, LAN, USB, GPIB, and RS232C are provided (standard) as communication interfaces.

Features

- User-defined waveform generation function
- Sequence function
- Synchronized operation function
- Central control with master unit utilizing master and slave operation
- Master unit display of total output current of all units (display of combined value) *1
- Safety design that switches all units off when alarm is generated for 1 unit *2
- Guarantee of specifications with Smart Rack (test data standardly included)
- LAN (Capable of LXI), USB, GPIB, and RS232C provided (standard)
- 100 kHz frequency characteristic (CV)
- *1 Slave unit displays its own output current.
- *2 If the alarm for the master unit is cleared, alarms for all units are cleared.

	Ou	Output		Ripple • Noise		Line Regulation		Load Regulation		Input (AC)	
Model	CV	CC	CV	CC	CV	CC	CV	CC	nominal voltage	Current	
	V	A	rms/p-p	rms	mV	mA	mV	mA	V	А	
PBZ20-60 SR	±20	±60	3 mV/30 mV(TYP)		±0.005 %+1	±0.01 %+1	±0.005 %+1	±0.01 %+1	200 to 240, single phase	15 A (max)	
PBZ40-30 SR	±40	±30	6 mV/30 mV(TYP)	5 mA							
PBZ60-20.1 SR	±60	±20.1	6 mV/40 mV(TYP)	(TYP)							
PBZ80-15 SR	±80	±15	6 mV/40 mV(1YP)								

Four parallel type

Three parallel type

	Ou	ıtput	Ripple • Noise		Line Regulation		Load Regulation		Input (AC)	
Model	CV	CC	CV	CC	CV	СС	CV	CC	nominal voltage	Current
	V	A	rms/p-p	rms	mV	mA	mV	mA	V	A
PBZ20-80 SR	±20	±80	3 mV/30 mV(TYP)		±0.005 %+1	±0.01 %+1	±0.005 %+1	±0.01 %+1	200 to 240, single phase	20 A (max)
PBZ40-40 SR	±40	±40	6 mV/30 mV(TYP)	5 mA						
PBZ60-26.8 SR	±60	±26.8	6 mV/40 mV(TYP)	(TYP)						
PBZ80-20 SR	±80	±20								

Five parallel type

	Ou	Output		Ripple • Noise		Line Regulation		Load Regulation		.C)
Model	CV	СС	CV	CC	CV	CC	CV	CC	nominal voltage	Current
	V	A	rms/p-p	rms	mV	mA	mV	mA	V	A
PBZ20-100 SR	±20	±100	3 mV/30 mV(TYP)				±0.005 %+1	±0.01 %+1	200 to 240, single phase	25 A (max)
PBZ40-50 SR	±40	±50	6 mV/30 mV(TYP)	5 mA	±0.005 %+1	±0.01 %+1				
PBZ60-33.5 SR	±60	±33.5	6 mV/40 mV(TYP)	(TYP)	10.005 %1	±0.01 %+1				
PBZ80-25 SR	±80	±25								

Ultra-compact AC/DC Power Supply (CV/CF)



Dimensions / Weight

PCR1000WEA: 430(16.93")W × 129.2(5.09")H × 655(25.79")Dmm/ 16kg(35.27lbs) PCR2000WEA: 430(16.93")W × 129.2(5.09")H × 655(25.79")Dmm/ 20kg(44.09lbs) PCR3000WEA2: 430(16.93")W × 129.2(5.09")H × 655(25.79")Dmm/ 23kg(50.71lbs) PCR6000WEA2R: 430(16.93")W × 262(10.32")H × 550(21.65")Dmm/ 42kg(92.59lbs) PCR6000WEA2: 430(16.93")W × 262(10.32")H × 550(21.65")Dmm/ 43kg(94.80lbs) PCR12000WEA2R: 430(16.93")W × 389(15.32")H × 550(21.65")Dmm/ 66kg(145.51lbs) PCR12000WEA2: 430(16.93")W × 389(15.32")H × 550(21.65")Dmm/ 65kg(143.3lbs) PCR18000WEA2R: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm/120kg(264.56lbs) PCR18000WEA2: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm/120kg(264.56lbs) PCR24000WEA2R: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm/130kg(286.60lbs) PCR24000WEA2: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm/130kg(286.60lbs) PCR30000WEA2R: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm/160kg(352.74lbs) PCR30000WEA2: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm/160kg(352.74lbs) PCR36000WEA2R: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm/180kg(396.83lbs) PCR36000WEA2: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm/170kg(374.79lbs)

Functions

Low ripple noise

Low ripple noise performance achieved despite switching inverter.

Eco function (energy-saving function)

The series is equipped with a sleep mode that reduces overall power consumption after a certain amount of time with no output, as well as an energy saving mode that only draws power from necessary modules resulting in reduced power consumption and cost of operation.

Various communication interface options LAN, USB and RS232C standard digital interface.

GPIB is available as an optional interface board.

DC output – 100% of rated power

In addition to AC output, DC output as well as AC+DC output are available for a wide range of industries including R&D in the fields

A new generation of regulated AC-DC power supplies with multiple functions and large capacity in high-density packaging.

The PCR-WEA/WEA2 series is an ultra-compact, high-power density, high-performance PWM inverter type large capacity AC/DC stabilized power supply. The new PCR-WEA/WEA2 Series is the result of specification changes to the PCR-WE/WE2 Series. We've powered-up our products in key areas including output voltage and transient response/response speed to meet our customers' wishes. Automobiles, airplanes, and anechoic chambers... Bringing the high-capacity test environment to a new stage.

Features

- Compact size: 6 kVA in 6U (PCR6000WEA2/PCR6000WEA2R)
- Up to 36 kVA in a single unit
- AC output *1: Single-phase/Single-phase three-wire/Three-phase
- DC output: +/-, 100% of rated power
- Mix-and-match parallel operation up to 144 kVA. Same model set up is not required.^{*2}
- Flexible digital interface: LAN (LXI), USB, RS232C, GPIB (factory option)
- Power line disturbance simulation features
- Sequence function for advanced simulation
- External analog, digital control function (standard)
- Power-saving function
- Output frequency up to 5 kHz
- Output rating: AC 0 to 320 Vrms, DC 0 to ±452 V

*1 For 3kVA or more, the multi-type can switch between single-phase, single-phase 3-wire, and threephase output (PCR-WEA2).

2 Parallel operation is possible with a maximum of four units of 6kVA or higher models, and different models can be combined as long as they have the same input voltage.

Accessories

Cable tie, external control (DIGITAL I/O) connector, heavy object warning label, read this first!, quick reference, CD-ROM, safety Information

*Power cord is not included for the PCR-WEA/WEA2 Series Please purchase the optional accessory separately.

[NOTICE] To users of the PCR-L/LA/LE Series

The PCR-WEA/WEA2 Series is not compatible with the previous product, the PCR-L/LA/LE Series. Consequently, it is not possible to upgrade a system if it includes a prior PCR-L/LA/LE Series in the system. Furthermore, along with this, in principle options cannot be used, with some exceptions. Please be aware of this notice when planning your future system. If you have any other questions, please contact our sales department for details.

Various measurement functions

Output effective value voltage/current, peak voltage/current, effective power/apparent power and power factor can be measured. Harmonic analysis (up to the 50 th harmonic) of output voltage/current is possible.

Power line abnormality simulation

This feature allows the PCR-WEA/WEA2 series to simulate power line abnormalities simulation including power outtages, voltage dips, and voltage pops. This can be used to test switching power supplies and other electronic equipment.



Functions

Compact Size!

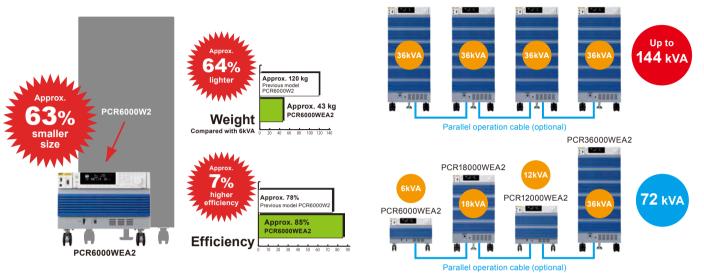
Compared to our previous PWM models, the size of the PCR-WEA has been drastically reduced by 60%. Efficiency has also been increased by approximately 7%, for an overall high efficiency of approximately 85%.

Parallel operation function

Parallel operation among all models available up to 144 kVA (maximum 4 units).

PCR36000WEA2×4 units

*Input voltage must be the same for models 6 kVA and higher



Options

Input power cable

AC5.5-1P3M-M6C-3S (For PCR1000WEA/2000WEA(1P2W input))
AC14-1P3M-M6C-3S (For PCR3000WEA2(1P2W input))
AC5.5-1P3M-M5C-4S (For PCR6000WEA2R(3P3W input))
AC5.5-1P3M-M5C-5S (For PCR6000WEA2/PCR12000WEA2(3P4W input))
AC14-1P3M-M5C-4S (For PCR12000WEA2R(3P3W input))
AC22-1P3M-M8C-4S (For PCR18000WEA2R(3P3W input))
AC8-1P3M-M5C-5S (For PCR18000WEA2(3P4W input))
AC38-1P3M-M8C-4S (For PCR24000WEA2R(3P3W input))
AC14-1P3M-M5C-5S (For PCR24000WEA2(3P4W input))
AC60-1P3M-M8C-4S (For PCR30000WEA2R/36000WEA2R(3P3W input))
AC22-1P3M-M5C-5S (For PCR30000WEA2/36000WEA2(3P4W input))

- Parallel operation cable PC01-PCR-WE(1 m)
- Power linkage cable LC01-PCR-LE(1 m)
- GPIB interface board IB07-PCR-WE
- Base hold angle OP03-KRC
- External control connector OP01-PCR-WE(DIGITAL I/O) OP02-PCR-WE(ANALOG I/O)
- Sequence creation software SD032-PCR-WE(Wavy for PCR-WE)

- Software for avionics norms
 SD012-PCR-LE/WE
 Quick immunity sequencer
 SD009-PCR-LE/WE
- Rack mount brackets For PCR1000WEA/2000WEA/3000WEA2 KRB3-TOS (EIA inch rack) KRB150-TOS (JIS millimeter rack) For PCR6000WEA2(R) KRB6 (EIA inch rack) KRB300 (JIS millimeter rack) For PCR12000WEA2(R) KRB9 (EIA inch rack) KRB400-PCR-LE (JIS millimeter rack)

PCR-WEA/WEA2 Series Specifications

Unless specified otherwise, the specifications are for the following settings and conditions. • The product is warmed up for at least 30 minutes (with current flowing).

• TYP: These are typical values that are representative of situations where the product operates in an environment with an ambient temperature of 23 °C. They are not guaranteed performance values. • setting: Indicates a setting. • reading: Indicates a reading. • f.s: Indicates full scale.

		Single-phase	output model		Single-phase/three-phase switchable model						
It	em/Model	PCR	PCR	PCR 3000WEA2	PCR 6000WEA2	PCR 12000WEA2	PCR 18000WEA2	PCR 24000WEA2	PCR 30000WEA2	PCR 36000WEA2	
		1000WEA	2000WEA		PCR 6000WEA2R	PCR 12000WEA2R	PCR 18000WEA2R	PCR 24000WEA2R	PCR 30000WEA2R	PCR 36000WEA2R	
Input (AC rms)											
	1P2W input model	100 Vrms to 120	Vrms, 200 Vrms	s to 240 Vrms *1				-			
Voltage (nominal)	3P3W input model		-		200 Vrms to 240 Vrms (3 phase line voltage) *PCR-WEA2R models						
(noninal)	3P4W input model		-		380 Vrms to 480 Vrms (3 phase line voltage) *PCR-WEA2 models						
Voltage _	1P2W input model	85 Vrms to 132	Vrms, 170 Vrms	to 250 Vrms *1				-			
	3P3W input model	-			170 Vrms to 250 Vrms (3 phase line voltage) *PCR-WEA2R models						
varation range)	3P4W input model		-		323 Vrms to 519 Vrms (3 phase line voltage) *PCR-WEA2 models						
Nominal input Fre	quency	50 Hz to 60 Hz									
Input frequency ra	ange	45 Hz to 65 Hz									
Apparent power		1.4 kVA or less	2.7 kVA or less	4 kVA or less	7.8 kVA or less	15.6 kVA or less	23.4 kVA or less	31.2 kVA or less	39 kVA or less	46.8 kVA or less	
Power factor *2			0.95 (TYP)		0.97 (TYP) 3P3W input model / 0.95 (TYP) 3P4W input model						
	1P2W input model	17 A / 8.5 A	32 A / 16 A	48 A / 24 A				-			
Max. current *3	3P3W input model	-			27 A	53 A	80 A	106 A	133 A	159 A	
	3P4W input model			14 A	28 A	42 A	56 A	70 A	84 A		
Hold-up time for p	ower interruption *2					10 ms				·	

1 100 V/200 V input system (auto select) *2 At output voltage 100 V/200 V rated output current sine wave load nower factor 1 output frequency 40 Hz to 1 kHz

PCR-WEA/WEA2 Series Specifications

		Single-phase	e output model			1	/three-phase swi	1					
	ltem/Model	808			PCR 6000WEA2	PCR 12000WEA2	PCR 18000WEA2	PCR 24000WEA2	PCR 30000WEA2	PCR 36000WEA2			
	nem/moder	PCR 1000WEA	PCR 2000WEA	PCR 3000WEA2	PCR 6000WEA2R	PCR 12000WEA2R	PCR	PCR	PCR 30000WEA2R	PCR			
Output					COOUNEAZI	12000WEA2K	TOODOTVEA2R	24000WEA2K	SOUDDWEALK	SUCCOMEAZI			
Maximum p	beak current *11				M	aximum current:	x 4						
Inrush curre	ent capacity *3	Maximum current x 3 (0.07 s) *24 Maximum current x 1.4 (0.5 s) Maximum current x 1.4 (0.5 s)											
Efficiency *	1	82 %(TYP) 85 %(TYP)											
	Rating	160 V / 320V *2 0 V to 161.0 V / 0 V to 322.0 V											
AC voltage	Setting range Resolution	0.1 V											
*1	Accuracy *3 *4 (phase voltage)			±	(0.3 % of setting	-	6 of setting + 0.6	V)					
	Accuracy *3 *4 (line voltage)	±(0.3 % of setting + 0.3 V) / ±(0.3 % of setting + 0.6 V) *5											
Maximum	Single-phase output	10 A / 5 A	20 A / 10 A	30 A / 15 A	60 A / 30 A	120 A / 60 A	180 A / 90 A	240 A / 120 A	300 A / 150 A	360 A / 180 A			
current *1 *6	Single-phase three-wire output, Three-phase output		-	10 A / 5 A	20 A / 10 A	40 A / 20 A	60 A / 30 A	80 A / 40 A	100 A / 50 A	120 A / 60 A			
Phase		Single	e-phase		Single-phase	Two-wire, Single	-phase Three-w	ire, and Three-p	hase Four-wire	1			
Power	Single-phase output	1 kVA	2 kVA	- 3 kVA	6 kVA	12 kVA	18 kVA	24 kVA	30 kVA	36 kVA			
capacity	Three-phase output		-										
Lood nouvo	Single-phase three-wire output			2 kVA	4 kVA	8 kVA	12 kVA	16 kVA	20 kVA	24 kVA			
Load powe	Setting range					1 (leading or lag 7 (5 kHz -3dB, <	<u> </u>						
Frequency	Resolution		C	0.01 Hz (1.00 Hz 1	to 100.0 Hz), 0.1 l		•,	000 Hz to 5000 H	Hz)				
	Accuracy *3				±0.01 % , Temp	erature coefficie	nt : ±0.005 %/°C						
Phase	Resolution		-		0.01°, 0.1	° * <mark>25</mark> (1 Hz to 500	<i>/</i> · (<i>/·</i> (Hz or more)				
Thate	Accuracy *3		-				- fo×0.9) *8 fo: fr	requency [kHz]					
	Rating *1 Setting range *1					+226 V, -452 V to							
DC	Resolution		-227.5 V to +227.5 V, -455.0 V to +455.0 V 0.1 V										
voltage	Accuracy *9				±(0.0	05 % of setting +	0.1 V)						
	DC Maximum current *6	10 A / 5 A	20 A / 10 A	30 A / 15 A	60 A / 30 A	120 A / 60 A	180 A / 90 A	240 A / 120 A	300 A / 150 A	360 A / 180 A			
	Power capacity	1 kW	2 kW	3 kW	6 kW	12 kW	18 kW	24 kW	30 kW	36 kW			
	age stability (phase voltage)												
Line regula			Within +0	0.1 V/±0.2 V (1 Hz	to 100 Hz)	Within ±0.1 %	l v	/ithin +0 2 V/+0 4	4 V (1 Hz to 100 H				
Load regula	ation *13		Within ±0.3 Within ±1	V/±0.6 V (100.1 I V/±2 V (500.1 H	Hz to 500 Hz) z to 1 kHz)		With V	hin ±0.3 V/±0.6 V Vithin ±1 V/±2 V	/ (100.1 Hz to 500 (500.1 Hz to 1 kH) Hz) Iz)			
Variation a	ccording to output frequency *14		when the output		on function is ena ne output voltage				(1001 HZ to 5 KH2	Z)			
	re coefficient *16					100ppm/°C (TYF	?)						
Total harmo	onic distortion *17		0.3 % or	less (1 Hz to 100	Hz), 0.5 % or les	s (100.1 Hz to 33	, 0 Hz), 1.5 %/kHz	or less (330.1 H	lz to 5 kHz)				
	esponse *18					onse FAST: 40 µs	· · · ·						
<u> </u>	speed Tr/Tf *19		Respor	nse FAST: 40 µs (TYP), Response	e MEDIUM: 100 µ	is (TYP), Respo	nse SLOW: 300	µs (TYP)				
Measureme Voltage	Resolution					0.1 V							
Rms value			D	C. 40 Hz to 999.9	9 Hz: ±(0.3 % of r	-	Hz to 5 kHz; ±(0.	5 % of reading +	1 V)				
Current	Resolution			01 A				0.1 A					
Rms value	Accuracy *20 *21		50.40.11			±(0.3 % of reading			1.0.0/				
	Resolution			to 999.9 Hz: ±(0. 01 A	6 % of reading +	0.6 % of f.s) 1 K	HZ to 5 KHZ: ±(1. 0.1 A	2 % of reading +	,	A			
Current Peak value	Accuracy *20 *22		0.			4 % of f.s	0.1 A		1	A			
Active	Resolution		1	W				10 W					
power	Accuracy *20 *21 *23				45 Hz to 65 Hz:	±(0.3 % of reading	ng + 0.3 % of f.s)						
Apparent power			1	VA				10 VA					
power factor	Resolution					0.01 0.1°							
Phase difference	Resolution Frequency range (fundamental wave)					10 Hz to 1 kHz							
Harmonic	Upper limit of harmonic analysis					5th to 50th							
measure- ment	FFT data length					4096							
	Measurement items				Rms voltage	and current, pha	se angle, THD						
Recommen	nded calibration period					1 year							
*2 The spectra	range, H range c guaranteed voltage range is 1 V to 1 c guaranteed voltage range is 1.4 Vdc bient temperature of 23 °C±5 °C. ad, output frequency 45 Hz to 65 Hz. hase angle of 120° of each phase. te output voltage is between 100 Vac is reduced by the output voltage. Whe ut current is reduced by the output fre 500 Hz limit model, the frequency is lin (0.4° + 2.5 µs×360°×fo×103) Examp aquency, within ± 0.5° (at 60 Hz output ad, 23 °C±5 °C.	e to 226 Vdc, 2.8 and 160 Vac or in the output freq equency. The out nited to 1 Hz to 5 le in which ang t), within ± 0.8° (a	Vdc to 452 Vdc(Dd 200 Vac and 320 uency is between out current is 70 % 00.0 Hz for three- le conversion is it 400 Hz output)	Vac, the output 1 Hz and 40 Hz, at 1 Hz. phase output. performed at a	and 160 \ mode is s *14 Voltage v voltage is is 1. Whe *15 5 Hz to 1 *16 For chang *17 When the is 1. Whe from 0 A 1 *19 At 10 % to	/ (L range) or 160 let to FAST. At the ariation over 40 H between 80 V and n the response mo MHz components i ges within the oper output phase volta n the response mo output voltage is i to the rated value a 90 % of the outpu	V and 320 V (H rai output terminal blo tz to 5 kHz in AC d 160 V (L range) o de is set to FAST. in DC mode. ating temperature age is between 80 de is set to FAST. 100 V or 200 V, the and from the rated it voltage.	nge) and the load p bock. When the cond mode with 55 Hz for 160 V and 320 V At the output term v and 160 V or 16 At the output term e load power factoi	power factor is 1. V npensation functio z as the reference y (H range) and the ninal block. bhase voltage 100 30 V and 320 V, the ninal block.	. When the output e load power factor			
frequenc	ut voltage 100 V/200 V, rated output cy 40 Hz to 1 kHz. ed output is possible when the crest fa		ave, load power	ractor 1, output	*21 At 10 % to	pient temperature o 100 % of maximu aht of sine wave.		ine wave.					

*11 Repeated output is possible when the crest factor is 4.
*12 For input voltage changes within the rated range.

^{*22} Pulse height of sine wave. *23 At a power factor of 1. *24 125 Vac/ 250 Vac (output L range/ H range) .

PCR-WEA/WEA2 Series Specifications

				Single-phase	output model			Single-phase	'three-phase swi	tchable model		
	Item/Mode	el		PCR	PCR	PCR	PCR 6000WEA2	PCR 12000WEA2	PCR 18000WEA2	PCR 24000WEA2	PCR 30000WEA2	PCR 36000WEA2
				1000WEA	2000WEA	3000WEA2	PCR 6000WEA2R	PCR 12000WEA2R	PCR 18000WEA2R	PCR 24000WEA2R	PCR 30000WEA2R	PCR 36000WEA2I
Output impe	edance setting			1		1	1			1		
Resistance	component											
L		1P		0 Ω to 2000 mΩ	0 Ω to 1000 mΩ	0 Ω to 667 mΩ	0 Ω to 333 mΩ	0 Ω to 167 mΩ	0 Ω to 111 mΩ	0 Ω to 83 mΩ	0 Ω to 67 mΩ	0 Ω to 56 mΩ
Range		1P3W	3P	-	-	0 Ω to 2000 mΩ	0 Ω to 1000 mΩ	0 Ω to 500 mΩ	0 Ω to 333 mΩ	0 Ω to 250 mΩ	0 Ω to 200 mΩ	0 Ω to 167 mΩ
н		1P		0 Ω to 8000 mΩ	0 Ω to 4000 m Ω	0 Ω to 2667 mΩ	0 Ω to 1333 mΩ	0 Ω to 667 mΩ	0 Ω to 444 mΩ	0 Ω to 333 mΩ	0 Ω to 267 mΩ	0 Ω to 222 mΩ
Range		1P3W	3P	-	-	0 Ω to 8000 mΩ	0 Ω to 4000 mΩ	0 Ω to 2000 mΩ	0 Ω to 1333 mΩ	0 Ω to 1000 mΩ	0 Ω to 800 mΩ	0 Ω to 667 mΩ
Reactance	component											
	L	1P		40 µH to 2000 µH	20 µH to 1000 µH	13 µH to 667 µH	7 µH to 333 µH	3 µH to 167 µH	2 µH to 111 µH	2 µH to 83 µH	1 µH to 67 µH	1 µH to 56 µ⊦
Response:	Range	1P3W	3P	-	-	40 µH to 2000 µH	20 µH to 1000 µH	10 µH to 500 µH	7 µH to 333 µH	5 µH to 250 µH	4 µH to 200 µH	3 µH to 167 µI
AST	н	1P		160 µH to 8000 µH	80 µH to 4000 µH	53 µH to 2667 µH	27 µH to 1333 µH	13 µH to 667 µH	9 µH to 444 µH	7 µH to 333 µH	5 µH to 267 µH	4 µH to 222 µI
	Range	1P3W	3P	-	-	160 µH to 8000 µH	80 µH to 4000 µH	40 µH to 2000 µH	27 µH to 1333 µH	20 µH to 1000 µH	16 µH to 800 µH	13 µH to 667 µ
	L	1P		80 µH to 2000 µH	40 µH to 1000 µH	27 µH to 667 µH	13 µH to 333 µH	7 µH to 167 µH	4 µH to 111 µH	3 µH to 83 µH	3 µH to 67 µH	2 µH to 56 µH
Response:	Range	1P3W	3P	-		80 µH to 2000 µH		20 µH to 500 µH	13 µH to 333 µH	10 µH to 250 µH	8 µH to 200 µH	7 µH to 167 µI
MED	н	1P		320 µH to 8000 µH	160 µH to 4000 µH	107 µH to 2667 µH	53 µH to 1333 µH	27 µH to 667 µH	18 µH to 444 µH	13 µH to 333 µH	11 µH to 267 µH	9 µH to 222 µl
	Range	1P3W	3P	-	-		160 µH to 4000 µH			40 µH to 1000 µH	32 µH to 800 µH	27 µH to 667 µ
	1	1P		240 µH to 2000 µH	120 uH to 1000 uH		40 µH to 333 µH		13 µH to 111 µH	10 µH to 83 µH	8 µH to 67 µH	7 µH to 56 µH
Response:	Range	1P3W	3P	-	-		120 µH to 1000 µH		40 µH to 333 µH		24 µH to 200 µH	20 µH to 167 µ
SLOW	Н	1P	01	960 uH to 8000 uH	480 uH to 4000 uH			80 µH to 667 µH			32 µH to 267 µH	
	Range	1P3W	3P	-	-			240 µH to 2000 µH				
General	0		0.					210 0110 2000 011		120 pi 100 1000 pi 1	00 µ11 (0 000 µ11	00 µ. 1 (0 001 µ
nsulation esistance	Between input a						500) Vdc, 10 MΩ or n	nore			
Withstand voltage	Between input and chassis, an						1.5 kVa	c, 2.15 kVdc for 1	minute			
Electromag	netic compatibi	lity (EMC) *1 *2	EMC Dir EN 55011 (Class Applicable under	ective 2014/30/EL s A*3, Group 1*4), r the following con	he following directi J, EN 61326-1 (Cla EN 61000-3-2*5, Iditions. The maxir he product must be	ss A*3), EN 61000-3-3*5 num length of all	EN 6 Applicable unde	EMC 1326-1 (Class A er the following c	ents of the follow Directive 2014/3 *3), EN 55011 (C onditions. The m o the product mus	0/EU Class A*3, Group aximum length o	1*4) f all cabling an
Safety *1					-	Complies v	vith the requirem	ents of the follow J*2 EN 61010-1	ing directive and	l standards.		
	Operating en	vironmen	t					se, overvoltage c				
	Operating ten	nperature	range				0 °C to -	+50 °C (32 °F to	+122 °F)			
Environ-	Storage temp							+60 °C (14 °F to	· · · · · · · · · · · · · · · · · · ·			
nental onditions	Operating hu	miditv rar	nae				20 %rh to	80 %rh (no cond	ensation).			
conditions	Storage humi		•					or less (no conde				
	Altitude							Up to 2000 m	, ,			
nput termin					M6		N	15	200 V i	nput model: M8	400 V input mo	del: M5
Output term					M6			15		16	N	
 Only on m This is a C environme 	ent. This product	the CE/UK ent. This p may caus	CA marki roduct is i e interfere		an industrial * dential areas. *	electromagnetic 5 This does not a	c radiation, induction pply to the PCR60 onfirms to Class I.	s product does not ve and/or capacitiv 00WEA2R. Be sure to ground	e coupling, for the	e treatment of mate	erial or inspection/	analysis purpos

*7 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

Limit values and protection functions

and television broadcasts.

electromagnetic emis-sions to prevent interference to the reception of radio

			Setting range	Resolution	
	Upper AC voltage limit Lower AC voltage limit		0.0 V to 322.0 V	0.1 V	
Upper DC voltage limit Lower DC voltage limit			-455.5 V to 455.5 V	0.1 V	
Voltage		Rms value	14.0 V to 500.5 V	0.1 V	
orotection Output overvoltage	protection(OVP)	Positive peak value	14.0 V to 500.5 V	0.1 V	
		Negative peak value	-500.5 V to -14.0 V	0.1 V	
	Power module overvo	Itage protection	Fixed	-	
	Output undervoltage	protection (UVP)	0.0 V to 500.5 V	0.1 V	
requency protection	Upper frequency limit Lower frequency limit		1 Hz to 5000 Hz 1 Hz to 500 Hz on the 500Hz LMT model (for three-phase output)	0.01 Hz (1.00 Hz to 100.0 Hz), 0.1 Hz (100.0 Hz to 1000 Hz), 1 Hz (1000 Hz to 5000 Hz)	
	Current limit *1	it *1 Maximum output current × 0.1 to maximum output current × 1.1			
Current rotection	Positive peak current Negative peak curren		Maximum output current × 0.1 to maximum output current × 4.2	0.01 A (0.35 A to 100.0 A), 0.1 A (100.0 A to 1000 A)	
Overheat	Power module overhe	at protection	Fixed	-	
rotection	Fan error		Fixed	-	
overload pro	tection		Rated current or current limit	Current limit resolution	
ndependent	operation detection		Fixed	-	
Sensing erro	r detection		±(10 % +10 V) with respect to the output terminal voltage	-	

*1 The current that can actually be supplied is 1.1 times the rated current or the current limit, whichever is less. *2 The current that can actually be supplied is the maximum peak current or the peak current limit, whichever is less.

Specifications of the communication interface

Specifications of the communication interface								
USB	Complies with the USB 2.0 specifications; data rate: 480 Mbps (high speed), socket B type, self-powered, Complies with the USBTMC-USB488 device class specifications							
LAN	IEEE802.3, 100Base-TX Ethernet LXI 1.4 Core 2011 (Extended Functions: HiSLIP, IPv6), data rate: 100 Mbps (auto negotiation, Full Speed) AUTO MDIX function, IPv4, RJ45 connector, category 5, straight cable							
RS232C	Complies with the EIA232D specifications, asynchronous full duplex, D-SUB 9-pin connector (male), crossover cable (null modem) 9600 bps/ 19200 bps/ 38400 bps/ 57600 bps/ 115200 bps							





Dimensions / Weight

- PCR500MA: 214(8.43")W×124(4.88")H×350(13.78")Dmm(inch)/ 6.5 kg(14.33 lbs)
- PCR1000MA: 429(16.89")W×128(5.04")H×350(13.78")Dmm(inch)/ 11 kg(24.25 lbs)
- PCR2000MA: 429(16.89")W×128(5.04")H×450(17.72")Dmm(inch)/ 16 kg(35.27 lbs)
- PCR4000MA: 429(16.89")W×262(10.31")H×520(20.47")Dmm(inch)/ 32 kg(70.54 lbs)

Accessories

Power cord, Cable tie(1 pc.), Core(1 pc.), Packing List(1 pc.), Quick Reference(Japanese 1 sheet, English 1 sheet), Safety Information(1 copy), CD-ROM(1 disc), Heavy object warning label(1 pc.)(Included only with the PCR4000MA)

Features

■ Compact design (PCR500MA) Small enough to fit on your work desk! Only 214 W × 124 H × 350 D mm! Weighs only 6.5 kg and easy to carry!





High-quality output waveform

Output voltage available in two ranges: 0-155 V / 0-310 V. The maximum current is 5 A (155 V range) or 2.5 A (310 V range) with a peak current that can triple the maximum rated current for capacitor input type rectifier loads. The distortion rate of the output waveform is below 0.5% (RCP 500MA)

Compact AC power supply using the PWM inverter method

The PCR-MA AC power supply series is a PWM inverter type (switching) power supply that builds on the success of our conventional model, the PCR-M. Maximum output voltage has been increased to 310Vrms AC while maintaining a compact, portable design. The digital interface now includes LAN (LXI) and USB as standard, with GPIB as a factory option for easy integration into any test system. The LXI compliant LAN interface allows the operator to easily monitor and control the instrument via virtual interface wherever they are. Various features including a remote sensing function have been introduced to ensure precise voltage and current measurements. Other features including DC mode, memory functions, and various protections make the PCR-MA the most accessible AC power supply on the market.

Options

- GPIB interface board IB22
- Analog interface board EX08-PCR-MA

Sequence creation software Wavy for PCR-M *Use the PCR-M series compatible mode switching function. (Restrictions apply)

Rack-mount frames and brackets
 For the PCR500MA
 KRA150 (for JIS metric size)
 KRA3 (for EIA inch size)
 KBP3-2 (Blank panel)
 For the PCR1000MA and PCR2000MA
 KRB150-TOS (for JIS metric size)
 KRB3-TOS (for EIA inch size)
 For the PCR4000MA
 KRB300 (for JIS metric size)
 KRB6 (for EIA inch size)

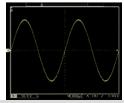
Easy access with a built-in web server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PCR-MA series for convenient control and monitoring.

*Screen sample

[Recommended browser]

- Requires for the Microsoft Edge 10
 Requires for the Internet Explorer version 9.0 or later
- Requires for the firefox 8.0 or later
- Requires for the safari/mobile Safari 5.1 or later
- Requires for the Chrome 15.0 or later
 Requires for the Opera 11.0 or later
- Requires for the Opera 11.0 or later
- * Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).



Easy to carry with only

one hand

Small and light. Only **6** . 5 kg

(PCR500MA)

Features

Versatile output modes

Three modes (AC, DC, AC+DC) are available. *1 The frequency range is up to 500 Hz (setting resolution: 0.1 Hz).

Memory feature

Three combinations of setting, voltage, and frequency can be stored and recalled on the front panel. By recalling memory during output, you can test sudden changes in voltage and frequency. Additionally, when using communication commands, the internal memory can store up to 11 settings.

Measurement features

Voltage, current, power, apparent power, reactive power, power factor, crest factor and current peak hold can all be measured. *2

- Various communication interface options
 - LAN and USB digital interfaces included as standard. GPIB optional interface board also available.
- Analog interface

Analog control is also available with an optional analog interface (EX08-PCR-MA). Input DC signals can be used to change output AC voltage and boost the input waveform.

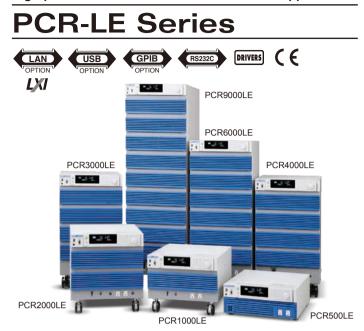
- *1: AC+DC mode is only valid with communication command.
- *2: You can use the communications interface to measure apparent power (VA), reactive power (VAR), power factor (PF), crest factor (CF), and held current peak.

PCR-MA Series Specifications

		PCR500MA		PCR1000MA	PCR2000MA	PCR4000MA				
Input voltage			Nominal input ra	ting: 100 Vac to 120 Vac/20	0 Vac to 240 Vac, 50 Hz/60 Hz, single ph	lase				
nput voltage		Voltage r	ange: 90Vac to 13	2Vac/180Vac to 264Vac (au	to detection at power-on), Single phase,	47 Hz to 63 Hz				
nput current	Input 90 V to 115 V	8 A/6.3 A or less	1	6 A/12.5 A or less	32 A/25 A or less	64 A/50 A or less				
nput current	Input 180 V to 230 V	4 A/3.2 A or less		3 A/6.3 A or less	16 A/12.5 A or less	32 A/25 A or less				
nput power factor *1				0.9 (stand	lard value)					
Efficiency				≥ 7	0 %					
Output voltage					C (output 155 V/310 V range)					
Output voltage		-219 V to +219 V/-438 V to +438 V DC (output 155 V/310 V range)								
Setting Resolution		0.1 V								
Output capacity		AC mode: 500 VA at maximum		e: 1000 VA at maximum	AC mode: 2000 VA at maximum	AC mode: 4000 VA at maximum				
		DC mode: 400 W at maximum		de: 800 W at maximum	DC mode: 1600 W at maximum	DC mode: 3200 W at maximum				
Maximum current		AC mode: 5 A/2.5 A *2		mode: 10 A/5 A *2	AC mode: 20 A/10 A *2	AC mode: 40 A/20 A *2				
		DC mode: 4 A/2 A *3		C mode: 8 A/4 A *3	DC mode: 16 A/8 A *3	DC mode: 32 A/16 A *3				
Dutput frequency					ting: 0.1 Hz, accuracy: ≤ ±2 × 10 ⁻⁴					
Output waveform dis	ortion ratio		≤ 0.5 % (At outp	-	V to 310 V, load power factor 1, in AC m	ode)				
Accuracy of voltmete	r				ing +0.3 V/0.6 V)	1.5 %				
		±(0.5 % of reading + 0.02 A/0.01		f reading + 0.04 A/0.02 A)	utput frequency 45 Hz to 65 Hz/DC at 23 ±(0.5 % of reading + 0.08 A/0.04 A)	± 5 C) ±(0.5 % of reading + 0.16 A/0.08 /				
Accuracy of ammeter	(RMS)	, <u> </u>	, ,		$\pm (0.5\% \text{ of reading} + 0.08 \text{ A}/0.04 \text{ A})$ output frequency 45 Hz to 65 Hz or DC at	· · ·				
	re and humidity range	(5 %			0 %rh (no condensation)	23 ± 5 (6)				
Storage temperature					0 %rh (no condensation)					
° .	, ,	<u> </u>								
factor is 1. At output voltage	1 V to 100 V/2 V to 200 V. L	310 V range), maximum current, loa imited by the power capacity at outp V. Limited by the power capacity at a	out voltage 100 V	o 155 V/200 V to 310 V.) V/200 V (in the 135 V/270 V range), the	current is maximum, and the load po				
	s of the communica	ation interface								
_AN		Complies with IEEE 802.3 100base-TX/10Base-T Ethernet 1.5 LXI Device Specification 2016 RJ-45 connector								
JSB		Complies with the USB 2.0 specifications; data rate: 480 Mbps (HighSpeed), TypeB socket								
GPIB (IB22: optional)	Complies with IEEE Std 488.1-1978 SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E1								
Common		Software protocol: IEEE 488.2 S	TD 1992 Comm	and language: SCPI Specifi	cation 1999.0					
Analog interf	ace specifications (EX08-PCR-MA: optional)							
	Maximum allowable	input voltage		±15 V						
nput terminal	Туре			BNC						
nputterminai	Input impedance			10 k Ω ±5 % (unbalanced)						
	Isolation voltage			42 Vpk						
	Input voltage range			-10 V to +10 V (DC)						
XT-AC mode *1	Voltage amplification	n rate (155 V/310 V range)		15.5 times, 31 times						
	Frequency setting ra	nge		40 Hz to 500 Hz						
	Input voltage range*	2	ATT OFF	-2.19 V to +2.19 Vpeak	(0 V to 155 Vrms sine wave)					
	input voltage range	2	ATT ON	-10V to +10V (DC)						
EXT-DC mode	Input frequency rang	le	ATT OFF	40 Hz to 500 Hz (sine v	wave), 40 Hz to 100 Hz (square wave), D	0				
LAT-DC mode	Frequency character	ristics	ATT OFF	500 Hz -0.3 dB (TYP)	55 Hz as the reference					
	Valtaga amplification	rate (155)/(210)/ range)	ATT OFF	100 times, 200 times						
	voltage amplification	n rate (155 V/310 V range)	ATT ON	21.9 times, 43.8 times						
Vaveform distortion	ratio*3			≤ main unit specificatio	ons +0.5 %					
ATT ON at all time For DC input in E IGeneral spec	KT-AC mode and sine wave	es of voltage, current, and power and with 0.1% or less distortion in EXT-	e DC and 40 Hz to DC mode.	500 Hz. Set the frequency a	according to the input waveform period.					
Safety *1		Complies with the requirements of Low Voltage Directive 2014/35/E	of the following dir U [*] 2 EN 61010- ⁻	ective and standards. I (Class I*5, Pollution Degree	e 2*6)					
Electromagnetic compatibility *1, *2		Low Voltage Directive 2014/35/EU*2 EN 61010-1 (Class I*5, Pollution Degree 2*6) Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN 61326-1 (Class A*3) EN 55011 (Class A*3, Group 1*4) EN 61000-3-2 EN 61000-3-3 Applicable under the following conditions Load cables are less than 30 m. Other cables connected to the product are all less than 3 m.								

*1 Does not apply to specially ordered or modified products. *2 Only on models that have the CE marking on the panel. *3 This product confirms to Class A. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. *4 This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/nanl-ysis purpose. *5 This product confirms to Class I. Be sure to ground the protective conduct. If not grounded properly, safety is not quaranteed. *6 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only

High-performance Multifunctional AC Power Supplies



Dimensions / Weight

PCR500LE : 430(16.93")W × 173(6.81")H × 550(21.65")Dmm / 17kg(37.48 lbs) PCR1000LE: 430(16.93")W × 262(10.31")H × 550(21.65")Dmm / 35kg(77.16 lbs) PCR2000LE: 430(16.93")W × 389(15.31")H × 550(21.65")Dmm / 55kg(121.25 lbs) PCR3000LE: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm / 82kg(180.78 lbs) PCR4000LE: 430(16.93")W × 690(27.17")H × 550(21.65")Dmm / 96kg(211.64 lbs) PCR6000LE: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm / 196kg(211.64 lbs) PCR9000LE: 430(16.93")W × 1325(52.17")H × 550(21.65")Dmm / 190kg(418.88 lbs)

Accessories

Setup Guide, Quick Reference (1 each for English and Japanese), CD-R(Contains the User's Manual and the Communication Interface Manual), Safety information PCR500LE : Power cord (with plug, length: 3 m)

[NOTICE] To users of the PCR-L/LA Series

The PCR-LE Series is not compatible with the previous product, the PCR-L/LA Series. Consequently, it is not possible to upgrade a system if it includes a prior PCR-L/LA Series in the system. Further, along with this, in principle options cannot be used, with some exceptions. Please be considered of this notice for your planning of future system. If you have any other questions, please contact our sales department for details.

New stage of AC power supply supporting new energy field

The PCR-LE Series is a new line of advanced multifunctional AC power supply that has been developed from the former PCR-L/LA Series (linear amplifier type).

The PCR-LE Series provides high reliability and to support various applications, by taking advantage of the features that can control broadband waveform freely. Moreover, the PCR-LE Series can be configured as a core device of a test system combined with Electonic Loads and Power Analyzers for "Grid Connection Testing" in regard to dispersed power generation, such as Solar Power, Wind Power, Fuel Cell, and Gas Engine referred to as "New Energy Field". With various options, the low frequency immunity test and various power environment tests are supported. The options for parallel operation and three-phase operation enable you to expand a single-phase system up to 27 kVA, single-phase three wires system up to 54 kVA, and a three-phase system up to 81 kVA. The system can be applied to a large-scale EMC site for testing of industrial high-capacity air conditioners.

Features

- High-quality/high-stability output with a high-speed linear amp
- Capable of various power line abnormality simulations and the sequence operation
- Single phase 500 VA to 9 kVA, supporting the system for the single-phase, and expandable with optional drivers for the single-phase three-wire, and three-phase operation
- Expandable capacity up to 27 kVA (single-phase), 54 kVA (single-phase three-wires), and 81 kVA (three-phase)
- Equipped with various measuring functions
- Features a full range of measuring functions and supports AC, DC, and AC + DC Outputs
- Detachable front panel
- Eco-friendly function equipped

Functions

Wide range of output. DC output is also supported.

Item	Range
Voltage (AC) *1	1 V to 150 V (L range), 2 V to 300 V (H range)
Frequency	1 Hz to 999.9 Hz *2
Voltage (DC/AC+DC) *1	±1.4 V to ±212 V (L range), ±2.8 V to ±424 V (H range)

*1 : Settings available from 0 V.

*2 : The frequency is limited to the range from 1 Hz to 500.0 Hz when the 3P05-PCR-LE (500 Hz LMT) is installed in the PCR-LE series

In addition, the system supports a DC output mode and AC + DC output mode. The system can be useful in a wider range of fields such as chemistry- and physics-related areas.

Selectable response mode

Allows to select a response mode for the internal amplifier system depending on the load condition and application.

Item	Application
High-speed response (FAST) *3	for requesting a rate of power rise/fall
Normal response (MEDIUM)	for testing various power supply environments
Highly stable response (SLOW)	for power supply for EMC testing sites

*3 : Excluding PCR6000LE, PCR9000LE, PCR6000LE2, PCR9000LE2, three phase operation, single phase 3-wire operation and parallel operation

PCR-LE/LE2 Series Options

Interface

IB05-PCR-LE (GPIB) LN05-PCR-LE (LAN/LXI) EX06-PCR-LE (Analog)*2

US05-PCR-LE (USB) EX05-PCR-LE (Analog)*1

Extension cable for control panel(2 m) EC05-PCR

Sequence creation software SD011-PCR-LE(Wavy for PCR-LE)

Software for avionics norms SD012-PCR-LE/WE

Power line abnormality simulation

In AC mode, it is possible to simulate the power line abnormalities by setting the output of the PCR-LE series system to the state of a power outage, voltage drop (dip), or voltage increase (pop). This allows the ability to test switching power supplies and electronic equipments.



power outage

voltage drop (dip)

Various measuring functions

Output voltage/current RMS values, peak voltage/current, effective power/apparent power, average voltage/current, and power factor can be measured.

It is possible to analyze harmonics (up to 40 th order) of the output current.

PCR-LE Series Options

Input power cable AC5.5-3P3M-M4C(For PCR1000LE) AC8-1P3M-M5C-3S(For PCR2000LE) AC14-1P3M-M8C-3S (For PCR3000LE/PCR6000LE(1P2W input))

AC22-1P3M-M8C-3S(For PCR4000LE)

AC14-1P3M-M5C-4S (For PCR6000LE(3P3W input)/PCR9000LE(3P3W input)) AC5.5-1P3M-M5C-5S (For PCR6000LE(3P4W input)/PCR9000LE(3P4W input))

Extension cable for PD05S-PCR-LE PC01-PCR-LE(130 cm) (For parallel operation)

■ Connecting cable (for 2P05,3P05) CC01-PCR-LE (150 cm) CC02-PCR-LE (280 cm)

Power signal cable CC11-PCR-LE(100 cm)(for parallel operation) Parallel operation driver*3 PD05M-PCR-LE (For master unit operated in parallel) PD05S-PCR-LE (For slave unit operated in parallel)

■ Three-phase output driver 3P05-PCR-LE 3P05-PCR-LE (500 Hz LMT)

Single-phase Three-wire Output Driver 2P05-PCR-LE

Power linkage cable (1 m) LC01-PCR-LE

475 mm

*Depth: 595mn

PCR2000LE

430 mm

Quick immunity sequencer SD009-PCR-LE/WE

"Quick Immunity Sequencer 2" (model name: SD009-PCR-LE/WE)is an application software for immunity testing with the AC power supply PCR-LE series system, based on the power line disturbance standard (IEC61000-4 Series) for the immunity testing of the EMC standard. Not only can it be used for compliance testing based on the latest

standards or for some types of preliminary testing, but the software can be also employed for advance checking in development phases and for immunity margin tests, because it allows extended testing conditions to be set as needed.

The latest standards for IEC61000-4 supported!

the first parts	annen gener per	
Open Rave Core	AC High ON 3F	Toulos
	2 540 2 # Viltage dpi	In the L in
Ind a	000000000000000000000000000000000000000	
	Horizontal Horizon	Passing Reduced Introducing Information (RC strengthing Int) (RC REDUCED IN - 23.6 kp - 93.600 - 13.0 kp - 11.000 .000 3.500 a 3.600 to 3.600

Front panel serving as a remote control

The front panel is detachable. With the optional extension cable, the panel functions as a remote control.

work bench remotely from the front panel connected with the optional extension cable (EC05-PCR).

Desk

[Practical example]



*1 The input waveform is directly amplified and output.

*2 The voltage of the output alternating current can be changed based on the level input DC signal *3 PCR500LE and PCR1000LE and PCR6000LE2 and PCR9000LE2 can not be operated in parallel.

You can operate the PCR-LE unit installed under your work desk/

PCR-LE Series Specifications

Item/Model			PCR500LE	PCR1000LE	PCR2000LE	PCR3000LE	PCR4000LE		PCR6000LE		PCR9	
Input ratings (AC rms)					1P:	2W			3P3W 200V	3P4W 400V	3P3W 200V	3P4W 400V
Voltage				85 V to 1	132 V/170 V to	250 V *1		170 V	to 250 V	Line voltage 324 V to 440 V (Phase voltage 187 V to 254 V)	170 V to 250 V	Line voltage 324 V to 440 V (Phase voltage 187 V to 254 V
Phases					Single	phase			Three phase 3-wires	Three phase 4-wires	Three phase 3-wires	Three phase 4-wires
Frequency							47 Hz to	o 63 Hz				
Apparent power			Approx. 0.93 kVA	Approx. 1.8 kVA	Approx. 3.6 kVA	Approx. 5.5 kVA	Approx. 7.3 kVA	,	Approx. 10.6 kV	Ά	Approx.	15.7 kVA
Power factor *2					0.0	0.01171	0.97 (TYP)				
Max. current *1			11.3 A, 5.5 A	22 A, 10.8 A	44 A, 21.5 A	66 A, 32 A	88 A, 43 A	64 A	38 A	21 A	55 A	30 A
AC mode output ratings (AC rms												
Voltage (output L range, output H							1 V to 150 V /					
N/ 10 10	F	Resolution					0.1					
Voltage setting range Voltage setting accuracy (output L range	e output H r	(2000) * 1				(V to 152.5 V / ± (0.3 % of		V			
Max. current (output L range, ou			5 A, 2.5 A	10 A, 5 A	20 A, 10 A	30 A, 15 A	40 A, 20 A	Set + 0.0V)	60 A, 30 A		90 A	45 A
Phase			,		,	,	Single	phase				
Power capacity			500 VA	1 kVA	2 kVA	3 kVA	4 kVA		6 kVA		9 k	VA
Maximum peak current *6							Max. current (r	ms) × 4 (TYF	')			
Max. reverse current *7						3	0 % of the ma	x. current (rm	s)			
Load power factor							0 to 1 (leading		5			
Frequency *5	[-	Decel II				04 11- /1 00	1 Hz to 9			->		
DC mode output ratings	F	Resolution			0	.u1 Hz (1.00 H	z to 100.0 Hz),	u.1 Hz (100.0) Hz to 999.9 H:	Z)		
DC mode output ratings Voltage (output L range, output I	H range)*	3				_ _1	.4 V to ±212 V/	+2.8 V to +42	4.1/			
vonage (output Litalige, output i	- Č	Resolution				ΞI	.4 V to ±212 V/ 0.1		-T V			
Voltage setting range		Coolution				-215.5	V to +215.5 V /		431.0 V			
Voltage setting accuracy (output L range	e, output H r	range) *8					±(0.05 % of se					
Max. current (output L range, ou		• ,	3.5 A, 1.75 A	7 A, 3.5 A	14 A, 7 A	21 A, 10.5 A	28 A, 14 A		42 A, 21 A		63 A,	31.5 A
Max. instantaneous current *10		• /					Max. current	t (rms) × 3.6				
Power capacity			350 W	700 W	1.4 kW	2.1 kW	2.8 kW		4.2 kW		6.3	kW
Output voltage stability												
Line regulation *11							Within					
Load regulation (output L range, o	output H ra						Within ±0.1 V,	within ±0.2 V				
Output frequency variation *13	Ŀ	FAST			Within ±0.2 %					-		
Ripple noise in DC mode (5 Hz to 1		MEDIUM	Within ±0.3 % 0.15 Vrms or less 0.25 Vrms or less									
Ambient temperature variation *		iponeniis)	0.15 Vills of less 0.25 Vills of less 0.25 Vills of less 0.25 Vills of less 100 ppm/°C (TYP)									
Output frequency stability, output		waveform	n distortion rati	o. output volta	de response si	peed. efficienc		0(111)				
Output frequency stability *15					5 1 1		Within ±	5×10 ⁻⁵				
	S	etting accuracy					±1×	10 ⁻⁴				
Output voltage waveform distortio	on ratio	FAST			±0.2 % or less					-		
*16	1	MEDIUM					±0.3 %	or less				
Output voltage response speed	*17	FAST			20 µs (TYP)					-		
		MEDIUM					30 µs	(TYP)				
Eff			54 % or more, 56 % or more		55 % or more,	57 % or more				58 % or more		
Efficiency *18												
-												
Meters (fluorescent display)	F	Resolution					0.1	IV				
-		Resolution Accuracy			± (1	% of rdng + 2			room temperat	ure)		
Meters (fluorescent display) Voltmeter *19				0.01 A	± (1	% of rdng + 2			room temperat 0.1 A	ure)		
Meters (fluorescent display)	F	Accuracy				Ū	digits) (10 V to	424 V and at		,	perature)	
Meters (fluorescent display) Voltmeter *19 Ammeter *19	F	Accuracy Resolution				Ū	digits) (10 V to	424 V and at	0.1 A	,	perature)	
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20	F F F	Accuracy Resolution Accuracy	± (1 % of rdr	± (1 % o 0.1 W/1 W	f rdng + 2 digit	s) (5 % of the r	digits) (10 V to nax. rated curr	424 V and at	0.1 A ated current and	d at room temp		emperature.)
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals	F F	Accuracy Resolution Accuracy Resolution Accuracy		± (1 % o 0.1 W/1 W ng +3 digits) (10	f rdng + 2 digit % of the rated	s) (5 % of the r power capacity	digits) (10 V to nax. rated curr to the rated po	424 V and at rent to max. ra wer capacity,	0.1 A ated current and 1 W when the load p	d at room temp ower factor is 1	, and at room to	
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21	F F Pulse	Accuracy Resolution Accuracy Resolution Accuracy	prox. 10µs, oper	± (1 % o 0.1 W/1 W ng +3 digits) (10 n collector outp	f rdng + 2 digit % of the rated ut, pullup at +5	s) (5 % of the r power capacity V and approx.	digits) (10 V to nax. rated curr to the rated po 10 kΩ serial res	424 V and at rent to max. ra wer capacity, istance appro	0.1 A ated current and 1 W when the load p x. 220 Ω, maxim	d at room temp ower factor is 1 num sink curren	, and at room to	connector
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21	Pulse Step	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp	prox. 10µs, oper put, open collec	± (1 % o 0.1 W/1 W ng +3 digits) (10 n collector outp ctor output, pul	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and	s) (5 % of the r power capacity V and approx. 1 approx. 10 ks	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial res 2 serial resista	424 V and at rent to max. ra wer capacity, istance appro-	0.1 A ated current and 1 W when the load p x. 220 Ω, maxim 220 Ω, maximur	d at room temp ower factor is 1 num sink curren n sink current	, and at room to at 10 mA, BNC o 10 mA, BNC c	connector
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21	Pulse Step Oper	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp	prox. 10µs, oper put, open collec	± (1 % o 0.1 W/1 W ng +3 digits) (10 n collector outp ctor output, pul	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and	s) (5 % of the r power capacity V and approx. d approx. 10 kg t, driving volta	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial res 2 serial resista ge 5 V, serial r	424 V and at rent to max. ra wer capacity, istance approx. 2 esistance app	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur prox. 470 Ω, act	d at room temp ower factor is 1 num sink curren n sink current	, and at room to at 10 mA, BNC o 10 mA, BNC c	connector
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V	Pulse Step Oper t type V or 200 V,	Accuracy Resolution Accuracy Resolution Accuracy width app time outp rating puls	prox. 10µs, open out, open collec e width 10µs c t voltage is 100	± (1 % o 0.1 W/1 W ng +3 digits) (10 n collector outp ttor output, pul r greater, phot	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu	s) (5 % of the r power capacity V and approx. d approx. 10 kg t, driving volta *12 With	digits) (10 V to nax. rated curr to the rated po 10 kΩ serial res 2 serial resista ge 5 V, serial r respect to 0 % t	424 V and at rent to max. rr wer capacity, istance approx. 2 esistance app o 100 % chang	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur prox. 470 Ω, act	d at room temp ower factor is 1 num sink curren n sink current ive with 7 mA	, and at room to at 10 mA, BNC o 10 mA, BNC c source, BNC c	connector onnector onnector
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power	Pulse Pulse Step Oper type V or 200 V, factor is 1,	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp rating puls	brox. 10µs, oper out, open collec e width 10µs c t voltage is 100 utput frequency i	± (1 % o 0.1 W/1 W ng +3 digits) (10 n collector outp ttor output, pul r greater, phot	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu	s) (5 % of the r power capacity V and approx. d approx. 10 k0 t, driving volta *12 With Wher the la	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output voli	424 V and at rent to max. ra wer capacity, istance approx. 2 esistance ap o 100 % chang age is betwee	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur prox. 470 Ω, act es in the rating	d at room temp ower factor is 1 ium sink curren n sink current ive with 7 mA s V (L range) or 1	, and at room to at 10 mA, BNC of 10 mA, BNC c source, BNC c	connector onnector onnector / (H range) a
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by n *4 When the output frequency is b	Pulse Step Oper t type V or 200 V, factor is 1, means of a	Accuracy Resolution Accuracy Resolution Accuracy e width app time outpr rating puls the output and the ou a switch on 6 5 Hz and 6 5 Hz and 5	brox. 10µs, open out, open collect e width 10µs c t voltage is 100 itput frequency i the front panel. 5 Hz, with no loc	± (1 % o 0.1 W/1 W mg +3 digits) (10 n collector outp tor output, pul r greater, phot V or 200 V, the s between 40 H2 id, and at room	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature.	s) (5 % of the r power capacity V and approx. 1 approx. 10 kf t, driving volta *12 With Wher the lc MED *13 Betw	digits) (10 V to nax. rated curr to the rated po $10 k\Omega$ serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. sen 40 Hz and S	424 V and at rent to max. rr wer capacity, istance approx. 2 esistance app o 100 % chang age is betwee r is 1. At the ou	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 Y and 150 tput terminal blo	d at room temp ower factor is 1 num sink curren n sink current ive with 7 mA s V (L range) or 1 ck. When the re	, and at room to at 10 mA, BNC c 10 mA, BNC c source, BNC c 160 V and 300 v esponse mode is	connector onnector onnector / (H range) a s set to FAST
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by n	Pulse Step Oper t type V or 200 V, factor is 1, means of a between 45 between	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp rating puls , the output , and the output a switch on 5 Hz and 61 1 V and 11	brox. 10µs, open out, open collect e width 10µs c t voltage is 100 itput frequency i the front panel. 5 Hz, with no loc	± (1 % o 0.1 W/1 W mg +3 digits) (10 n collector outp tor output, pul r greater, phot V or 200 V, the s between 40 H2 id, and at room	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature.	s) (5 % of the r power capacity V and approx. d approx. 10 kf t, driving volta *12 With Wher the lo *13 Betw Wher the lo	digits) (10 V to nax. rated curr to the rated po $10 \text{ k}\Omega$ serial res 2 serial resista ge 5 V, serial r the output voll ad power factor UM. sen 40 Hz and 9 the output voll ad power factor	424 V and at rent to max. rr wer capacity, istance approx. 2 esistance approx. 2 esistance app o 100 % chang age is betwee is 1. At the ou 199.9 Hz. age is betwee is 1. This is th	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 V and 150 e output line regi	d at room temp ower factor is 1 num sink current n sink current ive with 7 mA V (L range) or 1 ck. When the re	, and at room te tt 10 mA, BNC of 10 mA, BNC of source, BNC of 160 V and 300 h rsponse mode is	connector onnector onnector / (H range) a s set to FAST / (H range) a
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ STAT OUT *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by in *4 When the output frequency is betwee When the output voltage is betwee When the output voltage is betwee When the output voltage is betwee	Pulse Pulse Step Oper type V or 200 V, factor is 1, means of a petween 44 s between an 0.8 and tween 100	Accuracy Resolution Accuracy Resolution Accuracy e width app time output and the output and the output and the output a switch on 5 Hz and 6 5 Hz and 6 1 V and 10 V and 150	prox. 10µs, open out, open collect re width 10µs of t voltage is 100 i utput frequency i the front panel. 5 Hz, with no los 00 V (L range) of	± (1 % o 0.1 W/1 W mg +3 digits) (10 n collector output, pul r greater, phot V or 200 V, the is between 40 H2 is between 40 H2 id, and at room r 2 V and 200 V	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu output current is z and 999.9 Hz. temperature. / (H range) and	s) (5 % of the r power capacity V and approx. d approx. 10 kg t, driving volta *12 With Wher the lc MED *13 Betw Wher the lc *14 With	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. en 40 Hz and 5 to the output volt ad power factor to chang	424 V and at rent to max. rr wer capacity, istance appro. 2 esistance appro. 2 esistance appro. 2 is 1. At the ou- 99.9 Hz. age is betwee is 1. This is th ras betwee is 1. This is the rate	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 V and 150 tput terminal blo n 80 V and 150 e output line regul r ange	d at room temp ower factor is 1 num sink current n sink current ive with 7 mA : V (L range) or 1 ck. When the re V (L range) or 1 Julation with 200	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of 160 V and 300 v 160 V and 300 v Hz as the refer	connector onnector onnector / (H range) a s set to FAST / (H range) a
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by In *4 When the output frequency is b *5 When the output root is betwee When the load power factor is between When the load power factor i	Pulse Pulse Step Oper t type V or 200 V, factor is 1, means of a between 48 between a n 0.8 and tween 100 e output vo	Accuracy Resolution Accuracy Resolution Accuracy e width app time output and the ou s width output the output	brox. 10µs, oper out, open collect we width 10µs c t voltage is 100 itput frequency i the front panel. 5 Hz, with no los 00 V (L range) c V (L range) or	± (1 % o 0.1 W/1 W Ig +3 digits) (10 In collector output tor output, pul r greater, phot V or 200 V, the is between 40 H2 Id, and at room r 2 V and 200 V 200 V and 300 V	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature. V (H range) and V (H range), the	s) (5 % of the r power capacity V and approx. 1 approx. 10 kf t, driving volta *12 With Wher the lc MED *13 Betw Wher the lc *14 With When the lc *15 Swith	digits) (10 V to nax. rated curr to the rated po $10 k\Omega$ serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. een 40 Hz and 9 the output volt respect to chan the output volt respect to chan	424 V and at rent to max. rr wer capacity, iistance approx. 2 esistance approx. 2 o 100 % chang age is betwee r is 1. At the ou 99.9 Hz. age is betwee is 1. This is th gaps in the rate age range is 11 rates in all rated	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 V and 150 n 80 V and 150 n 80 V and 150 n 90 V and 150 n range 00 V or 200 V an anges	d at room temp ower factor is 1 num sink current ive with 7 mA : V (L range) or 1 ck. When the re V (L range) or 1 ulation with 200 d the output cur	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of 160 V and 300 v Hz as the reference rent is 0 A.	connector onnector onnector / (H range) a s set to FAST / (H range) a ence.
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by m 4 When the output frequency is b 5 When the maximum voltage is betwee When the load power factor is betwee When the load power factor is factor.	Pulse Pulse Step Oper type V or 200 V, factor is 1, means of a setween 45 between an 0.8 and tween 100 between 0	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp rating puls , the output and the ou a switch on 5 Hz and 6 1 V and 150 olitage.) and 0.8, t	brox. 10µs, open out, open collect we width 10µs co t voltage is 100 typut frequency i the front panel. 6 Hz, with no loc 0 V (L range) or the output curre	$\pm (1 \% o$ 0.1 W/1 W ag +3 digits) (10 ag +3 di	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is and 99.9 Hz. temperature. V (H range) and V (H range), the the load power	s) (5 % of the r power capacity V and approx. d approx. 10 kG t, driving volta *12 With wher the lc MED *13 Betw Wher the lc *14 With *15 With *16 Wher	digits) (10 V to nax. rated curr to the rated po $10 \text{ k}\Omega$ serial resize Ω serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. sen 40 Hz and 2 wer factor to chan the output volt respect to chan the output volt respect to chan the output volt respect to chan the output volt	424 V and at rent to max. ra- wer capacity, istance approx. 2 esistance approx. 2 esistance approx. 4 o 100 % chang age is betwee is 1. At the ou 99.9 Hz. age is betwee is 1. This is th gas in the rate age range is 11 ges in all rated age is betwee	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximu 220 Ω, maximu orox. 470 Ω, act es in the rating n 80 V and 150 tput terminal blo n 80 V and 150 e output line regr f range 0 V or 200 V an	d at room temp ower factor is 1 num sink current ive with 7 mA : V (L range) or 1 ck. When the re V (L range) or 1 ulation with 200 d the output cur	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of 160 V and 300 v Hz as the reference rent is 0 A.	connector onnector onnector / (H range) au s set to FAST / (H range) au ence.
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ STAT OUT *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by in *4 When the output frequency is b *5 When the maximum voltage is betwee When the load power factor is of factor. When the output frequency is b frequency.	Pulse Step Oper type V or 200 V, factor is 1, means of a petween 45 between a between 00 between 1	Accuracy Resolution Accuracy Resolution Accuracy e width app time output and the output and the output and the output and the	brox. 10µs, open out, open collect e width 10µs co t voltage is 100 typut frequency i the front panel. 6 Hz, with no los 00 V (L range) or the output curre Hz, the output o	± (1 % o 0.1 W/1 W in collector output, pull in collector output, pull in collector output, pull in greater, phot V or 200 V, the i is between 40 Hi is between 40 Hi id, and at room in 2 V and 200 V 200 V and 300 ⁻¹ in t is reduced by current is reduced	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature. V (H range) and V (H range), the the load power ed by the output	s) (5 % of the r power capacity V and approx. d approx. 10 kf t, driving volta *12 With Wher the lc MED *13 Betw Wher the lc *14 With Wher the lc *14 With Wher the lc *17 Wher *15 With	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. sen 40 Hz and 5 to the output volt ad power factor the output volt	424 V and at rent to max. r. wer capacity, istance approx. 2 esistance approx. 2 esistance approx. 2 esistance approx. 2 esistance approx. 2 is 1. At the ou- 199.9 Hz. age is betwee is 1. This is th ges in the rate age is betwee is 1. at the ou- ges in a the rate age is betwee is 1. At the ou- the set output to the set age is betwee is 1. At the ou- the set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set is 1. At the ou- the set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set age is between is 1. At the ou- set output to the set age is a th	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur rox. 470 Ω, act es in the rating n 80 V and 150 to 200 V and range 00 V or 200 V and range n 80 V and 150 or 200 V, the le	d at room temp ower factor is 1 num sink current ive with 7 mA : V (L range) or 1 ulation with 200 d the output cur V (L range) or 1 soad power fact	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of 160 V and 300 V 160 V and 300 V Hz as the referent rent is 0 A. 160 V and 300 V 160 V and 300 V or is 1, and the	connector onnector onnector / (H range) a s set to FAST / (H range) a ence. / (H range) a
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ STAT OUT *21 *1 100 V input type or 200 V input *1 100 V input type or 200 V input *2 When the input voltage is 100 *4 When the output frequency is b *5 When the output frequency is b *6 When the output voltage is bet output current is reduced by the When the load power factor is betwee When the output voltage is bet output current is reduced by the When the load power factor is is factor. When the output frequency is b	Pulse Pulse Step Oper t type V or 200 V, factor is 1, means of a 5 between 46 s between 100 e output vo between 00 between 1 uds (howev)	Accuracy Resolution Accuracy Resolution Accuracy e width app time output rating puls the output and the ou s witch on 5 Hz and 60 1 V and 10 0 ltage. 0 and 0.8, t Hz and 40 rer, this is li	brox. 10µs, oper out, open collect width 10µs c t voltage is 100 the front panel. 5 Hz, with no los 00 V (L range) c V (L range) or the output curre Hz, the output c	± (1 % o 0.1 W/1 W mg +3 digits) (10 m collector output, pul r greater, phot V or 200 V, the r s between 40 H2 kd, and at room r 2 V and 200 V 200 V and 300 U nt is reduced by current is reduced	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature. / (H range) and V (H range), the the load power ed by the output at's rms value).	s) (5 % of the r power capacity V and approx. 1 approx. 10 kf t, driving volta *12 With Wher the lc MED *13 Betw Wher the lc *14 With When *15 With *16 When cham *18 When *18 When	digits) (10 V to nax. rated curr to the rated po $10 k\Omega$ serial res 2 serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. the output volt ad power factor respect to chan the output volt ad power factor respect to chan the output volt ad power factor respect to chan the output volt ad power factor the output volt the input volta	424 V and at rent to max. r. wer capacity, iistance approx. 2 esistance approx. 2 esista	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur yrox. 470 Ω, act es in the rating n 80 V and 150 n 80 V and 150 or 200 V and range n 80 V and 150 or 200 V, the lo and from the ration or 200 V, the lo and from the ration of 0 V, the output	d at room temp ower factor is 1 num sink current ive with 7 mA : V (L range) or 1 ck. When the re V (L range) or 1 ulation with 200 d the output cur V (L range) or 1 boad power fact ed value to 0 A. voltage is 100 ¹	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of source, BNC of the sponse mode is 160 V and 300 V Hz as the refer rent is 0 A. 160 V and 300 V tor is 1, and the V or 200 V, the i	connector onnector onnector / (H range) al s set to FAST / (H range) al ence. / (H range) al output current
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ TRIG OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 *4 When the output frequency is b *5 When the output reduced by the When the duptur voltage is bet output current is reduced by the When the duptur voltage is bet output current is reduced by the When the duptur voltage is bet output current is reduced by the When the duptur frequency is b *6 When the output voltage is bet output current is reduced by the When the output voltage is bet output current is reduced by the When the output voltage is 100 Hz (reverse current is -180 deg	Pulse Pulse Step Oper t type V or 200 V, factor is 1, means of a between 45 between 0 between 100 between 1 between 1 ds (howev 0 V or 200 0 out of pha	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp time outp time outp and the output and t	brox. 10µs, open out, open collect e width 10µs control total totage is 100 the front panel. 6 Hz, with no loc 00 V (L range) or 00 V (L range) or 00 V (L range) or 01 C (L r	± (1 % o 0.1 W/1 W mg +3 digits) (10 m collector output tor output, pul r greater, phot V or 200 V, the s between 40 H2 ad, and at room r 2 V and 200 V 200 V and 300 ¹ nt is reduced by current is reduced ed output currer cy is between 4	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu putput current is z and 999.9 Hz. temperature. / (H range) and V (H range), the the load power ed by the output at's rms value).	s) (5 % of the r power capacity V and approx. d approx. 10 kg t, driving volta *12 With the lc *13 Betw Wher the lc *13 Betw Wher the lc *14 With *15 With *16 Wher *15 With *16 Wher *17 When chan *17 When chan *18 Wher	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial resista ge 5 V, serial r respect to 0 % tr the output volt ad power factor UM. sen 40 Hz and 2 the output volt respect to chan the output volt ad power factor the output volt respect to chan the output volt	424 V and at rent to max. ra- wer capacity, istance approx. 2 esistance approx. 2 esistance approx. 4 o 100 % chang age is betwee is 1. At the o. 99.9 Hz. age is betwee is 1. This is th gage in the rate age is betwee is 1. This is th rate is betwee is 1. This is the rate is betwee is 1. This is the rate is betwee is 1. This is the rate is a state is a state is 1.	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur 220 Ω, maximur orox. 470 Ω, act es in the rating n 80 V and 150 to V and 150 to V or 200 V and ranges n 80 V and 150 or 200 V, the lot and from the rat or 200 V, the lot and from the rat or 200 V, the lot and from the rat 100 V or 200 V and 150 or 200 V, the lot and from the rat 200 V, the output	d at room temp ower factor is 1 itum sink curren n sink current ive with 7 mA s V (L range) or 1 ck. When the re V (L range) or 1 ulation with 200 d the output cur V (L range) or 1 obad power fack ed value to 0.A. voltage is 100 ¹ put frequency is	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of source, BNC of 160 V and 300 V Hz as the refer rent is 0 A. 160 V and 300 V Hz as the refer rent is 0 A.	connector onnector onnector / (H range) at s set to FAST / (H range) at ence. / (H range) at output current output current and 99.9 H
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 *1 100 V input type or 200 V input *2 When the input voltage is 100 V the rated value, the load power *3 L/H range can be changed by fr *4 When the output frequency is b *5 When the output frequency is b *6 For capacitor-input voltage is betwee When the load power factor is factor. When the output trequency is b frequency. *6 For capacitor-input voltage is 180 deg *7 When the output voltage is 180 deg *8 With no load at arcom temperature *9 When the output voltage is 280 deg	Pulse Pulse Step Oper type V or 200 V, factor is 1, means of a setween 45 between 10 between 10 between 10 o V or 200 j out of pha ure tween 100 V or 200 j out of pha ure tween 100 V or 200 j out of pha ure tween 100 V or 200	Accuracy Resolution Accuracy Resolution Accuracy e width app time outp rating puls , the output and the output and the output and the output and the output	brox. 10µs, open orox. 10µs, open e width 10µs of t voltage is 100 thput frequency i the front panel. 5 Hz, with no los 00 V (L range) or 3 the output curre Hz, the output of mited by the rate output frequen e output voltage	± (1 % o 0.1 W/1 W mg +3 digits) (10 n collector output tor output, pul r greater, phot V or 200 V, the s between 40 H2 id, and at room r 2 V and 200 V 200 V and 300 V nt is reduced by current is reduced by	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu output current is z and 999.9 Hz. temperature. V (H range) and V (H range), the the load power ed by the output tt's rms value). 0 Hz and 999.9	s) (5 % of the r power capacity V and approx. d approx. 10 kG t, driving volta *12 With wher the lc MED *13 Betw Wher the lc *14 With *15 With *16 Wher the lc *17 When the lc *17 When the lc *17 When the lc *18 When the lc *19 With *19 With *19 With *19 With *19 With *19 With *19 With *19 With *10 When the lc *10 When the lc *11 When the lc *11 When the lc *11 When the lc *12 With *12 With *13 With *16 When *11 With *16 When *11 With *16 When *17 When *17 When *18 With *18 With *18 With *19 With *19 With *19 With *10 With *11 Wi	digits) (10 V to nax. rated curr to the rated po 10 k Ω serial resista ge 5 V, serial r respect to 0 % to the output volt ad power factor UM. sen 40 Hz and 9 the output volt respect to chan respect to chan the output volt respect to chan respect to cha	424 V and at rent to max. ra- wer capacity, istance approx. 2 esistance approx. 2 esistance approx. 4 o 100 % chang age is betwee is 1. At the ou- y9.9 Hz. age range is 1 ges in the rate age is betwee is 1. This is th gas in the rate age is betwee is 1. This is th gas in the rate is 100 V or 1 thage is 100 V or is ad power factor isplay, a wavy 99.9 Hz. RMS	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximu 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 V and 150 to V and 150 to V and 150 to V and 150 to V or 200 V an ranges n 80 V and 150 or 200 V, the la and from the ration or 200 V, the la and from the ration of ram with a cre and AVE.	d at room temp ower factor is 1 inum sink current inve with 7 mA sink v (L range) or 1 ck. When the re V (L range) or 1 ulation with 200 d the output cur V (L range) or 1 ad power factured value to 0 A. voltage is 100 but frequency is st factor of 3 of	, and at room to the tot mA, BNC of 10 mA, BNC of source, BNC of source, BNC of 160 V and 300 V Hz as the refer rent is 0 A. 160 V and 300 V Hz as the refer rent is 0 A.	connector onnector onnector / (H range) at s set to FAST / (H range) at ence. / (H range) at output current output current and 99.9 H
Meters (fluorescent display) Voltmeter *19 Ammeter *19 Wattmeter *20 BNC terminals SEQ TRIG OUT *21 SEQ STAT OUT *21 SEQ TRIG IN *21 1 100 V input type or 200 V input '2 When the input voltage is 100 '4 When the output frequency is b '5 When the load power factor is is the load power factor is is frequency.' 6 For capacitor-input rectifier load? '7 When the output voltage is load? '7 When the output voltage is 100 '8 With no load at room temperatu	Pulse Pulse Step Oper type V or 200 V, factor is 1, means of a between 45 b between n 0.8 and tween 100 e output vo between 100 between 100 e output vo between 100 between 100 e output vo between 100 between 10	Accuracy Resolution Accuracy Resolution Accuracy e width app time output rating puls the output and the ou s witch on 5 Hz and 6i 1 V and 150 Oltage. D and 0.8, t HZ and 40 ver, this is ii 0 V and the asse with the V and the asse with the V and 120 Oltage.	brox. 10µs, open orox. 10µs, open e width 10µs of t voltage is 100 thput frequency i the front panel. 5 Hz, with no los 00 V (L range) or 3 the output curre Hz, the output of mited by the rate output frequen e output voltage	± (1 % o 0.1 W/1 W mg +3 digits) (10 n collector output tor output, pul r greater, phot V or 200 V, the s between 40 H2 id, and at room r 2 V and 200 V 200 V and 300 V nt is reduced by current is reduced by	f rdng + 2 digit % of the rated ut, pullup at +5 lup at +5 V and o-coupler inpu output current is z and 999.9 Hz. temperature. V (H range) and V (H range), the the load power ed by the output tt's rms value). 0 Hz and 999.9	s) (5 % of the r power capacity V and approx. 1 approx. 10 kd t, driving volta *12 With *12 With *13 Betw Wher the lc *13 Betw Wher the lc *14 With *15 With *15 With *15 With *16 Wher *17 When *18 Wher *19 With betw *20 Wher	digits) (10 V to max. rated curr to the rated po 10 k Ω serial resize 2 serial resize ge 5 V, serial r respect to 0 % to the output voll ad power factor UM. een 40 Hz and 9 the output voll ad power factor respect to cham the output voll ad power factor the input volta dower factor the output voll ad power factor the output voll the input volta dower factor the output volt the output volt the output volt the input volta dower factor the output volt the output volt the input volta to the output volt the output volt the output volt the output volta	424 V and at rent to max. ra- wer capacity, istance approx. 2 esistance approx. 2 esistance approx. 2 esistance approx. 2 esistance approx. 4 esistance approx. 4 o 100 % chang age is betweet is 1. This is th age is betweet is 1. This is the age is 100 V or is 100 V or ad power factor is play, a wave 99.9 Hz, RMS	0.1 Å ated current and 1 W when the load p x. 220 Ω, maximur prox. 470 Ω, act es in the rating n 80 V and 150 to ut terminal blo n 80 V and 150 to ut terminal blo n 80 V and 150 to ut terminal blo n 80 V and 150 o V or 200 V an ranges n 80 V and 150 or 200 V, the i 200 V, the output ris 1, and the output ris 1, and the output form with a cre-	d at room temp ower factor is 1 itum sink curren n sink current ive with 7 mA s V (L range) or 1 ck. When the re V (L range) or 1 ck. Voltage is 100 v totad power facts ed value to 0 A. voltage is 100 v totat factor of 3 of 5 Hz.	, and at room to t 10 mA, BNC of 10 mA, BNC of source, BNC of source, BNC of televide and 300 vi televide and 300 vi Hz as the referring rent is 0 A. 160 V and 300 vi or is 1, and the V or 200 V, the of s between 40 Hz or less, DC, ou	connector onnector onnector / (H range) ar s set to FAST / (H range) ar ence. / (H range) ar output current z and 999.9 Hz tput frequent

PCR-LE Series Specifications

Item/Model		PCR500LE	PCR1000LE	PCR2000LE	PCR3000LE	PCR4000LE		PCR6000LE		PCR9	000LE
General				1P	2W			3P3W 200V	3P4W 400V	3P3W 200V	3P4W 400V
Insulation resistance	Between input and chassis, output and chassis, and input and output	500 \	500 Vdc, 30 MΩ or more 500 Vdc, 10 MΩ or more							1	
Withstand voltage	Between input and chassis, output and chassis, and input and output		1.5 kVAC for 1 minute								
Circuit method	1				Line	ar amplifier sys	stem				
	Operating environment				Indoor use	, overvoltage o	category II				
	Operating temperature range					0 °C to +50 °C					
Environmental	Storage temperature range		-10 °C to +60 °C								
conditions	Operating humidity range				20 % rh to 8	0 % rh (no cor	ndensation)				
	Storage humidity range					less (no cond	ensation)				
	Altitude				-	Up to 2000 m					
Weight		Approx.17 kg (37.48 lbs)							prox. 190 kg I18.88 lbs)		
Input terminal		Inlet	M4	M5	M8	M8	M8	M5	M5	M5	M5
Output termina	al	M4	M4	M4	M5	M5	M8	M8	M8	M8	M8
	Power cord	1 pc. With plug Length: 3 m				-					
Accessories	Setup guide					1 copy					
Accessones	CD-ROM (User's manual)					1 disc					
	Quick Reference				1 each fo	r English and J	lapanese				
	Safety information					1 copy					
Electromagnetic compatibility (EMC) *1, 2		Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN 61326-1 (Class A *3), EN 55011 (Class A *3, Group 1 *4), EN 61000-3-2 *5, EN61000-3-3 *5 The maximum length of all cables and wires connected to the PCR-LE Series must be less than 3 m.									
Safety			Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU *2 EN 61010-1 Class I *6, Pollution Degree 2								

Does not apply to specially ordered or modified PCR-LEs.

Only on models that have the CE marking on the panel. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special *3

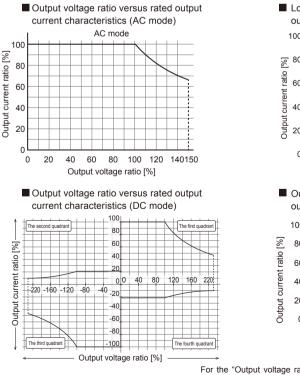
measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material *4 or inspection/analysis purpose

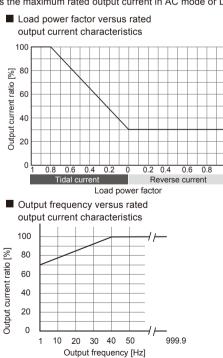
⁴⁵ Excluding PCR3000LE, PCR4000LE, PCR6000LE and PCR9000LE.
 ⁴⁶ This is a Class I equipment. Be sure to ground this product's protective conductor terminal. The safety of this product is only guaranteed when the product is properly grounded.

Output voltage ratio versus rated output current characteristics

The output voltage ratio is a percentage where 100 % represents an output voltage of 100 V (output L range) or 200 V (output H range) in AC mode or DC mode.

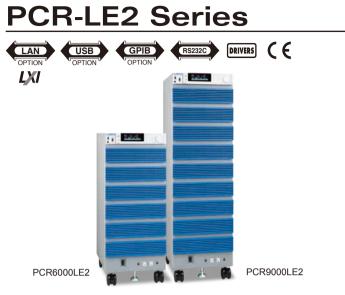
The output current ratio is a percentage where 100 % represents the maximum rated output current in AC mode or DC mode.





For the "Output voltage ratio versus rated output current characteristics (AC mode)" and "Load power factor versus rated output current characteristics" graphs, the rated output current is the product of the output current ratios shown in both graphs. The output current ratio shown in the "Output frequency versus rated output current characteristics" graph is given priority if it is less than the product of the output current ratios described above. (This only applies to AC mode.)

High-performance Multifunctional AC Power Supplies



Dimensions / Weight

PCR6000LE2: 430(16.93")W × 944(37.17")H × 550(21.65")Dmm / 140kg(308.65 lbs)

PCR9000LE2: 430(16.93")W × 1325(52.17")H × 550(21.65")Dmm / 190kg(418.88 lbs)

Capable of single-phase, single-phase threewire, and three-phase output with a single unit. Convenient multiple output supports a versatile range of industrial devices.

The PCR-LE2 Series are designed based on the PCR-LE Series which can switch between single-phase output, single-phase three-wire output, and three-phase output by a switching from the front panel operation. It contains the same basic features and performance of the PCR-LE Series, and uses the same power unit as the PCR-LE Series. Use of this series is much easier than installing individual singlephase, single-phase three-wire, and three-phase systems, and allows more effective use of space. The PCR-LE2 Series 2 models: 6 kVA, and 9 kVA.

Features

- High-quality/high-stability output with a high-speed linear amp
- Capable of various power line abnormality simulations and the sequence operation
- Single-phase 6 kVA to 9 kVA, Capable of the Single-phase output, Single-phase 3-wire output, and Three-phase output.
- Equipped with various measuring functions
- Features a full range of measuring functions and supports AC, DC, and AC + DC Outputs
- Detachable front panel
- Eco-friendly function equipped

Accessories

Setup Guide, Quick Reference (1 each for English and Japanese), CD-R(Contains the User's Manual and the Communication Interface Manual), Safety information

Options

■ Input power cable AC5.5-1P3M-M5C-5S (For PCR6000LE2(3P4W input)/PCR9000LE2(3P4W input)) AC14-1P3M-M8C-3S(For PCR6000LE2(1P2W input)) AC14-1P3M-M5C-4S (For PCR6000LE2(3P3W input)/PCR9000LE2(3P3W input))

- Other options
- Please refer to PCR-LE/LE option section at previous page.
- Fixing PCR6000LE2/PCR9000LE2 to the floor by L-shaped brackets is required.

PCR-LE2 Series Specifications

Item/Model			PCR6000LE2			0000LE2			
Input ratings (AC rm	IS)	1P2W	3P3W 200V	3P4W 400V Line voltage 324 V to 440 V	3P3W 200V Line voltage	3P4W 400V Line voltage 324 V to 440			
Voltage		Line voltage	170 V to 250 V	(Phase voltage 187 V to 254 V)	170V to 250V	(Phase voltage 187 V to 254 V			
Phases			Three phase 3-wire	Three phase 4-wire	Three phase 3-wire	Three phase 4-wire			
requency			A	47 Hz to 63 Hz	Approx. 15.7 kVA				
Apparent power Power factor *1			Approx. 10.6 kVA	0.97 (TYP)	Арргох	. 15.7 KVA			
Max. current		64 A or less	38 A or less	21 A or less	55 A or less	30 A or less			
AC mode output rati									
	nge, output H range) *2			1 V to 150 V, 2 V to 300 V					
/oltage setting rang	e iracy (output L range, output H range) *3			0 V to 152.5 V / 0 V to 305.0 V ±(0.3 % of set + 0.6 V)					
Max. current *4	Single phase, poly phase, L range, H range		60 A, 30 A · 20 A, 10 A		90 A, 45 A	A · 30 A, 15 A			
Phase *5				e · Single phase 3-wire · Three					
Power capacity	Single phase, Three-phase 4-wire, Single phase 3-wire		6 kVA · 4 kVA		9 kV/	A · 6 kVA			
Maximum peak curr Max. reverse curren				Max. current (rms) × 4 (TYP) 30 % of the max. current (rms))				
oad power factor *4				0 to 1 (leading or lagging)	·				
requency *4 *8				1 Hz to 999.9 Hz ★					
	ings (for Single-phase and Single-phase Three-wire c	utput only)		±1.4 V to ±212 V/±2.8 V to ±424	N/				
oltage setting rang	nge, output H range) *2 ie			5 V to +215.5 V / -431.0 V to +4					
	uracy (output L range, output H range) *9			± (0.05% of set + 0.05V/0.1V)					
Aax. current *4	Single phase, poly phase, L range, H range		42 A, 21 A · 14 A, 7 A		63 A, 31.5 A	A · 21 A, 10.5 A			
Max. instantaneous			4.0 544 0.0 544	Max. current (rms) × 3.6	0.011	1. 4.2 KW			
ower capacity Output voltage stabi	Single phase, Single phase 3-wire		4.2 kW · 2.8 kW		б.3 kV	/ · 4.2 kW			
	respect to changes in the rated range)			Within ±0.1 %					
oad regulation(With	n respect to 0 % to 100 % changes in the rating) *11			±0.3 V					
	riation in AC mode(Between 40 Hz and 999.9 Hz) *12			Within ±0.5 %					
	node(5 Hz to 1 MHz components) variation(With respect to changes in the rated range) *13			0.25 Vrms or less 100 ppm/ °C (TYP)					
	ability, output voltage waveform distortion ratio, output	t voltage response speed, ef	ficiency						
	ability(With respect to changes in all rated ranges)			5×10 ⁻⁵ , Setting accuracy : With	in ±1×10 ⁻⁴				
	eform distortion ratio *14			0.3 % or less					
Output voltage resp	onse speed *15	30 μs (TYP)							
fficiency *1 hase difference of	the	58 % or more							
utput phase voltag	e *16 Accuracy		Within ±(0.4°+fo	×1.8×10 ⁻³ °), where the output fr	equency is fo. *17				
Aeters (fluorescent				0.4.14					
oltmeter Resoluti 18 *19 Accuration	on RMS,AVE Display mode cy RMS,AVE Display mode	0.1 V Within ± (1 % of rdng + 2 digits) (10 V to 848 V and at room temperature)							
Ammeter Resoluti		0.1 A · 0.01 A 0.1 A							
18 *19 Accura	cy RMS Display mode	Within ± (19		of the max. rated current to max	nax. rated current and at room temperature)				
Vattmeter Resoluti 19 Accura		1 W 0.1 W/1 W 1 W Within ± (1% of reading + 3digits) (10 % of the rated power capacity to the rated power capacity, when the load power factor is 1, and at room temperature							
requency		within ± (1% of reading + 30	ligits) (10 % of the rated power of		y, when the load power factor i	s 1, and at room temperature.)			
neter *20	Ition			0.01 Hz/0.1 Hz					
Seneral				500.1/ 10.110					
sulation resistance Vithstand voltage	Between input and chassis, output and chassis, and input and output			500 V, 10 MΩ or more 1.5 kVAC for 1 minute					
ircuit method				Linear amplifier system					
Invironmental	Operating temperature range / Storage temperature range			0 °C to +50 °C / -10 °C to +60 °					
onditions	Operating humidity range / Storage humidity range			no condensation) / 90 % rh or le					
Veight nput terminal	Input terminal board [3ø]	M8	Approx.140 kg (308.65 lbs)) M5		kg (418.88 lbs) M5			
	Output terminal board [59]	IVIO				WI5			
Output terminal	3-wire,Three-phase 4-wire			M8 · M5					
nput power cord	Shape	2 = 0	4.80	Single-core cable	4.00	E no			
Sold separately ption]	The number Conductor cross section/Length	3 pc 14 mm ² /3 m	4 pc 8 mm ² /3m	5 pc 5.5 mm ² /3 m	4 pc 14 mm ² /3 m	5 pc 5.5 mm ² /3 m			
	User's manual (Setup guide)			1 сору					
Accessories	CD-ROM (User's manual)			1 disc					
	Quick Reference			1 each for English and Japanes	e				
	Safety information Electromagnetic compatibility (EMC)	FMC Directive 2014/30/EL	EN61326-1 The maximum	1 copy n length of all cables and wires	connected to the PCP-I E G	Series must he less than 2 m			
Other	Safety	2/10 Directive 2014/30/EU		ve 2014/35/EU, EN61010-1Clas		5565 must be less tridit 3 m			
	Output voltage ratio versus rated output current characteristics		· · · · · · · · · · · · · · · · · · ·	ne as PCR-LE series. (Refer to					
is 1, and the outp L/H range can be When the output 1 When the maxim power factor is be 300 V (AC mode) output phase volt load power factor reduced by the ou The output phase indicates single-p	phase voltage is 100 V or 200 V, the output current is the ut frequency is between 40 Hz and 999.9 Hz. changed by means of a switch on the front panel. Resolu frequency is between 45 Hz and 65 Hz, with no load, and um voltage is between 1 V and 100 V (L range) or 2 V etween 0.8 and 1.When the output phase voltage is betw or 100 V and 212 V or 200 V and 424 V (OC mode), th age. When the load power factor is between 0 and 0.8, ti . (AC mode) When the output frequency is between 1 H utput frequency.(AC mode) mode can be changed by means of a key on the operatii hase three-wire mode and three-phase four-wire mode.	tion: 0.1V at room temperature. and 200 V (H range) and the sen 100 V and 150 V or 200 V e output current is reduced by the output current is reduced by z and 40 Hz, the output curre on panel. "Multi-phase" in the t	load power fa mode is set to *13 When the out out and the *15 When the out the *15 When the out the form 0 A to the neutral point. *17 The following Within 40.5" (put phase voltage is between 80 ctor is 1. This is the output line MEDIUM.(There is no F mode) out phase voltage is between 80 ctor is 1. When the response mod out phase voltage is between 80 ctor is 1. When the response mod out phase voltage is 100 V or 200 rated value and from the rated v nce between output voltages (ph show the angles obtained by calc when generating 400 Hz output) when generating 400 Hz output)	regulation with 200 Hz as the V and the output current is 0 V and 150 V (L range) or 16 le is set to MEDIUM.(There is v), the load power factor is 1 ralue to 0 A. ase voltages) when each ph	e reference. When the respo A. 0 V and 300 V (H range) and no F mode) , and the output current chan ase is considered along with			
output current's ri When the output (reverse current is Resolution : 0.01		*18 With the true rms display, a waveform with a crest factor of 3 or less.							

9 With no load at room temperature
 10 Limited by the rated output current's rms value
 11 When the output phase voltage is between 80 V and 150 V (L range) or 160 V and 300 V (H range) and the load

* PCR-LE2 Series 500Hz Limit Model The PCR-LE Series offers the type on each model that limits the maximum output frequency to 500 Hz.

ELECTRONIC LOAD SELECTION GUIDE

Series		PLZ-5W	PLZ-5WH2	PLZ-4WL	PLZ-U	
Line up		4 models	5 models	1 model	4 models	
Features		Multi Functional	High Voltage	High Speed	Multi Channel	
Input		DC	DC	DC	DC	
	CC	✓	v	v	v	
	CC+CV	v	v	v	v	
	CR	✓	v	v	v	
Mode	CR+CV	✓	v	v	v	
	CV	✓	v	v	v	
	CP	✓	v	v	-	
	ARB*	✓	v	-	-	
		200 W/ 400 W/ 1.2 kW	1 kW/ 2 kW/ 4 kW/ 12 kW/ 20 kW	330 W	75 W/ 150 W	
Input rating	(Max.)	150 V	1000 V	30 V	150 V	
		240 A	400 A	100 A	30 A	
Zero Voltag	e Input	-	-	-	Available	
GPIB		Option	Option	Standard	Standard	
RS232C		Standard	Standard	Standard	Standard	
USB		Standard	Standard	Standard	-	
LAN		Standard	Standard	-	-	

*Arbitrary I-V characteristics

Rated Current (12 A/30 A) 90 A Max. Current in Parallel Operation

				Max	. Input Cu	rrent			
	Input Voltage	10	30 50	100	200	400 10	000 180	0 200	00
PLZ-5W	1 V to 150 V		40 /	4/80 A/240	A	480 A 1200 A (6 kW	2160 A (1		Z2405WB 1200 W type +
PLZ-5WH2	10 V to 1000 V		20 A/40	A/80 A/240	A/400 A		2000 A (<mark>100 kW)</mark>	2.4 kW booster units realize a large capacity system! (max.10.8 kW) Large capacity models (Smart Rack) 6 kW to 20.4 kW
PLZ334WL DC	0.3 V to 30 V			100 A					
PLZ-U	1.5 V to 150 V PLZ150U 0 V to 150 V PLZ70UA	15		A (750 W)					

ELECTRONIC LOAD

Multifunctional Electronic Load (CC/CV/CR/CP)



Dimensions

 $\label{eq:plz205W} \begin{array}{l} \mbox{PLZ205W}\/405W\; 214.5(8.45^{\prime\prime})W \times 124(4.88^{\prime\prime})H \times 400(15.75^{\prime\prime})Dmm(inch) \\ \mbox{PLZ1205W}\; 429.5(16.91^{\prime\prime})W \times 128(5.04^{\prime\prime})H \times 400(15.75^{\prime\prime})Dmm(inch) \\ \end{array}$

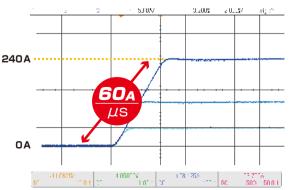
Accessories

Power cord (Cord length: Approx. 2.5 m), Rear-panel load input terminal cover, Load input terminal screw set (2 sets), Screws for the rear-panel load input terminal cover (2 pcs.), Frontpanel load input terminal cover, Front-panel load input knob set, External control connector kit, Setup Guide, CD-ROM, Quick Reference(Japanese 1 sheet, English 1 sheet), Safety Information

Functions

Maximum slew rate of 60 A/µs

Achieving a rise time of 4 µs to reach the rated current of the electronic load. Power supply evaluation demands a fast transient response which the PLZ-5W series achieves with ease.



High-speed response, advanced communications, large-scale system capability

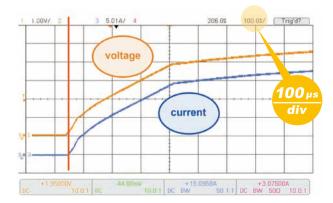
The PLZ-5W Series high performance electronic load is the successor to the highly respected PLZ-4W series, whilst still retaining the same high specification and build quality. Advances include a high visibility color display, low voltage operation from a minimum of 1 V to a maximum of 150 V. Programmable profiles of voltage/current can be applied (using the new ARB function, as used in LED/solar testing) in addition to the inherited 6 modes of operation: Constant Current, Constant Resistance, Constant Voltage, Constant Power, Constant Current + Constant Voltage, Constant Resistance + Constant Voltage. Equipped with a high-speed response feature boasting a maximum slew rate of 60 A/µs (PLZ1205W) and a minimum setting resolution of 10 µA (PLZ205W). Additional features of the PLZ-5W series include: Soft-start function, variable slew rate, selectable response (CV/CR mode), switching function, ABC preset memory, 20 user-defined setup configurations, and a sequence operation function. The advanced high-speed response makes the PLZ-5W ideal for the development and testing of today's modern power supplies that require variable highspeed current changes. This advantage extends to the testing of current clamps/transducers. The PLZ-5W Series is available in 4 standard models which can be incrementally extended by adding additional booster units (PLZ2405WB) to achieve a maximum of 10.8 kW/2160 A DC electronic load.

Features

- Operation voltage: 1 V to 150 V (from 0.05 V)
- High speed slew rate: 60 A/µs
- Arbitrary I-V characteristics: Installed "ARB mode"
- Parallel operation feature: The total current and power capacities can be increased to the maximum of 10.8 kW (2160 A) by connecting the booster units.
- New high visibility color display.
- LAN(LXI compliant)/RS232C/USB are standard interface. External analog control. *GPIB is factory option.
- Improved sequence feature (Maximum 10000 steps)
- Setup memory can be saved to or loaded from a USB flash drive.

High speed voltage tracking characteristics

High speed voltage tracking characteristic in CR mode is perfect for applications such as startup tests for power supplies.



Functions

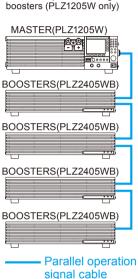
Parallel operation

Without using boosters, you can connect up to five units of the same model in parallel, including the master unit (max. 6 kW, 1200 A).

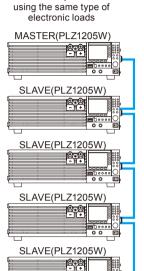
In the parallel connection configuration, one control master operates with one or more slave units, enabling you to control the entire system and view the sum of the combined data on the master unit's panel.

To connect the units requires the use of as many optional parallel cables (PC01-PLZ-5W) as the number of units to be connected.

*The PLZ2405WB (Booster) comes with 1 pc. of parallel operation cable (PC01-PLZ-5W).



Parallel operation using



Parallel operation

signal cable (PC01-PLZ-5W)

* Do not stack three or more loads on top of each other.

You can stack loads (booster and master unit), but for safety reasons, only stack up to two units. If you want to use two or more boosters, we recommend you to rack mount them.

PLZ2405WB Specifications

Model		PLZ2405WB				
Rating						
Operating voltag	le	1 Vdc to 150 Vdc				
Power		2400 W				
Current		480 A				
Current range						
H range		0 A to 480 A				
M range		0 A to 48 A				
L range		0 A to 4.8 A				
Setting accuracy						
CC mode	H, M range	±(0.4% of set + 0.8% of range)				
CC mode	L range	±(0.4% of set + 5% of range)				
CR mode	H, M range	±(0.5% of set + 1.5% of range)				
CK mode	L range	±(0.5% of set + 5% of range)				
CV mode		±(0.2% of set + 0.2% of range)				
CP mode *1	H, M range	±(2% of range + 0.4% current range × Vin)				
GF HIDDE I	L range	±(2% of range + 2.5% current range × Vin)				

*1 Vin: Load input terminal voltage or sensing terminal voltage.

Measurement	Measurement accuracy						
Voltmeter acc	uracy	±(0.1% of reading + 0.1% of range)					
Ammeter	H, M range	±(0.4% of set + 0.8% of range)					
accuracy	L range	±(0.4% of set + 5% of range)					
Protection fun	ctions						
	ctions other than those e the PLZ-5W user's m	below are detected and activated on the PLZ1205W. anual.					
Over temperature protection (OTP)		Turns off the load when the heatsink temperature reaches 100 °C					
General speci	ifications						
Input power s	upply voltage range	100 Vac to 240 Vac (90 Vac to 250 Vac) single-phase, continuous					
Input frequency range		47 Hz to 63 Hz					
Power consur	nption	95 VAmax					
Inrush current	(peak value)	45 Apeak					

Booster unit PLZ2405WB*

Connecting up to 4 booster (PLZ2405WB) units with the master (PLZ1205W) increases the maximum system capability to 10.8 kW, 2160 A.

The optional parallel cable (PC01-PLZ-5W) is required to connect between the master and slave/booster units.

Specifications

е
)



*PLZ2405WB is a dedicated booster for PLZ1205W It cannot be used with any other model

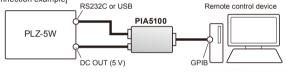
Options

GPIB converter

PIA5100

This converter converts RS232C or USB of the PLZ-5W to GPIB, enabling connection of a remote controller using GPIB. [Accessories: Power cord set, Magnetic sheet] Not CE certified product

[Connection example]



Parallel operation signal cable kit PC01-PLZ-5W (Cable length: Approx. 30 cm)

Sequence creation software SD023-PLZ-5W (Wavy for PLZ-5W)

Model			PLZ2405WB		
General spec	ifications				
	Operating tem	perature range	0 °C to 40 °C (32 °F to 104 °F)		
	Operating hum	nidity range	20%rh to 85%rh (no condensation)		
Environment	Storage tempe	erature range	-20°C to 70°C (-4 °F to 158 °F)		
	Storage humid	lity range	90%rh or less (no condensation)		
	Installation I	ocation	Indoor use, altitude of up to 2000 m, overvoltage category II		
Isolation volta	age		±500 V		
Insulation resistance			500 Vdc 30 MΩ or greater (at 70%rh humidity or less)		
	Between primary and input terminals		No abnormalities at 1500 Vac for 1 minute		
Withstand- ing voltage	Between primary and chassis		No abnormalities at 1500 Vac for 1 minute		
	Between input terminals and chassis		No abnormalities at 750 Vdc for 1 minute		
Electromagne compatibility (EMC) *1 *2	Electromagnetic compatibility (EMC) *1 *2 ENC Dire EN 61326 EN 61326 EN 61000 Applicable		with the requirements of the following directive and standards. sctive 2014/30/EU, -1 (Class A *3), EN 55011 (Class A *3, Group1 *4) -3-2, EN 61000-3-3 under the following conditions. The maximum length of all d wiring connected to the product must be less than 3 m.		
Safety *1 Complies with the require Low Voltage Directive 20			with the requirements of the following directive and standards. ge Directive 2014/35/EU *2 -1 (Class I *5, Pollution Degree 2 *6)		

*1 Does not apply to specially made or modified products. *2 Limited to products that have the CE mark on their panel. *3 This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. *4 This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the from of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose. *5 This is a Class I equipment. Be sure to ground the this product protective conductor terminal. The safety of this product is only guaranteed when the product is properly grounded. *6 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-

PLZ-5W Series Specifications

Unless specified otherwise, the specifications are for the following settings and conditions. The product is warmed up for at least 30 minutes (with current flowing). TYP: These are typical values that are representative of situations where the product operates in an environment with an ambient temperature of 23 °C. They are not guaranteed performance values. set: Indicates a setting. • range: Indicates the rated value of each range. • eading: Indicates a reading. The specifications of the PLZ-5W are for the load input terminals on the rear panel.

Model	PLZ205W	PLZ405W	PLZ1205W
Rating			
Operating voltage (DC) *1		1 V to 150 V *2	
Current	40 A	80 A	240 A (80 A *3 for the load input terminals on the front panel)
Power	200 W	400 W	1200 W
Input resistance when the load is off		Approx. 660 kΩ *4	
Load input terminal's isolation voltage		±500 V	

*1 The minimum operating voltage at which current begins to flow through the PLZ-5W is approximately 0.05 V. At the load input terminals on the rear panel.
*2 In switching mode, for every slew rate setting of 1 A/µs, the minimum operating voltage (including the voltage drop due to the wiring inductance component) increases by approximately 150 mV for the PLZ405W, at 75 mV for the PLZ405W.
*3 The specifications of the PLZ-5W are for the load input terminals on the rear panel and the load input terminals

terminals on the front panel may not meet the specifications. *4 In the case of parallel operation using the same models, approx. 660/number of units kΩ.

Model			PLZ205W	PLZ405W	PLZ1205W		
CC mod							
Operating range		H range	0 A to 40 A	0 A to 80 A	0 A to 240 A		
		M range	0 A to 4 A	0 A to 8 A	0 A to 24 A		
		L range	0 A to 0.4 A	0 A to 0.8 A	0 A to 2.4 A		
		H range	0 A to 42 A	0 A to 84 A	0 A to 252 A		
Setting range		M range	0 A to 4.2 A	0 A to 8.4 A	0 A to 25.2 A		
		L range	0 A to 0.42 A 0 A to 0.84 A		0 A to 2.52 A		
		H range	1 mA 2 mA		5 mA		
Resolution		M range	0.1 mA 0.2 mA		0.5 mA		
		L range	0.01 mA 0.02 mA		0.05 mA		
		H range	±(0.2% of set + 0.1% of range)				
Setting	accuracy	M range	±(0.2% of set + 0.3% of range)				
		L range	±(0.2% of set + 1% of range)				
	Parallel	H, M range	±(0.	4% of set + 0.8% of ran	ge)		
	operation	L range	±(0.	4% of set + 5% of range	e)		
Input lin	e regulation	*1	4 mA	8 mA	24 mA		
Ripple		rms *2	4 mA	8 mA	24 mA		
rtipple		p-p *3	40 mA	80 mA	200 mA		

*1 When the input voltage is changed from 1 V to 150 V at a current of rated power/150 V.
*2 Measurement frequency bandwidth: 10 Hz to 1 MHz
*3 Measurement frequency bandwidth: 10 Hz to 20 MHz

Model		PLZ205W PLZ405W		PLZ1205W
CR mode				
	H range	40 S to 0.002 S (0.025 Ω to 500 Ω)	80 S to 0.004 S (0.0125 Ω to 250 Ω)	240 S to 0.012 S (0.0042 Ω to 83.333 Ω)
Operating range *1	M range	4 S to 0.0002 S (0.25 Ω to 5000 Ω)	8 S to 0.0004 S (0.125 Ω to 2500 Ω)	24 S to 0.0012 S (0.042 Ω to 833.33Ω)
	L range	400 mS to 0.02 mS (2.5 Ω to 50000 Ω)	800 mS to 0.04 mS (1.25 Ω to 25000 Ω)	2400 mS to 0.12 mS (0.42 Ω to 8333.3Ω)
	H range	42 S to 0 S (0.0238 Ω to Open)	84 S to 0 S (0.0119 Ω to Open)	252 S to 0 S (0.00397 Ω to Open)
Setting range	M range	4.2 S to 0 S (0.238 Ω to Open)	8.4 S to 0 S (0.119 Ω to Open)	25.2 S to 0 S (0.0397 Ω to Open)
	L range	420 mS to 0 S (2.38 Ω to Open)	840 mS to 0 S (1.19 Ω to Open)	2520 mS to 0 S (0.397 Ω to Open)
	H range	1 mS	2 mS	5 mS
Resolution	M range	0.1 mS	0.2 mS	0.5 mS
	L range	0.01 mS	0.02 mS	0.05 mS
Setting accuracy	H, M range	±(0.5	5% of set + 0.5% of ran	ge)
*2	L range	±(0.5	5% of set + 1.5% of ran	ge)
Parallel	H, M range	±(0.5	5% of set + 1.5% of ran	ge)
operation	L range	±(0.5	5% of set + 5% of range	e)

*1 Conductance [S] = input current [A]/input voltage [V] = 1/resistance [Ω] *2 Converted value at the input current. At the connectors.

Model		PLZ205W	W PLZ405W PLZ1				
CV mode							
Operating range	H range		1 V to 150 V				
Operating range	L range	1 V to 15 V					
Setting range	H range	0 V to 157.5 V					
Setting range	L range	0 V to 15.75 V					
Resolution	H range	5 mV					
Resolution	L range	0.5 mV					
Setting accuracy *1		±(0.1	±(0.1 % of set + 0.1% of range)				
P a r a l l e l operation ±(0.2 % of set + 0.2% of range)				nge)			
Input current variati	on *2		12 mV				

*1 With the input voltage within the operating range, and at the connector during remote sensing.
*2 For a current change in the range of 10% to 100% of the rating at an input voltage of 5 V (during remote sensing).

Model			PLZ205W	PLZ405W	PLZ1205W		
CP mode							
		H range	20 W to 200 W	40 W to 400 W	120 W to 1200 W		
Operating ra	nge	M range	2 W to 20 W	4 W to 40 W	12 W to 120 W		
		L range	0.2 W to 2 W	0.4 W to 4 W	1.2 W to 12 W		
Setting range		H range	0 W to 210 W	0 W to 420 W	0 W to 1260 W		
Setting range	e	M range	0 W to 21 W	0 W to 42 W	0 W to 126 W		
		L range	0 W to 2.1 W	0 W to 4.2 W	0 W to 12.6 W		
-		H range	0.005 W	0.01 W	0.05 W		
Resolution		M range	0.0005 W	0.001 W	0.005 W		
		L range	0.00005 W	0.0001 W	0.0005 W		
0.111		H range	±(0.5% of range + 0.04 A × Vin)	±(0.5% of range + 0.08 A × Vin)	±(0.5% of range + 0.24 A × Vin)		
Setting acc *1	uracy	M range	±(0.5% of range + 0.008 A × Vin)	±(0.5% of range + 0.016 A × Vin)	±(0.5% of range + 0.048 A × Vin)		
		L range	±(1% of range + 0.004 A × Vin)	±(1% of range + 0.008 A × Vin)	±(1% of range + 0.024 A × Vin)		
	allel	H, M range		ange + 0.4% current ra			
ope	ration	L range	±(2% of ra	ange + 2.5% current ra	nge × Vin)		
1 Vin: The v	oltage a	at the load inpu	it terminals on the rear	panel or sensing conn	ectors.		
Model			PLZ205W	PLZ405W	PLZ1205W		
ARB mode							
Operating ra	nge			current values can be so veen two points is linear			
Response sp	beed			se for input voltage ma			
Voltmeter							
H range			0.00 V to 150.00 V				
Display		L range		0.000 V to 15.000 V			
2 10.190		±(0.1% of reading + 0.1% of range)					
Accuracy		Parallel operation (TYP)	±(0.1% of reading + 0.1% of range)				
Ammeter		,					
		H range	0.000 A to 40.000 A 0.000 A to 80.000 A 0.00 A to 240.00				
Display		M range	0.0000 A to 4.0000 A	0.0000 A to 8.0000 A	0.000 A to 24.000 A		
-17		L range		0.00 mA to 800.00 mA			
		H, M range		% of reading + 0.3% of			
Accuracy		L range		% of reading + 1% of ra			
D		÷					
Parallel operation	(TYP)	H, M range		% of reading + 0.8% of			
	. ,	L range	±(0.49	% of reading + 5% of ra			
Power displa Display	ly		Displays the product -	f the voltmeter reading	and ammeter reading		
Switching fu	oction		pispiays the product o				
				CC and CD			
Operation m				CC and CR			
Frequency s		-		1.0 Hz to 100.0 kHz			
		o 10 Hz		0.1 Hz			
Frequency		to 100 Hz		1 Hz			
setting resolution	-	z to 1000 Hz	10 Hz				
resolution		Iz to 10.0 kHz		0.1 kHz			
		z to 100 kHz	2	0 kHz, 50 kHz, 100 kH	z		
Frequency s				±(0.5% of set)			
	1 Hz t	o 10 Hz					
Duty cycle	11 Hz	to 100 Hz	5.	0% to 95.0%, 0.1% ste	ps		
setting range, step	110 H	z to 1000 Hz					
*1	1.1 k⊢	Iz to 10.0 kHz	5% to 95%, 1% steps				
	10 kH	z to 100 kHz	10% to 90%, 10% steps				
1 The minimu	um time	span is 5us.	The minimum duty cycl				
			PLZ205W	PLZ405W	PLZ1205W		
Model							

Slew rate							
Operation mode			CC				
	H range	0.01 A/µs to 10 A/µs 0.02 A/µs to 20 A/µs		0.06 A/µs to 60 A/µs			
Setting range	M range	0.001 A/µs to 1 A/µs	0.001 A/µs to 1 A/µs 0.002 A/µs to 2 A/µs				
	L range	0.1 mA/µs to 100 mA/µs	0.2 mA/µs to 200 mA/µs	0.6 mA/µs to 600 mA/µs			
	H range	0.01 A/µs	0.02 A/µs	0.06 A/µs			
Resolution	M range	0.001 A/µs	0.006 A/µs				
	L range	0.1 mA/µs 0.2 mA/µs		0.6 mA/µs			
Setting	H, M range	±(10% of set +1.25 µs)					
accuracy *1	L range	±(12% of set +5 μs)					
*1 The time it takes to shift from 10% to 90% when the current is varied from 0% to 100% of the rated current.							
Model		PLZ205W	PLZ405W	PLZ1205W			
Soft start							
Operation mode		CC					

100 µs, 200 µs, 500 µs, 1 ms, 2 ms, 5 ms, 10 ms, 20 ms, or off

ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

Time setting range

PLZ-5W Series Specifications

Model		PLZ205W	PLZ405W	PLZ1205W	Model		PLZ205W	PLZ405W	PLZ1205W
Possible remote	sensing compensa	ition voltage			Sequence function				
approx. 7 V	(Total potential diff	erence between	the input terminals and ser	ising connectors)	Operation mode			CC, CR, CV, CP	
Protective function					Maximum number of	f programs		30	
	Setting range	0.0 A to 44.0	A 0.0 A to 88.0 A	0.0 A to 264.0 A	Maximum number of	f steps		10000	
Overcurrent	Resolution	10 mA	10 mA	10 mA	Step execution time			25 µs to 1000 h	
protection (OCP)	Protection operation		load off or limitation can b	e selected	Time resolution			25 µs	
	Setting range	0 W to 220 W		0 W to 1320 W	Other functions			20 00	
Overpower	Resolution	0.1 W	0.1 W	0.1 W	Elapsed time displa		Display	s the time from load on	to load off
protection (OPP)		-				-	Display		
	Protection operation	Eithei	r load off or limitation can b		-	Range		1s to 999h 59min 59s	
Undervoltage	Setting range		0.00 V to 150.00 V, or c	off	Integrated current d			egrated current from loa	
protection (UVP)	Resolution		0.01 V		Integrated power di	splay		tegrated power from loa	
	Protection operation		Load off		Auto load off timer		Automatically turn	s off the load after the s	pecified time elapses.
Watchdog	Setting range		1 s to 3600 s or off		-	Setting range		1s to 3599999s, or o	ff
protection (WDP)	Protection operation		Load off		-				
Model			PLZ205W		PLZ4	05W		PLZ1205	w
EXT CONT conr								. 22.203	
Load on/off cont			Logic low	el switchable. Pulled u	o to 5 V by a 10 kΩ resistor.	The threshold	s are HIGH: 3.5.V to	5 V I OW: 0 V to 1 5 V	
	· ·	Thor							
Range control in	put		-		a 2 bit signal. Pulled up to				
Alarm input				-	ind 1.5 V. Pulled up to 5 V b				
Alarm clearing in	nput		The alarm will be cleared or	n the rising edge of this	larm, and change the input signal. Pulled up to 5 V by	a 10 kΩ resiste	or. The thresholds ar	e HIGH: 3.5 V to 5.0 V,	LOW: 0 V to 1.5 V.
Trigger input			Paused sequ		es when a voltage between The thresholds are HIGH: 2			p to 5 V by a 10 kΩ resis	stor.
					, CR, CP mode through ext				
External voltage					the range of 0% to 100% of				
(CC, CR, CP mo	ue)				range of 0% to 100% of the the range of 0% to 100% of				
	Setting accu	racy	01.1110.3610		-		-		
External voltage	-		±(1% of range) (TYP value of H range in CC mode) The load setting of CV mode can be controlled through external voltage input. The rated voltage can be controlled in the range of 0% to 100% with 0 V to 10 V.						
(CV mode)	oontron input		The load setting of CV mode can be controlled through external voltage input. The rated voltage can be controlled in the range of 0% to 100% with 0 V to 10 V. The input impedance is approx. 10 kΩ.						
	Setting accu	racy	1(1% of range) (TYP value) ±(1% of range) (TYP value)						
External voltage									
(superimposing i			Adds curre		of -100% to 100% of the rated current for -10 V to 10 V. The input impedance is approx. 10 k Ω .				2.
	Setting accu	racy			±(1% of range) (TYP value of H range)				
Load-on status of	output			On wh	en load is on. Open-collect	or output from	a photocoupler. *1		
Range status ou	tput			Outputs current range	state L, M, and H using 2 bi	ts. Open-colle	ctor output from a ph	notocoupler. *1	
ALARM 1 output					ection, reverse-connection				
			front-panel load termina	al overcurrent detection	or parallel operation anon			ollector output from a ph	otocoupler. *1
ALARM 2 output					On when OCP, OPP, UV				
DIGITAL 0 / DIG	ITAL 1 output				of a sequence. Output imp			• • •	
DIGITAL 2 output	ıt				put. Output: Logic signal ou re sequence and the measu				
Current monitor	output		Input. This signal is the t		0 V to 10 V for 0% to 100%				VV. 0 V 10 0.8 V.
Current monitor	Accuracy	,		Outputs	±(1% of range) (TYI				
Short signal out				Relay	contact on when the short f				
Front-panel BNC				Relay	contact on when the short i				
	terminar	T	ransmits 10 us pulses whe	n trigger output is ON	during sequence operation	and during ste	n execution Transm	its 1 us pulses during sv	witching operation
Trigger output			ranamita to pa pulaea whe		tput impedance: 200 Ω, ou			ita i pa puises during av	ntening operation.
Current monitor	output			Outputs	0 V to 2 V for 0% to 100%	of the rated cu	rrent of each range.		
	Accuracy	/			±(1% of range) (TYI	P value of H rai	nge)		
Isolation voltage					±30		0,		
Communication	function								
RS232C		1	D-SUB 9-pin connector Ba	ud rate: 9600, 19200, 3	38400, 115200 bps Data	lenath: 8 bits.	Stop bits: 1 bit. Parit	v bit: None, Flow contro	I: None, CTS-RTS
USB					a rate: 480 Mbps (High spe	-		•	
LAN					02,3 100Base-TX/10Base-				
General specific	ations								
	e / Input frequency ra	nge		100 Vac to 24) Vac (90 Vac to 250 Vac) s	ingle phase. or	ontinuous / 47 Hz to	63 Hz	
Power consumpt		iigo	50 VAmax	100 100 10 21	50 VA			85 VAma	
Inrush current (p			ov valida		45	-		05 VAIIId	
initiasii current (p	1				0 °C to 40 °C (3				
	Operating temperat Operating humidi	-			20%rh to 85%rh (,	20)		
Environ-mental	Storage temperatu				-20 °C to 70 °C				
conditions		-			-20 C to 70 C				
	Storage humidit						,		
	Installation loc			Inde	por use, altitude of up to 20	uu m, overvolta	age category II.		
Insulation	Between primary and inp				500.1/1 00.1/0				
resistance	Between primary an				500 Vdc, 30 MΩ or n	iore (70%rh or	iess)		
	Between input terminals								
Withstanding	Between primary and inp				No abnormalities at 1				
voltage	Between primary an				No abnormalities at 1				
-	Between input terminals	and chassis			No abnormalities at 7		inute.		
Weight			Approx. 7 kg (15.		Approx. 7.5			Approx. 14 kg (30.9 lb.)
Electromagnetic	compatibility (EMC	2)			with the requirements of th				<u>^</u>
*2 *3					1326-1 (Class A *4), EN 55 The maximum length of a				
Sofoty *2		0-				-			
Safety *2			mplies with the requirement		ctive and standards. Low V	-		-5Ws *3 Limited to pr	

*1 The maximum voltage that can be applied to the photocoupler is 30 V. The maximum current is 4 mA. *2 Does not apply to specially ordered or modified PLZ-5Ws. *3 Limited to products that have the CE mark on their panels. *4 This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. *5 This is a Group 1 equipment. This product does not generate and/or use intentionally radiofrequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose. *6 This is a Class I equipment. Be sure to ground this product's protective conductor terminal. The safety of this product is only guaranteed when the product is properly groundd. *7 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary

Multifunctional Electronic Load (CC/CV/CR/CP)



Dimensions

PLZ1005WH2: 429.5(16.91")W×128(5.04")H×400(15.75")Dmm(inch) PLZ2005WH2: 429.5(16.91")W×128(5.04")H×400(15.75")Dmm(inch) PLZ4005WH2: 429.5(16.91")W×128(5.04")H×550(19.69")Dmm(inch) PLZ12005WH2: 430(16.93")W×396.2(15.6")H×550(21.65)"Dmm(inch) PLZ20005WH2: 430(16.93")W×573.5(22.58")H×550(21.65)"Dmm(inch)

Accessories

Common to all models: Power cord, Safety terminal adapter TL41 (red, black), External control connector kit, Safety Information, Setup Guide, Quick Reference (Japanese, English), CD-ROM

PLZ1005WH2, PLZ2005WH2, PLZ4005WH2: Rear-panel DC INPUT terminal cover, Screw set for rear-panel DC INPUT terminals, Screws for the rear-panel DC INPUT terminal cover, Front-panel DC INPUT terminal cover, Screws for the front-panel DC INPUT terminals, Heavy object warning label (PLZ4005WH2 only)

PLZ12005WH2, PLZ20005WH2: Rear-panel DC INPUT terminals cover, Screw set for rear-panel DC INPUT terminals, Rear-panel DC INPUT terminals cover screws, Heavy object warning label, Parallel operation signal cable kit [PC02-PLZ-5W]

Options

GPIB converter

PIA5100

This converter converts RS232C or USB connection into GPIB, enabling remote control connection using GPIB as seen below. [Accessories: Power cord set, Magnetic sheet] *Not CE certified product



■ Parallel operation signal cable kit PC01-PLZ-5W (approx. 30 cm) PC02-PLZ-5W*(approx. 1 m) *Supplied with PLZ12005WH2 and PLZ20005WH2.

High-voltage load cable HV22-2P3M-M12M8 This load cable supports high voltage. Up to 80 A (Kikusui-recommended current) is supported

■ Sequence creation and control software SD033-PLZ-5WH2 (Wavy for PLZ-5WH2)

Ideal for high-capacity power supply and rechargeable battery evaluation! Testing with hyper-realistic load simulation made possible!

The PLZ-5WH2 high-power DC electronic load series is where durable, reliable ingenuity meets multifunctional, high-power design. Providing 5 variety of power range line-ups, from a 1 kW bench-top style model, to a high-power model that can sink up to 20 kW of power in a single unit. You can easily select the applicable power range according to the load. Load simulation can be achieved faster than ever before thanks to the reliable, high-speed design of the PLZ-5WH2 current control circuits. Accurate current measures can be made with extremely high-setting resolution. A color LCD display allows for highly visible, user-friendly front-panel operation. RS232C, USB, and LAN digital inter faces are included as standard for simple integration into any system.

Features

- Operating voltage: 10 V to 1000 V (Min. 1.5 V)
- 20 kW capacity in a single, compact unit (PLZ20005WH2)
- 100 kW/ 2000 A with parallel operation (Max. 5 units) *Connectable with different models.
- Synchronized operation
- Sequence function
- Arbitrary IV characteristic (ARB) mode
- User-friendly color LCD display
- Data-logging function: voltage/current/power/elapsed time/ integrated current/integrated power measurements. (Measurement display, programmable internal memory, stored as CSV format onto a USB.)
- Superposition of sinusoidal current (sine function, 1 Hz to 10 kHz)
- Cutoff function: The load can be turned off when the elapsed time, the voltage drop, the integrated current, or the integrated power reaches the specified value.
- LAN (LXI Compliant)/USB/RS232C standard interface *GPIB optional

Easy access with the built-in web server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PLZ-5WH2 series for convenient control and monitoring.

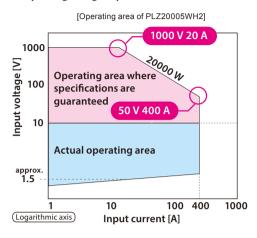
Use latest browser version (Recommended browser: Internet Explorer11, Chrome, Safari).

* Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).



Functions

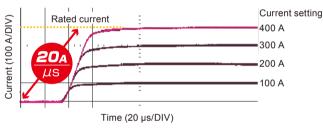
■ Wide ranging operation voltage up to 1000 V Operating voltage ranges from 10 V to 1000 V. Minimum operating voltage required to sink current is 1.5 V.



■ Maximum slew rate of 20 A/µs

For the PLZ20005WH2, a slew rate of 20 A/µs is achieved for current changes up to the rated current.

PLZ20005WH2 Slew Rate: 20 A/µs



PLZ-5WH2 Series Specifications

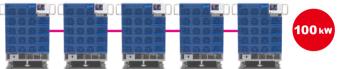
Model	1		PLZ1005WH2	PI 72005WH2	PI 74005WH2	PLZ12005WH2	PI 720005WH2	
Rating			T EE TOTOTTTIE	TELECOOUTINE	T EE4000TTTE		LEEGOOOTITIE	
0		tage (DC)	10 V to 1000 V					
Currer	nt		20 A	40 A	80 A	240 A	400 A	
Power			1000 W	2000 W	4000 W	12000 W	20000 W	
DC INI		erminal's age		Positive pin: ±	1 000 V, Negat	ve pin: ±900 V		
Minimu		the rated rent			10 V			
operatir voltage	• • • • •	rent begins	1.5 V or less					
Consta	ant cu	rrent (CC)	mode					
Opera	ting ra	inge	0 A to 20 A	0 A to 40 A	0 A to 80 A	0 A to 240 A	0 A to 400 A	
Setting	g rang	e	0.0000 A to 20.2000 A	0.000 A to 40.400 A	0.000 A to 80.800 A	0.00 A to 242.40 A	0.00 A to 404.00 A	
Resolu	ution		0.0005 A	0.001 A	0.002 A	0.005 A	0.01 A	
Setting	g accu	iracy	±(0.2 % of setting + 0.1 % of rating)					
Pa	arallel o	operation	±(0.4 % of setting + 0.2 % of rating)					
Consta	ant res	sistance (0	CR) mode					
Opera	ting	H range	500 mS to 0 S	1 S to 0 S	2 S to 0 S	6 S to 0 S	10 S to 0 S	
range	*1	L range	5 mS to 0 S	10 mS to 0 S	20 mS to 0 S	60 mS to 0 S	100 mS to 0 S	
Setting	a	H range	505.00 mS to 0.00 S	1.01000 S to 0.00000 S	2.02000 S to 0.00000 S	6.0600 S to 0.00000 S	10.1000 S to 0.0000 S	
range	-	L range	5.05000 mS to 0.00000 S	10.1000 mS to 0.0000 S	20.2000 mS to 0.0000 S	60.600 mS to 0.000 S	101.000 mS to 0.000 S	
Deer	tion	H range	0.01 mS	0.00002 S	0.00005 S	0.0002 S	0.0002 S	
Resolu	ulon	L range	0.0001 mS	0.0002 mS	0.0005 mS	0.002 mS	0.002 mS	
Setting	9	H range		±(0.5 % of s	setting + 0.5 %	of rating*3)		
accura	acy *2	L range		±(0.5 % of s	setting + 0.2 %	of rating*3)		
Pa	arallel	H range		±(1.0 % of s	setting + 1.0 %	of rating*3)		
ор	eration	L range		±(1.0 % of s	setting + 0.4 %	of rating*3)		

Parallel operation

Parallel operation (max. 5 units) is available on all models by simply connecting an optional parallel-operation cable. This feature is available even among different models for a wide range of high power. (up to 100 kW / 2000 A)

*A parallel cable needed to connect with each unit. A parallel cable is included with 12 kW and 20 kW models. A parallel-operation cable is not included with 1 kW, 2 kW or 4 kW models.





PLZ20005WH2 (5 units)

Maximum current and power during parallel operation using the same model

Model	Parallel operation number	Maximum current	Maximum power
	2	800 A	40 kW
PLZ20005WH2	3	1200 A	60 kW
PLZZUUUSVVHZ	4	1600 A	80 kW
	5	2000 A	100 kW

• Parallel connection with PLZ-5WH series*

Must be PLZ-5WH as a Master with updated firmware to newest version. *When parallel operation between 5WH and 5WH2, only same capacity model is available.

Model	PLZ1005WH2	PLZ2005WH2	PLZ4005WH2	PLZ12005WH2	PLZ20005WH2
Constant voltage (CV)	mode				
Operating range			10 V to 1000 V		
Setting range	0.00 V to 1010.00 V				
Resolution	0.02 V				
Setting accuracy *4		±(0.05 % of	setting + 0.05	% of rating)	
Parallel operation		±(0.1 % of	setting + 0.1 %	of rating)	
Response speed			NORM/FAST		
Constant power (CP) r	node				
Operating range	0 W to 1000 W	0 W to 2000 W	0 W to 4000 W	0 W to 12000 W	0 W to 20000 W
Setting range	0.00 W to 1010.00 W	0.00 W to 2020.00 W	0.0 W to 4040.0 W	0.0000 kW to 12.1200 kW	0.0000 kW to 20.2000 kW
Resolution	0.02 W	0.05 W	0.1 W	0.000	5 kW
Setting accuracy	±(0.5 % of rating*5 + 0.02 A × Vin*6)	±(0.5 % of rating*5 + 0.04 A × Vin*6)	±(0.5 % of rating*5 + 0.08 A × Vin*6)	±(0.5 % of rating*5 + 0.2 A × Vin*6)	±(0.5 % of rating*5 + 0.4 A × Vin*6)
Parallel operation		% of power rat			ower rating rating × Vin*6)
Arbitrary I-V character	istics (ARB) m	ode			
Operating range				n be specified for etween specifi	
Response speed	500 µs, 1	1 ms, 2 ms, 5 m	ns, 10 ms, 20 m	s, 50 ms, 100 r	ns, or off

*1 Conductance [S] = input current [A]/input voltage [V] = 1/resistance [Ω]

*2 Converted value at the input current. At the sensing point during remote sensing

*3 Rated current

*4 With the input voltage within the operating range, and at the sensing point during remote sensing. *5 Rated power

*6 DC INPUT terminal voltage or SENSING terminal voltage.

PLZ-5WH2 Series Specifications

Model		PLZ1005WH2	PLZ2005WH2	PLZ4005WH2	PLZ12005WH2	PLZ20005WH2		
Measurem	ent function				2.1.(
	Display		0.00 V to 1000.00 V 10 mV					
Voltmeter	Resolution Accuracy		+(0.05 % of	reading + 0.05	% of rating)			
· ontinotor	Parallel							
	operation		±(0.1 % of rea	ding + 0.1 % o	f rating) (TYP)			
	Display	0.000 A to	0.000 A to	0.000 A to	0.00 A to	0.00 A to		
		20.000 A	40.000 A	80.000 A	240.00 A	400.00 A		
Ammeter	Resolution	0.001 A	0.001 A	0.001 A	0.01 A	0.01 A		
	Accuracy			reading + 0.1 9				
	operation		±(0.4 % of rea	ding + 0.2 % o	f rating) (TYP)			
Power	Display	Displays the	e product of the	e voltmeter rea	ding and amm	eter reading		
display					-			
	Trigger Source Trigger Count	Imme	ediate, BUS, D	1 to 65536	nc, TALINK, LO			
Measure-	Trigger Delay		0.000	00 s to 100.00	000 s			
ment	Interval			Disable/Enable				
trigger	Interval Time		0.0	00001 s to 360	0 s			
	Sense Aperture		0.00	001 s to 1.000	00 s			
Pulse funct								
Operation				CC and CR	-			
Frequency	setting range 1 Hz to 10 Hz		1.	0 Hz to 10.0 kH 0.1 Hz	1Z			
Frequency	11 Hz to 10 Hz 11 Hz to 100 Hz			1 Hz				
Frequency setting	110 Hz to							
resolution	1000 Hz			10 Hz				
*1	1.1 kHz to			0.1 kHz				
F	10.0 kHz 1 Hz to 5.0 kHz			0 E % of pottin	<u>a)</u>			
Frequency setting	5.1 Hz to			0.5 % of settin	•			
accuracy	10.0 kHz		±(1.0 % of settin	g)			
	1 Hz to 10 Hz							
	11 Hz to							
Duty cycle setting	100 Hz 110 Hz to		5.0 % t	0 95.0 %, 0.1 %	6 steps			
range, step	1000 Hz							
	1.1 kHz to	5 % to 95 % *2, 1 % steps						
	10.0 kHz		1					
	CC mode	0.000 0 A to 20.2000 A	0.000 A to 40.400 A	0.000 A to 80.800 A	0.000 A to 242.40 A	0.00 A to 404.00 A		
Switch	CR mode	505.00 mS	1010.00 mS	2020.00 mS	6.06000 S to	10.1000 S to		
value (Depth) *3	H range	to 0.00 S	to 0.00 S	to 0.00 S	0.00000 S	0.0000 S		
()) / /	CR mode	5.0500 mS to 0.0000 S	10.1000 mS to 0.0000 S	20.2000 mS to 0.0000 S	60.600 mS to 0.000 S	101.000 mS to 0.000 S		
Slew rate	L range	10 0.0000 3	10 0.0000 3	10 0.0000 3	10 0.000 3	10 0.000 3		
Operation	mode			CC				
Operation		0.001 A/µs	0.002 A/µs	СС 0.004 А/µs	0.01 A/µs to	0.02 A/µs to		
Operating	range	to 1 A/µs	to 2 A/µs	0.004 A/µs to 4 A/µs	12 A/µs	20 A/µs		
Operating Resolution	range		to 2 A/μs 0.00005 A/μs	0.004 A/µs to 4 A/µs 0.0001 A/µs	12 A/μs 0.0002 A/μs			
Operating Resolution Setting acc	range curacy *4	to 1 A/µs	to 2 A/μs 0.00005 A/μs	0.004 A/µs to 4 A/µs	12 A/μs 0.0002 A/μs	20 A/µs		
Operating Resolution Setting acc Sine function	range curacy *4 on	to 1 A/µs	to 2 A/μs 0.00005 A/μs	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2	12 A/μs 0.0002 A/μs	20 A/µs		
Operating Resolution Setting acc Sine function	range curacy *4 on	to 1 A/μs 0.00002 A/μs	to 2 A/μs 0.00005 A/μs	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC	12 Α/μs 0.0002 Α/μs 20 μs)	20 A/µs 0.0005 A/µs		
Operating Resolution Setting acc Sine function Operation Frequency	range curacy *4 on mode	to 1 A/μs 0.00002 A/μs	to 2 A/μs 0.00005 A/μs ±(10	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC	12 Α/μs 0.0002 Α/μs 20 μs)	20 A/µs 0.0005 A/µs		
Operating I Resolution Setting acc Sine function Operation I Frequency Frequency	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to	to 1 A/μs 0.00002 A/μs	to 2 A/μs 0.00005 A/μs ±(10	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500	12 Α/μs 0.0002 Α/μs 20 μs)	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acc Sine function Operation Frequency Frequency setting resolution	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz	to 1 A/μs 0.00002 A/μs	to 2 A/μs 0.00005 A/μs ±(10	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz	12 Α/μs 0.0002 Α/μs 20 μs)	20 A/µs 0.0005 A/µs		
Operating of Resolution Setting acconstruction of Sine function of Frequency Frequency Frequency setting	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to	to 1 A/μs 0.00002 A/μs	to 2 A/μs 0.00005 A/μs ±(10	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz	12 Α/μs 0.0002 Α/μs 20 μs)	20 A/µs 0.0005 A/µs		
Operating I Resolution Setting acc Sine function Operation Frequency Frequency setting resolution *5	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to	to 1 A/μs 0.00002 A/μs	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz	12 Α/µs 0.0002 Α/µs 0 µs) 00 Hz, 10000 F	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acc Sine function Operation Frequency Frequency setting resolution	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz	to 1 A/μs 0.00002 A/μs	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz	12 Α/µs 0.0002 Α/µs 0 µs) 00 Hz, 10000 F	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acc Sine function Operation Frequency Frequency setting resolution *5 Frequency	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz Other than the	to 1 A/μs 0.00002 A/μs	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz	12 A/µs 0.0002 A/µs 10 µs) 00 Hz, 10000 H	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acc Sine functif Operation i Frequency setting resolution *5 Frequency setting accuracy	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz	to 1 A/μs 0.00002 A/μs	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin	12 A/µs 0.0002 A/µs 10 µs) 00 Hz, 10000 H	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acco Sine functii Operation Frequency Frequency setting resolution *5 Frequency setting	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz Other than the frequencies above	to 1 A/μs 0.00002 A/μs	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin	12 A/µs 0.0002 A/µs 10 µs) 00 Hz, 10000 H	20 A/µs 0.0005 A/µs		
Operating in Resolution Setting acco Sine function Operation Frequency Frequency setting resolution *5 Frequency setting accuracy Soft start Operation Time settin	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz 00ther than the frequencies above mode g range	to 1 A/µs 0.00002 A/µs 1	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 100 Hz 100 Hz 1.0 % of settin 0.5 % of settin CC	12 A/µs 0.0002 A/µs 0 µs) 00 Hz, 10000 H 9) g) g)	20 A/µs 0.0005 A/µs 4z		
Operating in Resolution Setting acco Sine function Operation Frequency Frequency setting resolution *5 Frequency setting accuracy Soft start Operation Time settin	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 1000 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz Other than the frequencies above mode	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(±(ms, 2 ms, 5 m	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC is, 10 ms, 20 m	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) g) g) s, 50 ms, 100	20 A/µs 0.0005 A/µs 4z ms, or off		
Operating in Resolution Setting acco Sine function Operation I Frequency Frequency setting resolution *5 Frequency setting accuracy Soft start Operation I Time settinn Alarm function	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz to 900 Hz 00ther than the frequencies above mode g range	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1	the load when	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) g) g) is, 50 ms, 100 is 110 % of the	20 A/µs 0.0005 A/µs 4z ms, or off		
Operating in Resolution Setting acco Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation in Time settion Alarm functo Overvoltag	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 200 Hz to 900 Hz 000 Hz	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off	the load when h	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that igher is applied	12 A/µs 0.0002 A/µs 0 µs) 00 Hz, 10000 H 90 Hz, 10000 H 90 9) 10 s, 50 ms, 100 11 10 % of the 1.	20 A/µs 0.0005 A/µs Iz Iz ms, or off e rating or		
Operating in Resolution Setting acco Sine function Operation I Frequency Frequency setting resolution *5 Frequency setting accuracy Soft start Operation I Time settinn Alarm function	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 200 Hz to 900 Hz 000 Hz	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(ms, 2 ms, 5 m the load when h load when app	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that igher is applied	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) 9) 9) 15, 50 ms, 100 16 st 110 % of the 1. % of the rated	20 A/µs 0.0005 A/µs Iz Iz ms, or off e rating or		
Operating in Resolution Setting acc Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation i Time settin Alarm funce Overvoltag Reverse-cc detection Overheat dete	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz 000 Hz 000 Hz 0ther than the frequencies above mode g range tion Alarm 1 e detection onnection	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off the Turns off the	the load when th	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that igher is applie proximately -1 te DC INPUT 1 te heatsink terr	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) 9) 9) 9) 10 Hz, 10000 H 10	20 A/µs 0.0005 A/µs 1z 1z ms, or off e rating or current flows nes 100 °C.		
Operating in Resolution Setting acc Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation i Time settin Alarm funce Overvoltag Reverse-cc detection Overheat dete	range curacy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 00 Hz to 1000 Hz 00 Hz 00 Hz 00 Hz to 1000 Hz 1000	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off the Turns off the	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(the load when app through ti the load when app through ti the load when app	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC s, 10 ms, 20 m a voltage that igher is applier proximately -1 he DC INPUT 1 he heatsink tem current of 30 A	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) 10 Hz, 10000 H 10 Hz, 1000 H 10 Hz, 10000 H 10 Hz, 1000 H 10 H	20 A/µs 0.0005 A/µs 1z 1z ms, or off e rating or current flows nes 100 °C.		
Operating in Resolution Setting acc Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation in Alarm funce Overvoltag Reverse-cc detection Overheat detc current detecc panel DC INP	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 300 Hz 200 Hz to 1000 Hz 000 Hz 000 Hz 00 Hz 0	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off the Turns off the Turns off th	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(the load when app through ti the load when app through ti the load when app	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin 0.5 % of settin CC s, 10 ms, 20 m a voltage that igher is appliet proximately -1 he DC INPUT the heatsink tem current of 30 <i>A</i> anel DC INPUT	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9 9 9 10 Hz, 10000 H 10 Hz, 1000 H 10 Hz, 100 Hz, 1000 H 10 Hz, 100 Hz, 100	20 A/µs 0.0005 A/µs Az Az ms, or off e rating or current flows hes 100 °C. bwing through		
Operating in Resolution Setting acc Sine functi Operation I Frequency setting resolution *5 Frequency setting accuracy Soft start Operation I Time settin Alarm func Overvoltag Reverse-cd detection Overheat detec	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 300 Hz 200 Hz to 1000 Hz 000 Hz 000 Hz 00 Hz 0	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off the Turns off the Turns off the Turns off the ALA	the load when a were not when a were not were no	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that igher is applied oroximately -1 he DC INPUT he heatsink tem current of 30 <i>A</i> anel DC INPUT is an of the EXT	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9) 9) 9) 9) 10 K ated 10 % of the rated 10 % of the rated 10 % of the rated 10 % of the rated 10 minutes file 10 minutes f	20 A/µs 0.0005 A/µs 1z 1z ms, or off e rating or current flows nes 100 °C. pwing through / is applied to ctor.		
Operating in Resolution Setting acc Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation in Alarm funce Overvoltag Reverse-cc detection Overheat detc current detecc panel DC INP	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 200 Hz to 1000 Hz 300 Hz 200 Hz to 1000 Hz 000 Hz 000 Hz 00 Hz 0	to 1 A/µs 0.00002 A/µs 1 1 500 µs, 1 Turns off the Turns off the Turns off the Turns off the ALA Turns off the	to 2 A/µ's 0.00005 A/µs ±(10 Hz to 1000 Hz ±(1) Hz to 1000 Hz ±(1)	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 10 Hz (1.0 % of settin 0.5 % of settin CC s, 10 ms, 20 m a voltage that igher is applied oroximately -1 he DC INPUT oltage betweed neb heatsink tem current of 30 A anel DC INPUT oltage betweed n 6) of the EX1 en any of the for	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 100 Hz, 1000 H 90 Hz, 100 Hz, 100 Hz, 100 H 90 Hz, 100 Hz,	20 A/µs 0.0005 A/µs 1z 1z 1z ms, or off e rating or current flows hes 100 °C. bwing through / is applied to ctor. occurs.		
Operating in Resolution Setting acc Sine function Operation in Frequency setting resolution *5 Frequency setting accuracy Soft start Operation i Time settin Alarm funce Overvoltag Reverse-cc detection Overheat detec panel DC INP Alarm inpu	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz 000 Hz 100 Hz 100 Hz 000 Hz 000 Hz 000 Hz 100 Hz	to 1 A/μs 0.00002 A/μs 1 1 500 μs, 1 Turns off the Turns off the Turns off the Turns off the ALA Turns off the ALA	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(1) Hz to 1000 Hz ±(1)	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin 0.5 % of settin CC is, 10 ms, 20 m a voltage that igher is applied proximately -1 he DC INPUT 1 he heatsink terr current of 30 A anel DC INPUT 1 banel DC INPUT 1 ottage between n 6) of the EXT m any of the for during parallel	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 9 9 9 9 9 9 9 9 10 Hz, 10000 H 9 9 9 10 Hz, 10000 H 9 9 10 Hz, 10000 H 10 Hz, 1000	20 A/µs 0.0005 A/µs 12 12 12 13 14 15 15 15 15 15 15 15 15 15 15		
Operating in Resolution Setting acco Sine functi Operation i Frequency Frequency setting accuracy Soft start Operation i Time settin Alarm func Overvoltag Reverse-co detection Overheat dett current detec panel DC INP Alarm inpu	range suracy *4 on mode setting range 1 Hz to 10 Hz 20 Hz to 100 Hz 200 Hz to 1000 Hz 300 Hz 000 Hz 100 Hz 100 Hz 000 Hz 000 Hz 000 Hz 100 Hz	to 1 A/µs 0.00002 A/µs 1 1 500 µs, 1 Turns off the Turns off the Turns off the Turns off the ALA Turns off the ALA	to 2 A/µs 0.00005 A/µs ±(10 Hz to 1000 Hz ±(the load when h load when ap through ti te load when a the front-pz load when a v RM INPUT (pi ff the load when	0.004 A/µs to 4 A/µs 0.0001 A/µs % of setting +2 CC , 2000 Hz, 500 1 Hz 10 Hz 100 Hz (1.0 % of settin 0.5 % of settin CC s, 10 ms, 20 m a voltage that igher is applied oroximately -1 he DC INPUT oltage betweet he heatsink tem current of 30 A anel DC INPUT oltage betweet n 6) of the EX1 en any of the fc mmunication I	12 A/µs 0.0002 A/µs 0 µs) 0 Hz, 10000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 1000 H 90 Hz, 100 Hz, 1000 H 90 Hz, 100 Hz, 100 Hz, 100 H 90 Hz, 100 Hz, 100 Hz, 100 H 90 Hz, 100 Hz, 10	20 A/µs 0.0005 A/µs 12 12 12 12 13 14 15 14 15 15 10°C		

		PLZ1005WHZ	PLZ2005WH2	PLZ4005WH2	PLZ12005WH2	PLZ20005WH		
Alarm functi								
	Setting	0.000 A to	0.00 A to	0.00 A to	0.00 A to	0.0 A to		
Overcurrent	range	22.000 A	44.00 A	88.00 A	264.00 A	440.0 A		
protection	Resolution	0.001 A 0.01 A 0.01 A 0.01 A 0.1 A						
(OCP)	Protection	Select load off or limit.						
	operation							
	Setting	0.0 W to	0.0 W to	0 W to	0.000 W to	0.000 W to		
Overpower	range	1100.0 W	2200.0 W	4400 W	13.200 kW	22.000 kW		
protection	Resolution	0.1 W	0.1 W	1 W	0.001 kW	0.001 kW		
(OPP)	Protection		Sele	ect load off or I	imit.			
	operation							
Under-	Setting range		0.00 V	' to 1000.00 V,	or off.			
voltage	Resolution			0.02 V				
protection	Protection			0.02 V				
(UVP)	operation		Sele	ect load off or I	imit.			
	Setting							
Watchdog	range		1:	s to 3600 s or (off			
protection	Protection							
(WDP)	operation			Load off				
Sequence fi								
Operation m			(CC, CR, CV, CI	P			
	per of programs			30				
Maximum nui				10000				
Step execut			0 000050 e to		0 µs to 1000 h)			
Time resolu			5.5555555555					
				1 µs				
Integration of			Diaplo: a th - t	imo from los d	on to load off			
Elapsed time				ime from load				
	Range			000 s (1000 ł				
Ampere-hour	meter display			ys integrated o	1			
	Range	0 Ah to 70000 Ah	0 Ah to 140000 Ah	0 Ah to 280000 Ah	0 Ah to	0 Ah to 1400000 A		
	_	70000 An			800000 Ah	1400000 A		
watt-nour m	eter display	0.14/1 /		ays integrated	1	0 Wh to		
				0 Wh to	0 Wh to			
	Range	0 Wh to 4000000 Wh	0 Wh to 8000000 Wh					
	•				500000000 Wh			
Cutoff functi	on	40000000 Wh	80000000 Wh	16000000 Wh	500000000 Wh	80000000 V		
Cutoff functi	on	40000000 Wh	80000000 Wh d turns off whe	16000000 Wh n the elapsed	500000000 Wh time value rea	80000000 V		
Cutoff functi	on e	40000000 Wh	80000000 Wh d turns off whe	160000000 Wh n the elapsed specified value	500000000 Wh time value rea	80000000 V		
Cutoff functi	on e Range	40000000 Wh	80000000 Wh d turns off whe	16000000 Wh n the elapsed specified value 0000 s (1000 h	500000000 Wh time value rea	80000000 V		
Cutoff functi	on e	40000000 Wh	80000000 Wh d turns off whe 0 s to 3600	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s	500000000 Wh time value reader.	80000000 W		
Cutoff functi Elapsed tim	on e Range Resolution	40000000 Wh	8000000 Wh d turns off whe s 0 s to 3600 rns off when th	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s	50000000 Wh time value reader. n 0 min 0 s) ur meter value	80000000 W		
Cutoff functi Elapsed tim	on e Range Resolution urrent	40000000 Wh The load	8000000 Wh d turns off whe s 0 s to 3600 rns off when th	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou specified value	50000000 Wh time value reader.	80000000 W		
Cutoff functi Elapsed tim	on e Range Resolution	40000000 Wh	80000000 Wh d turns off whe s 0 s to 3600 rns off when th	16000000 Wh n the elapsed specified value 2000 s (1000 h 1 s ne ampere-hou	50000000 Wh time value reader. n 0 min 0 s) ur meter value	800000000 W ches the reaches the 0 Ah to		
Cutoff functi Elapsed tim	on e Range Resolution urrent	4000000 Wh The load The load tu 0 Ah to 70000 Ah	80000000 Wh d turns off whe 0 s to 3600 rns off when th 0 Ah to 140000 Ah	16000000 Wh n the elapsed specified value 2000 s (1000 h 1 s ne ampere-hou specified value 0 Ah to 280000 Ah	50000000 Wh time value read a. n 0 min 0 s) ur meter value a. 0 Ah to	800000000 W ches the reaches the 0 Ah to 1400000 A		
Cutoff functi Elapsed tim	on e Range Resolution urrent	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh	8000000 Wh 4 turns off whe 0 s to 3600 mrs off when th 140000 Ah (0.000 mAh tc), 0.001 kAh n	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1	50000000 Wh time value reas. a 0 min 0 s) ur meter value - b. 0 Ah to 800000 Ah kh), 0.001 Ah (1 000.000 kAh)	800000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to		
Cutoff functi Elapsed tim	on e Range Resolution urrent Range	4000000 Wh The load The load tu 0 Ah to 70000 Ah 1000.000 A	8000000 Wh d turns off whe o s to 3600 rns off when th s 0 Ah to 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1 MAh to 1.400	50000000 Wh time value rear a 0 min 0 s) ur meter value b. 0 Ah to 800000 Ah xh), 0.001 Ah (1 000.000 kAh) MAh)	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh		
Cutoff functi Elapsed tim	on e Range Resolution urrent Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 1000.000 A	8000000 Wh d turns off when tr s 0 s to 3600 rns off when tr s 0 Ah to 140000 Ah (0.000 mAh to h), 0.001 kAh (1.001 kAh (1.001 kAh	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s the ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1 MAh to 1.4000 the watt-hour	50000000 Wh time value reas 0 0 min 0 s) ur meter value s 0 Ah to 800000 Ah Ah), 0.001 Ah (1000.000 kAh) MAh) meter value re	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh		
Cutoff functi Elapsed tim	on e Range Resolution urrent Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load	8000000 Wh 4 turns off whee s 0 s to 3600 rns off when th s 0 Ah to 140000 Ah (0.001 kAh (1.001 kAh (1.001 kuh s) (1.001 kah (1.001 kah	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s e ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1 MAh to 1.400 the watt-hour specified value	50000000 Wh time value reas 0 0 min 0 s) a 0 min 0 s) ur meter value s 800000 Ah kh), 0.001 Ah (1000.000 kAh) MAh) meter value re	800000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the		
Cutoff functi Elapsed tim	on e Range Resolution urrent Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 1 0 Wh to	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when 5 0 Wh to	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ae ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.400 the watt-hour the watt-hour specified value 0 Wh to	50000000 Wh time value reas a 0 min 0 s) a meter value 5. 0 Ah to 800000 Ah Vh), 0.001 Ah (1000.000 kAh) MAh) meter value re 5. 0 Wh to	80000000 W ches the reaches the 1400000 A 1.001 Ah to 0.001 MAh aches the 0 Wh to		
Cutoff functi Elapsed tim	e Range Resolution urrent Range Resolution ower	4000000 Wh The load The load tu 0 Ah to 70000 Ah 1000.000 A The load 1 0 Wh to 4000000 Wh	8000000 Wh 4 turns off when 5 0 s to 3600 mrs off when th 5 0 Ah to 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when 5 0 Wh to 80000000 Wh	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s the ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1 MAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh	50000000 Wh time value reas. a 0 min 0 s) ur meter value i 8. 0 Ah to 800000 Ah 4. 0,0.001 Ah (1000.000 kAh) MAh) meter value re 8. 0 Wh to 50000000 Wh	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 MAh aches the 0 Wh to 80000000 W		
Cutoff functi Elapsed tim	e Range Resolution urrent Range Resolution ower	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 1 0 Wh to 40000000 Wh 0.001 Wh (0	8000000 Wh d turns off when tr s 0 s to 3600 rns off when tr s 0 Ah to 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when s 0 Wh to 80000000 Wh 0.000 Wh to 1	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 kAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh 000.000 Wh,	50000000 Wh time value reas 0 0 min 0 s) r meter value s 0 Ah to 800000 Ah (000.000 kAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 KWh to		
Cutoff functi Elapsed tim	on e Range Resolution urrent Range Resolution ower Range	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 0 Wh to 40000000 Wh 0.001 Wh (1000.000	8000000 Wh d turns off when tr s 0 s to 3600 rns off when tr s 0 Ah to 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 kAh (1.001 kAh (0.000 mAh tc h), 0.001 kAh s0000000 Wh 80000000 Wh to 0.000 Wh to 1 0 kWh), 0.001	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou pecified value 0 Ah to 280000 Ah 1.001 KAh to 1 1.001 KAh to 1 MAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh 000.000 Wh, MWh (1.001 M	50000000 Wh time value reas 0 0 min 0 s) ur meter value s 0 0 Ah to 800000 Ah (000.000 kAh) MAh) MAh) meter value re 0 Wh to 50000000 Wh 0.001 kWh (1.0 Wh to 800.000	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed tim Integrated c	e Range Resolution urrent Range Resolution ower Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 0 Wh to 40000000 Wh 0.001 Wh (1000.000	8000000 Wh d turns off when tr s 0 s to 3600 rns off when tr s 0 Ah to 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when tr 8000000 Wh to 1 0 kWh), 0.001 rns off when tr	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s the ampere-hou specified value 0 Ah to 280000 Ah 1000.000 Mh 1000.000 Mh 1000.000 Wh 1000.000 Wh 000.000 Wh 1000.000 Wh 1000	50000000 Wh time value reases a 0 min 0 s) ar meter value is 800000 Ah to 800000 Ah (000.000 Ah) MAh) meter value reases 0 Wh to 50000000 Wh 0.001 kWh (1.00000 Wh 0.001 kWh (1.00000 Wh 0.001 kWh (1.00000 Wh 0.001 kWh (1.00000 Wh 0.000 kWh (1.000000 Wh 0.000 kWh (1.00000 Wh 0.000 kWh (1.00000 Wh 0.000 kWh (1.0000 Wh 0.000 kWh (1.0000 Wh 0.000 kWh (1.0000 Wh 0.000 kWh (1.0000 kWh (1.0000 Wh 0.000 kWh (1.0000 kWh (1.0000 Wh 0.000 kWh (1.0000 kWh (1.0000 Wh 0.0000 kWh (1.0000 kWh (1.00000 Wh 0.0000 kWh (1.0000 kWh (80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed tim Integrated c	on Range Resolution urrent Range Resolution ower Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 0 Wh to 40000000 Wh 0.001 Wh (1000.000	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh an the elapsed pecified value 0000 s (1000 h 1 s and ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.400 the watt-hour 160000000 Wh 000.000 Wh 16000000 Wh 000.000 Wh 000.000 Wh 000.000 Wh and 1.001 M the voltmeter ve o the specified	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c	on Range Resolution urrent Range Resolution ower Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 0 Wh to 40000000 Wh 0.001 Wh (1000.000	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh appecified value 0000 s (1000 h 1 s a ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mÅ (1.001 kAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 1.001 kA 1.001 kAh to 2.400 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 000.0000 Wh 000.000 Wh 000.000 Wh	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed tim Integrated c Integrated p Voltage drop	on e Range Resolution urrent Range Resolution ower Range Resolution	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load 0 Wh to 40000000 Wh 0.001 Wh (1000.000	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh an the elapsed pecified value 0000 s (1000 h 1 s and ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.400 the watt-hour 160000000 Wh 000.000 Wh 16000000 Wh 000.000 Wh 000.000 Wh 000.000 Wh and 1.001 M the voltmeter ve o the specified	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed tim Integrated c Integrated p Voltage drop	on e Range Resolution urrent Range Resolution ower Range Resolution ox	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh appecified value 0000 s (1000 h 1 s a ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mÅ (1.001 kAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 1.001 kA 1.001 kAh to 2.400 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 000.0000 Wh 000.000 Wh 000.000 Wh	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed tim Integrated c Integrated p Voltage drop Other functi	on e Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh appecified value 0000 s (1000 h 1 s a ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mÅ (1.001 kAh to 1.400 the watt-hour specified value 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 1.001 kA 1.001 kAh to 2.400 0 Wh to 16000000 Wh 16000000 Wh 000.000 Wh 000.0000 Wh 000.000 Wh 000.000 Wh	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote	on Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating *6	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ae ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.400 the watt-hour pecified value 0 Wh to 16000000 Wh 000.000 Wh 16000000 Wh 000.000 Wh 000.	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote	on Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating "6 Isolation	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ae ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.400 the watt-hour pecified value 0 Wh to 16000000 Wh 000.000 Wh 16000000 Wh 000.000 Wh 000.	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote sensing	on e Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating *6 Isolation voltage	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s the ampere-hou specified value 0 Ah to 280000 Ah 1000.000 mA (1.001 kAh to 1.4000 0 Wh to 160000000 Wh 000.000 Wh 000.000 Wh 000.000 Wh 1000.000 Wh 000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 Wh 1000.000 V to 1000.00 V to 1000 V V V V V V V V V V V V V V V V V V	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote sensing Number of u	on e Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating *6 Isolation voltage nits in	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (1000.00 The load tu	8000000 Wh 3 turns off when 5 0 s to 3600 140000 Ah (0.000 mAh tc 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 turns off when th 80000000 Wh to 1 0 Wh to 80000000 Wh to 1 10 kWh), 0.001 rns off when tt equal t	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s the ampere-hou pecified value 0 Ah to 280000 Ah 0 1000.000 mA 1.001 KAh to 1 4.001 KAh to 1 16000000 Wh 0 Wh to 16000000 Wh 000.000 Wh 0.000 V to 0 00 V to 0.02 V 1000 V *7	50000000 Wh time value read 0 min 0 s) a meter value i 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes i 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 80000000 W 001 kWh to 10 MWh)		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote sensing Number of u parallel ope	on e Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating *6 Isolation voltage units in ration	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 4000000 Wh 0.001 Wh (to 1000.00 The load tu	8000000 Wh 4 turns off when tr 5 0 s to 3600 0 s to 3600 140000 Ah (0.000 mAh tc h), 0.001 kAh (1.001 kAh 0.000 Wh to 0.000 Wh to 0.000 Wh to 10 kWh), 0.001 rrns off when tr equal t 0.00	16000000 Wh n the elapsed specified value 0000 s (1000 h 1 s ne ampere-hou specified value 0 Ah to 280000 Ah 1.001 KAh to 1 MAh to 1.4000 16000000 Wh 10000000 Wh 000.000 Wh 000.000 Wh 000.000 Wh 1000 V to 1000.00 0.02 V 1000 V *7 ±1000 V 5 units	50000000 Wh time value reas a 0 min 0 s) ar meter value i 0 Ah to 800000 Ah (000.000 kAh) MAh) meter value re 0 Wh to 50000000 Wh 0.001 kWh (1.0 Wh to 800.00 alue becomes I value. 0 V	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 80000000 W 001 kWh to 001 kWh to 10 MWh) less than or		
Cutoff functi Elapsed time Integrated c Integrated p Voltage drop Other functi Remote sensing Number of u	on Range Resolution urrent Range Resolution ower Range Resolution ons Input voltage rating *6 Isolation voltage nits in ration	4000000 Wh The load The load tu 0 Ah to 70000 Ah 0.001 mAh 1000.000 A The load tu 0 Wh to 40000000 Wh 0.001 Wh (0 1000.00 The load tu 0.001 Wh (0 1000.00 The load tu 0.001 Wh (0 1000.00 0.001 Wh (0 1000.000 0.001 Wh (0 1000.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.0	8000000 Wh d turns off when tr s 0 s to 3600 rns off when tr (0.000 mAh tr h), 0.001 kAh (0.000 mAh tr h), 0.001 kAh (0.000 wh to 80000000 Wh 0.000 Wh to 10 kWh), 0.001 rns off when tr equal t 0.00 0.	16000000 Wh n the elapsed specified value 0000 s (1000 f 1 s the ampere-hou specified value 0 Ah to 280000 Ah 0 1000.000 mA (1.001 KAh to 1 280000 Ah 0 1000.000 mA (1.001 KAh to 1 1000 Vito 1000.00 0 Wh to 160000000 Wh 000.000 Wh), MWh (1.001 M the voltmeter va 0 Wh to 16000000 Wh 0 1000.000 Wh 1000.000 V to 1000.02 V 1000 V to 1000 V to 5 units Synchronizati	50000000 Wh time value read 0 min 0 s) a meter value is 0 Ah to 800000 Ah Vh), 0.001 Ah (1 1000.000 KAh) MAh) meter value re 0 Wh to 500000000 Wh 0.001 kWh (1.0 WWh to 800.000 alue becomes is 4 value.	80000000 W ches the reaches the 0 Ah to 1400000 A 1.001 Ah to , 0.001 MAh aches the 0 Wh to 800000000 W 001 kWh to 10 MWh) less than or		

*1 (Reference) The resolution actually set in the device is period resolution ightarrow T = 1 µs, as shown in the equation below. For example, if you specify 9300 Hz, the period set in the device will be n × ightarrow T = 108 × 1 µs = 108 µs (where n is a number set in the device). Converted to frequency, this becomes 1/108 μs = 9259 Hz.
*2 The minimum time span is 20 μs. The minimum duty cycle is limited by the minimum time span.

*3 The switch value is limited to the set current or set conductance or less.

 $^{\star\!4}$ Time to change from 10 % to 90 % when the current is changed from 0 % to 100 % of the rated current

*5 (Reference) The resolution actually set in the device is period resolution \varDelta T= 20 µs, as shown in the equation below. For example, if you specify 900 Hz, the period set in the device will be $n \times \Delta T = 56 \times 20 \ \mu s = 1120 \ \mu s$ (where n is a number set in the device). Converted to frequency, this becomes 1/1120 µs ≈ 893 Hz.

*6 There are limitations depending on the actual power that the load consumes.
 *7 Total potential difference between the DC INPUT terminals and SENSING terminals

*8 The terminals for mutual synchronized operation are isolated from the DC INPUT terminals and operate at the chassis potential.

PLZ-5WH2 Series Specifications

Model EXT CONT of	connector *1	PLZ1005WH2	PLZ2005WH2	PLZ4005WH2	PLZ12005WH2	PLZ20005WH2
			ol owitebable. Dullad up to 5 V http://	a 10 kO register. The threat state		
Load on/off c	control input	Logic lev	vel switchable. Pulled up to 5 V by	a 10 kΩ resistor. The thresholds ctivated with a voltage between		V to 1.5 V.
Alarm input				istor. The thresholds are HIGH:		
		After an alarm occurs, elimit	nate the root cause of the alarm, a			low level signal to a high level
Alarm clearir	ng input	signal. The alarm will be clear	red on the rising edge of this signa	I. Pulled up to 5 V by a 10 k Ω resi	stor. The thresholds are HIGH: 3	3.5 V to 5.0 V, LOW: 0 V to 1.5 V
Trigger input	ł			resumes when a voltage betwee		
			Pulled up to 5 V by a 10 kΩ resis			
External volt	age control input		ols the load settings of CC, CR, C ng can be controlled in the range			
(CC, CR, CP			an be controlled in the range of 0			
(/-/-			ing can be controlled in the range			
	Setting accuracy		±(1	% of rating) (TYP value in CC m	ode)	
	age control input (CV	.		mode can be controlled through		401.0
mode)	Catting accuracy	i ne rat	ed voltage can be controlled in the		to 10 v. Input Impedance: Appr	οχ. 10 κΩ.
External yelt	Setting accuracy		Controls the load acting of	±(1 % of rating) (TYP) f CC mode by adding current thro		
	ing in CC mode)	Adds cu	urrent in the range of -100 % to 10			ox. 10 kΩ.
(···· · · · ·	Setting accuracy		3	±(1 % of rating) (TYP)	the best of bb	
Load-on stat			On when load is	on. Open-collector output from a	photocoupler.*2	
ALARM 1 ou	itout	ON when overvoltage dete	ction, reverse-connection detection	on, overheat detection, front-pan	el DC INPUT overcurrent detec	tion, alarm input detection, or
				ection is activated. Open-collecto		
ALARM 2 ou	· · · · · · · · · · · · · · · · · · ·		Turns on when OCP, OPP, UVP, o			
DIGITAL 0 or	utput/DIGITAL 1 output	Can be controlled	d through sequences. Output impo		sholds are HIGH: 2.5 V to 3.3 V	, LOW: 0 V to 0.4 V.
DIGITAL 2 in	put/output	Output: Sea	uence trigger output. The output ir	Input/output switchable.	ds are HIGH: 2.5 \/ to 3.3 \/ I.O	W: 0 \/ to 0 4 \/
DIGITAL 2 III	ιραι/οαιραι		signal for the sequence and the n			
Current moni	itor output	55 P**	· ·	to 100 % of the rated current Out		,
	Accuracy		·	±(1 % of rating) (TYP)		
BNC connec						
Trigger outpu	ut	Transmits 10 µs pulses du	ring step execution when trigger o	utput is set in a sequence. Trans	mits 10 µs pulses during pulse	operation and sine operation.
	1			Ω, output voltage HIGH: 4.2 V to		
Current	Output voltage		Outputs 0 V	to 10 V for 0 % to 100 % of the r	ated current	
monitor output	Output impedance			50 Ω (TYP)		
ouipui	Accuracy			±(1 % of rating)		
Voltage monitor	Output voltage Output impedance		Outputs the measur	ed voltage with 1/100 magnificat 50 Ω (TYP)	ion from 0 V to 10 V.	
output	Accuracy			±(1 % of rating)		
Isolation volt				±30 V		
Communicat	<u> </u>					
RS232C		D-SUB 9-pin connector.	Baud rate: 9600, 19200, 38400, 1	15 200 bps. Data length: 8 bits.	Stop bits: 1 bit. Parity bit: None.	Flow control: No. CTS/RTS
	N		Standard type B socket.Complies			
USB (device))		Complies with th	e USBTMC-USB488 device clas	ss specifications.	
USB (host)		5	Standard type A socket. Complies		1 \ 0 1	ed).
LAN			IEEE 802,3 100Ba	ase-TX/10Base-T Ethernet, IPv4	, RJ-45 connector.	
General spec						
Input voltage			100 Vac to	240 Vac (90 Vac to 250 Vac) sin	igle phase	
Input frequer		70.1/4	001/4	47 Hz to 63 Hz	0001/4	500.14
Power consu	- P	70 VAmax	90 VAmax	150 VAmax	360 VAmax	590 VAmax
inruen current	100 Vac	30 Amax	30 Amax	30 Amax 80 Amax	40 Amax	40 Amax 160 Amax
	1230 Vac	80 Amax	80 Amax 0.6 mA or less		160 Amax 1.6 mA or less	2.4 mA or less
(peak value)	rent *3	0.5 mA or loss		0.8 mA or less	1.0 IIIA OF IESS	2.4 IIIA OF less
(peak value)		0.5 mA or less	0.0 11/ 01 1000	0 °C to 40 °C (32 °E to 104 °E)		
(peak value)	Operating temperature range	0.5 mA or less		0 °C to 40 °C (32 °F to 104 °F)	n)	
(peak value) Leakage curr Environmental	Operating temperature range Operating humidity range	0.5 mA or less	2	0 %rh to 85 %rh (no condensatio	,	
(peak value) Leakage curr Environmental	Operating temperature range Operating humidity range Storage temperature range	0.5 mA or less	2	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F		
peak value) _eakage curr Environmental	Operating temperature range Operating humidity range Storage temperature range Storage humidity range	0.5 mA or less	2	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation)	
(peak value) Leakage curr Environmental	Operating temperature range Operating humidity range Storage temperature range	0.5 mA or less	21 Indoor use, al	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation titude of up to 2000 m, overvolta) ge category II	
(peak value) Leakage curr Environmental conditions	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location	0.5 mA or less	21 Indoor use, al	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation) ge category II	
(peak value) Leakage curr Environmental conditions	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and	0.5 mA or less	2 Indoor use, al 1000	0 wrh to 85 wrh (no condensation) -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation) titude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or	ge category II less)	
(peak value) Leakage curr Environmental conditions	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal	0.5 mA or less	2 Indoor use, al 1000	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation titude of up to 2000 m, overvolta	ge category II less)	
(peak value) Leakage curr Environmental conditions Insulation resistance	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal Between primary and chassis,	0.5 mA or less	2 Indoor use, al 1000	0 wrh to 85 wrh (no condensation) -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation) titude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or) ge category II less) ess)	
(peak value) Leakage curr Environmental conditions Insulation resistance Withstanding	Operating temperature range Operating humidity range Storage temperature range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal Between primary and chassis, input, monitor terminals	0.5 mA or less	20 Indoor use, al 1000 100 N	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation ltitude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or 0 Vdc, 3 MΩ or more (70 %rh or o abnormalities at 1500 Vac for 2	ge category II less) ess) 2 s	
(peak value) Leakage curr Environmental conditions Insulation resistance Withstanding	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal Between primary and chassis,	0.5 mA or less	20 Indoor use, al 1000 100 N	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation titude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or 0 Vdc, 3 MΩ or more (70 %rh or	ge category II less) ess) 2 s	
(peak value) Leakage curr Environmental conditions Insulation resistance Withstanding voltage	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal Between input terminals and chassis, monitor terminals		2 Indoor use, a 1000 100 N N Complies with the n	0 %rh to 85 %rh (no condensatio -25 °C to 60 °C (-13 °F to 140 °F 90 %rh or less (no condensation ltitude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or 0 Vdc, 3 MΩ or more (70 %rh or 0 abnormalities at 1500 Vac for 2 0 abnormalities at 1500 Vac for 2 equirements of the following dire	ge category II less) ess) ? s ? s ctive and standards.	
(peak value) Leakage curr Environmental conditions Insulation resistance Withstanding voltage	Operating temperature range Operating humidity range Storage temperature range Installation location Between primary and chassis, input, monitor terminals Between primary and chassis input, monitor terminals Between primary and chassis Input, monitor terminals Between primary and chassis Input, monitor terminals Between input terminals and	EMC Dir	2 Indoor use, al 1000 100 N Complies with the re ective 2014/30/EU, EN 61326-1 (0	0 wrh to 85 wrh (no condensation) -25 °C to 60 °C (-13 °F to 140 °F, 90 wrh or less (no condensation) titude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or 0 Vdc, 3 MΩ or more (70 %rh or 0 odd, 3 MΩ or more (70 %rh or 0 abnormalities at 1500 Vac for 2 equirements of the following dire class A*6), EN 55011 (Class A*6)	ge category II less) ess) ? s ? s Ctive and standards. Group 1*7), EN 61000-3-2, EN	
(peak value) Leakage curr Environmental conditions Insulation resistance Withstanding voltage	Operating temperature range Operating humidity range Storage temperature range Storage humidity range Installation location Between primary and chassis, input, monitor terminals Between input terminals and chassis, monitor terminal Between input terminals and chassis, monitor terminals	EMC Dir	20 Indoor use, al 1000 100 N N Complies with the rr ective 2014/30/EU, EN 61326-1 (0 he following conditions, The maxi	0 wrh to 85 wrh (no condensation) -25 °C to 60 °C (-13 °F to 140 °F, 90 wrh or less (no condensation) titude of up to 2000 m, overvolta 0 Vdc, 30 MΩ or more (70 %rh or 0 Vdc, 3 MΩ or more (70 %rh or 0 odd, 3 MΩ or more (70 %rh or 0 abnormalities at 1500 Vac for 2 equirements of the following dire class A*6), EN 55011 (Class A*6)	ge category II less) ess) ? s ? s Ctive and standards. Group 1*7), EN 61000-3-2, EN ing connected to the product m	

*1 1000 V reinforced insulation between each terminal and the DC INPUT terminal *2 The maximum voltage that can be applied to the photocoupler is 30 V. The maximum current is 4 mA.

*3 Leakage current between the positive and negative terminals of the rear-panel DC INPUT. At 1000 Vdc.

*4 Does not apply to specially ordered or modified products.
*5 Limited to models that have a CE mark on their panels.

*6 This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. *7 This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of

material or inspection/analysis purpose.

*8 This is a Class I instrument. Be sure to ground this product's protective conductor terminal. The safety of this product is guaranteed only when the product is properly grounded. *9 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur

ELECTRONIC LOAD

Multifunctional Electronic Load (CC/CV/CR/CP)



Dimensions

214.5(8.44")W × 124(4.88")H × 400(15.75")Dmm

Accessories

Setup guide, Quick reference (1 each for English and Japanese), CD-R (Contains the user's manual and the communication interface manual), Power cord, Set of screws for the load input terminal (2 sets.), Load input terminal cover, Screws for the Input terminal cover (2 pcs.), Protection dummy plug for J1 terminal, Connecting cable to the chassis

Options

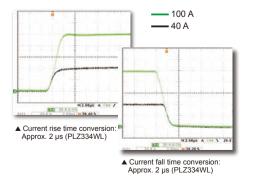


Sequence creation software Wavv for PLZ-4W

Functions

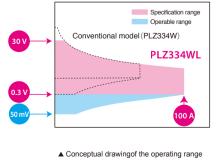
Fast slew rate

Realize the slew rate of 50 A/ μ s at 2.3 V of the load input terminal voltage.



Realizing the low voltage operation

Possible to operate as low as 50 mV by the input voltage. Even below the input voltage of 0.3 V, this product can be used by reducing the current.



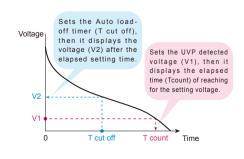
Large current DC electronic load with fast slew rate(50 A/µs)

While the PLZ334WL succeeds to the superior operability of our conventional model of the PLZ-4W series, the PLZ-4WL series realizes the fast rise and fall time (slew rate of 50 A/µs.) in the range of low voltage with large current. The PLZ-4WL offers six operation modes, and equips with various features such as sequence operation, switching operation, soft-start function, and time and voltage measurement. The PLZ-4WL applies not only for the conventional load test of the CPU power supply, but also it can be applied to even faster current response test. In addition, the PLZ-4WL is a space-saving design (about 50 % less volume of the conventional model) that can save the facility space of the testing site, and it can be applied for single cell testing of large scale rechargeable batteries.

Features

- Full-load current of 100 A at 0.3 V!
- Possible to operate as low as 50 mV of the input voltage ■ Realize the fast slew rate of 50 A/µs at 2.3 V of the load input terminal voltage. (Rise/Fall time conversion: Approx. 2 µs)
- Current setting resolution: 50 µA (L range)
- 6 operation modes (CC, CR, CV, CP, CC+CV, CR + CV)
- Equipped with sequence function and switching function
- Elapsed time display function and auto load-off timer function are convenient for the discharge tests of batteries.
- GPIB/RS232C/USB are standard interface
- Available for input voltage range AC100 V to 120 V/200 V to 240 V
- Equipped with various protection functions (OVP, OCP, OPP, OHP, UVP, REV)
- Optional low inductance cables are available exclusively for PLZ-4WL series.
- Optional sequence creation software (Wavy for PLZ-4W) is available
 - Convenient feature for the discharge testing

The Auto load-off timer and the Cut-off features can be applied to the discharge capacity measurement of the rechargeable battery



PLZ334WL Specifications

model			PLZ334WL 0.3 V to 30 V		
			Minimum operating voltage for the Switching mode(includes the		
Rating	Operating voltage (DC)	value of voltage drop generated by the inductance component of wirings)increases approximately 40 mV per 1 A/µs of the slew rate		
Rating	Current		setting. 100 A		
	Power		330 W		
	Minimum start voltage	*1	50 mV (typ)		
		Н	0 A to 100 A		
	Operating range	M	0 A to 10 A		
		H	0 A to 1 A 0 A to 105 A		
	Setting range	м	0 A to 10.5 A		
Constant		L	0 A to 1.05 A		
Current (CC)		н	5 mA		
mode	Resolution	м	0.5 mA		
	A	L	0.05 mA		
	Accuracy of setting Input voltage variation *4	H, M, L H, M, L	±(0.2 % of set + 0.1 % of f.s.*2) + Vin/150 k *3 ±(0.1 % of set + 0.02 % of f.s.*2)		
		rms *5	8 mA		
	Ripple	p-p *6	80 mA		
		н	330 S to 6 mS		
		<u> </u>	(3.03 mΩ to 166.7 Ω)		
	Operating range	м	33.3 S to 600 µS		
			(30.3 mΩ to 1.667 kΩ) 3.3 S to 60 μS		
		L	3.3 S to 60 μS (303 mΩ to 16.67 kΩ)		
Constant			346.5 S to 0 S		
Resistan-		Н	(2.886 mΩ to OPEN)		
ce (CR)	Setting range	м	34.65 S to 0 S		
mode	County range		(28.86 mΩ to OPEN)		
		L	3.465 S to 0 S		
		н	(288.6 mΩ to OPEN) 6 mS		
	Resolution	M	6 ms		
		L	60 µS		
	Accuracy of setting *7	H, M, L	±(0.5 % of set *8 + 0.5 % of f.s.*2) + Vin/150 k		
	Operating range	Н	0.3 V to 30 V		
	g.u.g.	L	0.3 V to 4 V		
Constant	Setting range	H	0 V to 31.5 V 0 V to 4.2 V		
Voltage (CV)		H	2 mS		
node	Resolution	L	200 µS		
	Accuracy of setting		±(0.1 % of set + 0.1 % of f.s.)		
	Input current variation		12 mV		
	On a set in a second	H	33 W to 330 W		
	Operating range	L	3.3 W to 33 W 0.33 W to 3.3 W		
Constant		Н	0 W to 346.5 W		
Power	Setting range	М	0 W to 34.65 W		
(CP) mode		L	0 W to 3.465 W		
noue		н	20 mW		
	Resolution	M	2 mW		
	Accuracy of setting	L	0.2 mW		
	, , , , , , , , , , , , , , , , , , , ,	H, M, L H	±(2.5 % of f.s. *2) 0.000 V to 30.000 V		
Voltmeter	Display	L	0.0000 V to 4.0000 V		
	Accuracy		±(0.1 % of rdg + 0.1 % of f.s.)		
	Display	Н, М	0.00 A to 100.00 A		
Ammeter		L	0.0000 A to 1.0000 A		
	Accuracy	Н. М	±(0.2 % of rdg + 0.3 % of f.s.) 0.00 W to 330.00 W		
Natt-	Display	L *15	0.000 W to 30.000 W		
neter		L *16	0.0000 W to 3.3000 W		
	Operation mode		CC/CR mode		
Switching		ange	1 Hz to 50 kHz		
mode	Duty cycle setting		5 % to 95 % 1 % step *10		
	Accuracy of frequency		±(0.5 % of set)		
	Selectable range (CC)	H M	5 mA/μs to 50 A/μs 500 μA/μs to 5 A/μs		
Slew rate	- isotasio range (66)	L	50 µA/µs to 500 mA/µs		
	Accuracy of setting *11		±(10 % of set + 0.8 µs)		
	Operation mode		CC mode		
Soft start	Selectable time range	*12	Off, 100 µs, 200 µs, 500 µs, 1000 µs, 2 ms, 5 ms,10 ms,20 ms		
	Accuracy of setting		±(30 % of set + 10 µs)		
Response Remote	Response speed Sensing voltage that ca	an he	NORMAL, FAST		
Remote	compensated		3 V for a single line		
	Overvoltage protection	(OVP)	Turns off the load at 115 % of the rated voltage		
	Overcurrent protection	(OCP)	Setting range 10 % to 110 % of the rated current		
Protoo			Load off or limit selectable Setting range 10 % to 110 % of the rated power		
Protec- tion	Overpower protection (OPP)	Load off or limit selectable		
function	Overheat protection (O	HP)	Turns off the load when the heat sink temperature reaches 90 °C		
	Undervoltage protectio	n (UVP)	Turns off the load when detected. Can be set in the range of 0.3 V to 30 V		

nodel			PLZ334WL
	Normal sec		
	Operation r		CC, CR, CV, CP
	<u> </u>	number of steps	256
	Step execu	tion time	1 ms to 999 h 59 min
Sequence	Resolution		1 ms, 100 ms, 1 s, 10 s, 1 min
unction	Fast seque		00.00
	Operation r		CC, CR
		number of steps	1024
	Step execu	tion time	25 µs to 100 ms
	Resolution		25 µs (25 µs to 100 µs)
			100 µs(100 µs to 100 ms)
Other	Elapsed tin	ne display	Measures the time from load on to load off. On/Off selectable. Measures from 1 s up to 999 h 59 min 59 s.
unctions	Auto load o		Measures the time from load on to load off. Can be set in the range of 1 s to 999 h 59 min 59 s or off. 26-pin MIL connector
			CC/CR/CP External Voltage Control,
	EX	T cont MODE	0 to 100 % of the rating of Range by 0 to 10V
	EX	T cont ADD	CC mode External Voltage Control, 0 to 100 % of the Local settin value of the rating Range by 0 to ±10 V, Adding up the value to th setting value of ExtCont.
	EX	T cont CV	CV mode External Voltage Control,
	IM	2N	0 to 100 % of the rating of Range by 0 to 10V Current monitor output, 10 Vf.s. (H/L range), 1 Vf.s. (M range)
			CMOS signal L level (or H level) Load On,
	LO	AD CONT INPUT	Switchable to the logic level
	RA	NGE CONT	External range switch input, 2 bit
		ARM INPUT	The alarm activates when the L level of CMO signal is applied for more than 10 μs.
nput /			The internal circuit pulls up to 5 V by 10 kΩ
output ignal	TR	IG INPUT	When it is in the pause condition, the pause can be cancelled when the L level of CMOS signal is applied for more than 10 μs. The internal circuit pulls up to 5 V by 10 kΩ
	AL	ARM CLEAR INPUT	The alarm can be cleared when the L level of CMOS signal is applied for more than 100 ms. The internal circuit pulls up to 5 V by 10 kΩ
		AD ON STATUS	On when the load is on. Open collector by the photo coupler
		NGE STATUS	Range status output. 2 bit
			On when the alarm is on(OVP, OCP, OPP, OHP, REV, UVP) or
	AL	ARM STATUS	Turns on when the external alarm is applied
	SH	ORT SIGNAL OUT	Relay contact output (DC30 V/1 A)
	Front panel	BNC connector	
	ТВ	IG OUT	Outputs a pulse during sequence operation
			and switching operation.
	IM	TUO NC	1 V f.s(H/L range), 0.1 V f.s(M range)Isolated to the internal common(connected to the chassis potential)
communica-	GPIB, RS2	32C, and USB interfac	es are equipped as standard.
	Input voltag	e range	100 V AC to 240 V AC (90 V AC to 250 V AC), Single phase
	Input frequ		47 Hz to 63 Hz
	Power cons		95 VAmax
	Inrush curr		65 Amax
		emperature range	0 °C to 40 °C
		numidity range	20 % to 85 % RH (without condensation)
		nperature range	-20 °C to 70 °C
		midity range	90 % RH or less (without condensation)
	Isolation vo		±500 V
		Primary - input terminal	500 VDC, 30 M or more (ambient humidity of 70 % RH or less)
	Insulation	Primary - chassis	500 VDC, 30 M or more (ambient humidity of 70 % RH or less)
	resistance	Input terminal - chassis	500 VDC, 30 M or more(ambient humidity of 70 % RH or less)
	Withstand	Primary - input terminal	No abnormalities at 1500 VAC for 1 minute.
eneral pecifica-	voltage	Primary - chassis	No abnormalities at 1500 VAC for 1 minute.
ons			Setup Guide, Quick Reference (1 each for English and Japanese
	Accessorie	s	CD-R (Contains the User's Manual and the Communication Interface Manual), Power cord, Set of screws for the load input terminal (2 sets.), Load input terminal cover, Screws for the Inpu terminal cover (2 pcs.), Protection dummy plug for J1 terminal,
	Safety *14		Connecting cable to the chassis Conforms to the requirements of the following directive and standard Low Voltage Directive 2014/35/EU, EN61010-1 Class I, Pollution degree 2
	Electromag (EMC)	netic compatibility	Conforms to the requirements of the following directive and standard EMC Directive 2014/30/EU, EN 61326-1, EN 55011 Emissions: Class A, Group 1 Immunity: Minimum immunity test requirements
			EN61000-3-2, EN61000-3-3
	Weight		Approx. 8.0 kg(17.64 lbs)
	Dimensions	(mm(inch)(maximum)	214.5(8.44")W×124(4.88")(155(6.1"))H×400(15.75")(455(17.91"))
In the N Vin: Inp When the Measur	l range, it ap ut terminal v ne input volta ement frequ	plies for the full scale oltage or the sensing	voltage of the electronic load. V to 30V at a current of the rated power/30 V z to 1 MHz

minimum time width minimum time width. *11 Time to reach from 10 % to 90 % when the current is varied from 2 % to 100 % (20 % to 100 % in M range) *12 Time to reach from 10 % to 90 % of the input current *13 Approximately 35 A for the input voltage of AC100 V *14 This product is categorized in the "Class I". The protective conductor terminal of this product must be connected to the ground. The safety can not be guaranteed when it is not connected to the ground properly.

Multifunctional Electronic Load (CC/CV/CR/CC+CV/CR+CV)

PLZ-U Series





This photo shows a 5-channel frame housing 5 units. The rack mount bracket is optional.

Dimensions

PLZ-30F: 292(11.5")W × 128(5.04")H × 400(15.75")Dmm PLZ-50F: 435(17.13")W × 128(5.04")H × 400(15.75")Dmm

Features

- Slew rate of 2.4 A/µs in the rising and falling edges in CC mode (PLZ150U)
- Built-in three ranges; voltmeter, ammeter, and wattmeter functions that provide readings of up to five digits
- The current slew rate can be changed continuously in constant current and constant resistance modes.
- Supports 0-V input an indispensable feature for testing singlecell fuel cells.
- Individual units (channels) can operate either independently or in synchronization.
- Up to five load units of the same model can be operated in parallel.
- Up to three values can be stored in memory for each most frequently used operation mode and range.
- Equipped with various types of protection circuits (over voltage protection, over current protection, over power protection, over heat protection, under voltage protection, and reverse connection protection).
- Supports the GPIB and RS232C interfaces as standard.
- External control is available to turn on or off the output.

Multi-channel load systems can be built easily! Operating multiple units in parallel offers large capacity!*

The PLZ-U Series provides a set of compact, high-performance multichannel electronic load systems capable of operating in five modes - constant current, constant resistance, constant voltage, constant current+constant voltage and constant resistance+constant voltage. Adopting the modular (plug-in) design, the Series consists of four models - two frame models and two load unit models. The PLZ-30F frame can configure the load units up to three channels, and the PLZ-50F frame can configure up to five channels. Two load unit models are available, the PLZ-70UA (75-watt load that operates even at 0 V) and PLZ-150U (150-watt load that operates from 1.5 V up). Load units can be operated in parallel to increase the current capacity or power capacity. By combining different models of load units and frame, the power capacity can be changed from 75 W to 750 W (when five PLZ150U units are mounted in a PLZ-50F frame). Supporting the GPIB and RS232C interfaces as standard, the electronic load can be built into various types of test systems, making it useful in testing fuel cells, secondary cells, DC/DC converters, switching power supplies, multiple-output power supplies, and more. *Only load units of the same model can be operated in parallel.

Accessories

Load unit: Operation manual, Rear load input terminal cover, Load input connector screw set (2 sets/M6 bolt, M6 nut, M6 spring washer and M4 screw), Load unit attachment screw (2 pcs./M3-10 screw), Sensing terminal screw (2 pcs./M3-6 screw, attached to the unit) Frame: Operation manual, Power cord (with SVT3 18AWG 3-prong plug, cable length of 2.4 m), Front/Rear blank panel (2 pcs./PLZ-30F or 4 pcs./PLZ-50F), Protection dummy plug (2 pcs./for the FRAME CONT connector, attached to the unit)

Application Software (downloadable free of charge)

Application software for controlling this system from a PC is available from our website.

[NOTICE]PLZ-70UA

The operating voltage is guaranteed by the input terminal of the load unit. Be sure to select a load cable that never inputs a voltage of 0 V or less to the load unit input terminal. This system detects the no-signal condition. The no-signal condition is detected when the voltage at the load unit input terminal is 0.3 V or less and when the input current is equal to or less than about 1 % of the rating, in which case the current will stop flowing.

Options

Control flat cable PC01-PLZ-4W (300 mm) PC02-PLZ-4W (550 mm) (for connection between frames)



Sequence creation software Wavy for PLZ-U

Parallel Operation for Larger Capacity

Up to five adjacent load units of the same models can be operated in parallel. For example, you can build a 375-watt load system by operating five PLZ70UA load units in parallel in the PLZ-50F frame or a 750-watt load system by operating five PLZ150U load units in parallel.



M: Master S: Slave

When three load units of one model and two load units of another model are operated in parallel in the PLZ-50F frame

гΓ						
4						
			لـــــا			
	•0 •••	•0 •••	•0 •••	•0 •••	•0 •••	
				C	C	0000
	-5A-	-5A-	-IVI	-5-	-5-	00 0
						0
L.	@ ##@	(Maa)	(Maa)	() () () () () () () () () () () () () (@\$\$ @	
L	لهجها					
þ	A	-3A @••@			 	© © ==

- M: Master S: Slave
- SA: Standalone load unit

When three load units of the same model are operated in parallel and two standalone load units are operated independently in the PLZ-50F frame

Number of Modules and Capacities

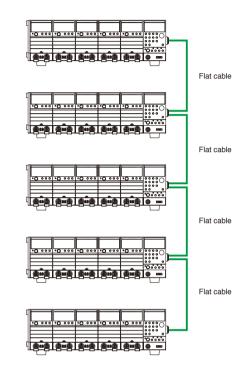
Number of parallel operated load modules	PLZ70UA	PLZ150U
2	30 A/150 W	60 A/300 W
3	45 A/225 W	90 A/450 W
4	60 A/300 W	120 A/600 W
5	75 A/375 W	150 A/750 W

Ordering Code * Please inquire by following code

Model name	Frame model	PLZ70UA	PLZ150U	Total number of unit
PLZ30F-70UA0-150U1		0	1	1
PLZ30F-70UA0-150U2		0	2	2
PLZ30F-70UA0-150U3		0	3	3
PLZ30F-70UA1-150U0		1	0	1
PLZ30F-70UA1-150U1	PLZ-30F	1	1	2
PLZ30F-70UA1-150U2		1	2	3
PLZ30F-70UA2-150U0		2	0	2
PLZ30F-70UA2-150U1		2	1	3
PLZ30F-70UA3-150U0		3	0	3

Frame Control

By connecting two or more frames, you can use one frame to control the other frames (up to five frames can be connected at a time). Operations such as load on/off and preset memory call can be performed.



Model name	Frame model	PLZ70UA	PLZ150U	Total number of unit
PLZ50F-70UA0-150U1		0	1	1
PLZ50F-70UA0-150U2		0	2	2
PLZ50F-70UA0-150U3		0	3	3
PLZ50F-70UA0-150U4		0	4	4
PLZ50F-70UA0-150U5		0	5	5
PLZ50F-70UA1-150U0		1	0	1
PLZ50F-70UA1-150U1		1	1	2
PLZ50F-70UA1-150U2		1	2	3
PLZ50F-70UA1-150U3		1	3	4
PLZ50F-70UA1-150U4	PLZ-50F	1	4	5
PLZ50F-70UA2-150U0	PLZ-50F	2	0	2
PLZ50F-70UA2-150U1		2	1	3
PLZ50F-70UA2-150U2		2	2	4
PLZ50F-70UA2-150U3		2	3	5
PLZ50F-70UA3-150U0		3	0	3
PLZ50F-70UA3-150U1		3	1	4
PLZ50F-70UA3-150U2		3	2	5
PLZ50F-70UA4-150U0		4	0	4
PLZ50F-70UA4-150U1		4	1	5
PLZ50F-70UA5-150U0		5	0	5

PLZ150U

PLZ70UA

PLZ-U Series Specifications

Model			PLZ150U	PLZ70UA		
Rating						
Operating voltage (DC)			1.5 V to 150 V	0 V to 150 V		
		Н	30 A/150 W	15 A/75 W		
Current/power	Range	М	3 A/150 W	1.5 A/75 W		
		L	300 mA/45 W	150 mA/22.5 W		
Isolation voltage of the lo	ad input te	rminal	500			
Withstand voltage between lo	-		500			
Minimum start voltage*1			0.3 V or	-		
CC mode				g		
		Н	0 A to 30 A	0 A to 15 A		
Operating range	Range	M	0 A to 3 A	0 A to 1.5 A		
		L	0 A to 300 mA	0 A to 150 mA		
Selectable range			0 % to 10			
concettable runge		н	2 mA	1 mA		
Resolution	Range	M	0.2 mA	0.1 mA		
	runge	L	0.02 mA	0.01 mA		
Accuracy of setting	Range	H. M. and L	±(0.2 % of set + 0.2 %			
Accuracy of setting	Trange	H	2 r			
Input voltage	Range	M				
variation*3	Range	L	1 mA 0.1 mA			
		rms*4	3 mA	7.5 mA		
Ripple			30 mA	50 mA		
CR mode		p-p*5	50 IIIA	50 IIIA		
			PLZ150U OPEN to	OPEN to 100 mΩ		
Operating range				н	50 mΩ (0 S to 20 S)	(0 S to 10 S)
The value inside	Range	м	OPEN to 500 mQ	OPEN to 1 Ω		
parentheses is the	Range	IVI	(0 S to 2 S)	(0 S to 1 S)		
conductance. *6		L	OPEN to 5 Ω	OPEN to 10 Ω		
			(0 S to 200 mS)	(0 S to 100 mS)		
Selectable range						
	1			% of f.s *7		
		Н	0.2 mS (0 S to 2 S)	0.1 mS (0 S to 1 S)		
		н	0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S)	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S)		
Resolution			0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 µS (0 S to 200 mS)	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS		
The value inside	Range	H	0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 µS (0 S to 200 mS) 0.2 mS	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 µS (0 S to 100 mS 0.1 mS		
	Range		0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 μS (0 S to 200 mS) 0.2 mS (200 mS to 2 S)	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS 0.1 mS (100 mS to 1 S)		
The value inside parentheses is the	Range	M	0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 μS (0 S to 200 mS) 0.2 mS (200 mS to 2 S) 2 μS (0 S to 20 mS)	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS 0.1 mS (100 mS to 1 S) 1 μS (0 S to 10 mS)		
The value inside parentheses is the	Range		0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 μS (0 S to 200 mS) 0.2 mS (200 mS to 2 S) 2 μS (0 S to 20 mS) 2 μS (0 S to 20 mS) 20 μS	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS 0.1 mS (100 mS to 1 S) 1 μS (0 S to 10 mS) 10 μS		
The value inside parentheses is the	Range	M	0.2 mS (0 S to 2 S) 2 mS (2 S to 20 S) 20 μS (0 S to 200 mS) 0.2 mS (200 mS to 2 S) 2 μS (0 S to 20 mS)	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS 0.1 mS (100 mS to 1 S) 1 μS (0 S to 100 mS) 10 μS (10 mS to 100 mS)		
The value inside parentheses is the operating range.		M	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS } (2 \text{ S to } 20 \text{ S}) \\ 20 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{ mS} \\ (200 \text{ mS to } 2 \text{ S}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{ mS}) \\ 2 0 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ (20 \text{ mS to } 200 \text{ mS}) \end{array}$	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \mu \text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{mS} \\ (100 \text{mS to 1 S}) \\ 1 \mu \text{S} (0 \text{ S to 100 mS}) \\ 10 \mu \text{S} \\ (10 \text{mS to 100 mS}) \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8 CV mode	Range	M	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS } (2 \text{ S to } 20 \text{ S}) \\ 20 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{ mS} \\ (200 \text{ mS to } 2 \text{ S}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{ mS}) \\ 2 0 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ (20 \text{ mS to } 200 \text{ mS}) \end{array}$	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \mu \text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{mS} \\ (100 \text{mS to 1 S}) \\ 1 \mu \text{S} (0 \text{ S to 100 mS}) \\ 10 \mu \text{S} \\ (10 \text{mS to 100 mS}) \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8 CV mode		M L H, M, and L	$\begin{array}{c} 0.2 \text{ mS} (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS} (2 \text{ S to } 20 \text{ S}) \\ 20 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{ mS} \\ (200 \text{ mS to } 2 \text{ S}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{ mS}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{ mS}) \\ (20 \text{ mS to } 200 \text{ mS}) \\ \pm (0.5 \% \text{ of set"9} + 0.5 \% \end{array}$	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \ \mu\text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{ mS} \\ (100 \text{ mS to 1S}) \\ 1 \ \mu\text{S} (0 \text{ S to 10 mS}) \\ 10 \ \mu\text{S} \\ (10 \text{ mS to 100 mS}) \\ 0 \text{ of } f.\text{s}^{\ast}10 \) + \text{Vin/500 kC} \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8	Range	M L H, M, and L H	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to 2 S}) \\ 2 \text{ mS } (2 \text{ S to 20 S}) \\ 20 \mu \text{S} (0 \text{ S to 200 mS}) \\ 0.2 \text{mS} \\ (200 \text{ mS to 2 S}) \\ 2 \mu \text{S} (0 \text{ S to 20 mS}) \\ 20 \mu \text{S} \\ (20 \text{mS to 200 mS}) \\ \pm (0.5 $	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \ \mu\text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{ mS} \\ (100 \text{ mS to 1 S}) \\ 1 \ \mu\text{S} (0 \text{ S to 10 mS}) \\ 10 \ \mu\text{S} (0 \text{ S to 10 mS}) \\ 10 \ \mu\text{S} (10 \text{ mS to 100 mS}) \\ 0 \ \text{f.s^{*}10} + \text{Vin/500 kG} \\ \hline \\ 0 \ \text{V to 150 V} \\ 0 \ \text{V to 15 V} \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8 CV mode Operating range Selectable range	Range	M L H, M, and L H	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS } (2 \text{ S to } 20 \text{ S}) \\ 20 \ \mu\text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{ mS} \\ (200 \text{ mS to } 2 \text{ S}) \\ 2 \ \mu\text{S} (0 \text{ S to } 20 \text{ mS}) \\ 2 \ \mu\text{S} (0 \text{ S to } 20 \text{ mS}) \\ 20 \ \mu\text{S} \\ (20 \text{ mS to } 200 \text{ mS}) \\ \pm (0.5 \ \% \text{ of set"9 + 0.5 \%} \\ \hline 1.5 \ \forall \text{ to } 150 \ \forall \\ 1.5 \ \forall \text{ to } 15 \ \forall \end{array}$	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \ \mu\text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{ mS} \\ (100 \text{ mS to 1 S}) \\ 1 \ \mu\text{S} (0 \text{ S to 10 mS}) \\ 10 \ \mu\text{S} \\ (10 \text{ mS to 100 mS}) \\ 0 \text{ f f.s}^{*} 10 \) + \text{Vin/S00 kC} \\ \hline \\ 0 \ V \text{ to 150 V} \\ 0 \ V \text{ to 15 V} \\ 5 \ \% \text{ of f.s} \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8 CV mode Operating range	Range	M L H, M, and L H L	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS } (2 \text{ S to } 20 \text{ S}) \\ 20 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{mS} \\ (200 \text{mS to } 2 \text{ S}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{mS}) \\ 20 \mu \text{S} \\ (20 \text{mS to } 200 \text{mS}) \\ \hline 20 \mu \text{S} \\ (20 \text{mS to } 200 \text{mS}) \\ \pm (0.5 \% \text{ of set"9 + } 0.5 \% \text{mS}) \\ \hline \pm (0.5 $	$\begin{array}{c} 0.1 \text{ mS} (0 \text{ S to 1 S}) \\ 1 \text{ mS} (1 \text{ S to 10 S}) \\ 10 \ \mu\text{S} (0 \text{ S to 100 mS}) \\ 0.1 \text{ mS} \\ (100 \text{ mS to 1 S}) \\ 1 \ \mu\text{S} (0 \text{ S to 10 mS}) \\ 10 \ \mu\text{S} \\ (10 \text{ mS to 100 mS}) \\ 0 \text{ ff.s^{-10}} + \text{Vin/500 kG} \\ \hline \\ 0 \ V \text{ to 150 V} \\ 0 \ V \text{ to 15V} \\ 5 \ \% \text{ of f.s} \\ \text{mV} \end{array}$		
The value inside parentheses is the operating range. Accuracy of setting*8 CV mode Operating range Selectable range	Range	M L H, M, and L H L	$\begin{array}{c} 0.2 \text{ mS } (0 \text{ S to } 2 \text{ S}) \\ 2 \text{ mS } (2 \text{ S to } 20 \text{ S}) \\ 20 \mu \text{S} (0 \text{ S to } 200 \text{ mS}) \\ 0.2 \text{mS} \\ (200 \text{ mS to } 2 \text{ S}) \\ 2 \mu \text{S} (0 \text{ S to } 20 \text{ mS}) \\ 20 \mu \text{S} \\ (20 \text{mS to } 200 \text{mS}) \\ \frac{20 \mu \text{S}}{(20 \text{mS to } 200 \text{mS})} \\ \pm (0.5 \% \text{ of set"}9 + 0.5 \% \\ \hline 1.5 \text{ V to } 150 \text{ V} \\ 1.5 \text{ V to } 15 \text{ V} \\ 0 \% \text{ to } 10 \end{array}$	0.1 mS (0 S to 1 S) 1 mS (1 S to 10 S) 10 μS (0 S to 100 mS 0.1 mS (100 mS to 1 S) 1 μS (0 S to 10 mS) 10 μS (10 mS to 100 mS) of f.s*10) + Vin/500 kC 0 V to 150 V 0 V to 15 V 5 % of f.s mV nV		

Minimum voltage at which the current starts flowing to the PLZ-U. (The PLZ-U detects no signal at an input voltage less than or equal to approximately 0.3 V and an input current less than or equal to approximately 1 % of the range rating. Therefore, if the input voltage is gradually increased from 0 V, no current will flow until 0.3 V is exceeded. If a current greater than or equal to 1% of the range rating starts flowing, the current can flow at voltages less than equal to 0.3 V.) Vin: Load input terminal voltage At a current greater than or equal to (Vin/500 kΩ) Measurement frequency bandwidth: 10 Hz to 1 MHz Measurement frequency bandwidth: 10 Hz to 20 MHz Conductance [S] = (Input current [A]/input voltage [V]) = (1/resistance [Ω]) Conductance [s] = (Input current [A]/input current, during remote sensing set = input voltage vspecified conductance = (input voltage/specified resistance)

*2 *3 *4 *5 *6 *7 *8

*9 set = input voltage × spe *10 f.s = Rated current of the *11 During remote sensing set = input voltage × specified conductance = (input voltage/specified resistance) f.s = Rated current of the specified range

VOILITIELEI					
Measurement range			0 V to 150.0 V		
Desclution	15.75 V to 150 V		0.01 V		
Resolution	0 V to 15.75 V		0.001 V		
Measurement accuracy			±(0.1 % of rdg + 15 digits)		
Ammeter					
		Н	0 A to 30 A	0 A to 15 A	
Measurement range	Range	М	0 A to 3 A	0 A to 1.5 A	
		L	0 mA to 300 mA	0 mA to 150 mA	
		Н	0.001 A		
Resolution	Range	М	0.0001 A		
		L	0.01	mA	
Measurement accuracy			±(0.2 % of rdg	+ 0.3 % of f.s)	
Wattmeter *1					
Measurement range			0 W to 150 W	0 W to 150 W	
Resolution	100 W mir	nimum	0.0	1 W	
Resolution	100 W or greater		0.1	W	
Switching mode					
Operation mode			CC ar	nd CR	
Selectable frequency ra	nge		1 Hz to	20 kHz	
Duty cycle setting			2 % to 98 %,	0.1 % steps	
	1 Hz to less than 1 kHz		1 Hz		
Frequency resolution	1 kHz to less than 10 kHz		10 Hz		
	10 kHz to	20 kHz	100 Hz		
Accuracy of frequency s	etting		±(0.5 % of set)		
Slew rate					
Operation mode			CC and CR		
		Н	0.10 A/µs to 2.40 A/µs	0.05 A/µ to 1.20 A/µ	
Selectable range (CC)	Range	М	0.10 A/us to 0.24 A/us	0.05 0/0 40 0/0	
	rtango	IVI	Itz an 10 Hz z 100 Hz ±(0.5 % of set) ±(0.5 % of set) CC and CR H 0.10 A/µs to 2.40 A/µs 0.05 A M 0.10 A/µs to 2.40 A/µs 0.05 A L 24 mA/µs*2 1 H 0.10 A/µs to 0.24 A/µs 0.05 A	0.05 A/µ to 0.12 A/µ	
	range	L		12 mA/μs*2	
	lange		24 mA/µs*2	12 mA/µs*2	
Selectable range (CR)	Range	L	24 mA/μs*2 0.10 A/μs to 0.24 A/μs	12 mA/µs*2	
Selectable range (CR)		L H	24 mA/μs*2 0.10 A/μs to 0.24 A/μs	12 mA/μs*2 0.05 A/μ to 0.12 A/μ	
Selectable range (CR) Resolution		L H M	24 mA/μs*2 0.10 A/μs to 0.24 A/μs 24 mA/μs*2	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2	
		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs	
Resolution		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs	
Resolution Accuracy of setting*3		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs set + 5 µs)	
Resolution Accuracy of setting*3 Soft start		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01 ±(10 % of s	12 mA/μs*2 0.05 A/μ to 0.12 A/μ 12 mA/μs*2 1.2 mA/μs*2 A/μs set + 5 μs) C	
Resolution Accuracy of setting*3 Soft start Operation mode		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01 ±(10 % of s	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs set + 5 µs) C 100, or 300 ms	
Resolution Accuracy of setting*3 Soft start Operation mode Selectable time range		L H M	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01 ±(10 % of s C 0.1, 1, 3, 10, 30,	12 mA/µs*2 0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs set + 5 µs) C 100, or 300 ms	
Resolution Accuracy of setting*3 Soft start Operation mode Selectable time range Time accuracy		L H L	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01 ±(10 % of s C 0.1, 1, 3, 10, 30,	12 mA/μs*2 0.05 A/μ to 0.12 A/μ 12 mA/μs*2 1.2 mA/μs*2 A/μs set + 5 μs) C 100, or 300 ms et +100 μs)	
Resolution Accuracy of setting*3 Soft start Operation mode Selectable time range Time accuracy	Range	L H L	24 mA/µs*2 0.10 A/µs to 0.24 A/µs 24 mA/µs*2 2.4 mA/µs*2 0.01 ±(10 % of s C 0.1, 1, 3, 10, 30, ±(30 % of s	0.05 A/µ to 0.12 A/µ 12 mA/µs*2 1.2 mA/µs*2 A/µs set + 5 µs) C 100, or 300 ms et +100 µs) d CR	

Number of loops 1 to 9999 (9999 is infinite loop)

*1 Product of the measured voltage and measured current

*2 *3

Model

Voltmet

Fixed value Time to reach from 10 % to 90 % when the current is changed from 2 % to 100 % of the rated current of H range

Model	PLZ150U	PLZ70UA			
Protection function					
Overvoltage protection (OVP)	Turns off the load at 11	Turns off the load at 110 % of the rated voltage			
Overcurrent protection (OCP)	Trips at the value or 110 % of the rated	Set the value in the range of 0 % to 110 % of the rated current of H range. Trips at the value or 110 % of the rated current of the range, whichever is less. The action taken when the OCP trips can be set to load off or limit.			
Overpower protection (OPP)	Trips at the value or 110 % of the rated	Set the value in the range of 0 % to 110 % of the rated power of H range. Trips at the value or 110 % of the rated power of the range, whichever is less. The action taken when the OPP trips can be set to load off or limit.			
Overheat protection (OHP)	Trips when the heat sink temperature reaches 95 °C. The	he action taken when the OHP trips is to turn the load off.			
Reverse connection protection (RVP)		Short-term protection provided by a short-circuit system using a protection diode. The action taken when the OHP trips is to turn the load off.			
Undervoltage protection (UVP)		of 0 % to 100 % of the rated voltage. HP trips is to turn the load off.			
Communication function					
	IEEE std. 488.2-1994 SH1, AH1, T6,	L4, SR1, RL1, PP0, DC1, DT1, C0, and E1			
GPIB		Supports the SCPI command set Sets panel functions except the POWER switch and key lock and reads measured values			
	D-SUB 9-pin connector	D-SUB 9-pin connector (conforms to EIA-232-D)			
RS232C		Sets panel functions except the POWER switch and key lock and reads measured values			

PLZ-U Series Specifications

Model		PLZ150U	PLZ70UA		
Inter-frame control a	nd external control				
		Controls up to four slave frames from the master frame.			
Inter-frame control			Enables you to turn on/off the load, recall presets ABC on all channels simultaneously, and recall setup memories 0 to 3.		
	Recall input of preset mem-ories A, B, and C	Recalls preset memories A, B, and	d C on all channels simultaneously		
External control	Setup memory recall input	Recalls the setup memory 0 to 3			
	Enable input	Enables the turning on/off of the load, recalling of presets ABC on all channels simultaneously, and recalling of setup memories 0 to 3.			
	Load-on input	Turns on the load on all of	channels simultaneously.		
	Load on status output	On when the load is on	(open collector output)		
	Alarm status output	On when the alarm is or	n (open collector output)		
	Internal power output	5 V and maximum out	tput current of 100 mA		
nput signal		Low active, pull up Low level input voltage: 0 V to 1 V,	to 5 V using 10 k $\Omega.$ high level input voltage: 4 V to 5 V		
Output signal			hstand voltage of 30 VDC, 1 V, and maximum output current of 100 mA.		
Remote sensing					
	t can be compensated	2 V for a s	single line		
Miscellaneous					
ABC preset memorie	es	Saves settings (A, B, and C) for each operation mode of each range			
Setup memories		Saves four sets of setup parameters			
Elapsed time display		Measures the time from when the load is turned on to when the load is turned off (0.1 s to 99999 s)			
Auto load off timer		Turns off the load after the specified time elapses (off or 1 s to 99999 s)			
Delayed load-on		Turns on the load after the specified time elapses (0 ms to 1 s, 10 ms steps)			
Parallel operation		Possible between adjacent load units (same model) in the frame.			
External analog cont	trol				
Power output		12 V and maximum output current of 50 mA.			
External voltage control input *1		Operates in CC, CR, and CV modes. 0 % to 100 % of f.s in the range of 0 V to 10 V.			
Load-on input		Low active (or high active), pull up to 5 V using 10 k $\Omega.$ Low level input voltage: 0 V to 1 V, high level input voltage: 4 V to 5 V			
Current monitor outp	but	0 % to 100 % of the rated current in the range of 0 V to 10 V			
Common		Negative pin electric potential of the load input terminal			
General Specificatio					
Weight		Approx. 2 kg (4.41 lbs)			
	Rear load input terminal cover	1 pc.			
	Set of screws for the load input connector	2 sets (M6 bolt, M6 nut, M6 spring washer, M4 screw)			
Accessories	Load unit attachment screws	2 pcs. (M3-10 screws, attached to the unit)			
	Sensing terminal screw on the rear panel	2 pcs. (M3-6 screws, attached to the unit)			

*1 The time for updating the setting in CR or CV mode is approximately 100 ms.

Model		PLZ30F	PLZ50F	
Rated supply voltage		100 VAC to 240 VAC (90 VAC to 250 V) single phase		
Rated frequency		50 Hz or 60 Hz (47 Hz to 63 Hz)		
Device construction	Frame alone	33 VA or less	40 VA or less	
Power consumption	When load units are installed in all channels	300 VAmax	500 VAmax	
Cooling system		Forced air cooling using a heat sensing variable speed fan.		
Operating temperature r	ange	0 °C to	40 °C	
Operating humidity rang	le	20 % to 85 % RH (wi	thout condensation)	
Storage temperature rar	nge	-20 °C t	o 70 °C	
Storage humidity range		90 % RH or less (wit	hout condensation)	
Insulation resistance	Primary - chassis	500 VDC, 30 MΩ or more (ambie	ent humidity of 70 % RH or less)	
Withstand voltage	Primary - chassis	No abnormalities at 15	00 VAC for 1 minute.	
Ground continuity		25 Aac, 0.1	Ω or less	
Battery backup		Backs up the setup data immediately before the power is turned off Battery life: 3 years or longer (at 25 °C)		
Number of installable load modules		3	5	
Dimensions (mm)		See outline drawing.		
Weight	Frame alone	Approx. 5 kg (11.02 lbs)	Approx. 7 kg (15.43 lbs)	
	Power cord	1 pc. (with SVT3, 18AWG, 3-prong plug, cable length of 2.4 m)		
Accessories	Blank panel (front panel)	2 pcs. maximum *1	4 pcs. maximum *1	
Accessories	Protection dummy plug	2 pcs. (for the FRAME CONT connector, attached to the unit)		
	Operation manual	1 p	с.	
Electromagnetic compatibility *1, *2		Conforms to the requirements of the following directives and standards EMC Directive 2014/30/EU EN 61326-1 En 55011 Emission: Class A, Group 1 Immunity: Minimum immunity test requirement EN61000-3-2, EN61000-3-3		
Safety *3, *4		Conforms to the requirements of the following directives and standards Low Voltage Directive 2014/35/EU EN61010-1 Class I Pollution degree 2		

*1 In products that have load units installed, blank panels are installed in the empty slots. In products that contain the frame alone, the maximum number of blank panels are installed. *2 Only on models that have CE marking on the panel. *3 Not applicable to custom order models.

Charge/Discharage System



Dimensions / Weight

PFX2511: 214.5(8.45")W×124(4.88")H×400(15.75")Dmm(inch)/7kg(15.43 lbs) PFX2512: 214.5(8.45")W×124(4.88")H×400(15.75")Dmm(inch)/7kg(15.43 lbs) PFX2532: 429.5(16.91")W×128(5.04")H×550(21.65")Dmm(inch)/17 kg (37.48 lbs)

Accessories

Power cord, 26-core/20-core flat cable, Sensing connector, Thermistor, Lock lever, Operation manual,

PFX2511/PFX2512: Cable with crimp terminal, PFX2512: LAN cable(2m), PFX2511: Twisted-pair wire with TP-BUS connectors, TP-BUS core, BPChecker2000 setup guide, BPChecker2000 BASIC edition CD-ROM. PFX2532: I/O terminal cover set. I/ O terminal M8 screw set, Load input terminal cover set, Ferrite core for 26-core/20-core flat cables, 26-core cable (with ferrite core) for PAT-T, Sensing connector cover set, LAN cable

Options

Load cable TL08-PFX Max.50 A, length:5 m Load cable with voltage current, and temperature sensing cable. Sensing cable set TL09-PFX (for OP01/02-PFX) approx. 5 m TL08-PFX TL11-PFX (for OP03-PFX) approx. 5 m TL12-PFX* (for OP03-PFX) approx. 3 m Cable set TL10-PFX* (for PFX2532) Voltage/thermometer unit OP01-PFX* (for PFX2511) TL09-PFX Up to 3 boards can be mounted OP02-PFX* (for PFX2512/2532) Up to 3 boards can be mounted Voltage unit OP03-PFX* (for SL01-PFX) Up to 8 boards can be mounted OP03-PFX 8 slot unit SL01-PFX* (for PFX2512/2532) I/F cable SC05-PFX (for PLZ-5W) SC07-PFX (for PWR-01) SL01-PFX Application software SD002 (for PFX2511) BPChecker2000 FULL Edition (The 2-channel version is supplied with PFX2511) SD007-PFX (for PFX2512/2532) BPChecker3000 Rack mount frame SC07-PFX SC05-PFX KRB3-TOS(EIA) (for PFX2532) KRB150-TOS(JIS) (for PFX2532)

Fully support charge and discharge measurement from basic test to simulation test

PFX2500 Series is a high performance Charge/Discharge system controller that takes measurements in combination with our DC power supply and electronic load in order to evaluate test sample (electric storage elements such as secondary batteries) characteristics. It is also capable to perform evaluation test with high-performance, large capacity and wide range of rating with the combination of DC power supply and electronic load. Execution of the test is conducted by the exclusive application software. The test corresponds to long time continuous test and synchronization test with temperature chambers with the multiplexed protection performance. In addition, easy data editing is also capable with fulfilling graphic performance.

Features

- Capable of high-precision measurement of cumulative capacities and amount of power as well as voltage and current
- Pattern charging/discharging capabilities by 1000 steps are installed (for PFX2512, 2532)
- Supporting temperature measurement and capable of monitoring temperatures during charging/discharging
- Fully equipped with safety features of the overcharge protection using voltage, electric charge and temperature
- Battery deterioration is prevented by turning off the output after detecting wobbling and shock with vibration sensor
- Capable of seamless charging/discharging (high speed charging/discharging transfer control) (for PFX2512, 2532)
- High speed sampling with maximum 1 ms can be realized (for PFX2512, 2532)
- A 6 V range is newly installed and is capable of high-precision measurement (for PFX2512, 2532)
- LAN as standard interface (for PFX2512, 2532)

The comparison of PFX2500 Series

Item	PFX2511	PFX2512	PFX2532	
Rating	60 V / 50 A	60 V / 50 A 60 V / 200 A		
Communication interface	TP-BUS (PFX2121 is required for PC connection)	LAN		
Monitoring data minimum time interval	1 s (up to 30 channels), 2 s (more than 30 channels)	0.1 s		
High speed data sampling	-	✓ (Selected form 1 ms/10 ms/ 100 ms maximum 6000 points for every profile)		
Charge/ discharge mode	6 modes Charging: CC, CC-CV Discharging: CC, CP, CC-Pulse, CP-Pulse	9 modes Charging: CC, CC-CV(Cell CV Voltage)*1 Discharging: CC, CP,CC-CV(Cell CV Voltage)*1 CP-CV(Cell CV Voltage)*1 Others: Pattern(CC, CP, Cell CV voltage*2), I-V, Pause		
Test condition configuration	Maximum 20 patterns are divided into individual loop setting and total repeat setting with charging and discharging as a pair.	for Charging/Discharging, etc		
Seamless charge/ discharge	(Approx. 2 seconds for charge/discharge transfer time: Depending on the number of channels)	✓ (Response within 50 ms (TYP)*3)		
Rest time control	Fixed time	The time variable by cell temperature		

Can be set only when the optional OP02-PFX Volt/Thermometer Unit or OP03-PFX Voltmeter Unit

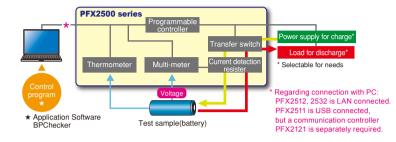
is installed. Step time can be used in more than 500 ms.

*3 It is defined as the time for the charge/discharge current to change from 10 % to 90 % of the preset

Complicated Systems Integrated into One

PFX2500 Series has integrated systems into one unit where battery evaluation is required. In addition, the series has high degrees of flexibility corresponding to wide range of rating since it is possible to combine our conventional DC power supply

• System conceptual diagram



(for charging) and our electronic load (for discharging) tailored to needs. Introduction cost is able to be reduced by selecting equipment which meets charge/discharge test condition required.

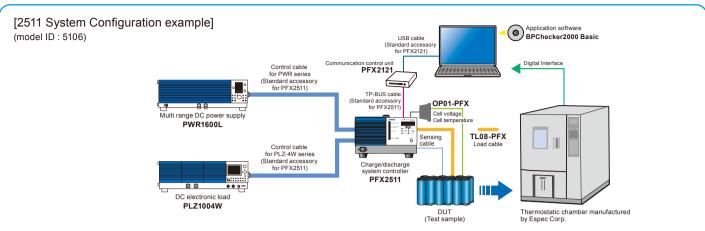
• System configuration (example) Charge/Discharge System Controller



[Applied configuration (model ID)]

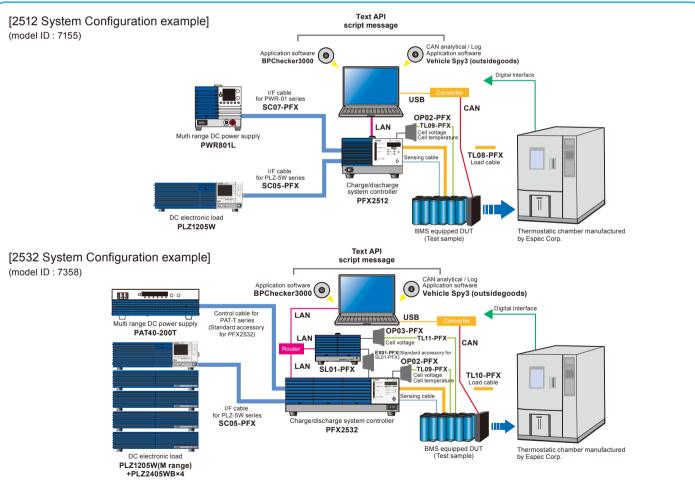
Model ID is used for combination of the selected power supply and electronic load if you wish to have a combination that is not on the available model ID list, please consult with us. More model IDs will be added in future. The latest information for the system configuration is available on our website.

Model ID		Device events for shores	Electronic local fear discharge	Model ID	Power supply for charge	Electropic load for discharge	
PFX2511	PFX2512	Power supply for charge	Electronic load for discharge	PFX2532	Power supply for charge	Electronic load for discharge	*1. M range *2. H range *3. Can be replaced with
5103	7103	PWR1600L	PLZ1004W(2 units in parallel)*2	7301	PWR1600L	PLZ1004W*2 + 2004WB	
5105 *4	7105 *4	PAT60-67T	PLZ1004W+2000WB *1	7301	(2 units in parallel)	PL21004W 2 + 2004WB	the Kikusui SR Large
5106	7106	PWR1600L	PLZ1004W *2	7302	PAT60-133T	PLZ1004W*2 + 2004WB x 2	Capacity Electronic
5107	7107	PAS10-70	PLZ1004W *2	7302	FA100-1551	(2 units in parallel)*3	Load Smart Rack
5110	7110	PAS40-27	PLZ1004W *2	7303	PAT40-200T	PLZ1004W*2 + 2004WB x 2	System PLZ5004W. *4. A separate cable is
5112	7112	PAS10-35	PLZ334W *2	7303	FA140-2001	(2 units in parallel)*3	required. For details,
5119	7119	PWR1600L	PLZ1004W+2004WB *1	7304	PAT40-200T	PLZ1004W*2 + 2004WB	contact your Kikusui
5122		PAS60-12	PLZ1004W *2	7305	PWR1600L	PLZ1004W*2	agent or distributor.
5125		PWR1600L	PLZ664WA *2	7306	PAT40-200T	PLZ1004W*2	
	7122	PAS60-12	PLZ664WA *2	7307	PWR1601L	PLZ1004W*2 x2 (2 units in parallel)	*A SC07-PFX (optional) is
	7124	PAS40-9	PLZ1004W *2	7351	PWR1201L	PLZ1205W *2	necessary to connect the
	7125	PWR1600L	PLZ664WA *2	7352	PWR1201L	PLZ1205W*2 x 2	PWR-01 series with the
	7126	PWR801L	PLZ1004W *2	7353	PAT60-133T	PLZ1205W*2 + 2405WB x 2	PFX2500 series.
	7127	PWR801ML	PLZ1004W *2	7354	PAT40-200T	PLZ1205W *2	
	7128	PWR1201ML	PLZ1004W *2	7355	PAT40-200T	PLZ1205W*2 + 2405WB	*A SC05-PFX (optional) is necessary to connect the
	7151	PWR401L	PLZ205W *2	7356	PAT40-200T	PLZ1205W*2 + 2405WB x 2	PLZ-5W series with the
	7152	PWR401ML	PLZ205W *2	7357	PAT40-200T	PLZ1205W*2 + 2405WB x 3	PFX2500 series.
	7153	PWR401L	PLZ405W *2	7358	PAT40-200T	PLZ1205W*1 + 2405WB x 4	
	7154	PWR401ML	PLZ405W *2	7359	PAT80-100T	PLZ1205W*1 + 2405WB x 4	
	7155	PWR801L	PLZ1205W *2				
	7156	PWR801ML	PLZ1205W *2				
	7157	PWR1201L	PLZ1205W *2				
	7158	PWR1201ML	PLZ1205W *2				
	7159	PWR1201ML	PLZ1205W(2 units in parallel)*2				
	7160	PWR1201ML	PLZ1205W+2405WB *1				



Comprehensive management from test condition setting to execution and data analysis on test results by PFX2511 exclusive application software, BPChecker2000 BASIC

The application software, BPChecker2000, can manage all processes from creating the test condition file to output of the test result file. Setting and execution of conditions for battery charge and discharge characteristics test and an analysis of test results can be performed on the PC. In addition, in an environment where an RS485-USB (or RS232C) converter can be controlled, it can externally control the temperature chambers manufactured by ESPEC, and it allows to synchronize with the temperatures in the chamber. * The control of BPChecker2000 Basic supplied with PFX2511 is limited to 2 channels. BPChecker2000 FULL Edition with no function limit is sold separately.



Comprehensive management from test condition setting to execution and data analysis on test results by PFX2512, 2532 exclusive application software, BPChecker3000

The application software, BPChecker3000 (SD007-PFX), is the new capability of PFX2512, 2532 where test condition and graphical drawing function are emphasized on existing BPChecker2000. This is the PFX2512, 2532 exclusive application software which realized [Seamless Charge/Discharge] and [High Speed Data Sampling]. At the test condition setting, the test condition (project) is created from database compiled charge/discharge condition (profile). The test execution shows that graphical display function is emphasized in its extraction and overwriting functions for larger data integration. In addition, synchronization operation with temperature chambers is capable and the charge/discharge test is comprehensively controlled including temperature control under test environment. Further, correspondence will also be capable working together with [CAN Bus] for which demand will be increased accompanied by the technical development of battery management in future.

PFX2500 Series Specifications

Unless otherwise specified, specifications should pursuant to the following settings and conditions. * Worm-up time should be 30 minutes. * TYP Value indicates typical values. Not assuring performance

"reading" shows readout value. * "set" indicates setting value. * "rating" indicates rating.

Rated Output		PFX2511	PFX2512	PFX2532
Number of output		1 ch	1 ch	1 ch
Charging current ra	ange *1	0.000 A to 50.000 A	0.000 A to 50.000 A	0.000 A to 200.000 A
Charging voltage	60 V range	0.000 V to 60.000 V	0.000 V to 60.000 V	0.000 V to 60.000 V
range *1	6 V range	-	0.000 V to 6.000 V	0.000 V to 6.000 V
Discharge current	range *1	0.000 A to 50.000 A	0.000 A to 50.000 A	0.000 A to 200.000 A
Discharge voltage	60 V range	0.000 V to 60.000 V	0.000 V to 60.000 V	0.000 V to 60.000 V
range *1 *2	6 V range	-	0.000 V to 6.000 V	0.000 V to 6.000 V

*1 The range varies depending on factors such as the connected DC power supplies and electronic loads, the wiring configuration of the system, and the charge/discharge operation. *2 The minimum voltage that can be discharged varies depending on factors such as the connected

electronic load models and the wiring configuration.

Setting Ac	curacy		PFX2511	PFX2512	PFX2532	
Static						
Constant	Range *	3	0.000 A to 50.000 A	0.000 A to 50.000 A	0.000 A to 200.000 A	
current charge/	Accurac	y *4	*5	*5	*5	
discharge	Resoluti	on	1 mA	1 mA	1 mA	
	Range	60 V range	0.000 V to 60.000 V	0.000 V to 60.000 V	0.000 A to 200.000 / *5 1 mA 0.000 V to 60.000 V 0.000 V to 60.000 V *5 1 mV 1 W to 12000 W 9 ± (0.5% of set + 10 W) 	
Constant	*3	6 V range	-	0.000 V to 6.000 V	0.000 V to 6.000 V	
voltage charging	Accurac	y *4	*5	*5	*5	
onarging	Resoluti	on	1 mV	1 mV	1 mV	
Constant	Range *	3	0.10 W to 3000.00 W	0.10 W to 3000.00 W	1 W to 12000 W	
power discharg-	Accurac	y *4 *6	*5	*5 *5 1 mA 1 mA 000 V 0.000 V to 60.000 V 0.000 V to 60.000 V 0.000 V to 60.000 V *5 *5 1 mV 1 mV .000 W 0.100 V to 60.000 W *5 *5 1 mV 1 mV .000 W 0.10 W to 3000.00 W 1 W to 12000 W ± (0.5% of set + 10 W) *9 10 mW 1 W .000 A - - - - - .00 ms - - .010 ms - - .020 ms - - .03 ms - - .04 ms/mm number - - .05 ms) - - .105 ms) - - .100 ms 10000 values		
ing	Resoluti	on *7	100 mW		1 W	
Pulse					1	
	Range *	3	0.000 A to 50.000 A	-	-	
			*5	-	-	
Constant	Accuracy *4 *5 *5 *5 Resolution 1 mA 1 mA 1 mA 1 mA Range 60 V range 0.000 V to 60.000 V 0.000 V to 60.000 V 0.000 V to 60.000 V '3 60 V range - 0.000 V to 60.000 V 0.000 V to 60.000 V Accuracy *4 *5 *5 *5 Resolution 1 mV 1 mV 1 mV Range *3 0.10 W to 3000.00 W 0.10 W to 3000.00 W 1 W to 12000 W Accuracy *4 *6 *5 ± (0.5% of set + 10 W) *9 ± (0.5% of set + 10 W) *9 Resolution *7 100 mW 10 mW 1 W Range *3 0.000 A to 50.000 A - - Accuracy *4 *6 *5 - - Range *3 0.000 A to 50.000 A - - Range *3 0.000 A to 50.000 A - - Range 5.0 ms to 6500.0 ms - - - Range 60 V range 0.1 W to 3000.0 W - - - Range 60 V range 0.1 W to 3000.0 W					
current	Number	of settings	20 values	-	-	
discharg- ing		Range	5.0 ms to 65000.0 ms	-	-	
5		Accuracy *4 *8	± (0.05% of set + 0.05 ms)	-	-	
	width	Width		-	*5 *5 1 mA 1 mA .000 V to 60.000 V 0.000 V to 60.000 V .000 V to 60.000 V 0.000 V to 6.000 V .000 V to 60.000 V 0.000 V to 6.000 V .5 *5 1 mV 1 mV 10 W to 3000.00 W 1 W to 12000 W 0.5% of set + 10 W) *9 ± (0.5% of set + 10 W) *9 10 mW 1 W - -	
	Range	60 V range	0.1 W to 3000.0 W	-	-	
		6 V range	-	-	_	
			*5	_	_	
Constant	60 V range		100 mW	-	-	
power	Resolution		-	-	-	
discharg- ing	Number	of settings	20 values	-	-	
		÷	5.0 ms to 65000.0 ms	-	-	
		Accuracy *4 *8	*5 *5 *5 1 mA 1 mA 1 mA 1 mA 1 mA 1 mA 1 mA 1 mA 1 mA 0.000 V to 60.00 V 0.000 V to 60.00 V 0.000 V to 60.00 V range - 0.000 V to 60.00 V 0.000 V to 60.00 V *5 *5 *5 *5 1 mV 1 mV 1 mV 1 mV 0.10 W to 3000.00 W 0.10 W to 3000.00 W 1 W to 12000 *6 *5 ± (0.5% of set + 1W) *9 ± (0.5% of set + 10 *100 mW 10 mW 1 W 1 W *100 mW 10 mW 1 W 1 W *20 values - - - *1 mA - - - *20 values - - - *1 mA - - - *1 mage - -	-		
	width	Resolution	100 µs	*5 *5 1 mA 1 mA 1 mA 1 mA 0.000 V to 60.000 V 0.000 V to 60.000 V 0.000 V to 60.000 V 0.000 V to 60.000 V *5 *5 1 mV 1 mV 4 0.10 W to 3000.00 W 1 W to 12000 W ± (0.5% of set + 1 W) *9 ± (0.5% of set + 10 W) *2 10 mW 1 W 4 - -<		
Pattern *1	0				1	
	Range *	3	-	-50.000 A to 50.000 A	-200.000 A to 200.000 A	
	Accurac	y *4	-	*5	*5	
	Resoluti	on	-	1 mA	1 mA	
Pattern constant current	Number	of settings	-	(Maximum number	(Maximum number	
current	Time	Range	-			
		Accuracy *4	-	± (0.05% of set + 10 ms)	± (0.05% of set + 10 ms)	
		Resolution	-	100 ms	or 1 step) (Time width for 1 step) + 10 ms) ± (0.05% of set + 10 ms) s 100 ms	
	Range *	3	-	-3000.00 W to 3000.00 W	-12000 W to 12000 W	
	Accurac	y *4	-	± (0.5% of set + 1 W) *9	± (0.5% of set + 10 W) *9	
	Resoluti	on	-	10 mW	1 W	
Pattern constant power	Number	of settings	-			
	Time	Range	-	0.1s to 9999.9s	0.1s to 9999.9s	
	Time width	Accuracy *4	-	± (0.05% of set + 10 ms)	±(0.05% of set + 10 ms)	
		Resolution	-	100 ms	100 ms	

*3 Range might be different depending on DC power supply to be connected, model of electronic load, wiring situation, etc. Ambient temperature at 18 °C to 28 °C *4

*5 External equipment is controlled so as to Measurement Value being equal to Set Value by the software control. *6 *7

*8

External equipment is controlled so as to Measurement Value being equal to Set Value by the software control. 60 V range = At battery voltage above 5 V, 6 V range = at above 0.5 V Voltage activation rage for constant power discharge: 5 V to 60 V (assured value) Measure time after setting trigger at the half position (1/2) of pulse width (current amplitude) With battery voltage of 2 V or more. The battery voltage is measured, and the control current (constant current control) is calculated from the set power value through software calculation. The time required to *9 process one calculation (from the voltage measurement to the output setting) is approximately 1 ms. *10 The operating voltage range is 1 V or more (when the TL08-PFX is being used; regardless of whether a bias power supply is being used).

Measurer	nent Accu	iracy	PFX2511	PFX2512	PFX2532	
Static						
Charge /	Range *1	11	0.0000 A to 50.0000 A	0.0000 A to 50.0000 A	0.000 A to 200.000 A	
discharge current	Accuracy	/ *12 *13			0.02% of rating) + 0.1 % of rating)	
measure- ment	Resolutio	on	0.1 mA	0.1 mA	1 mA	
	Danas	60 V range	-6.0000 V to 60.0000 V	-6.0000 V to 60.0000 V *14	-6.0000 V to 60.0000 V *14	
	Range	6 V range	-	-1.0000 V to 6.0000 V *15	-1.0000 V to 6.0000 V *15	
Voltage measure-	Accuracy *12 *13	60 V range	± (0.05% of reading + 0.02% of rating)	± (0.05% of reading + 0.02% of rating)	± (0.05% of reading + 0.02% of rating)	
ment	*16	6 V range	-	± (0.05% of reading + 0.04% of rating)	± (0.05% of reading + 0.04% of rating)	

Measurem Static	ient Accu	пасу	PFX2511	PFX2512	PF X2532
Static	Range		-	0.000 W to 3000.000 W	0.0 W to 12000.0 W
Power					
measure- ment	Accurac	:y	-	(Voltage measurement	
	Resoluti	on	-		100 mW
Capacity	Range				Calculation * current measureme 0.000 Ah to 2000.00C to the time accuracy 1 mAh ±10 ppm (TYP)
calculation		y *12 *13		0.000 W to 3000.000 W 0.0 W to Software calculation (Voltage measurement × current m 1 mW 10 00 Ah 0.000 Ah to 2000.000 Ah 0.000 Ah to urrent measuring accuracy and the time 1 mAh 1 1 mAh 1 9) ±10 ppm (TYP) ±10 pp 100 A - - 10 Areracy	
	Resoluti		0.1 mAh		
Time *17	Accurac	y *12 *18	±10 ppm (TYP)	±10 ppm (TYP)	±10 ppm (TYP)
Pulse	Range		0.0000 A to 50.0000 A	_	_
			± (0.2% of reading		
Charge /	Accurac	y *12 *13	+ 0.03% of rating)	-	-
discharge	Resoluti	on	0.1 mA	-	-
current			Average current,		
	Measure	ed value	Update a data per period of 500 ms	-	-
	Range		0.0000 V to 60.0000 V	_	_
	-		± (0.05% of reading		
	Accurac	y *12 *13	+ 0.02% of rating)	-	-
	Resoluti	on	0.1 mV	-	-
		Linh	Indicates the		
Battery voltage		High voltage	maximum battery voltage in one cycle of	-	-
voltage	Monourc		the pulse setting.		
	Measure- ment	Low	Indicates the		
		Low voltage	minimum battery voltage in one cycle of	-	-
		ronago	the pulse setting.		
		Arbitrary	At the specified pulse point	-	-
	Range		0.0000 Ah to 2000.0000 Ah	-	-
Capacity	Accuracy *12 *13		Rely on the current		
				-	-
	pacity culation Accuracy *12 *13 Rely on the current measuring accuracy and the time accuracy - Resolution 0.1 mAh - me *17 Accuracy *12 *18 ±10 ppm (TYP values) - ttern - - -	_	_		
Time *17				-	-
Pattern				I	
	Range *	11	-	-50.0000 A to 50.0000 A	-200.000 A to 200.000
Charge /	Accuracy *12		_	± (0.2% of reading	±(0.2% of reading
discharge	-		_	÷.	.
current			-		
	Measure		-		
current	Range		-		
Valtaga	-	6 V range	-		
	Accuracy	60 V range	-		
	*12	6 V range			± (0.05% of reading
		-	-	+ 0.04% of rating)	+ 0.04% of rating)
	Resoluti	on *16	-		0.1 mV
Power	Range		-		-12000.00 W to 12000.00
	Accurac	y *12	-		
ment	Resoluti	on	_		
			_		
		v *12	_		
calculation		-	_		
Time *17			-		±10 ppm (TYP)
High speed			1		
			-	-50.0000 A to 50.0000 A	-200.000 A to 200.000
		1 ms		± (0.2% of reading	± (0.4% of reading
Current	Accuracy	sampling			+ 0.5% of rating)
measure-	*12 *19	10 ms	-		± (0.3% of reading + 0.1% of rating)
ment	*20				÷.
		sampling			+ 0.1% of rating)
	Resoluti		_		
	Pango	60 V range		-6.0000 V to 60.0000 V	-6.0000 V to 60.0000
	Kange	6 V range		-1.0000 V to 6.0000 V	-1.0000 V to 6.0000 V
		1 ms			± (0.1% of reading
voltage voltage voltage voltage voltage results ender Arbitrary Atthe specified pulse point – Capacity calculation Accuracy *12 *13 Rely on the current measuring accuracy and the time accuracy – Time *17 Accuracy *12 *18 ±10 ppm (TYP values) – Pattern – ±0.03% of read Charge / discharge current Range *11 – -50.0000 A to 50.0 Accuracy *12 *18 ±10 ppm (TYP values) – Pattern – ±0.03% of read Resolution – 0.1 mA Measured value – 4.0.03% of read Accuracy *12 – + 0.03% of read Accuracy *12 – + 0.000 V to 60.000 fo V range – + 0.02% of read Accuracy *12 – - Resolution *16 – 0.1 mV Power ment Range – - Resolution – 1 mV - Accuracy *12 – Rely on the current measur					
Voltage				1 0.0070 01 Iaung)	· 0.00 /0 01 raulity)
					60 V range:
measure-	*12 *19	sampling *16	_	60 V range: ± (0.05% of reading	± (0.05% of reading
measure-		sampling *16		60 V range: ± (0.05% of reading + 0.02% of rating)	± (0.05% of reading + 0.02% of rating)
measure-	*12 *19	sampling *16		60 V range: ± (0.05% of reading + 0.02% of rating) 6 V range:	± (0.05% of reading + 0.02% of rating) 6 V range:
measure-	*12 *19	sampling *16		60 V range: ± (0.05% of reading + 0.02% of rating) 6 V range: ± (0.05% of reading	± (0.05% of reading + 0.02% of rating)

*11 Measurable range: PFX2512/ -52.500 A to 52.500 A (TYP value) However, accuracy outside of the range is not assured. PFX252/ -210.000 A to 210.000 A (TYP value) However, accuracy outside of the range is not assured.
*12 Ambient temperature at 18 °C to 28 °C
*13 Measurable range: -6.500 V to 65.000 V (TYP value) However, accuracy outside of the range is not assured.
*14 Measurable range: -6.500 V to 65.000 V (TYP value) However, accuracy outside of the range is not assured.
*15 Measurable range: -6.500 V to 6.500 V (TYP value) However, accuracy outside of the range is not assured.
*16 Common with 6 V/60 V ranges
*17 Accuracy of the elapsed time (Cutoff condition) when charging / discharging or resting.
*14 Measure and a state of the seconds

*18 Monthly error: approximately 30 seconds. *19 Accuracy outside of the rating output range is not assured

PFX2500 Series Specifications

Temperature measurement	PFX2511	PFX2512	PFX2532		
Resistor (temperature) measurir	ig section *1				
Measurement range		-40.0 °C to 100.0 °C			
Measurement resolution		0.1 °C ± 0.5 °C (measurement temperature at 0 °C to 40.0 °C)			
*0 *0	± 0.5 °C (measurement temperature at 0 °C to 40.0 °C)				
Measurement accuracy *2 *3	± 1 °C (measurement temperature at -20 °C to 80 °C)				
Reference (thermistor 103AT-2)					
Part name	Thermistor	(103AT-2, SEMITEC C	orporation)		
R25	10.0 kΩ, Nom	inal zero-power resistor	value at 25 °C		
Operating temperature range	-50.0 °C to 110.0 °C				
Temperature accuracy *3	± 0.5 °C (measurement temperature at 0 °C to 40.0 °C)				
Tolerance		±1%			
Constant-B	3435 K ± 1 %	(measurement temperation	ature at 25 °C)		

*1 The temperature measurement does not mean tracing absolute temperature. Resistor to temperature conversion value *2 Error of temperature detecting element is excluded.

*3 Ambient temperature at 18 °C to 28 °C

Protection Functions	PFX2511	PFX2532			
Overvoltage (overcharge) protection	Software OVP, Hardware OVP				
Undervoltage (overdischarge) protection	Sof	tware UVP, Hard	ware UVP		
Overcurrent protection	Software OCP *1,	Hardware OCP	Load shorting protection		
Capacity (overcharge/ overdischarge) protection		Software OAH	1*2		
Overtemperature (DUT) protection		Software OT	ſP		
Vibration alarm					

*1 For the software OCP, the application software automatically sets a value obtained by adding 5 A to the preset current.

*2 The application software calculates the value by multiplying the nominal capacity by the preset percentage and sets the capacity

General S	Specifications	PFX2511	PFX2512	PFX2532			
Nominal i	nput rating	100	Vac to 240 Vac, 50 Hz/6	i0 Hz			
Input volta	age range		90 Vac to 250 Vac 60 VAmax 60 VAmax 60 VAmax 0P02-PFX 3 boards 0P02-PFX 3 boards				
Power co	nsumption	60 VAmax OP01-PFX 3 boards installed: 80 VAmax		OP02-PFX 3 boards			
Operating te	mperature/ humidity range	0 °C to 40 °C,	ax 60 VAmax 60 VAmax boards OP02-PFX 3 boards OP02-PFX 3 boards VAmax Installed: 80 VAmax OP02-PFX 3 boards to 40 °C, 20 % rh to 85 % rh (No condensation) Installed: 80 VAmax OP02-PFX 3 boards to 40 °C, 20 % rh to 85 % rh (No condensation) Indoors, Overvoltage category II Up to 2000 m ± 70 Vmax ± 70 Vmax 500 Vdc, 30 MΩ or greater, 70 % rh or less 1500 Vac, No abnormalities over 1 minute Intwith the requirements in the following standard. Low voltage directive 2014/35/EU Intwith the requirements in the following standard. EMC Directive 2014/30/EU Intwith the requirements in the following standard. EMC Directive 2014/30/EU 11 (Class 1 * 2, Pollution degree 2) Int with the requirements in the following standard. EMC Directive 2014/30/EU 12 (Class A * 3), EN55011 (Class A * 3, Group 1 * 4), EN61000-3-2, EN61000-3-3 1 pc				
Storage ten	nperature/humidity range	-10 °C to 60 °C, 0 % rh to 90 % rh (No condensation)					
Operating	environment	Indo	ors, Overvoltage catego	ory II			
Altitude			Up to 2000 m				
Isolation voltage	Across the I/O terminals and chassis		± 70 Vmax				
Inculation	Primary and chassis						
Insulation resistance	Primary and across the I/O terminals	500 Vdc,	max 60 VAmax 60 VAmax 3 boards OP02-PFX 3 boards OP02-PFX 3 boards 0 VAmax Installed: 80 VAmax OP02-PFX 3 boards 0 C to 40 °C, 20 % rh to 55 % rh (No condensation) installed: 80 VAmax °C to 60 °C, 0 % rh to 90 % rh (No condensation) Indoors, Overvoltage category II Up to 2000 m ± 70 Vmax 500 Vdc, 30 MΩ or greater, 70 % rh or less 1500 Vac, No abnormalities over 1 minute EN6100-1 (Class 1*2, Pollution degree 2) Itiant with the requirements in the following standard. Low voltage directive 2014/35/EU EN6100-1 (Class 1*2, Pollution degree 2) Itiant with the requirements in the following standard. EMC Directive 2014/35/EU EN6100-3-2, EN61000-3-3 1 pc - 6 sets - - 1 pc - 1 pc 1 pc - 1 pc				
Withstand	Primary and chassis						
voltage	Primary and across 1500 VaC, No abnormalities over 1 minute Compliant with the requirements in the following standard. Low voltage directive 2014/35/EU						
Safety *1		Compliant with the requirements in the following standard. Low voltage directive 2014/35/EU EN61010-1 (Class I *2 , Pollution degree 2)					
Electromagnetic compatibility(EMC) *1		EN61326-1 (Class A *3), EN55011 (Class A *3, Group 1 *4),					
	Power cord						
	Cable with crimp terminal	4 pcs. (Red: 2 pcs, White: 2 pcs) 45 cm each (17.72 inch)		-			
	I/O terminal cover set	-	-				
	I/O terminal M8 screw set	-	-	6 sets			
	Load input terminal cover set	-	-	Cover, four auxiliary band			
	26-core flat cable		1 pc				
	20-core flat cable		1 pc				
	26-core cable (for PAT-T)	-	-	1 pc			
Accessories	Twisted pair cable with TP-BUS connector	1 pc (1 m)	-	-			
	Sensing connector		1 pc				
	Sensing connector cover set	-	-	One cover set, one cable tie for locking			
	Thermistor		1 pc				
	Lock lever		2 pcs				
	LAN cable	-	1 pc (2 m)	1 pc (2 m)			
	Operation manual		1 copy				
	BPChecker2000 Setup guide	1 copy	-	-			
	BPChecker2000 Basic Edition CD-ROM	1 pc	-	-			

*1 Limited to the product with CE marking on panel. Not applied to specially ordered or modified articles. *2 This product is the Class I equipment. Please be sure to connect the protection conductor terminal

of product to ground. If not correctly connected to ground, safeness is not guaranteed. *3 This product is the Class A equipment. It is aimed to use the product under the industrial environment. If

this product is used in housing area, it might be the cause of interference. If it is the case, special action to reduce electromagnetic radiation might be required for users in order to prevent receiving interference.

*4 This product is the Group 1 equipment. The product does not generate/use radio frequency energy in the form of electromagnetic radiation, induction and/or static coupling intentionally for material processing or inspection/analysis.

Voltage/thermometer unit OP01-PFX / OP02-PFX

Cell Voltage m	easurement	OP01	OP02	
Static				
Number of mea	asurement terminals		1	
Measurable range *1 -2.0000 V to 20.0000 V			20.0000 V	
Accuracy		±(0.05% of rdng	g + 0.02% of f.s)	
Measurement resolution *2		0.1	mV	
Measurement	value	Average voltage of the every 500 ms	Average voltage of the every 100 ms	
Measurement	interval	500 ms	100 ms	
Pulse				
Number of measurement terminals		4	-	
Measurable rai	nge *1	-2.0000 V to 20.0000 V	-	
Accuracy	±(0.05% of rdng + 0.02% of f.s)		-	
Measurement resolution *2		0.1 mV	-	
	High voltage	Maximum voltage in one cycle	-	
Measurement value *3	Low voltage	Minimum voltage in one cycle	fr drog + 0.02% of f.s) 0.1 mV 00 ms Average voltage of the every 100 ms 100 ms	
	able range *1 -2.0000 V to 20.0000 V - cy ±(0.05% of rdng + 0.02% of f.s) - ement resolution *2 0.1 mV - High voltage Maximum voltage in one cycle - Low voltage Minimum voltage in one cycle - user-specified - -	-		
Measurement i	nterval *4	1 ms	-	
Cell Temperatu	ire measurement *5			
Number of mea	asurement terminals	·	1	
Thermocouple	type	K type		
Measurable rai	nge *6	-100.0 °C to 400.0 °C		
Measurement i	resolution *7 *8	±1.5 °C (TYP values)		
Reference juncti	on compensation *7 *9	±0.5 °C(T)	YP values)	
Accuracy		0.1	°C	

You can apply a voltage from -20 V to 22 V.

*2 Ambient temperature at 18 °C to 28 °C
 *3 Automatically synchronized with the BPChecker2000 pulse setting (specify two points from high voltage, low voltage, and user-specified).

 *4 The application software records data every second.
 *5 The temperature scale conforms to JIS C 1602-1995 (ITS-90). (ITS-90 is an international temperature scale.)

*6 Depending on your thermocouple's specifications (thermocouple class, wire diameter and insulation), the usable temperature range will vary. *7 Ambient temperature at 18 °C to 28°C.

*8 When the voltage that the thermocouple calibrator produces is measured.
 *9 This shows the internal sensor performance. This indicates the temperature measurement accuracy

of the thermocouple connector. Thermometer accuracy = Measurement accuracy + reference junction compensation + thermocouple tolerance

Voltmeter unit OP03-PFX

Cell voltage measurement	
Number of measured terminals	8
Measurement range *1	-2.0000 V to 20.0000 V
Measurement accuracy *2	±(0.05 % of reading + 0.02 % of rating)
Resolution	0.1 mV
Measured value	Average voltage every 100 ms
Measurement interval	100 ms

*1 You can apply a voltage from -20 V to 22 V.
*2 Ambient temperature at 18°C to 28°C.

8Slot unit SL01-PFX

Number of slots		8				
Compatible boards *1	Voltmeter Ur	nit OP03-PFX				
Interface	LAN(Ethernet) PC connection	Sync connector EX01-PFX connection				
Input voltage range	90 Vac to 250 Vac, 50 Hz/60 Hz					
Power consumption	when 8 OP03-PFXs a	when 8 OP03-PFXs are installed: 80 VAmax 0°C to 40°C, 20 %rh to 85 %rh (no condensation)				
Operating temperature and humidity range	0°C to 40°C, 20 %rh to 8					
Dimensions (mm (inch))	214.5(8.44) W × 155(6.10) H × 410(16.14) Dmm					
weight	Approx. 5 kg (11.02 lb)					
	Power cord/100 V System (1 pc.)					
	Power cord/200 V System (1 pc.)					
	EX01-PFX (1 pc.) extension board (for installing in a PFX2512/2532 slot)					
Accessories	LAN cable (1 pc.)) 2m Straight type				
	14-core flat	cable (1 pc.)				
	Ferrite core for 14-c	core flat cable (1 pc.)				
	Lock leve	er (2 pcs.)				
	Handling of the	product (1 copy)				

*1 OP02-PFX cannot be installed

ELECTRICAL SAFETY TESTER

TOS SERIES SELECTION GUIDE

High-End Multi-type Hipot, Insulation Resistance, Ground Bond, Leakage or Partial discharge,

TOS9303LC @ P.80

AC/DC Hipot Tester with Insulation Resistance, Ground Bond, and Leakage Current Test







D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H ×500(19.69")(550(21.65"))Dmm W 22 kg(48.5 lbs)

TOS9303 🖙 P.79

AC/DC Hipot Tester with Insulation Resistance and Ground Bond Test

ACW 5 kV/100 mA(500 VA) 5 kV/20 mA,7.2 kV/13.9 mA(100 W) DCW 0.001 MΩ to 100.0 GΩ (DC-25 V to -1000 V/DC+50 V to +7200 V) 0.001 Ω to 0.600 Ω (3.0 A to 42.0 A) FC





D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H ×500(19.69")(540(21.26"))Dmm W 21 kg(46.3 lbs)

TOS9302 🖙 P.79

AC Hipot Tester with Ground Bond Test

ACW 5 kV/100 mA(500 VA) 0.001 Ω to 0.600Ω (3.0 A to 42.0 A) FC



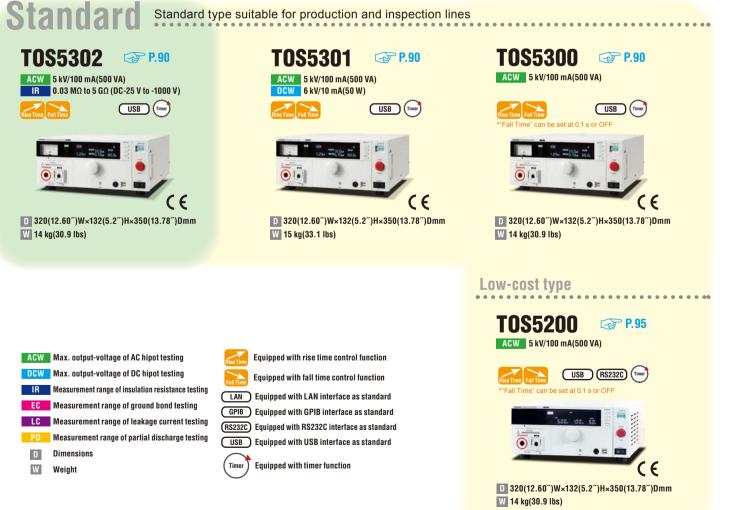


D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H ×500(19.69")(540(21.26"))Dmm W 20 kg(44.1 lbs)

Hipot Tester

Hipot Tester with Insulation Resistance Test

Standard type suitable for production and inspection lines



TOS9320

High-voltage Scanner

multi-channel testing systems

High voltage scanner for TOS9300 series

D 430(16.93")(440(17.32"))W×88(3.46")(105(4.13"))H

×370(14.57")(390(15.35"))Dmm

8 kg(17.6 lbs)

W

P.80

CE

TOS9300 🖙 P.78

5 kV/100 mA(500 VA)

IR 0.001 MΩ to 100.0 GΩ (DC-25 V to -1000 V)

D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H

×370(14.57")(410(16.14"))Dmm

W 17 kg(37.5 lbs)

LAN USB (RS232C)

AC Hipot Tester with

ACW

Insulation Resistance Test

this analyzer covers it all!



D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H

×525(20.67")(565(22.24"))Dmm

W 22 kg(48.5 lbs)

DC+50 V to +7200 V)



D 430(16.93")(440(17.32"))W×132(5.2")(155(6.10"))H ×370(14.57")(410(16.14"))Dmm W 18 kg(39.7 lbs)

TOS9301 🖙 P.78

5 kV/100 mA(500 VA)

LAN

5 kV/20 mA,7.2 kV/13.9 mA(100 W)

0.001 M Ω to 100.0 G Ω (DC-25 V to -1000 V/

USB RS232C

AC/DC Hipot Tester with

ACW

DCW

Insulation Resistance Test

Ground Bond Tester



The Electrical Appliance & Material Safety Low (Japan), UL (U.S.A.), CSA (Canada), VDE (Germany) and BS (U.K) are some major examples of safety standards in use throughout the world that require the performing of hipot testing. For this reason, it is necessary to confirm for what portion of what standard testing is to be performed when purchasing a hipot tester. Although the 500 VA capacity hipot testers available from KIKUSUI can basically be applied to tests specified in all safety standards, we recommend that you consult with us prior to purchase in order to select the model that best matches

For the withstanding test and the insulation resistance test of the EUT (Equipment Under Test) with turned on electricity.

Our Hipot Testers and Insulation Resistance Testers are designed to test the EUT (Equipment Under Test) with turned off electricity. In case the test requires the EUT (Equipment Under Test) with turned on electricity, please contact with our distributor or agent.

Hipot Tester with Insulation Resistance Test



Dimensions / Weight

TOS9300: 430(16.93")W × 132(5.2")H × 370(14.57")Dmm(inch) / 17 kg(37.5 lbs) TOS9301: 430(16.93")W × 132(5.2")H × 370(14.57")Dmm(inch) / 18 kg(39.7 lbs)

Accessories

Power cord, High-voltage test lead [TL31-TOS], High-voltage warning sticker, Cable tie, SIGNAL I/O plug(Assembly type D-sub plug unit), Setup guide, CD-ROM, Safety Information TOS9301 only: Heavy object warning label(Affix this to the product as necessary.)

Hipot Tester with Insulation Resistance and Partial Discharge Test



Dimensions / Weight

430(16.93")W × 132(5.2")H × 525(20.67")Dmm(inch) / 22 kg(48.5 lbs)

Accessories

Power cord, High-voltage test lead [TL31-TOS], High-voltage warning sticker, Cable tie, SIGNAL I/O plug(Assembly type D-sub plug unit), Setup guide, CD-ROM, Safety information, Heavy object warning label(Affix this to the product as necessary.)

High-performance hipot tester with insulation resistance capabilities

The TOS9300/9301 is a high performance electrical safety analyzer with hipot tester and insulation resistance capabilities for international safety standards. Wide-ranging hipot capabilities and insulation resistance capabilities make the TOS9300/9301 the perfect safety analyzer for R&D equipment, quality assurance testing, standard compliance tests and product line equipment. Combined with the high-voltage scanner TOS9320, the TOS9300 series can be automated into a safe, reliable test system with up to 16 channels.

Features

- AC5 kV/100 mA, DC7.2 kV/100 W hipot test
- Electrical breakdown inspection setting available
- LAN/USB/RS232C standard digital interface
- Easy to read LCD display for real time monitoring during tests, All measurement values and standard outlines displayed in each test

AC/DC hipot tester with insulation resistance and partial discharge test capabilities

The TOS9301PD is an electrical safety analyzer capable of AC and DC hipot, insulation resistance, and partial discharge testing. Wideranging hipot capabilities, insulation resistance and partial discharge testing features make the TOS9301PD the perfect safety analyzer for R&D equipment, quality assurance testing, standard compliance tests and product line equipment tests. Combined with the high-voltage scanner TOS9320, the TOS9301PD can be automated into a safe, reliable test system with up to 16 channels.

Features

- AC5 kV/100 mA, DC7.2 kV/100 W hipot test
- Insulation diagnosis available with partial discharge model
- Electrical breakdown inspection setting available
- LAN/USB/RS232C standard digital interface
- Easy to read LCD display for real-time monitoring during testing. All measurement values and standard outlines displayed in each test.

Hipot Tester with Ground Bond Test



AC hipot tester with ground bond test capabilities

The TOS9302 is an electrical safety analyzer capable of AC hipot tester and ground bond test capabilities. Accurate AC hipot and ground bond testing features make the TOS9302 the perfect safety analyzer for R&D equipment, quality assurance testing, standard compliance tests and product line equipment. Combined with the high-voltage scanner TOS9320, the TOS9302 can be automated into a safe, reliable test system with up to 16 channels.

Dimensions / Weight

430(16.93")W × 132(5.2")H × 500(19.69")Dmm(inch) / 20 kg(44.1 lbs)

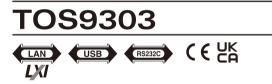
Accessories

Power cord, High-voltage test lead [TL31-TOS], High-voltage warning sticker, Cable tie, SIGNAL I/O plug(Assembly type D-sub plug unit), Setup guide, CD-ROM, Safety Information, Heavy object warning label(Affix this to the product as necessary.), Test leads for earth continuity test [TL13-TOS]

Features

- AC5 kV/100 mA hipot test
- New amplifier type allows for 40 A AC/DC ground bond testing
- LAN/USB/RS232C standard digital interface
- Easy to read LCD display for real time monitoring during tests, All measurement values and standard outlines displayed in each test

Hipot Tester with Insulation Resistance and Ground Bond Test





Dimensions / Weight

430(16.93")W × 132(5.2")H × 500(19.69")Dmm(inch) / 21 kg(46.3 lbs)

Accessories

Power cord, High-voltage test lead [TL31-TOS], High-voltage warning sticker, Cable tie, SIGNAL I/O plug(Assembly type D-sub plug unit), Setup guide, CD-ROM, Safety Information, Heavy object warning label(Affix this to the product as necessary.), Test leads for earth continuity test [TL13-TOS]

AC/DC hipot tester with insulation resistance and ground bond test capabilities

The TOS9303 is a highly versatile electrical safety analyzer capable of AC/DC hipot, insulation resistance, and ground bond testing. Combined with the high-voltage scanner TOS9320, the TOS9303 can be automated into a safe, reliable test system with up to 16 channels.

Features

- AC5 kV/100 mA, DC7.2 kV/100 W hipot test
- New amplifier type allows for 40 A AC/DC ground bond testing
- Electrical breakdown inspection setting available
- LAN/USB/RS232C standard digital interface
- Easy to read LCD display for real time monitoring during tests, All measurement values and standard outlines displayed in each test

ELECTRICAL SAFETY TESTER

Hipot Tester with Insulation Resistance, Ground Bond, and Leakage Current Test



Dimensions / Weight

430(16.93")W × 132(5.2")H × 500(19.69")Dmm(inch) / 22 kg(48.5 lbs)

Accessories

Power cord(2 pcs), High-voltage test lead [TL31-TOS], Highvoltage warning sticker, Cable tie, SIGNAL I/O plug(Assembly type D-sub plug unit), Setup guide, CD-ROM, Safety Information, Heavy object warning label(Affix this to the product as necessary.), Test leads for earth continuity test [TL13-TOS], Spare fuse(15 A, 250 V *Stored in the fuse holder), Test leads for leakage current test [TL22-TOS], Flat probe [FP01-TOS]

The all-in-one multi analyzer capable of AC/DC hipot tester, insulation resistance, ground bond, and leakage current testing

The TOS9303LC is the "all-rounder" electrical safety analyzer capable of conducting AC/DC hipot, insulation resistance, ground bond and leakage current testing in a single model. Combined with the high-voltage scanner TOS9320, the TOS9303LC can be automated into a safe, reliable test system with up to 16 channels.

Features

- AC5 kV/100 mA, DC7.2 kV/100 W hipot test
- New amplifier type allows for 40 A AC/DC ground bond testing
- Touch current/protective conductor current/leakage current testing
- Electrical breakdown inspection setting available
- LAN/USB/RS232C standard digital interface
- Easy to read LCD display for real time monitoring during tests, All measurement values and standard outlines displayed in each test

High-voltage scanner



			1
Densat, IS III III	N 07094 12	-	
in the second	and as well as a second comment		1.10
	-	-	

Dimensions / Weight

430(16.93")W × 132(5.2")H × 500(19.69")Dmm(inch) / 8 kg(17.6 lbs)

Accessories

Power cord, High-voltage test lead [TL31-TOS], Lead for high voltage parallelconnection [TL33-TOS], Interface cable, CONTROLLER INTERFACE plug (Assembly type)[D-sub plug unit], High-voltage warningsticker(2 pc.), Channel labels(For the panel, For the test leads), User's manual, Safety Information

High voltage scanner for TOS9300 series multi-channel testing systems

The TOS9320 high-voltage scanner allows for rapid distribution of testing voltage from the main unit to multiple testing points for withstanding voltange and insulation resistance testing. Channels can be controlled via an external device through the rear panel CONTROLLER INTERFACE connector. The scanner can also be used standalone or with an external control device for other Kikusui withstanding voltage and insulation resistance testing instruments. Hipot tests for electronic devices with multiple testing points have never been easier.

Features

- Output can be expanded to four channels with one highvoltage scanner. The electric potential of each channel can be arbitrarily set to high, low, or open, and can be tested at any of these four points.
- Up to four high voltage scanners (total 16 channels) can be connected to each unit.
- Output of each channel and contact with testing points can be easily monitored.
- High voltage scanner capable of output distribution both standalone and when connected with existing withstanding voltage/insulation resistance testing equipment models

Wishtanding Voltage Test

Output 1	function		TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC	
	Output r	ange	0.050 kV to	0.050 kV to 5.000 kV					
		Resolution	1 V						
		Setting accuracy	±(1.2 % of s	±(1.2 % of setting + 0.02 kV) (at no load)					
	Max. rat	ed load *1	500 VA(5 k	V / 100 mA)					
	Max. rat	ed current	100 mA (wł	nen the outp	out voltage is	0.2 kV or h	igher)		
	Transfor	Transformer rating 500 VA							
AC	Output voltage waveform Sine								
output section					nd no load				
	Crest factor		√2 ± 3 % (0.8 kV or more)						
	Frequen	су	50 Hz / 60 Hz						
		Accuracy	±0.1 %						
	Voltage	regulation	±3 % or les	s (when cha	inging from r	maximum ra	ted load to	no load)	
	Short-ci	rcuit current	200 mA or	more (outpu	t voltage 0.5	kV or highe	er)		
	Output n	nethod	PWM switc	hing					
Start vo	Itage		The voltage at the start of the test can be set.						
	Setting range		1 % to 99 %	6 of the test	voltage				
		Resolution	1 %						
Output	oltage m	onitor function			ceeds ±(10 %			the output	

DC Out	put functi	on	TOS9301	TOS9301PD	TOS9303	TOS9303LC		
	Output v	oltage range	0.050 kV to 7.200) kV				
		Resolution	1 V					
		Setting accuracy	E(1.2 % of setting + 0.02 kV)					
	Max. rat	ed load *1	100 W (5 kV/20 m	nA, 7.2 kV/13.9 mA	()			
	DC Max. rated c		20 mA					
output section	Ripple	7.2 kV no load	20 Vp-p (TYP)					
	Rippie	Max. rated load	50 Vp-p (TYP)					
	Voltage	regulation	1 % or less (when changing from maximum rated load to no load)					
	Short-ci	rcuit current	100 mA (TYP) (200 mA peak)					
	Dischar	ge function	Forced discharge after test completion (discharge resistance: 125 kΩ)					
Start vo	ltage		The voltage at the start of the test can be set.					
		Setting range	1 % to 99 % of th	e test voltage				
		Resolution	1 %					
Output	Output voltage monitor function		If the output voltage exceeds $\pm(10 \% \text{ of setting } + 0.05 \text{ kV})$, the output is turned off, and the protection function is activated.					

*1 When tests are performed consecutively, output time limit and rest time may become necessary depending on the upper limit setting

*2 If an AC voltage is applied to a capacitive load, the output voltage may rise higher than at no load depending on the load capacitance. Further, waveform distortions may occur if an EUT whose capacitance is dependent on voltage (for example, an EUT that consists of ceramic capacitors) is connected as the load. However, if the test voltage is 1.5 kV, the effect of a capacitance of 1000 pF or less can be ignored. Because the product's high-voltage power supply uses the PWM switching method, if the test voltage is 500 V or less, the switching and spike noise proportions are large. The lower the test voltage, the greater the waveform is distorted.

Measurem	ent function	TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC		
	Measurement range	0.00 kV to 7	7.50 kV AC/I	C					
	Resolution	0.1 V							
	Accuracy	±(1.2 % of r	eading + 0.0	005 kV)					
Voltmeter		Can be swi conversion		en true rms	and mean-	value respoi	nse rms		
	Response	Peak-value response in a separate system (the peak-value response is for measuring the dielectric breakdown voltage while rising)							
	Hold function	The voltage measurement after a test is finished is held while the pass/fail judgment is displayed.							
	Measurement range	AC: 0.00 mA to 110 mA, DC: 0.00 mA to 22 mA (Current including the active component and reactive component)							
	Accuracy	±(1 % of reading + 2 μA) (active component)							
	Response	Can be switched between true rms and mean-value response rms conversion.							
Ammeter	Hold function	The current measurement after a test is finished is held while the judgment is displayed.							
*3 *4	Offset cancel function	Cancels up to 10 mA of the current flowing through the insulation resistance and stray capacitance components across output ca and the like (resistance component only for DC tests). OFF fund available.							
	Calibration	Active component: Calibrated with the rms of a sine wave using a pu resistive load. Reactive component: Not calibrated.							

*3 During AC voltage tests, current also flows in the stray capacitance of items such as the test leads and tools.

For details on stray capacitance, see "Stray Capacitance of AC Withstanding Voltage Tests"
 When the temperature and humidity are high, erroneous current from the product's internal and external high-voltage wiring sections to ground increases. When the humidity exceeds 70 %, an erroneous current of about 50 µA may be generated.

Judg	ment function	on	TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC	
Curre	ent judgmer	nt operation	can be set i an auto tes	in the range	then a judgm of 0 (OFF) to r is valid only im.	o 10 for pas	s and fail se	parately. In	
		Judgment method	Upper limit		nen a curren For DCW, ju Delay).				
	UPPER	Display	"Upper-FAI	L" is display	ed.				
		Buzzer	On						
		SIGNAL I/O	The Upper- is received.		is generated	d continuous	sly until a S⊺	OP signal	
		Judgment method	limit is dete		hen a currer nent is not m ACW test.				
	LOWER	Display	"Lower-FAI	L" is display	ed.				
		Buzzer	On						
		SIGNAL I/O		The Lower-FAIL signal is generated continuously until a STOP signal is received.					
		Judgment method			e if Upper-F. ne elapses.	AIL or Lowe	r-FAIL has i	not oc-	
	Display		"PASS" is d	lisplayed.					
	PASS	Buzzer	On (fixed to	50 ms)					
		SIGNAL I/O	The PASS signal is generated for the length of time specified by the Pass Hold setting. If Pass Hold is set to Infinity, the PASS signal is generated continuously until a STOP signal is received.						
Volta opera	ge rise rate ation	judgment	Monitors the voltage rise rate during Voltage rise time. This is valid when Auto set-ting of the judgment delay (Delay Auto) is set to on and the output voltage is 0.2 kV or more. The output is shut off when a judgment is made. Buzzer volume level can be set in the range of 0 (OFF) to 10 for pass and fail separately.						
		Judgment method	When the v	oltage rise r	ate (dV/dt) is	s less than a	approx. 1 V/	3.	
	dV/dt	Display		L (dV/dt)" is	displayed.				
	FAIL	Buzzer	ON						
		SIGNAL I/O	The U FAIL received.	signal is ge	nerated con	tinuously ur	ntil a STOP	signal is	
Uppe	er limit settir	ng range	AC: 0.01 m	A to 110.00	mA, DC: 0.0	1 mA to 21.0	00 mA		
Lowe	er limit settir	ng range	AC: 0.00 mA to 109.99 mA, DC: 0.00 mA to 20.99 mA, OFF. Setting 0.00 is equivalent to OFF.						
Judgment accuracy *5 *6		acy * <mark>5 *6</mark>	±(1 % of se	tting + 5 µA					
Curre	ent detection	n method	Compares to the reference value using the following method. Calculate true rms values, convert mean-value responses to rms values						
Resp ing	onse speed	d (filter) switch-	- Switches the current detection response speed (sensitivity) used in UPPER FAIL judgment between five levels in ACW and DCW tests.						
5 Du	uring AC vol	Itage tests, cur	rent also flow	vs in the stra	ay capacitan	ce of items	such as the	test leads	

*5 During AC voltage tests, current also flows in the stray capacitance of items such as the test leads and tools. For details on stray capacitance, see "Stray Capacitance of AC Withstanding Voltage Tests"

*6 When the temperature and humidity are high, erroneous current from the product's internal and external high-voltage wiring sections to ground increases. When the humidity exceeds 70 %, an erroneous current of about 50 µA may be generated.

Timer function	TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC
Voltage rise time settings range	0.1 s to 200	.0 s				
Voltage fall time setting time *7	0.1 s to 200	.0 s, OFF				
	0.1 s to 1000.0 s, OFF					
Judgment delay (Judge Delay) setting range *8	0.1 s to 100.0 s, AUTO *9 (DCW only)					
Accuracy	±(100 ppm	of setting +	20 ms) (excl	uding the fa	II time)	

*7 This setting is used only when a PASS judgment occurs in ACW and DCW tests. During a DCW test, the voltage may not drop all the way within the set time because of the electrostatic capacity inside the product and the EUT.

*8 Less than the sum of the rise time and fall time.

*9 If Delay Auto is set to on, LOWER judgment is not made until the charge time ends.

Other specifica	tions	TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC	
Analog monitor *10		Outputs a voltage signal according to the current waveform or voltage waveform						
	I	Current wa	veform: Sca	le 50 mA/1	/			
	V	Voltage waveform: Scale 1 kV/1 V						
Grounding mod	e (GND)	Can be switched between Low and Guard.						
	Low	GND is connected to the low terminal. Measures the current flowing across the low terminal and chassis (normal applications).						
	Guard *11	GND is connected to Guard. Measures only the current flowing through the low terminal (current flowing through the chassis is not measured) (high sensitivity, high accuracy measurement applications).						

*10 Monitor signal output is isolated from the chassis (earth). If you connect an oscilloscope or an external device whose BNC shield is grounded, be sure to set the grounding mode (GND) to Guard. The value is not calibrated.
*11 If there is a possibility that the EUT or tools and the like will be grounded or if you are uncertain, do

11 If there is a possibility that the EUT or tools and the like will be grounded or if you are uncertain, do not set GND to Guard. Doing so is extremely dangerous because the ammeter will be shorted and will not be able to measure current. For normal applications, set GND to Low.

Insulation Resistance Test

Output fur	nction		TOS9300	TOS9301	TOS9301PD	TOS9303	TOS9303LC		
	Output		-0.025 kV to	-1 kV					
	voltage	Resolution	1 V						
	range	Setting accuracy	±(1.2 % of se	tting + 0.002	kV)				
Negative polarity	Max. rat	ed load	1 W (-1 kV/1	mA)					
polarity	Dinalo	1 kV no load	2 Vp-p or les	s					
	Ripple	Max. rated load	10 Vp-p or le	10 Vp-p or less					
	Short-circuit current		12 mA or less						
	Output			+0.05 kV to +7.2 kV					
		Resolution		1 V					
Positive	range	Setting accuracy]	±(1.2 % of setting + 0.02 kV)					
polarity	Max. rat	ed load	-	7.2 W(7.2 kV/1 mA)					
*1	Dinalo	1 kV no load		20 Vp-p or less					
	Ripple	Max. rated load		50 Vp-p or less					
	Short-ci	rcuit current]	100 mA (TYP) (200 mA peak)					
Max. rate	d current		1 mA						
Voltage re	gulation		1 % or less (when changing from maximum rated load to no load)						
Discharge	function		Forced discharge after test completion (discharge resistance: 20 kΩ)						
Output vo	Itage mon	nitor function	If the output voltage exceeds $\pm(10\% \text{ of setting } + 0.05 \text{ kV})$, the output is turned off, and the protection function is activated.						

*1 TOS9300 are not supported.

Measureme	nt function		TOS9300	TOS9301	TOS9301PD	TOS9303	TOS9303LC
	Measurem	ent range		arity: 0 Vdc to rity: 0 Vdc to 7			<u>.</u>
Voltmeter	Resolution		0.1 V		.5 KVUC		
volumeter	Resolution	1	-		reading + 0.0	01 kV/)	
	Accuracy				f reading + 0.0		
	Measurem	ient range	0.001 MΩ to (in the range		rated current of	of 1 mA to 5 i	nA)
			500.000 MΩ :	≤ R < 1.000 G	Ω: ±(15 %	of reading +	0.5 MΩ)
		5 nA ≤i≤	1.000 GΩ ≤ F	< 10.000 GΩ	1: ±(15 %	of reading +	5 MΩ)
		50 nA *4	10.000 GΩ ≤	R ≤ 100.000 (of reading +	
			200.000 MΩ :	≤ R < 1.000 G		of reading +	
		50 nA < i ≤	1.000 GΩ ≤ F	R < 10.000 GΩ	1: ±(10 %	of reading +	- 5 MΩ)
		100 nA *4		R < 50.000 G		of reading +	
	Accuracy *2 *3		50.000 GΩ ≤	R ≤ 100.000 (GΩ: ±(20 %	of reading +	200 MΩ)
	(when GND		100.000 MΩ :	≤ R < 1.000 G	Ω: ±(7 %)	of reading +	0.5 MΩ)
	is set to	100 nA <	1.000 GΩ ≤ F	R < 2.000 GΩ:	±(7 %)	of reading +	5 MΩ)
	Guard)	i ≤ 200 nA *5	2.000 GΩ ≤ F	R < 10.000 GΩ		of reading +	
	(i: measured current)	5	10.000 GΩ ≤	R < 50.000 G	Ω: ±(7 %)	of reading +	100 MΩ)
	(R: meas-	meas-	10.000 MΩ ≤	R < 100.000 I	MΩ: ±(5 %)	of reading +	0.05 MΩ)
	urement	200 nA <	100.000 MΩ :	≤ R < 1.000 G	Ω: ±(5 %)	of reading +	0.5 MΩ)
	resistance)	sistance) i ≤ 1 µA *5	1.000 GΩ ≤ F	R < 10.000 GΩ	±(5 %)	of reading +	5 MΩ)
			10.000 GΩ ≤	R < 25.000 G	Ω: ±(5 %)	of reading +	50 MΩ)
			0.001 MΩ ≤ F	R < 10.000 MC	2: ±(2 %)	of reading +	0.003 MΩ)
		1 µA < i≤ 1 mA *5	10.000 MΩ ≤	R < 100.000 I	MΩ: ±(2 %)	of reading +	0.03 MΩ)
			100.000 MΩ :	≤ R < 1.000 G	Ω: ±(2 %	of reading +	0.3 MΩ)
			1.000 GΩ ≤ F	R < 5.000 GΩ:	±(2 %	of reading +	3 MΩ)
Resistance			500.000 MΩ :	≤ R < 1.000 G	Ω: ±(25 %	of reading +	· 0.5 MΩ)
meter		5 nA ≤ i ≤ 50 nA *4	1.000 GΩ ≤ F	R < 10.000 GΩ	1: ±(25 %	of reading +	· 5 MΩ)
		50 IIA 4	10.000 GΩ ≤	R ≤ 100.000 (GΩ: ±(30 %	of reading +	· 200 MΩ)
			200.000 MΩ :	≤ R < 1.000 G	Ω: ±(20 %	of reading +	· 0.5 MΩ)
		50 nA < i ≤	1.000 GΩ ≤ F	R < 10.000 GΩ	: ±(20 %	of reading +	- 5 MΩ)
		100 nA *4	10.000 GΩ ≤	R < 50.000 G	Ω: ±(20 %	of reading +	· 50 MΩ)
	Accuracy *6		50.000 GΩ ≤	R ≤ 100.000 (GΩ: ±(30 %	of reading +	· 200 MΩ)
	(when GND is set to		100.000 MΩ :	≤ R < 1.000 G	Ω: ±(10 %	of reading +	· 0.5 MΩ)
	Low)	100 nA < i ≤ 200 nA	1.000 GΩ ≤ F	R < 2.000 GΩ:	±(10 %	of reading +	- 5 MΩ)
	(i: measured	1≤200 HA *5	2.000 GΩ ≤ F	R < 10.000 GΩ	1: ±(10 %	of reading +	· 10 MΩ)
	current)		10.000 GΩ ≤	R < 50.000 G	Ω: ±(10 %	of reading +	· 100 MΩ)
	(R: meas- urement		10.000 MΩ ≤	R < 100.000 I	MΩ: ±(5 %	of reading +	0.05 MΩ)
	resistance)	200 nA <	100.000 MΩ :	≤ R < 1.000 G	Ω: ±(5 %	of reading +	0.5 MΩ)
		i ≤ 1 µA *5	1.000 GΩ ≤ F	R < 10.000 GΩ	1: ±(5 %	of reading +	5 MΩ)
	-		10.000 GΩ ≤	R < 25.000 G	Ω: ±(5 %	of reading +	50 MΩ)
			0.001 MΩ ≤ F	R < 10.000 MC	2: ±(2 %)	of reading +	0.003 MΩ)
		1 µA < i ≤	10.000 MΩ ≤	R < 100.000 I	MΩ: ±(2 %	of reading +	0.03 MΩ)
		1 mA *5	100.000 MΩ :	≤ R < 1.000 G	Ω: ±(2 %	of reading +	0.3 MΩ)
			1.000 GΩ ≤ F	R < 5.000 GΩ:	±(2 %	of reading +	3 MΩ)
	Hold funct	ion		ce measurem	ent after a test ayed.	is finished i	s held while
	Offset can	cel function			the unnecess the like. OFF fu		

				across outpu	it caples and th	ie like. OFF lunci	ion available	
*2				condensation),	when there is	no interference	caused by w	vobbly test
	loade or o	ther proble	mo					

*3 If the grounding mode (GND) is set to low in a highly humid environment, leakage current to ground will be generated from the high-voltage wiring sections inside the product and the high-voltage wiring sections between the product and the EUT. This leakage current ranges from several nA to several tens of μ A depending on the usage and wiring conditions of the optional TOS9320 high voltage scanner and greatly affects measurement accuracy. The effects of leakage current can be reduced by

- *4 Add 10 % to the accuracy when measuring 100 V or less.
 *5 Add 5 % to the accuracy when measuring 100 V or less.

cotion) when the humidity is 50 % rh

Judgment fu	notion		TOS9300 TOS9301 TOS9 The output is shut off when a jud	ament is made. Buzzer volume
Behavior bas	sed on judg	gment	level can be set in the range of 0 separately. In an auto test, the bu that takes place at the end of the	(OFF) to 10 for pass and fail uzzer is valid only for the judgmen
				tance greater than or equal to the
		Judgment method	Upper limit is detected. Judgment time.	
	UPPER FAIL	Display Buzzer	"Upper-FAIL" is displayed. On	
		SIGNAL I/O	The Upper-FAIL signal is genera signal is received.	ted continuously until a STOP
		Judgment method	LOWER FAIL results when a res	istance less than or equal to the it is not made during the judgmer
	LOWER FAIL	Display Buzzer	"Lower-FAIL" is displayed.	
		SIGNAL I/O	The Lower-FAIL signal is genera signal is received.	ted continuously until a STOP
		Judgment method	PASS judgment is made if Upper- curred when the test time elapses	
	PASS	Display	"PASS" is displayed.	
	SIGNAL		On (fixed to 50 ms) The PASS signal is generated fo the Pass Hold setting. If Pass Ho	
		I/O	signal is generated continuously	until a STOP signal is received.
Voltage rise judgment op			Monitors the voltage rise rate du when Auto setting of the judgmeu and the output voltage is 0.2 kV when a judgment is made. Buzze range of 0 (OFF) to 10 for pass a	nt delay (Delay Auto) is set to on or more. The output is shut off er volume level can be set in the
		Judgment method	When the voltage rise rate (dV/d	
	dV/dt FAIL	Display Buzzer	"Lower-FAIL (dV/dt)" is displayed On	l
		SIGNAL	The L FAIL signals are generated	d continuously until a STOP signa
Upper limit s	etting rang	I/O le	is received. 0.001 M Ω to 100.000 G Ω (in the current), OFF	range up to the maximum rated
Lower limit s	etting rang	e	0.000 M Ω to 99.999 G Ω (in the recurrent), OFF. Setting 0.000 is eq	
		5 nA ≤ i ≤ 50 nA <mark>*10</mark>	500.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R ≤ 100.000 GΩ:	±(15 % of setting + 0.51 MΩ) ±(15 % of setting + 15 MΩ) ±(20 % of setting + 210 MΩ)
		50 nA < i ≤ 100 nA *10	200.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 50.000 GΩ: 50.000 GΩ ≤ R ≤ 100.000 GΩ:	±(10 % of setting + 0.51 MΩ) ±(10 % of setting + 15 MΩ) ±(10 % of setting + 60 MΩ) ±(20 % of setting + 210 MΩ)
Accuracy *7 (i: measured (R: measure resistance)	current)	100 nA < i ≤ 200 nA *11	100.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 2.000 GΩ: 2.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 50.000 GΩ:	±(7 % of setting + 0.51 MΩ) ±(7 % of setting + 15 MΩ) ±(7 % of setting + 20 MΩ) ±(7 % of setting + 110 MΩ)
resistancej		200 nA < i ≤ 1 µA *11	10.000 MΩ ≤ R < 100.000 MΩ: 100.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 25.000 GΩ:	\pm (5 % of setting + 0.06 MΩ) \pm (5 % of setting + 0.51 MΩ) \pm (5 % of setting + 15 MΩ) \pm (5 % of setting + 60 MΩ)
		1 µA < i≤ 1 mA <mark>*11</mark>	0.001 MΩ ≤ R < 10.000 MΩ: 10.000 MΩ ≤ R < 100.000 MΩ: 100.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 5.000 GΩ:	±(2 % of setting + 0.013 MΩ) ±(2 % of setting + 0.04 MΩ) ±(2 % of setting + 0.31 MΩ) ±(2 % of setting + 13 MΩ)
		5 nA ≤ i ≤ 50 nA <mark>*10</mark>	500.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R ≤ 100.000 GΩ:	±(25 % of setting + 0.51 MΩ) ±(25 % of setting + 15 MΩ) ±(30 % of setting + 210 MΩ)
Accuracy *12 (when GND is set to Low) (i: measured current) (R: measurement resistance) 410 100 nA < $i \le 200$ n/ *11 200 nA < $i \le 200$ n/ 110 100 nA < $i \le 200$ n/ 100 n		≤ 100 nA	200.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 50.000 GΩ: 50.000 GΩ ≤ R ≤ 100.000 GΩ:	±(20 % of setting + 0.51 MΩ) ±(20 % of setting + 15 MΩ) ±(20 % of setting + 60 MΩ) ±(30 % of setting + 210 MΩ)
		100 nA < i ≤ 200 nA *11	100.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 2.000 GΩ: 2.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 50.000 GΩ:	±(10 % of setting + 0.51 MΩ) ±(10 % of setting + 15 MΩ) ±(10 % of setting + 20 MΩ) ±(10 % of setting + 110 MΩ)
		200 nA < i ≤ 1 µA *11	10.000 MΩ ≤ R < 100.000 MΩ: 100.000 MΩ ≤ R < 1.000 GΩ: 1.000 GΩ ≤ R < 10.000 GΩ: 10.000 GΩ ≤ R < 25.000 GΩ:	\pm (5 % of setting + 0.06 MΩ) \pm (5 % of setting + 0.51 MΩ) \pm (5 % of setting + 15 MΩ) \pm (5 % of setting + 60 MΩ)
		1 µA < i≤ 1 mA <mark>*11</mark>	$\begin{array}{l} 0.001 \text{ M}\Omega \leq R < 10.000 \text{ M}\Omega; \\ 10.000 \text{ M}\Omega \leq R < 100.000 \text{ M}\Omega; \\ 100.000 \text{ M}\Omega \leq R < 1.000 \text{ G}\Omega; \\ 1.000 \text{ G}\Omega \leq R < 5.000 \text{ G}\Omega; \end{array}$	$\begin{array}{c} \pm (2 \% \text{ of setting + 0.013 M}\Omega) \\ \pm (2 \% \text{ of setting + 0.04 M}\Omega) \\ \pm (2 \% \text{ of setting + 0.31 M}\Omega) \\ \pm (2 \% \text{ of setting + 13 M}\Omega) \end{array}$

judgments when the low pass filter is set to on requires at least 10 seconds after the rise time ends. Humidity: 70 %rh or less (no condensation), when there is no interference caused by wobbly test *8

leads or other problems.

¹⁹ If the grounding mode (GND) is set to low in a highly humid environment, leakage current to ground will be generated from the high-voltage wiring sections inside the product and the high-voltage wiring sections between the product and the EUT. This leakage current ranges from several nA to several tens of μ A depending on the usage and wiring conditions of the optional TOS9320 high voltage scanner and greatly affects measurement accuracy. The effects of leakage current can be reduced by making measurements with the offset enabled.

*10 Add 10 % to the accuracy when measuring 100 V or less. *11 Add 5 % to the accuracy when measuring 100 V or less.

*12 When the measured current is limited to 100 nA or more (no condensation) when the humidity is 50 %rh

Timer function	TOS9300	TOS9301	TOS9301PD	TOS9303	TOS9303LC
Voltage rise time settings range	0.1 s to 200.0 s				
Test time setting range	0.1 s to 1000.0 s, OFF				
Judgment delay (Judge Delay) setting range *13	0.1 s to 100.0 s, AUTO *14				
Accuracy *15	±(100 ppm of	setting + 20	ms)		

*13 Less than the sum of the rise time and fall time. *14 If Delay Auto is set to on, UPPER judgment is not made until the charge time ends.

*15 This excludes fall time.

Other specifications		TOS9300	TOS9301	TOS9301PD	TOS9303	TOS9303LC	
Grounding mode (GN	ND)	Can be switched between Low and Guard.					
Lo	ow	GND is connected to the low terminal. Measures the current flowing across the low terminal and chassis (normal applications).					
Gu	uard *16	GND is connected to Guard. Measures only the current flowing through the low terminal (current flowing through the chassis is no measured) (high sensitivity, high accuracy measurement applica- tions).					
Filter function	A low-pass filter can be inserted into the ammeter measurement circuit. *17						

*16 If there is a possibility that the EUT or tools and the like will be grounded or if you are uncertain, do not set GND to Guard. Doing so is extremely dangerous because the ammeter will be shorted and will not be able to measure current. For normal applications, set GND to Low.
*17 When the low pass filter is on, a judgment delay of at least 5 seconds and a test time are required.

Earth Continuity Test

Outp	ut function		TOS9302	TOS9303	TOS9303LC				
_			3.0 A to 42.0 A AC/DC						
Curr	ent setting	Resolution	0.1 A	0.1 A					
rang	6 1	Accuracy	±(1 % of setting + 0.4 A)						
	Maximum rate	ed output *2	220 VA (at the output te	rminal)					
	Distortion		2 % or less (20 A or mo	2 % or less (20 A or more, using a 0.1 Ω pure resistive load)					
AC	Frequency		Select 50 Hz or 60 Hz.	Sine					
AC	Frequency	Accuracy	±200 ppm						
	Open termina	l voltage	6 Vrms or less						
	Output metho	d	PWM switching						
	Maximum rate	ed output	220 W (at the output terminal)						
DC	Ripple		±0.4 Ap-p or less (TYP)						
	Open terminal voltage		6.0 V or less						

*1 No greater than the maximum rated output and resistance no greater than the output terminal volt-age 5.4 V.

2 When tests are performed consecutively, output time limit and rest time may become necessary depending on the upper limit setting

Measureme	ent function	TOS9302	TOS9303	TOS9303LC		
	Measurement range	0.0 A to 45.0 A AC/DC				
	Resolution	0.1 A				
Output	Accuracy	±(1 % of reading + 0.2 A)				
ammeter	Response	AC: true rms value: DC	: mean value			
	Hold function	The current measurem pass or fail judgment is	ent after a test is finishe displayed.	d is held while the		
	Measurement range	AC: 0.00 V to 6.00 V, D	C: 0.00 V to 8.50 V			
	Resolution 0.001 V					
Output	Offset cancel function	Cancels up to 5 V (AC/ measurements. OFF fu	DC) of the unnecessary nction available.	voltage from		
voltmeter	Accuracy	±(1 % of setting + 0.02	V)			
	Response	AC: true rms value: DC	: mean value			
	Hold function	The voltage measurement after a test is finished is held while the pass or fail judgment is displayed.				
	Measurement range *3	1 mΩ to 600 mΩ				
	Resolution	1 mΩ				
Resistance meter	Offset cancel function	Cancels up to 10 Ω of the unnecessary resistance from measurements. OFF function available.				
	Accuracy	±(2 % of reading + 3 m	ב)			
	Hold function	The resistance measur pass judg-ment is displ	ement after a test is finis ayed.	shed is held while th		

*3 Calculated from the measured output voltage and measured output current.

Judgment fu	unction		TOS9302	TOS9303	TOS9303LC			
			The output is shut off w can be set in the range	sistance or sensing volt. when a judgment is mad. of 0 (OFF) to 10 for pase izer is valid only for the j program.	e. Buzzer volume level as and fail separately.			
		Judgment method		hen a resistance greate or when a sensing volta g a contact check.				
	UPPER	Display	"Upper-FAIL" is displayed.					
	FAIL	Buzzer	On					
Behavior		SIGNAL I/O	The Upper-FAIL signal is received.	is generated continuou	sly until a STOP signal			
based on judgment		Judgment method		hen a resistance less the tected or when a sensi				
J== <u>J</u>	LOWER	Display	"Lower-FAIL" is display	"Lower-FAIL" is displayed.				
	FAIL	Buzzer	On					
		SIGNAL I/O	The Lower-FAIL signal is received.	The Lower-FAIL signal is generated continuously until a STOP signal is received.				
		Judgment method	PASS judgment is made if Upper-FAIL or Lower-FAIL has not oc- curred when the test time elapses.					
		Display	"PASS" is displayed.					
	PASS	Buzzer	On (fixed to 50 ms)					
		SIGNAL I/O	Pass Hold setting. If Pa	nerated for the length of ass Hold is set to Infinity y until a STOP signal is	, the PASS signal is			
	Upper limit	setting range	0.0001 Ω to 10.0000 Ω					
Resistance judgment	Lower limit setting range		0.0000 Ω to 9.9999 Ω					
Judgment	Judgment accuracy		±(2 % of UPPER + 3 mΩ)					
	Upper limit	setting range	0.001 V to 5.000 V AC/DC					
Voltage	Lower limit	setting range	0.000 V to 4.999 V AC/DC					
judgment	Judgment a	accuracy	±(2 % of UPPER + 0.05 V)					
Calibration			Calibrated using a pure resistive load (with the rms of a sine wave for AC)					
Contact check function			ws through the test lead					
Timer functi	ion		TOS9302	TOS9303	TOS9303LC			
Current rise	time setti	ngs range	0.1 s to 200.0 s					
Current fall	time setti	ing time *4	0.1 s to 200.0 s, OFF					
Test time			0.1 s to 1000.0 s, OFF					
Accuracy			±(100 ppm of setting +	20 ms) (excluding the fa	III time)			
			·					

*4. This sotting is used only when a PASS judgment ecours. During a DC test, the volta

mov not dr

Partial Discharge Test

Output fu	nctio	n	TOS9301PD
	Out	out range	0.050 kV to 5.000 kV
		Resolution	1 V
		Setting accuracy	±(1.2 % of setting + 0.02 kV) (at no load)
	Max	. rated load	250 VA (5 kV/50 mA)
	Max	. rated current	50 mA (when the output voltage is 0.2 kV or higher)
AC output	Output voltage waveform *1		Sine
section		Distortion	2 % or less. (when the output voltage is 0.5 kV or higher and no load or a pure resistive load is connected)
	Cres	st factor	√2 ± 3 % (800 V or higher)
	Fred	luency	50 Hz / 60 Hz
		Accuracy	±0.1 %
	Volt	age regulation	±3 % or less (when changing from maximum rated load to no load)
	Out	out method	PWM switching
Output vo function	Output voltage monitor function		If the output voltage exceeds $\pm(10\% \text{ of setting } + 0.05 \text{ kV})$, the output is turned off, and the protection function is activated.

*1 If an AC voltage is applied to a capacitive load, the output voltage may rise higher than at no load depending on the load capacitance. Further, waveform distortions may occur if an EUT whose capacitance is dependent on voltage (for example, an EUT that consists of ceramic capacitors) is connected as the load. However, if the test voltage is 1.5 kV, the effect of a capacitance of 1000 pF or less can be ignored. Because the product's high-voltage power supply uses the PWM switching method, if the test voltage is 500 V or less, the switching and spike noise proportions are large. The lower the test voltage to may apply a spike noise proportions are large. lower the test voltage, the greater the waveform is distorted.

Measurer	nent functi	on	TOS9301PD	
	Measurem	ent range	0.00 kV to 7.50 kV AC/DC	
	Resolutio	n	0.1 V	
Voltme-	Accuracy		±(1.2 % of reading + 0.05 kV)	
ter	Response	;	Can be switched between true rms and peak-value response.	
	Hold func	tion	The voltage measurement after a test is finished is held while the pass/fail judgment is displayed.	
	Electric cha	arge ent method	IEC60664-1 Edition 3.0 compliant	
	Measurem	ent range	0 pC to 10000 pC	
	Meas-	100 pC range	0.1 pC	
	urement resolu-	1000 pC range	0.1 pC	
	tion	10000 pC range	1 pC	
		100 pC range	±(5% of full scale + 7 pC)	
	Accuracy *2	1000 pC range	±(5% of full scale)	
		10000 pC range	±(5% of full scale)	
	Measurement interval		Determination based on the measured values in each cycle of an applied voltage.	
El e etci e	Hold function		Determination based on the measured values in each cycle of an applied voltage.	
Electric charge meas-	Maximum electrostatic capacity of the EUT		10 nF	
urement	Peak hold function		Holds the maximum value during a measurement.	
	Filter function		A low-pass filter can be inserted into the electric charge meas- urement circuit.	
	Discharge inception voltage, discharge inception voltage measurement		Measures the voltage at which discharge exceeding a preset electric charge starts and the voltage at which discharge ceases (complies with IEC60664-1 third edition).	
	Calibratio (Precalibr		Calibrate using the built-in calibration capacitor (1000 pF).	
	Pulse		Counts the number of pulses that have passed through the high-pass filter and makes a FAIL judgment if the count exceeds the upper limit.	
	counting function	Upper limit setting range	1 to 100000	
	BPF chara switching	acteristics function	Can switch the characteristics of the band-pass filter in the electric charge measuring circuit	
		Center frequency	100 kHz / 160 kHz / 300 kHz	
	Coupling capacitor		0.01 µF	

Judgment function		TOS9301PD
Electric discha	rge judgment	The output is shut off when a judgment is made.
	Judgment method	A current higher than or equal to the upper limit is measured.
Upper FAIL	Display	"Upper-FAIL (Current)" is displayed.
(Current)	Buzzer	On
	SIGNAL I/O	The U FAIL signal is generated continuously until a STOP signal is received.
	Judgment method	An electric charge greater than or equal to the upper limit is measured.
Upper	Display	"Upper-FAIL (Coulomb)" is displayed.
FAIL (Coulomb)	Buzzer	On
	SIGNAL I/O	The U FAIL signal is generated continuously until a STOP signal is received.
	Judgment method	A discharge pulse count greater than or equal to the upper limit is measured.
Upper	Display	"Upper-FAIL (Pulse)" is displayed.
(Pulse)	Buzzer	On
	SIGNAL I/O	The U FAIL signal is generated continuously until a STOP signal is received.
	Judgment method	Upper-FAIL does not happen after the test time has elapsed.
	Display	"PASS" is displayed.
PASS	Buzzer	On
	SIGNAL I/O	The PASS signal is generated for the length of time specified by the Pass Hold setting. If Pass Hold is set to Infinity, the PASS signal is generated continuously until a STOP signal is received.
Upper current I	imit	50 mA (with no calibration)
Upper limit of	Setting range	1 pC to 10000 pC
electric charge (Upper Coulomb)	Accuracy	As per the accuracy of electric charge measurement
Pulse count jud (Upper Pulse C setting range		1 to 100000 (with no calibration)

Timer function	TOS9301PD
Voltage rise time (Rise Time) setting range	0.1 s to 200.0 s
Voltage fall time (Fall Time) setting range *3	0.1 s to 200.0 s, OFF
Fest time setting range	0.1 s to 1000.0 s, OFF
Accuracy	±(100 ppm of setting + 20 ms) (excluding Fall Time)

'3 This setting is used only when PASS judgment occurs.

Other specifications		TOS9301PD
Analog monitor *4		Outputs a voltage signal according to the current waveform, voltage waveform, or electric discharge waveforms.
	V	Voltage waveform: Scale 1 kV/1 V
	Qpd	Electric discharge: Full scale of the scale measurement range/10 V
	Ipd *5	Partial discharge current waveform

^{*4} Monitor signal output is isolated from the chassis (earth).
 ^{*5} The lpd waveforms are the ones that can be obtained after the actual discharge waveforms have passed the TOS9301PD measurement filter. Therefore, the scale varies according to the frequency response of the discharge waveform.

*2 When Band Pass Filter is set to 160 kHz.

Leakage Current Test

Measurer	nent fu	nction		TOS9303LC
	тс			Touch current measurement
		Measurement mode		Uses a measurement circuit network representing the impedance of a human body and measures the voltage drop across a reference resistance to calculate the touch current.
			Enc - Pe	A terminal: measurement terminal (for connecting to the enclosure of the EUT) B terminal: open
		Probe settings	Enc - Enc	A and B terminals: measurement terminal (for connect- ing to the enclosure of the EUT)
			Enc - Liv Enc - Neu	A terminal: measurement terminal (for connecting to the enclosure of the EUT) B terminal: open
				Protective conductor current measurement
Meas- urement Item	PCC	Measurement method		Measures the voltage drop across a reference resistance inserted in the middle of the protective ground line to calculate the protective conductor current. The measurement impedance is 150 Ω .
				Patient leakage current measurement
	Pa- tient	Measurement method		Uses a network conforming to IEC 60601 and meas- ures the voltage drop across a reference resistance to calculate the patient leakage current.
				Measures the current flowing or voltage applied across the A and B terminals (simultaneous measurement not possible).
	Meter	Meas- urement method	Current meas- urement	Uses a measurement circuit network representing the impedance of a human body and measures the voltage drop across a reference resistance to calculate the cur- rent flowing across the A and B terminals.
			Voltage meas- urement	Measures the voltage applied across the A and B termi- nals.
Current m	Current measurement			Eliminates AC components and measures only the DC component.
mode			RMS	Measures the true rms value (switch AC and AC+DC)
	P			Measures waveform peak values

*1 Current measurements may not be stable due to the effects of the power supply line waveform or the wiring environment between the product and the EUT.

Measur	ement cire	cuit network	TOS9303LC
	A (IEC 6	0990 compliant) *2	(1.5 kΩ // 0.22 $\mu F)$ + 500 Ω, reference measurement element: 500 Ω
	B (IEC 6	0990 compliant)	$(1.5~k\Omega$ // $0.22~\mu F)$ + 500 Ω // (10 $k\Omega$ + 22 nF), reference measurement element: 500 $\Omega,$ voltage measurement U1 and U3 switchable
	C (IEC 6	0990 compliant)	$(1.5~k\Omega~{/}/~0.22~\mu F)$ + 500 $\Omega~{/}/~(10~k\Omega$ + (20 $k\Omega$ + 6.2 nF) ${/}/~9.1$ nF), reference measurement element: 500 $\Omega,$ voltage measurement U1 and U3 switchable
		rical Appliances and s Safety Act, etc.)	1 k Ω , reference measurement element: 1 k Ω
Net- work		rical Appliances erials Safety Act)	1 k Ω // (10 k Ω + 11.225 nF + 579 Ω), reference measurement element:1 k Ω
	F (UL ar	nd the like)	1.5 k Ω // 0.15 μF , reference measurement element: 1.5 k Ω
	G		2 k Ω , reference measurement element: 2 k Ω
	H (IEC 6 1wet)	61010-1, 60601-	375 Ω // 0.22 μF + 500 $\Omega,$ reference measurement element: 500 Ω
	I (Patier	it)	1 k Ω // 10 k Ω + 0.015 $\mu F,$ reference measurement element: 1 k Ω
	J (throug	gh)	For voltmeter calibration
	PCC-1		150 $\Omega,$ reference measurement element: 150 Ω
	PCC-2 (IEC 60598-1)	150 Ω // 1.5 μF , reference measurement element: 150 Ω
Network	Network constant tolerance		Resistance: ±0.1 %, capacitor 0.15 μF : ±2 %, others: ±1 %
		A, B, C, H	Input voltage vs. output voltage ratio: logical value \pm 5 % (according to IEC 60990 Annex L and F)
Network	k accu-	E	Input voltage vs. output voltage ratio: logical value $\pm5~\%$
racy		D, G	Reference measurement element (resistance) ± 1 %
		I	Input voltage vs. output voltage ratio: logical value \pm 5 %

*2 Current measurements may not be stable due to the effects of the power supply line waveform or the wiring environment between the product and the EUT.

Measur	em <u>ent</u> s	sec <u>tio</u> r	<u>ו</u>	TOS9303LC
	Range			DC, RMS: 1.00 μA(min.) to 200.00 μA(max),
	Range			Peak: 1.00 μA(min.) to 282.00 μA(max) DC, RMS: 12.50 μA(min.) to 2000.0 μA(max), Peak: 17.50 μA(min.) to 2830.0 μA(max)
	Range 3			DC, RMS: 125.0 μA(min.) to 20.000 mA(max), Peak: 175.0 μA(min.) to 28.300 mA(max)
	Range 4			DC, RMS: 1.250 mA(min.) to 100.00 mA(max),
	- 3*			Peak: 1.750 mA(min.) to 100.00 mA(max) Auto or Fix selectable. If a measurement falls outside
Meas- ure- ment	Range	switch	ning	the measurement range of each range, the measured value blinks as a warning.
range		Auto		The range is set automatically according to the measurements.
		Fix		For TC and PCC measurements, the measurement range is selected automatically according to the UPPER value. For meter measurements, the range is fixed to the speci- fied range.
	Bandw	ridth sv	witching	Can be expanded to a bandwidth that allows measure- ments from 0.1 Hz, which is required in the measure- ment of medical instruments and the like.
		Norm	al	Normal measurement bandwidth: 15 Hz to 1 MHz
		Expa	nd	Expands the measurement range to 0.1 Hz to 1 MHz
		DC		\pm (5.0 % of reading + 2 μ A)
		DMO	0.1 Hz ≤ f < 15 Hz	±(10.0 % of reading + 2 μA)
	_	RMS		\pm (7.0 % of reading + 2 µA)
	Range 1		$0.1 \text{ Hz} \le f \le 15 \text{ Hz}$	±(10.0 % of reading + 2 μA) ±(10.0 % of reading + 10 μA)
	'			
		Peak	$15 \text{ Hz} \le f \le 1 \text{ kHz}$	±(10.0 % of reading + 10 μA)
				±(10.0 % of reading + 10 μA) ±(20.0 % of reading + 10 μA)
		DC		
		DC 0.1 Hz ≤ f < 15 Hz		±(5.0 % of reading + 20 μA) ±(10.0 % of reading + 10 μA)
		RMS		$\pm(7.0\% \text{ of reading} + 8\mu\text{A})$
	Danaa			±(10.0 % of reading + 10 μA)
	Range 2		$0.1 \text{ Hz} \le f < 15 \text{ Hz}$	±(10.0 % of reading + 10 μA)
Total accu-	-		15 Hz ≤ f ≤ 1 kHz	$\pm(10.0\% \text{ of reading} \pm 10\ \mu\text{A})$
racy *4		Peak		$\pm(10.0\% \text{ of reading} \pm 10\ \mu\text{A})$
(when				±(20.0 % of reading + 10 μA)
network		DC		±(5.0 % of reading + 50 μA)
A, B, or C is			0.1 Hz ≤ f < 15 Hz	±(10.0 % of reading + 20 μA)
used)		RMS		±(7.0 % of reading + 20 µA)
*5	Range		100 kHz < f ≤ 1 MHz	±(10.0 % of reading + 20 μA)
	3		0.1 Hz ≤ f < 15 Hz	±(10.0 % of reading + 50 μA)
		Deale	15 Hz ≤ f ≤ 1 kHz	±(7.0 % of reading + 50 μA)
		Peak	1 kHz < f ≤ 100 kHz	±(10.0 % of reading + 50 μA)
			100 kHz < f ≤ 1 MHz	±(20.0 % of reading + 50 μA)
		DC		±(5.0 % of reading + 0.5 mA)
			0.1 Hz ≤ f < 15 Hz	±(10.0 % of reading + 0.2 mA)
		RMS	15 Hz ≤ f ≤ 100 kHz	±(7.0 % of reading + 0.2 mA)
	Range			±(10.0 % of reading + 0.2 mA)
	4		0.1 Hz ≤ f < 15 Hz	±(10.0 % of reading + 0.5 mA)
		Peak		±(7.0 % of reading + 0.5 mA)
		Car		±(10.0 % of reading + 0.5 mA)
lans 1	-1-4		100 kHz < f ≤ 1 MHz	±(20.0 % of reading + 0.5 mA)
input re	Input resistance			1 MΩ ± 1 %
Input capacitance				200 pF or less (internal voltmeter input capacitance: 100 pF or less)
Common mode rejection ratio			tion ratio	10 kHz or less: 60 dB or more, 10 kHz to 1 MHz: 40 dB or more
Offset c	ancel f	unctio	n	Cancels up to 10 mA of the unnecessary current from measurements. OFF function available.
3 Voltmeter hand expansion is possib				No when notwork Lin colocted

*3 Voltmeter band expansion is possible when network I is selected. *4 0.1 Hz \leq f < 15 Hz is for when voltmeter band expansion (VoltMeter BandWidth) is set to

5 A value converted to current for measurements using Network A, B, C or H with voltmeter accuracy of this product as the reference.

If a network other than A, B, C or H is used, calculate as follows: For Network D, E, or I, the \blacksquare part of $\pm(\square\% \text{ of reading } + \blacksquare A)$ is half the value.

For F, the part is one-third the value.

For G, the ■ part is one-fourth the value. For PCC-1 or PCC-2, the ■ part is 3.3 times the value.

Timer function		TOS9303LC
(L L D L)	Setting range	1 s to 1000 s, OFF
	Accuracy	±(100 ppm of setting + 20 ms)
Test time	Setting range	1 s to 1000 s, OFF
	Accuracy	±(100 ppm of setting + 20 ms)

Judgment	function		TOS9303LC
			Judgment starts after the judgment delay (Judge Delay). Buzzer volume level can be set in the range of 0 (OFF) to 10 for pass and fail separately. In a auto test, the buzzer is valid only for the judgment that takes place at the end of the program.
		Judgment method	UPPER FAIL results when a current greater than or equal to the upper limit (Upper) is detected.
	UPPER	Display	"Upper-FAIL" is displayed.
	FAIL	Buzzer	On
		SIGNAL I/O	The Upper-FAIL signal is generated continuously until a STOP signal is received.
Behavior based on		Judgment method	LOWER FAIL results when a current less than or equal to the lower limit (Lower) is detected.
judgment	LOWER	Display	"Lower-FAIL" is displayed.
	FAIL	Buzzer	On
		SIGNAL I/O	The Lower-FAIL signal is generated continuously until a STOP signal is received.
		Judgment method	PASS judgment is made if Upper-FAIL or Lower-FAIL has not occurred when the test time elapses.
		Display	"PASS" is displayed.
	PASS	Buzzer	On (fixed to 50 ms)
		SIGNAL I/O	The PASS signal is generated for the length of time specified by the Pass Hold setting. If Pass Hold is set to Infinity, the PASS signal is generated continuously until a STOP signal is received.
	RANGE '	1	DC, RMS: 0.1 µA(min.) to 200 µA(max), Peak: 0.1 µA(min.) to 282 µA(max)
Upper	RANGE 2	2	DC, RMS: 15.1 µA(min.) to 2.00 mA(max), Peak: 21.3 µA(min.) to 2.83 mA(max)
Setting range	RANGE	3	DC, RMS: 151 µA(min.) to 20.00 mA(max), Peak: 213 µA(min.) to 28.3 mA(max)
	RANGE 4	4	DC, RMS: 1.51 mA(min.) to 100 mA(max), Peak: 2.13 mA(min.) to 100 mA(max)
Judgment accuracy			Conforms to total accuracy(Read "reading" as "upper setting" of total accuracy.)

Setting range and the measured current. (This is invalid in meter mode.) Setting range 80.0 V to 300.0 V, OFF Resolution 0.1 V Power supply line polarity selection Set the polarity of the power supply line to supply to the EUT to positive or negative. Ground check In the touch current test between the enclosure and power supply line, if the EUT enclosure is grounded, CONTACT FALL occurs. Measurement check Checks the measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply voltage measurementAcc LINE (EUT) Measure- ment range 0.0 V to 250.0 V Resolution 0.1 A to 15.00 A Resolution 0.01 V Accuracy ±(5 % of reading + 1 V) Supply current measurement (active power) Measure- ment range 10 W to 1500 W Measure- ment range 10 W to 1500 W ±(5 % of reading + 30 mA) Voltage measurement across DC 10.00 V to 300.0 V Resolution 0.1 V ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Settir grape 10.00 V to 300.0 V ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Resolution 0.1 V ±(3 % of reading + 2 V)	Other spec	cifications		TOS9303LC			
Resolution 0.1 V Power supply line polarity selection Set the polarity of the power supply line to supply to the EUT to positive or negative. Single fault mode (Condition) selection Set the EUT single fault mode to normal, neutral line disconnection (Fault Neu), or protective ground wire disconnection (Fault PE). In the touch current test between the enclosure and power supply line, if the EUT enclosure is grounded, CONTACT FAL occurs. Measurement check Measure- ment range Measure- ment range Checks the measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply current measurementAC LINE (EUT) Measure- ment range 0.01 V Supply current measurement (active power) Measure- ment range 0.1 A to 15.00 A Resolution 0.001 A 10.00 V to 300.0 V Power measurement actorss the A and B terminal B terminal B terminal B terminals Measure- ment range 10.00 V to 300.0 V Resolution 0.01 V to 99.0, OFF Set a voltage or detecting SELV. When the value is exceeded, the DANGER LED lights. Rated voltage Betwen the A and B terminals and a disterminals or display. 250 V Rated current 100 mA 250 V Rated current 100 V to 240 V, 50 Hz/60 Hz Nominal voltage range (alowable vo	Voltage co	Voltage conversion		voltage (Conv Voltage), based on the voltage supplied to the EUT			
Power supply line polarity selection Set the polarity of the power supply line to supply to the EUT to positive or negative. Single fault mode (Condition) Set the EUT single fault mode to normal, neutral line disconnection (Fault Neu), or protective ground wire disconnection (Fault PE). In the touch current test between the enclosure and power supply line, if the EUT enclosure is grounded, CONTACT FALL occurs. Measurement check Checks the measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply voltage measurement LINE (EUT) Measure- ment range 80.0 V to 250.0 V Resolution 0.01 V Accuracy ±(5 % of reading + 1 V) Supply current measurement (active power) Measure- ment range 10.4 to 15.00 A Measure- ment range 10 W to 1500 W Voltage measurement actorss Measure- ment range 10 W to 1500 W Voltage measurement actors DC 10.00 V to 300.0 V Measure- ment range DC 10.00 V to 300.0 V Peak 15.00 V to 430.0 V Peak 15.00 V to 430.0 V Settin grange 10.00 V to 930.0 V Settin grange 10.0 V to 930.0 V Resolution 0.1 V	Setting range			80.0 V to 300.0 V, OFF			
selection Set the EUT single fault mode (Condition) Set the EUT single fault mode (Condition) Ground check Set the EUT single fault mode to normal, neutral line disconnection (Fault Neu), or protective ground wire disconnection (Fault PE). In the touch current test between the enclosure and power supply line, if the EUT enclosure is grounded, CONTACT FAIL occurs. Measurement check Measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply voltage measurementAC LINE (EUT) Measure- ment range measurement (active power) Accuracy ±(3 % of reading + 1 V) Measure- ment range Measure- ment range Measure- Measure- Measure- Measure- Measure- Measure- Measure- Measure- Measure- Measure- Measure		Resolutio	n	0.1 V			
(Fault Neu), or protective ground wire disconnection (Fault PE). Ground check In the touch current test between the enclosure and power supply line, if the EUT enclosure is grounded, CONTACT FAIL occurs. Measurement check Checks the measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply voltage measurementAC LINE (EUT) Measure- ment range 80.0 V to 250.0 V Supply current measurementAC LINE (EUT) Measure- ment range 0.1 V Resolution 0.001 A Accuracy ±(5 % of reading + 1 V) Measure- measurement (active power) 0.0 V to 1500 W Measure- ment range 10 W to 1500 W Measure- ment range 10 W to 1500 W Measure- ment range 10.00 V to 300.0 V Resolution 0.1 V Measure- ment range 10.00 V to 300.0 V Resolution 0.1 V SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Setting range 10.0 V to 99.9 V, OFF Rated voltage Between the terminals and 250 V Measure- ment range Esting range 250 V <td< td=""><td>Power sup selection</td><td>ply line po</td><td>larity</td><td></td></td<>	Power sup selection	ply line po	larity				
Ground check line, if the EUT enclosure is grounded, CONTACT FAIL occurs. Measurement check Checks the measurement function by shorting across the A and B terminals. If an error is found, the protection function is activated. Supply voltage measurementAC Measure-ment range Supply current measurementAC Measure-ment range NeasurementAC Measure-ment range INE (EUT) Measure-ment range NeasurementAC Measure-ment range Neasurement (active power) Accuracy Accuracy ±(5 % of reading + 30 mA) Power measurement (active power) Measure-ment range Measure-ment range DC Notitage measurement ment across the A and B terminals. If an error is found, with the supply voltage at 80 V or more, a load power factor of 1) Measure-ment range DC Notitage measurement ment and B terminals Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Set voltage voltage in dub terminals and chassis Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Set voltage indicated at Between the and B terminals and chassis 250 V Atom across the A and B terminals and chassis 250 V Measurement category	Single faul selection	t mode (Co	ondition)	Set the EUT single fault mode to normal, neutral line disconnection (Fault Neu), or protective ground wire disconnection (Fault PE).			
Measurement check terminals. If an error is found, the protection function is activated. Supply voltage measurementAC LINE (EUT) Measure- ment range 80.0 V to 250.0 V Supply current measurementAC LINE (EUT) Measure- ment range 0.1 V Accuracy ±(3 % of reading + 1 V) Measure- ment range 0.1 A to 15.00 A Power measurement (active power) Measure- ment range 0.01 A Accuracy ±(5 % of reading + 30 mA) Voltage measurement (active power) Measure- ment range 10 W to 1500 W Measure- ment range DC 10.00 V to 300.0 V Resolution 0.00 V to 300.0 V Resolution D.00 V to 300.0 V Input impedance Approx. 40 MQ Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Set a voltage for detecting SELV. When the value is exceeded, the DANCER LED lights. Setting range 0.0 V to 99.9 V, OFF Resolution 0.1 V Set a voltage for detecting SELV. When the value is exceeded, the DANCER LED lights. Between the terminals and chassis 250 V Rated ourrent 100 mA Measurement category Voltage ra	Ground ch	eck					
Supply voltage measurementAC LINE (EUT) ment range Resolution 0.01 V Supply current measurementAC LINE (EUT) Accuracy ±(3 % of reading + 1 V) Supply current measurementAC LINE (EUT) 0.1 A to 15.00 A Power measurement (active power) Resolution 0.001 A Accuracy ±(5 % of reading + 30 mA) Power met range Measure- ment range 10 W to 1500 W Power mets range DC 10.00 V to 300.0 V Resolution (active power) DC 10.00 V to 300.0 V Resolution (actros) Peak 15.00 V to 430.0 V Peak 15.00 V to 430.0 V Resolution (across) Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Setting range 10.0 V to 99.9 V, OFF Resolution 0.1 V Between the t and B terminals and chassis 250 V Rated outrent 100 mA Measurement category Volid terminal voltage range 85 Vac to 250 Vac Rated current 100 vto 240 V, 50 Hz/60 Hz Input voltage range	Measurem	ent check					
LINE (EUT) Resolution 0.01 V Accuracy ±(3 % of reading + 1 V) Measure- ment range Resolution 0.001 A Accuracy ±(5 % of reading + 30 mA) Measure- ment range Resolution 0.001 A Accuracy ±(5 % of reading + 30 mA) Measure- ment range 10 W to 1500 W Accuracy ±(5 % of reading + 8 W) (with the supply voltage at 80 V or more, a a load power factor of 1) Measure- ment range DC 10.00 V to 300.0 V RMS 10.00 V to 300.0 V Peak 15.00 V to 430.0 V Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Setting range 10.0 V to 99.9 V, OFF Resolution 0.1 V Between the A and B terminals Reade voltage Reted current 100 mA Measure- reminal display Terminals valid for measurement are indicated on the display. 110% terminal Nominal voltage range Bt Accuracy CAT-II Voltage range Rated outlage range Reted voltage range Reted voltage range Ret and light 20 V to 240 V, 50 Hz/60 Hz Input voltage range Rated outlage range Rated outlage range Rated outlage range Rated outlage range Rated outlage range Rated outlage range Reted voltage range Rated outlage range Rated output capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A,)				80.0 V to 250.0 V			
Accuracy ±(3 % of reading + 1 V) Supply current measurementACLINE (EUT) Measure-rement range 0.1 A to 15.00 A Power measurement (active power) Measure-rement range 10 W to 1500 W Voltage measurement (active power) Measure-rement range 10 W to 1500 W Voltage measurement (active power) Measure-rement range 10 W to 1500 W Notation Peak 15.00 V to 300.0 V measurement a load power factor of 1) Voltage measurement across Measure-rement Peak 15.00 V to 300.0 V Resolution 0.00 V to 300.0 V meak Resolution 10.00 V to 300.0 V meak Resolution 10.00 V to 300.0 V meak Input impedance Approx.40 MΩ Accuracy *6 Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Setting range 10.0 V to 99.9 V, OFF Resolution 0.1 V Valid terminals and chassis Etween the A and B terminals Between the chassis 250 V Rated woltage range 100 mA			Resolution	0.01 V			
Supply current measurementAC LINE (EUT) ment range Resolution 0.1 A to 15.00 A Power measurement (active power) ment range Accuracy 0.001 A Measure- ment range 10 W to 1500 W Accuracy ±(5 % of reading + 30 mA) Measure- ment range 10 W to 1500 W Accuracy ±(5 % of reading + 8 W) (with the supply voltage at 80 V or more, a a load power factor of 1) Voltage measure- ment across the A and B termi- nals Measure- ment range DC SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Set voltage ment terminal Rated voltage voltage Between the A and B terminals and chassis 250 V Rated current 100 mA 250 V Measure- ment terminal Terminals voltage range (allowable voltage range uply for the EUT) Terminals volta for measurement are indicated on the display. Power supply for the EUT Nominal voltage range (allowable voltage range) 85 Vac to 250 Vac		/	Accuracy	±(3 % of reading + 1 V)			
LINE (EUT) Resolution 0.001 A Accuracy ±(5 % of reading + 30 mA) Power measurement (active power) Measure- ment range 10 W to 1500 W Accuracy ±(5 % of reading + 8 W) (with the supply voltage at 80 V or more, a load power factor of 1) Voltage measure- ment ment across the A and B termi- nals Measure- ment range DC 10.00 V to 300.0 V RMS 10.00 V to 300.0 V Peak 15.00 V to 430.0 V Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Between the voltage Between the and B terminals and chassis 250 V Rated ourrent 100 mA Valid terminal display Terminals valid for measurement are indicated on the display. 110% torminal voltage range supply for the EUT Nominal voltage range Rated output capacity 85 Vac to 250 Vac Rated output capacity 150 V Ko 240 V, 50 Hz/60 Hz Hou Valage range Rated output capacity 150 VA				0.1 A to 15.00 A			
Accuracy ±(5 % of reading + 30 mA) Power measurement (active power) Measure- ment range Accuracy 10 W to 1500 W Measure- ment range measurement across the A and B terminal asross Measure- ment ment across 0 W to 1500 W Measure- ment across DC 10.00 V to 300.0 V Nument ment across DC 10.00 V to 300.0 V Nument ment across DC 15.00 V to 430.0 V Nument ment across SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Seture- ment terminal Setween the A and B terminals 250 V Rated voltage Between the terminal sand chassis 250 V Rated current 100 mA Measure- ment terminal Terminal svalid for measurement are indicated on the display. Yalid terminal terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range supply for the EUT Nominal voltage range Rated output capacity 85 Vac to 250 Vac			Resolution	0.001 A			
Power measurement (active power) ment range Accuracy 10 W to 1500 W Accuracy Measure- ment ment ment across the A and B termi- nals Measure- ment ment across the A and B termi- nals DC MMS 10.00 V to 300.0 V Peak 15.00 V to 430.0 V Peak Measure- ment ment ment across the A and B termi- nals Measure- ment ment across the A and B termi- nals DC MMS 10.00 V to 300.0 V Peak 15.00 V to 430.0 V SetU detection Set 15.00 V to 430.0 V Peak Set 0 V to 430.0 V Measure- ment accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) SetU detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. SetU detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Between the voltage Between the and B terminals and terminals 250 V Rated current 100 mA 250 V Measurement category Valid terminals and isolagy Terminals valid for measurement are indicated on the display. 110% terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range (allowable voltage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 150 VA Maximum operating current 15 A (Ove		/	Accuracy	±(5 % of reading + 30 mA)			
(active power) Accuracy ±(5 % of reading + 8 W) (with the supply voltage at 80 V or more, a a load power factor of 1) Voltage measure- ment across the A and B termi- nals Measure- ment ment across the A and B termi- nals DC 10.00 V to 300.0 V Accuracy MMS 10.00 V to 300.0 V Peak 15.00 V to 430.0 V Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Rated voltage Between the A and B terminals and b terminals dcassis 250 V Rated current 100 mA Voltage trainals and chassis Terminals valid for measurement are indicated on the display. 110% terminal Terminals valid for measurement are indicated on the display. 110% totage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 150 V to 240 V, 50 Hz/60 Hz Input voltage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 150 VA	Power			10 W to 1500 W			
Weasurement ment measurement across the A and B terminals RMS Peak 10.00 V to 300.0 V Accuracy *6 45.00 V to 430.0 V Accuracy *6 4(3 % of reading + 2 V) (measurement range fixed to AUTO) Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Set voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Seture Seture toton Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Resolution 0.1 V Seture toton Seture toton Between the A and B terminals voltage 250 V Seture toton Rated voltage Between the A and B terminals 250 V Rated current 100 mA Measurement category Valid terminal Terminals valid for measurement are indicated on the display. 110% torminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range slopuly for the EUT 85 Vac to 250 Vac Rated output capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)			Accuracy	$\pm(5~\%$ of reading + 8 W) (with the supply voltage at 80 V or more, at a load power factor of 1)			
Voltage measurent across Preak 15.00 V to 430.0 V Input impedance Approx. 40 MΩ Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. SetU detection DANGER LED lights. Resolution 0.1 V Between the terminal Between the terminal and the terminals Rated voltage Between the terminal sand chassis 250 V Rated current 100 mA Measurement category CAT-II Valid terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range supply for the EUT 85 Vac to 250 Vac Rated outy totage range supply for 85 Vac to 250 Vac		Measure-	DC	10.00 V to 300.0 V			
Measurement across Image in the peak in the second of th	1/- 14	ment	RMS	10.00 V to 300.0 V			
Input impedance Approx. 40 MΩ across Accuracy *6 ±(3 % of reading + 2 V) (measurement range fixed to AUTO) B terminals SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Measurement terminal Rated voltage Between the A and B terminals and chassis 250 V Between the terminal and chassis Between the 100 mA 250 V Valid terminal display Terminals valid for measurement are indicated on the display. 110% terminal Terminals valid for measurement are indicated on the display. Input voltage range B5 Vac to 250 Vac Input voltage range 85 Vac to 250 Vac Rated output capacity 100 V to 240 V, 50 Hz/60 Hz Input voltage range 85 Vac to 250 Vac Rated output capacity 150 VA	measure-	range	Peak	15.00 V to 430.0 V			
Result Rated voltage Between the and B terminals Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Resultion 0.1 V Between the voltage 250 V Rated voltage Between the and B terminals between the terminal 250 V Rated voltage Terminals and chassis 250 V Rated current 100 mA Measurement category CAT-II Valid terminal Terminals valid for measurement are indicated on the display. 110% tortage range (allowable voltage range) 85 Vac to 250 Vac Rated outgar range (allowable voltage range) 85 Vac to 250 Vac Rated outgar range (allowable voltage range) 85 Vac to 250 Vac Rated outgar range (allowable voltage range) 85 Vac to 250 Vac Rated outgut capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	ment	Input impedance					
B terminals SELV detection Set a voltage for detecting SELV. When the value is exceeded, the DANGER LED lights. Setting range 10.0 V to 99.9 V, OFF Resolution 0.1 V Between the A and B terminals and chassis 250 V Rated current 100 mA Valid terminal display Terminals valid for measurement are indicated on the display. 110% terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range 85 Vac to 250 Vac Input voltage range 85 Vac to 250 Vac Rated outgrape range 85 Vac to 250 Vac Rated outgrape range 85 Vac to 250 Vac Rated outgrape range 100 V to 240 V, 50 Hz/60 Hz Input voltage range 85 Vac to 250 Vac Rated outgrape range 85 Vac to 250 Vac Rated outgrape range 85 Vac to 250 Vac Rated outgrape range 150 VA	across	Accuracy *6					
Measurement terminal Setting range Rated voltage 10.0 V to 99.9 V, OFF Rated voltage Between the A chassis 250 V Rated voltage Between the A chassis 250 V Rated voltage Between the terminals and betrninals 250 V Rated current 100 mA Measurement category CAT-II Valid terminal Terminals valid for measurement are indicated on the display. 110% terminal 110% terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range Input voltage range 85 Vac to 250 Vac 85 Vac to 250 Vac Rated output capacity 1500 VA 1500 VA	B termi-	SELV detection					
Between the A and B terminals terminal Between the A and B terminals 250 V Between the A and B terminals 250 V Between the A chassis 250 V Measurement category Valid terminal display 250 V 100 valid terminal to staper ange (allowable voltage range) 100 V to 240 V, 50 Hz/60 Hz Input voltage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	naio		Setting range				
Measurement and B terminals between the terminals and B terminals Between the terminals 250 V Rated ourrent 100 mA Rated current 100 mA Valid terminal display Terminals valid for measurement are indicated on the display. 110% terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 1500 VA				0.1 V			
Measurement terminal Between the terminals and Assis 250 V Rated ourrent 100 mA Measurement category CAT-II Valid terminal Terminals valid for measurement are indicated on the display. 110% terminal Terminals valid for measurement are indicated on the display. 110% terminal Terminals of supplying 110% voltage of the AC line. Input voltage range (allowable voltage range) 85 Vac to 250 Vac Rated output capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)		Rated	and B terminals	250 V			
Measurement category CAT-II Valid terminal display Terminals valid for measurement are indicated on the display. 110% terminal Terminals for supplying 110% voltage of the AC line. Nominal voltage range 100 V to 240 V, 50 Hz/60 Hz Input voltage range 85 Vac to 250 Vac Rated output capacity 1500 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	Measure- ment		terminals and	250 V			
Valid terminal display Terminals valid for measurement are indicated on the display. 110% terminal Terminals valid for measurement are indicated on the display. 110% terminal Terminal for supplying 110% voltage of the AC line. Nominal voltage range 100 V to 240 V, 50 Hz/60 Hz Input voltage range 85 Vac to 250 Vac Rated output capacity 1500 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	terminal	Rated cur	rent	100 mA			
Internation Terminal for supplying 110% voltage of the AC line. Nominal voltage range supply for the EUT Nominal voltage range (allowable voltage range) (Rated output capacity) 100 V to 240 V, 50 Hz/60 Hz Rated output capacity 85 Vac to 250 Vac Maximum operating current 150 VA		Measurem	ent category	CAT-II			
Power of the EUT Nominal voltage range 100 V to 240 V, 50 Hz/60 Hz Input voltage range (allowable voltage range) Rated output capacity 1500 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)		Valid term	ninal display	Terminals valid for measurement are indicated on the display.			
Power supply for the EUT Rated output capacity 150 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)			-				
Power (allowable voltage range) 85 Vac to 250 Vac supply for Rated output capacity 1500 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)		L		100 V to 240 V, 50 Hz/60 Hz			
the EUT Rated output capacity 1500 VA Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	Power			85 Vac to 250 Vac			
Maximum operating current 15 A (Overcurrent protection is activated at approximately 15.7 A.)	the EUT	Rated out	put capacity	1500 VA			
Inrush current 70 Apeak max. (within 20 ms)	/	Maximum o	perating current	15 A (Overcurrent protection is activated at approximately 15.7 A.)			
		Inrush cu	rrent	70 Apeak max. (within 20 ms)			

*6 If voltage is measured with the A and B terminals open, measurements will be easily affected by induced voltage.

Interface (Common)

		TOS9300		TOS9301PD					
REMOTE		5-pin DIN connector. Connect the following option to remotely control the starting and stopping of tests. • Remote control box RC01-TOS, RC02-TOS • High voltage test probe HP01A-TOS, HP02A-TOS (when the test volt- age is 4 kVac 5 kVdc or less)							
SIGNAL I/O				For the pin a	-				
Function	1	programs, s status, mon execution st functions	tart/stop tes itor the test tatus of auto	t, recall setup ting, monitor status, monito tests, monito	the test and or judgment or the activat	voltage gen results, mon ion status of	eration itor the step f protection		
Input sp	ecifications		by a resisto	low-active co . Leaving the nal.					
	High-level input voltage	11 V to 15 V							
	Low-level input voltage Low-level	0 V to 4 V							
	input current	-5 mA max.							
	Input time width	5 ms min.							
	Output method	Open collec	tor output (4	.5 Vdc to 30	/dc)				
Output specifi-	Output with- standing voltage	30 Vdc							
ca-tions	Output satu- ration voltage Maximum	Approx. 1.1	Approx. 1.1 V (25 °C)						
STATUS OU	output current	400 mA(TO		tion product.					
				tus Out of CO	NFIG settin	as to set the	output		
	terminal (red)	conditions.							
Negative terminal (black)		+24 V circuit common.							
SCANNER		MINI DIN 8-pin connector. Terminal for the optional TOS9320 high voltage scanner. The maximum number of connections is 4 devices(16 channels).							
USB (host)		Standard type A socket, FAT32, 32 GB or less Complies with the USB 2.0 specifications; data rate: 12 Mbps (full speed							
Remote cont	rol	All functions except turning on and off the power, key lock, and auto tes can be remotely controlled.							
RS232C	Hardware	Baudrate: 9	600, 19200,	EIA-232D cor 38400, 5760 bits: 1 bit; pa	0, 115200 b		ol: none/		
	Message terminator			during transn					
	Hardware	Standard Ty data rate: 4		ctor. Complie gh speed)	s with the U	SB 2.0 spec	ifications;		
USB (device)	Message terminator	LF or EOM	during recep	tion, LF + EO	M during tra	insmission.			
	Device class			MC-USB488					
	Hardware	RJ-45 conn		K/10Base-T E	tnernet. Aut	o-MDIX con	1pilant.IPv4		
LAN	Compliant standards	LXI 1.4 Cor	e Specificati	on 2011					
	Communica- tion protocol			AW, SCPI-Te			tranom'-		
	Message terminator	sion. SCPI-		ND during rec ring receptior					
Display		7-inch LCD							

Other Functions (Common)

		TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC			
Auto test		Auto execution by com	bining ACW, DCW, IR,	and EC. For LC, a comb	ination is possible only u	ising TC, PCC, and Pa	tient.			
-	Setup memory	Up to 51 test conditions	s (ACW, DCW, IR, EC, I	PD, LC) can be saved.						
Test condition memory	Program memory	Up to 100 program (AC	W, DCW, IR, EC, PD) o	ombinations, each cont	aining 100 steps, can be	saved.				
memory	Program memory (LC)	Up to 100 program (TC	, PCC, Patient) combin	ations, each containing	100 steps, can be saved					
Test result memory	ý	Records up to 1000 late saved in CSV format to			sts. These are cleared w	nen the power is turned	l off. Test results can be			
System clock		For recording the calib	ration time and test time	es						
	Recordable time	Up to year 2038								
	Calibration period setting	Displays a warning at p in the display area whe		cified period passes. Se	lect whether to activate a	a protection function or	only display a warning			
Measurement disp	lay	Maximum and minimur	n measurements can b	e displayed.						
	Normal	Displays measurement	s during a test. Maximu	m and minimum values	are not held.					
	Maximum and minimum value display				(ACW/DCW) tests, the r ement for earth continuity		asurement for insulation			
	Double Action	When you press STOP	, "READY" is shown for	0.5 seconds. A test sta	rts only when you press	START within this perio	od.			
Test start method	Momentary	Tests are only executed while the START switch is held down.								
	Start Long	A test starts only when	A test starts only when the START switch is held down for at least 1 second.							
PASS judgment di	splay time (Pass Hold)	Set the time to hold the	Set the time to hold the pass judgment result display (0.05 s to 10.00 s) or hold it until STOP is pressed (Infinity).							
STOP signal disable (Fail Mode)			It is possible to set the instrument so that fail judgment results and PROTECTION mode cannot be released from a device connected to the SIGNAL I/O connector or REMOTE connector.							
Key lock		Lock the operation of the	Lock the operation of the keys to prevent changing the settings or overwriting memory or programs by mistake.							
Protection function	IS				and the test is stopped in that cause a protection					
	Interlock	Interlock is activated.								
	Power Supply	There is an error in the	power supply section.							
	Output Error	An output voltage outsi ACW, DCW, IR test, PI			6 of setting + 2 A)					
	Over Load	ACW, DCW, IR test, PD test: ±(10 % of setting + 50 V), EC test: ±(10 % of setting + 2 A) An output power or output current outside of the following range is detected. ACW: 550 VA, DCW: 110 W or 50 mA, IR (7200 V test): 110 W or 25 mA, IR (-1000 V test): 2 mA, EC: 240 VA, LC: AC LINE OUT current at approx. 15.7 A or power at 1600 VA								
	Over Heat	The internal temperatu	re of the product is abn	ormally high.						
	Over Rating	During a withstanding	voltage test, an output o	urrent is generated for	a length of time that exce	eds the output time lin	iit			
	Cal	The preset calibration	period is exceeded.							
	Remote	The REMOTE connect	or is connected or disco	onnected.						
	Signal I/O	There is a change in th	e SIGNAL I/O connecto	or's ENABLE signal.						
	Communication	An internal communica	tion error is occurring.							
	Over Range	A value exceeding the	maximum value of the r	neasurement range is d	etected.					
	Measure	An error is detected in	the LC test measureme	nt check.						
	Short	A relay operation error	is detected in an LC tes	st.						
	Earth Fault	When the grounding m	ode (GND) is set to Gu	ard, abnormal current flo	ows from the high voltage	e output of this product	to ground.			
	Scan I/F	While scanning, the int	erface cable is disconn	ected. Or, the channel-a	assigned scanner is not o	detected.				

General Specifications (Common)

			TOS9300	TOS9301	TOS9301PD	TOS9302	TOS9303	TOS9303LC
Backup battery life	•		3 years (at 25 °C)				·	
Installation location Ir			Indoors, 2000 m or less	3				
	Spec guaranteed	Temperature	5 °C to 35 °C (41 °F to 9	95 °F) (18°C to 28°C for	partial discharge tests)	1		
Environment	range	Humidity	20 %rh to 80 %rh (20%	rh to 70%rh for partial o	lischarge tests) (no con	densation)		
	Operating rang	Temperature	0 °C to 40 °C (32 °F to	104 °F)				
	Operating rang	Humidity	20 %rh to 80 %rh (no c	ondensation)				
	Storogo rongo	Temperature	-20 °C to 70 °C (-4 °F to	o 158 °F)				
	Storage range	Humidity	90 %rh or less (no cond	densation)				
	Nominal voltage range (allowable voltage range)	100 Vac to 120 V, 200 V	/ to 240 V (90 Vac to 13	2 V, 170 V to 250 V)			
Dowor oursely	Power consumption	No load(READY state)	100 VA or less					
Power supply	Power consumption	Rated load	800 VA max.					
	Allowable frequency ran	ige	47 Hz to 63 Hz					
Insulation resistan	ce (between AC LINE and	l chassis)	30 MΩ or more (500 Vdc)					
Withstanding volta	ge (between AC LINE and	d chassis)	1500 Vac, 1 minute, 20 mA or less					
Earth continuity			25 Aac, 0.1 Ω or less					
Weight			TOS9300: Approx. 17 kg (37.5 lb.), TOS9301: Approx. 18 kg (39.7 lb.), TOS9301PD: 22 kg (48.5 lb.), TOS9302: Approx. 20 kg (44.1 lb.), TOS9303: Approx. 21 kg (46.3 lb.), TOS9303LC: Approx. 22 kg (48.5 lb.)					
Accessories			Power cord (1 pc., *length: 2.5 m : The attached power cord varies depending on the shipment destination.) High-voltage test lead [TL31-TOS] (1 pair), SIGNAL I/O plug (1 set), High-voltage warning sticker (1 pc.), Setup Guide (1 copy), CD-ROM (1 disc), Safety Information (1 copy), Heavy object warning label (1 pc., 'Not included with the TOS9300) Test leads for earth continuity test [TL13-TOS] (1 pair., *TOS9302, TOS9303,TOS9303LC only) [TOS9303LC only: Spare fuse (1 pc.), Test leads for leakage current test (2 red, 1 black), Flat probe (1 sheet)]					
Electromagnetic compatibility *1 *2			Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN 61326-1 (Class A*3), EN 55011 (Class A*3, Group 1*4), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the prod-uct must be less than 2.5 m.Shielded cables are being used when usi the SIGMAL I/O.The high-voltage test lead TL31-TOS is in use.Electrical discharges are applied only to the EUT.					being used when usin
Safety *1			Complies with the requirements of the following directive and standards. Low Voltage Directive 2014/35/EU *2, EN 61010-1 (Class I *5, Pollution Degree 2 *6)					

*1 Does not apply to specially ordered or modified products.

 2 Only on models that have CE/UKCA marking on the panel.
 *3 This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts. *4 This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of

material or inspection/anal-ysis purpose. *5 This is a Class I instrument. Be sure to ground this product's protective conductor terminal. The safety of this product is guaranteed only when the product is properly grounded. *6 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur

High Voltage Scanner

Basic specifications		TOS9320				
Maximum operating voltage	AC	5 kV				
DC		7.2 KV				
Number of channels		4 (Each channel can be set to high, low, or open.)				
Maximum connections		4 units Channel numbers are assigned according to the order in which connections are made to the TOS9300 series tester. 1st scanner: CH1 to CH4 2nd scanner: CH5 to CH8 3rd scanner: CH9 to CH12 4th scanner: CH13 to CH16				
Contact check function	Contact check function Available					
	DANGER	Lights in sync with the TOS9300 series tester				
Indicators	CHANNEL	Indicates the setting of each channel with color Red: High Green: Low Orange: Contact being checked Off: Open				
	EXTERNAL	Lights when external control is on				
	POWER	Lights when the power is on				

Interface and other functions			TO\$9320				
Control sv	Control switch		XTERNAL I/O switch for switching the following controls. N: External control through the CONTROLLER INTERFACE FF: Control from the TOS9300 series tester				
CONTRO	LLER INTERFACE ((external control)	-sub 25-pin connector.				
	Function		Sets each channel to high or low or all channels to open. Outputs the setting of each channel.				
			The input signals are all low-active control. The input terminal is pulled up to +12 V by a resistor. Leaving the input terminal open is equivalent to applying a high level signal.				
	Innest	High-level input voltage	11 V to 15 V				
	Input	Low-level input voltage	0 V to 4 V				
		Low-level input current	-5 mA max.				
		Input time width	5 ms min.				
		Output method	Open collector output (4.5 Vdc to 30 Vdc)				
	Output	Output withstanding voltage	30 Vdc				
	Output	Output saturation voltage	Approx. 1.1 V (25°C, 77°F)				
		Maximum output current	400 mA (TOTAL)				
TOS9300	TOS9300 series tester interface		MINI DIN 8-pin connector. Accuracy guaranteed up to 4 units (16 channels)				

TO 00000

General specifications			TOS9320			
	Installation location	า	Indoors, 2000 m or less			
	Spec guaranteed	Temperature	5°C to 35°C (41°F to 95°F)			
	range	Humidity	20%rh to 70%rh (no condensation)			
Environment	On a section of a section of	Temperature	0°C to 40°C (32°F to 104°F)			
	Operating range	Humidity	20%rh to 80%rh (no condensation)			
		Temperature	-20°C to 70°C (-4°F to 158°F)			
	Storage range	Humidity	90%rh or less (no condensation)			
	Nominal voltage ra (allowable voltage r		100 Vac to 240 Vac (90 Vac to 250 Vac)			
Power supply	Power consumption	า	50 VA max.			
	Allowable frequency range		47 Hz to 63 Hz			
Insulation resistance (between AC LINE and chassis)			30 MΩ or more (500 Vdc)			
Withstanding voltage (between AC LINE and chassis)			1500 Vac for 1 minute, 20 mA or less			
Earth continuity			25 Aac/0.1 Ω or less			
Weight			Approx. 8 kg (17.6 lb)			
Accessories		Power cord (1 pc., length: 2.5 m: The attached power cord varies depending on the shipment destination.) High-voltag [TL31-TOS] (8 red), Lead for high voltage parallelconnection [TL33-TOS] (1 pair), Interface cable (1 pc.), CONTROLLE FACE plug (1 set), High-voltage warningsticker (2 pc.), Channel labels (For the panel (1 sheet), For the test leads (1 sh manual (1 copy), Safety Information (1 copy)				
Electromagnetic compatibility *1 *2			Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU, EN 61326-1 (Class A *3), EN 55011 (Class A *3, Group 1 *4), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to this product is less than 2.5 m. A shielded cable is used for the connection to the CONTROLLER INTERFACE. The high-voltage test lead TL31-TOS is in use.Electrical discharges are applied only to the EUT.			
Safety *1			Complies with the requirements of the following directive and standards. Low Voltage Directive 2014/35/EU *2, EN 61010-1 (Class I *5, Pollution Degree 2 *6)			

Does not apply to specially ordered or modified products.

*2 Only on models that have CE/UKCA marking on the panel.
 *3 This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless

*4 This is a Group 1 instrument. This product is included to use interfacional product interfacional technical measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.
*4 This is a Group 1 instrument. This product does not generate and/or use intentionally radio frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose.

*5 This is a Class I instrument. Be sure to ground this product's protective conductor terminal. The safety of this product is guaranteed only when the product is properly grounded.

*6 Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

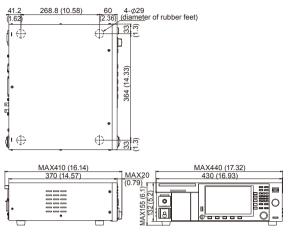
60

(2.36)

(¥

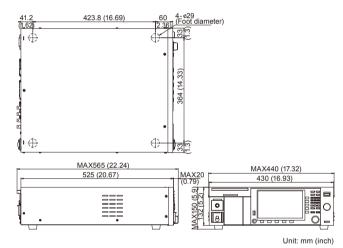
External Dimensional Diagrams

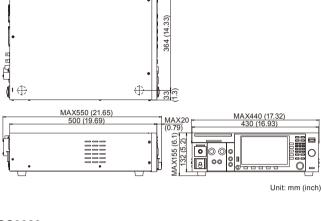
TOS9300, TOS9301



Unit: mm (inch)

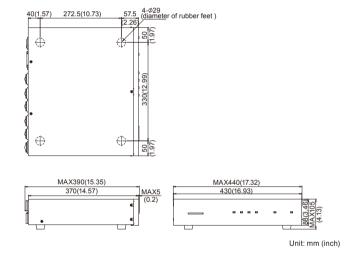
TOS9301PD



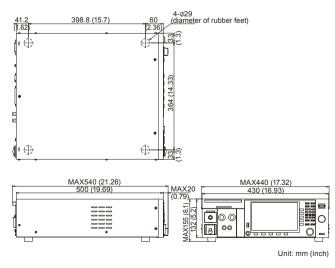


4-Ø29 (diameter of rubber feet)

TOS9320



TOS9302, TOS9303



TOS9303LC

(1.62

0

398.8 (15.7)

Hipot Tester / Hipot Tester with Insulation Resistance Test

Dimensions / Weight

TOS5302: 320(12.60[°])W × 132(5.20[°])H × 350(13.78[°])Dmm / 14kg(30.9 lbs) TOS5301: 320(12.60[°])W × 132(5.20[°])H × 350(13.78[°])Dmm / 15kg(33.1 lbs) TOS5300: 320(12.60[°])W × 132(5.20[°])H × 350(13.78[°])Dmm / 14kg(30.9 lbs)

Accessories

Power cord, High-voltage test lead wire: TL31-TOS, Highvoltage warning sticker, D-sub 25-pin plug, User's Manual, CD-R(Contains the Communication Interface Manual, the KI-VISA library, and the Safety evalution test.)

Features and Functions

The PWM amplifier provides highly stable output! [Input voltage variation: ± 0.3 %]

The TOS5300 Series equips with a high-efficient PWM amplifier that can output a stable high-voltage without being affected by the variation of AC power line, users can perform "safe", "stable", and highly "reliable" tests with confidence, even in regions with large voltage variations.



6 kV/50 W DC Hipot (Withstanding voltage) test [Model TOS5301] Capable to perform DC Hipot (Withstanding voltage) test up to 6 kV. (Model TOS5301) Equipped with a stable DC/DC converter with a low-ripple and the load variation of 3 % or less.

A new standard for hipot & insulation resistance testing applied to world-wide input voltage

The TOS5300 Series are test instruments used in Hipot tests and insulation resistance tests, two of the four tests regarded as necessary for ensuring the safety of electrical products. With an output of 5 kV/100 mA (AC) and 6 kV/50 W (DC), the series can be used in Hipot & insulation resistance testing of electronic equipment and electronic parts, based on the requirements of IEC, EN, UL, VDE, JIS, and other international safety standards and the Electrical Appliance and Material Safety Law. Also, the test voltage stability is improved with the adoption of a newly developed switching amplifier. Since the output voltage can be kept constant even when the AC line voltage or frequency changes, consistent testing can be performed, even when the power supply environment is in an unstable region. The TOS5300 is also equipped with a number of features that are capable of meeting a variety of test needs. It is a new low-cost standard model that provides thorough operability, reliability and safety.

Features

TOS5302: ■ Hipot (Withstanding voltage): AC 5 kV/100 mA
Insulation Resistance: 25 V -1000 V
TOS5301: ■ Hipot (Withstanding voltage): AC 5 kV/100 mA, DC 6 kV/50 W
TOS5300: Hipot (Withstanding voltage): AC 5 kV/100 mA
Common: ■ The PWM amp system provides highly-stable output
High-precision measurement ± 1.5 % of reading
Rise/Fall time control function
Key lock function and Protection cover on the panel operation
Limit voltage function
Monitoring output voltage function
Calibration due notice and warning function
Equipped with USB interface
Realizing high-precision measurement with high-resolution

Realizing high-precision measurement with high-resolution and high-speed judgement

Equipped with a high-accuracy, high-resolution of True RMS measurement circuit, including a Voltmeter with \pm 1.5 % of reading (500 V or greater)/ minimum resolution of 1V, and an Ammeter with \pm 1.5 % of reading (1 mA or more)/minimum resolution of 1 $\mu A.$

In addition, it is also equipped with an Auto range function, with achieving a judgment accuracy of ± 1.5 % of reading. The Lower limit judgment accuracy achieves a level of performance equivalent to the Upper limit judgment accuracy that enables to detect for such a poor contact or disconnections of test leads. Moreover, it realizes the fast judgment by the test time of 0.1 second, while reliable testing can be performed, thanks to high-precision, high-resolution, high-speed measurement and the judgment functions.



▲ AC Hipot (Withstanding voltage) test settings display (example)

Features and Functions

Insulation resistance test for 25 V to 1000 V* [Model TOS5302] The TOS5302 is equipped with an insulation resistance tester. The test voltages can be set from 25 V, 50 V, 100 V, 125 V, 250 V, 500 V and 1000 V. And for setting at 500 V and above, it can perform the insulation resistance test up to 5.00 GΩ.

*At 500 V and above, measurements up to 5.00 G Ω are possible

Protection cover prevents physical operation error in the production site

In many cases, workers on electronic equipment production lines and inspection lines are not technical experts. Therefore, it is possible that the operators may change setting conditions and make operation errors. In order to prevent from such cases, the TOS5300 is equipped with a key lock function and a protection cover to disable a physical key operation from the front panel.





▲ View with the protection cover removed

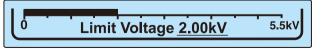
- Storing the protection cover for the key operation to the base of unit.
- New design of output terminal improves safety and functionality The free rotation mechanism protects from twisting (or breaking) of the cable. Also, with having the lock function for the LOW terminal on the main unit, the metal plate is no longer attached to the test lead of LOWside, and it makes to resist damage to the test lead. Because of elimination of these projected components, the TOS5300 can avoid from unexpected accidents such as when the unit travels to other location. And also when the test lead is snagged on something, or unexpected stress is applied on the test lead, the High (High-voltage) test lead is designed to disconnect easily, but the Low (ground) test lead is designed to resist disconnection.



▲ Flat surface design of the HIGH terminal with free rotation mechanism, and the LOW terminal with lock function

Limit voltage function

Prevents the user from setting a test voltage that exceeds the preset voltage.



▲ LIMIT VOLTAGE setting (example)

Monitoring output voltage function

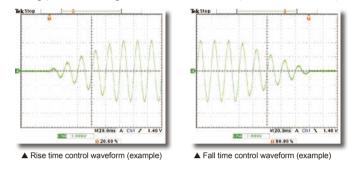
If the output voltage exceeds the setting voltage of (\pm 350 V), it turns off the output and the system switches to PROTECTION mode.

In order to handle kilo's of high voltage when the Hipot (Withstand voltage) and insulation tests are conducted, there are number of safety measures are required to take place. Having with these functions improve, the operational safety and the protection for the EUT.

■ Rise/Fall time control function

The Rise time control function enables you to increases the test voltage gradually to reach the setting voltage while the AC Hipot (Withstanding voltage) test is conducted. The voltage rise time can be set from 0.1 s to 10.0 s at a resolution of 0.1 s.

The Fall time control function enables you to decrease the test voltage gradually when the PASS judgment is made at the AC Hipot (Withstanding voltage) test. The voltage fall time is fixed at 0.1 s. (OFF is also selectable).



Interlock feature

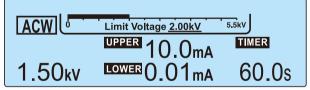
The product is equipped with an interlock function that operates together with external devices to interrupt output. To ensure the safe operation of tester, the interlock function activates when the SIGNAL I/O connector pins number 1 and 13 are opened, and when they are short-circuited, the interlock function is released.

Discharge feature [Model TOS5301/TOS5302]

Equipped with a forced discharge function that forcibly discharge the electricity which has been charged in the EUT after the completion of DC Hipot (Withstanding voltage) test or insulation resistance test.

Upper limits/Lower limits setting function

It automatically detects connector lead breaks and disconnections of wiring by measuring extremely small amounts of current that flows when voltage is applied to the EUT.



▲ Example setting display of Upper limit, Lower limit, and Test time

Calibration due notice and Warning function

To assure the traceability of periodic calibration of the product, this function gives a notice of calibration due managed by the builtin real-time clock. Even if the due data has elapsed, it is possible to avoid the oversight of operator with limiting the operation with a display of warning message.

■ AUTO TEST feature for consecutive testing [Model TOS5302]

The TOS5302 can perform an AC Hipot (Withstanding voltage) test and an insulation resistance test consecutively.

Either of the following can be conducted :

Insulation resistance test \rightarrow AC Hipot (Withstanding voltage) test, or AC Hipot (Withstanding voltage) test \rightarrow Insulation resistance test.

Unless specified otherwise, the specifications are for the following settings and conditions • The warm-up time is 30 minutes. • TVP: These are typical values. These values do not guarantee the performance of the product. • rdng: Indicates the readout value. • set: Indicates a setting. • f.s: Indicates full scale.

Withstanding Voltage Test Mode

tax. rate tax. rate tax. rate requent requent tololtage r nput vol thort-cir tolottage r nput vol thort-cir tax. rate tax.	Accuracy Setting range Resolution ed output *1 ed voltage ad current mer rating tage waveform *2 Distortion Cy Accuracy regulation cuit current ethod ange Accuracy Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	100 mA (w If the out (when no l ±0.5 ^c (when char ±0.3 po	(When changing from	o load is co 50 kV is 00 mA) ge is 0.5 kV / or more: 3 ive load is c 0 Hz voltage rise iss n rated load iad is conne 90 V to 250 voltage is 1. hing 00 kV 20 V) connected 20 kV P 0 mA) 	/ or greater) % or less connected). e time) I to no load) incted; V V)
tax. rate tax. rate tax. rate requent requent tololtage r nput vol thort-cir tolottage r nput vol thort-cir tax. rate tax.	Setting range Resolution ad output *1 ad voltage ad current mer rating tage waveform *2 Distortion cy Accuracy regulation cuit current tage variation cuit current ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	100 mA (w If the out (when no l ±0.5 ^c (when char ±0.3 po	0.00 kV to 5. 10 V step 500 VA (5 kV/1 5 kV hen the output volta 500 VA Sine 500 VA Sine 50 VA Sine 50 VA 50 VA Sine 50 VA 50 VA 50 VA (excluding during 10 % or le nging from maximur % (5 kV when no lo wer supply voltage: e (when the output t PWM switcl 0.05 kV to 6. ± (2 % of set + When no load is c 0.00 kV to 6. ± (2 % of set + When no load is c 0.00 kV to 6. 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	50 kV is 00 mA) ige is 0.5 kV / or more: 3 ive load is c) Hz voltage rise: ss n rated load iad is conne 90 V to 250 voltage is 1. hing 00 kV - 20 V) connected 20 kV - 20 V) connected 0 mA) 	/ or greater) % or less connected). e time) I to no load) incted; V V)
tax. rate tax. rate tax. rate requent requent tololtage r nput vol thort-cir tolottage r nput vol thort-cir tax. rate tax.	Resolution	If the out, (when no I ±0.5 ^c (when char ±0.3 po	10 V step 500 VA (5 kV/1 5 kV hen the output volta 500 VA Sine but voltage is 0.5 kV oad or a pure resist 50 Hz or 60 % (excluding during 10 % or le nging from maximur % (5 kV when no low wer supply voltage: e (when the output') PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is of 0.00 kV to 5.2 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-l 3% or les (When changing from	os 00 mA) ge is 0.5 kV / or more: 3 ive load is co) Hz voltage rise ss n rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV 20 V) connected 20 kV (P 0 mA) p	% or less connected). e time) I to no load) incted; VV)
tax. rate tax. rate tax. rate requent requent tololtage r nput vol thort-cir tolottage r nput vol thort-cir tax. rate tax.	ed output *1 ad voltage ad current mer rating tage waveform *2 Distortion Cy Accuracy regulation tage variation cuit current nethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	If the out, (when no I ±0.5 ^c (when char ±0.3 po	500 VA (5 kV/1 5 kV hen the output volta 500 VA Sine out voltage is 0.5 kV oad or a pure resist 50 Hz or 60 % (excluding during 10 % or le ging from maximur % (5 kV when no lo wer supply voltage: e (when the output + PWM switcl 0.05 kV to 6.1 (2 % of set + When no load is c 0.00 kV to 6.1 10 V STFI 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p- 100 Vp-1 3% or les (When changing fro	00 mA) ge is 0.5 kV / or more: 3 ive load is c 0 Hz voltage rise ss n rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV 20 V) connected 20 kV P 0 mA) p	% or less connected). e time) I to no load) incted; VV)
tax. rate tax. rate tax. rate requent requent tololtage r nput vol thort-cir tolottage r nput vol thort-cir tax. rate tax. rate tax	ed voltage ed current mer rating tage waveform *2 Distortion cy Accuracy regulation tage variation cuit current nethod ange Accuracy Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	If the out, (when no I ±0.5 ^c (when char ±0.3 po	5 kV hen the output volta 500 VA Sine bout voltage is 0.5 kV ooad or a pure resist 50 Hz or 60 % (excluding during 10 % or le ging from maximur % (5 kV when no lo wer supply voltage: e (when the output 1 PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.1 ± 0 V STE 50 W (5 kV/tt 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	ge is 0.5 kV / or more: 3 ive load is c 0 Hz voltage rise ss m rated load add is conne 90 V to 250 voltage is 1. hing 00 kV 20 V) connected 20 kV P 0 mA) p	% or less connected). e time) I to no load) incted; VV)
tax. ratesform	ad current mer rating tage waveform *2 Distortion cy Accuracy regulation cuit current nethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	If the out, (when no I ±0.5 ^c (when char ±0.3 po	hen the output volta 500 VA Sine Sine Solut voltage is 0.5 kV 6 do a pure resist 50 Hz or 60 % (excluding during 10 % or le nging from maximur % (5 kV when no lo wer supply voltage: a (when the output \ PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 5.1 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	/ or more: 3 ive load is c 0 Hz voltage rise iss n rated load iad is conne 90 V to 250 voltage is 1. hing 00 kV 20 kV 20 kV 20 kV 20 kV 20 mA)	% or less connected). e time) I to no load) incted; VV)
ransforring requenting for the second	mer rating tage waveform *2 Distortion cy Accuracy regulation tage variation cuit current ethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	If the out, (when no I ±0.5 ^c (when char ±0.3 po	500 VA Sine Sout voltage is 0.5 kV, oad or a pure resist 50 Hz or 60 % (excluding during 10 % or le nging from maximur % (5 kV when no lo wer supply voltage: e (when the output v PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.2 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	/ or more: 3 ive load is c 0 Hz voltage rise iss n rated load iad is conne 90 V to 250 voltage is 1. hing 00 kV 20 kV 20 kV 20 kV 20 kV 20 mA)	% or less connected). e time) I to no load) incted; VV)
requenning for the second seco	tage waveform *2 Distortion Cy Accuracy egulation tage variation cuit current ethod ange Accuracy Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	(when no l ±0.5 ^c (when chai ±0.3 po	Sine Sine put voltage is 0.5 kV oad or a pure resist 50 Hz or 60 % (excluding during 10 % or lenging from maximur % (5 kV when no lower supply voltage: e (when the output PWM stylic 0.05 kV to 6. 10 0 V STE 50 W cs kV to 6. 10 0 V STE 50 W (5 kV/III) 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing from	/ or more: 3 ive load is c) Hz voltage rise iss in rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV 20 kV 20 kV 20 kV P 0 mA)	e time) I to no load) ected; V V)
requenning oltage r apput vol hort-cir uutput n uutput r lax. rata fax. rata	Distortion Distortion Accuracy regulation tage variation cuit current nethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	(when no l ±0.5 ^c (when chai ±0.3 po	Dut voltage is 0.5 kV oad or a pure resist 50 Hz or 60 % (excluding during 10 % or le ging from maximur % (5 kV when no lo wer supply voltage: e (when the output \ PWM switcl 0.05 kV to 6.1 (0.05 kV to 6.1 (10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-p 3% or les (When changing fro	ive load is c) Hz voltage rise ss n rated load and is conne 90 V to 250 voltage is 1. hing 00 kV > connected 20 kV P 0 mA)	e time) I to no load) ected; V V)
lax. rate lipple ryput vol lihort-cirr luutput n lax. rate lipple rypp	Cy Accuracy regulation tage variation cuit current nethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	(when no l ±0.5 ^c (when chai ±0.3 po	oad or a pure resist 50 Hz or 60 % (excluding during 10 % or le ging from maximur % (5 kV when no lo wer supply voltage: e (when the output \ PWM switcl 0.05 kV to 6.1 (2 % of set + When no load is c 0.00 kV to 6.1 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp-g (When changing fro	ive load is c) Hz voltage rise ss n rated load and is conne 90 V to 250 voltage is 1. hing 00 kV > connected 20 kV P 0 mA)	e time) I to no load) ected; V V)
lax. rate lipple ryput vol lihort-cirr luutput n lax. rate lipple rypp	Accuracy egulation tage variation cuit current nethod ange Accuracy Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	(when char ±0.3 po	% (excluding during 10 % or le ging from maximur % (5 kV when no lo wer supply voltage: e (when the output \ PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.1 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	voltage rise ss n rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV 20 kV 20 kV 20 kV 20 kV 20 kV 20 kV 20 mA)	l to no load) ected;) V)
ihort-cir nput vol ihort-cir nutput n hutput n hutput n hax. rata fax. rata	regulation tage variation cuit current nethod ange Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	(when char ±0.3 po	10 % or le nging from maximur % (5 kV when no lo wer supply voltage: e (when the output \ PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.1 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	ss n rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV 20 kV 20 kV 20 kV 20 kV 20 kV 20 kV 20 mA)	l to no load) ected;) V)
hput vol hort-cir Dutput m Dutput ra 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate	tage variation cuit current nethod ange Accuracy Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	±0.3 po	nging from maximur % (5 kV when no lo wer supply voltage: e (when the output v PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.2 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	n rated load ad is conne 90 V to 250 voltage is 1. hing 00 kV - 20 V) connected 20 kV P.P. 0 mA)	ected; V)
hort-cir Dutput m Dutput ra lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate	cuit current nethod ange Accuracy Setting range Resolution ad output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	ро	wer supply voltage: a (when the output v PWM switcl 0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.1 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	90 V to 250 voltage is 1. hing 00 kV 20 V) connected 20 kV p 0 mA) p) V)
Output m Output ra Nax. rate Nax. rate	Accuracy Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	200 mA or mor	PWM switcl 0.05 kV to 6. ± (2 % of set + When no load is c 0.00 kV to 6 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	hing 00 kV 20 V) connected 20 kV P 0 mA)	0 kV or greater
lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate lax. rate	Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	-	0.05 kV to 6.1 ± (2 % of set + When no load is c 0.00 kV to 6.2 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	00 kV 20 V) connected 20 kV P 0 mA) p	-
1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate 1ax. rate	Accuracy Setting range Resolution ad output *1 ad voltage ad current 5 kV when no load is connected Max. rated load regulation	-	± (2 % of set + When no load is o 0.00 kV to 6.: 10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp-1 3% or les (When changing fro	P 20 V) connected 20 kV P 0 mA)	-
lax. rate lax. rate tipple TYP)	Setting range Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	-	When no load is a 0.00 kV to 6 10 V STE 50 W (5 kV/11) 6 kV 10 mA 50 Vp-p 100 Vp- 3% or les (When changing from	p	- - - - - -
lax. rate lax. rate tipple TYP)	Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	-	10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp- 3% or les (When changing fro	P 0 mA) 0	- - - - - -
lax. rate lax. rate tipple TYP)	Resolution ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load regulation	-	10 V STE 50 W (5 kV/11 6 kV 10 mA 50 Vp-p 100 Vp- 3% or les (When changing fro	P 0 mA) 0	- - - - - -
lax. rate lax. rate tipple TYP)	ed output *1 ed voltage ed current 5 kV when no load is connected Max. rated load	- -	50 W (5 kV/10 6 kV 10 mA 50 Vp-p 100 Vp-p 3% or les (When changing fro	0 mA)	- - - - -
lax. rate lax. rate tipple TYP)	ed voltage ed current 5 kV when no load is connected Max. rated load regulation	-	6 kV 10 mA 50 Vp-p 100 Vp-j 3% or les (When changing fro	p	-
lax. rate tipple TYP) /oltage r	ed current 5 kV when no load is connected Max. rated load regulation	-	10 mA 50 Vp-p 100 Vp-1 3% or les (When changing froi	p	-
tipple TYP) oltage r	5 kV when no load is connected Max. rated load regulation	-	50 Vp-p 100 Vp-j 3% or les (When changing froi	p	-
TYP) /oltage r	load is connected Max. rated load regulation	-	100 Vp-j 3% or les (When changing fro	p	-
oltage r	regulation		3% or les (When changing from		
oltage r	regulation		3% or les (When changing from		-
			(When changing from	3% or less	
hort-circ			(When changing from maximum rated load to no load)		
Short-circuit current (TYP)			40 mA (when generation 6	kV output)	
Discharge feature			Forced discharge completio	n	
				nstanding vo	
		ca	n be set to 50% of th	ne test volta	ge.
•		The AC: 0.0	test voltage upper 0 kV to 5.50 kV, DC	limit can be : 0.00 kV to	set. 6.20 kV
ge moni	itor feature	+350 V or	is lower than the sp	pecified valu	ue - 350 V,
	Scale		6 kV AC/DC	C f.s	
nalog	Accuracy		± 5 % f.s	6	
	Indication	A	le		
	Measurement range				
	Display		0.000	kV	
igital		V < 500 V: ±(1			±1.5 % of rdna
	Response				
	Hold feature	After a	est is finished, the r	measured vo	oltage is
	Measurement range	AC: 0.00 mA to 110 mA			AC: 0.00 mA t 110 mA
		i = measured cu		1 m 1 ~ : :	< 10 mA
	Display				
ligital					
ngitai			JLI. 🗆 mA	000.	⊔mA
	Accuracy *3				
	Response			-	
	Kooponae				
	Hold feature				
ge .n	alog	alog Accuracy Indication Measurement range Display Accuracy Response Hold feature Measurement range Display desurement range Accuracy *3 Response	sital	can be set to 50% of th The test voltage upper AC: 0.00 kV to 5.50 kV, DC If output voltage exceeds +350 V or is lower than the sy output is turned off, and protecting alog Scale Accuracy ± 5 % f.f. Indication Average value response Display □ Hold feature After a test is finished, the retained until the PASS or FAI Measurement range 0.000 kV to 6.500 Accuracy V < 500 V: ±(1.5 % of rdng + 20 V)	output is turned off, and protective features: alog Scale 6 kV AC/DC f.s Accuracy ± 5 % f.s 1 Indication Average value response/rms sca mange 0.000 kV to 6.500 kV AC/DC Display □. □□□ kV Accuracy V < 500 V: ±(1.5 % of rdng + 20 V); V ≥ 500 V:

Withstanding Voltage Test Mode

		TOS5300		TOS5301			TOS5302
		Judgment	Jud	gment method	Display	Buzzer	SIGNAL I/O
Judg- ment feature		UPPER FAIL	than or limit is of is turned the outp an UPP occurs. rise time withstar an UPP also oc	ent that is greater equal to the upper letected, the output off, and an UPPER ut is turned off, and ER FAIL judgment During the voltage (Rise Time) of DC ding voltage tests, ER FAIL judgment curs if there is a n with the voltage b.	FAIL LED lights OVER is displayed on the screen	ON	Generates a U-FAIL signal
	Judgment method and judgment operation	If a current that is less than or equal to the lower limit is detected, the output is turned off, and a LOWER FAIL judgment occurs. This judgment is not performed during voltage rise time (Rise Time) of all tests and during the voltage fall time (Fall Time) of AC withstanding voltage tests.		FAIL LED lights UNDER is displayed on the screen	ON	Generates a L-FAIL signal	
		PASS	without output i	ecified time elapses any problems, the s turned off, and a dgment occurs.	PASS LED lights	ON	Generates a PASS signal
		If PASS HOLD is enabled, the PASS signal is generated continuously until the TOS5300 Series receives a STOP signal. The UPPER FAIL and LOWER FAIL signals are generated continuously until the TOS5300 Series receives a STOP signal. The FAIL and PASS buzzer volume levels can be changed. For PASS judgments, the length of time that the buzzer sounds for is fixed to 0.2 seconds. Even if PASS HOLD is enabled, the buzzer furms off after 0.2 seconds.					
	Upper limit setting	AC: 0.01 mA to 110 mA		AC: 0.01 mA to 110 mA DC: 0.01 mA to 11 mA		AC	: 0.01 mA to 110 mA
	Lower limit setting	AC: 0.01 110 mA	mA to	AC: 0.01 mA to 1 DC: 0.01 mA to	10 mA / OF		: 0.01 mA to 0 mA / OFF
	Judgment accuracy *3			.5 % of set), i < 1.0			
	Current detection method	Ca		the current's true his value with the r			pares
	Calibration	Calibrat	ed with	he rms of a sine w	ave using a	pure re	sistive load
	Voltage rise time			0.1 s to 1			
	Resolution	0.4		0.1 s		d ano: '	0001150
Time	Voltage fall time Test time	0.1 9		only enabled wher 999 s, can be tur			
	Resolution			s to 99.9 s: 0.1 s. 1			.,
	Accuracy						
*1. Regardi	Accuracy ±(100 ppm + 20 ms) excluding Fall Time						

*1. Regarding the output time limits: Taking size, weight, and cost into consideration, the heat dissipation capability of the voltage generator that is used for withstanding voltage tests has been designed to be one half that of the rated output. Use the TOS5300 Series within the following limits. If you use the product in a manner that exceeds these limits, the output section may overheat, and the internal protection circuits may be activated. If this happens, stop testing, and wait until the TOS5300 Series returns to its normal temperature.

Ambient temperature	Upper limit		Pause time	Output time	
	AC	50 mA < i ≤ 110 mA	Greater than or equal to the output time	30 min. max.	
t ≤ 40 °C	AC	i ≤ 50 mA	Not necessary	Continuous output possible	
l≤40 C	DC	5 mA < i ≤ 11 mA	Greater than or equal to the output time	1 min. max.	
		i≤5 mA	Greater than or equal to the wait time (WAIT TIME)	Continuous output possible	

(Output time = voltage rise time + test time + voltage fall time)

*2. Regarding the test voltage waveform

Waveform distortions may occur if an DUT whose capacitance is dependent on voltage (for example, an DUT that consists of ceramic capacitors) is connected as the load. However, if the test voltage is 1.5 kV, the effect of a capacitance of 1000 pF or less can be ignored. Because the product's high-voltage power supply uses the PWM switching method, if the test voltage is 500 V or less, the switching and spike noise proportions are large. The lower the test voltage, the greater the waveform is distorted.

*3. Regarding ammeter and judgment accuracy:

3. Regarding animeter and pugment accuracy. During AC withstanding voltage tests, current also flows in the stray capacitance of items such as the measurement leads and jigs. This current that flows in the stray capacitances is added to the current that flows in the DUT, and the sum of these currents is measured.Especially if you want to perform judgments with high sensitivity and accuracy, it is necessary to consider methods to limit the current that flows in these stray capacitances, such as by adding upper and lower limits.

Output voltage	1 kV	2 kV	3 kV	4 kV	5 kV
When using 350 mm long test leads that are suspended in air (TYP)	2 µA	4 µA	6 µA	8 µA	10 µA
When using the accessory,	16 µA	32 µA	48 µA	64 µA	Au 08

Insulation resistance test section

								то	S5302				
	Output voltage		25 V, 50 V, 100 V, 125 V, 250 V, 500 V, 1000 VDC (negative)										
		Accuracy	-0 %, +5 V										
	Max, rated load		1 W (-1000 V DC / 1 mA)										
	Max. rated current		1 mA										
		1000 V when no							p or less				
Output section	Ripple	load is connected Max. rated load							-p or less				
	Voltage regulat						1 % or less (wher		-	ed load	to no load)		
	Short-circuit cu	urrent						12 m/	A or less				
	Discharge feat	ure				Force	ed discharge after	test completion	on (discharge re	sistanc	e: approx. 25 kΩ		
	Limit voltage					The test v	oltage upper limit	can be set : 2	5 V, 50 V, 100 V	, 125 V,	250 V, 500 V, 1000	V	
	Output voltage	monitor feature	If outpu	ut volta	ige exceeds	"10 % of set	+ 10 V" or is lowe			output is	s turned off, and pro	tective featur	es are activated.
		Scale							C/DC f.s				
	Analog	Accuracy		± 5 % f.s Average value response/rms scale									
		Indication					Av	erage value r	esponse/rms so	ale			
Voltmeter		Measurement range						0 V to	-1200 V				
	Digital	Disalari	[1	Measured vo	oltage	V < 100	V	100 V ≤ V	< 1000	V 10	00 V ≤ V	
	3	Display	[Display		00 \		00		1	1000 V	
		Accuracy						± (1 % of	rdng + 1 V)				
		25 V					25	$M\Omega < R \le 125$	/ ±(2 % of rdng 5 MΩ / ±5 % of r 0 MΩ / ±10 % of	dng	s)		
		50 V					50	MΩ < R ≤ 250	/ ±(2 % of rdng) MΩ / ±5 % of r) MΩ / ±10 % of	dng	s)		
	Measurement	100 V		$0.100 \text{ M}\Omega \le R \le 100 \text{ M}\Omega / \pm 2\% \text{ of rdng} \\ 100 \text{ M}\Omega < R \le 500 \text{ M}\Omega / \pm 5\% \text{ of rdng} \\ 500 \text{ M}\Omega < R \le 1 \text{ G}\Omega / \pm 10\% \text{ of rdng} \end{cases}$									
Resistance	range / measurement accuracy *4 *5	125 V		0.125 MΩ ≤ R ≤ 125 MΩ / ±2 % of rdng 125 MΩ < R ≤ 625 MΩ / ±5 % of rdng 625 MΩ < R ≤ 1.25 GΩ / ±10 % of rdng									
meter		250 V		0.250 MΩ ≤ R ≤ 250 MΩ / ±2 % of rdng 250 MΩ < R ≤ 1.25 GΩ / ±5 % of rdng 1.25 GΩ < R ≤ 2.5 GΩ / ±10 % of rdng									
		500 V		$0.50 \text{ M}\Omega \le R \le 500 \text{ M}\Omega / \pm 2\%$ of rdng $500 \text{ M}\Omega < R \le 2.5 \text{ G}\Omega / \pm 5\%$ of rdng $2.5 \text{ G}\Omega < R \le 5 \text{ G}\Omega / \pm 10\%$ of rdng									
		1000 V		$1 M\Omega \le R \le 1 G\Omega / \pm 2 \% \text{ of rdng}$ 1 GΩ ≤ R ≤ 5 GΩ / $\pm 5 \%$ of rdng									
	Display *5		25 kΩ ≤ R < 1.00 MΩ 1.00 MΩ ≤ R < 10.0 MΩ 10.0 MΩ ≤ R < 100 MΩ 100.0 MΩ ≤ R < 1.00 GΩ 1.00 GΩ ≤ R ≤ 9.99 GΩ										
								100.0		-	. ΠΠ GΩ		
Hold feature		-	After a test is finished, the measured resistance is retained until the PASS judgment is cleared. Can be switched between three levels: Fast. Mid. Slow										
Current detectio	n response spee	a	Can be switched between three levels: Fast, Mid, Slow										
			Judgm	ent			Judgment m	ethod			Display	Buzzer	SIGNAL I/O
			UPPER I	FAIL	output is turi	ned off, and a	eater than or equ an UPPER FAIL ju e rise time (Rise T	dgment occur			FAIL LED lights; OVER is displayed on the screen	ON	Generates a U-FAIL signal
		nod and judgment	LOWER FAIL IS less than or equal to the lower limit is detected or if a FAIL LED lights; problem occurs during the voltage rise time (Rise Time), the output is turned off, UNDER is displayed and a LOWER FAIL judgment occurs. On the screen				Generates a L-FAIL signal						
	operation		PASS			ed time elaps judgment oc	ses without any pr curs.	oblems, the o	utput is turned o	off,	PASS LED lights	ON	Generates a PASS signal
Judgment feature			 If PASS HOLD is enabled, the PASS signal is generated continuously until the TOS5300 Series receives a STOP signal. The UPPER FAIL and LOWER FAIL signals are generated continuously until the TOS5300 Series receives a STOP signal. The FAIL and PASS buzzer volume levels can be changed. For PASS judgments, the length of time that the buzzer sounds for is fixed to 0.2 seconds. 										
	Upper limit set	ting range	Éven if PASS HOLD is enabled, the buzzer turns off after 0.2 seconds.										
	Lower limit set			0.03 MΩ to 5.00 GΩ 0.03 MΩ to 5.00 GΩ									
		angrange											
	Judgment accu (the same for U	iracy PPER and LOWER)	Measurement accuracy + 2 digits Humidity: 20 %rh to 70 %rh (no condensation). No interference caused by wobbly test leads or other problems. For judgments of 200 nA or less, a test time of at least 1.0 seconds is necessary. If the current detection response speed is set to Mid, a test time of at least 0.5 seconds is necessary. If the current detection response speed is set to Slow, a test time of at least 0.5 seconds is necessary.										
	Voltage rise tin	ne						10 m	s (TYP)				
Time	Test Time						0.1 s to	999 s, can be	turned off (TIM	ER OFF	·)		
Time		Resolution					0.1 s	to 99.9 s: 0.1	s. 100 s to 999	s:1 s.			
A	Accuracy		± (100 ppm + 20 ms)										

 *4 Humidity: 20 %rh to 70 %rh (no condensation). No bends in the test leads. *5 R = measured insulation resistance

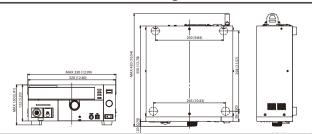
Other features/Interfaces

		TOS5300	TOS5301	TOS5302			
Double action feature		Tests can only be started by pressing and r	Tests can only be started by pressing and releasing STOP and then pressing START within 0.5 seconds of releasing the STOP switch.				
Length of time	e to maintain a PASS judgment result	You can set the length of time	You can set the length of time to maintain a PASS judgment: 50 ms, 100 ms, 200 ms, 1 s, 2 s,5 s, or HOLD.				
Momentary fe	eature	Tests a	re only executed while the START switch is held	d down.			
Fail mode fea	ture	This feature enables you to prevent rem	otely transmitted stop signals from clearing FAI	L judgments and PROTECTION modes.			
Timer feature		This f	eature finishes tests when the specified time ela	apses.			
Output voltag	e monitor feature		ge exceeds "setting + 350 V" or is lower than "se itches to PROTECTION mode, output is turned				
Memory		Up to	three sets of test conditions can be saved to me	emory.			
Key lock		L	ocks panel key operations (settings and change	s).			
Protective fea	atures		the TOS5300 Series switches to the PROTECTI stops testing. A message is displayed on the sci				
	Interlock Protection		An interlock signal has been detected.				
	Power Supply Protection		An error was detected in the power supply.				
	Volt Error Protection		While monitoring the output voltage, a voltage outside of the rated limits was detected. AC or DC withstanding voltage tests: ±350 V Insulation resistance test: ±(10 % of set + 10 V)				
	Over Load Protection		During a withstanding voltage test, a value that is greater than or equal to the output limit power was specified. AC withstanding voltage test: 550 VA. DC withstanding voltage test: 55 VA.				
	Over Heat Protection	The internal temperature of the TOS5300 Series became too high.					
	Over Rating Protection	During a withstanding voltage test, the output current was generated for a length of time that exceeds the regulated time.					
	Calibration Protection		The specified calibration period has elapsed.				
	Remote Protection	A connection to or d	sconnection from the front-panel REMOTE con	nector was detected.			
	SIGNAL I/O Protection	The rear-pa	anel SIGNAL I/O connector's ENABLE signal ha	is changed.			
	USB Protection	The USB connector has been disco	nnected while the TOS5300 Series was being c	ontrolled through the USB interface.			
System clock		Set in the	following format: year/month/day hour/minutes	/seconds.			
	Calibration date		Set when the TOS5300 Series is calibrated.				
	Calibration period setting	Set	the period before the next calibration is necess	sary.			
	Notification of when the calibration period elapses		n that is performed when the specified calibration n, it can display a notification or switch to the pr				
	USB		USB Specification 2.0				
Interfaces	REMOTE	Front-panel 9-pin MINI DIN connector. By conne	Front-panel 9-pin MINI DIN connector. By connecting an optional device to this connector, you can control the starting and stopping of tests remote				
	SIGNAL I/O		Rear-panel D-sub 25-pin connector				

General

			TOS5300	TOS5301	TOS5302		
Display				VFD: 256 × 64 dots + 4 status indicators			
Backup battery life			3 years (at 25 °C or 77 °F)				
	Installation locati	ion	Indoors, at a height of up to 2000 m				
	Spec guaranteed	Temperature	5 °C to 35 °C (41 °F to 95 °F)				
	range	Humidity		20 %rh to 80 %rh (no condensation)			
Environment	Operating range	Temperature		0 °C to 40 °C (32 °F to 104 °F)			
	Operating range	Humidity		20 %rh to 80 %rh (no condensation)			
	Storage range	Temperature		-20 °C to 70 °C (-4 °F to 158 °F)			
	Storage range	Humidity	90 %rh or less (no condensation)				
	Nominal voltage	range (allowable voltage range)	100 VAC to 240 VAC (90 VAC to 250 VAC)				
Jower ownels	Power	When no load is connected (READY)	100 VA or less				
Power supply	consumptio	When rated load isconnected		800 VA max.			
	Allowable freque	ncy range	47 Hz to 63 Hz				
nsulation resi	istance (between A	AC LINE and the chassis)	30 MΩ or more (500 VDC)				
Vithstanding	voltage (between /	AC LINE and the chassis)	1390 VAC, 2 seconds, 20 mA or less				
Earth continui	ity		25 AAC, 0.1 Ω or less				
Safety *6			Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU, EN 61010-1 Class I Pollution degree 2				
Electromagnetic compatibility (EMC) *6 *7			Complies with the requirements of the following directive and standard. EMC Directive 2014/30/EU EN 61326-1 (Class A), EN 55011 (Class A, Group 1), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the TOS5300 Series must be less than 3 m. The high test lead TL31-TOS is being used. Electrical discharges are not occurring outside the DUT.				
Dimensions			See "Outline drawing."				
Veight			Approx. 14 kg (30.9 lbs)	Approx. 15 kg (33.1 lbs)	Approx. 14 kg (30.9 lbs)		
Accessories				d (TL31-TOS): 1set (1 red wire and 1 black wire, bly type/High-voltage warning sticker: 1pc./Use			

External Dimensional Diagrams



*6 Does not apply to specially ordered or modified TOS5300 Series testers.

*7 Limited to products that have the CE mark on their panels.

*8 Contains the User's Manual, the Communication Interface Manual, the KI-VISA library, and the Safety evalution test.

ELECTRICAL SAFETY TESTER

Hipot Tester



Dimensions / Weight

320(12.60")W × 132(5.20")H × 350(13.78")Dmm / 14kg(30.9 lbs)

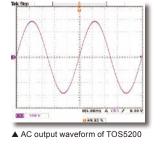
Accessories

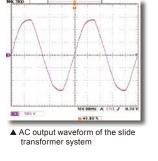
Power cord, High-voltage test lead wire: TL31-TOS, Highvoltage warning sticker, D-sub 25-pin plug, Setup Guide, Quick Reference, Safety information, CD-R(Contains the Communication Interface Manual, the KI-VISA library, and the Safety evalution test.)

Features and Functions

■ Highly stable output is realized with PWM Switching Amplifier! Equipped with the PWM switching amplifier system, the TOS5200 realizes highly stable output not affected by input form AC line.A conventional Hipot Tester boosts and outputs the AC line's input voltage using a slide transformer system and which, the input voltage fluctuations will affect the output, preventing test from being performed properly. Since the TOS5200 equips with a high-efficient PWM amplifier that can output a stable highvoltage without being affected by the variation of AC power line, users can perform "safe", "stable", and highly "reliable" tests with confidence, even in regions with large voltage variations.

The output waveform is essential factor in Hipot (Withstanding oltage) testing!





A perfect AC hipot test solution, with 500 VA capacity and equipped PWM amplifier at very affordable investment

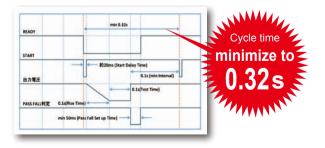
TOS5200 is designated model for AC Hipot Test with 500 VA capacity and 200 mA short circuit current output capability. With equipped PWM amplifier, this model can provide a stable & reliable output without being affected by AC power line. Therefore, it is a perfect AC Hipot Test solution for electronic equipment or devices based upon IEC, EN, UL, VDE and JIS etc. requirement. As TOS5200 maintains most of all features of our upper class model for AC Hipot Test, it achieves the superb cost / performance ratio for those who needs 200 VA or 500 VA capacity, or both. Also, as it equips Interlock function together with other safety features, operator can carry out the Test with higher current value in safety.

Features

- Hipot (Withstanding voltage): AC 5 kV/100 mA
- High-precision measurement ± 1.5 % of reading
- Rise/Fall time control function
- Key lock function and Protection cover on the panel operation
- Limit voltage function
- Monitoring output voltage function
- Equipped with USB and RS232C interface as standard

Capable of Test Time setting from 0.1s, which enables to reduce the tact time !

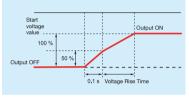
The TOS5200 can set the test time from 0.1 sec without sacrificing measurement accuracy. This makes test time 5 times faster compared to the TOS5050A (max test time:0.5sec) and it leads to reduce the tact time. Reduction of the tact time leads to improve the productivity, so it has been an issue that reducing the tact time may cause to worsen the measurement accuracy when the test time is faster than measurement respond speed.



Features and Functions

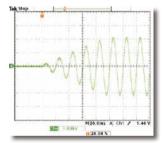
Rise time / Fall time control function

The rise time control function is to prevent the excessive stress that is being applied to the EUT (equipment under test). The Hipot (Withstanding voltage) test is conducted to verify the safety performance of the EUT and which test voltage for Hipot (Withstanding voltage) test is applied approximately five to ten times greater than the voltage that handles by the EUT. If a high voltage is applied rapidly with no rise time, the transitional large voltage (current) will be occurred, and it may cause a damage to the EUT. For this reason, safety standards stipulate the procedure of Hipot (Withstanding voltage) test, and the test voltage must be gradually increased to the specified voltage when the test is performed. The rise time control function adopted in the TOS5200 can set the voltage rise time from 0.1s to 10.0s (at a resolution of 0.1s) and also it is capable to set the 50% (fixed) of the applied test voltage. In addition, the fall time control function enables to decrease the test voltage gradually after the completion of a PASS judgement. The voltage fall time is fixed at 0.1s (OFF is also selectable).



▲ Start voltage can be set at 50 % of the test voltage

resolution of 0.1s.



▲ Rise time control waveform (example)

120 days & Ch1 X

▲ Fall time control waveform (example)

1.40

The Fall time control function enables you to decrease the test voltage gradually when the PASS judgment is made at the AC Hipot (Withstanding voltage) test. The voltage fall time is fixed at 0.1s. (OFF is also selectable).

The Rise time control function enables you to increases the test voltage gradually to reach the setting voltage while the AC Hipot (Withstanding voltage) test is conducted. The voltage rise time can be set from 0.1s to 10.0s at a

High Precision, High Resolution, Realizing high-speed judgment

High-precision measurement $\pm 1.5\%$ of reading (with voltmeter 500 V or higher, Ammeter 1 mA or higher) The auto-range function achieves the equivalent specifications of the judgment accuracy for the upper and lower fail, and it makes effective to detect the contact failure or the disconnected status of the test lead. Moreover, the test time as fast as 0.1s realize the high-speed judgment. It assures to perform testing with the high-precision, high-resolution, high-speed-measurement, and the judgment function.

Improved the setting resolution of the leak current by 0.01 mA !

TOS5200 can set the current limit from 0.01 mA to 110 mA. (TOS5050A: 0.1 mA to 110 mA)

lEnables to clarify the actual value of device under test (DUT) IThe setting resolution of the lower limit setting has been improved from the previous model, it enables to defect the failure more accurately.

ELECTRICAL SAFETY TESTER

TOS5200 Specifications

Unless specified otherwise, the specifications are for the following settings and conditions. • The warm-up time is 30 minutes. • TYP: These are typical values. These values do not guarantee the performance of the product. • rdng: Indicates the readout value. • set: Indicates a setting. • f.s: Indicates full scale.

Withstanding voltage tester

	Outpu	t range	0.05 kV to 5.00 kV			
		Accuracy	± (2 % of set + 20 V) when no load is connected			
		Operating range	0.00 kV to 5.50 kV			
		Resolution	10 V steps			
	Max. r	ated output *1	500 VA (5 kV/100 mA)			
	Max.r	ated voltage	5 kV			
	Max. r	ated current	100 mA (when the output voltage	is 0.5 kV or greater)		
	Transf	ormer rating	500 VA			
AC	Outpu wavefe	t voltage prm *2	Sine			
Output section	Distortion		If the output voltage is 0.5 kV or more: 3 % or less (when no load or a pure resistive load is connected)			
	Crest	factor	$\sqrt{2\pm3}$ % less than (when the output voltage is 800 V	′ or greater, no load)		
	Frequ	ency	50 Hz or 60 Hz			
		Accuracy	± 0.5 % (excluding during voltage	rise time)		
	Voltag	e regulation	10 % or less (when changing from maximum rated load to no load)			
	Input v variati	voltage on	± 0.3 % (5 kV when no load is connected; power supply voltage: 90 V to 250 V)			
	Short-	circuit current	200 mA or more (when the output voltage is 1.0 kV or greater)			
	Outpu	t method	PWM switching			
Start volt	age		The voltage at the start of withstanding voltage tests can be set to 50 % of the test voltage.			
_imit volt	age		The test voltage upper limit can be set . AC: 0.00 kV to 5.50 kV			
Output ve	oltage r	monitor feature	If output voltage exceeds the specified value + 350 V or is lower than the specified value - 350 V, output is turned off, and protective features are activated.			
		Measurement range	0.000 kV to 6.500 kV AC			
		Display				
Voltmeter	Digital	Accuracy	V < 500 V: ± (1.5 % of reading + 20 V), V ≥ 500 V: ±1.5 % of reading			
		Response *3	True rms, Average value response/rms display switchable			
		Hold feature	After a test is finished, the measu PASS or FAIL judgment is cleared			
		Measurement range				
			i = measured current			
			i < 1 mA	1 mA ≤ i < 10 mA		
		Display				
		Display	10 mA ≤ i < 100 mA	100 mA ≤ i		
Ammeter	Digital		mA	mA		
		Accuracy *4	1.00 mA ≤ i: ± (1.5 % of reading), + 30 µA)	I < 1.00 mA: ± (1.5 % of reading		
			1. 00			

				Judgment	Judgment method	Display	Buzzer	SIGNAL I/O			
				UPPER FAIL FAIL UPGER FAIL UPGER FAIL Judgment occurs.			ON	Generates a U-FAIL signal			
	Judgment method and judgment operation			LOWER FAIL	If a current that is less than or equal to the lower limit is detected, the output is turned off, and a LOWER FAIL judgment occurs. This judgment is not performed during voltage rise time (Rise Time) of all tests and during the voltage fall time (Fall Time) of AC withstanding voltage tests.	FAIL LED lights; LOWER is displayed on the screen	ON	Generates a U-FAIL signal			
lg- nt ture				PASS	If the specified time elapses without any problems, the output is turned off, and a PASS judgment occurs.	PASS LED lights; displayed on the screen	ON	Generates a PASS signal			
			 If PASS HOLD is enabled, the PASS signal is generated continuously until the TOS5300 Series receives a STOP signal. The UPPER FAIL and LOWER FAIL signals are generated continuously until the TOS5300 Series receives a STOP signal. The FAIL and PASS buzzer volume levels can be changed. For PASS judgments, the length of time that the buzzer sounds for is fixed to 0.2 seconds. Even if PASS HOLD is enabled, the buzzer turns off after 0.2 seconds. 								
	Upper	limit setting	0.01 mA to 110 mA								
	Lower	limit setting	0.01 mA to 110 mA / OFF								
	Judgn *4	nent accuracy	1.00 mA ≤ i: ± (1.5 % of set), i < 1.00 mA: ± (1.5 % of set + 30 μA)								
	Current detection method		Calculates the current's true rms value and compares this value with the reference value					this value			
	Calibration		С	alibrated	I with the rms of a sine wav	e using a	pure re	sistive loa			
	Voltag	je rise time	0	.1 s to 10	.0 s						
		Resolution	0.1 s								
	Voltag	e fall time	0.1 s / OFF (only enabled when a PASS judgment occurs)								
ne	Test T	ïme	0	.1 s to 99	9 s, can be turned off (TIM	ER OFF)					
	Resolution		0.1 s to 99.9 s: 0.1 s/100 s to 999 s: 1 s								
	Accur	acy	±	± (100 ppm + 20 ms) excluding Fall Time							
			_	x · PP	,						

*1. Regarding the output time limits:

Response *3

Hold feature

Taking size, weight, and cost into consideration, the heat dissipation capability of the voltage generator that is used for withstanding voltage tests has been designed to be one half that of the rated output. Use the TOS5300 Series within the following limits. If you use the product in a manner that exceeds these limits, the output section may overheat, and the internal protection circuits may be activated. If this happens, stop testing, and wait until the TOS5300 Series returns to its normal temperature.

Jud mer feat

Tim

Ambient temperature		Pause time	Output time
t ≤ 40 °C	50 mA < i ≤ 110 mA	Greater than or equal to the output time	30 min. max.
	i ≤ 50 mA	Not necessary	Continuous output possible
		(Output time = vol	tage rise time + test time + voltage fall time)

True rms, Average value response/rms display switchable

until the PASS judgment is cleared.

After a test is finished, the measured current value is retained

*2. Regarding the test voltage waveform:

Waveform distortions may occur if an DUT whose capacitance is dependent on voltage (for example, an DUT that consists of ceramic capacitors) is connected as the load. However, if the test voltage is 1.5 kV, the effect of a capacitance of 1000 pF or less can be ignored. Because the product's high-voltage power supply uses the PWM switching method, if the test voltage is 500 V or less, the switching and spike noise proportions are large. The lower the test voltage, the greater the waveform is distorted *3. For both True rms and Mean-value response, 50 ms or above response time is required to satisfy the measurement accuracy.

*4. Regarding ammeter and judgment accuracy:

During AC withstanding voltage tests, current also flows in the stray capacitance of items such as the measurement leads and jigs. This current that flows in the stray capacitances is added to the current that flows in the DUT, and the sum of these currents is measured. Especially if you want to perform judgments with high sensitivity and accuracy, it is necessary to consider methods to limit the current that flows in these stray capacitances, such as by adding upper and lower limits.

Output voltage	1 kV	2 kV	5 kV
When using 350 mm long test leads that are suspended in air (TYP)	2 µA	4 µA	10 µA
When using the accessory, high test lead TL31-TOS (TYP)	16 µA	32 µA	80 µA

In case of 70 % humidity or higher, it is considerable to add 50 μA on the Limit value

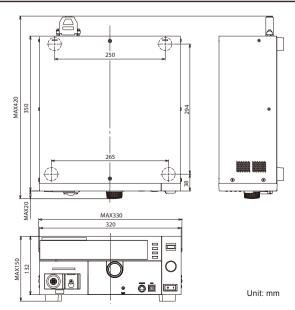
TOS5200 Specifications

Other features / Interfaces

Test m	ode				
	Double	e action feature	Tests can only be started by pressing and releasing STOP and ther pressing START within 0.5 seconds of releasing the STOP switch.		
	Length of time to maintain a PASS judgment result		You can set the length of time to maintain a PASS judgment: 50 ms 100 ms, 200 ms, 1 s, 2 s,5 s, or HOLD.		
	Mome	ntary feature	Tests are only executed while the START switch is held down.		
	Fail m	ode feature	This feature enables you to prevent remotely transmitted stop signals from clearing FAIL judgments and PROTECTION modes.		
	Timer	feature	This feature finishes tests when the specified time elapses.		
	Outpu feature	t voltage monitor	If output voltage exceeds "setting + 350 V" or is lower than "setting - 350 V," the TOS5200 switches to PROTECTION mode, output is turned off, and testing finishes.		
	Memo	ry	Up to three sets of test conditions can be saved to memory.		
	Key lo	ck	Locks panel key operations (settings and changes).		
Protective features		tures	Under any of the following conditions, the TOS5200 switches to the PROTECTION state, immediately turns output off, and stops testing. A message is displayed on the screen.		
	Interlo	ck Protection	An interlock signal has been detected.		
	Power	Supply Protection	An error was detected in the power supply.		
	Volt Er	ror Protection	While monitoring the output voltage, a voltage outside of the rated limits was detected. AC or DC withstanding voltage tests: ±350 V		
	Over Load Protection		During a withstanding voltage test, a value that is greater than or equal to the output limit power was specified. AC withstanding voltage test: 550 VA.		
	Over H	leat Protection	The internal temperature of the TOS5200 became too high.		
	Over F	Rating Protection	During a withstanding voltage test, the output current was generated for a length of time that exceeds the regulated time.		
	Remot	e Protection	A connection to or disconnection from the front-panel REMOTE connector was detected.		
	SIGNA	AL I/O Protection	The rear-panel SIGNAL I/O connector's ENABLE signal has changed.		
	USB P	rotection	The USB connector has been disconnected while the TOS5200 was being controlled through the USB interface.		
		USB	USB Specification 2.0		
Interfa	0.00	RS232C *1	D-SUB 9-pin connector on the rear panel (compliant with EIA- 232-D) All functions other than the POWER switch and KEY-LOCK		
inter la	003	REMOTE	Front-panel 9-pin MINI DIN connector. By connecting an optional device to this connector, you can control the starting and stopping of tests remotely.		
		SIGNAL I/O	Rear-panel D-sub 25-pin connector		
1. "Tal	k mode	" can be set, when F	RS232C is used as comunication interface.		
iaik m	iude D	escription			

Talk mode	Description	escription					
0	It responds or	t responds only for commands from PC. (Default setting)					
	It responds au measured val		art and end test, and returns the status, setting value,				
1	Response at	start	<start></start>				
I	Response at end of test	Status	<pass>, <u_fail>, <l_fail>, <prot>, <about></about></prot></l_fail></u_fail></pass>				
			Test No., Programme No., Test mode, Measured voltage, Measured current, Test time				

External Dimensional Diagrams



General

Display			LCD: LED backlight		
	Installation	location	Indoors, at a height of up to 2000 m		
	Spec guara	nteed range	5 °C to 35 °C (41 °F to 95 °F)/		
Environ-	temperature	e/humidity	20 %rh to 80 %rh (no condensation)		
ment	Operating rating ratio	ange temperature/	0 °C to 40 °C (32 °F to 104 °F)/ 20 %rh to 80 %rh (no condensation)		
		ige temperature/	-20 °C to 70 °C (-4 °F to 158 °F)/		
	humidity		90 %rh or less (no condensation)		
	Nominal vol (allowable v	ltage range /oltage range)	100 Vac to 240 Vac (90 Vac to 250 Vac)		
Power	Power	When no load is connected (READY)	100 VA or less		
supply	consumptio	When rated load isconnected	800 VA max.		
	Allowable fr	equency range	47 Hz to 63 Hz		
	n resistance n AC LINE a	nd the chassis)	30 MΩ or more (500 Vdc)		
	nding voltage n AC LINE a	e nd the chassis)	1500 Vac, one minute		
Earth co	ontinuity		25 Aac, 0.1 Ω or less		
Electron	nagnetic corr	npatibility (EMC) *1	Complies with the requirements of the following directive and standard. EMC Directive 2014/30/EU, EN 61326-1(ClassA *2), EN 55011(ClassA *2, Group1 *3), EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the TOS5200 must be less than 2.5 m. The shielded cable is being used when using the SIGNAL I/O. The hink test lead TL31-TOS		
Safety *	*1		Complies with the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU, EN 61010-1 (Class I *4, Pollution degree 2)		
Dimensions (mm(inches))(maximum)			320 (12.6") (330(12.99")) W × 132(5.2") (150(5.91")) H × 350(13.78") (420(16.54")) D		
Weight			Approx. 14 kg (30.9 lbs)		
Accessories			Power cord : 1pc. / High test lead (TL31-TOS) : 1set (1 red wire and 1 black wire, each with alligator clips); 1.5 m / D-sub 25-pin plug : 1set ; assembly type / High-voltage warning sticker : 1pc. / Setup Guide / Quick Reference (1 each for English and Japanese) / Safety informaion / CD-R *5		

*1 Only on models that have the CE marking on the panel. Although signals are insulated with output

*2

terminals, each signal is common. Logic setting is also possible. This is a Class A equipment. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

*3 This is a Group 1 equipment. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose. This is a Class I equipment. Be sure to ground this product's protective conductor terminal. *4

The safety of this product is only guaranteed when the product is properly grounded. *5 Contains the User's Manual, the Cimmunication Interface Manual, VISA library (KI-VISA), IVI-COM driver, and Safety evaluation test.

TU01-TOS Option(s) for Electrical Safety Testers

The TU01-TOS is a terminal unit that converts the 25 pin SIGNAL I/O connector of the Kikusui TOS5200/5300/5301/5302 Withstanding Voltage Tester to the 14 pin SIGNAL I/O connector of the TOS5050A/ 5051A. You can insert this unit between a controller and a TOS5200/5300/5301/5302 to perform the same external control that you can perform on the TOS5050A/ 5051A



ELECTRICAL SAFETY TESTER

Ground Bond Tester





Dimensions / Weight

430(16.93")W × 88(3.47")H × 270(10.63")Dmm / 11kg(24.25 lbs)

Accessories

AC power cord, Test leadwire TL12-TOS, Short bar(2pcs., these are inserted between the OUTPUT and SAMPLING terminals.), AC power fuse(2pcs., including one spare in the fuse holder), Operation manual

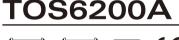
Supports UL60950-1 - new standard for information technology equipment (ITE)

While inheriting the basic performance and functions of its predecessor (TOS6200), such as a constant current driving system that provides current waveforms with little skew and high measurement accuracy, the TOS6210 tester extends the maximum test current from 30 A to 60 A, which is demanded by the new standard. In addition, the tester also lets you judge the acceptability of the device under test based on the drop in voltage, as required in the standard. What's more, you can preset test conditions of up to 20 different types of safety standards, such as those for information technology equipment, home appliances, medical devices, and measuring instruments, in the memory on the main unit's panel. A simple memory call operation allows you to set up a protective earthling or protective bonding continuity test as stipulated in UL60950-1 and other relevant specifications including IEC and JIS standards. The tester also features a set of functions that meet the specific needs of testing personnel, such as an offset cancellation function and a memo function that allows you to input calibration dates, production numbers, and other test-related information and read the input information later via the GPIB or RS-232C interface.

Features

- Test current value: 6 A to 62 A AC / Resistance value: 0.001 Ω to 0.600 Ω
- Voltage judgement function
- Offset cancelling function
- Stores 100 test conditions in memory
- Incorporates test conditions into program
- Contact Check function
- Equipped with standard GPIB and RS232C interfaces
- Equipped with standard test lead (TL12-TOS)

Ground Bond Tester







Dimensions / Weight

430(16.93")W × 88(3.47")H × 270(10.63")Dmm / 9kg(19.84 lbs)

Accessories

AC power cord, Test leadwire TL11-TOS, Short bar(2pcs., these are inserted between the OUTPUT and SAMPLING terminals.), AC power fuse(2pcs., including one spare in the fuse holder), Operation manual

Suitable design for the automated ground bond testing adopted with the constant current method.

The TOS6200A tester is designed to perform the ground bond tests required for class-I devices by safety standards such as IEC, EN, VDE, BS, UL, JIS, and the Electrical Appliance and Material Safety Low (Japan). Equipped with a new high-efficiency power supply, it is compact and lightweight, about half the size and weight of our conventional products, while achieving a large output of 150 VA. Use of the constant current method eliminates the need to reset test currents even in the face of fluctuating resistance values for the device being tested. The test duration can also be set from 0.3 s, making the tester suitable for production line testing, which requires reduced cycle time. This tester is also designed for ease of use, featuring a large, easy-to-read display, memory capacity for storage of 100 types of test conditions, and incorporation of test conditions into programs to enable automatic testing. Standard GPIB and RS-232C interfaces allow the user to use PCs or other devices to control test conditions such as test current, resistance value for judgement, and test duration, and enables read-back of measured values and test results.

Features

- \blacksquare Test current value: 3 A to 30 A AC / Resistance value: 0.001 Ω to 1.200 Ω
- Offset cancelling function
- Stores 100 test conditions in memory
- Incorporates test conditions into program
- Contact Check function
- Equipped with standard GPIB and RS232C interfaces
- Equipped with standard test lead (TL11-TOS)

TOS6210 Specifications

Output blo	ck		
Current se	tting r	ange *1	6.0 Aac to 62.0 Aac (With respect to resistance resulting in output power of the maximum rated Output or less and an output terminal voltage of 5.4 V or less)
Reso	olution		0.1 A
Accu	iracy		± (1 % of setting + 0.4 A)
Maximum		output	220 VA (at the output terminals)
Distortion			2 % or less (with respect to 0.1 Ω pure resistance load of 20 A or greater)
Frequency			50/60 Hz, sine wave (selectable)
Accu Open term		ltago	±200 ppm 6 Vrms or less
Output me		mage	PWM switching method
Output am			T will switching method
Measurem		nge	0.0 Aac to 66.0 Aac
Resolution		0 -	0.1 A
Accuracy			± (1 % of reading + 0.4 A)
Response	Response		Mean value response/rms value display (response time: 200 ms)
Holding fu	nction		The current measured at the end of test is held during the PASS or FAIL
-			inteval
Output vol Measurem			0.00 Vac to 6.00 Vac
Resolution		liye	0.01 V
Offset can		oction	0.00 to 5.40 V (Offset ON/OFF function provided)
Accuracy	Certu	ICTION	$\pm (1\% \text{ of reading} + 0.02 \text{ V})$
Response			Mean value response/rms value display (response time: 200 ms)
			The voltage measured at the end of test is held during the PASS or FAIL
Holding fu			inteval
Ohmmeter			
Measurem		nge	0.001 to 0.600 Ω
Resolution			
Offset can	cel fur	nction	0.000 to 0.600 Ω (Offset ON/OFF function provided)
Accuracy	_	_	\pm (2 % of reading + 0.003 Ω)
Holding fu	nction		The resistance measured at the end of test is held during the PASS or FAIL interval
Pass/fail ju	ıdaem	ent functio	
	3.544		Window comparator system
			If a resistance value equal to or greater than the upper reference value
			is detected, a FAIL determination is returned.
Resistance	e value	e-based	 If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned.
judgement	ont		 If a resistance value has been judged as FAIL, the tester shuts off the
			output and generates a FAIL signal.
			If the set time elapses without abnormalities, the tester shuts off the
			output and generates a PASS signal.
		for the upper	0.001 to 0.600 Ω
		ie (UPPER)	
		for the lower ie (LOWER)	0.001 to 0.600 Ω
	olution		0.001 Ω
		accuracy	± (2 % of UPPER + 0.003 Ω)
			Window comparator system
			• If a voltage value equal to or greater than the upper reference value is
			detected, a FAIL determination is returned.
Sampled v	oltage		If a voltage value equal to or less than the lower reference value is
value-base	ed judg	gement	 detected, a FAIL determination is returned. If a voltage value has been judged as FAIL, the tester shuts off the
			output and generates a FAIL signal.
			If the set time elapses without abnormalities, the tester shuts off the
			output and generates a PASS signal.
		for the upper	
retere	nce valu	ie (UPPER)	0.01 to 5.40 V
	a ranae	for the lower	
		ie (LOWER)	0.01 to 5.40 V
	olution		0.01 V
		accuracy	± (2 % of UPPER + 0.05 V)
Calibration			Calibration is performed with the rms value of the sine wave, using a pure
		_	resistance load.
		DASS	Lights for approximately 0.2 sec when the measured value has been
		PASS	judged as PASS. It is lit continuously when the PASS holding time is set to HOLD.
LED		UPPER	Lights if a resistance or voltage value equal to or greater than the upper
		FAIL	reference value is detected and judged FAIL.
		LOWER	Lights if a resistance or voltage value equal to or greater than the upper
		FAIL	reference value is detected and judged FAIL.
			The buzzer sounds for the pass holding time has been set if the
			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS.
			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition:
Dura			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS.
Buzzer			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL.
Buzzer			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL.
Buzzer			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The measured value for FAIL or PASS judgment are adjustable.
Buzzer			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with
			The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The measured value for FAIL or PASS judgment are adjustable.
Buzzer Time	Sattin	10 12000	The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS.
	<u> </u>	ng range	The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available.
Time Test time	Accu		The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS.
Time Test time Environme	Accu ent	racy	The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s. Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms)
Time Test time Environme Operating	Accu ent enviro	nment	 The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II
Time Test time Environme Operating Warranty	Accu ent enviro Temp	nment erature	 The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II 5 °C to 35 °C
Time Test time Environme Operating	Accu ent enviro Temp Humi	nment erature dity	The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II 5 °C to 35 °C 20 %rh to 80 %rh (non condensing)
Time Test time Environme Operating Warranty range Operating	Accu ent enviro Temp Humi Temp	nment erature dity erature	 The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II 5 °C to 35 °C 20 %rh to 80 %rh (non condensing) 0 °C to 40 °C
Time Test time Environme Operating Warranty range	Accu ent enviro Temp Humi	nment erature dity erature	 The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II 5 °C to 35 °C 20 %rh to 80 %rh (non condensing) 0 °C to 40 °C 20 %rh to 80 %rh (non condensing)
Time Test time Environme Operating Warranty range Operating	Accu ent enviro Temp Humi Temp Humi	nment erature dity erature	The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The measured value has been judged as LOWER FAIL. Note that it cannot be adjusted individually since setting is shared with the setting for PASS. Setting range 0.3 to 999 s Timer ON/OFF function is available. ± (100 ppm of setting + 20 ms) Indoor use, Overvoltage Category II 5 °C to 35 °C 20 %rh to 80 %rh (non condensing) 0 °C to 40 °C

range

Humidity

90 %rh or less (non condensing)

Power require	ment					
Allowable volt	age range	85 Vac to 250 Vac				
	At no load (READY)	60 VA or less				
tion	At rated load	420 VA max.				
Allowable free	uency range	47 Hz to 63 Hz				
Insulation res	istance	$30 \text{ M}\Omega$ min. (500 Vdc), between AC line and chassis				
Hipot		1390 Vac (2 seconds), between AC line and chassis				
Ground bond		25 Aac/0.1 Ω max.				
Electromagne	tic compatibil	ity (EMC) *5 *6				
2. Used the st Safety *5 Conforms to t	adwire (TL12 nielded cable he requiremen	-TOS) which is supplied. which length is less than three meters when the SIGNAL I/O is used. nts of the following directive and standard.				
Low Voltage E EN61010-1 (C						
Physical dime	nsions (mm(ir	nch)(maximum)/ Weight				
430(16.93")(4	55(17.91"))W>	<88(3.46")(140(5.51"))H×270(10.63")(350(13.78))D/ Approx.11 kg(24.25 lbs)				
	Accessories					
AC power cor	d	1 piece				
Test leadwire	TL12-TOS	1 set				
Short bar		2 pieces (These are inserted between the OUTPUT and SAMPLING terminals.)				
AC power fuse 2 pieces (2, including one spare in the fuse holder)						

1 copy

Operation manual

*1 Time limitation with respect to output The heat radiation capacity at the output block of the tester is designed to be onethird of the rated output, accounting for size, weight, cost, and other factors. Always use the tester within the limitation values given below. Use of the tester beyond these limits will cause the temperature of the output block to rise excessively, potentially tripping the internal protection circuit. In this case, suspend testing for approximately 30 minutes, then press the STOP switch. When temperatures fall to normal levels, the tester will revert to ready status

Output time limitation			
Ambient temperature t (°C)	Test current I (A)	Pause time	Maximum allowable continuous test time
	40 < I ≤ 60	Equal to or greater than the test time	≤ 10 minutes
t ≤ 40°C	20 < I ≤ 40	Equal to or greater than the test time	≤ 30 minutes
	I ≤ 20	Not required	Continuous output possible

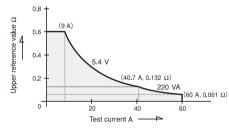
*2 About ohmmeter's response time

A resistance value is instantaneously obtained, calculated using the measured voltage and current values. The response time of the ohmmeter complies with the response times of the voltmeter and ammeter.

*3 Resistance value-based and sampled voltage value-based judgments cannot be simultaneously conducted.

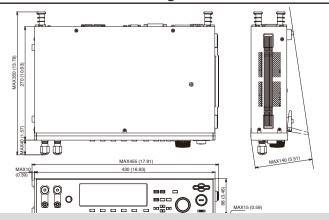
*4 Limited by the maximum rated output and the output terminal voltage. The tester can be used within the range shown below

Allowable range in which to determine the test current value and upper reference value



*5 Not applicable to custom order models. *6 Only on models that have CE marking on the panel.

External Dimensional Diagrams



TOS6200A Specifications

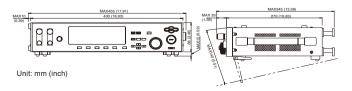
Section 3.0 Act 0 30 0 Act (With response the sistance resulting in output of terminal voltage of 5.4 V or less) Resolution 0.1 A Accuracy Accuracy 115 V A (at the output reminals) Distortion factor 2 % or less/with respect to 0.1 0 pure resistance load of 10 A or greater) Frequery 5000 Hz, sine wave (selectable) Accuracy 4 200 pm Oppol metrominals 2 % or less/with respect to 0.1 0 pure resistance load of 10 A or greater) Outpol method PWM switching method Outpol method PWM switching method Outpol method 0.1 A Accuracy 4 10 % of reading + 0.2 A) Resolution 0.1 A Accuracy 1 1 % of reading + 0.2 A) Resolution 0.1 A Accuracy 1 1 % of reading + 0.2 A) Resolution 0.1 A Accuracy 1 1 % of reading + 0.2 A) Resolution 0.1 A Accuracy 1 1 % of reading + 0.2 A) Resolution 0.01 V Accuracy 1 1 % of reading + 0.2 A) Resolution 0.01 D Accuracy	Output bl	ock		
Current setting range *1 With respect to resistance resulting in output power of the maximum rated Output or less and an output terminal voltage of 5.4 V or less) Resolution 0.1 A Accuracy 115 VA (at the output terminals) Distortion factor 25% or less/with respect to 0.1 0 pure resistance load of 10 As greater) Accuracy 8060 LFL; interwave (selectable) Accuracy 8070 As (at the output terminals) Distortion factor 25% or less/with respect to 0.1 0 pure resistance load of 10 As greater) Accuracy 8070 As (at the output terminals) Output method PWM switching method Output method 0.0 Ac to 3.0 Aac Resolution 0.1 A Accuracy 4 (1 % of reading + 0.2 Å) Resolution 0.1 A Accuracy 4 (1 % of reading + 0.2 Å) Resolution 0.0 Vac to 6.0 Vac Resolution 0.01 A Accuracy 1 % of reading + 0.2 Å) Resolution 0.00 Vac to 6.0 Vac Resolution 0.00 10 1.200 Q Resolution 0.001 0 1.200 Q Resolution 0.001 0 1.200 Q Resolution </td <td>in a con</td> <td></td> <td>3.0 Aac to 30.0 Aac</td>	in a con		3.0 Aac to 30.0 Aac	
Resolution 0.1 A Accuracy 1 (1 % of setting + 0.2 A) Maximum rated output 150 VA of the output reminals) Distortion factor 15 vX or less(with respect to 0.1 Ω pure resistance load of 10 A or greater) Frequency 50/60 Hz, sine wave (selectable) Accuracy 4 200 ppm Open terminal voltage 6 Vims or less Output method PWM switching method Output method 0.0 Ac to 3.0 Aac Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 Å) Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 Å) Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 Å) Resolution 0.01 V Accuracy ± (1 % of reading + 0.2 Å) Resolution 0.01 V Accuracy ± (1 % of reading + 0.2 Å) Resolution 0.01 Vac to 6.00 Vac Resolution 0.01 Lo 1 20 Q Resolution Doint 0 to 1.200 Q (Offset ONOFF function provided) Accuracy ± (2 % of reading + 0.003 Q) Resolution </td <td>Current s</td> <td>etting range *1</td> <td>(With respect to resistance resulting in output power of the maximum rated Output or less and an output</td>	Current s	etting range *1	(With respect to resistance resulting in output power of the maximum rated Output or less and an output	
Maximum rated output 150 VA (at the output terminals) Distortion factor 2 % or tess(with respect to 0.1 Q pure resistance load of 10 A or greater) Frequercy 5000 Hz, sine wave (selectable) Accuracy 2 200 ppm Open terminal vottage 6 Vms or less Output method PVM witching method Output method 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy 1 (1 % of reading + 0.2 A) Resolution 0.1 A Accuracy 1 (1 % of reading + 0.2 A) Resolution 0.01 V Accuracy 1 (1 % of reading + 0.2 A) Resolution 0.01 V Accuracy 1 (1 % of reading + 0.2 V) Resolution 0.01 V Accuracy 1 (1 % of reading + 0.02 V) Resolution 0.01 V Accuracy 1 (2 % of reading + 0.03 Q) Resolution 0.001 Q to 1.200 Q Resolution 0.001 Q to 1.200 Q </td <td></td> <td>Resolution</td> <td></td>		Resolution		
Distortion factor 2 % or fess(with respect to 0.1 Ω pure resistance load of 0 A or greater) Frequency 5060 Hz, sine wave (selectable) Accuracy 4 200 ppm Open terminal voltage 0 Virms or less Output method PVM switching method Output animeter 0.0 Ac to 33.0 Aac Resolution 0.1 A Accuracy 4 (1 % of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS or FALL interval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy 1 (1 % of reading + 0.2 V) Resolution 0.01 V Accuracy 1 (1 % of reading + 0.02 V) Resolution 0.001 Q Othermet range 0.001 Q 10 1.200 Q Resolution 0.001 Q Offset cancel function 0.002 N to 1.200 Q Resolution 0.001 Q 10 1.200 Q Resolution 0.001 Q 10 1.200 Q Resolution 0.001 Q 10 1.200 Q Resolifal judgement func		Accuracy	± (1 % of setting + 0.2 A)	
Distriction 10 A or greater) Frequency 500 Hz, sine wave (selectable) Accuracy 4 200 pm Open terminal voltage 6 Vrms or less Output method PWM switching method Output and/or 2 VMM switching method Output method 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 A) Resolution 1.1 A Accuracy ± (1 % of reading + 0.2 A) Resolution The aurent measured at the end of test is held during the PASS or FAL interval Output voltneter Measurement range 0.00 Vac to 6.00 Vac Resolution 0.01 V Cacuracy ± (1 % of reading + 0.02 V) Resolution 0.01 Do 1.200 Q Resolution Resolution Accuracy ± (1 % of reading + 0.03 Q) Resolution Resolution Obtin Diato 1.200 Q Resolution 0.001 Qo 1.200 Q Resolution Accuracy ± (2 % of reading + 0.003 Q) Resolution Resolution Resolution Accuracy ± (2 % of reading + 0.003 Q) Resolution	Maximum		· · · ·	
Tot A of greater) Frequency 5000 Hz, sine wave (selectable) Accuracy ± 200 ppm Open terminal voltage 6 Vmms or less Output method PVM waviching method Output method 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy ± f1 % of reading + 0.2 A) Resolution 0.1 A Accuracy ± f1 % of reading + 0.2 A) Holding function The current measured at the end of test is held during the PASS of FAL inteval Output voltate		· · · · ·	2 % or less(with respect to 0.1 Ω pure resistance load of	
Accuracy ± 200 ppm Open terminal voltage 6 Vmms or less Output method PWM switching method Output animeter 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 A) Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL inteval Output voltmeter Response Measurement range 0.00 Vac to 6.00 Vac Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL inteval Ohrmmeter Measurement range Resolution 0.001 Ω Offset cancel function 0.000 Ω Offset cancel function The resistance value equal to or less the held during the PASS interval Pass/fail judgement function The resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. If a resistance value equal to or less than the lower reference v			· · ·	
Open terminal voltage 6 Vms or less Output method PVM switching method Output method PVM switching method Measurement range 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy £ (1 % of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS or FALL inteval Output voltmeter Mean value response/ms value display (response time: 200 ms) Resolution 0.01 V Accuracy £ (1 % of reading + 0.02 V) Resonate Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FALL inteval Measurement range 0.001 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω Resolution The voltage measured at the end of test is held during the PASS or FALL inteval Pointer targe 0.001 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Resistance value	Frequenc			
Output method PWM switching method Output animeter Measurement range 0.0 Aac to 33.0 Aac Resolution 0.1 A Accuracy 4.0 % of reading + 0.2 A) Response Mean value response/ims value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS or FAL inteval Output voltimeter Output voltimeter Measurement range 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy 4.0 % of reading + 0.02 V) Resonation 0.01 V Accuracy 4.0 % of reading + 0.02 V) Resonation 0.00 Q to 1 200 Q Resonation 0.001 Q to 1.200 Q Resonation 0.001 Q Resonation 0.001 Q Accuracy + 12 % of reading + 0.003 Q) Holding function The resistance value equal to or rester than the		,		
Output anmeter O.O. A ac to 33.0 A ac Resolution 0.1 A Accuracy 1 (% of reading + 0.2 A) Response Mean value responsemms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS or FALL inteval Measurement range 0.00 Vac to 6.00 Vac Response Mean value response/ms value display (response time: 200 ms) Holding function 0.01 V Accuracy 4 (1% of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FALL inteval Ohnmeter : Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Resolution Odd to 1.200 Ω (Dest ON/OFF function provided) Accuracy 4 (2% of reading + 0.03 Ω) Holding function The resistance value equal to or greater than the upper reference value is detected, a FALL determination is returned. • 'I a resistance value equal to or greater than the upper reference value is detected, a FALL determination is returned. • 'I a resistance value equal to or greater than the upper reference value is detected, a FALL determination is return	· ·			
Measurement range 0.0 Ac to 33.0 Acc Resolution 0.1 A Accuracy £ (1% of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the SS of FALL interval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1% of reading + 0.02 V) Resolution 0.01 V Accuracy ± (1% of reading + 0.02 V) Resolution 0.01 V Accuracy ± (1% of reading + 0.02 V) Resolution 0.001 O to 1.200 Q Resolution 0.001 0 to 1.200 Q Resolution The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system If a resistance value equal to or less than the lower reference value is detected, a FAL determination is returned. If a resistance value has been jud			PWM switching method	
Resolution 0.1 A Accuracy ± (1 % of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS of FALL inteval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Resolution 0.01 Ω to 1.200 Ω Resolution 0.001 Ω Offset cancel function 0.001 Ω Offset cancel function 0.001 Ω Ordig function The resistance measured at the end of test is held during the PASS of FALL inteval Poss/fail judgement function 0.001 Ω Indig function The resistance value equal to or resistance value equal to				
Accuracy ± (1 % of reading + 0.2 A) Response Mean value response/ms value display (response time: 200 ms) The current measured at the end of test is held during the PASS of FAIL Inteval Output voltmeter Measurement range Measurement range 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Resolution 0.01 Q Accuracy ± (1 % of reading + 0.02 V) Resolution 0.001 Ω to 1.20 0 Resolution 0.001 Ω Ohimmeter '2 Measurement range Measurement range 0.001 Ω to 1.20 0 Resolution 0.001 Ω Accuracy ± (2 % of reading + 0.03 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function The resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • Undow comparator system • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned.				
Response Man value response/ms value display (response time: 200 ms) Holding function The current measured at the end of test is held during the PASS or FAIL interval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL interval Ohmmeter • Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Accuracy ± (2 % of reading + 0.033 Ω) Holding function The resistance result at the end of test is held during the PASS interval Pass/fail judgement function • Resistance value-based judgement • • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or g				
Holding function The current measured at the end of test is held during the PASS or FALL interval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1% of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FALL inteval Ohrmeter *2 Measurement range Odffset cancel function 0.001 Ω to 1.200 Ω Resolution 0.000 Lo 1.200 Ω Offset cancel function 0.000 Lo 1.200 Ω Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system • If a resistance value equal to or less than the lower reference value is detected, a FAL determination is returned. • If a resistance value quale to release FAL signal. • If a resistance value base been judged as FAL, the tester shuts of the output and generates a FAL signal. • If a resistance value has been judged as FAL, the tester shuts of the output and generates a FAL signal. • If a resistance value has been judged as FAL, the tester shuts of the output and generates a FAL signal. <td></td> <td></td> <td></td>				
Holding function The PASS or FAIL inteval Output voltmeter 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Resolution The voltage measured at the end of test is held during the PASS or FAIL inteval Ohimmeter 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Offset cancel function 0.000 Ω to 1.200 Ω Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function The resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper value equal to the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper value function 0.001 Ω to 1.200 Ω Setting range for the upper referen	Response	e		
Measurement range 0.00 Vac to 6.00 Vac Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FALL interval Ohmmeter • Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function • If a resistance value equal to or greater than the upper reference value is detected, a FAL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAL determination is returned. • If a resistance value has been judged as FALL determination is returned. • If a resistance value equal to or greater than the upper value (LOWFER) Setting range for the upper reference 0.001 Ω to 1.200 Ω Resolution 0.001 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window compa	Holding f	unction		
Resolution 0.01 V Accuracy ± (1 % of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL inteval Ohnmeter ** • Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω Offset cancel function 0.000 Ω to 1.200 Ω Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If the set time elapses without abromatilites, the tester shuts off the output and generates a FASS signal. Setting range for the lower reference 0.001 Ω to 1.200 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Judgement accuracy ± (2 % of UPPER + 0.003 Ω)	Output vo	oltmeter	·	
Accuracy ± (1 % of reading + 0.02 V) Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the VASS or FALL inteval Ohmmeter*2 Measurement range 0.001 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω (Offset ON/OFF function provided) 4 (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the resistance value equal to or greater than the upper reference value is detected, a FAIL determination is refurned. Resistance value-based judgement Window comparator system If a resistance value equal to or greater than the lower reference value is detected, a FAIL determination is refurned. If a resistance value equal to or greater than the lower reference value is detected, a FAIL determination is refurned. Value (UPPER) 0.001 Ω to 1.200 Ω Setting range for the lower reference 0.001 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is refurned. Value (UPPER) 0.001 Ω 0.1200 Ω Setting range for the lower reference value is detected, a FAIL determination is refurned. • If a voltage val	Measure	ment range	0.00 Vac to 6.00 Vac	
Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL inteval Ohnmeter ** Measurement range 0.001 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function The resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Resistance value-based judgement "If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. * If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. * If a resistance value equal to or greater than the upper reference value is detected, a FAIL general. * If the set time elapses without adopenrates a FAIL signal. * If the output and generates a FAIL signal. * If the voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. * If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. * If a voltage value equal to regreater than the upper reference value is detected,	Resolutio	n	0.01 V	
Response Mean value response/ms value display (response time: 200 ms) Holding function The voltage measured at the end of test is held during the PASS or FAIL Inteval Ohnmeter ♥ Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function The resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Resistance value-based judgement "If a resistance value equal to or rest than the lower reference value is detected, a FAIL determination is returned. Resistance value-based judgement 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the lower reference 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Value (LOVER) 0.001 Ω to 1.200 Ω Sampled voltage valu	Accuracy		± (1 % of reading + 0.02 V)	
Housing function the PASS or FAIL inteval Ohnumeter*2 Measurement range 0.001 Ω to 1.200 Ω Resolution 0.000 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system If a resistance value equal to or rest than the upper reference value is detected, a FAIL determination is returned. If a resistance value equal to or rest than the lower reference value is detected, a FAIL determination is returned. If a resistance value equal to or rest than the lower reference value is detected, a FAIL determination is returned. If a resistance value equal to or rest than the lower reference value (UPPER) Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the upper reference 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system ••• •• If a voltage value equal to or rester than the upper reference value is detected, a FAIL determination is returned. Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator s	Response	e		
Ohmmeter *2 Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system • if a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • if a resistance value equal to or greater than the lower reference value is detected, a FAIL determination is returned. • if a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. • if a resistance value equal to or greater than the lower reference value (UDWER) Setting range for the upper reference value is detected, a FAIL determination is returned. • if a resistance value equal to or greater than the upper value (UDWER) Resolution 0.001 Ω to 1.200 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system • if a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a voltage value equal to or greater than the upper reference value (UOWER) • 0.001 Ω Sampled voltage value-based judge walue equal to norereates a FAIL signal. • if a voltag	Holding f	unction		
Measurement range 0.001 Ω to 1.200 Ω Resolution 0.001 Ω Offset cancel function 0.000 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system • If a resistance value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FALL determination is returned. • If a resistance value base on judged as FALL, the tester shuts off the output and generates a FALL signal. • Value (UPPER) 0.001 Ω to 1.200 Ω Setting range for the upper reference value equal to or greater than the upper reference value (LOWER) 0.001 Ω to 1.200 Ω Setting range for the lower reference value (LOWER) 0.001 Ω 1.200 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a voltage value equal to or rester than the upper reference value is detected, a FALL determination is returned. Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator	Ohmmete	er *2		
Resolution 0.001 Ω Offset cancel function 0.000 Ω to 1.200 Ω (Offset ON/OFF function provided) Accuracy ± (2 % of reading + 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected. a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value (UPPER) 0.001 Ω to 1.200 Ω Setting range for the upper reference value (UPPER) 0.001 Ω to 1.200 Ω Value (LOWER) 0.001 Ω to 1.200 Ω Sampled voltage value-based judge value equal to or greater than the upper reference value (UPPER) 0.001 Ω to 1.200 Ω Sampled voltage value-based judge value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the upper reference value (UPPER) Sampled voltage value-based judge value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned.			0.001 Ω to 1.200 Ω	
Accuracy ± (2 % of reading ± 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system Resistance value-based judgement • If a resistance value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FALL determination is returned. • If a resistance value equal to or less than the lower shuts off the output and generates a FALL signal. • If a resistance value has been judged as FALL, the tester shuts off the output and generates a FAL signal. • If a resistance value has been judged as FALL, the tester shuts off the output and generates a FAL signal. • If the set time elapses without abnormalities, the tester shuts off the output and generates a FAL signal. • If a voltage value (LOWER) Setting range for the lower reference 0.001 Ω to 1.200 Ω • If a voltage value equal to or greater than the upper reference value (LOWER) Sampled voltage value-based • If a voltage value equal to or less than the lower reference value is detected, a FALL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FALL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FALL determination is returned. Stampled voltage value-based • If a voltage value equal to o	Resolutio	on San San San San San San San San San Sa	0.001 Ω	
Accuracy ± (2 % of reading ± 0.003 Ω) Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system Resistance value-based judgement • If a resistance value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FALL determination is returned. • If a resistance value equal to or less than the lower shuts off the output and generates a FALL signal. • If the set time elapses without abnormalities, the tester shuts off the output and generates a FALL signal. • If a resistance value equal to or greater than the upper reference value (LOWER) Setting range for the upper reference 0.001 Ω to 1.200 Ω Setting range for the lower reference Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FALL determination is returned. Sampled voltage value-based • Of 0 UPPER + 0.003 Ω) Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FALL determination is returned. • If a voltage value equal to or less than the lower reference value	Offset ca	ncel function	0.000Ω to 1.200Ω (Offset ON/OFF function provided)	
Holding function The resistance measured at the end of test is held during the PASS interval Pass/fail judgement function Window comparator system If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. Setting range for the upper reference value is detected, a FAIL determination is returned. If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIS signal. Setting range for the upper reference value (UPPER) 0.001 Ω to 1.200 Ω Setting range for the lower reference value is detected, a FAIL determination is returned. 0.001 Ω to 1.200 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Image for the lower reference value is detected, a FAIL determination is returned. Sampled voltage value-based judg-ment • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. Satting range for the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. Satting range for the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage				
Holding function the PASS interval Pass/fail judgement function Window comparator system • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value (UPPER) Setting range for the upper reference value (UPPER) 0.001 Ω to 1.200 Ω • If a resistance value equal to or greater than the upper reference value (LOWER) Resolution 0.001 Ω to 1.200 Ω • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Sampled voltage value-based • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference va				
Resistance value-based judgement Window comparator system • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIS signal. • If the set time elapses without abnormalities, the tester shuts off the output and generates a FAIS signal. Setting range for the lower reference value is detected, a FAIL determination is returned. • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Sampled voltage value-based judg-ment • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value as been judged as FAIL, the tester shuts off the output and generates a FAIL signal. • If a voltage value equal to or less than the lower reference value (UPPER) Setting range for the upper reference 0.01 V to 5.40 V	-			
Resistance value-based judgement • If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. • If it he set time elapses without abnormalities, the tester shuts off the output and generates a FAIL signal. • If it he set time elapses without abnormalities, the tester shuts off the output and generates a FAIL signal. • If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. • If the set time elapses without abnormalities, the tester shuts off the output and generates a PASS signal. Setting range for the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and generates a PASS signal. Setting range for the upper reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and generates a PASS signal. • If a voltage value has been judged as FAIL, the tester shuts off the output and generates a PASS	Pass/fail	judgement function		
value (UPPER) 0.001 Ω to 1.200 Ω Setting range for the lower reference value (LOWER) 0.001 Ω to 1.200 Ω Resolution 0.001 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Sampled voltage value-based judg-ment "If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. Sampled voltage value-based judg-ment "If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. Setting range for the upper reference value (UPPER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. Lights if a resistance value equal to or greater than the upper reference value equal	Resistan	ce value-based judgement	If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. If the set time elapses without abnormalities, the tester	
value (LOWER) 0.001 Ω 10 10 1.200 Ω Resolution 0.001 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Sampled voltage value-based judg- ment • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and gen- erates a FAIL signal. • If the set time elapses without abnormalities, the tester shuts off the output and generates a PASS signal. Setting range for the upper reference value (LOWER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Calibration 0.01 V to 2.40 V Resolution 0.01 V to 5.40 V Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD. Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD. Lights fi a resistance value equal to or greater than the upper reference value equal to or greater than the	Setting ra value (UF	ange for the upper reference PPER)	0.001 Ω to 1.200 Ω	
Resolution 0.001 Ω Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Sampled voltage value-based judg- ment Window comparator system • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and gene-rates a FAIL signal. • If the ext time elapses without abnormalities, the tester shuts off the output and generates a PASS signal. Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V 0.01 V to 5.40 V 0.01 V Judgment accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. LED PASS Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL.			0.001 Ω to 1.200 Ω	
Judgement accuracy ± (2 % of UPPER + 0.003 Ω) Sampled voltage value-based Window comparator system judg-ment • If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and gene rates a FAIL signal. • If the est time elapses without abnormalities the tester shuts off the output and generates a PASS signal. Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Resolution 0.01 V to 5.40 V Judgment accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL.			0.001 Ω	
Sampled voltage value-based judg- ment Window comparator system Sampled voltage value-based "If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. • If a voltage value equal to or greater than the lower reference value is detected, a FAIL determination is returned. • If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. • If a voltage value has been judged as FAIL, the tester shuts off the output and gene rates a FAIL signal. • If the est time elapses without abnormalities, the tester shuts off the output and generates a PASS signal. Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Galibration 0.01 V Upgrent accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. Lights for approximately 0.2 see when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL.	-			
value (UPPER) 0.01 V to 5.40 V Setting range for the lower reference value (LOWER) 0.01 V to 5.40 V Resolution 0.01 V Judgment accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. LED PASS LIghts for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. LIPPER FAIL Lights if a resistance value equal to or greater than the upper reference value equal to or greater than the upper reference value equal to or greater than the			If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. If a voltage value has been judged as FAIL, the tester shuts off the output and gen- erates a FAIL signal. If the set time elapses without abnormalities, the tester	
value (LOWER) 0.01 V to 5.40 V Resolution 0.01 V Judgment accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. LED PASS UPPER FAIL Lights for approximately 0.2 sec when the measured value has been judged as PASS.It is lit continuously when the PASS holding time is set to HOLD. LOWER FAIL Lights if a resistance value equal to or greater than the upper reference value equal to or greater than the	Setting ra value (UF	ange for the upper reference PPER)	0.01 V to 5.40 V	
Judgment accuracy ± (2 % of setting + 0.05 V) Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. LED PASS Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is it continuously when the PASS holding time is set to HOLD. UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL. LOWER FAIL Lights if a resistance value equal to or greater than the	value (LC	WER)	0.01 V to 5.40 V	
Calibration Calibration is performed with the rms value of the sine wave, using a pure resistance load. LED PASS Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD. UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL. LOWER FAIL Lights if a resistance value equal to or greater than the				
LED PASS Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD. UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL. LOWER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL.		·		
LED PASS Value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD. UPPER FAIL UPPER FAIL Lights if a resistance value equal to or greater than the upper reference value is detected and judged FAIL. Lights if a resistance value equal to or greater than the	Calibratio	on I	wave, using a pure resistance load.	
UPPER FAIL the upper reference value is detected and judged FAIL. LOWER FAIL Lights if a resistance value equal to or greater than the		PASS	value has been judged as PASS.It is lit continuously when the PASS holding time is set to HOLD.	
	LED	UPPER FAIL	the upper reference value is detected and judged FAIL.	
		LOWER FAIL		

Buzzer		The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS.
Time		
Test	Setting range	0.3 to 999 s Timer ON/OFF function is available.
Time	Accuracy	± (100 ppm of setting + 20 ms)
Environm		
Operating	g environment	Indoor use, Overvoltage Category II
Warranty	range	Temperature: 5 °C to 35 °C Humidity: 20 %rh to 80 %rh (non condensing)
Operating	g range	Temperature: 0 °C to 40 °C Humidity: 20 %rh to 80 %rh (non condensing)
Storage	range	Temperature: -20 °C to 70 °C Humidity: 90 %rh or less (non condensing)
Altitude		Up to 2000 m
Power re-		
Allowable	e voltage range	85 Vac to 250 Vac
Power consum-	At no load (READY)	60 VA or less
ption	At rated load	280 VA max.
	e frequency range	47 Hz to 63 Hz
	resistance	30 MΩ min. (500 Vdc), between AC line and chassis
Hipot		1390 Vac (2 seconds), between AC line and chassis
Ground b		25 Aac/0.1 Ω max.
		of the following directive and standard.
	-	010-1, Class I, Pollution degree 2
Electrom	agnetic compatibility (EMC) *3 *	4
EMC Dire EN61000 Under fol	-3-2, EN61000-3-3 lowing conditions 1. Used test le	wing directive and standard. Class A), EN55011 (Class A, Group 1), adwire (TL11-TOS) which is supplied. s less than three meters when the SIGNAL I/O is used.
	dimensions n)(maximum)	430(16.93")(455(17.91"))W × 88(3.46")(140(5.51"))H × 270(10.63")(345(13.58"))D
Weight		Approx. 9 kg (19.84 lbs)
Accessor	ies	
AC powe	r cord	1 piece
Test lead	wire TL11-TOS	1 set
Short bar		2 pieces (These are inserted between the OUTPUT and SAMPLING terminals.)
AC powe	r fuse	2 pieces (2, including one spare in the fuse holder)
Operation	n manual	1 сору
The he rated of limitation the out suspen	output, accounting for size, weig in values given below. Use of t out block to rise excessively, po	tput block of the tester is designed to be one-third of the ht, cost, and other factors. Always use the tester within the he tester beyond these limits will cause the temperature of tentially tripping the internal protection circuit. In this case, inutes, then press the STOP switch. When temperatures fall ready status.

Output time limitation			
Ambient temperature t (°C)	Test current I (A)	Pause time	Maximum allowable continuous test time
t ≤ 40°	15 < I ≤ 30	Equal to or greater than the test time	≤ 30 minutes
	l ≤ 15	Not required	Continuous output possible

*2 About ohmmeter's response time A resistance value is instantaneously obtained, calculated using the measured voltage and current A resistance value is instantaneously obtained, calculated using the measured voltage and current values. The response time of the ohmmeter complies with the response times of the voltmeter and ammeter.
 3 Not applicable to custom order models.
 *4 Only on models that have CE marking on the panel.

External Dimensional Diagrams



Options for Electrical Safety Testers

Test Lead TL01-TOS [cable length: 1.5 m/max. operating voltage: 5 kV]



TL13-TOS [cable length: 1.6 m/max. operating current: 40 A]



Buzzer Unit BZ01-TOS (for 100 V AC) *This can not be used with TOS5300 Series.



Remote Control Box

[one-hand operation/

dimensions: 200(7.87")W

 \times 70(2.76")H \times 39(1.54")

D mm/cable length: 1.5 m]

RC01-TOS *

TL02-TOS [cable length: 3 m/max. operating voltage: 5 kV]

TL03-TOS

TL31-TOS

[cable length: 1.5 m/max.

operating voltage: 5 kV]



TL22-TOS [cable length: 1.7 m/max. rating: 1000 V, 10 A]



Test Probe

HP01A-TOS * [cable length: 1.8 m/max. operating voltage: 4 kV AC(RMS), 5kV DC]

HP02A-TOS * [cable length: 3.5 m/max. operating voltage: 4 kV AC(RMS), 5kV DC]



RC02-TOS *

[both-hands operation/

dimensions: 330(12.99")W

 \times 70(2.76")H \times 39(1.54")

D mm/cable length: 1.5 m]

The optional adaptor DD-5P/9P is required for the connection with TOS5300, TOS5200 series and TOS9300 series.

Warning Light Unit PL01-TOS (for 100 V AC) *This can not be used with TOS5300 Series.



PL02A-TOS (for 24 V DC)







Terminal Unit TU01-TOS



TOS5300, TOS5200 series and TOS9300 series.

The optional adaptor DD-5P/6P is required for the connection with

EIA Standard Rack (Inch Size) Mounting Options

Product name	Bracke	ət
Product name	Model name	Panel width (*1)
TOS9300/9301	KRB3-TOS	3
TOS9301PD	KRB3-TOS	3
TOS9302	KRB3-TOS	3
TOS9303	KRB3-TOS	3
TOS9303LC	KRB3-TOS	3
TOS9320	KRB2-TOS	2
TOS5300	KRA4-TOS	4
TOS5301	KRA4-TOS	4
TOS5302	KRA4-TOS	4
TOS5200	KRA4-TOS	4
TOS6210	KRB2-TOS	2
TOS6200A	KRB2-TOS	2

*1 · FIA nanel width is 44 45 mm (1 3/4 inch). The nanel width does not include the rubber feet

TL11-TOS [cable length: 1.5 m/max. [cable length: 1.5 m/max. operating voltage: 10 kV] operating current: 30 A]



TL32-TOS [cable length: 3 m/max. operating voltage: 5 kV]



LP02-TOS [cable length: 2 m/max. operating current: 60 A (for TOS6210)]



[cable length: 1.5 m/max. operating current: 60 A (for TOS6210)]

TL12-TOS



TL33-TOS [cable length: 0.5 m/max. operating voltage: 5 kV]



DIN Cable DD-3 5P [Cable length: 3 m/ DIN plug to DIN plug]



DD-5P/6P [Adaptor/DIN to Mini DIN]



TOS5300/TOS5200 series signal I/O converter unit (25 pin to 14 pin)

JIS Standard Rack (Millimeter Size) Mounting Options

Product name	Bracke	ət
Product name	Model name	Panel width (*2)
TOS9300/9301	KRB150-TOS	3
TOS9301PD	KRB150-TOS	3
TOS9302	KRB150-TOS	3
TOS9303	KRB150-TOS	3
TOS9303LC	KRB150-TOS	3
TOS9320	KRB100-TOS	2
TOS5300	KRA200-TOS	4
TOS5301	KRA200-TOS	4
TOS5302	KRA200-TOS	4
TOS5200	KRA200-TOS	4
TOS6210	KRB100-TOS	2
TOS6200A	KRB100-TOS	2

*2 · IIS nanel width is 50 mm. The nanel width does not include the rubber feet, casters, and

Battery Impedance Meter

BIM1000 Series ((RS232C



Lineup

USB

BIM1030 (300 V max.) BIM1100 (1000 V max.)

Dimensions / Weight

214(8.43")W × 80(3.15")H × 300(11.81")D mm(inch) / 3 kg(6.61 lbs)

Accessories

Power cable, For Safety documents, Packing list, CD-ROM

Options

Clip-type four-wire test lead TL01-BIM

Zero adjustment tool OP01-BIM

Pin-type four-wire test lead TL02-BIM

Specifications

Voltmeter

Item		BIM1030	BIM1100
Rated input		±300 V	±1000 V
Range		6 V, 60 V, 300 V, AUTO	6 V, 60 V, 600 V, 1000 V, AUTO
	6 V range	±6.30000 V	±6.30000 V
Maximum	60 V range	±63.0000 V	±63.0000 V
display	300 V range	±315.000 V	-
value *1	600 V range	-	±630.000 V
	1000 V range	-	±1050.00 V
	6 V range	10 µV	10 µV
	60 V range	100 µV	100 µV
Resolution	300 V range	1 mV	-
	600 V range	-	1 mV
	1000 V range	-	10 mV
Accuracy *2	2	±(0.01 % of reading + 3 digit)	
Temperatur	e coefficient	±(0.001 % of reading + 0.3 digit) /°C	

Resistance Meter

Item		BIM1030 BIM1100	
Measureme	ent method	Four-terminal measurement method	
Range 3 mΩ		3 mΩ, 30 mΩ, 30	0 mΩ, 3 Ω, AUTO
3 mΩ range		3.1000 mΩ	
Maximum display	$30 \text{ m}\Omega \text{ range}$	31.00	0 mΩ
value *1	$300\ m\Omega$ range	310.0	0 mΩ
	3 Ω range	3.100	Ω 00
	3 mΩ range	0.1	μΩ
Resolution	$30 \text{ m}\Omega$ range	1 μΩ	
Resolution	$300\ m\Omega$ range	10 μΩ	
	3Ωrange	100	μΩ
	3 mΩ range	100	mA
Measured	30 mΩ range	100 mA	
current *3	$300\ m\Omega$ range	10 mA	
	3 Ω range	1 mA	
Measureme	ent frequency	1 kHz ±	:0.2 Hz
Accuracy *4		±(0.5 % of reading + 5 digit)	
	3 mΩ range	±(0.05 % of read	ling + 1 digit) /°C
Tempera- ture	$30 \text{ m}\Omega \text{ range}$	±(0.05 % of reading	ng + 0.5 digit) /°C
coefficient	300 mΩ range	±(0.05 % of reading	ng + 0.5 digit) /°C

Easy & reliable Battery measurements

Ever-changing battery technology requires batteries powering electric vehicles to have high voltage, high power and low impedance. The Battery Impedance Meter, or BIM1000 Series, is capable of measuring up to 1000 V of test voltage for simultaneous measurements of both battery voltage and resistance at high speeds. The BIM is the ideal equipment for power battery development research and production tests.

Features

- Maximum voltage measurement: 1000 V max. (BIM1100), 300 V max. (BIM1030)
- Voltage measurement accuracy: ±(0.01 % of reading +3 digit)
- Resistance measurement accuracy: ±(0.5 % of reading +5 digit)
- **E** Resistance measurement ranges: $3 \text{ m}\Omega/30 \text{ m}\Omega/300 \text{ m}\Omega/3 \Omega$
- High resolution: Voltage 10 µV(6 V range),
- Resistance 0.1 $\mu\Omega(3 \text{ m}\Omega \text{ range})$ Measurement frequency: 1 kHz ±0.2 Hz
- Sampling speed(Resistance & voltage simultaneous measurements): 20 ms(FAST)
- Zero adjustment function: Effective for decreasing measurement error.
- Measurement logging(500 pairs) and collective transfer function
- SIGNAL I/O, RS232C and USB as standard interface
- New high visibility color display.

Samplin	Sampling Time				
Item		BIM1030	BIM1100		
Sampling	Power supply frequency 50 Hz	FAST: 20 ms, MID: 5	0 ms, SLOW: 160 ms		
speed	Power supply frequency 60 Hz	FAST: 20 ms, MID: 42 ms, SLOW: 150 ms			
Judgme	Judgment Function				
Item		BIM1030	BIM1100		

Judgment method		Window comparator method. Judgment made with software.	
Resistan-	Setting range	0.0000 Ω to 3.1000 Ω	
се	Resolution	100 μΩ	
Valtana	Setting range	0.000 V to 315.000 V	0.00 V to 1050.00 V
Voltage	Resolution	1 mV	10 mV

Other Functions

Item BIM1030 BIM1		BIM1100	
Trigger Function		Select external trigger (EXTERNAL) or internal trigger (INTERNAL).	
	INTERNAL	Measures at the sampling speed (FAST, MID, SLOW) interval.	
	EXTERNAL	Starts measurement with a SIGNAL I/O connector signal, *TRG, or the SNGL TRG key on the front panel	
	Trigger delay	0 to 9.99	9 s, OFF
	Accuracy	±0.2	ms
Avera	age function	The average count can be set between 2 and 99. OFF setting available.	
Memory function		Saves up to 100 sets of measurement conditions.	
key lo	ock	Locks the key operation.	
Zero	adjustment	Zero adjustment of the voltmeter and resistance meter. OFF setting available. Zero point clear function available.	
	Adjustment rang	1000 digit	
Inte	rface		
Item BIM1030 BIM1		BIM1100	
RS23	32C	D-SUB 9-pin connecto	r, EIA-232-D compliant
USB		Complies with USE 12 Mbps max	

General Specifications			
Item		BIM1030	BIM1100
	Installation location	Indoors, 200	00 m or less
Environ- ment	Spec guaran- teed range	Temperature: 18 °C to 2 Humidity: 20 %rh to 80	
	Operating range	Temperature: 0 °C to 4 Humidity: 20 %rh to 80	
	Storage range	Temperature: -10 °C to Humidity: 90 %rh or les	
B	Input voltage range	85 Vac to 264 Vac (100 Vac to 240 Vac)
Power supply	Input frequ- ency range	47 Hz te	o 63 Hz
	Rated power	30	VA
Isolation vo	Itage	±300 V max	±1000 V max
Insulation re (between A chassis)	esistance C LINE and	30 MΩ or more (500 Vdc)	
	Between the AC LINE and the chassis	1500 Vac for 1 min	ute, 10 mA or less
Withstand- ing voltage	Between all the measurement terminals and the chassis	2000 Vdc for 1 min	nute, 1 mA or less
	Between all the measurement terminals and SIGNAL I/O	2000 Vdc for 1 minute, 1 mA or less	
Electromagnetic compatibility (EMC)		Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN 61326-1 (Class A), EN 55011 (Class A, Group 1), EN 61000-3-2, EN 61000-3-3	
Safety		Complies with the requ following directive and Low Voltage Directive 2 EN 61010-1 (Class I, Po EN 61010-2-030, EN 6	standards. 2014/35/EU ollution Degree 2),

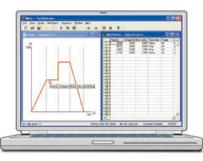
*2. Add ±2 digit when the sampling speed is set to FAST or MID

3. Within error ± 10 %.
 4. Add +3 digit when the sampling speed is set to FAST and +2 digit when

SOFTWARE

Application Software for Power Supplies and Electronic Loads





Features

- Easy operation for waveform images by using a mouse
- Sequence data can be edited easily.
- Sequence data can be stored easily.
- Four types of interfaces are available.

(USB, LAN, RS232C, GPIBs from NI, INTERFACE, and CONTEC) ■ Text files can be read freely.

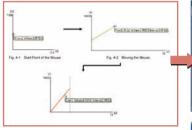
Operating Environment

- CPU: Pentium IV or later (Core 2 or later)
- OS/Memory: Refer to the website for the latest information available.
- Interface: RS232C. An RS232C cross-over cable is required.

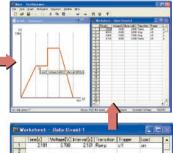
Easy-to-operate software expanding functions of power supplies and electronic loading units

WAVY is sequence creation software that supports the power supplies and electronic loads from KIKUSUI Electronics Corp.

You can use WAVY to create and edit sequences easily with a mouse. During sequence execution, you can also display execution points for visualization to monitor voltage, current, and other parameters and save them as a file.



Data now created with a mouse is displayed as shown on the right.



* When adding data, you can also enter the data directly in data cells.

Lineup

Model	Version	Hardware Sequence *1	Software Sequence *2	Operation Mode
Wavy for PCR-WE (SD032-PCR-WE)	6.0	✓ (600 steps)	-	CV (AC, DC, AC+DC)
Wavy for PWR-01 (SD027-PWR-01)	6.0	✓ (64 steps)	✓ (1024 steps)	CV, CC
Wavy for PWX (SD013-PWX)	6.0	-	✓ (1024 steps)	CV, CC
Wavy for PAV (SD024-PAV)	6.0	✓ (12 steps)	✓ (1024 steps)	CV, CC
Wavy for PMX (SD025-PMX)	6.0	-	✓ (1024 steps)	CV, CC
Wavy for PBZ	6.3	✓ (1024 steps)	-	CC, CV/DC, AC+DC
Wavy for PAS & PWR	5.0	-	✓ (1024 steps)	CV, CC
Wavy for PCR-M	5.1	-	✓ (2048 steps)	CV (AC, DC, AC+DC)
Wavy for PCR-LE (SD011-PCR-LE)	5.5	✓ (600 steps)	-	CV (AC, DC, AC+DC)
Wavy for PLZ-4W	5.3	✓ (Normal mode: 256 steps, Fast mode:1024 steps)	-	CV, CC, CR, CP
Wavy for PLZ-5W (SD023-PLZ-5W)	5.0	✓ (10000 steps)	-	CV, CC, CR, CP
Wavy for PLZ-5WH2 (SD033-PLZ-5WH2)	5.0	✓ (10000 steps)	-	CV, CC, CR, CP
Wavy for PLZ-U	3.2	✓ (256 steps)	✓ (1024 steps)	CC, CV, CR, CC + CV, CR + CV

*1 "Hardware Sequence" is to control the equipment using built-in sequence function of the unit. *2 "Software Sequence" is to control the sequence using "Wavy"

DRIVERS

The instrument drivers uploaded on our website are free to download for your convenience.

•					
	IVI-COM	IVI-C	VisualBasic 6.0	LabVIEW	Lab Windows/CVI
Test and Measurement Instruments					
TOS5300 Series	✓ (IviDCPwr)	✓ (IviDCPwr)	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
TOS6210/6200A			V		
AC Power Supplies					
PCR-MA Series	✓ (IviDCPwr)	✓ (IviDCPwr)	✔ (IVI-COM)	✔ (IVI-C)	✔ (IVI-C)
PCR-LE Series	✓ (IviACPwr)	✓ (IviACPwr)	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
DC Power Supplies					
PWR-01 Series	✓ (IviDCPwr)	🖌 (IviDCPwr)	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
PMX-A Series	✓ (IviDCPwr)	🖌 (IviDCPwr)	✔ (IVI-COM)	✔ (IVI-C)	✔ (IVI-C)
PBZ Series	✓ (IviDCPwr)	✓ (IviDCPwr)	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
PWX Series	✓ (IviDCPwr)	✓ (IviDCPwr)	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
Electronic Loads					
PLZ Series (5W/5WH2/4WL/U)	v .	 ✓ 	✔ (IVI-COM)	🖌 (IVI-C)	✔ (IVI-C)
Common Libraries					
VISA	KI-VISA				
IVI	IVI Shared Componer	nts			

Note: For details of the operation condition, please refer to our web site.

Rack Mount

Various Kikusui products can be easily mounted in a rack by using a bracket and rack mount frame, rack adaptor, etc.

JIS standards (millimeter size) and EIA standards (inch size) racks are available. Brackets and rack mount frames, rack adaptors, etc. applicable to each type are also available.

Since the width of one panel is 50 mm for JIS Standards and 44.45 mm for EIA Standards, the bracket and rack mount frame, etc. of the panel width matched to the product body are selected based on one panel width.

Racks

The KRO Series are designed in accordance with both JIS Standards and EIA Standards.

Since these racks are equipped with support angle as standard, even heavy products can be mounted. (With products weighing more than 70 kg, use a rack with brackets.)

The KRO Series conforms both JIS and EIA standards simply replacing the front panel with the rear panel.

The KRC series is a multifunctional decorative rack that is based on a steel cabinet rack and designed to allow the attachment of various rack options.

In addition to having models that meet two different standards (JIS and EIA) and being available in two overall heights (1,835 mm and 1,435 mm), this series comes in depths of 800 mm and 950 mm (two types), giving it eight models in all. Also, additional support angles (two types), base fittings and suspension eyebolts are available as separately sold options.

The Enclosed Type Rack (Custom product on request)

The rack system that will be used for concerning the heat generated from the Power Supplies, considerable amount of the dust as an environmental condition, metal corrosion occurred such as at plating factory, an electrolytic chemical synthesis factory.

(*The water cooled unit will be built in the system which require for the water pipe and drain)

Model		Pay load weight	Number	of panels	Overall height	Weight	The length for	Support	Support leveler	Options		
		kg	JIS	EIA	mm	kg	maximum surface	angle		Support angle	Base hold angle	Eyebolt
0	KRO1600	Approx. 300	32	36	1825	55		12 (6 pairs)	4			
Open rack (KRO series)	KRO1250		25	28	1475	50	700	10 (5 pairs)				
(1110 361163)	KRO900		18	20	1125	45		8 (4 pairs)				
Decorative rack	KRC363L	Approx. 300	x. 300	36	1835	95	950	12 (6 pairs)	4			
(KRC series)	KRC273L	Approx. 300		27	1435	85	950	10 (5 pairs)				
	KRC363			36	1835	90	800	12 (6 pairs)				
Decorative rack	KRC273		27	1435	75	000	10 (5 pairs)]	OP01-KRC OP02-KRC	OP03-KRC	OP04-KRC	
(KRC series)	KRC1603	Approx. 300	32		1835	90	800	10 (C noire)	4	*1	*2	*3
Production item	KRC1603L		32		1035	95	950	12 (6 pairs)	4			
upon order	KRC1203]	24]	1435	75	800	10 (E poiro)	5 pairs)			
	KRC1203L]				85	950	io (o pairs)				

• The KRO Series payload weight can be increased to approximately 400kg by changing the casters.

The KRO Series are sold in kit form.

• The support angle is designed for Kikusui racks and products. It is not interchangeable with products of the other manufacturer.

*1 These support angles (OP01-KRC) are equivalent to the support angles incorporated into the main rack unit.

They come in a two-item (1-pair) set. When the product weight exceeds 70 kg, use a weight support angle (OP02-KRC).

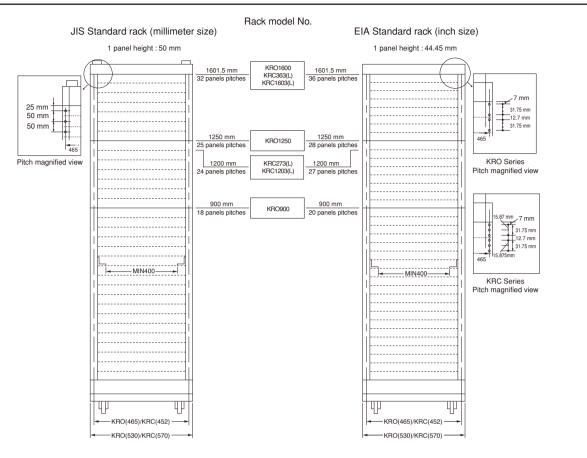
*2 These L-shaped fittings (OP03-KRC) secure the base of the rack to the floor. The set includes four main fitting components and the bolts and nuts that secure the fittings to the bases.

*3 These eyebolts (OP04-KRC) are specially made for the KRC series. The set includes four M12 eyebolts.



RACK ASSEMBLIES

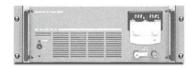
Racks Mount



Racks & Accessories

Bracket

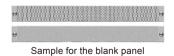
The bracket can be used to install models of 1 (1/1) rack in width directly in the rack.



Sample for the bracket (Pair of right and left portion)

Blank panel

When using brackets to install models liable to give off heat, it is necessary to provide at least the minimum number of blank panels required for each model. Plate-type panels and mesh-type blank panels are also available.

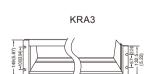


For use with rack adapter

KRA3 and KRA150 are rack adapters conforming to EIA/JIS standards to be used with standard racks. Power supplies can be stored without using brackets.

Complied products

- PWR-01 Series
- PWR Series (400/800 W)
- PWX750ML
- PMX-A Series
- PMX-Multi Series
- PCR500MA
- PLZ-5W Series (200/400 W)
- PLZ334WL
- PFX2500 Series



KRA150



EIA Standard Rack (Inch Size) Mounting Options

			1	Bracket		Blank panel		Rack n	nount frame	Rack a	dapter
	Product name			Bracket	Panel	"M" is added	Rack mount frame	Panel	Bracket necessary when fastening	Rack adaptor	Panel
	Series	Туре	Width	model No.	width(*1)	for mesh type	model No.	width(*1)	mainframe to rack mount frame	model No.	width(*1)
		400	1/6							KRA3	3
		800	1/3							KRA3	3
	PWR-01	1200	1/2							KRA3	3
		2000	1	KRB3-TOS	3						
DC power supply		400	1/4		,					KRA3	3
r su	PWR	800	1/2							KRA3	3
owe		1600	1	KRB3-TOS	3						
CB	PAV		1/6							KRA2-PAV	2
D	PWX	750/1500	1							KRB1-PWX SUPP	PORT ANGLE (*2)
	PMX-A 1/4		1/4			BP191(-M)				KRA3	3
	PMX-Multi 1/2		1/2			BP191(-M)				KRA3	3
	PBZ 1		1	KRB3-TOS	3					ĺ	
	PCR-WEA/WEA2	1000/2000/3000	1	KRB3-TOS	3					1	
		6000	1	KRB6	6					İ	
ply		12000	1	KRB9	9					ĺ	
ldns	PCR-MA	500	1/2							KRA3	3
ver		1000/2000	1	KRB3-TOS	3					1	
AC power supply		4000	1	KRB6	6						
AC		500	1	KRB4	4						
	PCR-LE	1000	1	KRB6	6						
		2000	1	KRB9	9						
	PLZ-5W	200/400	1/2							KRA3	
	PLZ-5W	1200	1	KRB3-TOS	3						
bad	PLZ2405WB 1		KRB2-TOS	2							
c L c	PLZ-5WH2	1000/2000/4000	1	KRB3-TOS	3						
Electronic Load		12000	1	KRB9	9						
ecti		20000	1	KRB13	13						
E	PLZ334WL 1/2		1/2							KRA3	3
	PLZ-U	PLZ-30F	2/3	KRB3-PLZ-30F	3						
	112-0	PLZ-50F	1	KRB3-PLZ-50F	3						
*3	PFX2511/PFX2512/SD	001-PFX	1/2							KRA3	3
*3	PFX2532		1	KRB3-TOS	3						

*1 EIA panel width is 44.45 mm (1 3/4 inch). The panel width does not include the rubber feet, casters, and levelers. *2 The instrument may fall. Install the suitable support angles applying to the used rack system to support the instrument. *3 Battery Tester

JIS Standard Rack (Millimeter Size) Mounting Options

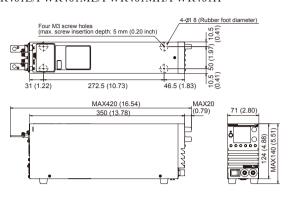
				Bracket		Blank panel		Rack n	nount frame	Rack a	dapter
	Product name			Bracket	Panel	"M" is added	Rack mount frame	Panel	Bracket necessary when fastening	Rack adaptor	Panel
	Series	Туре	Width	model No.	width(*1)	for mesh type	model No.	width(*1)	mainframe to rack mount frame	model No.	width(*1)
	ĺ	400	1/6	ĺ				·		KRA150	3
	DIVID OF	800	1/3							KRA150	3
	PWR-01	1200	1/2							KRA150	3
~		2000	1	KRB150-TOS	3						
ppl		400	1/4							KRA150	3
DC power supply	PWR	800	1/2							KRA150	3
owe		1600	1	KRB150-TOS	3						
Сp	PAV		1/6							KRA2-PAV	2
Д	PWX	750/1500	1							KRB1-PWX SUP	ORT ANGLE (*2)
	PMX-A 1/4		1/4			BP1H(-M)				KRA150	3
	PMX-Multi 1		1/2			BP1H(-M)				KRA150	3
	PBZ		1	KRB150-TOS	3						
	PCR-WEA/WEA2	1000/2000/3000	1	KRB150-TOS	3						
		6000	1	KRB300	6						
ply		12000	1	KRB400-PCR-LE	8						
AC power supply	PCR-MA	500	1/2							KRA150	3
ver		1000/2000	1	KRB150-TOS	3						
ód		4000	1	KRB300	6						
AC		500	1	KRB200	4						
	PCR-LE	1000	1	KRB300	6						
		2000	1	KRB400-PCR-LE	8						
	PLZ-5W	200/400	1/2							KRA150	3
	FLZ-JW	1200	1	KRB150-TOS	3						
bad	PLZ2405WB	PLZ2405WB		KRB100-TOS	2						
сĽс	PLZ-5WH2	1000/2000/4000	1	KRB150-TOS	3						
roni		12000	1	KRB400-PCR-LE	8						
Electronic Load		20000	1	KRB600	13						
Ξ	PLZ334WL 1/2		1/2							KRA150	3
	PLZ-U	PLZ-30F	2/3	KRB150-PLZ-30F	3						
	PLZ-U	PLZ-50F	1	KRB150-PLZ-50F	3						
*3	PFX2511/PFX2512/SL	01-PFX	1/2							KRA150	3
*3	PFX2532		1	KRB150-TOS	3						

*1 JIS panel width is 50 mm. The panel width does not include the rubber feet, casters, and levelers.

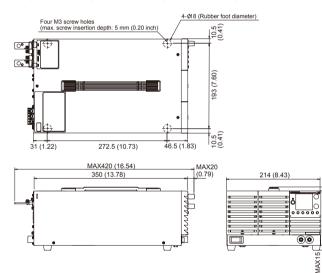
*2 The instrument may fall. Install the suitable support angles applying to the used rack system to support the instrument. *3 Battery Tester

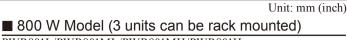
PWR-01 Series External Dimensional Diagrams / Rack Mount Option

■ 400 W Model (6 units can be rack mounted) PWR401L/PWR401ML/PWR401MH/PWR401H

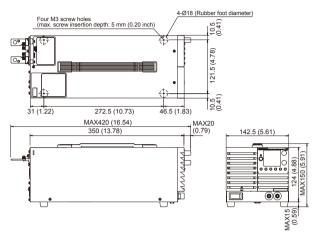


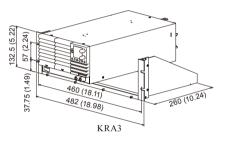
■ 1200 W Model (2 units can be rack mounted) PWR1201L/PWR1201ML/PWR1201MH/PWR1201H

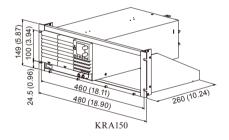




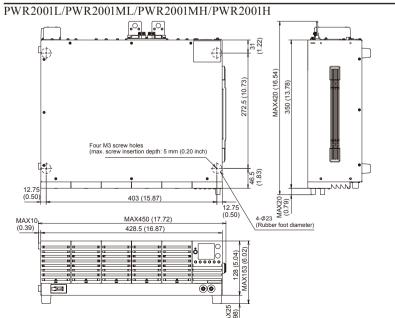
PWR801L/PWR801ML/PWR801MH/PWR801H

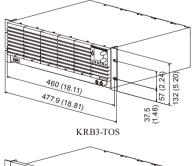


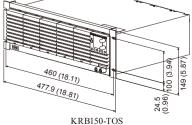




2000 W Model



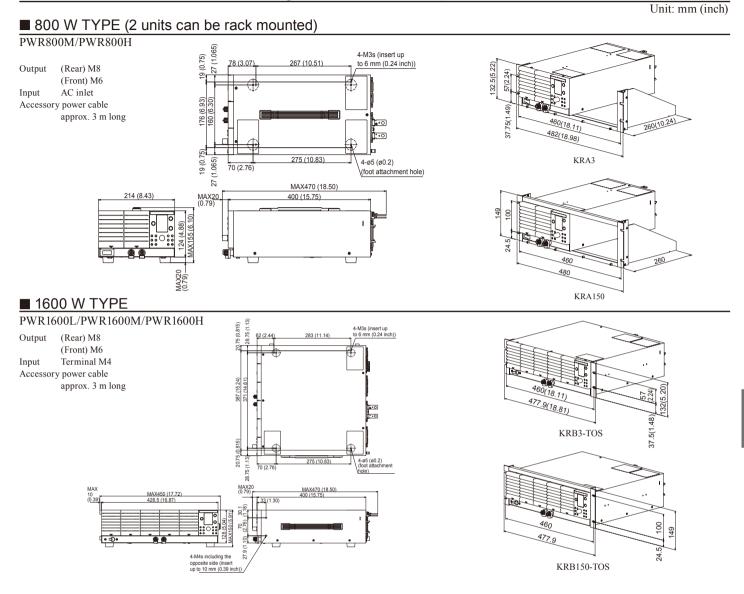




ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

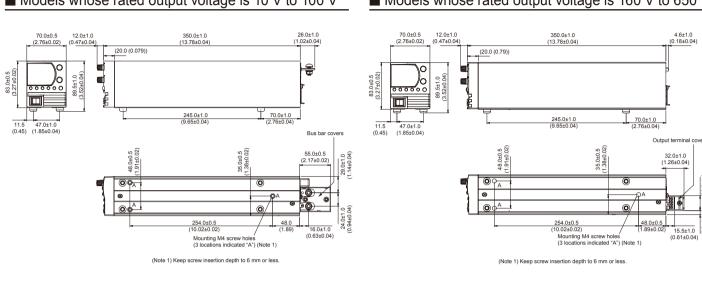
c

PWR Series External Dimensional Diagrams / Rack Mount Option



PAV Series External Dimensional Diagrams

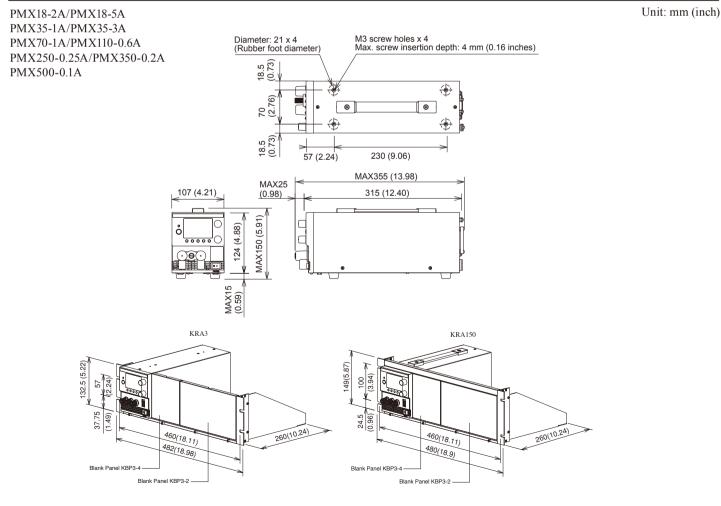
Unit: mm (inch)



Models whose rated output voltage is 10 V to 100 V

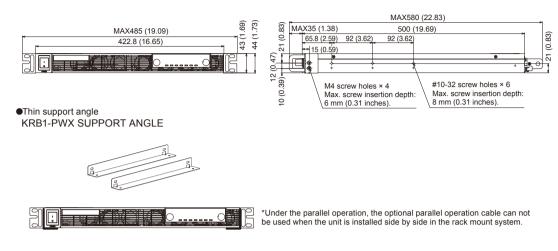
■ Models whose rated output voltage is 160 V to 650 V

PMX-A Series External Dimensional Diagrams / Rack Mount Option

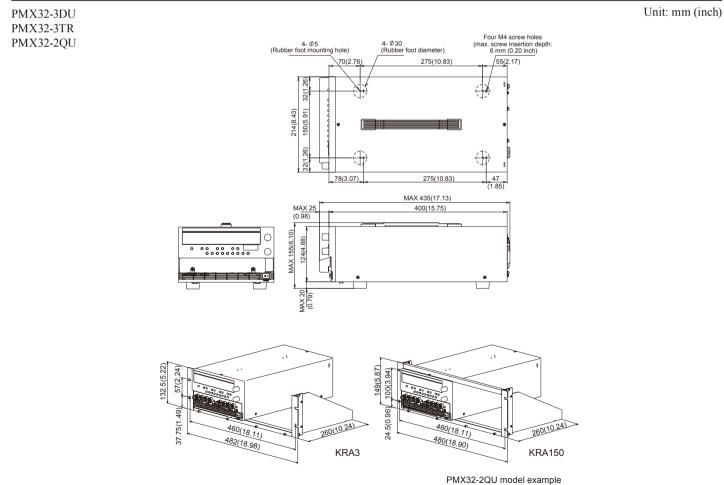


PWX Series External Dimensional Diagrams / Rack Mount Option

PWX750LF/PWX750MLF/PWX750MHF/PWX750HF PWX1500L/PWX1500ML/PWX1500MH/PWX1500H Unit: mm (inch)

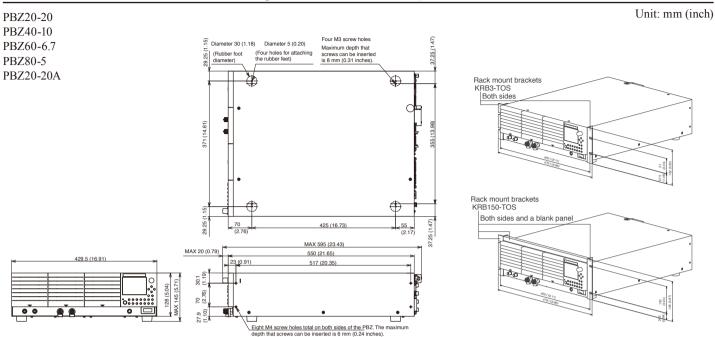


PMX-Multi Series External Dimensional Diagrams / Rack Mount Option



RACK ASSEMBLIES

PBZ Series External Dimensional Diagrams / Rack Mount Option



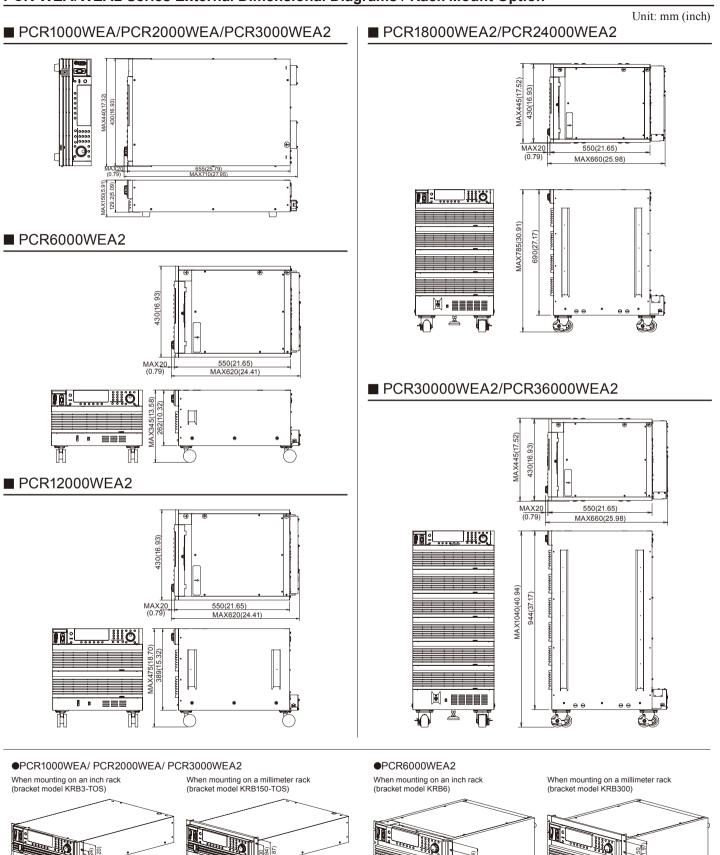
PBZ SR Series External Dimensionals

Dimensions (mm (inch) (Maximum dimensions))		
PBZ20-60 SR	PBZ40-30 SR	432.6 (17.03") (545 (21.46")) W × 579.4 (22.81") (685 (26.97")) H × 700 (27.56") (735 (28.94")) D
PBZ60-20.1 SR	PBZ80-15 SR	
PBZ20-80 SR	PBZ40-40 SR	432.6 (17.03") (545 (21.46")) W × 712.1 (28.04") (815 (32.09")) H × 700 (27.56") (735 (28.94")) D
PBZ60-26.8 SR	PBZ80-20 SR	
PBZ20-100 SR	PBZ40-50 SR	432.6 (17.03") (545 (21.46")) W × 844.8 (33.26") (950 (37.40")) H × 700 (27.56") (735 (28.94")) D
PBZ60-33.5 SR	PBZ80-25 SR	

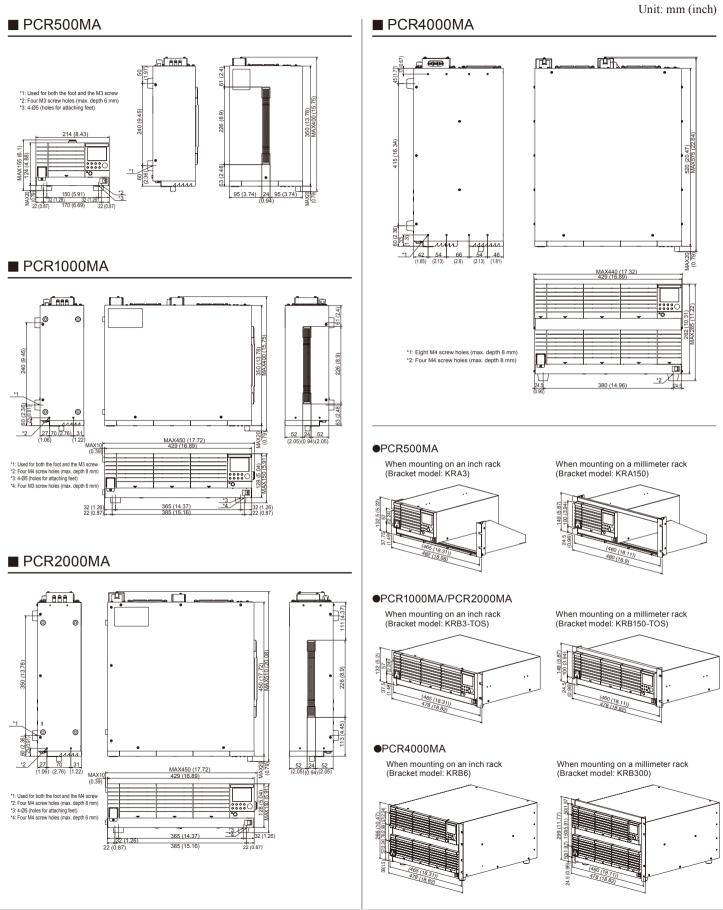
50.

460 (18.11)

PCR-WEA/WEA2 Series External Dimensional Diagrams / Rack Mount Option

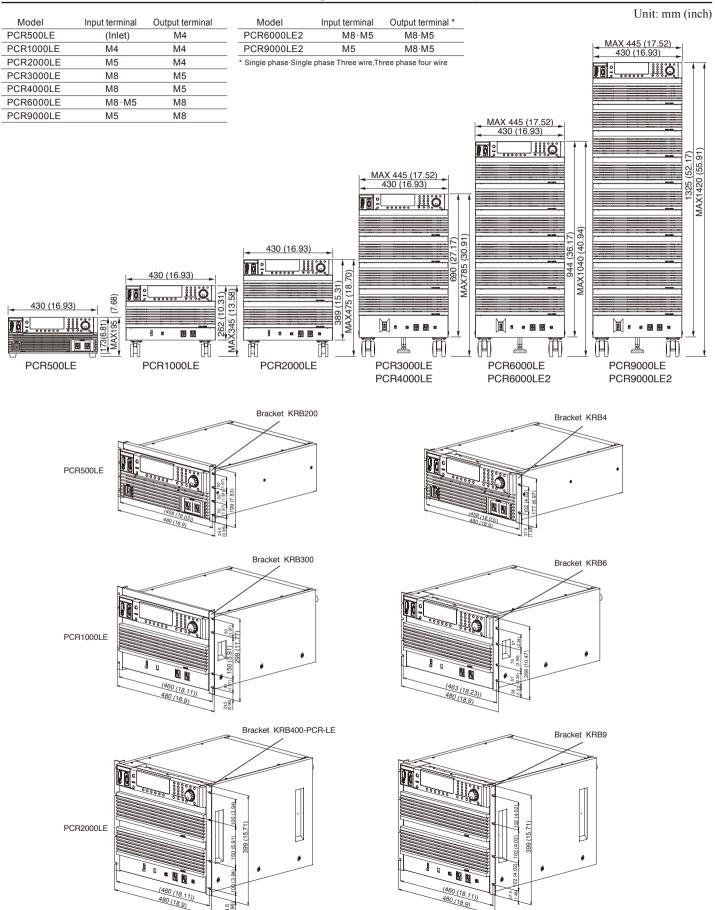


PCR-MA Series External Dimensional Diagrams / Rack Mount Option



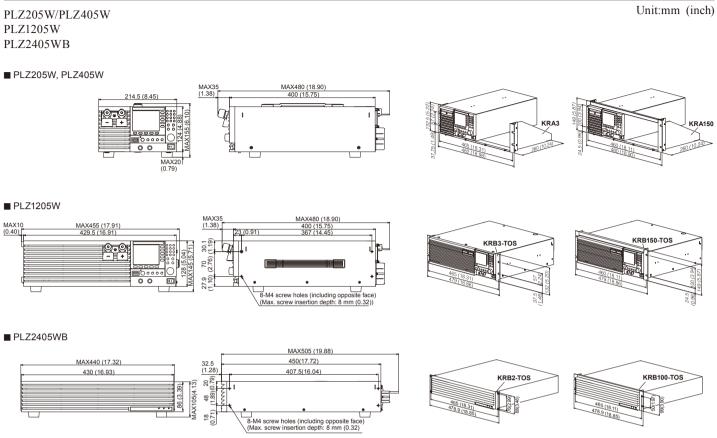
RACK ASSEMBLIES

PCR-LE/LE2 Series External Dimensional Diagrams / Rack Mount Option

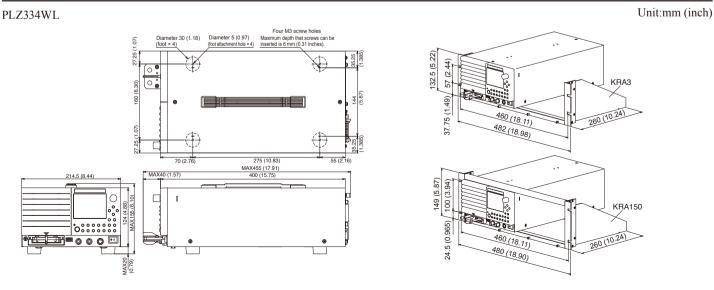


RACK ASSEMBLIES

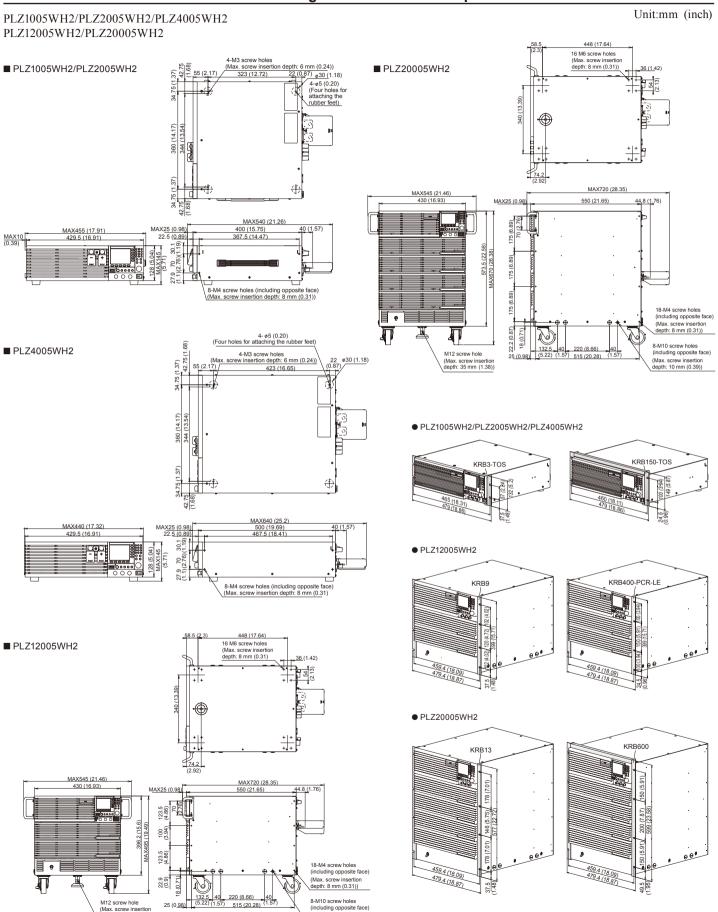
PLZ-5W Series External Dimensional Diagrams / Rack Mount Option



PLZ-4WL Series External Dimensional Diagrams / Rack Mount Option



PLZ-5WH2 Series External Dimensional Diagrams / Rack Mount Option



ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

25 (0,98)

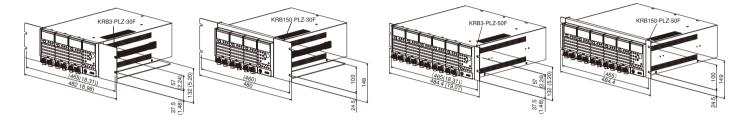
515 (20.28)

PLZ-U Series External Dimensional Diagrams / Rack Mount Option

PLZ70UA/ PLZ150U PLZ-30F/PLZ-50F

DC input terminals: (Rear) M6, (Front) M6 Input: AC inlet Attached power cable: SVT3 18AWG 3P plug, Cable length 2.4 m

MAX315 (12.40) MAX460 (18.11) MAX10 (0.39) 292 (11.50) MAX10 (0.39) 435 (17.13) MAX 470 (18.50) MAX 20 _____(0.79) 400 (15.75) ⊕ ۵ MAX150 (5.91) MAX150 (5.91) 128 (5.04) 128 (5.04) •0 ••• 0 *** *0 *** 0 0 ۲ **@**#@ **@**••@ **@**••@ **@**##@



ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

Unit: mm (inch)



KIKUSUI ELECTRONICS CORPORATION

Southwood 4F, 6-1 Chigasaki-chuo,Tsuzuki-ku,Yokohama,224-0032,Japan Phone: (+81)45-482-6353, Facsimile: (+81)45-482-6261

www.kikusui.co.jp/en/

For our local sales distributors and representatives, please refer to "sales network" of our website.

All products contained in this catalogue are equipment and devices that are premised on use under the supervision of qualified personnel, and are not designed or produced for home-use or use by general consumers. Specifications, design and so forth are subject to change without prior notice to improve the quality. Product names and prices are subject to change and production may be discontinued when necessary. Product names, company names and brand names contained in this catalogue represent the respective registered trade name or trade mark. Colors, textures and so forth of photographs shown in this catalogue may differ form actual products due to a limited fidelity in printing. Although every effort has been made to provide the information as accurate as possible for this catalogue, certain details have unavoidably been omitted due to limitations in space. If you find any misprints or errors in this

ES France - Département Puissance Energie - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

Distributor/Representative