

## TECHNICAL DATA AND OPTIONS

### MW I-TS-3873-1500-2600-2000-2 V3.0

Rated data AC terminal	
Number of AC mains connections	4
AC mains voltage, -frequency	3/PE AC 400 V 50 Hz
AC mains voltage tolerance	± 10 %
Frequency tolerance	± 5 %
Power consumption / mains connection	685 kVA
Power consumption total	2741 kVA
Power factor $\lambda$ at rated power	> 0.99 ind.
AC current max.	1100 A @ 400 V -10 %
Recommended pre-fuse	3x gL/gG 1250 A
Rated conditional short-circuit current $I_{CC}$	50 kA
Recommended cable cross section <sup>1, 2</sup>	4x 185 mm <sup>2</sup> per terminal ≥ 200 mm <sup>2</sup> PE
Connection for cable lug	M12
Implementation of rectifier	4 parallel rectifiers, each with a separate isolation transformer (DC connections are potential-free from the AC mains)
Rated data DC terminal	
Max. power at DC terminals supplied by rectifier	2600 kW
Number of DC terminals <sup>3</sup>	2
Power per DC terminal	± 3 000 kW (V <sub>nom</sub> x I <sub>nom</sub> )
DC voltage	DC 10 – 1 500 V
DC current	± 2 000 A
Measurement accuracy / measuring resolution	Voltage: 0.1 % fs / 16 Bit Current: 0.1 % fs / 16 Bit
Control accuracy	Voltage: 0.1 % fs Current: 0.1 % fs Power: 0.2 % fs (of max. DCC power)
Compensation of a voltage drop by use of sense line	Max. 5 % of DC voltage up to maximum nominal voltage
Short circuit performance	Short circuit proof ( $I_{CW} < 8$ kA, short circuit not for longer time)
Oversvoltage category at DC terminal <sup>4</sup>	II
Voltage tolerance static (setpoint value)	< 0.1 % fs <sub>rms</sub>

<sup>1</sup> Applies to installation type B1 as per DIN EN 60204, Tu = 25 °C, operating temperature conductor 70 °C, 3 leads simultaneously loaded to 100 %; Declared values are copper conductors; Usage of aluminum and copper conductors possible, Minimum cross-section for protective earth conductor according to DIN EN 61439-1 Tab. 5

<sup>2</sup> A cabinet base may be required for cable entry

<sup>3</sup> No galvanic isolation between the DC terminals; The minus poles of the individual DC terminals are connected to each other inside the system. The current in the negative pole per DC terminal must not exceed the rated current of the DC terminal. If DC inverter are connected in parallel, the same cables (same number, same cable type, same cross-section and same length) must therefore be connected to all minus poles.

<sup>4</sup> According to EN 60664-1

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Current tolerance static (setpoint value)	< 0.1 % fs <sub>rms</sub>
Voltage tolerance dynamic (0-100 % I <sub>Nom</sub> in 3 ms)	Simulator mode < 1 % Tester mode < 3 %
Ripple voltage residual <sup>5</sup>	< 0.1 % fs <sub>rms</sub>
Ripple current residual <sup>6</sup>	< 0.1 % fs <sub>rms</sub>
Recommended cable cross section <sup>1,2</sup>	8x 150 mm <sup>2</sup> per pole and per DC terminal ≥ 300 mm <sup>2</sup> PE per DC terminal
Connection for cable lug	M12
<b>Rated data total system</b>	
Protection type (as per EN 60529)	IP 20 (bottom IP 00)
Cabinet dimensions (W x D x H): (in 10 cabinets)	13 600 x 800 x 2 000 mm
Cabinet weights:	16 000 kg
Door stop	Right (standard), hinged 180°
Distance to ceiling min.	300 mm for IP 20
Distance to rear min.	200 mm
Cooling method	„WF“ enforced water cooling
Power loss max.	200 kW
Noise level (max. at full load and all DC converters at maximum current) <sup>7</sup>	< 80 dB(A)
<b>Safety characteristics according to EN ISO 13849-1:2015</b>	
Performance level <sup>8</sup>	d
Category	3
PFHd	5.7 · 10 <sup>-8</sup>
Operating life	20 years
Safe shutdown time	5 s

<sup>5</sup> Resistive load, operating mode “simulator” (voltage controlled)

<sup>6</sup> 48 V / 96 V starter battery, operating mode “tester” (current controlled)

<sup>7</sup> The current noise level of the system is depending on the load, the loading duration and the environmental conditions; Measurement takes place from front in 1 m high and 1 m distance

<sup>8</sup> Calculation basis: 1 000 000 switching cycles, 30 switching cycles per day  
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### General technical data

General data	
Protection class (as per EN 61140)	1
Earth conductor current	< 5 % I <sub>Nom</sub> typ. 50 mA
Permissible environmental conditions: Storage as per EN 60721-3-1 Transport as per EN 60721-3-2 Operation as per EN 60721-3-3	1K21 / 1M11 + 5 bis +40 °C 2K12 / 2M4 - 25 bis +70 °C 3K22 / 3M11 + 5 bis +40 °C <ul style="list-style-type: none"> <li>• 5 - 85 % rel. humidity, w/o condensation</li> <li>• with cabinet heater up to 95 % rel. humidity without moisture condensation</li> <li>• Degree of pollution 2</li> </ul>
Permissible installation height at rated load	1 000 m above sea level minimum air pressure 870 hPa
Installation site	<ul style="list-style-type: none"> <li>• Operating site with restricted access</li> <li>• Installation on non-flammable floor</li> </ul>
Cable entry	From below
Connection	Front, bottom, accessible after doors open
Paint	RAL 7035, full tone structured coating
Display	
Technology	TFT
Size	10.1" (screen diagonal)
Resolution	1 024 x 600 pixel
Input element	Resistive touchpad
Inputs emergency stop & stop <sup>9</sup>	
Voltage	24 VDC
Current	< 3.28 mA
Cable length • Unshielded cable • Shielded cable	< 30 m (≅ 60 m line length) < 200 m (≅ 400 m line length)
High voltage test	
Test voltages: – primary / secondary – primary / body – secondary / body	5.3 kVDC 2.8 kVDC 3.8 kVDC
Applied directives and standards	
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

<sup>9</sup> This data was taken from B&R's data sheet "Data sheet V 1.141 X20(c)SIx1x0". Further information can also be found here.  
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EMC Standards	EN 61000-2-4 Class 3 EN 61000-6-2 EN 55011 (tab. 2) EN 61800-3 Cat.C2(A1)
General requirements and safety requirements	EN 60146-1-1 EN 60146-2 EN 62040-1 EN 61439-1 EN 61439-2 EN 62477-1 EN 63000 EN 60529 EN 60721-X EN 61140
Further applicable standards in extracts:	
Safety of machinery	EN 60204-1 Exception: <ul style="list-style-type: none"> <li>• Sec. 11.3 Protection type see Techn. Data</li> <li>• Sec. 13.2 Identification of conductors</li> </ul>
Electr. power drives with adjustable speed: Functional safety	EN 61800-5-2
Safety of machinery - Safety-related parts of control systems	EN ISO 13849-1 EN ISO 13849-2
Technical data and options: Issue 12	

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### Basic equipment of MI-TS 3.0

- Safety control for Performance Level d (PL<sub>d</sub>) in accordance with ISO 13849-1 / EN 60204-1
- Display with touch operation
- "Battery tester" version
- Stop button for each DC converter (black mushroom button) in switch cabinet door
- Voltmeter and ready indicator light for each DC terminal in cabinet door
- DC contactors
- DC current measurement with 0.1 % accuracy
- Connection terminals for DC voltage measurement (0.1 % accuracy with sense lines)
- Connection terminals for external "Emergency Stop"
- Connection terminals for external "Stop" for each DC converter
- Connection terminals for calibrating case
- Interface Modbus TCP
- Interface CAN-bus ("100 Hz" with dbc file)
- Interface VNC over Ethernet
- Protection type IP 20

PRELIMINARY

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