PXI High Voltage Relay/Multiplexer 40-310/320

- INDUSTRY'S HIGHEST VOLTAGE PXI SWITCH MODULES
- Model 40-310: 8 or 16 x High Voltage SPST Reed Relays
- Model 40-320: 12 or 24 Channel High Voltage Multiplexer
- Hot Switch up to 750VDC or 750VAC peak, 10W Max Power
- Cold Switch up to 750VDC/750VAC peak Working Voltage (1000VDC/1000VAC peak Typical)
- Dry Reed Switch Contacts With RFI Suppression for Long Life
- Operating Speed 500µs Typical per Relay
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty

The 40-310/320 range of high voltage switching modules can hot switch up to 750V peak and cold switch up to 1000V peak in either general purpose relay (40-310) or multiplexer (40-320) configurations.

These modules use high quality reed relays with switching ratings comfortably higher than the 40-310/320 specification.

The 40-320 multiplexer allows multiple channels to be simultaneously selected. Alternatively, product variants can be supplied that operate as a conventional multiplexer with break-before-make action when a new channel is selected.

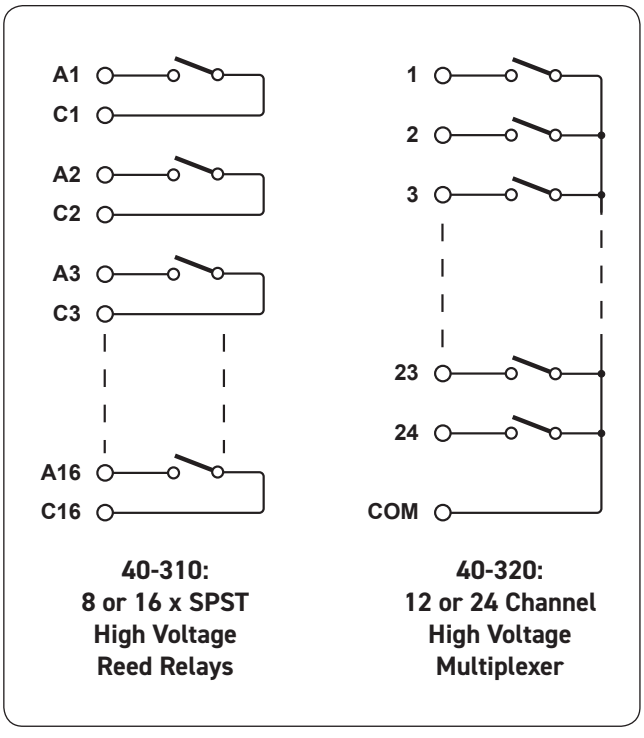
Applications include; circuit board isolation testing, relay testing, semiconductor breakdown monitoring and cable harness insulation testing.

RFI Suppression

The 40-310/320 module includes RFI suppression that extends relay contact life in hot switching applications and controls surges caused by high voltage transients in cold switching applications. The suppressors also ensure the module's safe operation when connected to a high voltage source via cable assemblies that might otherwise generate additional transients or RFI problems.

The suppression components result in reduced bandwidth and slightly higher path resistance compared to standard designs (please refer to the switching specification table).

Please note, it is good practice to keep high voltage switching modules away from more sensitive units to minimize crosstalk.



40-310: 8 or 16 x SPST High Voltage Reed Relays

40-320: 12 or 24 Channel High Voltage Multiplexer

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Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 240g (40-310-101).
3D models for all versions in a variety of popular file formats are available on request.

Connectors

PXI bus via 32-bit P1/J1 backplane connector.
Signals via front panel 37-pin male D-type high voltage connector, for pin outs please refer to the operating manual.

Operating/Storage Conditions

Switch Type:	Rhodium Reed
Max Hot Switching Voltage:	750VDC/750VAC peak*
Max Cold Switching Voltage:	750VDC/750VAC peak working* (1000VDC/1000VAC peak typical*)
Max Power:	10W
Max Hot Switch Current:	0.5A (13mA at max switch volts)
Max Cold Switch Current:	0.5A
Initial On Path Resistance:	<3Ω (single module)
Off Path Resistance:	>1x10^{10}Ω (single module)
Bandwidth:	250kHz
Operate Time - 40-310:	500µs typical
Operate Time - 40-320:	1ms typical, 500µs for multichannel mode
Expected Life, low power:	>1x10^{8} operations
Expected Life, full power:	>5x10^{6} operations

* For full voltage rating, signal sources to be switched must be fully isolated from mains supply and safety earth.

Power Requirements

+3.3V	+5V	+12V	-12V
0	400mA (typ 280mA)	0	0

Relay Type

The 40-310 and 40-320 are fitted with high quality Rhodium relays specifically designed for very high voltage switching and are manufactured by our sister company Pickering Electronics:

The design uses through hole leaded style relays to ensure easy replacement with no special tools required. A spare relay is fitted to each module to enable easy servicing.

High Voltage Switching Specification

Operating Conditions

Operating Temperature:	0°C to +55°C
Humidity:	Up to 90% non-condensing
Altitude:	5000m

Storage and Transport Conditions

Storage Temperature:	-20°C to +75°C
Humidity:	Up to 90% non-condensing
Altitude:	15000m

PXI & CompactPCI Compliance

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

Uses a 33MHz 32-bit backplane interface.

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives: Low-voltage safety EN61010-1:2010, EMC Immunity EN61326-1:2013, Emissions EN55011:2009+A1:2010.

Overview of "Hot" & "Cold" Switching Techniques

"Hot" Switching

This is when the load is switched with the high voltage source applied. Hot switching may generate considerable RFI, both within the switching module and on interconnecting wiring. Care must be taken to suppress or shield all cabling.

Note that any precaution which adds extra capacitance to a cable should be taken with great care, even a very small capacitance at high voltages can cause very large inrush current through the module resulting in possible switch weld and excessive RFI.

The 40-310/320 modules include extensive built-in RFI suppression circuits that minimize RFI and surge problems.

"Cold" Switching – The Preferred Option for Reliability & Long Life.

With cold switching, the relay is operated before the high voltage source is applied. In this case the maximum carry current is much greater, also there will be much less stress on the reed relays, resulting in improved reliability and life.

Most high voltage sources include a soft start facility which reduces the likelihood of generating RFI or temporary over-voltage.

High voltage switching modules are often used for isolation testing applications (e.g. cable, transformer or semiconductor isolation tests), in these cases, cold switching is nearly always the preferred option to reduce the risk of high voltage transients that may cause premature breakdown.

Product Order Codes - SPST Relays

8 x SPST, High Voltage Reed Relays	40-310-001
16 x SPST, High Voltage Reed Relays	40-310-101

Product Order Codes - Multiplexers

Channel Selection	Model Variant	Order Code
Multiple	12 Channel High Voltage MUX	40-320-001
Multiple	24 Channel High Voltage MUX	40-320-101

Note: Contact factory if the above modules are required in single channel selection mode.

Channel Selection	Model Variant	Order Code
Single	24 Channel High Voltage MUX	40-320-101-S1

Note: The above module is available to select a single channel.

Product Customization

Pickering PXI modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

Customization can include:

- Alternative relay types
- Mixture of relay types
- Alternative number of relays
- Different performance specifications

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Support Products

Spare Relay Kits

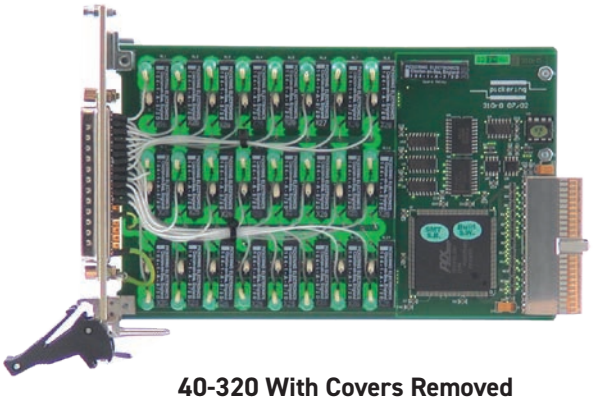
Kits of replacement relays are available for the majority of Pickering's PXI switching products, simplifying servicing and reducing down-time.

Product	Relay Kit
40-310-001/101	91-100-033
40-320-001/101	91-100-033

For further assistance, please contact your local Pickering sales office.

Mating Connectors & Cabling

For connection accessories for the 40-310/320 series please refer to the 90-007HVD High Voltage 37-pin D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.



40-320 With Covers Removed

40-320 With Covers In Place

Chassis Compatibility

This PXI module must be used in a suitable chassis. It is compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

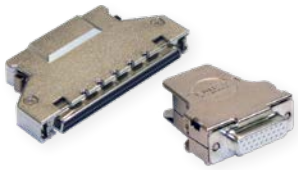
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system

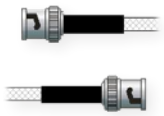
Connectivity Solutions

We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.

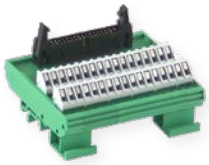


Connectors & Backshells

Multiway Cable Assemblies



RF Cable Assemblies



Connector Blocks

We also offer customized cabling and have a free online Cable Design Tool that can be used to create custom cable solutions for many applications.

Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for a PXI or LXI based test system. Our modules are fully supported by both Virginia Panel and MacPanel.

Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our sister company, Pickering Electronics. These instrument grade reed relays feature ***SoftCenter***® technology, ensuring long service life and repeatable contact performance

Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

The VISA driver is also compatible with Real-Time Operating Systems such as LabVIEW RT. For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE
- **Mathworks** Matlab
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries.

We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development.

Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available for all our modules and systems with various levels to suit your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years.

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector solutions you need. We have also published handy reference books for the PXI and LXI standards.