- Available as a PXI or PXIe Module
- High Density, High Current Switching
- 16 x SPST, 12 x SPST, 10 x SPST, 12 x SPDT and 6 x SPDT Options
- 16 A Maximum Switch Current
- Switch up to 300 VDC or 250 VAC
- 448 W/4000 VA Maximum Power
- 400 VDC Standoff Voltage
- Available With Optional Hardware Interlock
- VISA, IVI & Kernel Drivers Supplied for Windows
- PXI Version Supported by PXI or LXI Chassis
- 3 Year Warranty

40-161A Without Hardware Interlock

40-161A With Hardware Interlock Option

The 40-161A (PXI) and 42-161A (PXIe) have a choice of SPST, and SPDT power relay configurations and are suitable for switching loads up to 16 A at 250 VAC.

Power relay modules are intended for switching heavy AC or DC loads or for controlling large external relays, contactors and solenoids.

The 40/42-161A is ideal for switching up to 16 A in both AC and DC applications.


20-pin 16 A Power Connector for the 40/42-161A Module

Range Description:

- 40/42-161A-001   16 x SPST Power Relays
- 40/42-161A-002   12 x SPST Power Relays
- 40/42-161A-003   10 x SPST Power Relays
- 40/42-161A-101   12 x SPDT Power Relays
- 40/42-161A-102   6 x SPDT Power Relays
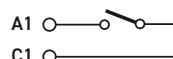
Updated Product Information

This product has been introduced as an update to the 40-161, the changes are to provide PXIe options plus the addition of the optional hardware interlock feature. The electrical performance of the 40-161 and 40/42-161A families are identical.
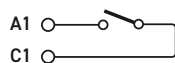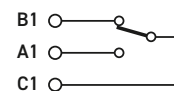

40/42-161A-001 - 16 x SPST
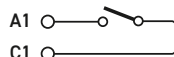
40/42-161A-002 - 12 x SPST

40/42-161A-003 - 10 x SPST

40/42-161A-101 - 12 x SPDT

40/42-161A-102 - 6 x SPDT

Relay Type

The 40/42-161A is fitted with electro-mechanical power relays with silver alloy contacts. A spare relay is built onto the circuit board to allow easy maintenance with minimum downtime.
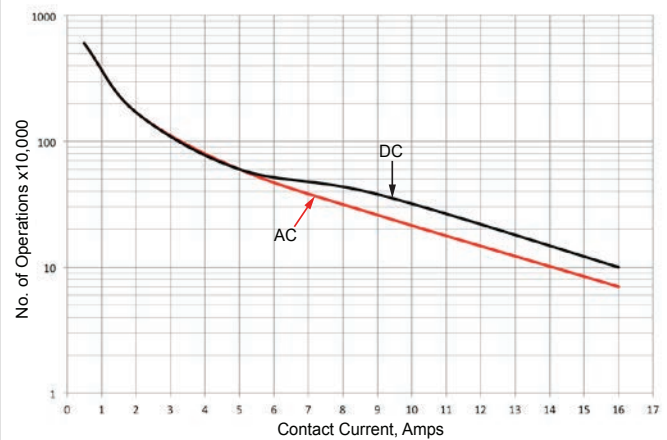
Switching Specification

Relay Type:	Electro-mechanical Power Relay
Contact Type:	Silver Alloy (AgNi)
Cold Switching Capacity	
Maximum Current:	16 A
Maximum Voltage:	400 VDC/250 VAC*
Hot Switching Capacity (Resistive Load)	
Maximum Current:	16 A
Maximum Voltage:	300 VDC/250 VAC*
Maximum Power:	448 W/4000 VA
Minimum Switching Capacity:	100 mA, 12 V
Maximum Continuous Total Switch Path Loading:	$1536\,A^2$ † (Example allowed conditions - 6 channels at 16 A)
Module Thermal Time Constant:	4 minutes typical
For information on module loading & pulsed currents please visit: Pickering's Wiki page on module current capacity	
Maximum Standoff Voltage:	400 VDC*
Initial On Path Resistance:	<20 mΩ (12 mΩ typical)
Off Path Resistance:	$>10^9\,\Omega$
Thermal Offset:	10 μV
Typical Operate Time:	10 ms
Expected Life (operations)	
Mechanical Endurance DC Coil:	$>3\times10^7$
Maximum Switch Capacity (Resistive Load)	
16 A @ 250 VAC (4000 VA):	1×10^5
8 A @ 30 VDC (240 W):	$>1\times10^5$ (NC/NO Contacts, Frequency of Operation 0.1 Hz, Duty Cycle 90 %)
16 A @ 28 VDC (448 W):	$>1\times10^5$ (NC/NO Contacts, Frequency of Operation 0.1 Hz, Duty Cycle 90 %)

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

† $1536\,A^2 = \sum I^2$, the sum of the squares of the current in each relay.
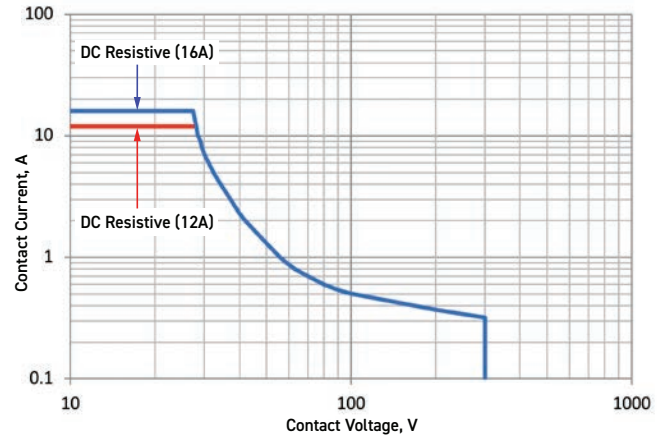
40/42-161A Maximum Switching Capacity

40/42-161A Operations Versus Hot Switch Current at Rated Power

RF Specification - In a 50 Ω System

Bandwidth (-3 dB):	20 MHz (typical)	
Crosstalk (typical):	10 kHz:	-65 dB
	100 kHz:	-60 dB
	1 MHz:	-45 dB
	10 MHz:	-25 dB
Isolation (typical):	10 kHz:	60 dB
	100 kHz:	60 dB
	1 MHz:	45 dB
	10 MHz:	30 dB

Power Requirements - 40-161A

+3.3 V	+5 V	+12 V	-12 V
0.2 A	1.3 A max	0	0

Power Requirements - 42-161A

+3.3 V	+12 V
0.4 A	0.55 A

Mechanical Characteristics

40-161A - Single slot 3U PXI (CompactPCI card).

42-161A - Single slot 3U PXIe, compatible with PXIe hybrid slot.

Module weight: 480 g maximum.
3D models for all versions in a variety of popular file formats are available on request.

Connectors

40-161A - PXI bus via 32-bit P1/J1 backplane connector.

42-161A - PXIe bus via XJ3 and XJ4 backplane connectors.

Signals via front panel connectors, for pin outs please refer to the operating manual.

- 40/42-161A-001: 2 x 20-pin male GMCT connectors.
- 40/42-161A-002: 2 x 20-pin male GMCT connectors.
- 40/42-161A-003: 1 x 20-pin male GMCT connector.
- 40/42-161A-101: 2 x 20-pin male GMCT connectors.
- 40/42-161A-102: 1 x 20-pin male GMCT connector.
- Interlock: 1 x 4-pin female 00 series connector* (40/42-161A versions fitted with hardware interlock option)

*Mating half supplied when hardware interlock option ordered.

PXI & CompactPCI Compliance - 40-161A

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus & Star Trigger are not implemented. Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 42-161A

The module is compliant with the PXIe Specification 1.0. Local Bus, Trigger Bus & Star Trigger are not implemented.

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.

Hardware Interlock

All versions of the 40/42-161A are available with an optional hardware interlock. The interlock, when activated, will return all relays to their default unpowered state (assuming the relays are fully functional) and also provide error notification via the software interface. For further details please refer to the Hardware Interlock section within the user manual.
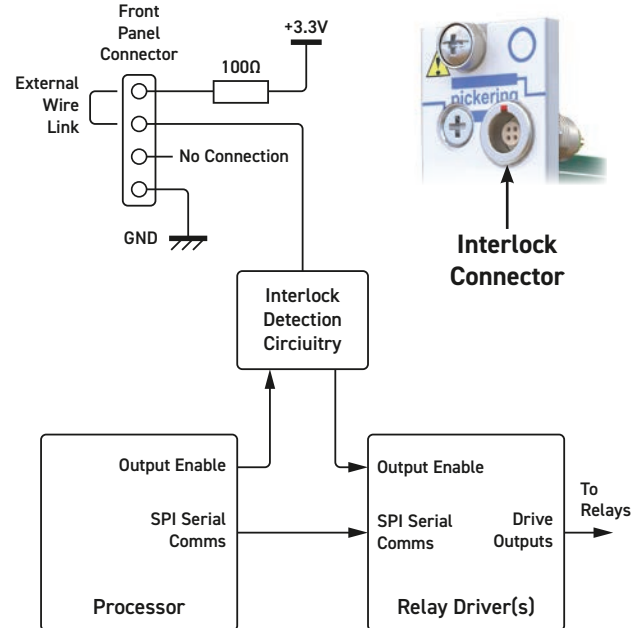
Interlock Signal Routing Diagram for 40/42-161A Versions With Hardware Interlock Option

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

Product Order Codes

PXI 16 A Power EMR Module

16 x SPST	**40-161A-001**
12 x SPST	**40-161A-002**
10 x SPST	**40-161A-003**
12 x SPDT	**40-161A-101**
6 x SPDT	**40-161A-102**

PXI 16 A Power EMR Module With Hardware Interlock

16 x SPST	**40-161A-001-HI**
12 x SPST	**40-161A-002-HI**
10 x SPST	**40-161A-003-HI**
12 x SPDT	**40-161A-101-HI**
6 x SPDT	**40-161A-102-HI**

PXIe 16 A Power EMR Module

16 x SPST	**42-161A-001**
12 x SPST	**42-161A-002**
10 x SPST	**42-161A-003**
12 x SPDT	**42-161A-101**
6 x SPDT	**42-161A-102**

PXIe 16 A Power EMR Module With Hardware Interlock

16 x SPST	**42-161A-001-HI**
12 x SPST	**42-161A-002-HI**
10 x SPST	**42-161A-003-HI**
12 x SPDT	**42-161A-101-HI**
6 x SPDT	**42-161A-102-HI**

Product Customization

Pickering 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
40/42-161A-001/002/003	**91-100-092**
40/42-161A-101/102	**91-100-091**

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

Mating Connectors & Cabling

For connection accessories for the 40/42-161A series please refer to the 90-014D 20-pin GMCT Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

42-161A PXIe 16 A Power Relay Module

Chassis Compatibility

The PXI versions of this module must be used in a suitable chassis. They are 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

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) 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
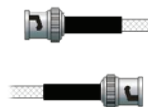
Connectivity Solutions

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.
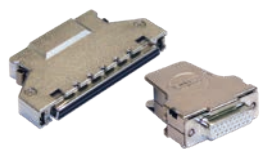
Connectors & Backshells   **Multiway Cable Assemblies**   **RF Cable Assemblies**   **Connector Blocks**

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. Visit: pickeringtest.com/cdt to start your design.

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 Relay Division. These instrument grade reed relays feature *SoftCenter*™ technology, ensuring long service life and repeatable contact performance. To learn more, please go to: pickeringrelay.com

pickering

pickeringtest.com

Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions. For a list of all supporting operating systems, please see: pickeringtest.com/os

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 and OpenTAP
- **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.

To learn more about software drivers and development environments, please go to: pickeringtest.com/software

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. To learn more, please go to: pickeringtest.com/spm
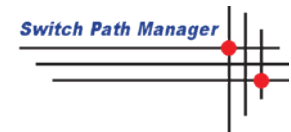
Diagnostic Relay Test Tools

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.

To learn more, please go to: pickeringtest.com/ebirst

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. To learn more, please go to: pickeringtest.com/support

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection solutions you need. We have also published handy reference books on Switching Technology and for the PXI and LXI standards.

To view, download or request any of our product resources, please visit: pickeringtest.com/resources

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