

- Precision Variable Resistance From 1.5Ω
- 2 Channels Per Module
- Fine Setting Resolution <2mΩ or 15mΩ
- Short and Open Circuit Simulation
- Low Thermo-electric EMF Errors
- Simple Calibration With External DMM
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty

The 40-261 is a new generation of PXI programmable resistors that features high setting resolution with excellent stability and accuracy through the use of innovative switching networks and software correction techniques. Two versions are available:

- 2 channel, 1.5Ω to 2.9kΩ range, <2mΩ precision
- 2 channel, 10Ω to 36kΩ range, <15mΩ precision

The use of innovative technology ensures all resistance values can be set – no missing values due to switch resistance or resistor tolerance.

This makes the 40-261 ideal for simulating sensors that require accurate control and fine setting values. Applications include air bag squib, strain gauge and temperature dependent resistor emulation.

The channels are fully isolated from the chassis ground and each other, allowing use in floating systems.

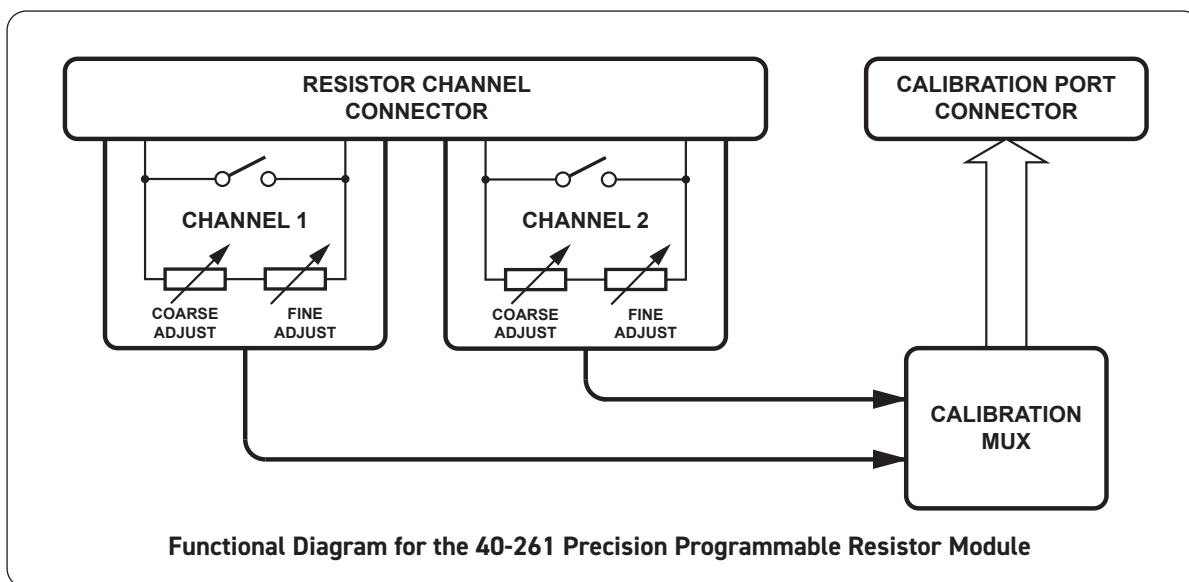
The 40-261 provides a convenient system for resistance calibration using an external DMM connected to the calibration port. It allows cascading so one DMM can be used to calibrate multiple modules. Calibration can be performed while the UUT is connected to the module.



Use of special switching techniques reduces measurement errors caused by thermo-electric EMFs to a minimum.

The 40-261 occupies one 3U PXI slot and can be supplied with other resistance ranges.

For applications requiring a higher starting resistance the 40-260 offers a solution with three channels in each module.



Specification

Resistor Channels	
Configuration:	2 resistor channels per module.
Resistance Range	
40-261-001:	1.5Ω to 2.9kΩ
40-261-002:	10Ω to 36kΩ
Resistance resolution:	<2mΩ, (40-261-001) <15mΩ, (40-261-002) continuous resolution, no missing settings.
Accuracy:	±0.08% ±70mΩ from 12°C to 32°C Typical temperature coefficient: 4mΩ per °C (low resistance settings)
Short Circuit Setting:	<0.1Ω initial
Open Circuit Setting:	>10 ⁹ Ω
Maximum power:	100mW
Maximum Voltage:	100V* or as limited by power
Thermo-electric emf:	<2μV 1.5Ω to 18Ω (40-261-001) 10Ω to 220Ω (40-261-002) <5μV >18Ω (40-261-001) >220Ω (40-261-002)
Resistance - power off:	Open circuit
Number of Operations:	100 million (10mA)
Operating time:	3ms typical

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

Calibration Channel	
Function:	Supports 4 terminal measurements of all the channels in the module. Modules can be cascaded together to permit single DMM to support multiple modules with resistor channel connected to UUT.
DMM:	DMM with 10mA source current measurement capability recommended.

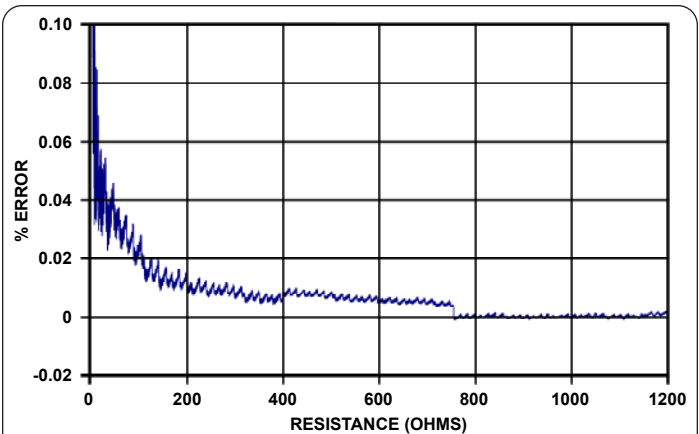
Software Support

Supplied with software that accepts a resistance instruction.

Power Requirements

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

The 40-261 uses innovative techniques which are the subject of protected Pickering Interfaces intellectual property rights.



Typical accuracy of 40-261 over the entire resistance range measured at 21°C

Performance is measured in 10mΩ increments by making a resistance call (in Ohms) to the module and then measuring the actual resistance with a DMM. Vertical axis shows the reading error as % of the requested value.

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).

3D models for all versions in a variety of popular file formats are available on request.

Connectors

PCI Interface: 33MHz, 32-bit address, 16 bit data.

Resistor channel signals via front panel 15-pin male D-Type connector. Calibration connection via front panel 9-pin male D-Type connector. For pin outs please refer to the operating manual.

Operating/Storage Conditions

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.

Product Order Codes

2 Channel Precision Resistor 1.5Ω to 2.9kΩ	40-261-001
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2 Channel Precision Resistor 10Ω to 36kΩ	40-261-002
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Accessories:

Calibration port to DMM lead (shrouded 4mm bayonet plug):

For a single module (1x9 pin D-type) 40-975-009-SL1

For two modules (2x9 pin D-types) 40-975-009-SL2

For three modules (3x9 pin D-types) 40-975-009-SL3

(calibration leads capable of supporting a greater number of modules are available, please contact sales office)

Mating Connectors & Cabling

For connection accessories for the 40-261 please refer to the [90-010D](#) 15-pin D-Type and [90-003D](#) 9-pin D-Type Connector Accessories data sheets where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Other Resistor Modules

Pickering Interfaces manufacture a range of variable resistor modules in the PXI format. If you have a requirement for a variable resistor module please contact your local sales office with the information below and we will advise you on the best solution for your application.

Lowest Resistance †	<input type="text"/>
Highest Resistance	<input type="text"/>
Resistance Resolution	<input type="text"/>
Overall Accuracy	<input type="text"/>
Maximum Power/Current	<input type="text"/>
Number of Channels (variable resistors)	<input type="text"/>

† Resistance is as measured across the user connector terminals, minimum resistance must have a non-zero value.

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 resistance range
- Alternative resolution
- Different number of channels
- 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.

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

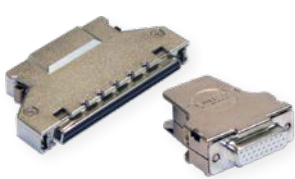
Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

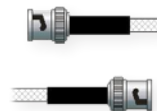
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



Connectors & Backshells



Multiwire 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 sister company, Pickering Electronics. These instrument grade reed relays feature **SoftCenter®** technology, ensuring long service life and repeatable contact performance.

To learn more, please go to: pickeringrelay.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

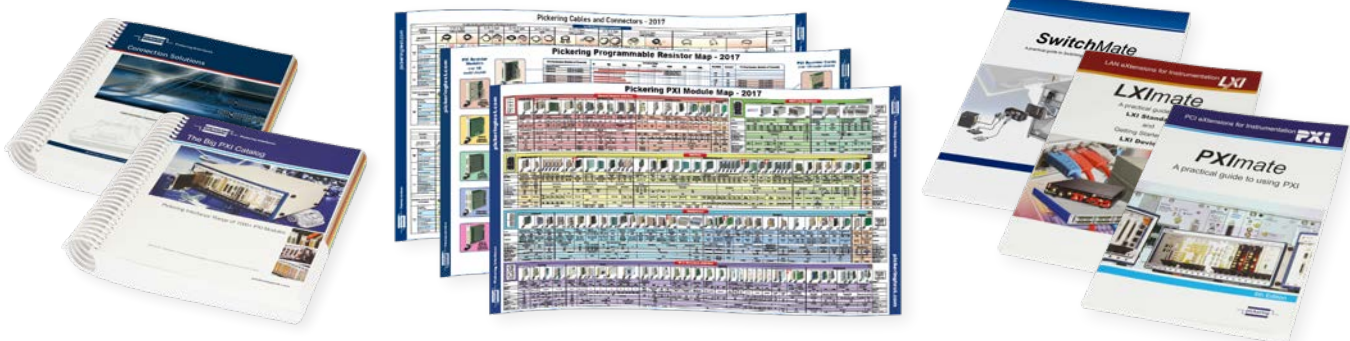


Three Year Warranty & Guaranteed Long-Term Support

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, 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 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