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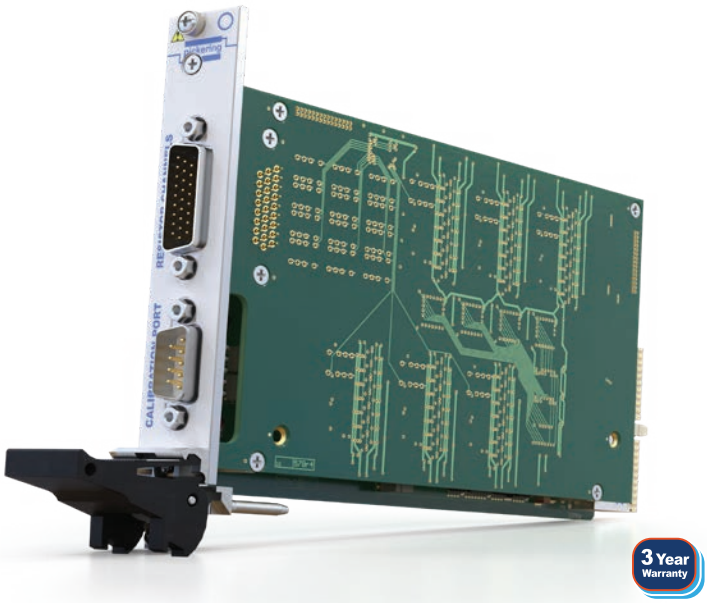
PXI Strain Gauge Simulator Modules

40-265

- Simulates Resistive Strain Gauge Bridge Circuits
- 6, 4 or 2 Simulators Per Module
- Simple Software Operation
- Fine Resistance Adjustment Over Full Operating Range
- Drivers Supplied for Windows & Linux, Plus Support for Real-time Systems
- Supported by PXI or LXI Chassis
- 3 Year Warranty



The 40-265 is ideal for testing strain gauge meters in a wide variety of industrial control systems. It provides 6, 4 or 2 channels of low cost simulation with excellent performance and is a simple way of replacing in-house developed sensors. It uses the same resistor bridge techniques of real-world strain gauges, ensuring accurate emulation under all conditions.

Each channel has a bridge output and an excitation input that can be driven with AC or DC. The bridge circuit uses three fixed resistors and one programmable resistor with a narrow range, fine adjustment and excellent accuracy. The range is sufficient to simulate quarter, half or full bridge circuits. The standard bridge impedances are 350 Ω, 1 kΩ, 1.5 kΩ, 2 kΩ and 3 kΩ.

The simulator is simple to use, the variable element can be programmed using a resistance call. The user is given the value required to balance the bridge, and the setting can be varied above and below this value to simulate extension and compression of a strain gauge.

A simple verification system is provided using a DMM connected to the calibration port. This allows any channel to be checked without disconnecting the module from the test system. The calibration port can also be used to find the bridge balance setting using the internal DC excitation source. Factory calibration information and the excellent long term stability of the bridge means adjustment is not routinely required.

We can offer strain gauge simulators with alternative resistance ranges and have a wide range of precision resistance modules that are suitable for simulating individual strain gauges. Please contact the sales office for information.

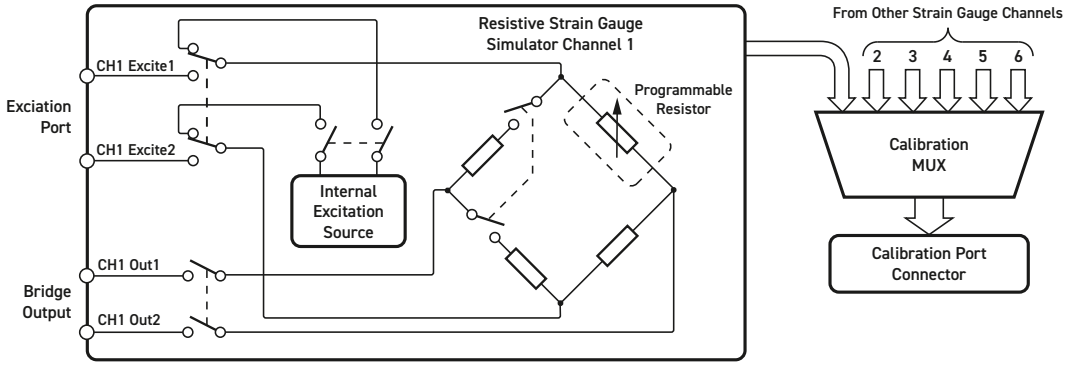


Diagram for a single channel of the 40-265 Strain Gauge Simulator

Issue 7.2 November 2024

Specifications

Strain Gauge Channels					
	40-265 -01x	**40-265 -20x**	**40-265 -40x**	**40-265 -30x**	**40-265 -10x**
Number of channels:	6, 4 or 2 per module				
Channel Configuration:	Independent excitation ports and bridge output.				
Resistor Values:	350 Ω	1 kΩ	1.5 kΩ	2 kΩ	3 kΩ
Variable Resistor:	±2 %	±5.3 %			
Resolution:	<2 mΩ	<10 mΩ	<12.5 mΩ	<20 mΩ	<25 mΩ
Variable Resistor Accuracy:	0.03 %	0.06 %			
Excitation Voltage*:	Up to ±10 V peak (relative to ground) 20 V peak-to-peak, DC or AC †	Up to ±12 V peak (relative to ground) 24 V peak-to-peak, DC or AC †			
Bridge Output:	> ±0.45 % of excitation voltage ‡	> ±1.25 % of excitation voltage ‡			

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

† Internal ±5 V DC source can be used. Excitation port is disconnected when card power is off.

‡ Bridge Output disconnected when card power is off.

Calibration Port	
Function:	Allows connection to any of the strain gauge bridges. Provides a simple means of checking the operation of any of the strain gauges and finding bridge balance points when internal excitation source is selected. Can be used for module verification procedures. Also used by Pickering Interfaces for module adjustment.

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0	0.2 A (0.55 A Max)	0.1 A (0.2 A Max)	0.1 A

Software Support

Supplied with software that accepts a resistance instruction.

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 240 g (40-265-016).
3D models for all versions in a variety of popular file formats are available on request.

Connectors

PCI Interface: 33 MHz, 32-bit address, 16-bit data.
Strain Gauge channel signals via front panel 26-pin male High Density 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:	5000 m

Storage and Transport Conditions

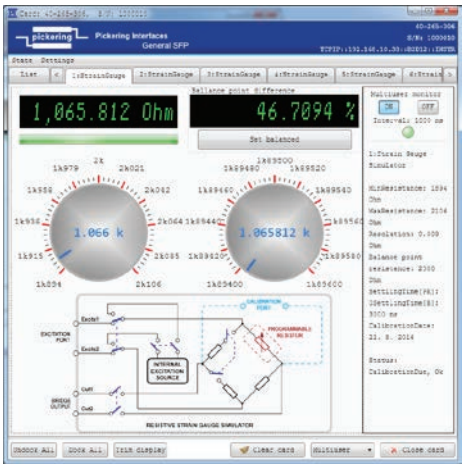
Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

PXI & CompactPCI Compliance

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.

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.



Soft Front Panel for Strain Gauge Simulator Modules

Product Order Codes

6 Channel Strain Gauge Simulator:	
350 Ω	40-265-016
1 kΩ	40-265-206
1.5 kΩ	40-265-406
2 kΩ	40-265-306
3 kΩ	40-265-106
4 Channel Strain Gauge Simulator:	
350 Ω	40-265-014
1 kΩ	40-265-204
1.5 kΩ	40-265-404
2 kΩ	40-265-304
3 kΩ	40-265-104
2 Channel Strain Gauge Simulator:	
350 Ω	40-265-012
1 kΩ	40-265-202
1.5 kΩ	40-265-402
2 kΩ	40-265-302
3 kΩ	40-265-102

Note: The 40-265-016 supersedes the 40-265-006. Both modules have the same functionality but the -016 has a resistor variation of ±2 % whereas the -006 has a resistor variation of ±1 %.

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)

The 40-265 uses innovative techniques which are the subject of protected Pickering intellectual property rights.

Mating Connectors & Cabling

For connection accessories for the 40-265 please refer to the 90-009D 26-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 website.

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 †	
Highest Resistance	
Resistance Resolution	
Overall Accuracy	
Maximum Power/Current	
Number of Channels (variable resistors)	

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

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:

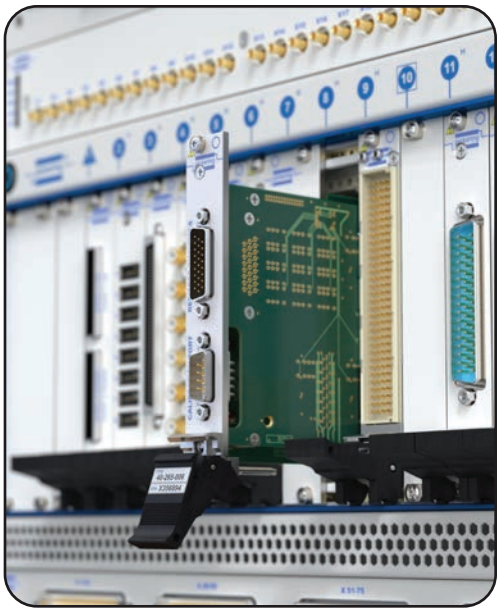
- Alternative resistance range
- Alternative resolution
- Different number of channels
- Different performance specifications

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.

The 40-265 is part of a range of Precision Resistor Modules suitable for simulation applications.

For applications that do not require the precision or accuracy of our precision range, look to our PXI Standard Resistor range which includes models 40-280, 40-281, 40-282, 40-290, 40-291, 40-292, 40-293, 40-294, 40-295 and 40-296.

Pickering's Range of Precision Resistor Modules				
Resistor Type	Channels	Range	Resolution	Model No.
Precision	3	90 Ω to 8 kΩ	<10 mΩ	40-260
Precision	2	1.5 Ω to 2.9 kΩ or 10 Ω to 36 kΩ	<2 mΩ or <15 mΩ	40-261
RTD Simulator	18, 12 or 6	90 Ω to 250 Ω or 900 Ω to 2500 Ω	<8 mΩ or <90 mΩ	40-262
RTD Simulator	24, 20, 16, 12, 8 or 4	40 Ω to 900 Ω, 200 Ω to 4.5 kΩ or 400 Ω to 9 kΩ	<10 mΩ, <50 mΩ or <100 mΩ	40-263
Strain Gauge Simulator	6, 4 or 2	350 Ω, 1 kΩ, 1.5 kΩ, 2 kΩ or 3 kΩ	<2 mΩ, <10 mΩ, <12.5 mΩ, <20 mΩ or <25 mΩ	40-265
High Density Precision	18, 9, 6, 4 or 3	Up to 85.3 MΩ	0.125 Ω, 0.25 Ω, 0.5 Ω, 1 Ω, 2 Ω, 4 Ω or 8 Ω	40/42-297A
High Density Precision	18, 9, 6, 4 or 3	Up to 22.3 MΩ	0.125 Ω, 0.25 Ω, 0.5 Ω, 1 Ω or 2 Ω	40-298





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 PXI Switching & Simulation Modules:

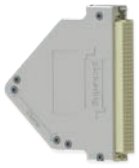
- Choose from 1000+ Pickering PXI Modules
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- 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. These accessories are detailed in Connector Accessories data sheets, where a complete list and documentation can be found for each accessory.





Connectors & Backshells



Multi-way Cable Assemblies



RF Cable Assemblies



Breakouts

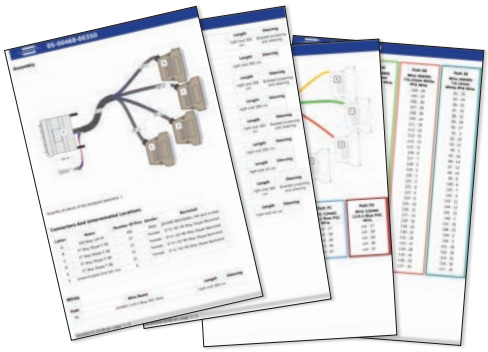


Connector Blocks

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.

- Fully supported on modern browsers and tablet operating systems.
- Built-in tutorials and videos allow you to get quickly up to speed.
- Store cable assemblies in the Cloud and develop over time.
- Each cable design has a downloadable PDF documentation file detailing all specifications

Start designing your custom cabling, go to pickeringtest.com/cdt



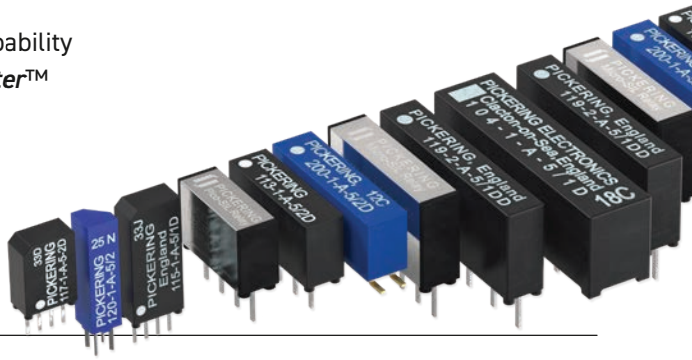
Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for PXI/LXI based test systems. Our modules are fully supported by 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 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 more information go to pickeringtest.com/os

The VISA driver support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-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++)
- **Programming Languages** C, C++, C#, Python
- **Keysight** VEE and OpenTAP
- **Mathworks MATLAB, Simulink**
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

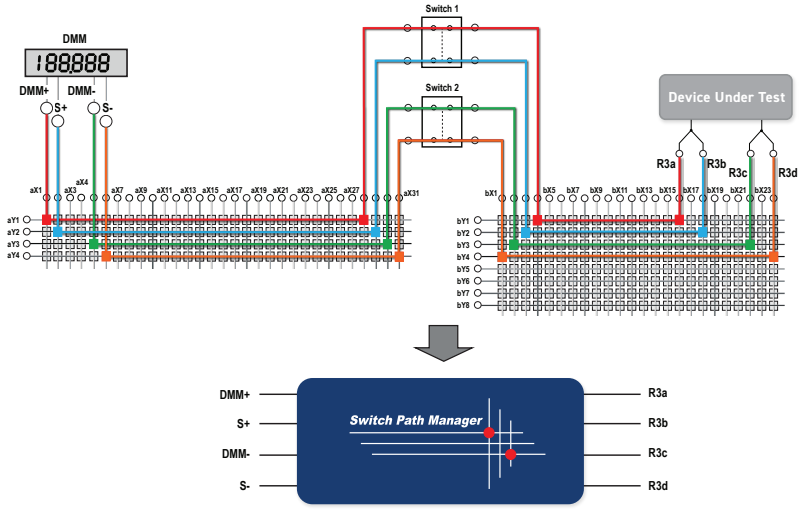
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments 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 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 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 three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for 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 go to pickeringtest.com/support

Available Product Resources

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources



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