# PXI 30A Fault Insertion Switch 40-191

- 6 Fault Insertion Channels
- 40 Amp Single Channel
- 30 Amp Continuous, All Channels
- Simulation of Various Types of Electrical Fault, Enabling Rigorous Fault Testing
- 2 Fault Insertion Buses
- High Inrush Current Rating
- Switch ±40V Signals (AC or DC)
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST* ™
- 3 Year Warranty


The 40-191 is a 6 Channel Fault Insertion switch designed for the simulation of fault conditions in automotive systems. It is capable of carrying 40A on single channel or 30A on all channels at the same time and provides a robust solution to high current fault insertion.

It is designed to be able to insert 3 different fault conditions between the test fixture and the equipment under test:

- Open-Circuit
- Short-Circuit between UUT connections
- Short-Circuit to external signals

Through relays on each channel enable signals to the UUT to be set open-circuit. There are two fault insertion buses that can be used for shorting channels together or connecting a channel to an external signal such as power, ignition or ground to simulate fault conditions.

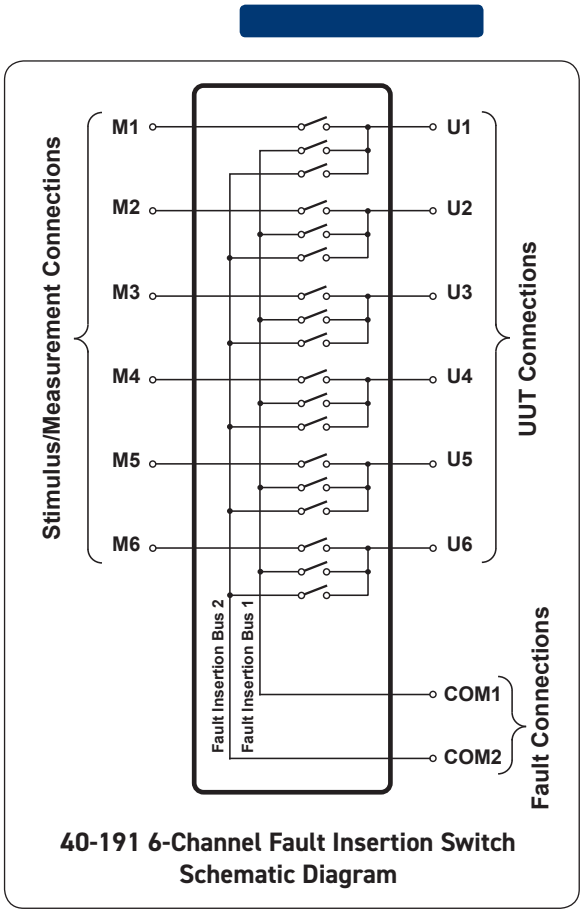
The 40-191 uses solid state switching capable of withstanding inrush current of greater than 120 Amps and peak voltage of 40V. With an indefinite number of switching operations the 40-191 can hot switch AC or DC with no life degradation.

**Pickering's Range of PXI Fault Insertion Switches**

| Model No. | Signal Channels | Fault Buses | Fault Inputs | Max Voltage | Max Current or Bus Type |
|---|---|---|---|---|---|
| **40-190B** | 74, 64 or 32 | 1 or 2 | 4 or 8 | 165V | 2A |
| **40-191** | 6 | 2 | 2 | 40V | 30A |
| **40-192** | 6 | 2 | 2 | 200V | 10A |
| **40-193** | 7 | 1 or 2 | 1 or 2 | 16V | 20A, 1A min |
| **40-194** | 7 | 1 or 2 | 1 or 2 | 16V | 20A, no min |
| **40-195** | 22 or 11 pairs | — | 8 or 4 | 150V | 1A |
| **40-196** | 10 or 5 pairs | — | 10 or 5 | 110V | 5A |
| **40-197A** | 34 or 16 | 4 | 8 | 300V | 2A |
| **40-198** | 20 | 1 or 2 | 3 or 6 | 250V | 5A |
| **40-199** | 10 | 1 or 2 | 2 | 250V | 10A |
| **40-200** | 4 or 8 differential | 4 | 8 | 100V | CAN, FlexRay |
| **40-201** | 4 or 8 differential | 2 | 4 | 100V | Ethernet/AFDX /BroadR-Reach |
| **40-202** | 22 or 11 pairs | — | 22 or 11 | 150V | 1A |

## Supported by *eBIRST*

*eBIRST* switching system test tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.




**40-191 6-Channel Fault Insertion Switch Schematic Diagram**

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### Relay Type

The 40-191 is fitted with solid state MOSFET switches.

### Switching Specification

| | |
|---|---|
| Switch Type | Solid State MOSFET |
| Max Switch Voltage: | ±40V (DC or AC peak)* |
| Continuous Switch Current: | 30A continuous, all channels. 40A continuous for single relay (other relays carrying <10A). |
| Peak Current: | 120A for 200µs |
| Max Total Module Current: | 6 channels each carrying 30A on thru path † |
| Max Fault Bus Current: | 40A, each bus |
| Initial On Path Resistance: | 6mΩ at 25˚C typical |
| Leakage Current (at ±40V): | <1µA at 25˚C and switch cold, <250µA at max temperature immediately after switch has carried maximum current for >10 minutes. |
| Rise/Fall Time: | 40µs/140µs (typical) |
| Operate Time: | 250µs |
| Max Operating Speed at nominal load: | 60 operations/sec |
| Expected Life (operations): | Indefinite when used within ratings |

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

† The capacity of the module to carry 30A on all channels is chassis dependent and dependent on the number of high power modules fitted to the chassis. Specification reflects test conditions in a Pickering PXI chassis. Refer to supplier for chassis cooling capacity, restrict average RMS current over 5 minute period to 25A per channel for chassis meeting the minimum PXI recommendations.

### Power Requirements

| +3.3V | +5V | +12V | -12V |
|---|---|---|---|
| 100mA | 1A | 0 | 0 |

### Mechanical Characteristics

Double slot 3U PXI (CompactPCI card).
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 2 front panel 8-pin male power D-Type connectors, 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.

# Ordering Information

## Product Order Codes

| | |
|---|---|
| **6-Channel 30A Fault Insertion Switch, Two Fault Buses:** | **40-191-012** |

## 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

### *eBIRST* Switching System Test Tool

This product is supported by the *eBIRST* test tools which simplify the identification of failed relays, the required *eBIRST* tools are below. For more information go to: pickeringtest.com/ebirst

| Product | Test Tool | Adaptor | Termination |
|---|---|---|---|
| 40-191 | 93-005-001 | 93-005-236 | 93-012-103 |

## Mating Connectors & Cabling

For connection accessories for the 40-191 please refer to the 90-012D 8-pin power D-Type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

## 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:**

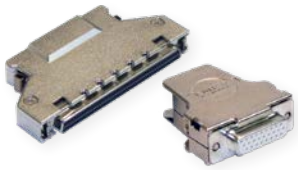
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

**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

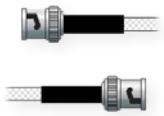
## Connectivity Solutions

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.

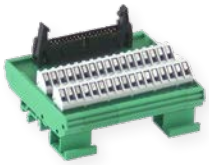


Connectors & Backshells

Multiway Cable Assemblies



RF Cable Assemblies



Connector Blocks

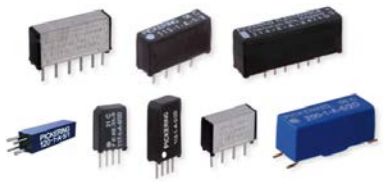
We also offer customized cabling and have a free online Cable Design Tool that can be used to create custom cable solutions for many applications.

### 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.