Keysight M9186A
PXI Voltage/Current Source
16-bit, 16 V at 200 mA
100 V at 20 mA

Data Sheet

The Keysight Technologies M9186A is a large range, isolated, single-channel voltage-current source providing accurate power supply, making it ideal for automated test equipement (ATE) in automotive electronic applications.



KEYSIGHT TECHNOLOGIES

Product Description

The M9186A is a two-slot, PXI based V/I source module that enables the sourcing of a voltage or a current to perform measurements on the resultant current or voltage through another module. It consists of two separate amplifiers, denoted by “low” and “high” that share a common output connection. The “low” amplifier provides voltages in the range of 16 volts at up to 200 mA and the “high” amplifier provides voltages in the range of 100 V at up to 20 mA.

Typical applications for the low-voltage amplifier include I/O pin parametric leakage, bias current, impedance, threshold and clamp voltage. The high voltage amplifier can be applied to help verify the presence of clamp diodes as the outputs of modules that drive inductive loads. Both the amplifiers can sense the amount of current flowing while forcing a constant voltage.

Uniquely present is a safety interlock for the high-voltage amplifier that automatically disables the high-voltage amplifier and opens all relays when the interlock circuit is broken. This provides protection to the DUT when dangerous high levels of voltage maybe present. The interlock in indicated by an LED on the module front panel and can be used, for example, by connecting to an external limit switch on fixtures.



Applications

- Automotive

Features

- 16-bit resolution
- 4-quadrant Voltage Current source
- Single isolated channel
- Voltage/current ranges
- > Low range: ±16 Vdc @ 200 mA
- > High range: –10 to +100 Vdc @ 20 mA
- Accuracy
- > Low range ±16 Vdc : 0.02 % + 3 mV
- > High range –10 to +100 Vdc: 0.02 % + 40 mV
- Safety Interlock for device under test protection from high voltage levels
- Connector compatibility with cPCI, PXI-H, PXI-1
- IVI®-COM, IVI-C, LabVIEW G drivers

Customer Values

- Large voltage current range for device under test characterization required in parametric testing
- Accurate power supply source to device under test
- Investment protection on device under test from damage due to high voltage levels

Easy Setup ... Test ... and Maintenance

Hardware Platform

Compliance

The M9186A is PXI compliant, using either a cPCI, PXI-1 or PXI Hybrid slot. The products can be integrated with other test and automation modules in cPCI, PXI-1 and PXI-H chassis (hybrid slots). The PXI format offers high performance in a small, rugged package. It is an ideal deployment platform for many automated test systems. A wide array of complementary PXI products are currently available. Products include multimeters, waveform generators, local oscillators, digitizers, downconverters and switch multiplexers.

Range

The M9186A has one of the largest PXI based voltage current range from –10 to 100 V at 20 mA for high voltage source or ±200 mA over ±16V range (4-quadrant operation) at low voltage range. This enables characterization of the device under test for parametric test of I/O pins.

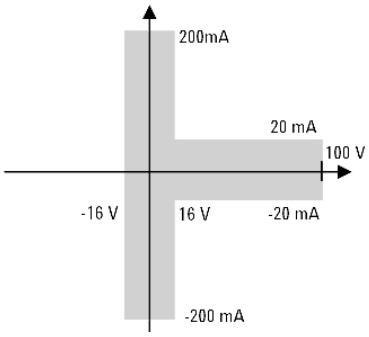


Fig. 1a. 4-quadrant voltage current of M9186A

SENSE input

The M9186A has a SENSE input that enables accurate voltage source to the I/O pins of a device under test. This is done by having feedback loop to enable the high and low voltage amplifiers to sense the amount of current flowing while forcing a constant voltage.

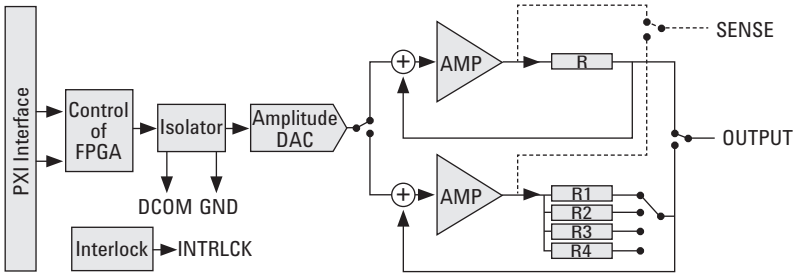


Figure 1b. M9186A system connections with SENSE input

Software Platform

IO Libraries

Keysight IO Libraries Suite offers FAST and EASY connection to instruments and the newest version extends that capability to include modular instruments.

NEW support for PXI — The Keysight IO Libraries Suite helps you display ALL of the modules in your system. From here you can view information about the installed software or start the modules' soft front panel. Launch the modules' soft front panel directly from Keysight Connection Expert.

Drivers

The M9186A voltage current source is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. The module comes with IVI-COM, IVI-C, and LabVIEW G software drivers that work in the most popular test and measurement development environments including LabVIEW and LabWindows/CVI from National Instruments, Microsoft® C/C++, C#, and VB.NET®.

Easy software integration

The module software support provides context sensitive help, complete documentation and code examples that allow a quick module set up and basic acquisition functionalities. These code examples can be easily modified, so that the card can be quickly integrated into a test system. Included are application code examples for LabVIEW, LabWindows/CVI, Visual Studio® C, C++, and C# and Visual Basic.

Software applications

In addition, the M9186A includes a soft front panel graphical interface. This simple software application can be used to

– enable verification that the modules are properly installed and working in the system.

– Assist in learning the module capability and behavior via interactive use.

– Assist in acquiring programming knowledge of the instrument.

– Assist in the verification and debugging of the system.

Calibration intervals

The M9186A is factory calibrated and shipped with a calibration certificate.

Calibration is recommended every year in order to verify product performance.

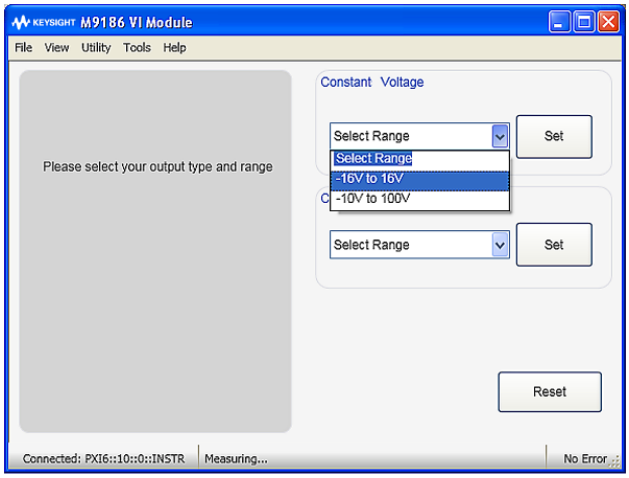


Figure 2. Module configuration - constant voltage.

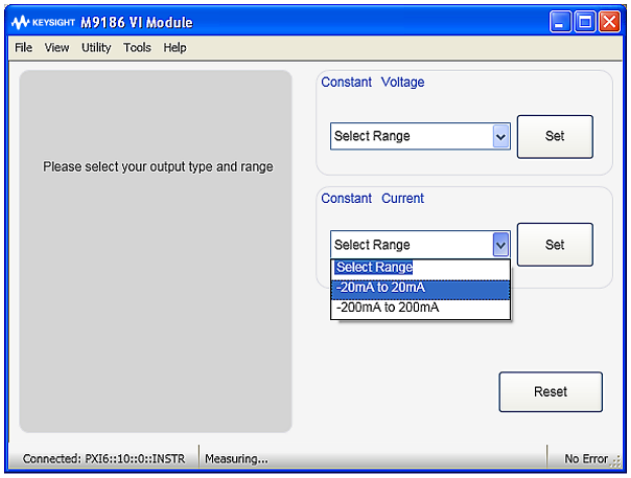


Figure 3. Module configuration - constant current.

Voltage Source Accuracy

Range	Conditions	Accuracy ± (% of output + offset) 1-year, 23 °C ± 5 °C
± 16 V	Up to 200 mA	0.02 % + 3 mV
	Current Sense using the SENSE pin with respect to OUTPUT.	200 mA range: 1.5 % + 500 µA 20 mA range: 0.5 % +50 µA 2 mA range: 0.5 % + 10 µA 200 µA range: 0.3 % + 5 µA
–10 to + 100 V	Up to 20 mA	0.02 % + 40 mV
	Current Sense using the SENSE pin with respect to OUTPUT.	0.75 % + 300 µA

Current Source Accuracy

Range	Conditions	Accuracy ± (% of output + offset) 1-year, 23 °C ± 5 °C
± 200 mA	Over ± 16 V	0.3 % + 500 µA
± 20 mA		0.1 % + 50 µA
± 2 mA		0.3 % + 5 µA
± 200 µA		0.1 % + 0.5 µA
± 20 mA	Over –10 to +100 Vdc	0.3 % + 500 µA

General Specifications

Description	Specification
Temperature Range	
• Operating	0 ° to 55 °C
• Storage	–40 °C to +70 °C
Relative Humidity	80%, 0 °C to 40 °C (Non condensing)
Certifications and Compliance	Altitude : 10,000 ft (Operating)/15,000 ft (Non-operating)
– CE Mark Compliance	2006/95/EC; 2004/108/EC
– Safety	Pollution Degree 2
– EMC Immunity	EN/IEC 61326-1 Industrial Environment
– EMC Emissions	EN/IEC 61326-1 Class A
Warm-Up Time	30 minutes
PXI Power Requirements (typ)	6 W at 5 V, 3 W at 3.3 V, 1 W at 12 V
Additional Information	
Recommended Calibration Interval	1 Year

General Specifications - continued

Physical Characteristics	
Dimensions	3U, 2-Slot, PXI/cPCI module; 40.30 mm x 129.11 mm × 212.73 mm (1.59 in. × 5.08 in. × 8.38 in.)
Weight	0.56 kg (1.23 lb)
Front Panel Connector	Mini-Fit Jr (6 circuits)
	NOTE *- Front panel connector can accept wire gauges up to 16 AWG.*

Configuration

Hardware

Model1	Description
M9186A	M9186A PXI isolated single channel voltage/current source

Related products

Software[2]

Model	Description
Keysight IO Libraries	Keysight IO Libraries Drivers, soft front panels and programming examples in LabVIEW, LabWindows/CVI, Visual Studio® C, C++ and C#, Visual Basic®, and MATLAB®
Accessories M9186A-CD1	Software and product information on CD

1. For the M9186A to work properly, at least one PXI chassis and one PXI controller type must be available.
2 Keysight IO Libraries Suite 16.0 is required. The modular product won't work with Keysight IO Libraries Suite versions earlier than version 16.0

Ordering

Model	Description
M9186A	M9186A PXI isolated single channel voltage/current source, 100 V

Warranty and Calibration

Advantage Services: Calibration and Warranty	
Keysight Advantage Services is committed to your success throughout your equipment's lifetime.	
Warranty	**Description**
Standard warranty is 1 year	
R-9MB-001-3C	1 year return-to-Keysight warranty extended to 3 years
R-9MB-001-5C	1 year return-to-Keysight warranty extended to 5 years

Definitions for specifications

Specification (spec): Represents warranted performance of a calibrated instrument that has been stored for a minimum of two hours within the operating temperature range of 0 to 40 °C, unless otherwise stated, and after a 45-minute warm-up period. The specifications include measurement uncertainty. Data represented in this document are specifications unless otherwise noted.

Typical (typ): Represents characteristic performance, which 80% of the instruments manufactured will meet. This data is not warranted, does not include measurement uncertainty, and is valid only at room temperature (approximately 25 °C).

Nominal (nom): The expected mean or average performance, or an attribute whose performance is by design, such as the 50 Ω connector. This data is not warranted and is measured at room temperature (approximately 25 °C).

Measured (meas): An attribute measured during the design phase for purposes of communicating expected performance, such as amplitude drift vs. time. This data is not warranted and is measured at room temperature (approximately 25 °C).

Note: All graphs contain measured data from several units at room temperature unless otherwise noted.



myKeysight

www.keysight.com/find/mykeysight

A personalized view into the information most relevant to you.

www.axiestandard.org

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Keysight is a founding member of the AXIe consortium.

www.pxisa.org

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Three-Year Warranty

www.keysight.com/find/ThreeYearWarranty

Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

Keysight Assurance Plans

www.keysight.com/find/AssurancePlans

Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

www.keysight.com/quality

Keysight Electronic Measurement Group
DEKRA Certified ISO 9001:2008
Quality Management System

Keysight Channel Partners

www.keysight.com/find/channelpartners

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

PXI is a registered US trademark of PXI Systems Alliance.

IVI is a registered U.S. trademark of the IVI Foundation, Inc.

MATLAB is a U.S. registered trademark of The Math Works, Inc.

www.keysight.com/find/modular
www.keysight.com/find/m9186a

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 33 51 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East

Belgium	32 (0) 2 404 93 40
Denmark	45 45 80 12 15
Finland	358 (0) 10 855 2100
France	0825 010 700* *0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 118 927 6201

For other unlisted countries:
www.keysight.com/find/contactus

(BP-04-23-14)

This information is subject to change without notice.
© Keysight Technologies, 2011 - 2014
Published in USA, August 1, 2014
5990-6655EN
www.keysight.com