

Signal Conditioning Modules and Terminal Boards



Terminal Board Selection Guide

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Isolated Signal Conditioning Modules

ADAM-3000 Series Isolated Signal Conditioning Modules

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ADAM-3011 Isolated Thermocouple Input Module

ADAM-3013 Isolated RTD Input Module

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ADAM-3014 Isolated DC Input/Output Module

ADAM-3016 Isolated Strain Gauge Input Module

ADAM-3112 Isolated AC Voltage Input Module

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ADAM-3114 Isolated AC Current Input Module

I/O Wiring Terminal Boards

PCLD-782/B 16/24-ch Opto-Isolated Digital Input Board

PCLD-785/B 16/24-ch Relay Board

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PCLD-885 16-ch Power Relay Board

To view all of Advantech's Signal Conditioning Modules and Terminal Boards, please visit www.advantech.com/products.

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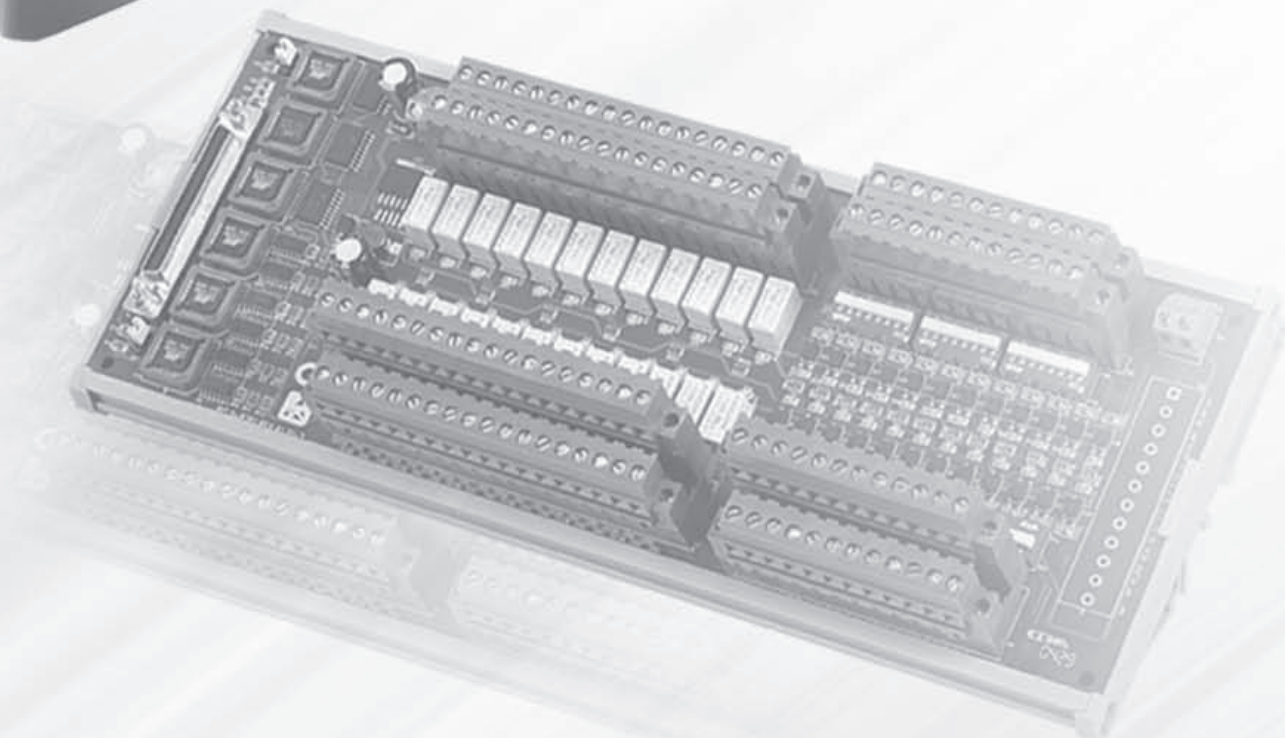


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Terminal Board Selection Guide

Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PCI & USB Data Acquisition (DAQ) Products

PCI & USB Product	Cable	I/O Wiring Terminal Board	Cable	Digital I/O Terminal
PCI-1710U/1710UL/1710HGU PCI-1711U/1711UL PCI-1716/1716L PCI-1741U PCI-1742U	PCL-10168	PCLD-8710	PCL-10120 PCL-10121	ADAM-3920
PCI-1712/1712L	PCL-10168	ADAM-3968		
		PCLD-8712		
PCI-1718HDU/HGU	PCL-10137	ADAM-3937, PCLD-880 PCLD-8115, PCLD-789D		PCLD-782
PCI-1727U PCI-1730U	PCL-10120 PCL-10121	PCL-10502+ PCL-10120, PCL-10121		
	PCL-10137	PCL-10503+ PCL-10137, ADAM-3937		PCLD-782B
PCI-1751	PCL-10168	ADAM-3968	PCL-10150+ ADAM-3950 PCLD-782B PCLD-785B PCLD-885 PCLD-7216	PCLD-785
PCI-1753	PCL-10268	PCLD-8751, PCLD-8761 PCLD-8762		
		ADAM-3968/50		
		ADAM-3968/20	PCL-10120	
PCI-1713U, PCI-1715U	PCL-10137	ADAM-3937 PCLD-880 PCLD-881B		PCLD-785B
PCI-1720U, PCI-1733, PCI-1734 PCI-1750, PCI-1760U, PCI-1761 USB-4702	PCL-10137	ADAM-3937		PCLD-786
PCI-1784U	PCI-10137H			
PCI-1752U, PCI-1754, PCI-1756	PCL-10250	ADAM-3951		PCLD-788
PCI-1724U, PCI-1762	PCL-10162	ADAM-3962		
PCI-1737U PCI-1739U USB-4751/L	PCL-10150	ADAM-3950, PCLD-782B PCLD-785B, PCLD-885 PCLD-7216		PCLD-885
PCI-1714U/1714UL, PCIE-1744	PCL-10901	ADAM-3909		
	PCL-1010B			PCLD-7216
PCI-1757UP	PCL-10125	ADAM-3925		
PCI-1747U, PCI-1721 PCI-1723, PCI-1780U	PCL-10168	ADAM-3968		
PCI-1735U	PCL-10120 PCL-10121	PCL-10502+ PCL-10120, PCL-10121		
	PCL-10501+ PCL-10137, ADAM-3937	PCL-10503+ PCL-10137, ADAM-3937		
PCI-1755	PCL-101100	ADAM-39100		
PCI-1758UDI/1758UDO/1758UDIO	PCL-101100S			
PCI-1671UP, USB-4671	PCL-10488			

Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PC/104 & PCI-104 Data Acquisition (DAQ) Products

PC/104 & PCI-104 Product	Cable	I/O Wiring Terminal Board	Digital I/O Terminal
PCM-3718H/HO/HG PCM-3730	PCL-10120 PCL-10121		ADAM-3920
PCM-3724 PCM-37531	PCL-10150	ADAM-3950, PCLD-782B PCLD-785B, PCLD-885 PCLD-7216	PCLD-780
PCM-3725 PCM-3780 PCM-37611	PCL-10120 PCL-10121	ADAM-3920	PCLD-782
	PCL-10150	ADAM-3950	PCLD-782B
PCM-38101	PCL-10126	PCL-10125	PCLD-785
	PCL-10150	ADAM-3950	PCLD-785B
PCM-38131	PCL-10141	PCL-10137	PCLD-786
		ADAM-3937	PCLD-788
PCM-37301	PCL-10120 PCL-10121	ADAM-3920	PCLD-885
			PCLD-7216

Cable Accessories

Model	Description
PCL-1010B-1E	BNC to BNC Wiring Cable, 1 m
PCL-101100-1E	100-pin SCSI High-Speed Cable, 1 m
PCL-101100S-1E	100-pin Mini-SCSI Cable, 1 m
PCL-101100S-2E	100-pin Mini-SCSI Cable, 2 m
PCL-101100S-3E	100-pin Mini-SCSI Cable, 3 m
PCL-10120-04E	20-pin Flat Cable, 0.4 m
PCL-10120-1E	20-pin Flat Cable, 1 m
PCL-10120-2E	20-pin Flat Cable, 2 m
PCL-10121-04E	20-pin Shielded Cable, 0.4 m
PCL-10121-1E	20-pin Shielded Cable, 1 m
PCL-10121-2E	20-pin Shielded Cable, 2 m
PCL-10125-1E	DB25 Cable, 1 m
PCL-10125-3E	DB25 Cable, 3 m
PCL-10137-1E	DB37 Cable, 1 m
PCL-10137-2E	DB37 Cable, 2 m
PCL-10137-3E	DB37 Cable, 3 m
PCL-10137H-1E	DB37 High-Speed Cable, 1 m

Model	Description
PCL-10137H-3E	DB37 High-Speed Cable, 3 m
PCL-10150-1.2E	50-pin Flat Cable, 1.2 m
PCL-10162-1E	DB62 Cable, 1 m
PCL-10162-3E	DB62 Cable, 3 m
PCL-10168-1E	68-pin SCSI Shielded Cable, 1 m
PCL-10168-2E	68-pin SCSI Shielded Cable, 2 m
PCL-10250-1E	100-pin SCSI to Two 50-pin SCSI Cable, 1 m
PCL-10250-2E	100-pin SCSI to Two 50-pin SCSI Cable, 2 m
PCL-10268-1E	100-pin SCSI to Two 68-pin SCSI Cables, 1 m
PCL-10268-2E	100-pin SCSI to Two 68-pin SCSI Cables, 2 m
PCL-10488-2	IEEE-488 Cable, 2 m
PCL-10501-AE	Adapter Analog Ports to DB37
PCL-10502-AE	Extender, Extend Dual 20-pin to PC Slot-Plate
PCL-10503-AE	Adapter Dual 20-pin to DB37
PCL-10901-1E	DB9 to PS/2 Cable, 1 m
PCL-10901-3E	DB9 to PS/2 Cable, 3 m

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ADAM-3000 Series



Features

- 1,000 V_{DC} three-way isolation
- Easy input/output range configuration
- Flexible DIN-rail mounting
- Linearized thermocouple/RTD measurement
- Low power consumption
- Wide input bandwidth

Introduction

The ADAM-3000 Series consist of the most cost-efficient, field configurable, isolation-based, signal conditioners on the market today. The modules are easily installed to protect your instruments and process signals from the harmful effects of ground loops, motor noise, and other electrical interferences.

Affordable Signal Isolation Solution

Featuring optical isolation technology, the ADAM-3000 modules provide three-way (input/output/power) 1,000 V_{DC} isolation. Optical isolation provides pin-point accuracy and stability over a wide range of operations at minimal power consumption.

Flexible Analog Data Conversion

The input/output range for the ADAM-3000 modules can be configured through switches located inside the module. The modules accept voltage, current, thermocouple or RTD as input, and pass voltage or current as output.

Thermocouple input is handled by the built-in input thermocouple linearization circuitry and a cold junction compensation function. These ensure accurate temperature measurement and accurate conversion of this information to the voltage or current output.

Configuration

The ADAM-3000 modules use 24 V_{DC} power. This electrical power wiring can be acquired from adjacent modules, which greatly simplifies wiring and maintenance. The I/O configuration switches are located inside the modules. To reach the switches, simply remove the modules from the DIN-rail bracket by sliding the modules downward.

Modular Industrial Design

The ADAM-3000 modules can be easily mounted on a DIN-rail, and signal wires can be connected through screw terminals. The screw terminals and input/output configuration switches are built inside the industrial grade plastic casing. With simple two-wire input/output cables, wiring is easy and reliable in harsh industrial environments.

Applications

- Signal isolation
- Signal transmitters
- Thermocouple/RTD/strain gauge measurements
- Signal amplifiers
- Noise filter

Common Specifications

- **Isolation** 1,000 V_{DC}
- **Indicators** Power LED indicator
- **Power Requirement** 24 V_{DC} ± 10%
- **Case** ABS
- **Screw Terminal** Accepts 0.5 mm² ~ 2.5 mm²
1- #12 or 2- #14 ~ #22 AWG
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
(ADAM-3011: 0 ~ 50° C (32 ~ 122° F))
- **Storage Temperature** -25 ~ 85° C
(-13 ~ 185° F)

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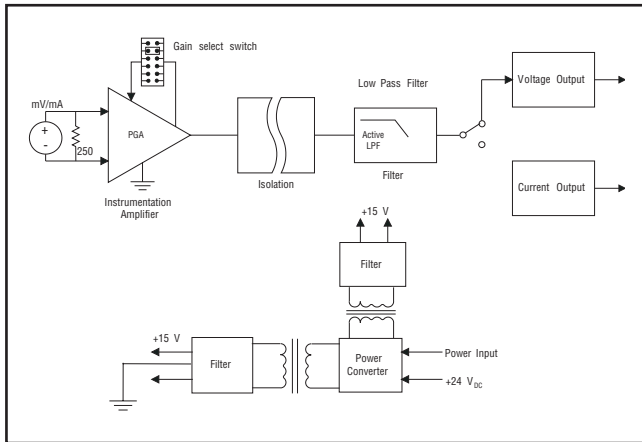


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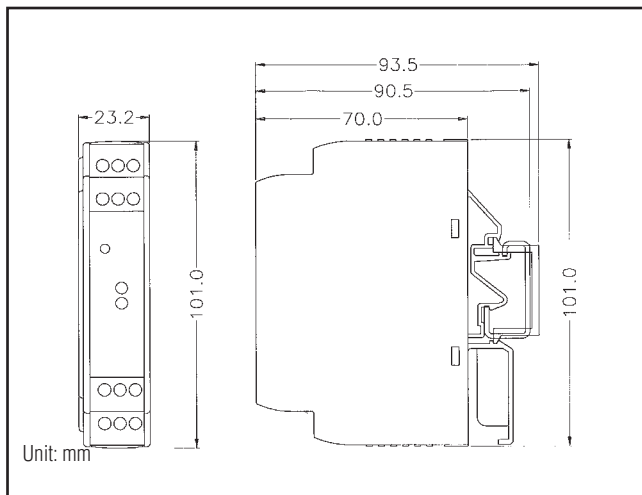
Isolated Signal Conditioning Modules

Block Diagram



Block Diagram of ADAM-3014

Dimensions

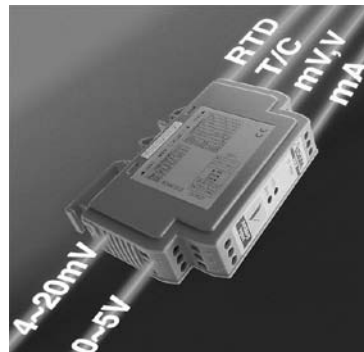


ADAM-3000 Series Modules



Three-way Signal Isolation

Three-way (input/output/power) 1,000 V_{DC} isolation.



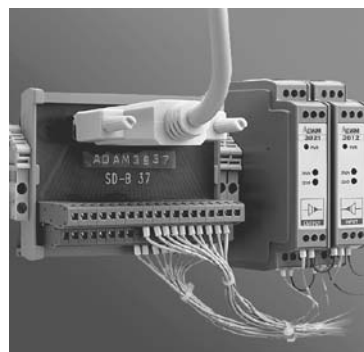
Field Configurable I/O Range

The I/O range can be configured on site with switches inside the module.



Easy Daisy Chain Power Wiring

Power can be connected conveniently from adjacent modules.



Interfacing to DAQ Cards

A wiring adapter can connect modules to a data acquisition card.

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ADAM-3011 ADAM-3013 ADAM-3014

Isolated Thermocouple Input Module

Isolated RTD Input Module

Isolated DC Input/Output Module



ADAM-3011



ADAM-3013



ADAM-3014



Specifications

Thermocouple Input

- Common Mode Rejection 115 dB min
- Input Type

T/C type	Temperature Range (°C)	Accuracy at 25° C (°C)
J	-40 ~ 760	±2
K	0 ~ 1,000	±2
T	-100 ~ 400	±2
E	0 ~ 1,000	±2
S	500 ~ 1,750	±4
R	500 ~ 1,750	±4
B	500 ~ 1,800	±4

- Isolation (Three-way) 1,000 V_{DC}
- Output Impedance 0.5 Ω
- Stability (Temperature Drift) ±2° C
- Voltage Output 0 ~ 10 V

General

- Connectors Screw terminal
- Enclosure ABS
- Indicators Power LED indicator
- Isolation 1,000 V_{DC}
- Power Consumption 1.4 W
- Power Input 24 V_{DC} ± 10%
- Operating Temperature 0 ~ 50° C (32 ~ 122° F)
- Storage Temperature -25 ~ 85° C (-13 ~ 185° F)

Ordering Information

- ADAM-3011 Isolated Thermocouple Input Module

Specifications

RTD Input

- Accuracy ± 0.1% of full range (voltage) or ± 0.15° C (voltage)
± 0.2% of full range (current)
- Bandwidth 4 Hz
- Input CMR at DC 92 dB min.
- Input Connections 2, 3 or 4 wires
- Input Type

RTD type	α	Temperature Range (°C)
Pt	0.00385	-100 ~ 100
Pt	0.00385	0 ~ 100
Pt	0.00385	0 ~ 200
Pt	0.00385	0 ~ 600
Pt	0.00385	-100 ~ 0
Pt	0.00385	-100 ~ 200
Pt	0.00385	-50 ~ 50
Pt	0.00385	-50 ~ 150
Pt	0.00392	-100 ~ 100
Pt	0.00392	0 ~ 100
Pt	0.00392	0 ~ 200
Pt	0.00392	0 ~ 600
Ni	N/A	0 ~ 100
Ni	N/A	-80 ~ 100

- Output Range 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA
- Output Resistance < 5 Ω
- Temperature Drift ± 30 ppm of full range

General

- Connectors Screw terminal
- Enclosure ABS
- Indicators Power LED indicator
- Isolation 1,000 V_{DC}
- Power Consumption < 0.95 W
- Power Input 24 V_{DC} ± 10%
- Operating Temperature 0 ~ 70° C (32 ~ 158° F)
- Storage Temperature -25 ~ 85° C (-13 ~ 185° F)

Ordering Information

- ADAM-3013 Isolated RTD Input Module

Specifications

I/O

- Accuracy ± 0.1% of full range (typical)
- Common Mode Rejection > 100 dB @ 50 Hz/60 Hz
- Current Input Bipolar: ±20 mA
Unipolar: 0 ~ 20 mA
Input impedance: 250 Ω
- Current Output 0 ~ 20 mA
- Stability (Temperature Drift) 150 ppm (typical)
- Voltage Input Bipolar input: ±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1.0 V, ±5 V, ±10 V
Unipolar input: 0 ~ 10 mV, 0 ~ 50 mV, 0 ~ 100 mV, 0 ~ 0.5 V, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V
Input impedance: 2 MΩ
Input bandwidth: 2.4 kHz (typical)
- Voltage Output Bipolar: ±5 V, ±10 V
Unipolar: 0 ~ 10 V
Impedance: < 50 Ω
Drive: 10 mA max.

General

- Connectors Screw terminal
- Enclosure ABS
- Indicators Power LED indicator
- Isolation (Three-way) 1,000 V_{DC}
- Power Consumption 0.85 W (voltage output)
1.2 W (current output)
- Power Input 24 V_{DC} ± 10%
- Operating Temperature -10 ~ 70° C (14 ~ 158° F)
- Storage Temperature -25 ~ 85° C (-13 ~ 185° F)

Ordering Information

- ADAM-3014 Isolated DC Input/Output Module

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ADAM-3016 ADAM-3112 ADAM-3114

Isolated Strain Gauge Input Module

Isolated AC Voltage Input Module

Isolated AC Current Input Module



ADAM-3016



ADAM-3112



ADAM-3114



Specifications

I/O

- **Accuracy** $\pm 0.1\%$ of full range
- **Bandwidth** 2.4 kHz (typical)
- **Isolation Mode Rejection** >100 dB @ 50 Hz/60 Hz
- **Current Output**
 - Current: 0 ~ 20 mA
 - Current load resistor: 0 ~ 500 Ω (Source)
 - 150 ppm (typical)
- **Stability (Temperature Drift)**
- **Voltage Specifications**
 - Electrical input: ± 10 mV, ± 20 mV, ± 30 mV, ± 100 mV
 - Excitation voltage: 1 ~ 10 V_{DC} (60 mA max)
- **Voltage Output**
 - Bipolar: ± 5 V, ± 10 V
 - Unipolar: 0 ~ 10 V
 - Impedance: < 50 Ω

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation (Three-way)** 1,000 V_{DC}
- **Power Consumption**
 - ≤ 1.85 W (voltage output)
 - ≤ 2.15 W (current output)
- **Power Input** 24 V_{DC} $\pm 10\%$
- **Operating Temperature** -10 ~ 70° C (14 ~ 158° F)
- **Storage Temperature** -25 ~ 85° C (-13 ~ 185° F)

Ordering Information

- **ADAM-3016** Isolated Strain Gauge Input Module

Specifications

Voltage Input

Full Range Mode		400 V	250 V	120 V
Input Voltage	AC (V _{RMS})	0 ~ 400	0 ~ 250	0 ~ 120
	DC (V)	0 ~ 400	0 ~ 250	0 ~ 120
Input Impedance		48 k	30 k	14.4 k

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < $\pm 1.0\%$ for full range
- **Output Impedance** < 10 Ω @ operating frequency < 60 Hz
- **Load** > 10 k Ω
- **Ripple** < 120 mVp-p
- **Temperature Coefficient** 400 ppm/° C
- **Input Bandwidth** 6 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} $\pm 10\%$
- **Current Consumption** 40 mA

General

- **Isolation Protection** 1,000 V_{DC} (output to power), 2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

- **ADAM-3112** Isolated AC Voltage Input Module

Specifications

Current Input

- **AC Current Input** 0 ~ 5 A_{RMS}
- **DC Current Input** 0 ~ 5 A

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < $\pm 1.0\%$ for full range
- **Output Impedance** < 10 Ω @ operating frequency < 60 Hz
- **Load** > 10 k Ω
- **Ripple** < 120 mVp-p
- **Temperature Coefficient** 400 ppm/° C
- **Input Bandwidth** 10 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} $\pm 10\%$
- **Current Consumption** 40 mA

General

- **Isolation Protection** 1,000 V_{DC} (output to power), 2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

- **ADAM-3114** Isolated AC Current Input Module

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Operator Panels

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Display Solutions

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Device Servers

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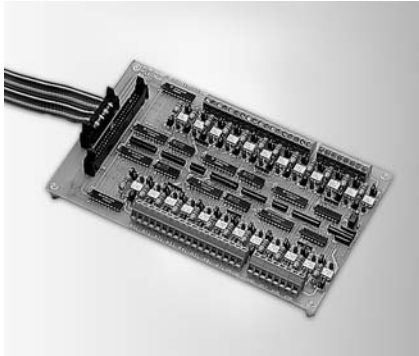
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PCLD-782/B PCLD-785/B PCLD-885

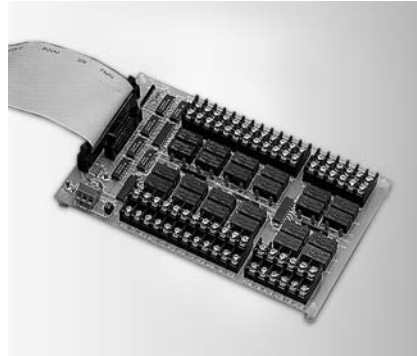
16/24-ch Opto-Isolated Digital Input Board

16/24-ch Relay Board

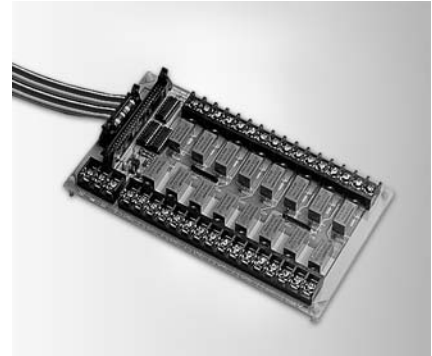
16-ch Power Relay Board



PCLD-782/B



PCLD-785/B



PCLD-885



Features

- Compatible with all PC-LabCard™ products with DI channels on either 20-pin flat cable or 50-pin Opto-22 compatible connectors
- 16 or 24 optically-isolated digital input channels
- Built-in screw terminals for easy input wiring
- LEDs indicate input logic status
- Inputs buffered with voltage comparators

Specifications

Isolated Digital Input

- Channels** PCLD-782: 16
PCLD-782B: 24
- Input Range** 0 ~ 24 V_{DC}
- Input Resistance** 560 Ω
- Isolation Voltages** 1,500 V_{DC} min.
- Threshold Voltage** 1.5 V_{DC} (VR adjustable)

General

- DI Connectors** Screw terminals (#12 ~ 22 AWG)
- Controller Connector** PCLD-782: 1 x 20-pin box header (CN1)
PCLD-782B: 1 x 20-pin box header (CN1) and 1 x 50-pin box header (CN2)
- Dimensions (L x W)** PCLD-782: 3U—205 x 114 mm (8.1" x 4.5")
PCLD-782B: 4U—220 x 132 mm (8.7" x 5.2")
- LED Indicators** Indicates input logic status
- Mounting** 4 x screw holes for flat surface mounting

Ordering Information

- PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables

Accessories

- PCL-10120-1** 20-pin Flat Cable, 1 m
- PCL-10120-2** 20-pin Flat Cable, 2 m
- PCL-10150-1.2** 50-pin Flat Cable, 1.2 m

Features

- Compatible with PC-LabCard™ products with 20-pin digital output connector and 50-pin Opto-22 digital output connector (PCLD-785B only)
- Automatic selection of control logic (PCLD-785B only): Negative logic for the Opto-22 connector
Positive logic for the 20-pin flat cable connector
- Screw terminals for easy output wiring
- LED status indicators

Specifications

Relay

- Channels** PCLD-785: 16 (CN1, 20-pin conn.)
PCLD-785B: 16 (CN1, 20-pin conn.)
24 (CN2, 50-pin conn.)
- Contact Ratings** 120 V_{AC} @ 0.5 A, 30 V_{DC} @ 1 A
- Contact Resistance** < 100 mΩ
- Operation Time** 5 ms max.
- Insulation Resist.** 100 MΩ
- Life Expectancy** 5 x 10⁵ @ 110 V_{AC}/0.3 A
5 x 10⁵ @ 24 V_{DC}/1.25 A
SPDT (Single-Pole Double-Throw) Form C
- Relay Type**
- Release Time** 5 ms max.

General

- Dimensions (L x W)** PCLD-785: 114x220 mm
PCLD-785B: 132x220 mm
- Power Consumption** 5 V @ < 100 mA; 12 V @ 33 mA for each relay
- Power Input** 20-pin connector: 5 V_{DC}: Jumper select PC bus or external supply
12 V_{DC}: Jumper select PC bus or external supply
50-pin connector: external 12 V supply

Ordering Information

- PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Accessories

- PCL-10120-1** 20-pin Flat Cable, 1 m
- PCL-10120-2** 20-pin Flat Cable, 2 m
- PCL-10150-1.2** 50-pin Flat Cable, 1.2 m

Features

- Accepts 20-pin or 50-pin (Opto-22 compatible) connectors
- 16 single-pole single-throw (SPST) relays
- High-power relay handles up to 5 A @ 250 VAC
- Onboard varistors protect all relay contact points
- Industrial screw terminals for ease of wiring
- LED status indicators
- 5 V/ 12 V power/status LED indicator

Specifications

Relay

- Channels** 16
- Contact Rating** 250 V_{AC} @ 6 A
30 V_{DC} @ 5 A
- Contact Resistance** 30 mΩ max.
- Insulation Resist.** 1,000 MΩ @ 500 V_{DC}
- Life Expectancy** >100,000 cycles at rated load
- Relay On Time** 6 ms max.
- Relay Off Time** 3 ms max.
- Relay Type** SPST (Form A), normally open

Varistor

- Clamping Voltage** 760 V (10 A)
- Max. Peak Current** 1,200 A for 8 msec.
- Max. Applied Voltage** 300 V_{RMS} AC continuous
- Varistor Voltage** 470 V (current = 1 mA)

General

- Power Consumption** 12 V @ 22 mA for each relay, 352 mA if all relays energized
5 V @ 200 mA max.
- Connectors** Input: 20-pin flat cable or 50-pin Opto-22 compatible
Output: Barrier strip screw terminal
- Dimensions (L x W)** 205 x 114 mm (8" x 4.5")
- Operating Temp.** 0 ~ 60° C (32 ~ 140° F)

Ordering Information

- PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables