*Installation Instructions*

# ArmorBlock-LP 16 Input Module

## Cat. No. 1792-IB16LP

This 1792 ArmorBlock™ I/O block module (Cat. No. 1792-IB16LP) contains I/O circuits, a built-in power supply, and a built-in DeviceNet I/O adapter. Because of its sealed housing, this 1792 I/O block requires no enclosure. It is compatible with PLC or SLC programmable controllers using DeviceNet scanners. The I/O values are accessible from the PLC or SLC programmable controller data table.

This ArmorBlock-LP module has no switches to set. You set module parameters using the DeviceNet Manager Software (cat. no. 1787-MGR) or similar configuration tool.

### Contents

This box contains:

- 1 ArmorBlock–LP module
- Package containing 10 write-on indicator tabs, and 7 micro caps
- 1 DeviceNet right hand aluminum T-port tap (part number 97042401)
- Installation Instructions

## European Union Directive Compliance

If this product is installed within the European Union or EEA regions and has the CE mark, the following regulations apply.

### EMC Directive

This apparatus is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC).

The product described in this manual is intended for use in an industrial environment.



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### Low Voltage Directive

This apparatus is also designed to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131–2 Programmable Controllers, Part 2 – Equipment Requirements and Tests.

For specific information that the above norm requires, see the appropriate sections in this manual, as well as the following Allen-Bradley publications:

- Industrial Automation Wiring and Grounding Guidelines for Noise Immunity, publication 1770-4.1
- Automation Systems Catalog, publication B111

## Install Your ArmorBlock Module

Installation of the ArmorBlock module consists of:

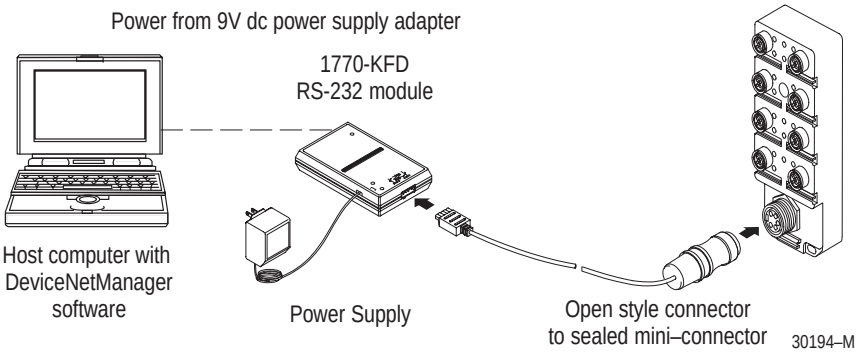
- setting the node address and communication rate in the ArmorBlock module
- mounting the ArmorBlock module
- connecting the wiring
- communicating with your module

### Set the Node Address

Each ArmorBlock comes with its internal program set for node address 63 and a communication rate of 125Kbps. To set the node address and communication rate, you need the following:

- host computer with DeviceNet Manager Software (or similar configuration software tool)
- 1770-KFD RS-232 module (or similar interface)
- suitable cables to connect the 1770-KFD to your module and to connect the 1770-KFD to your host computer

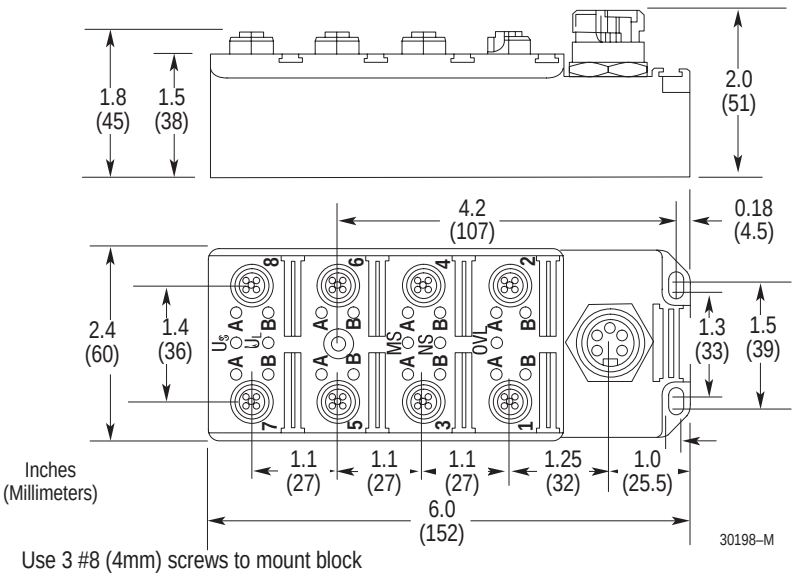
Set up a system (as shown below) to communicate with your ArmorBlock module to set the node address and communication rate to meet your system requirements.




## Mount the ArmorBlock Module

Mount the block module directly to the machine or device. Complete mounting dimensions are shown below.

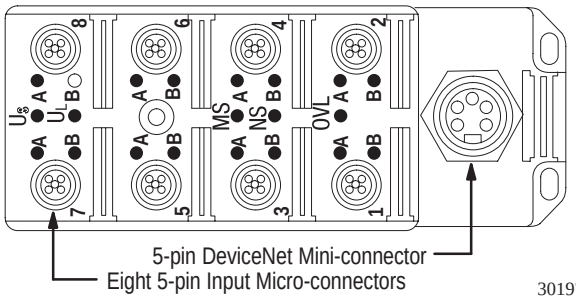
## Mounting Dimensions



## Connect the Wiring to the ArmorBlock Module

This module uses quick disconnect, screw-on style connectors for:

- I/O input wiring
- the DeviceNet connector



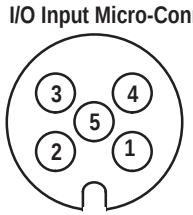

Seven micro plugs are included with your module. Use these plugs to cover and seal unused ports. Pinout diagrams for these connectors are shown below.

**ATTENTION:** Make sure all connectors are securely tightened to properly seal the connections against leaks and maintain IP67 requirements.

### Connecting the Input Wiring

Connect input wiring to the micro-connectors which screw into mating connectors on the front of the block.

Make connections as shown below.




**Pin 1 = Sensor Source Voltage Positive**

**Pin 2 = Signal B**

**Pin 3 = Negative/Return**

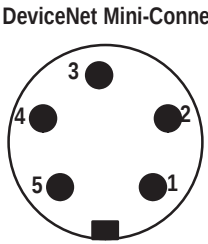
**Pin 4 = Signal A**

**Pin 5 = Ground**

Use a splitter cable (or “Y” cable) to access signal B.

## Connecting the DeviceNet Wiring

Connect DeviceNet wiring to the 5-pin mini-connector on the end of the block. Connections are shown below.




## Communicate with Your ArmorBlock Module

This ArmorBlock module's I/O is exchanged with the master through a poll, bit strobe or change of state connection.

When set for Polled, Bit Strobe, or change of state, the module consumes and produces as follows:

| Type of I/O Connection | Consumes | Produces |
|---|---|---|
| Polled | 0 Bytes | 3 Bytes |
| Bit Strobe | 0 Bytes | 3 Bytes |
| Change of State | 0 Bytes | 3 Bytes |

Polled device – a master initiates communication by sending its polled I/O message to the ArmorBlock module. The 16 input module scans the inputs and fault bit producing a response that reflects their status.

Change of state – productions occur when an input changes or an input source voltage fault occurs. If neither has occurred within the "expected packet rate," a heartbeat production occurs. This heartbeat production tells the scanner module that the ArmorBlock module is alive and ready to communicate.

Bit Strobe device – a master initiates communication by sending its bit strobe I/O message. All bit strobed devices then respond. The 16 input module scans the inputs and fault bits, producing a response that reflects their status.

Refer to the table below for the word/bit definitions.

| Bit | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 |
|---|---|---|---|---|---|---|---|---|
| Produces 1 | I8A | I7A | I6A | I5A | I4A | I3A | I2A | I1A |
| Produces 2 | I8B | I7B | I6B | I5B | I4B | I3B | I2B | I1B |
| Produces 3 | IS | Reserved | | | | | | |

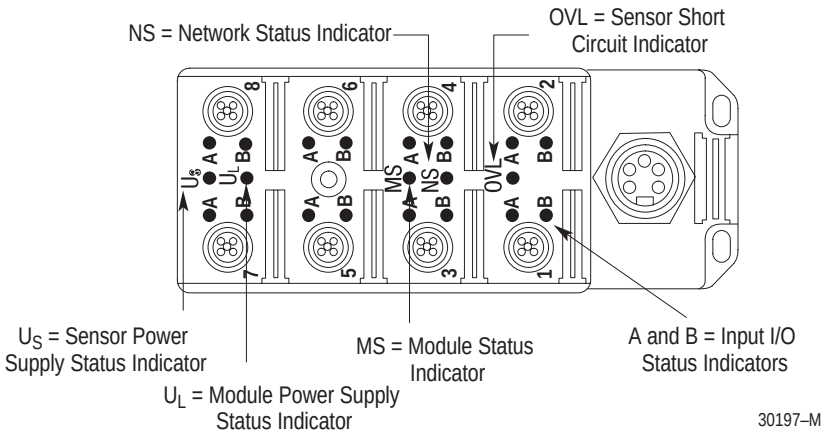
Where: I = Input
IS = Sensor source voltage fault

| Word | Bit | Description |
|---|---|---|
| Produces 1 | 00–07 | Input bits – bit 00 corresponds to input 1A, bit 01 to input 2A, and so on. 0 = input off; 1 = the input is on. |
| Produces 2 | 00–07 | Input bits – bit 00 corresponds to input 1B, bit 01 to input 2B, and so on. 0 = input off; 1 = the input is on. |
| Produces 3 | 00–06 | Reserved |
| | 07 | Sensor source voltage fault bit – this bit is set (1) when the sensor source voltage is faulted. |

## Troubleshoot with the Indicators

The ArmorBlock I/O module has the following indicators:

- Network status indicator (NS)
- Module status indicator (MS)
- Individual I/O status indicators (A, B)
- Power Status indicators
  - module power
  - sensor power
  - sensor short circuit




**Note:** This module contains a circuit to protect the DeviceNet power supply from short circuits in an attached sensor or sensor cable. If you connect a sensor while the module is powered, the surge current produced by the sensor can cause the module to fault. This operation is normal.

| Network Status Indicator NS | |
|---|---|
| **Indication** | **Status** |
| Flashing Green | On-line, not connected |
| Solid Green | Link OK, on-line connected |
| Flashing Red | At least 1 I/O connection is in the timed-out state |
| Solid Red | Incorrect baud rate, or a duplicate Mac ID exists |

| Module Status Indicator MS | |
|---|---|
| **Indication** | **Status** |
| OFF | No power, or no network access |
| Flashing Green/OFF | On-line but not connected |
| Solid Green | On-line, link okay, connected |
| Flashing Red | Recoverable fault |
| Solid Red | Critical failure |

| Sensor Short Circuit Indicator OVL | |
|---|---|
| **Indication** | **Status** |
| OFF | Sensor source voltage operating correctly |
| Solid Red | 1 or more Sensor source voltage shorts |

| Input I/O Status Indicators A and B | |
|---|---|
| **Indication** | **Status** |
| OFF | No valid input signal present |
| Yellow | Valid input signal present |

| Module and Sensor Power Supply Status Indicators $U_S$ and $U_L$ | |
|---|---|
| **Indication** | **Status** |
| OFF | Power supply is not functioning correctly |
| Green | Power Supply is operating |

# Specifications

**16 Input Module – Cat. No. 1792-IB16LP**

| | | |
|---|---|---|
| **Input Specifications** | | |
| Inputs per Block | | 16 sinking |
| On-state Voltage Range | | 12–30V dc |
| On-state Current | Maximum<br>Minimum | 15.0mA @ 30V dc<br>1.6mA @ 12V dc |
| Off-state Voltage | Maximum | 5V dc |
| Off-state Current | Minimum | 0.8mA |
| Transition Voltage | | 5–12.0V dc |
| Transition Current | | 0.8–2.2mA |
| Input Signal Delay<br>Off to On or On to Off | | 1ms maximum |
| Sensor Source | Voltage<br>Current | Minimum 13V dc @ 800mA out and DeviceNet power = 15V dc<br>50mA per point, 0.8A total per module |
| Indicators | | Network Status – red/green<br>Module Status – red/green<br>Sensor Power Supply Status – green<br>Module Power Supply Status – green<br>Short Circuit Sensors – red<br>I/O Status – yellow |
| Communication Rate in Baud | | 125k, 250k, 500k selectable |
| **General Specifications** | | |
| DeviceNet Power | Voltage<br>Current | 11.0 – 25.0V dc<br>100mA (no powered sensors)<br>900mA (full sensor load) |
| Dimensions | Inches<br>Millimeters | 6.0H X 2.4W X 2.0D<br>152H X 60W X 51D |
| Environmental Conditions<br>Operational Temperature<br>Storage Temperature<br>Relative Humidity<br>Shock<br>Vibration | <br><br><br><br>Operating<br>Non-operating | <br>0 to 60°C (32 to 140°F)<br>–20 to 80°C (–40 to 176°F)<br>up to 100%<br>30 g peak acceleration, 11(±1)ms pulse width<br>50 g peak acceleration, 11(±1)ms pulse width<br>Tested 10 g @ 10–500Hz per IEC 68-2-6 |

**Specifications continued on next page.**

| General Specifications | |
|---|---|
| Conductors | Refer to publication 1485-6.7.1 for information on cabling for your DeviceNet module. |
| Enclosure | Meets or exceeds IP67 |
| Agency Certification | CE marked for all applicable directives |
| Product Data (user information) | Publication 1792-2.1 |

**This product has been tested at an Open DeviceNet Vendor Association, Inc. (ODVA) authorized independent test laboratory and found to comply with ODVA Conformance Test Software Version FT 1.3/1.1.**

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