



Installation Instructions for DeviceNet™ Sensor Adapter Modules



DESCRIPTION

General Information

- Network Media - CAN (11-bit identifier)
- Protocol - DeviceNet
- Type - Group 2 Only Slave Device using Predefined Master Slave Connection Set
- Bandwidth - 125 Kbaud only

The sensor adapter module is an interface device designed to allow a generic input device to be monitored on DeviceNet. The module also provides 24 VDC power for operation of a powered input device. The adapter module will accept solid-state or contact inputs. A 4-pin micro-connector version is available so that any 3-wire, 10-30 VDC solid state sensor can be simply plugged in for immediate operation.

Features

- Automatically identifies NPN or PNP inputs
- Input State LED visually indicates NPN or PNP operation
- Choice of cable wiring or quick-disconnect connector

INSTALLATION



WARNING

DO NOT INSTALL OR PERFORM MAINTENANCE ON THIS DEVICE WHILE THE CONTROLLER IS ENERGIZED. DEATH OR SEVERE PERSONAL INJURY CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH INSTALLATION OR MAINTENANCE. Only qualified persons, as defined in the National Electric Code, who are familiar with the installation, maintenance and operation of this device and the equipment onto which is to be installed, as well as applicable local, state and national regulations and industry standards and accepted practices regarding safety of personnel and the equipment safety should be permitted to install, maintain or operate this device. These instructions are provided only as a general guide to such qualified persons and are not all-inclusive. They do not cover every application or circumstances which may arise in the installation, maintenance or operation of this equipment. Users are advised to comply with all local, state and national regulations and industry standards and accepted practices regarding safety of personnel and the equipment safety.

MODELS COVERED BY THIS MANUAL

Catalog Number	Description	DeviceNet Product Name
E60-DNSAM-S	Sensor Adapter Module DeviceNet connection, 6-foot cable Sensor input, 6-foot cable	SAM01
E60-DNSAMP-S	Sensor Adapter Module DeviceNet connection, 6-foot cable with 5-pin micro connector Sensor input, 6-foot cable	SAM02
E60-DNSAMP-SP	Sensor Adapter Module DeviceNet connection, 6-foot cable with 5-pin micro connector Sensor input, 1-foot cable with 5-pin micro connector	SAM03

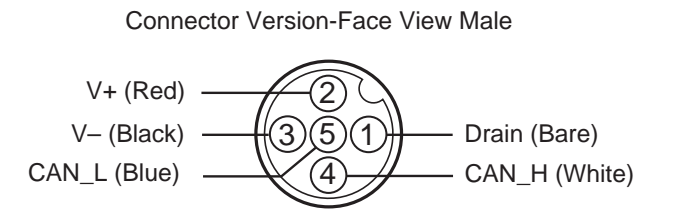
MOUNTING CONSIDERATIONS

The Sensor Adapter Module should be mounted near the input device to allow easy viewing of the LED indicators for monitoring and debug.

Secure the unit and cables in place with commonly available plastic cable ties to protect against damage. Although the housing is very strong, it can be damaged by excessive force or impact.

WIRING CONSIDERATIONS

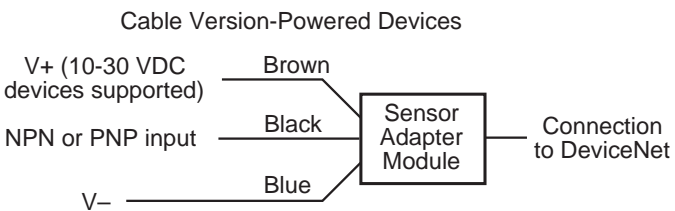
DeviceNet Connection



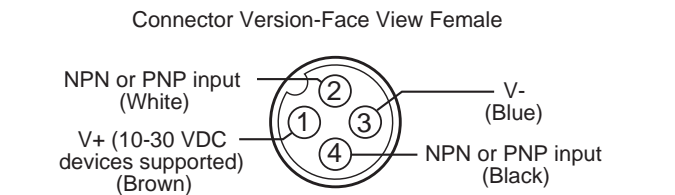
Input Device Connection

Solid State Device

For a cable connection, simply connect the device as shown in the diagram below.



For a DC solid-state sensor (single output, 4-pin, DC-key, micro connector) connect as shown in the diagram below.



 ATTENTION

When selecting sensors to be used with the adapter module, it is recommended that only “single output” devices be used. This is because “dual output” or “complimentary output” devices may conflict with the modules auto-detection circuitry.

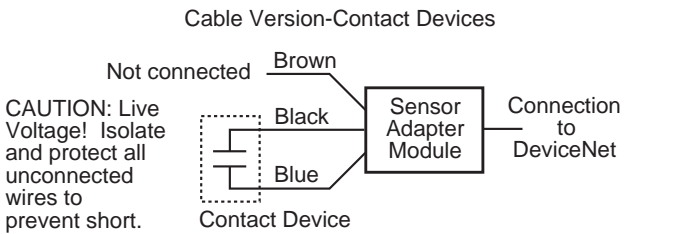
If a dual output, 4-pin, DC-key, micro connector device is used, it may be connected as shown in the drawing “Connector Version-Face View Female” (refer to the table below to determine how the dual inputs will be interpreted). Use of this type of device is not recommended.

Output Bit State for Dual input, 4-pin device

Pin 4	Pin 3	Output Bit
PNP Active (High)	Ignored	1
NPN Active (Low)	Ignored	1
Inactive (Floating)	PNP Active (High)	1
Inactive (Floating)	NPN Active (Low)	1
Inactive (Floating)	Inactive (Floating)	0

Contact Device

Adapter module does not debounce contact inputs. Debounce, if required, will need to be implemented as part of the control system.



DEVICE CONFIGURATION

Before using the Sensor Adapter Module, you **MUST** configure the following:

- Verify the network Communication rate (adapter module operates at 125 Kbaud only)
- Set the network address

Network Address

After connecting the module to the network, use the Netview configuration software (or other configuration software) to configure the device. Unless pre-configured, a new device will have a default address of 63 at a baud rate of 125 Kbaud when connected to the network.



CAUTION

Since all new DeviceNet devices are factory set to address 63, it is usually not a good idea to leave an address set at 63. Two nodes at the same address will cause a network fault!

Built into the Cutler-Hammer Netview configuration software is a function to locate nodes by illuminating the Module/Network Status LED. Verify that the software is communicating to the correct device using this feature (see the chart in the next section). Once the Netview configuration software is communicating to the adapter, the address and all other user configurable parameters can then be programmed. (See the Netview manual for specific information on how to change attributes.) A list of configurable attributes can be found in the appendix of this manual.

Now change the network address to the desired number. See the Cutler-Hammer DeviceNet system manual for a detailed description of choosing a network address.

SPECIFICATIONS

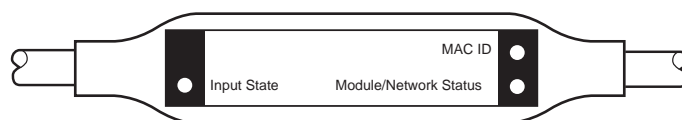
Response Time	2 mS from detection event until data is available to DeviceNet
Output Power	100 mA available to input device (derate to 40 mA when power supplied by DeviceNet to adapter falls below 12 VDC) CAUTION: Devices utilizing power supplied by adapter must be rated to 30 VDC.
Logic Levels	NPN (sinking) inputs detected below 1 VDC PNP (sourcing) inputs detected above 5 VDC
Temperature Range	Operating: -25° to +70° C (-13° to +158° F) Storage: -25° to +70° C (-13° to +158° F)
Cable/Connector	DeviceNet Connection: 6-ft cable (2 m), 4-wire with shield or 6-ft cable (2 m) with 5-pin micro connector (DC key) Input Device Connection: 6-ft cable (2 m), 3-wire or 1-ft cable (1/3 m) with 4-pin micro connector (DC key)
Material of Construction	Body: Polyolefin shrink tubing over a polycarbonate housing; Cable jacket: PVC
Vibration	30 g over 10 Hz to 2 kHz
Shock	50 g for 10 mS 1/2 sinewave pulse
Enclosure Ratings	NEMA 1, 2, 3, 4, 4X, 6, 6P, 12, and 13 (Our products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications. If you have questions about a specific application, contact the Sensor Applications Department at 1-800-426-9184.)
Approvals	Contact factory for the latest list of agency approvals

Off-line Configuration

A sensor adapter module may be configured off-line by connecting it directly to the configuration tool (PC with software or a hand-held type tool) and following the instructions for on-line configuration. 24 VDC must still be supplied to the adapter in order to configure it off-line.

LED definitions and diagnostics

The adapter includes three LED status indicators: Output status indication, network/module status indication and Mac ID.



LED Status

MAC ID LED

Red Flashes to indicate the 10's digit of the MAC ID

Green Flashes to indicate the 1's digit of the MAC ID

For example, a MAC ID of 53 is indicated by 5 red flashes, followed by a two second delay, then 3 green flashes, followed by a five second delay. This pattern will repeat continuously.

Module/Network Status LED

OFF Device is not on-line
- Device has not completed the Dup_MAC_ID test yet
- Device may not be powered

Solid Green Device is operating in a normal condition and the device is on-line with connections in the established state
- For a Group 2 Only device it means the device is allocated to a Master

Flashing Green Device is operating in a normal condition and the device is on-line with no connections in the established state
- The device has passed the Dup_MAC_ID test, is on-line, but has not established connections to other nodes
- For a Group 2 Only device it means that this device is not allocated to a Master
- Configuration missing, incomplete or incorrect

Flashing Red Recoverable fault and/or one or more I/O Connections are in the Timed-Out state

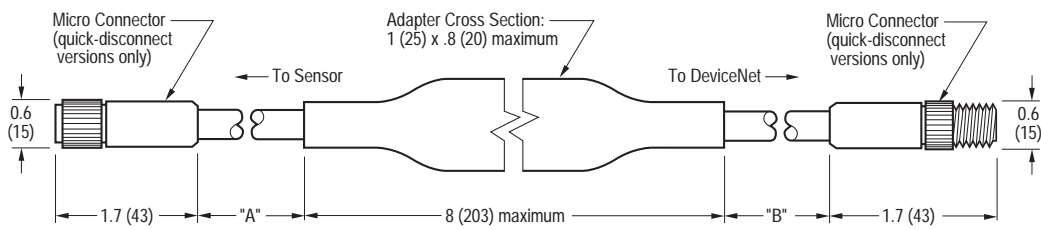
Solid Red The device has an unrecoverable fault; may need replacing
Failed communication device. The device has detected an error that has rendered it incapable of communicating on the network (Duplicate MAC ID, or Bus-off).

Input State LED

Solid Red The adapter is detecting an active NPN (sinking) input

Solid Green The adapter is detecting an active PNP (sourcing) input

APPROXIMATE DIMENSIONS in inches (mm)



CABLE LENGTHS

Catalog Number	"A"	"B"
E60-DNSAM-S	6 feet (2 m)	6 feet (2 m)
E60-DNSAMP-S	6 feet (2 m)	6 feet (2 m)
E60-DNSAMP-SP	1 feet (1/3 m)	6 feet (2 m)

APPENDIX: ELECTRONIC DATA SHEETS
(Programming Information)

Connection Object - Class 5 (05_{HEX}), Instance 1 and 3

This device supports Explicit Messaging (Instance 1) and I/O Bit Strobe (Instance 3).

Device Network Object - Class 3 (03_{HEX}), Instance 1

Attribute	Attribute ID	Get/Set
MAC ID (0-63)	1	Get/Set
Baud Rate (fixed at 125K)	2	Get

Use Device Network Object to program MAC ID.

Assembly Object Data - Class 4 (04_{HEX}), Instance 1

Attribute	Attribute ID	Get/Set
Data	3	Get

Use Assembly Object Data to read diagnostic and Output Status. This data is the same as returned using Bit Strobe Connection. Note: Reading Identity Object Status (Class 1 (01_{HEX}), Attribute 5) clears the diagnostic bit.

Assembly Object Data/Bit Strobe Connection Data

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	0	0	0	0	0	0	X
-----Not Used-----							
Diagnostic Bit (Bit 7)		Output Bit (Bit 0)		Byte Value			
0 (No fault)		0 (Off)		000 (00 _{HEX})			
0 (No fault)		1 (On)		001 (01 _{HEX})			
1 (Fault)		0 (Off)		128 (80 _{HEX})			
1 (Fault)		1 (On)		129 (81 _{HEX})			

Identity Object - Class 1 (01_{HEX}), Instance 1

Attribute	Attribute ID	Get/Set
Vendor - 68 00 (44 00 _{HEX})	1	Get
Device Type - 07 00 (07 00 _{HEX})	2	Get
Product Code - 00 00 (00 00 _{HEX})	3	Get
Product Name - see table below	7	Get

Note: A number of other attributes are supported. The above attributes are included to show the unique values associated with this product.

Product Name

Catalog Number	String Length (BYTE 1)	String (BYTES 2-6)			
		Decimal	Hexadecimal	ASCII	
E60-DNSAM-S	05	83 65 77 48 49	53 41 4D 30 31	SAM01	
E60-DNSAMP-S	05	83 65 77 48 50	53 41 4D 30 32	SAM02	
E60-DNSAMP-SP	05	83 65 77 48 51	53 41 4D 30 33	SAM03	

Still Need Help?
Contact the Cutler-Hammer
DeviceNet Products
Application Engineering Department
Phone: 1-800-231-1145

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