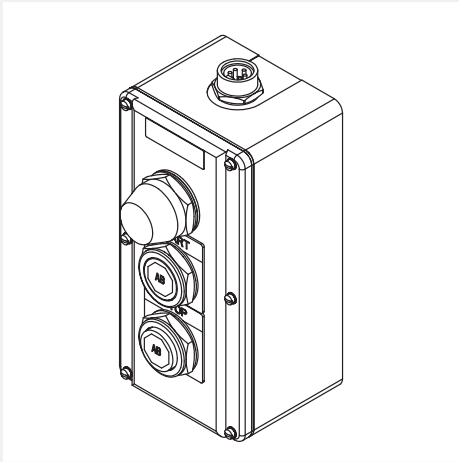**A·B** QUALITY

Allen-Bradley

RediSTATION™
Operator
Interface

User Manual

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. "Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls" (Publication SGI-1.1) describes some important differences between solid state equipment and hard–wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will the Allen-Bradley Company be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, the Allen-Bradley Company cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Allen-Bradley Company with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual we use notes to make you aware of safety considerations.

> ⚠️ **ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

Attentions help you:
- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is especially important for successful application and understanding of the product.

Preface

Overview of RediSTATION

Chapter 1

Installation and Mounting

Chapter 2

Preface

This manual gives an overview of the Bulletin 2705 RediSTATION ™ operator interface and describes how to configure, install, operate and troubleshoot the device on the DeviceNet ™ network.

Intended Audience

This manual is for the individuals responsible for installing, mounting and operating the RediSTATION in an industrial environment.

You should understand DeviceNet network operations, including how slave devices operate on the network and communicate with a DeviceNet master.

Contents of Manual

This manual is organized as follows:

Chapter	Title	Description
	Preface	Describes the purpose and contents of the manual, and the intended audience.
1	Overview	Provides an overview of the RediSTATION Operator Interface and its features.
2	Installation and Mounting	Describes how to configure, mount and install the RediSTATION device on the DeviceNet network.
3	Operations	Describes RediSTATION operations and other pertinent information.
4	Troubleshooting and Maintenance	Provides information on how to troubleshoot and maintain the device.
5	Building Custom Units	Describes how to assemble the separate components of a RediSTATION operator interface.
A	Specifications	Provides RediSTATION specifications.
B	DeviceNet Information	Describes DeviceNet message types, class services and object classes supported by the RediSTATION.
C	Unpopulated Configuration	Describes components and instructions for installing the unpopulated configuration of the RediSTATION.

Related Publications

The following table lists DeviceNet Network related publications.

Publication Title	Publication No.
DeviceNet Cable System Planning and Installation Manual	DN-6.7.1
1771-SDN Scanner Module Installation Instructions	1771-2.29

Overview of RediSTATION

Chapter Objectives

This chapter provides an overview of the RediSTATION and its features. It contains the following sections:

Description

The Bulletin 2705 RediSTATION is a three button station that operates on the DeviceNet™ network. The station receives power from the DeviceNet network. A separate power supply is not required.

The station supports three 800T devices in a standard or custom configuration. The standard unit includes two push buttons and one pilot light that are prewired for easy installation. Custom configurations support a variety of 800T devices that are prewired or customer installed.

The die cast enclosure of the standard unit complies with NEMA Type 4/12/13 standards for operation in rugged industrial environments.
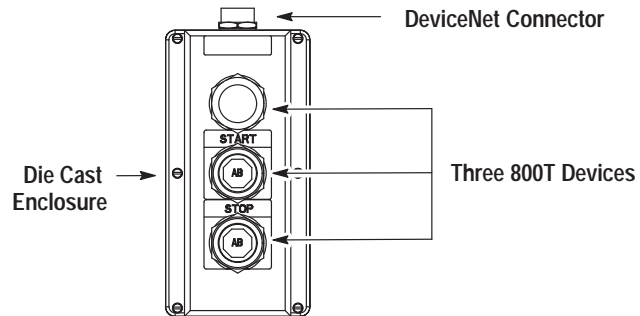
Summary of Features

- Standard or custom configurations
- Surface mounting device
- NEMA Type 4/12/13 die cast enclosure
- Easy installation and startup
- DeviceNet compatibility
- Powered by DeviceNet connection (no power supply required)
- Status LED provides indication of network and device operation

Standard Configuration

The standard RediSTATION unit (Catalog No. 2705-T3DN1A42A) has 2 push buttons (start and stop) and 1 pilot light.

- Catalog No. 800T-A1A Flush Head Push Button
- Catalog No. 800T-B6A Extended Head Push Button
- Catalog No. 800T-Q24R Pilot Light

The devices are prewired.

800T-Q24R Pilot Light
(red cap, 24V incandescent lamp)

800T-A1A Flush Head Push Button
(green, 1 NO contact, 1 NC contact)

800T-B6A Extended Head Push Button
(red, 1 NO contact, 1 NC contact)
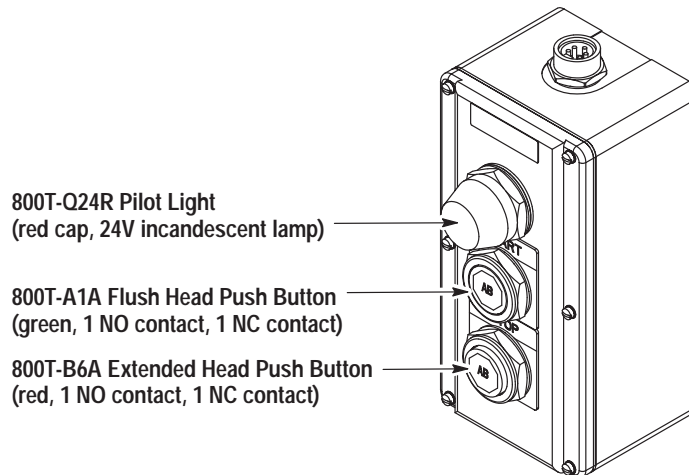
Custom Configurations

Custom configurations can be ordered to include other 800T devices that are prewired or customer installed. The RediSTATION supports direct connection to shallow contact blocks and 24 VDC incandescent lamps.

- push buttons, illuminated/non-illuminated
- selector switches, illuminated/non-illuminated
- key switches
- pilot lights

Other 800T devices are supported if the depth of the device is less than 1.92 inches (48.8 mm). Measure the device from the front mounting surface to the back of the 800T device.

Device depth must not exceed 1.92 inches (48.8 mm)
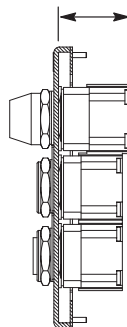
Unpopulated Configuration

An unpopulated configuration is available for customer configuration and installation of operator devices. The unpopulated configuration includes:

• DeviceNet Interface Board
• Six I/O Connector Cables (supporting 4 inputs and 2 outputs)
• DeviceNet PCB Terminal Block
• Mounting Hardware

Station Features

RediSTATION features are visible when the cover of the enclosure is removed.
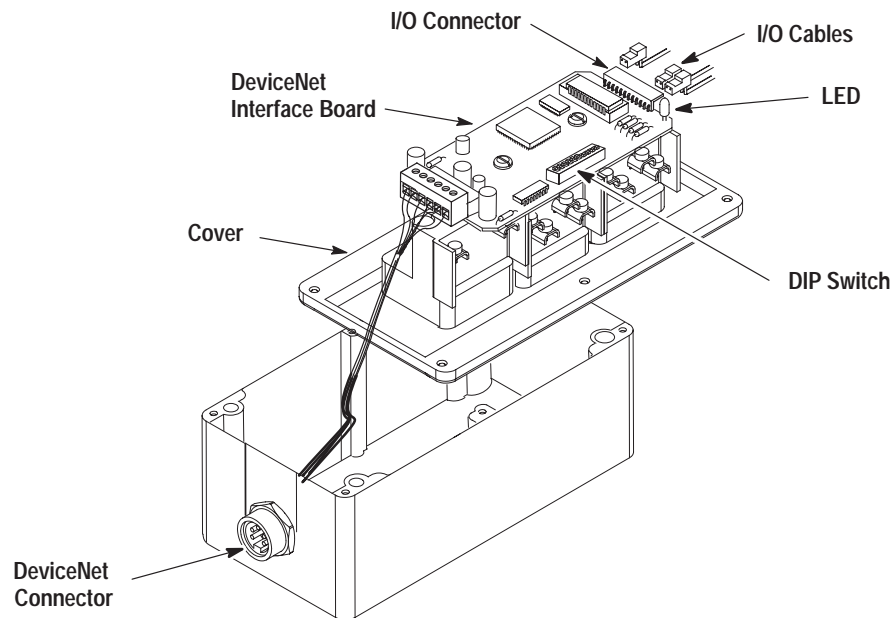
LED Indicator

The RediSTATION has one bicolor LED (red/green) to show its operating status. The LED shows the following indications.

Color	State	Indication
None	Off	No power.
Red	Solid	Unrecoverable fault.
	Flashing	Output error or configuration error.
Green	Solid	Normal runtime operation. The RediSTATION device is operating as a slave to the master controller.
	Flashing	Device is idle or not allocated to a master.

The LED is visible when the cover of the enclosure is removed.

DIP Switches

The RediSTATION has one 10-position DIP switch for setting:

- DeviceNet Node Address
- DeviceNet Data Rate
- Output Fault State (Off or Last State)
- Output Flash Rate

The DIP switch is located on the circuit board inside the enclosure. The switch settings and functions are shown below. The default setting for each switch or group of switches is underlined.

Default Configuration

```
OFF = 0
ON = 1
10 9 8 7 6 5 4 3 2 1
```

DeviceNet Address   000000 – 111111 (0 to 63)

DeviceNet Data Rate 00 =   125K BPS
                     01 =   250K BPS
                     10 =   500K BPS
                     11 =   Invalid

Output Fault State   0 = Outputs Turn Off on Fault
                     1 = Outputs Hold Last State on Fault

Output Flash Rate   0 = 1 Hz (0.5 sec On, 0.5 sec Off)
                     1 = 2 Hz (0.25 sec On, 0.25 sec Off)
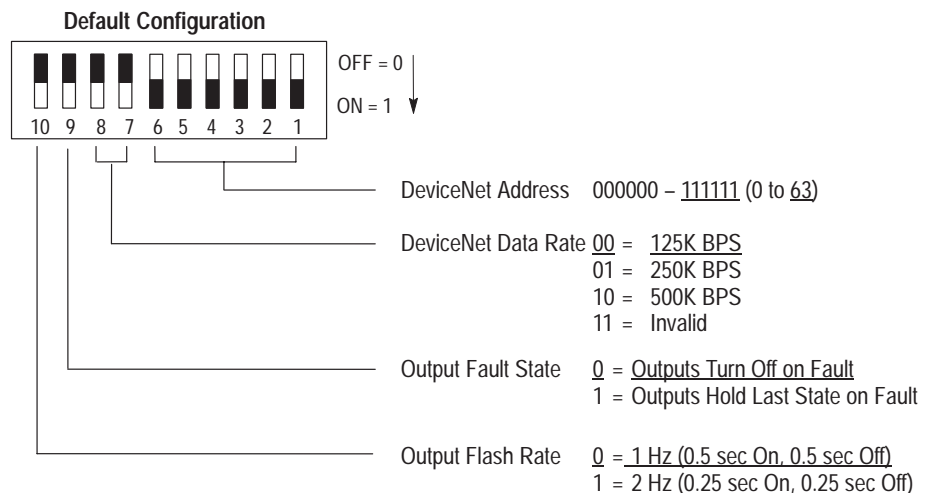
I/O Connector

Bulletin 800T devices connect to the 12-pin I/O connector on the circuit board. The connector supports 4 inputs and 2 outputs. The standard configuration uses 2 inputs and 1 output.

A separate cable attaches each 800T input or output device to the I/O connector. The 2-wire end of the cable attaches to the screw terminals of the device. The connector end of the cable connects to 2-pins on the I/O connector. Unused pins are left open.

The table below shows connections for the standard configuration. The pilot light connects to pins 1-2. The start push button connects to pins 9-10. The stop push button connects to pins 11-12. Pins 3-8 are unused.

I/O Connector Pin #	Wire Color	800T Terminal Labels	800T Device
1	Red	L1(+)	Indicator
2	Black	L2(–)	
9	Red	A3	Start Push Button
10	Black	A4	
11	Red	A3	Stop Push Button
12	Black	A4	

The illustration on the left shows the location of the I/O connector on the circuit board. The illustration on the right shows the terminal labels for each device in the standard configuration.

I/O Connector

Pin 1

Stop Push Button   **Start Push Button**   **Indicator**
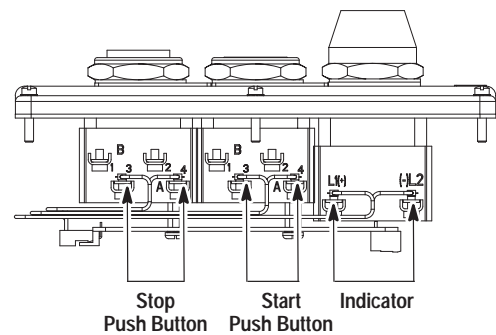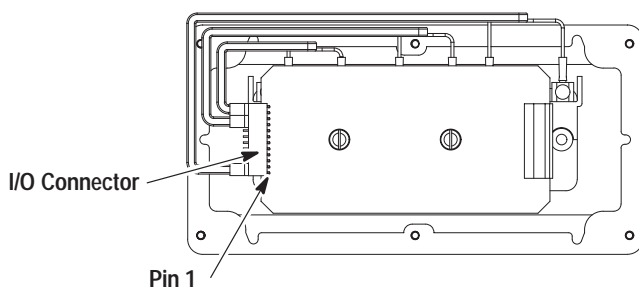
DeviceNet Connection

The RediSTATION receives all power and communications through the DeviceNet cable. A separate power supply is not required. This is the only external connection to the RediSTATION.

The RediSTATION connects to the DeviceNet using the sealed connector on the top of the unit or the DeviceNet terminal block inside the enclosure.

DeviceNet Sealed Connector

On standard units, the DeviceNet cable attaches directly to the DeviceNet connector at the top of the enclosure. The connector is wired to the DeviceNet terminal block on the circuit board.

DeviceNet Connector
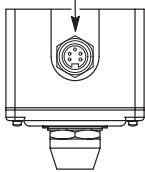
DeviceNet Connector	Pin#	Signal	Function	Color
	1	SHIELD	SHIELD	Green
	2	VDC+	Power Supply	Red
	3	COM	Common	Black
	4	CAN_H	Signal High	White
	5	CAN_L	Signal Low	Blue

DeviceNet Terminal Block

On stations without a sealed connector, DeviceNet cable wires (2 communication, 2 power, 1 shield) connect to the terminal block through the conduit at the top of the unit.

Conduit for DeviceNet Cable
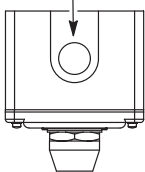
DeviceNet Terminal Block	Terminal	Signal	Function	Color
	1	COM	Common	Black
	2	CAN_L	Signal Low	Blue
	3	SHIELD	Shield	Uninsulated
	4	CAN_H	Signal High	White
	5	VDC+	Power Supply	Red
	6	E. GND	Chassis Ground	Green

Typical
DeviceNet Configuration

A DeviceNet network supports multiple RediSTATION devices and allows them to communicate with other network devices (up to 64).

The RediSTATION operates on the network as a slave device. It does not initiate communications except for a duplicate node address check on powerup. The master reads inputs from RediSTATION input devices and writes data to the output devices.

The following DeviceNet configuration shows a variety of sensors operating as slaves to a PLC-5 controller with a 1771-SDN DeviceNet Scanner Module.

PLC-5 Controller

DeviceNet Scanner Module

DeviceNet Network

Sensor

Block I/O

Drive

Smart Motor Controller

RediSTATION

RediSTATION
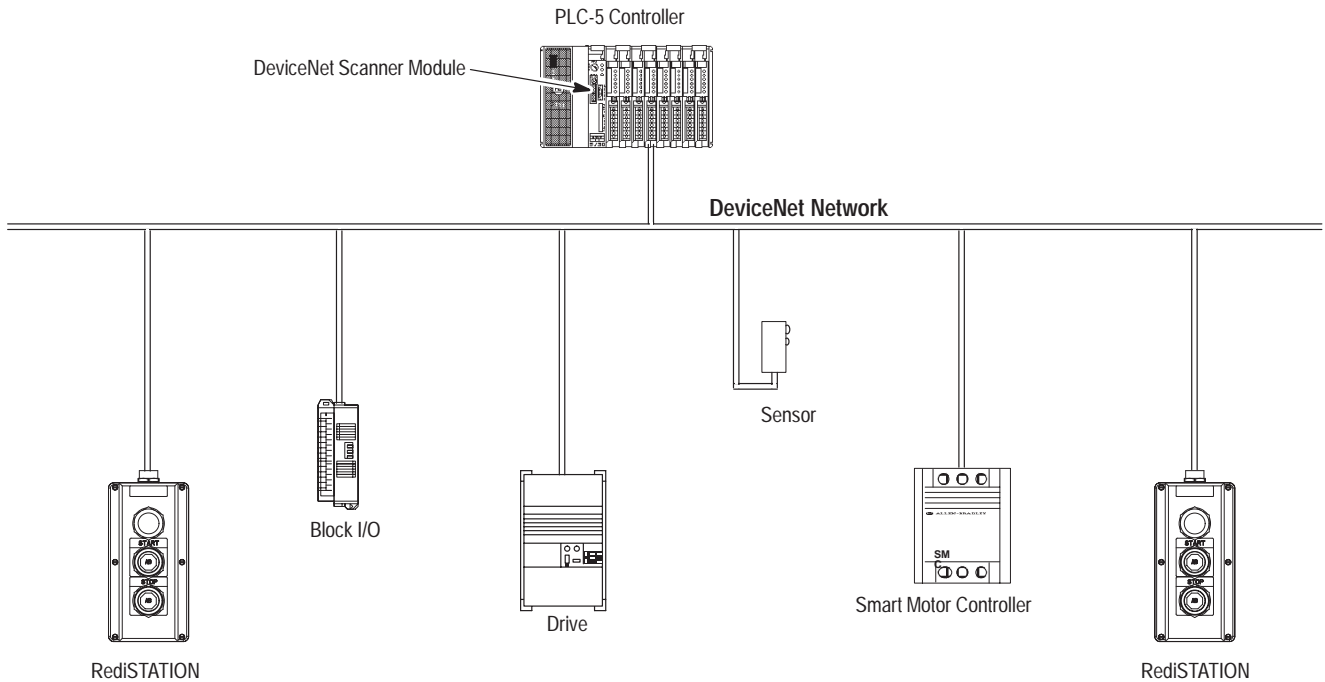
DeviceNet Components

DeviceNet cables and components are available from Allen-Bradley as separate catalog numbers.

It is your responsibility to install and implement the DeviceNet network and supported devices according to the DeviceNet guidelines.

Replacement Parts

The Standard RediSTATION unit is completely assembled and does not have accessories.

Replacement parts for 800T components (operators, pilot lights, legend plates) are available as separate catalog numbers.

Catalog Number Configurations

The following catalog number configuration shows how to order standard or custom built RediSTATION units.

2705 – T3DN1A42A – XXXXX

Bulletin Number

Button Type:
  T = 800T

Number of Operators:
  3

Network Type:
  DN = DeviceNet

Enclosure Type:
  1 = Die Cast

DeviceNet Connector:
  A = Sealed
  B = Terminal Block

Custom Layout
(see Publication 2705-3.5.1)

Configuration Type:
  A = Standard
    1 Pilot Light
    1 Start Button
    1 Stop Button
  X = Custom
  Z = Unpopulated

Board Type:
  42 = 4 Inputs, 2 outputs

Installation and Mounting

Chapter Objectives

This chapter describes how to install and mount a standard or custom RediSTATION. It contains the following sections:

DeviceNet Guidelines

It is your responsibility to install and implement the DeviceNet network and supported devices according to the DeviceNet guidelines.
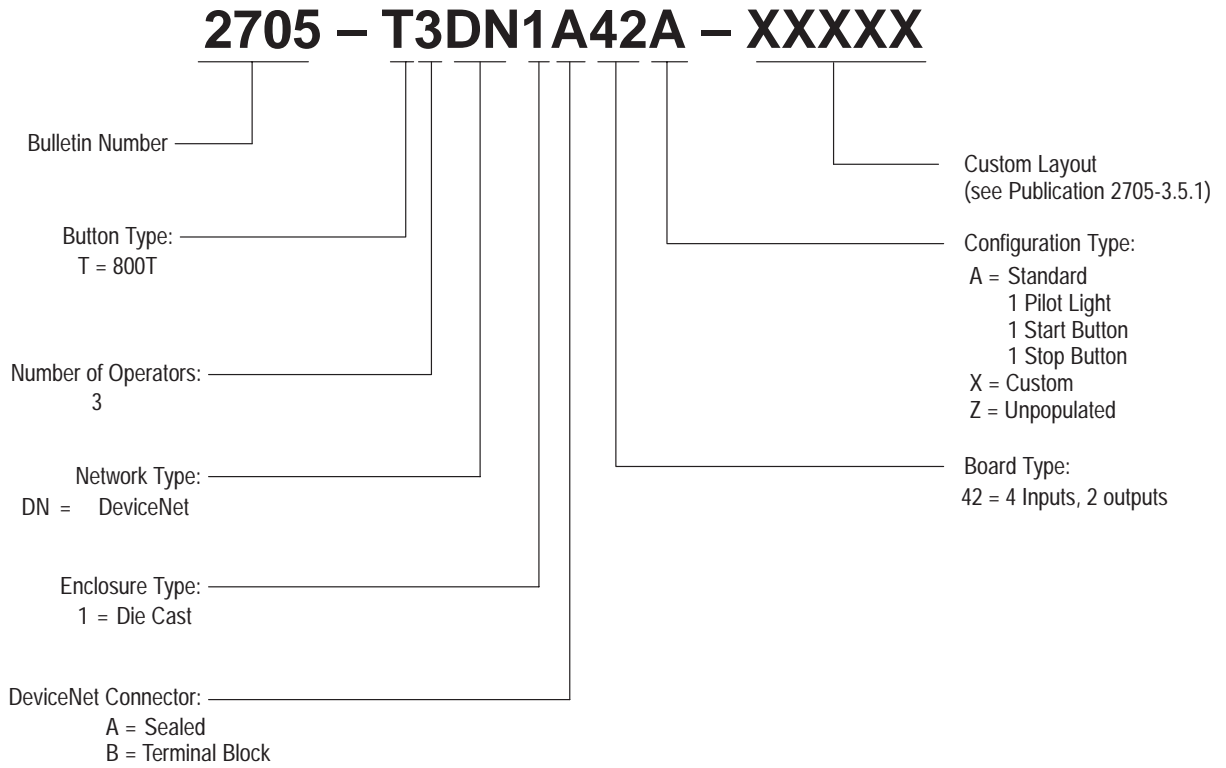
Equipment Needed

Install the RediSTATION using standard electricians tools.

- Wire strippers
- Slotted screwdriver

Removing the Enclosure Cover

To set the configuration parameters of the RediSTATION and mount the enclosure, you must remove the enclosure cover.

To remove the enclosure cover:

1. Using a slotted screwdriver, remove the 6 cover screws.

2. Carefully remove the cover so as not to disconnect any wires.

3. Remove the DeviceNet terminal block connector from the circuit board. Do not disconnect any wiring.

Removable Terminal
Block Connector
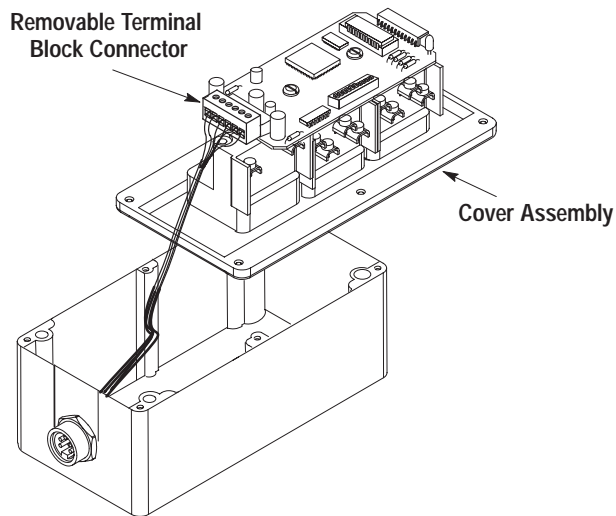
Cover Assembly

4. Store the cover assembly in a safe location; it is not required for mounting the enclosure.

Setting the DIP Switches

The setting of the DIP switch on the circuit board determines:

- DeviceNet node address
- DeviceNet data rate
- Output flash rate
- Output fault state

The location of the DIP switch and the factory defaults are shown below.

DIP Switches

OFF = 0

ON = 1

10 9 8 7 6 5 4 3 2 1

Setting the DeviceNet Node Address

DIP switches 1 to 6 set the node address (0 to 63) of the RediSTATION on the DeviceNet network. The address is set using binary addressing.

OFF = 0
ON = 1

10 9 8 7 6 5 4 3 2 1

DeviceNet Address 000000 – 111111 (0 to 63)

The table below shows the switch settings for each address (0 to 63).

To set the DeviceNet node address:

1. Refer to the table below for switch settings of a specific address.

2. Using your finger or a pointed object, slide switches 1 to 6 to the appropriate ON/OFF positions.
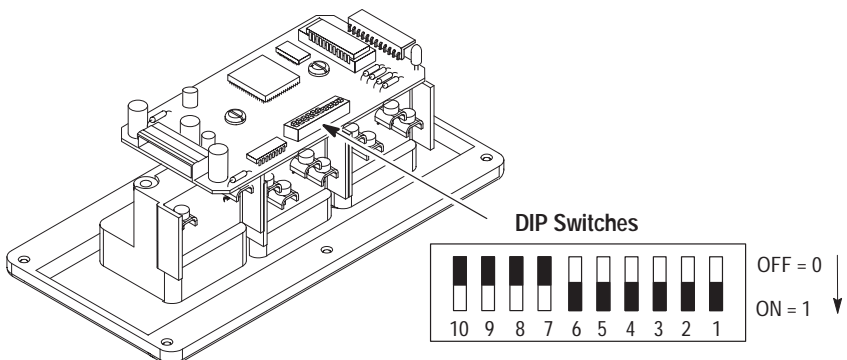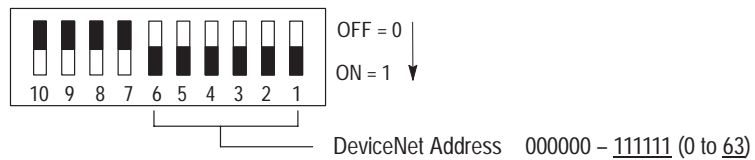
ATTENTION: Do not use a pencil. Graphite from the pencil is conductive and may damage DIP switch.

DeviceNet Address	Switch Settings 6 ← 1	DeviceNet Address	Switch Settings 6 ← 1	DeviceNet Address	Switch Settings 6 ← 1	DeviceNet Address	Switch Settings 6 ← 1
0	000000	16	010000	32	100000	48	110000
1	000001	17	010001	33	100001	49	110001
2	000010	18	010010	34	100010	50	110010
3	000011	19	010011	35	100011	51	110011
4	000100	20	010100	36	100100	52	110100
5	000101	21	010101	37	100101	53	110101
6	000110	22	010110	38	100110	54	110110
7	000111	23	010111	39	100111	55	110111
8	001000	24	011000	40	101000	56	111000
9	001001	25	011001	41	101001	57	111001
10	001010	26	011010	42	101010	58	111010
11	001011	27	011011	43	101011	59	111011
12	001100	28	011100	44	101100	60	111100
13	001101	29	011101	45	101101	61	111101
14	001110	30	011110	46	101110	62	111110
15	001111	31	011111	47	101111	63	111111

Setting the Data Rate

DIP switches 7 and 8 set the data rate at which the RediSTATION communicates on the DeviceNet network. The factory default setting is 125K BPS.

Default Configuration

OFF = 0
ON = 1

10 9 8 7 6 5 4 3 2 1

DeviceNet Data Rate

00	=	125K BPS
01	=	250K BPS
10	=	500K BPS
11	=	Unused
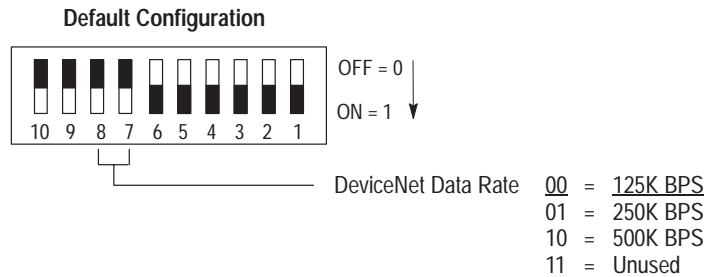
The data rate determines the maximum length of the DeviceNet cable.

Data Rate	Cable Length (Maximum)
125K BPS	500 meters (1600 feet)
250K BPS	200 meters (600 feet)
500K BPS	100 meters (300 feet)

To set the DeviceNet data rate:

1. Refer to the table above to select the correct data rate.

2. Slide switches 7 and 8 to the appropriate ON/OFF positions.

Setting the Output Fault State

DIP switch 9 sets the state of the outputs (pilot lights) when the device detects an error. The factory default setting is to turn the outputs off when an error is detected.

Default Configuration

OFF = 0
ON = 1

10 9 8 7 6 5 4 3 2 1

Output Fault State

0	=	Outputs Turn Off on Fault
1	=	Outputs Hold Last State on Fault
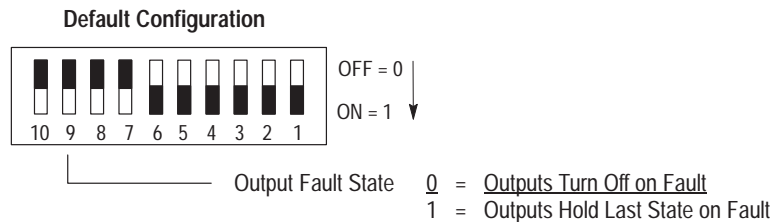
Output Fault States	Description
Outputs Retain Last State	When communications is lost, the station stops sending signals. The station ignores push button presses in the error state. The outputs remain in their last state.
Outputs Turn Off on Error	When communications is lost, the station turns off outputs. The station ignores push button presses in the error state. When communications is regained, the station updates itself and resumes operations.

To change the fault state, slide switch 9 to the appropriate ON/OFF setting.

Setting the Output Flash Rate

DIP switch 10 sets the flash rate of the outputs (pilot lights). The factory default setting is 1 Hz.

Default Configuration

OFF = 0
ON = 1

10 9 8 7 6 5 4 3 2 1

Output Flash Rate   0 = 1 Hz (0.5 sec On, 0.5 sec Off)
                     1 = 2 Hz (0.25 sec On, 0.25 sec Off)
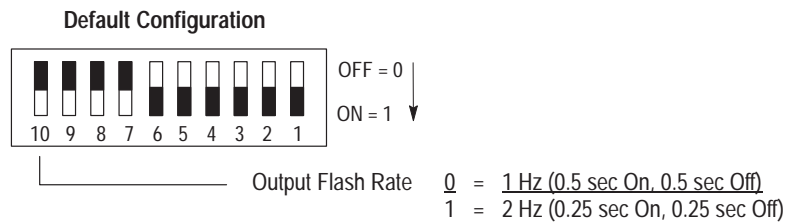
To change the flash rate, slide switch 10 to the appropriate ON/OFF position.

DeviceNet Termination

Devices on end nodes of the DeviceNet network require termination. If the RediSTATION is an end node, you must provide network termination.

To terminate the RediSTATION, install a 121 ohm 1% metal film resistor between the CAN_High and CAN_Low terminals on the DeviceNet terminal block.

DeviceNet Removable Terminal Block

CAN_Low

CAN_High
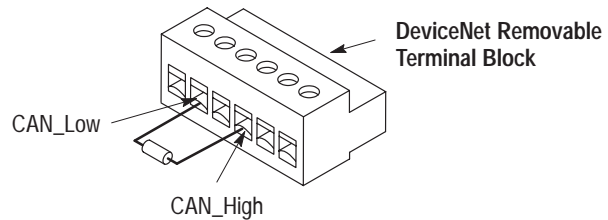
RediSTATION Dimensions

Figure 2.1 shows the dimensions of the standard RediSTATION. For custom built stations, the depth may vary depending upon the 800T operators or pilot lights installed.

Figure 2.1
RediSTATION Dimensions
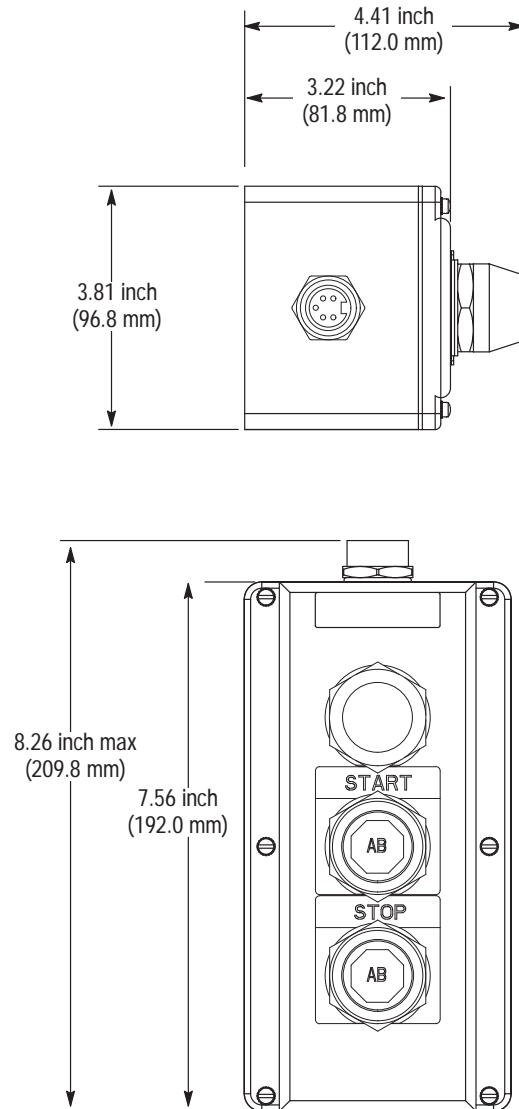
Mounting the RediSTATION

The RediSTATION mounts on a flat surface. The back of the unit has 4 holes that accept a 10-32 (5mm) screw. To maintain a watertight seal, use sealing grommets with screws. The screw length must be 1/2 inch (12.7 mm) plus the depth of the material into which the screw is mounted. The head of the screws must be 3/8 inch or less to fit in the sealed mounting holes.

For proper grounding, mount the enclosure to a grounded metal plate. Scrape the paint around the screw holes of the enclosure and plate to ensure good metal-to-metal contact.

Allow a clearance of at least 3 inches (76.2 mm) at the top of the enclosure for connecting the DeviceNet cable.

Figure 2.2
RediSTATION Mounting

Allow 3 inch clearance
for DeviceNet cable

4 Holes
.203 inch
(5.2 mm) Diameter

RediSTATION
Back Side

6.25 inch
(158.7 mm)

3.00 inch
(76.2 mm)

Sealed Mounting Hole

Sealing Grommets

10-32 (5mm) screws

Heads of screws must
be smaller than
3/8 inch to fit inside
mounting holes.
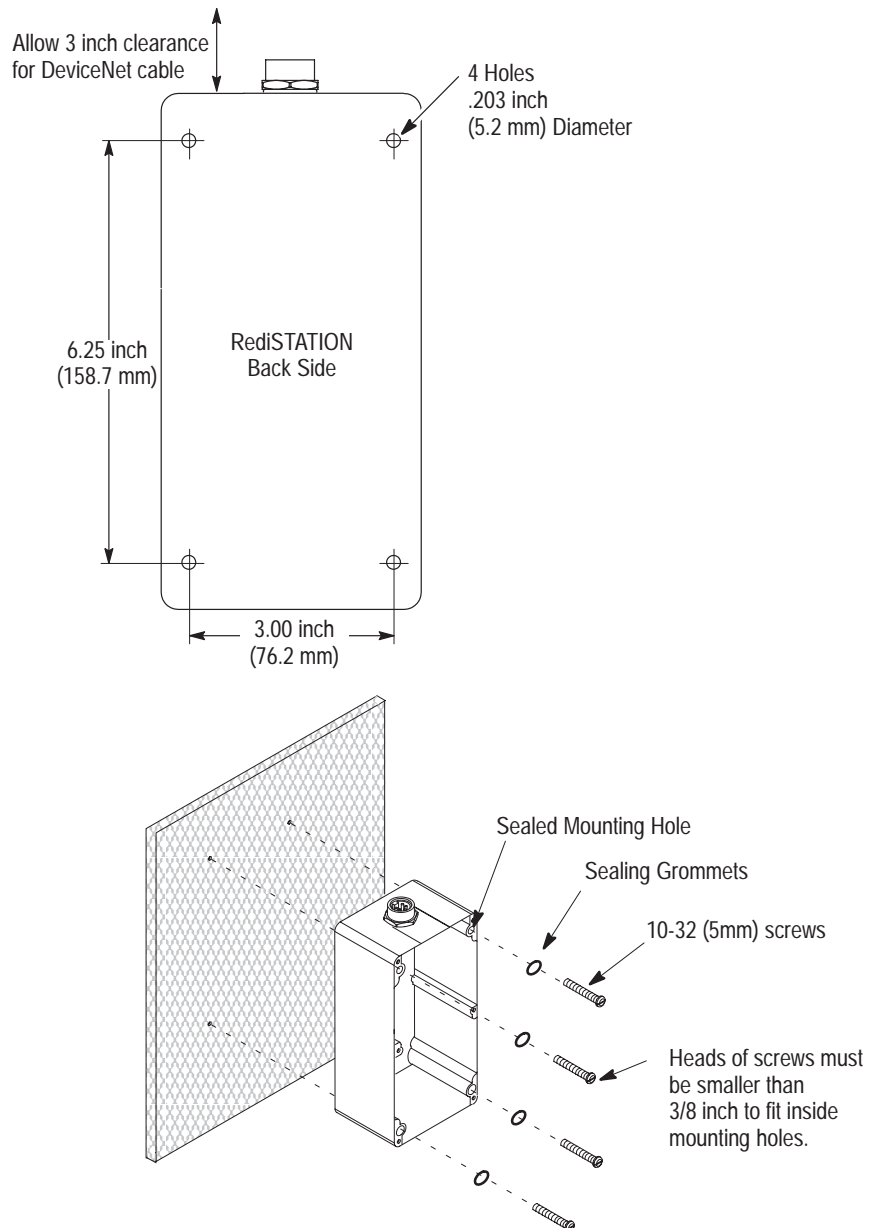
Securing Enclosure Cover

After setting the DIP switches and mounting the enclosure, secure the cover of the enclosure.

To secure the cover enclosure:

1. Plug the DeviceNet terminal block connector into the circuit board.

Plug Connector
Into Circuit Board

Removable Terminal
Block Connector
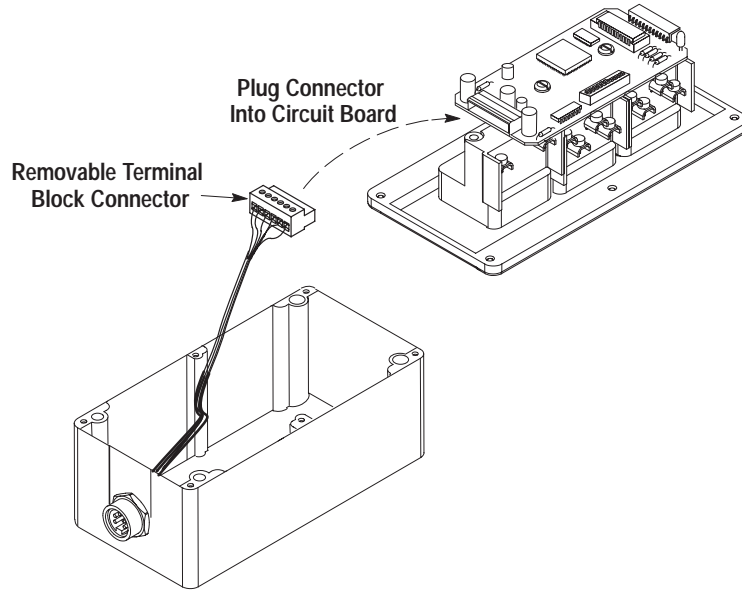
2. Secure the cover of the enclosure with the six cover screws. Tighten screws to 20 in-lbs to ensure proper seal.

Tighten 6 Screws
to 20 in-lbs
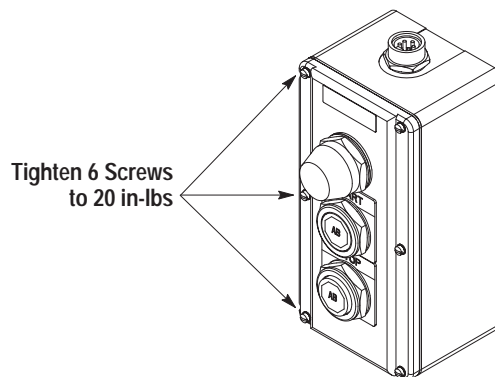
Connecting to the DeviceNet Network

It is not necessary to disconnect incoming power from DeviceNet network before connecting the RediStation. The DeviceNet cable connects directly to the connector on the top of the enclosure or through the conduit opening.

DeviceNet Cable

DeviceNet cable wires connect to terminal block through the conduit opening. Hole requires sealed fitting to maintain NEMA Type 4 environmental rating.
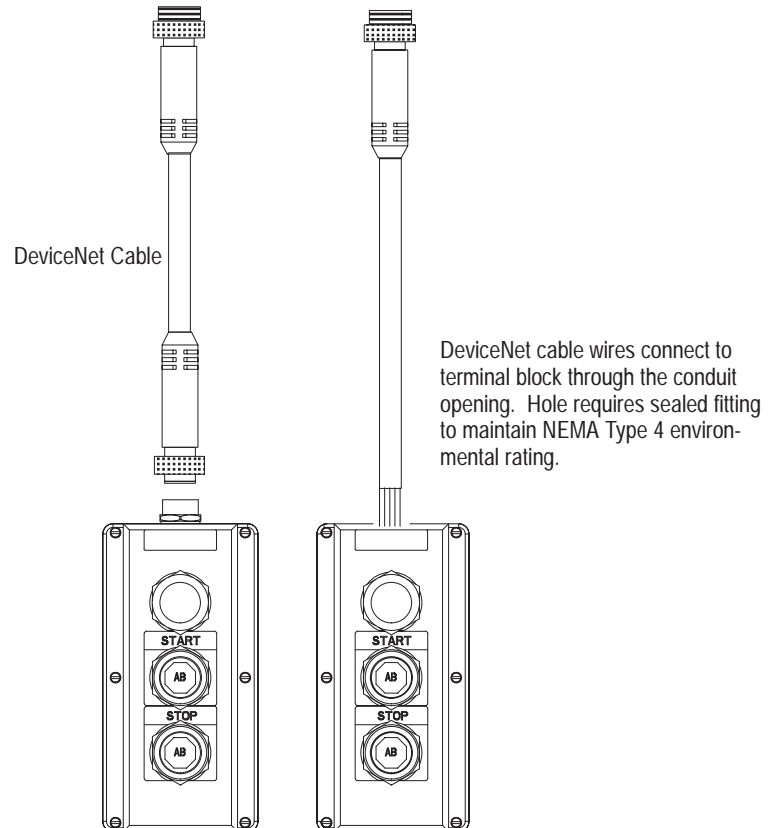
Important: When connecting conduit to the enclosure, use UL listed or recognized conduit hubs with the same environmental rating as the enclosure.

Operations

Chapter Objectives

This chapter contains the following sections:

Section	Page
Modes of Operations	3–1
Resetting the Device	3–2
DeviceNet Operations	3–3

Modes of Operation

The RediStation has 3 modes of operations:

- Powerup / Reset mode
- Run mode
- Error mode

Powerup/Reset Mode

During a powerup or reset, the RediSTATION:

1. Clears outputs (turns outputs off) and sets the LED indicator to solid red.

2. Performs powerup diagnostic tests including:

   – EPROM checksum test
   – RAM read/write test
   – Watchdog timer test
   – Serial number verification

   If any test fails, the outputs remain off and the LED remains solid red. You must recycle power to recover from a power-up diagnostic test failure. Repeated failures indicate a faulty unit.

3. Reads and stores the DIP switch settings.

   Important: DIP switches are only read in powerup or reset mode. Changes to DIP switch settings under power cause an error.

4. Performs a duplicate node address check to verify that another node is not assigned the same DeviceNet address as the RediSTATION device.

   If a duplicate node error occurs, the outputs turn off and the status led is set to blinking red. You must cycle power to clear the error.

During a powerup or reset, the LED is red. If the powerup or reset is successful, the RediSTATION enters run mode and the LED flashes green.

Run Mode

After a successful powerup or reset, the RediSTATION enters run mode and operates as a slave device to a master device. In run mode, the:

- controller scans switch inputs and writes lamp outputs.
- station accepts output messages and poll messages from other nodes on the DeviceNet network.
- station monitors outputs for underloads/overloads.

If an output error is detected, the RediSTATION sets the appropriate message bits and remains in run mode.

In run mode, you can configure the outputs to:

- turn on
- turn off
- flash

DIP switch 10 controls the rate of flashing for outputs.

The RediSTATION also supports DeviceNet configuration messages that are received over the network.

Error Mode

In error mode (LED turns red), the RediSTATION monitors the error state for correct operation. Errors are critical or noncritical.

Error Type	Description	LED State
Critical (Not recoverable)	Failure of diagnostic tests during powerup/reset mode	Solid Red
	Over-temperature condition of outputs during runtime	
	Changes to DIP switches during runtime	
	Duplicate node address detected	
	Incorrect data rate	
Non-Critical (Recoverable)	Pilot lamp burned out	Flashing Red
	Pilot lamp wired incorrectly	
	I/O connection timeout	

See the troubleshooting chart on page 4–2 for details on how to recover from an error.

Resetting the Device

To reset the RediSTATION, you must cycle power to the unit or disconnect the DeviceNet connector.

DeviceNet Operations

The Allen-Bradley 1747-SDN and 1771-SDN DeviceNet Scanner Modules
are master devices on the DeviceNet network. The RediSTATION supports
the Master/Slave Connection Set for master/slave communications on the
DeviceNet network.

To communicate with a RediSTATION, the DeviceNet Scanner Module must
be configured with the RediSTATION:

- node address
- input bytes (1)
- output bytes (1)

The DeviceNet Scanner Module:

- connects to the RediSTATION slave device
- performs the appropriate connection configuration
- polls the RediSTATION for inputs and outputs

Response Times

The RediSTATION responds to a DeviceNet Scanner poll within 1
millisecond.

The switch inputs are debounced for 50 milliseconds. When a change of
state is detected, the inputs are not read for another 50 milliseconds.

Troubleshooting and Maintenance

Chapter Objectives

This chapter contains the following sections:

Section	Page
Preventive Maintenance	4–1
Using the LED Indicator	4–2
Replacing RediSTATION devices	4–3
Replacing a Pilot Light Lamp	4–5

Preventive Maintenance

- Prevent accumulation of dust and dirt by:
  - keeping enclosure clean
  - keeping enclosure cover closed
- Periodically check for loose connections.

⚠ **ATTENTION:** To avoid shock hazard, remove incoming power before checking connections.

Using the LED Indicator

The LED provides status information on RediSTATION operations. The LED is visible when the enclosure cover is removed.

The troubleshooting chart shows LED indications. It also shows how to use the LED to detect and correct common operating problems.

LED		What it Means:	What to do:
Color	**State**		
None		1. RediSTATION is not receiving input power.	1. Check DeviceNet power and cable connections and the power connection on the DeviceNet terminal block. Page 1–7 references this connection.
Red	Solid	1. Diagnostics failed on powerup/reset.	1. Internal fault. Reset device. If fault still exists, return RediSTATION for repair.
		2. DIP switch settings changed after powerup. DIP Switch settings are only read during a powerup/reset.	2. Power down RediSTATION. Set DIP switch settings. Reconnect power.
		3. Over–temperature error detected during runtime. Outputs turn off.	3. Check ambient temperature rating. Reset device.
		4. Invalid data rate.	4. Reset DIP switches 7 and 8 to a valid DeviceNet data rate. See page 2–4 for valid data rates and cable lengths. Reset device.
Red	Flashing	1. Duplicate DeviceNet node address. Two nodes cannot have the same address.	1. Reset DIP switches 1 through 6 using a valid address. Page 2–3 provides a table of possible address settings. Reset device.
		2. Pilot light lamp is burnt out.	2. Replace pilot lamp bulb.
		3. Pilot light is not wired correctly to the I/O connector or the screw terminals of the device.	3. Check I/O cable connections for the pilot light device.
		4. I/O connection timeout.	4. Reset device.
Green	Solid	1. Normal operating state and device is allocated to a master device.	1. No action required.
Green	Flashing	1. Device is online but not allocated to master.	1. Check DeviceNet master for correct RediSTATION configuration information (node address, input bytes, output bytes).
		2. Device is in idle state.	2. Check DeviceNet master for proper operation.

The LED does not indicate the following malfunctions.

| Problem	What it Means:	What to do:
Switch or button operators do not function	1. Loose wiring	1. Check wiring and cable connections.
	2. Incorrect address	2. Check address setting of the DIP switch.
	3. Faulty contacts, switch or button	3. Use an ohmmeter to verify opening/closing of contacts.

Replacing RediSTATION Devices
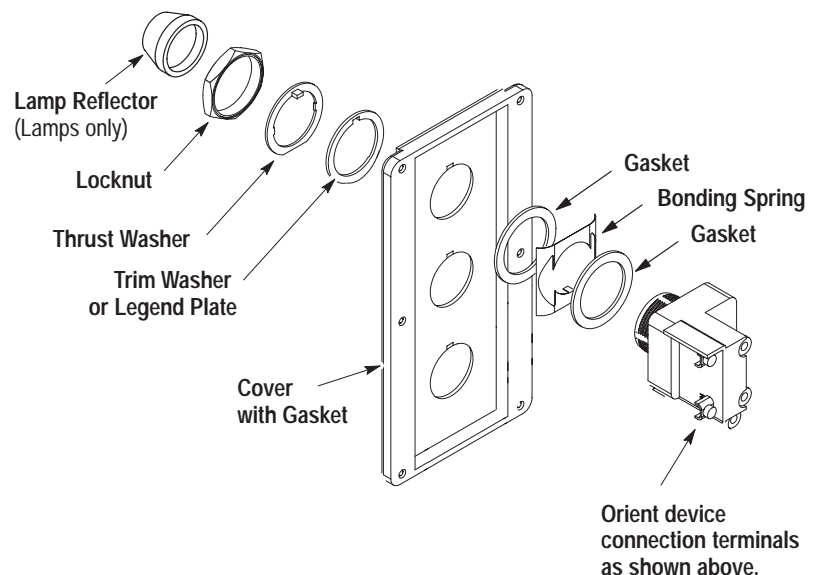
To replace a RediSTATION device:

> ⚠️ **ATTENTION:** To avoid electrical shock or unintended operation of the equipment, remove power before servicing.

1. Remove the (6) enclosure cover screws.

2. Disconnect DeviceNet terminal block connector from the circuit board.

3. Remove circuit board from back of the 800T devices. Remove the 2 circuit board screws and spacers.

Spacers

Circuit Board

Circuit Board Mounting Screws
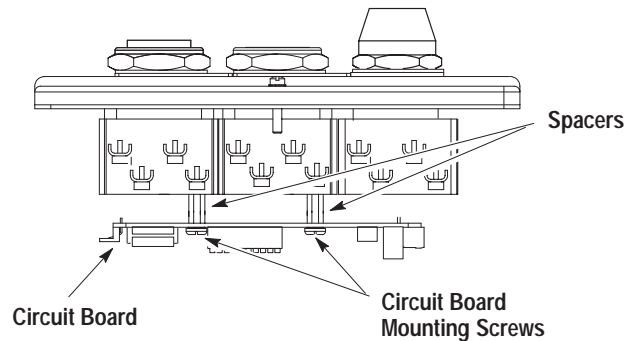
4. Disconnect wiring for the device you want to replace.

5. Remove device from enclosure cover.

6. Mount the replacement 800T device to the enclosure cover. Refer to the instruction sheet that accompanies each device for mounting instructions. All devices should have connection terminals on the same side.

Lamp Reflector
(Lamps only)

Locknut

Thrust Washer

Trim Washer
or Legend Plate

Cover
with Gasket

Gasket

Bonding Spring

Gasket

Orient device
connection terminals
as shown above.

7. Mount the circuit board to the back of the 800T devices with the DeviceNet terminal block oriented toward sealed connector/conduit hole of enclosure. Use the 2 screws and plastic spacers. Tighten circuit board mounting screws to 14 in-lbs.

8. Connect the 800T device terminals to the I/O connector using an I/O cable. An I/O cable consists of a twisted wire pair. Each set of contacts or pilot light connects to an I/O cable. See page 1–6 for a description of the I/O connector.
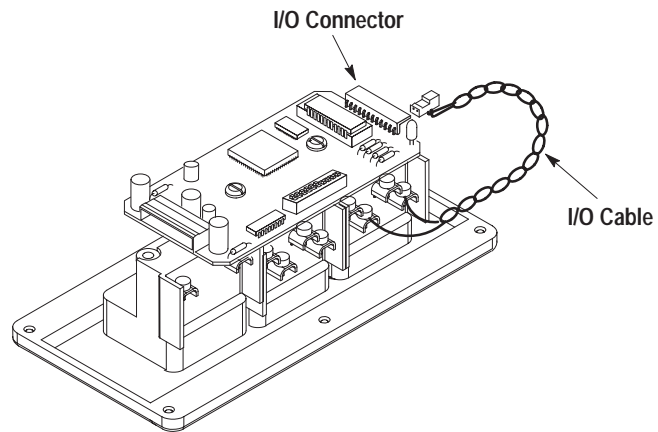
I/O Connector

I/O Cable

> ⚠ **ATTENTION:** Do not connect I/O pins to external devices or control circuits. Connecting pins to these devices will damage the circuit board.

9. Plug the DeviceNet terminal block connector into the circuit board.

10. Secure cover with the 6 mounting screws. Tighten screws to 20-in lbs.

Replacing a Pilot Light Lamp

Pilot light lamps can be replaced easily without opening enclosure.

To replace a pilot light lamp:

⚠️ **ATTENTION:** To avoid electrical shock or unintended operation of the equipment remove power.

1. Remove lens cap from the pilot light.

2. Remove lamp from socket.

⚠️ **ATTENTION:** Do not use a screwdriver or other metal object to remove lamp.

3. Carefully insert new lamp in socket.

⚠️ **ATTENTION:** Before replacing the lens cap, be sure the lamp is seated properly or a short may result.

4. Replace the lens cap.

5. Check for proper operation.
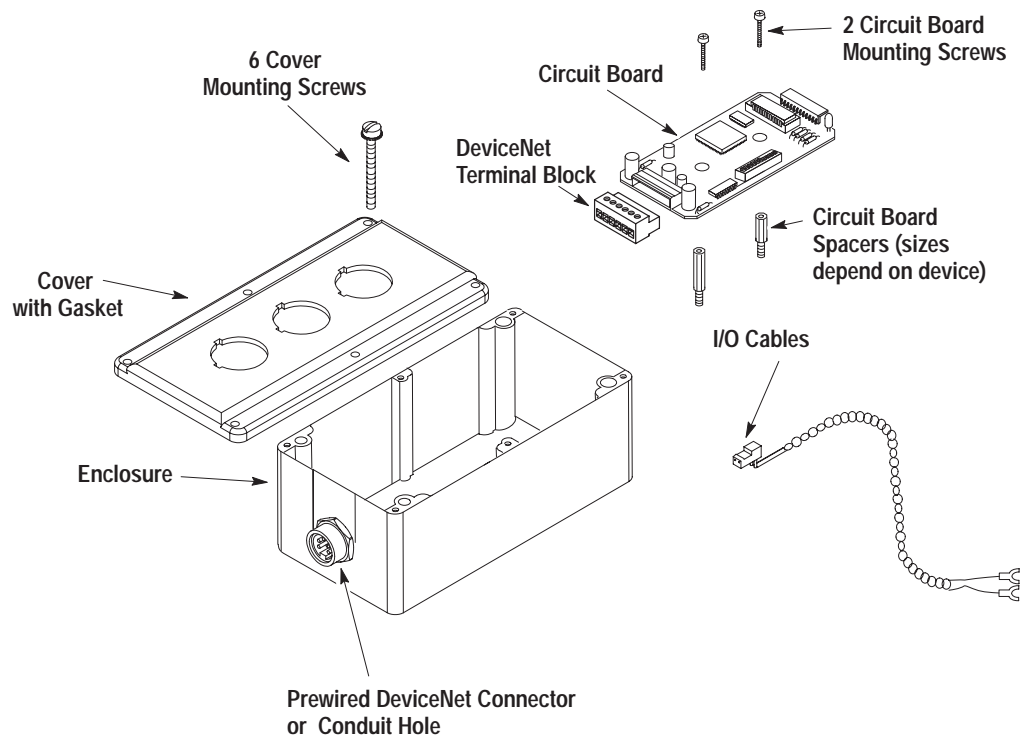
Building a Custom RediSTATION

Chapter Objectives

This chapter describes how to create a custom RediSTATION.

Custom Build Components

RediSTATION components can be ordered separately and customer installed. 800T operators and indicators must be purchased separately.

6 Cover Mounting Screws

2 Circuit Board Mounting Screws

Circuit Board

DeviceNet Terminal Block

Circuit Board Spacers (sizes depend on device)

Cover with Gasket

I/O Cables

Enclosure

Prewired DeviceNet Connector or Conduit Hole

Operators and Indicators

The RediSTATION supports all Allen-Bradley 800T operators and pilot lights including:

- Maintained push buttons, illuminated, non-illuminated
- Momentary push buttons, illuminated, non-illuminated
- Interlocked push buttons, illuminated, non-illuminated
- Push pull buttons, illuminated, non-illuminated
- Selector switches, illuminated, non-illuminated
- Pilot lights
- 2-3-4 way toggle switches

All pilot lights must be rated for 24 VDC.

> ⚠️ **ATTENTION:** Only use Allen-Bradley 800T devices in the RediSTATION. 800T devices maintain the NEMA rating of the enclosure and allow for proper installation of the circuit board.

RediSTATION Assembly

To assemble a RediSTATION device:

1. Mount the 800T devices to the enclosure cover. Refer to the instruction sheet that accompanies each device for mounting instructions. All of the devices should have the connection terminals on the same side.
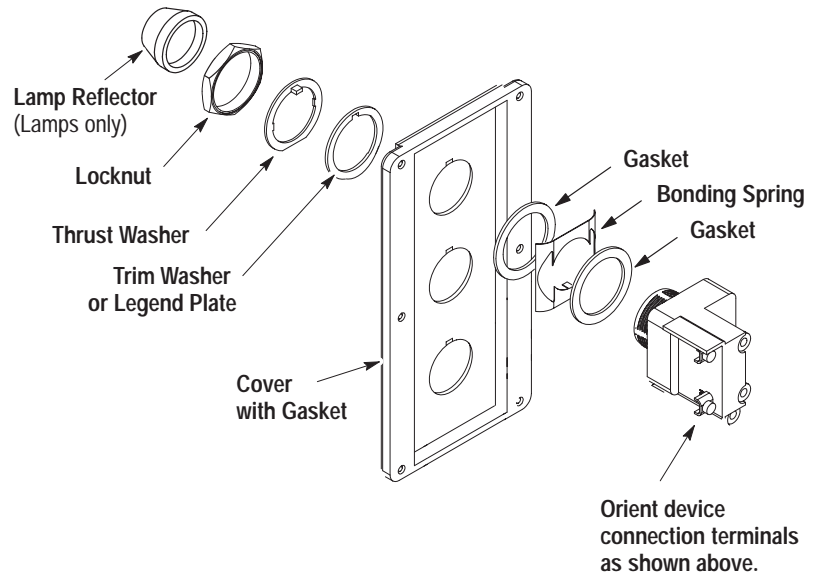

2. Connect the 800T device terminals to the I/O connector using the I/O cables. An I/O cable consists of a twisted (red/black) wire pair. Each set of contacts or pilot light connects to an I/O cable.
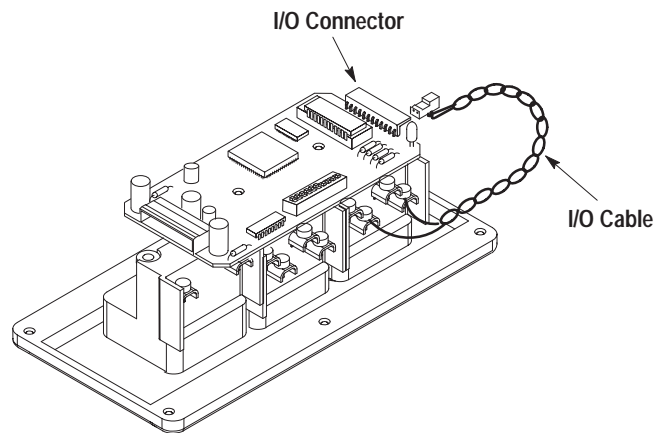
> ⚠ **ATTENTION:** Do not connect I/O pins to external devices or control circuits. Connecting pins to these devices will damage the circuit board.

Every 2 consecutive pins on the I/O connector connects to an I/O cable
connector. The I/O connector supports 2 outputs and 4 inputs.
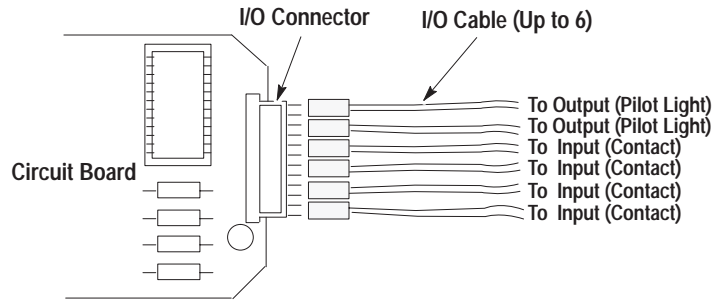
To simplify wiring, input devices and output devices attach to opposite
ends of the I/O connector. Table 5.A defines pin functions on the I/O
connector. Output devices connect to pins 1–2 and 3–4. Input devices
connect to pins 5–6, 7–8, 9–10 and 11–12. Unused pins are left open.

Table 5.A
I/O Connector Pin Functions

I/O Connector	Pin #	Pin Label	Function
	1	OUT1+	Connects Output Device
	2	OUT1–	
	3	OUT2+	Connects Output Device
	4	OUT2–	
	5	IN4+	Connects Input Device
	6	IN4–	
	7	IN3+	Connects Input Device
	8	IN3–	
	9	IN2+	Connects Input Device
	10	IN2–	
	11	IN1+	Connects Input Device
	12	IN1–	

3. Mount the circuit board to the back of the 800T devices with the DeviceNet terminal block oriented toward sealed connector/conduit hole of enclosure. Use the two screws and plastic spacers provided (2 sizes provided for different 800T device depths).   Tighten circuit board mounting screws to 14 in-lbs.
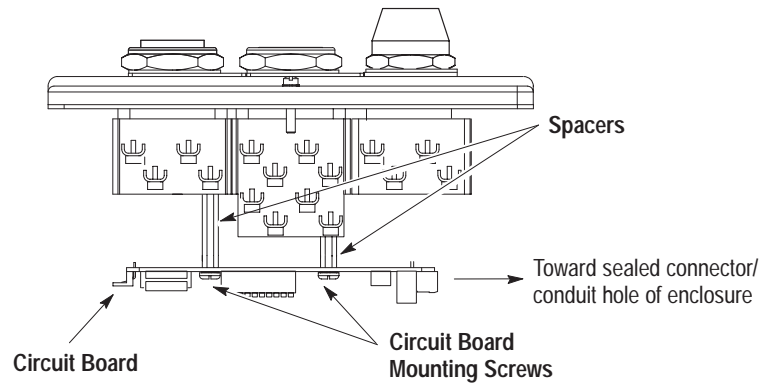

4. If you are not using a prewired DeviceNet connector, pull the DeviceNet cable through the conduit at the top of the enclosure. Then attach the 6 DeviceNet cable leads to the removable terminal block connector.

   Page 1–7 provides a description of the DeviceNet connections.
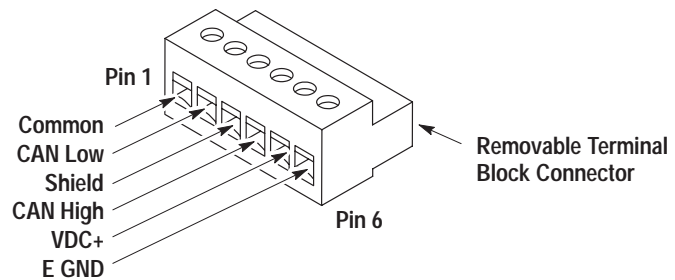
ATTENTION: Use conduit fittings with proper seals on the DeviceNet cable to maintain a watertight enclosure.

5. Plug the DeviceNet terminal block connector into the circuit board.

**Plug Connector
into Circuit Board**

**Removable Terminal
Block Connector**

**Ground Wire (EGND)
to Enclosure Ground Screw**

Ground Wire
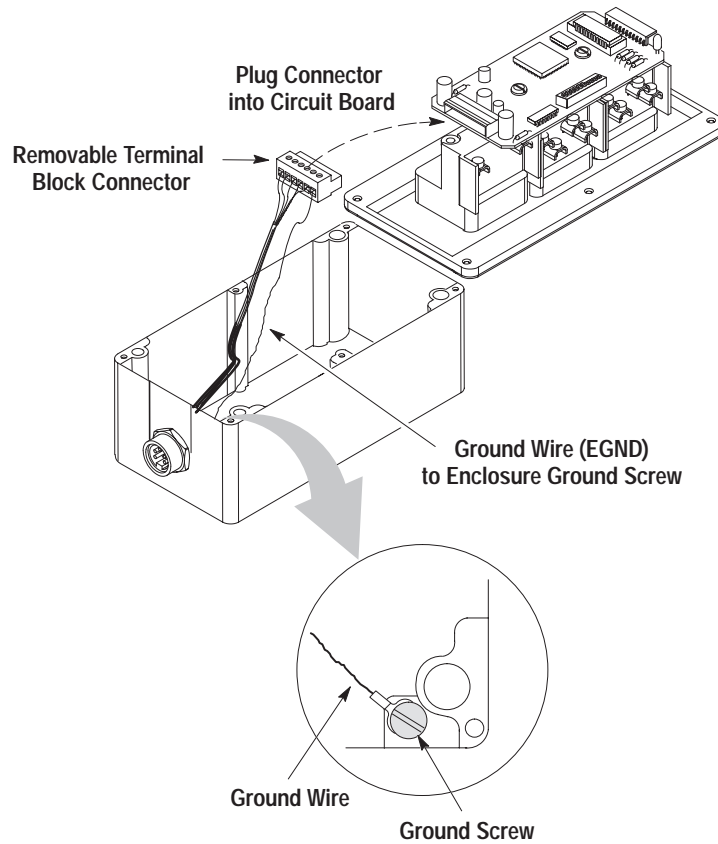
Ground Screw

6. Connect ground wire (E GND) to enclosure ground screw.

7. Secure the cover with the 6 mounting screws. Tighten screws to 20 in-lbs.

**Tighten 6 Screws
to 20 in-lbs**
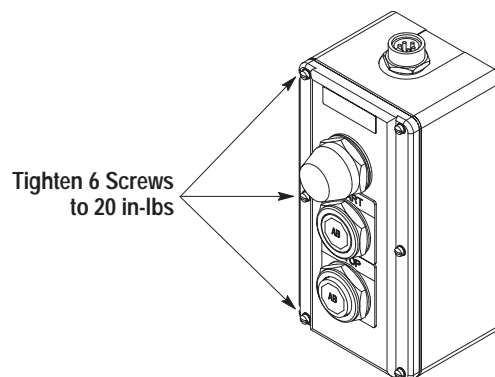
Specifications

Electrical

Supply Voltage	11 to 25 VDC
Power Consumption	7 Watts Maximum

Inputs

Maximum Number	4
Type	Hard Contact Sourcing
Voltage/Current	24 VDC/24mA Maximum
Isolation	None

Outputs

Maximum Number	2
Voltage/Current	24 VDC/100mA Maximum
Isolation	None

Mechanical

Enclosure	NEMA Type 4, 12, 13
2705-T3DN1B42A: (conduit entry)	UL Listed for Hazardous Location A196 Approved for Class I, Groups A, B, C, D, Division 2
2705-T3DN1A42A: (sealed connector)	UL Listed
LED Indicator	Operating Status (Green/Red)
Weight	3.1 lbs (1.4 kg)

Dimensions

Inches	8.26 (H) x 3.81 (W) x 4.41 (D)
Millimeters	209.8 (H) x 96.8 (W) x 112.0 (D)

Communications

DeviceNet

Data Rates	125K, 250K, 500K
Distance Max.	500 meters (1600 feet) @125K 200 meters (600 feet) @250K 100 meters (300 feet) @500K

Environment

Ambient Temperature

Operating	0 to 55° C (32 to 131° F)
Storage	-40 to 85° C (-40 to 185° F)
Relative Humidity (non-condensing)	5 to 95% 50% max at 40° C (104° F)

Shock and Vibration

Shock (operating)	30G
Impulse Shock (non-operating)	50G
Vibration (operating)	2.5G at 58 to 2000 Hz 5 to 57 Hz 0.38mm displacement (peak to peak)
Vibration (non-operating)	5.0G at 58 to 2000 Hz 5 to 57 Hz 0.76mm displacement (peak to peak)

DeviceNet Information

The RediSTATION operates as a slave device on the DeviceNet network. The RediSTATION supports Explicit Messages and Polled I/O Messages of the predefined master/slave connection set. It does not support the Explicit Unconnected Message Manager (UCMM).

This appendix defines the DeviceNet message types, class services and objects that are supported by the RediSTATION device.

DeviceNet Message Types

As a group 2 slave device, the RediSTATION supports the following message types.

CAN Identifier Field	Group 2 Message Type
10xxxxxx111	Duplicate MAC ID Check Messages
10xxxxxx110	Unconnected Explicit Request Messages
10xxxxxx101	Master I/O Poll Command Message
10xxxxxx100	Master Explicit Request Message

xxxxxx = RediSTATION Node Adrresss

DeviceNet Class Services

As a group 2 slave device, the RediSTATION supports the following class services and instance services.

Service Name	Service Code
Reset	0x05
Get_Attribute_Single	0x0E
Set_Attribute_Single	0x10
Allocate_Group_2_Identifier_Set	0x4B
Release_Group_2_Identifier_Set	0x4C

DeviceNet Object Classes

The RediSTATION device supports the following DeviceNet object classes.

Class	Object
0x01	Identity
0x03	DeviceNet
0x04	Assembly
0x05	Connection
0x08	Discrete Input Point
0x09	Discrete Output Point

Identity Object

Class Code: 01hex

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 1

Instance Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Vendor	UINT	1
2	Get	Product Type	UINT	0
3	Get	Product Code	UINT	1

4	Get	Revision
		  Major Revision
		  Minor Revision
			Structure of:
			  USINT
			  USINT
				
				1
				0

5	Get	Status	WORD	Device_Status①
6	Get	Serial Number	UDINT	unique 32 bit number

7	Get	Product Name
		  String Length
		  ASCII String
			Structure of:
			  USINT
			  STRING[5]
				
				5
				"2705T"

① device_status

bit 0	owned	0=not owned 1=owned (Group 2 allocated to master)
bit 1	reserved	always 0
bit 2	configured	always 0 (out-of-box configuration)
bit 3	reserved	always 0
bit 4-7	vendor specific	all 0
bit 8	minor cfg fault	0=no fault 1=minor configuration fault
bit 9	minor device fault	0=no fault 1=minor device fault
bit 10	major cfg fault	0=no fault 1=major configuration fault
bit 11	major device fault	0=no fault 1=major device fault
bit 12,13	reserved	always 0
bit 14,15	reserved	always 0

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	Yes	Yes	Get_Attribute_Single
05hex	No	Yes	Reset

DeviceNet Object

Class Code: 03hex

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 1

Instance Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Node Address	USINT	DIP Switch 6-1 defines
2	Get	Data Rate	USINT	DIP Switch 8-7 defines
3	Get / Set	BOI	BOOL	default = 0
4	Get / Set	Bus-Off Counter	USINT	range 0 – 255①
5	Get / Special	Allocation Information Allocation Choice Byte Master's Node Addr	Structure of: BYTE USINT	Allocation_byte② 0-63 = master address 255 = unallocated

① Set_attribute_single service to Instance Attributes 4 resets count value to 0, regardless of the value. Cannot preload this counter with nonzero value.

② Allocation_byte

bit 0	explicit message	supported, 1 to allocate
bit 1	polled	supported, 1 to allocate
bit 2	bit_strobe	not supported, always 0
bit 3-7	reserved	always 0

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	Yes	Yes	Get_Attribute_Single
10hex	No	Yes	Set_Attribute_Single
4Bhex	No	Yes	Allocate_Master/Slave_Connection_Set
4Chex	No	Yes	Release_Master/Slave_Connection_Set

Connection Object

Class Code: 05$_{hex}$

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 2

Instance 1 Attributes (Explicit Message Connection)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	State	USINT	0=nonexistent 3=established
2	Get	Instance Type	USINT	0=explicit message
3	Get	Transport Class Trigger	USINT	83$_{hex}$
4	Get	Produced Connection ID	UINT	10xxxxxx011$_{binary}$ xxxxxx = node address
5	Get	Consumed Connection ID	UINT	10xxxxxx100 $_{binary}$ xxxxxx = node address
6	Get	Initial Comm Characteristics	USINT	21 $_{hex}$
7	Get	Produced Connection Size	UINT	7
8	Get	Consumed Connection Size	UINT	7
9	Get/Set	Expected Packet Rate	UINT	2500 default (msec), with timer resolution of 10 msec
12	Get	Watchdog Timeout Action	USINT	1 = autodelete
13	Get	Produced Connection Path Length	USINT	0
14	Get	Produced Connection Path		null (no data)
15	Get	Consumed Connection Path Length	USINT	0
16	Get	Consumed Connection Path		null (no data)

Instance 2 Attributes (Polled I/O Message Connection)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	State	USINT	0=nonexistent 1=configuring 3=established 4=timed out
2	Get	Instance Type	USINT	1 = I/O message
3	Get	Transport Class Trigger	USINT	82_{hex}
4	Get	Produced Connection ID	UINT	$01111xxxxxx_{binary}$ xxxxxx = node address
5	Get	Consumed Connection ID	UINT	$10xxxxxx101_{binary}$ xxxxxx = node address
6	Get	Initial Comm Characteristics	USINT	01_{hex}
7	Get	Produced Connection Size	UINT	1
8	Get	Consumed Connection Size	UINT	1
9	Get/Set	Expected Packet Rate	UINT	2500 default (msec), with timer resolution of 10 msec
12	Get	Watchdog Timeout Action	USINT	0 = timeout (default) 1 = auto delete 2 = auto reset
13	Get	Produced Connection Path Length	USINT	6

14	Get	Produced Connection Path
		  Logical Segment, Class
		  Class Number
		  Logical Segment, Instance
		  Instance Number
		  Logical Segment, Attribute
		  Attribute Number
			Structure of:
			USINT
			USINT
			USINT
			USINT
			USINT
			USINT
				20_{hex}
				04_{hex}
				24_{hex}
				01_{hex}
				30_{hex}
				03_{hex}

15	Get	Consumed Connection Path Length	USINT	6

16	Get	Consumed Connection Path
		  Logical Segment, Class
		  Class Number
		  Logical Segment, Instance
		  Instance Number
		  Logical Segment, Attribute
		  Attribute Number
			Structure of:
			USINT
			USINT
			USINT
			USINT
			USINT
			USINT
				20_{hex}
				04_{hex}
				24_{hex}
				02_{hex}
				30_{hex}
				03_{hex}

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
05_{hex}	Yes	Yes	Reset[1]
$0E_{hex}$	Yes	Yes	Get_Attribute_Single
10_{hex}	No	Yes	Set_Attribute_Single

[1] For "Class", resets all connections to nonexistent. For "Instance", resets connection timer, and if applicable changes the state from timed out to established.

Assembly Objects

Class Code: 04hex

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 2

Instance 1 Attributes (Input Assembly)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Data	BYTE	Input_data①

① Input_data: bit 0 = discrete input object instance 1, attribute 3 (input value)
bit 1 = discrete input object instance 2, attribute 3 (input value)
bit 2 = discrete input object instance 3, attribute 3 (input value)
bit 3 = discrete input object instance 4, attribute 3 (input value)
bit 4 = discrete output object instance 1, attribute 4 (status)
bit 5 = discrete output object instance 2, attribute 4 (status)
bit 6,7 = undefined (0)

Instance 2 Attributes (Output Assembly)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Data	BYTE	Output_data②

② Output_data: bit 0 = discrete output object instance 1, attribute 3 (output value)
bit 1 = discrete output object instance 1, attribute 10 (flash output)
bit 2 = discrete output object instance 2, attribute 3 (output value)
bit 3 = discrete output object instance 2, attribute 10 (flash output)
bit 4,7 = undefined (0)

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	Yes	Yes	Get_Attribute_Single

Discrete Input Point Objects

Class Code: 08hex

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 4

Instance 1 Attributes (Discrete Input Number 1)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Input Value	BOOL	0 = OFF 1 = ON

Instance 2 Attributes (Discrete Input Number 2)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Input Value	BOOL	0 = OFF 1 = ON

Instance 3 Attributes (Discrete Input Number 3)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Input Value	BOOL	0 = OFF 1 = ON

Instance 4 Attributes (Discrete Input Number 4)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Input Value	BOOL	0 = OFF 1 = ON

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	Yes	Yes	Get_Attribute_Single

Discrete Output Point Objects

Class Code: 09hex

Class Attributes

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
1	Get	Revision	UINT	1

Number of Instances: 2

Instance 1 Attributes (Discrete Input Number 1)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Output Value	BOOL	0 = OFF 1 = ON
4	Get	Status	BOOL	0 = OK 1 = fault
5	Get	Fault State	BOOL	DIP Switch 9 Defines 0 = use fault value 1 = hold last state
6	Get	Fault Value	BOOL	0 (OFF)
7	Get	Idle State	BOOL	0 = use idle state
8	Get	Idle Value	BOOL	0 (OFF)
10	Get	Flash Output	BOOL	0 = no flash 1 = flash
11	Get	Flash Rate	USINT	DIP Switch 10 defines 1 = 1 HZ (OFF) 2 = 2 HZ (ON)

Instance 2 Attributes (Discrete Input Number 2)

Attribute ID	Access Rule	Name	DeviceNet Data Type	Data Value
3	Get	Output Value	BOOL	0 = OFF 1 = ON
4	Get	Status	BOOL	0 = OK 1 = fault
5	Get	Fault State	BOOL	DIP Switch 9 Defines 0 = use fault value 1 = hold last state
6	Get	Fault Value	BOOL	0 (OFF)
7	Get	Idle State	BOOL	0 = use idle state
8	Get	Idle Value	BOOL	0 (OFF)
10	Get	Flash Output	BOOL	0 = no flash 1 = flash
11	Get	Flash Rate	USINT	DIP Switch 10 defines 1 = 1 HZ (OFF) 2 = 2 HZ (ON)

Common Services

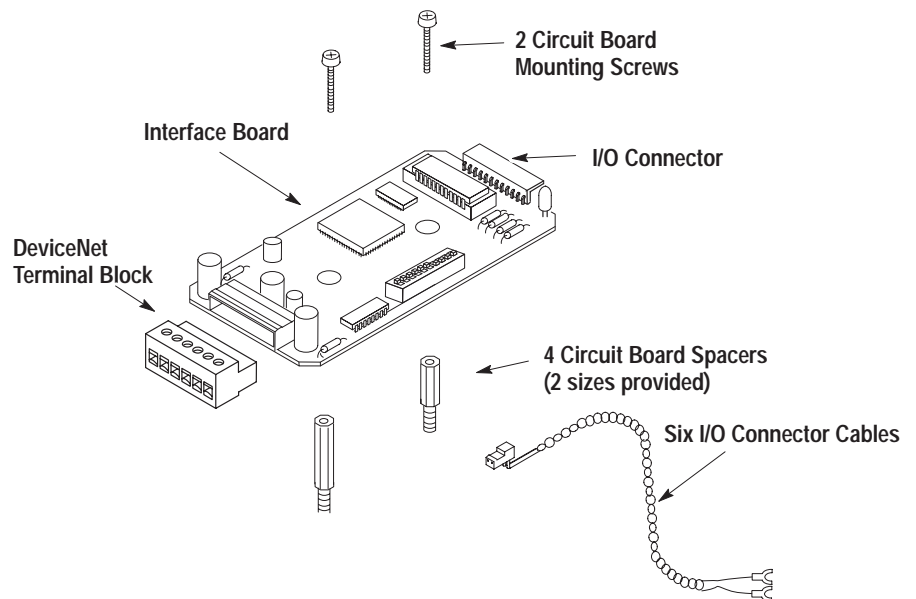| Service Code	Implemented for:		Service Name
	Class	Instance	
0Ehex	Yes	Yes	Get_Attribute_Single

User-Defined Configuration

An unpopulated configuration is available for customer configuration and installation of operator devices. This appendix provides information on:

- Kit Contents
- DeviceNet Interface Board Specifications
- Mounting Dimensions of Board
- Connecting Devices to Board

Kit Contents

The unpopulated configuration consists of:

- DeviceNet Interface Board
- Six I/O Connector Cables (supporting 4 inputs and 2 outputs)
- DeviceNet PCB Terminal Block
- Mounting Hardware

2 Circuit Board Mounting Screws

Interface Board

I/O Connector

DeviceNet Terminal Block

4 Circuit Board Spacers (2 sizes provided)

Six I/O Connector Cables

Specifications of DeviceNet Interface Board

Electrical

Supply Voltage	11 to 25 VDC
Power Consumption	7 Watts Maximum

Inputs

Maximum Number	4
Type	Hard Contact Sourcing
Voltage/Current	24 VDC/24mA Maximum
Isolation	None

Outputs

|	
Maximum Number	2
Voltage/Current	24 VDC/100mA Maximum
Isolation	None

Communications

DeviceNet

Baud Rates	125K, 250K, 500K
Distance Max.	500 meters (1600 feet) @125K
	200 meters (600 feet) @250K
	100 meters (300 feet) @500K

Environment

Ambient Temperature

Operating	0 to 55° C (32 to 131° F)
Storage	-40 to 85° C (-40 to 185° F)
Relative Humidity (non-condensing)	5 to 95%
	50% max at 40° C (104° F)

Mounting Dimensions

Refer to the following dimensions when mounting the DeviceNet Interface Board inside an enclosure.

1.30 inch
33.0 mm)

3.15 inch
(80.0 mm)

4.80 inch
(121.9 mm)

0.205 inch
(5.2 mm)

2.45 inch
62.2 mm)
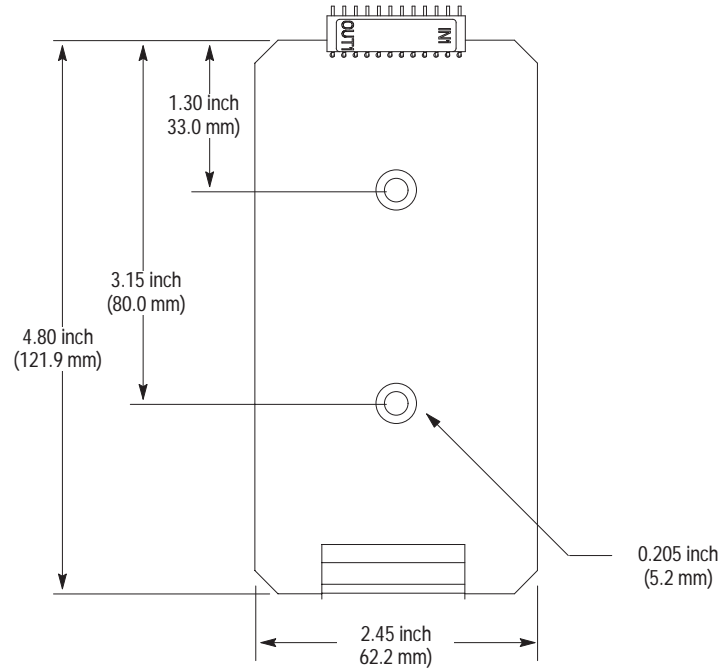
Connecting Devices

This section shows how to connect devices to the DeviceNet Interface Board and connect the DeviceNet cable to the DeviceNet terminal block connector.

To install devices:

1. Connect the device terminals to the I/O connector using the I/O cables. An I/O cable consists of a twisted (red/black) wire pair. Each set of contacts or pilot light connects to an I/O cable.
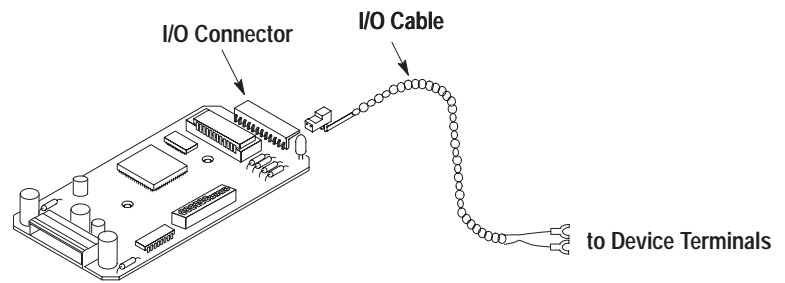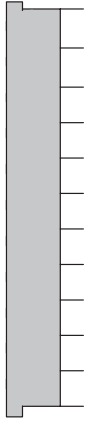

Every 2 consecutive pins on the I/O connector connects to an I/O cable connector. The I/O connector supports 2 outputs and 4 inputs.
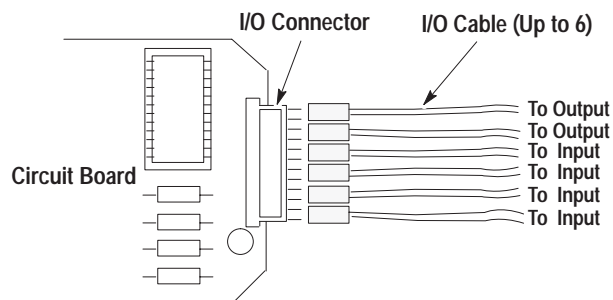

![attention triangle] **ATTENTION:** Do not connect I/O pins to standard control voltages. See page C–2 for maximum input voltages. I/O pins are not electrically isolated from the DeviceNet circuitry.

To simplify wiring, input devices and output devices attach to opposite ends of the I/O connector. The following table defines pin functions on the I/O connector. Output devices connect to pins 1–2 and 3–4. Input devices connect to pins 5–6, 7–8, 9–10 and 11–12. Unused pins are left open.

I/O Connector	Pin #	Pin Label	Function
	1	OUT1+	Connects Output Device
	2	OUT1–	
	3	OUT2+	Connects Output Device
	4	OUT2–	
	5	IN4+	Connects Input Device
	6	IN4–	
	7	IN3+	Connects Input Device
	8	IN3–	
	9	IN2+	Connects Input Device
	10	IN2–	
	11	IN1+	Connects Input Device
	12	IN1–	

2. Mount the circuit board using the spacers and mounting screws provided. Tighten circuit board mounting screws to 14 in-lbs.

3. Attach the 6 DeviceNet cable leads to the DeviceNet removable terminal block connector.

   Page 1–7 provides a description of the DeviceNet connections.

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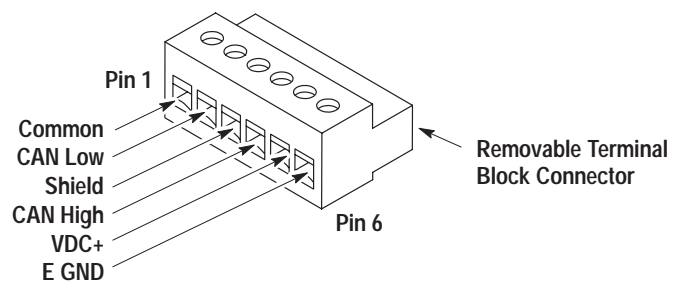
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