NOSHOK
2000
SERIES TECHNICAL MANUAL

DeviceNET COMMUNICATIONS OPTION CARD

DESCRIPTION

The 2000 series of meters can be fitted with up to three option cards. The slot bays of the option cards are dedicated to a particular card function. The option card functions are: serial communications, analog output and setpoint output. Only one card from each function category can be installed.

INSTALLING AN OPTION CARD

⚠ **Caution**: *The option and main circuit cards contain static sensitive components. Before handling the cards, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the cards at a static controlled clean workstation. Also, only handle the cards by the edges. Dirt, oil or other contaminants that may contact the cards can adversely affect circuit operation.*

⚠ **Warning**: *Exposed line voltage exists on the circuit boards. Remove all power to the meter AND load circuits before accessing the unit.*

1. Remove the main assembly from the rear of the case. Squeeze the finger holds on the rear cover, or use a small scewdriver to depress the side latches to release it from the case. It is not necessary to separate the rear cover from the main circuit card.
2. Locate the option card connector for the type of option card to be installed. Hold the unit by the rear connector, not the display board, when installing an option card.
3. Install the option card by aligning the option card connector with the slot in the rear cover. The cards are keyed by position with different main board connector locations. Be sure the connector is fully engaged and the tab on the option card rests in the alignment slot on the display board.
4. Slide the assembly back into the case. Be sure the rear cover latches fully into the case.
5. Apply the option card label to the bottom side of the meter. Do not cover the vents on the top surface of the meter. The surface of the case must be clean for the label to adhere properly. Apply the label to the area designated by the large case label.
6. See manual for wiring connections and programming procedures.

TOP VIEW
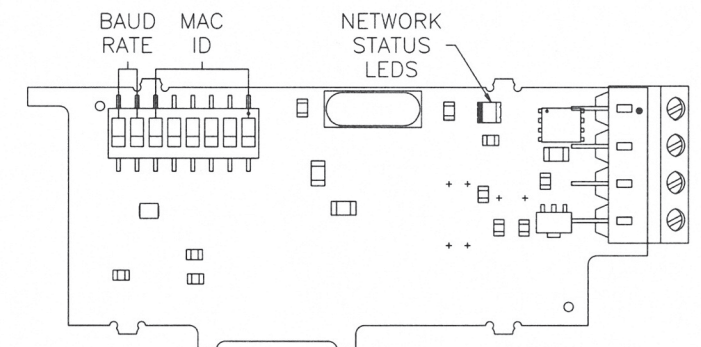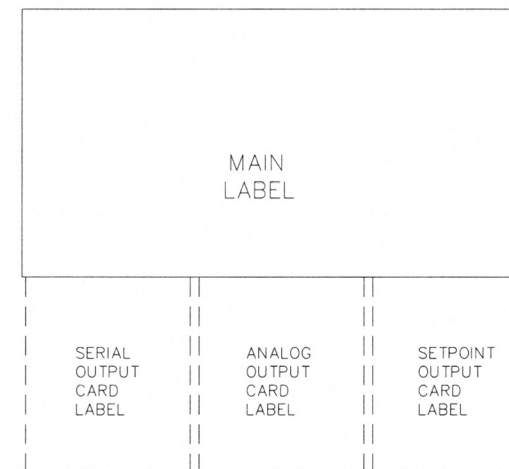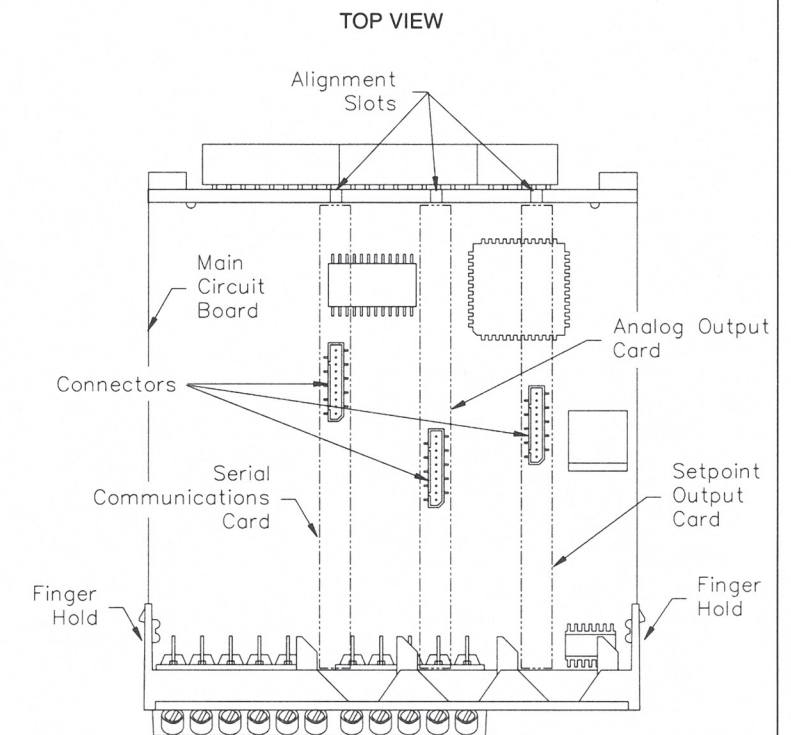
Both MacId and baud rate are set via DIP switches on the DeviceNet™ option card. See the DIP switch setting table for more details on these DIP switches. Configuration of MacId and baud rate is not supported over DeviceNet™

The network status LEDs provide visual indication to the operator of the DeviceNet™ card's current status.

DeviceNet™ SPECIFICATIONS

POWER SUPPLY

Source: Supplied by DeviceNet™ bus.
The bus does not power the host.
Voltage: 11 to 25 VDC.
Current:
Nominal: 40 mA at 25 VDC.
Inrush: 550 mA for 5 msec at 25 VDC.

NETWORK SPECIFICS

Compatibility: Group 2 Server Only, not UCMM capable.
Baud Rates: 125 Kbaud, 250 Kbaud, and 500 Kbaud.
Bus Interface: Phillips 82C250 or equivalent with mis-wiring protection per DeviceNet™ Volume 1 Section 10.2.2.
Node Isolation: Bus powered, isolated node.
Host Isolation: 500 Vrms for 1 minute (50 V working) between DeviceNet™ and meter input common.
Bus Connection: *
  12 CAN_L
  13 CAN_H
  14 V+
  15 V-
  * Shield: Refer to Appendix A, DeviceNet™ Physical Layer Schematics section of Volume I, of the ODVA Specifications Manual.

INSTALLATION INFORMATION

Initial Values:
  Baud rate: 125KBs.
  MacID: 63

DIP SWITCH SETTING TABLE

SWITCH #	SETTING
1 - 6	Mac Id (all off = 0, all on = 63)
7 off, 8 off	125 K baud
7 on, 8 off	250 K baud
7 off, 8 on	500 K baud
7 on, 8 on	N/A

CONNECTION SIZES

Device Profile: This product conforms to the DeviceNet™ specification Volumes I and II of version 2.0.
Device Configuration: No DeviceNet™ configuration is supported. However, some meter configuration is supported.

Message	Produced	Consumed
Explicit *	14 Bytes	14 Bytes
Polled	4 Bytes	0 Bytes
Bit Strobe	4 Bytes	8 Bytes

* Used to commission the device.

THE DeviceNet™ CARD BICOLOR LED

What to look for:

A. Flashing Red LED;
  This device is the only device on the network (waiting for an acknowledgment to its duplicate Mac Id check), or an I/O connection has timed out, or a recoverable error has occurred.
B. Flashing Green LED;
  The device is functioning correctly and is waiting to be commissioned by a bus master.
C. Solid Red LED;
  The device has encountered a non-recoverable fault, such as a duplicate Mac Id response, and has removed itself from the bus, or the device is in a power up reset state and is attempting to come on line.
D. Solid Green LED;
  The device is on line, functioning correctly and has been commissioned by a bus master.

APPLICATION OBJECT, METER

Polled Command: The Polled Command does not consume any data, this is a read only, but will still be performed if data is present in the data field. The data response from the Polled Command is in the format of a single precision four byte floating point decimal number.

The desired meter register that will be polled is determined by setting Attribute 1, Instance 1, Class 100 (decimal) with a value that represents the desired register. Use appropriate ASCII equivalent value from the Meter Register Identification Chart when setting this Attribute. Class 100 (decimal) is the "Meter Object Class" and is a vendor specific class.

Bit Strobe Command: The Bit Strobe Command consumes eight bytes of data, or less. This is a read only of a predetermined meter register. The data response from the Bit Strobe Command is in the format of a single precision four byte floating point decimal number.

The register that will be read using the Bit Strobe command is determined by setting Attribute 2, Instance 1, Class 100 (decimal) with a value that represents the desired register. Use appropriate ASCII equivalent value from the Meter Register Identification Chart when setting this Attribute. Class 100 (decimal) is the "Meter Object Class" and is a vendor specific class.

ASCII COMMAND STRING THROUGH DeviceNet™

Meter registers values can be read from or written to using a ASCII command string structure. This command string will be placed in the data field of the DeviceNet™ message. If the command string exceeds 6 bytes in length, the command string will be sent as a fragmented message .

The response of a read command will always be returned as a fragmented ASCII string message as the string will have a length of 14 bytes.

There is no response if the command is a register write.

To use the string command:

1. Set the Service Code value to decimal 50 (vendor specific command, Send String).
2. Set the Class ID value to decimal 100 (vendor specific Class ID, Meter Object).
3. Set the Instance ID value to 1 (only 1 instance for this object).
4. Set the Attribute ID value to decimal 100 (vendor specific Attribute ID code).

These settings will be used for meter register reading and writing command strings.

String command structures are as follows;

Referring to the Meter Command Chart and the Meter Register Chart a meter register read of the "Meter Input value", the data field of the message would have the following hex values:
  54 41 24.
The response to this command would be a 14 byte ASCII string that is terminated by an ASCII Carriage return (Hex: 0D).
Referring to the Meter Command Chart and the Meter Register Chart a meter register write of a value of 350 to the "Meter Setpoint 1", the data field of the message would have the following hex values:
  56 45 33 35 30 24
There is no response for a register write unless an error occurs.

Vendor Specific Error Responses

CODE ERROR #	ERROR CODE MEANING
1F (General Code)	Vendor Specific Error
1 (Additional Code)	Meter Response Time-out
2 (Additional Code)	Vendor Service Not Supported
3 (Additional Code)	Command String Syntax Error

Meter Register Identification Chart *

ASCII COMMAND LETTER & HEX VALUE	DESCRIPTION	READ AND OR WRITE
A (41)	Input	Read only
B (42)	Total	Read only
C (43)	Max Input	Read only
D (44)	Min Input	Read only
E (45)	Setpoint 1	Read and Write
F (46)	Setpoint 2	Read and Write
G (47)	Setpoint 3	Read and Write
H (48)	Setpoint 4	Read and Write
I (49)	Anolog Output	Read and Write
J (4A)	Control Status	Read and Write
$ (24)	String Terminator	

Meter Command Chart *

ASCII COMMAND LETTER & HEX VALUE	DESCRIPTION	NOTES
T (54)	Value read	Read a register from the meter. Must be followed by register ID character.
V (56)	Value change (write)	Write to register of the meter. Must be followed by register ID character and numeric data.

* Refer to Series 2000 manual for complete details.

Series 2000 DeviceNet™ OBJECT MODEL

OBJECT	OPTIONAL / REQUIRED	# OF INSTANCES
Identity	Required	1
Message	Required	1
DeviceNet™	Required	1
Connection	Required	3 (Explicit Messaging, Poll, & Bit Strobe)
Assembly	Required	1
Application; Meter	Optional	1