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2005/2012 Series
Profibus DP
Technical Manual



2005/2012 Series Profibus DP Technical Manual

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About Profibus DP

Overview

Profibus-DP is a communication protocol used to network industrial devices to eliminate labor intensive and expensive point to point wiring schemes. Siemens originally developed Profibus DP, but it is now supported by a multitude of manufacturers and the protocol standard governed by the Profibus Trade Organization (PTO).

The G2-2 Series Profibus-DP product is designed to conform to the Profibus standard EN50170, and is certified by Profibus Interface Center (PIC) according to the guidelines determined by the Profibus Trade Organization (PTO). The certification process ensures interoperability for all Profibus-DP devices.

Profibus-DP uses a 2-wire (plus shield) network and can have up to 126 nodes. The protocol can transfer a maximum of 244 bytes of data per node cycle with nine selectable communication (baud) rates of 9.6 Kbps, 19.2 Kbps, 93.75 Kbps, 187.5 Kbps, 500 Kbps, 1.5Mbps, 3 Mbps, 6 Mbps and 12 Mbps. Maximum distance is depended upon baud rate and cable media type. Refer to the section below for details.

More information about Profibus can be obtained from the Profibus web site http://www.profibus.com

G2-2 Profibus-DP Features

Features	*Description*
Bus Topology	**Linear bus, active bus termination on both ends. Stub lines permitted only for <= 1.5Mbit/sec baud rates.**
Baud Rates Supported	**9.6 Kbps, 19.2 Kbps, 93.75 Kbps, 187.5 Kbps, 500 Kbps, 1.5Mbps, 3 Mbps, 6 Mbps and 12 Mbps**
Duplicate address detection	**Node address must match address in Master configuration software, before node will enter the data exchange mode**
Error Correction	**Yes, if error detected, sender is requested to repeat the message**
Address Setting options	**Via Software (with Profibus-DP Class 2 Master) or with standard Manual Confuration Module (MCM)**

Cabling and Drop Line Lengths (as defined by Profibus specification)

Maximum Cable Length

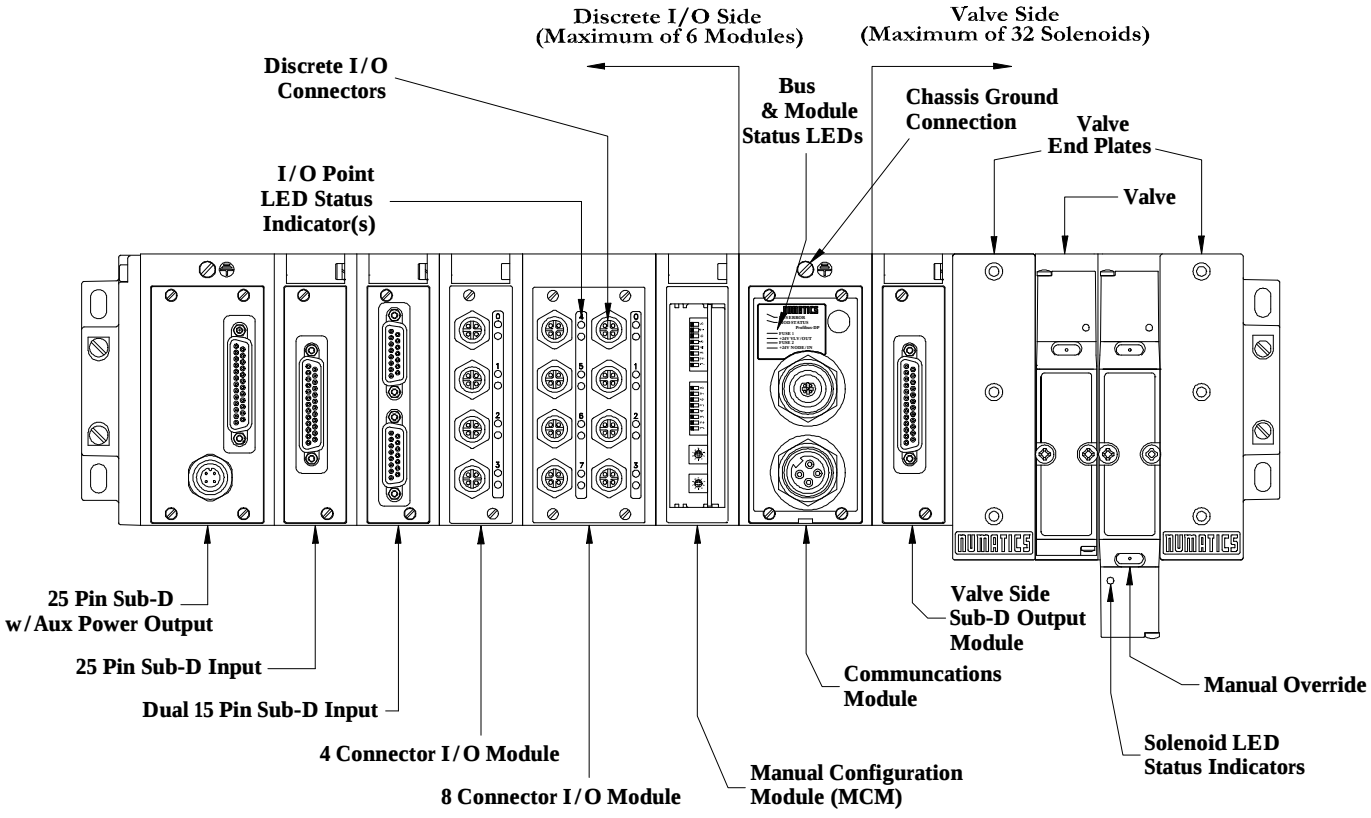
Baud Rate	**9.6Kbps**	**19.2Kbps**	**93.75Kbps**	**187.5Kbps**	**500Kbps**	**1.5Mbps**	**12Mbps**
Range/ Segment	**1200M**	**1200M**	**1200M**	**1000M**	**400M**	**200M**	**100M**

2005/2012 and G2-2 Introduction

Product Overview

The 2005/2012 valve series with G2-2 electronics is a product line featuring a variety of valve configurations and uses our G2-2 electronics capable of many interface options. These include several serial/bus communication protocols, which can control up to 32 valve solenoid coils on the valve side of the assembly, and up to 132 I/O points of I/O on the Discrete I/O side.

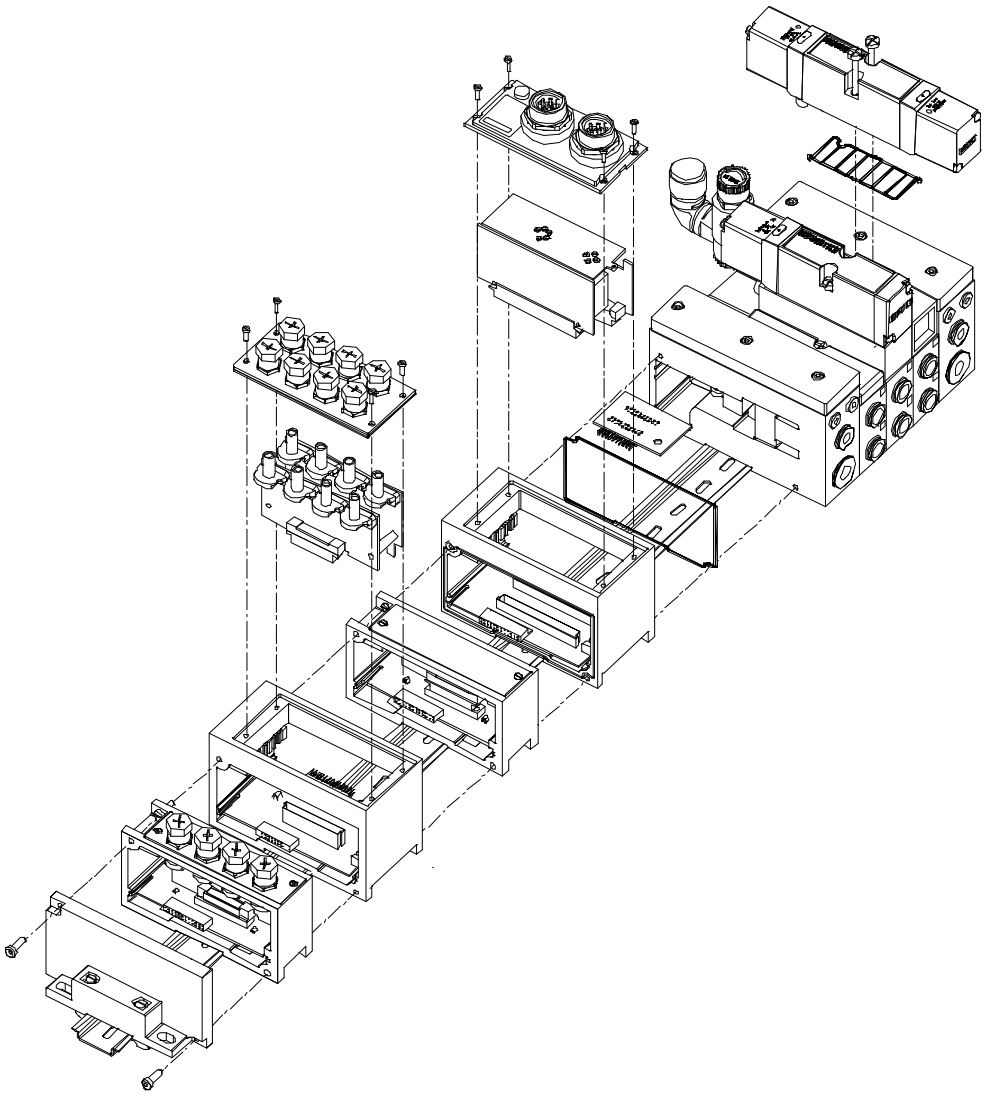
This manual addresses the specifics of configuring and commissioning the Numatics 2005/2012 Series product line configured with the Numatics' G2-2 Profibus-DP communication interface. For more information relating to pneumatic valving and valve manifold assemblies, please refer to the Numatics 2005 & 2012 Series catalog, No. LT2005/2012-1.



2005/2012 and G2-2 Electronic Modularity

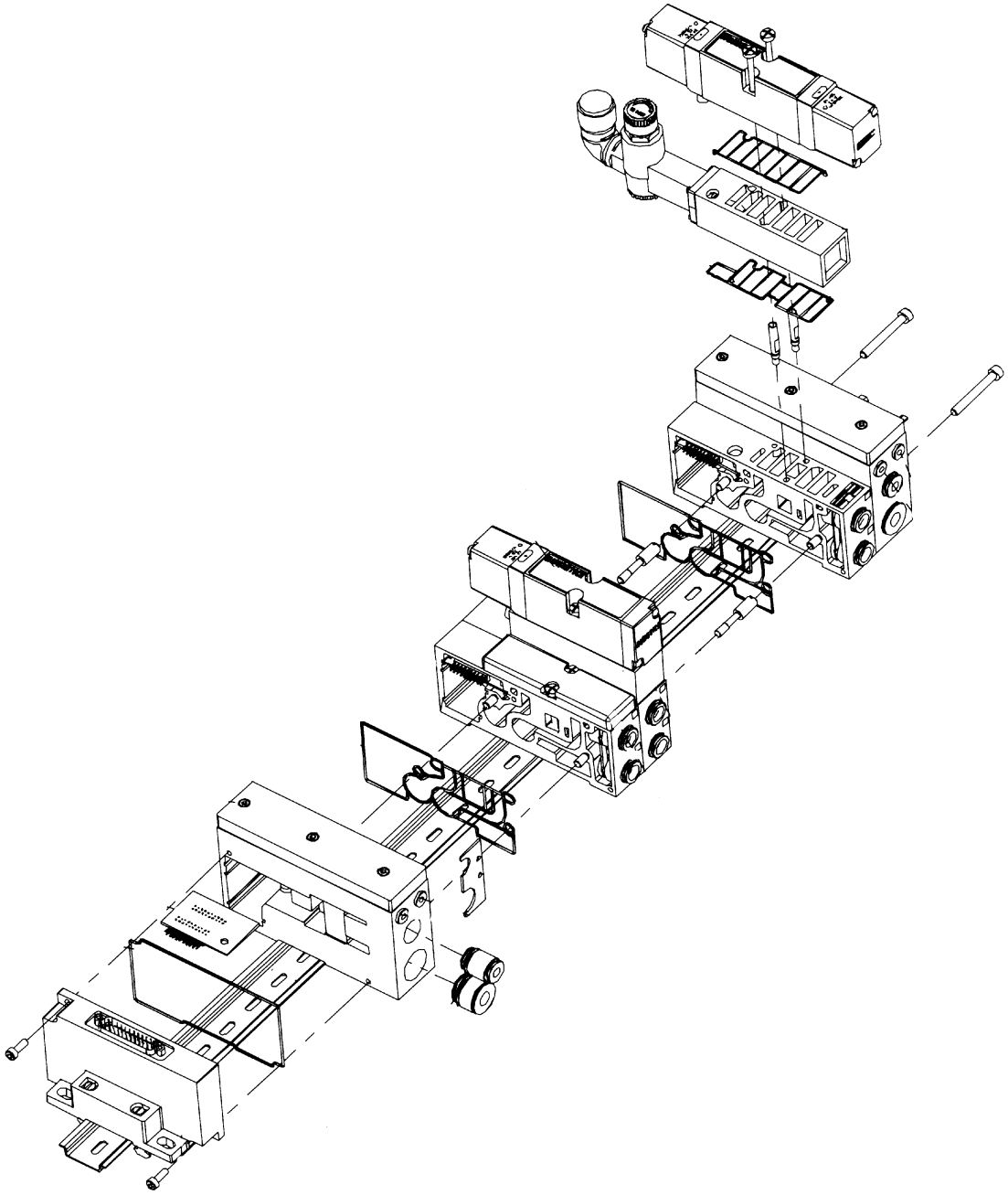
Discrete I/O

The 2005/2012 valve series with integrated G2-2 electronics product line is a completely modular system. As shown below, all of the electronic modules plug together, allowing easy assembly and field changes. Additionally, all the PC boards containing active electronics (i.e. Communication, I/O and MCM) are also modular, plugging into a backplane circuit board from the top of each module. This allows circuit board changes to be made without the need to dismantle the manifold.



Pneumatic Valve Manifold

The pneumatic valve manifold is also modular. The valve solenoid coil connections are made automatically using Z-Board™ technology (plug together PC boards which allow internal connection from solenoid coils to output drivers without the use of wires). This allows easy assembly and field changes.



Distributing I/O with G2-2 Electronics

The G2-2 series fieldbus manifold allows its discrete I/O points to be distributed from the central manifold by using various I/O modules (see pages 17-22). This distribution capability can be made at any time, even after the manifold has been installed and commissioned, although, network or communication rack configurations may be affected depending on the new total number of I/O points configured.

The distributed I/O points can be used for various input and output devices with many different termination options, including additional manifolds with Sub-D connector option. Please refer to *Figure 1* on the following page for a sample configuration layout.

G2-2 Profibus DP System Versatility

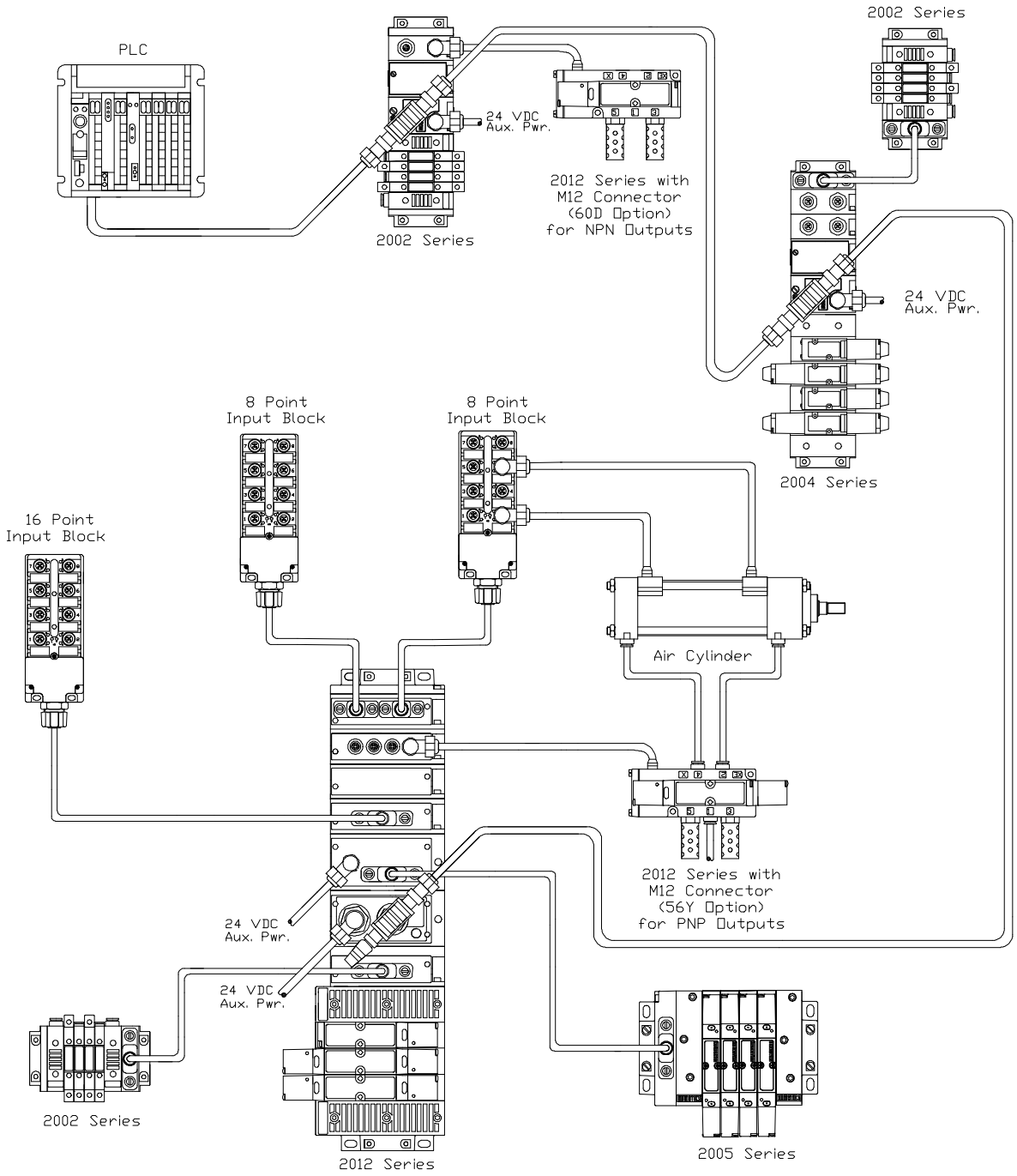
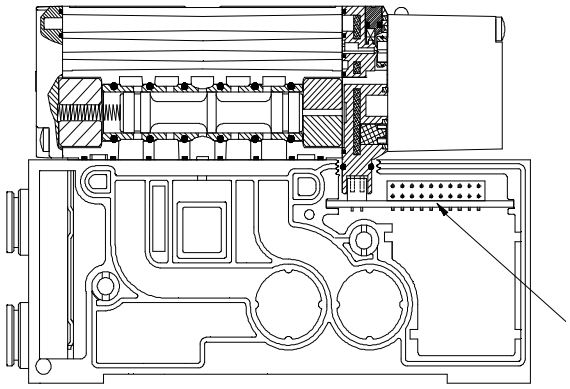


Figure 1
Example of network to PLC/IPC with distributed valve manifolds and I/O devices.

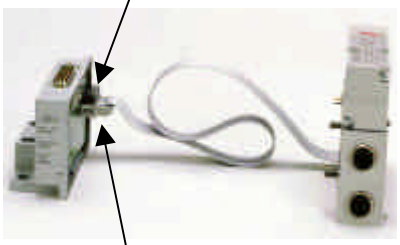
2005/2012 Valve Unit

Z-Board™ and Solenoid Coil Connections to Output Drivers

Z-Board™ plug together technology connects all valve solenoids to the valve coil output drivers, located in the communication node. The valve solenoid coil output drivers are divided into 2 separate 16 bit groups. Output group #1 is comprised of the first output word, bits 0-15, and output group #2 is comprised of the second output word, bits 16-31. Output group #1 connects directly to the Z-Boards™, while output group #2 is connected to Z-Boards™ via an internal ribbon cable or Valve Side Sub-D. The first output connects to the "14" (A) solenoid on the valve closest to the communication node. The 17th – 32nd solenoids interconnect via the Z-Boards™ to output group #2. For the maximum capability of 32 solenoids, the 16th and 17th solenoid coils must NOT be on the same subbase.



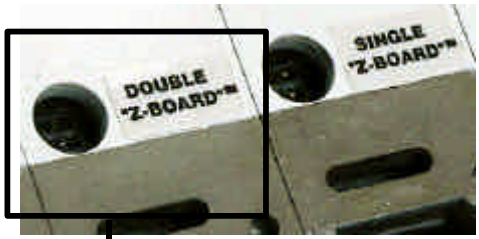
Plug-in Manifold with Integral "Z-Board™" Eliminates Wiring

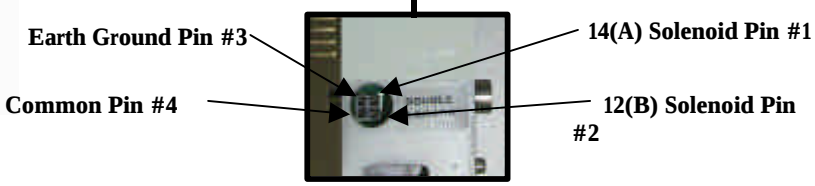


Single solenoid Z-Board™



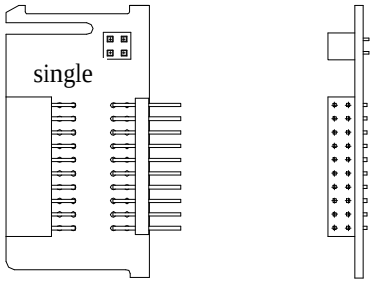
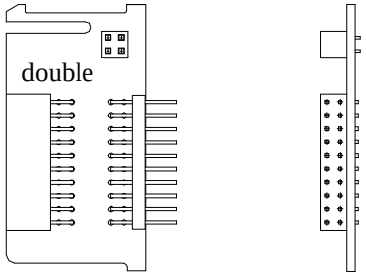
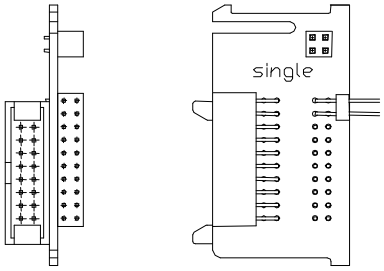
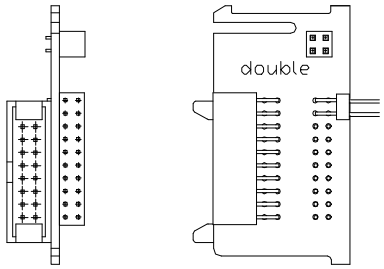
Double solenoid Z-Board™





Z-Board™ Connectors

The 2005/2012 valve series utilizes 2 different Z-Boards™ designs to achieve the single and double solenoid output functions that yield the possible 32 single, 16 double, or any combination of valve solenoid coil output capabilities.

Single Z-Board™ **Part # 256-640 (2012) Part # 256-151 (2005)**	***Double Z-Board™*** **Part # 256-641 (2012) Part # 256-152 (2005)**
	
Ribbon Connection Single Z-Board™ **Part # 256-642 (2012) Part # 256-742 (2005)**	***Ribbon Connection Double Z-Board™*** **Part # 256-643 (2012) Part # 256-743 (2005)**
	

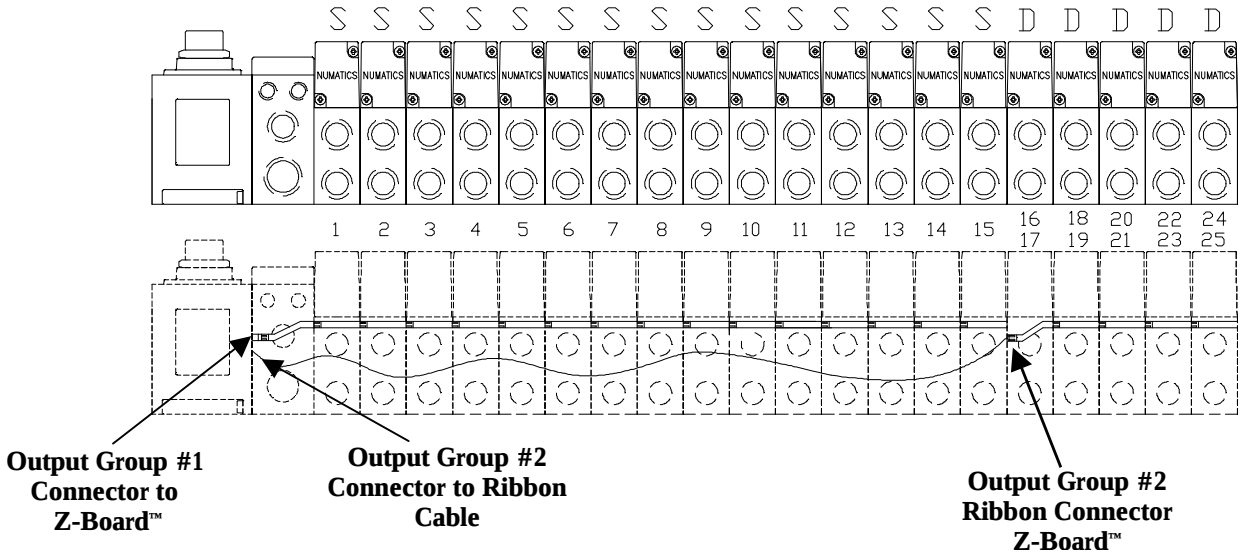


The 17th solenoid (output group #2's first bit) must be accessed via either the valve side sub-d output module or a ribbon connector type Z-board.

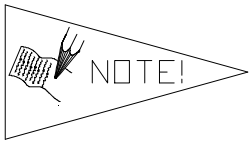
Z-Board™ and Ribbon Cable Example:

If fifteen (15) single solenoid valves are connected directly to the communication node via their Z-Boards™, and five (5) double solenoid valves are connected to the communication node via the ribbon cable, the following would be the valve side bit map:

S= Sgl. Sol. With Single Z-Board™
D= Dbl. Sol. With Double Z-Board™



Output Byte #	0								1								2								3							
Output Bit #	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid Coil Output #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	n/a	16	17	18	19	20	21	22	23	24	25	n/a	n/a	n/a	n/a	n/a	n/a

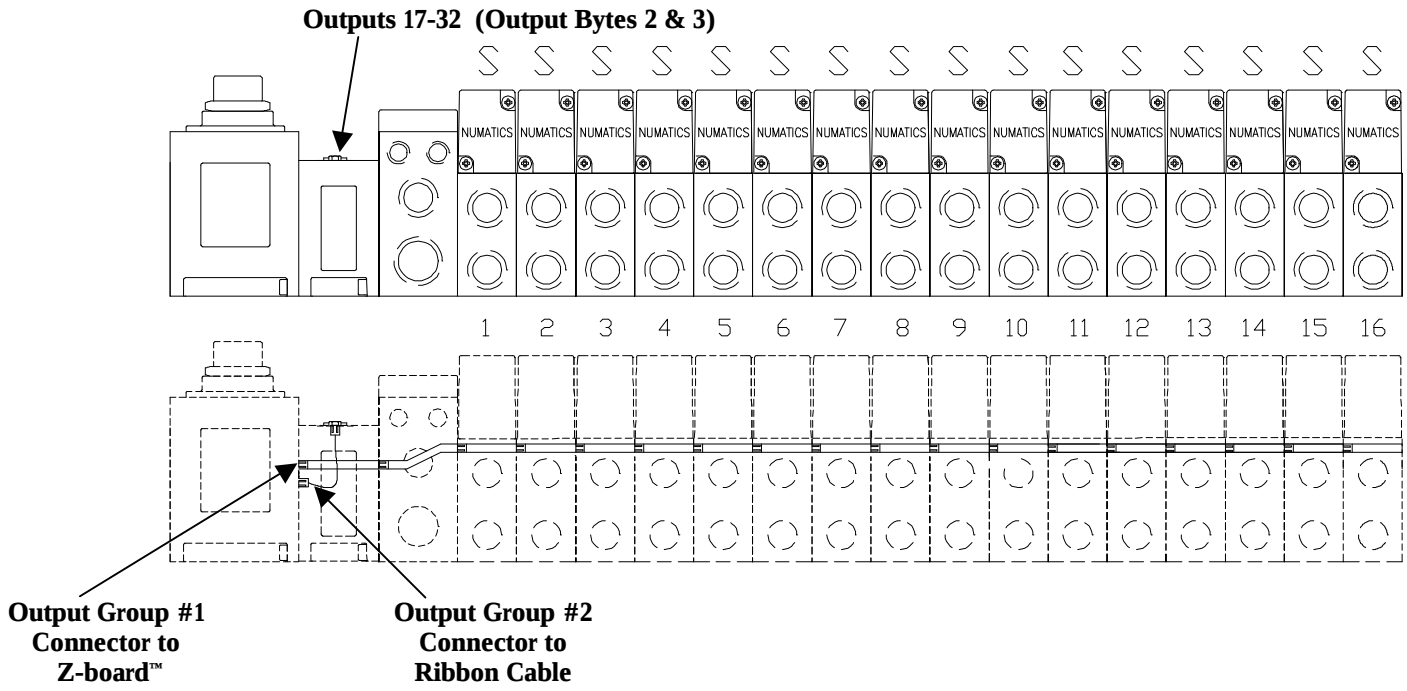


In the above example, Output Bits #15 and #26 thru #31 are allocated but not used.

Z-Board™ and Ribbon Cable with Valve Side Sub-d Example:

If sixteen (16) single solenoid valves are connected directly to the communication node via their Z-Boards™, and a valve side sub-d connector is connected to the communication node via the ribbon cable, the following would be the valve side bit map:

S= Sgl. Sol. With Single Z-Board™



Output Byte #	0								1								2								3							
Output Bit #	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid Coil Output #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Module Configurations and Pinouts

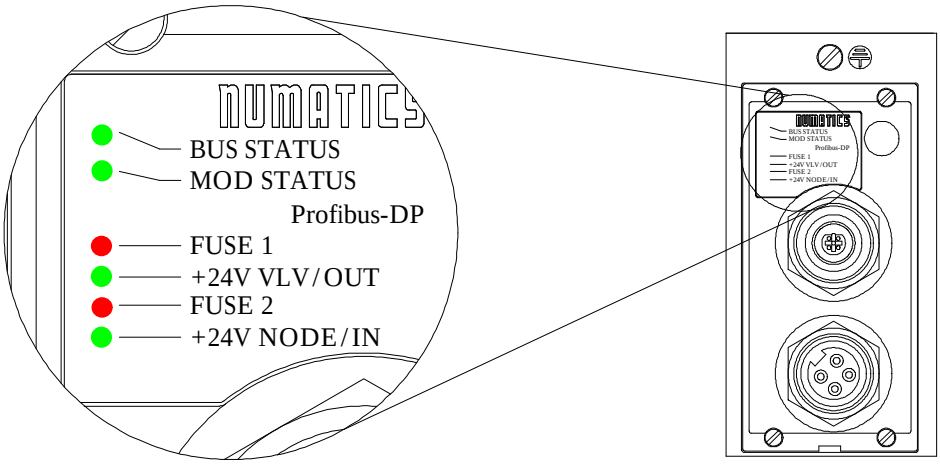
Profibus DP Communication Module (Node)

This module is the communication interface to the manifold. It contains communication electronics, short circuit protected solenoid coil output drivers and user replaceable fuses. This communication module can be configured via software (when using a Class 2 Master), or manually through the Manual Configuration Module (MCM) see page 15.

Factory Defaults Settings

Type	Value	Description
Node Address	126	Node address
Diagnostics	Disabled	Diagnostic Reporting is turned off
Diagnostic Mask	0	Determines which outputs are enabled for diagnostic reporting
Fail Safe Mode	Disabled	Fail Safe Mode Disabled
Fail Safe Data	0	Determines if Fail Safe Data is 1 or 0 for an output.

LED Display



Connector Types

Industry standard connectors are used for communication and auxiliary power. The Profibus DP 1.5 Mbps communication connector is a single keyway 5 pin male 12mm micro type connector and the Profibus DP 12 Mbps communication connector is a reverse keyway 5 pin female 12mm micro type connector. Both Profibus-DP versions use the same Aux. Power connector type, which is a single keyway 4 pin male "mini" connector.

Profibus DP Communication Connector Pinout

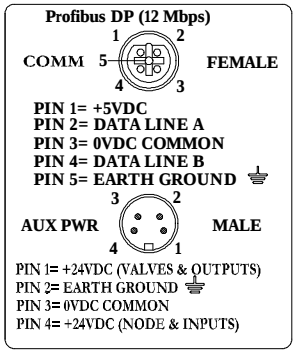
Pin #	Function	Description
1	+5 VDC	+5 volt output from node, used for termination of network or auxiliary devices.
2	Data Line A	Profibus-DP Communication Line A (Green)
3	0VDC Common	Common for +5V output and Data Lines A & B
4	Data Line B	Profibus-DP Communication Line B (Red)
5	Earth Ground	Internally connected to earth ground (case). Connect to shield of Profibus-DP cable.

Auxiliary Power Connector Pinout

Pin #	Function	Description
1	+24VDC (Valves and Outputs)	Voltage used to power outputs (valves and discrete outputs)
2	Earth Ground	Protective Earth (case)
3	0VDC Common	0VDC Common, for valve and I/O power
4	+24VDC (Node and Inputs)	Voltage used to power discrete inputs and node electronics

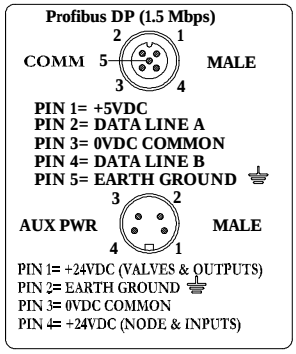
12 Mbps Connectors

Comm. - 12mm (reverse key)
Aux. Power - Mini



1.5 Mbps Connectors

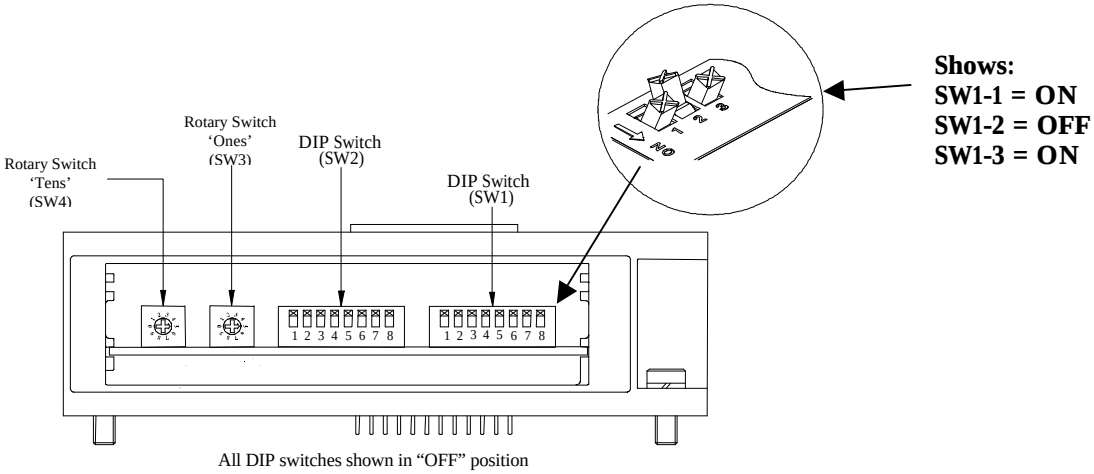
Comm. - 12mm (standard)
Aux. Power - Mini



ATTENTION

- ***Maximum pin capacity on pin #3 (0VDC common) of auxiliary power connector is 8 Amps. The combined draw of Pin #1 (Valves & Outputs) and pin #4 (Node & Inputs) cannot exceed 8 Amps, at any given moment in time.***
- ***Auxiliary power connector Pin #4 supplies power to node electronics. This pin must be powered at all times for communication node to be functional***

MCM - Manual Configuration Module (Optional with Class 2 Master)



All DIP switches shown in "OFF" position

The MCM is a configuration module that allows user to manually set address and other user definable options. It can be installed in any I/O station position on the Discrete I/O side. The MCM consists of two DIP switch sets (SW1 & SW2) and two rotary switches (SW3 & SW4).

DIP Switch Settings (SW1)

Reserved:

Switch	Description
SW1	Not Used - Reserved for Future Use

DIP Switch Settings (SW2)

Node Address – Hundreds Digit:

Switch	Setting	Description
SW2-1	*Off	Hundreds digit off
SW2-1	On	Hundreds digit on (add 100 to rotary switch setting)

Manual or Software Configuration:

Switch	Setting	Description
SW2-2	*Off	Address set manually using MCM Configuration
SW2-2	On	Address set in software when using Class 2 Profibus-DP Master

Node Address Reset:

Switch	Setting	Description
SW2-8	*Off	No change to address retained in flash memory
SW2-8	On	Node address in flash memory is set to 126 on next power up cycle

Reserved:

Switch	Description
SW2-3,4,5,6,7,9,10	Not Used – Reserved for Future Use

*** Factory default settings**

Rotary Switch Settings (SW3 & SW4)

Node Address – Tens and Ones Digits:

Switch	Description
SW3	Sets the Ones Digits
SW4	Sets the Tens Digits

ATTENTION

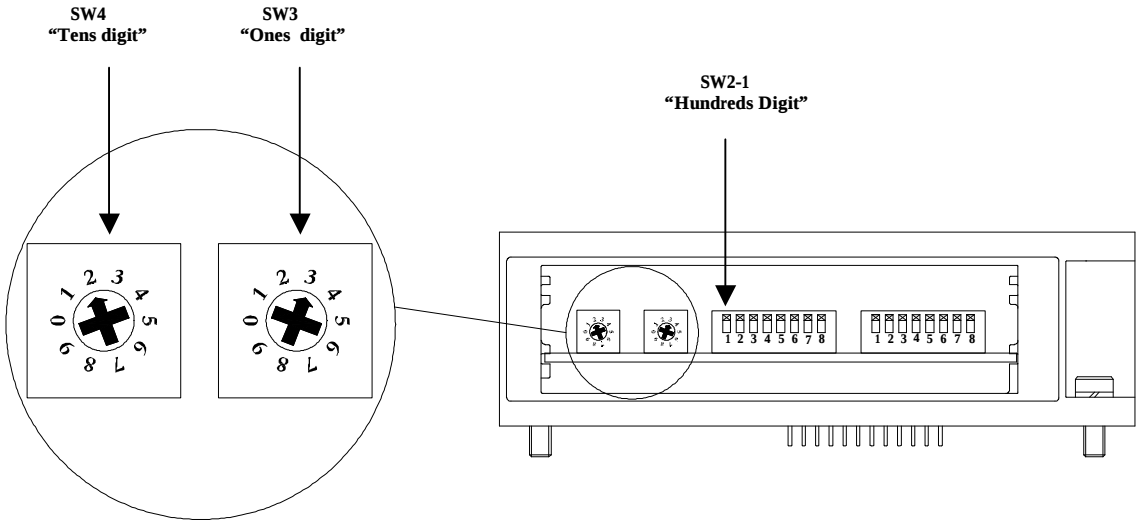
- ***All DIP and rotary switch settings do not take effect until power is cycled (turned OFF and ON).***
- ***Baud rate in Profibus-DP slaves is automatically configured.***
- ***Node address may only be assigned once per network.***
- ***GSD files may be downloaded from our web site at www.numatics.com.***

MCM Settings Example

The example below shows the correct settings for the following requirements:
MCM = Enabled; Node Address = 23

Switch Settings:

Switch	*Setting*	*Description*
SW2-1	Off	Hundreds Digit
SW2-2	Off	Address set manually using MCM
SW2-8	Off	No change to address retained in flash memory
SW3	3	Sets the Ones Digits of the Node Address to Three (3)
SW4	2	Sets the Tens Digits of the Node Address to Two (2)

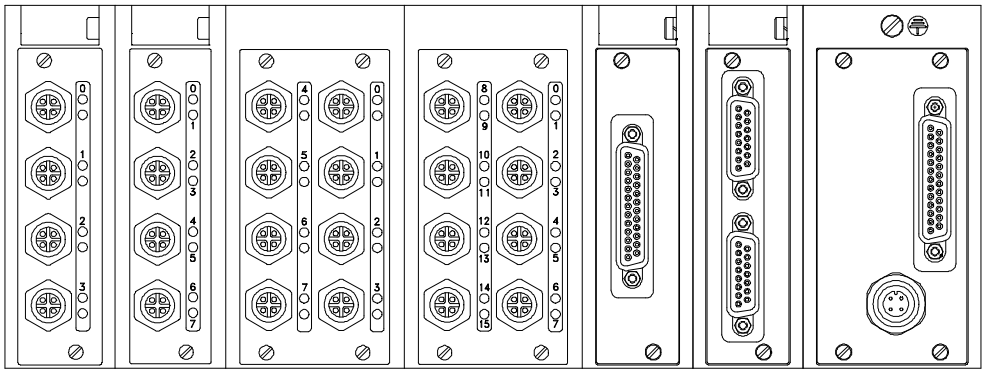


Discrete I/O Modules

Rules

The maximum number of I/O modules that can be used on the Discrete I/O side of the manifold is 6. If the optional Manual Configuration Module (MCM) is used, a maximum of five I/O modules may be installed. Modules can be connected in any combination and sequence of inputs and outputs up to the logical limitations of 132 I/O. ***Damage will occur if Discrete I/O and MCM Modules are inserted or removed with power applied.***

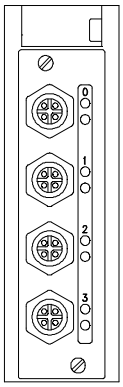
Module Types

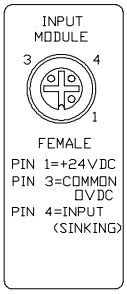


Module Part #	*Replacement I/O Board Part #*	*I/O*	*Points*	*Module Size*	*Connection Type*	*I/O Type*
239-1304	256-646	Input	4	Narrow	4 x 12mm (1 input per conn.)	Sinking (NPN)
239-1305	256-648	Input	4	Narrow	4 x 12mm (1 input per conn.)	Sourcing (PNP)
239-1308	256-647	Input	8	Narrow	4 x 12mm (2 input per conn.)	Sinking (NPN)
239-1309	256-649	Input	8	Narrow	4 x 12mm (2 input per conn.)	Sourcing (PNP)
239-1312	256-654	Input	8	Wide	8 x 12mm (1 input per conn.)	Sinking (NPN)
239-1313	256-656	Input	8	Wide	8 x 12mm (1 input per conn.)	Sourcing (PNP)
239-1316	256-655	Input	16	Wide	8 x 12mm (2 input per conn.)	Sinking (NPN)
239-1317	256-657	Input	16	Wide	8 x 12mm (2 input per conn.)	Sourcing (PNP)
239-1868	256-796	Input	16	Narrow	Dual 15 Pin Sub-D (8 inputs per Sub-D)	Sinking (NPN)
239-1870	256-798	Input	16	Narrow	Dual 15 Pin Sub-D (8 inputs per Sub-D)	Sourcing (PNP)
239-1869	256-797	Input	16	Narrow	25 Pin Sub-D (16 inputs)	Sinking (NPN)
239-1871	256-799	Input	16	Narrow	25 Pin Sub-D (16 inputs)	Sourcing (PNP)
239-1306	256-650	Output	4	Narrow	4 x 12mm (1 input per conn.)	Sinking (NPN)
239-1307	256-652	Output	4	Narrow	4 x 12mm (1 input per conn.)	Sourcing (PNP)
239-1310	256-651	Output	8	Narrow	4 x 12mm (2 input per conn.)	Sinking (NPN)
239-1311	256-653	Output	8	Narrow	4 x 12mm (2 input per conn.)	Sourcing (PNP)
239-1314	256-658	Output	8	Wide	8 x 12mm (1 input per conn.)	Sinking (NPN)
239-1315	256-660	Output	8	Wide	8 x 12mm (1 input per conn.)	Sourcing (PNP)
239-1318	256-659	Output	16	Wide	8 x 12mm (2 input per conn.)	Sinking (NPN)
239-1319	256-661	Output	16	Wide	8 x 12mm (2 input per conn.)	Sourcing (PNP)
239-1460	256-722	Output	22	Wide	25 Pin Sub-D w/Aux Power (22 outputs)	Sourcing (PNP)

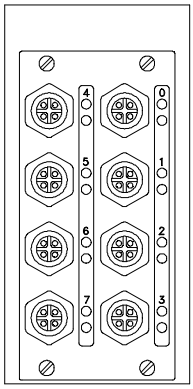
Input Modules

Part #	Description
239-1304	4 Inputs (Sinking-NPN) - 1 Input/Connector

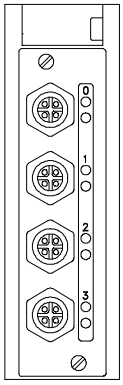


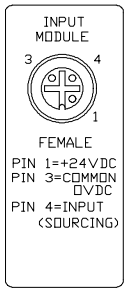


Part #	Description
239-1312	8 Inputs (Sinking-NPN) - 1 Input/Connector

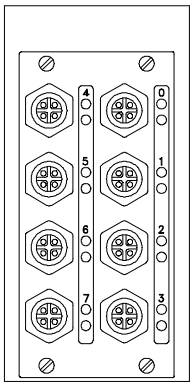


Part #	Description
239-1305	4 Inputs (Sourcing-PNP) - 1 Input/Connector

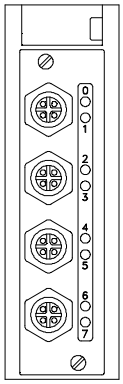


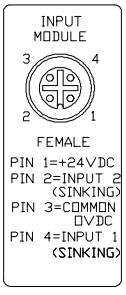


Part #	Description
239-1313	8 Inputs (Sourcing-PNP) - 1 Input/Connector

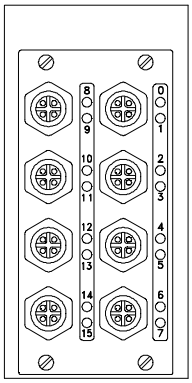


Part #	Description
239-1308	8 Inputs (Sinking-NPN) – 2 Inputs/Connector

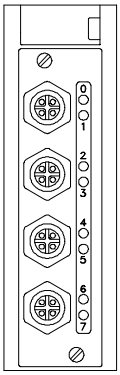


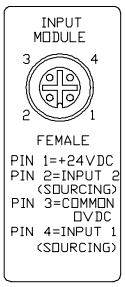


Part #	Description
239-1316	16 Inputs (Sinking-NPN) - 2 Inputs/Connector

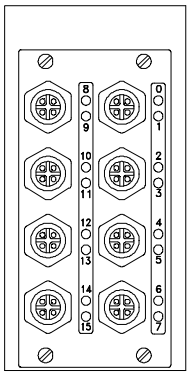


Part #	Description
239-1309	8 Inputs (Sourcing-PNP) - 2 Inputs/Connector

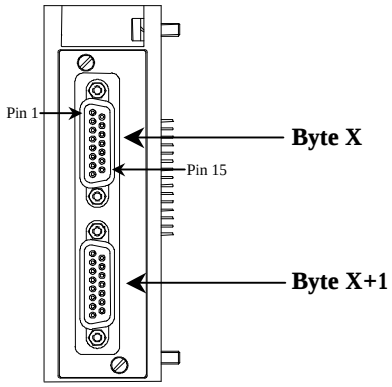


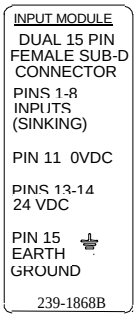


Part #	Description
239-1317	16 Inputs (Sourcing-PNP) - 2 Inputs/Connector

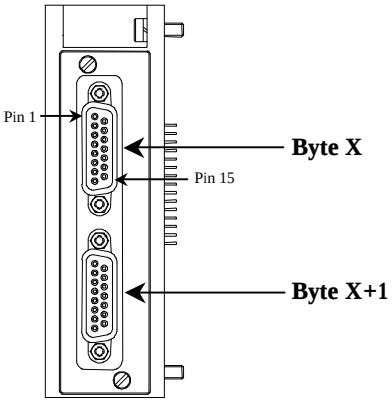


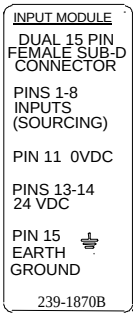
Part #	Description
239-1868	16 Inputs (Sinking-NPN) – 8 Inputs/Connector



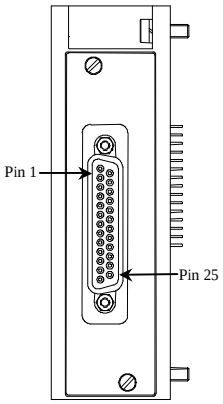


Part #	Description
239-1870	16 Inputs (Sourcing-PNP) – 8 Inputs/Connector



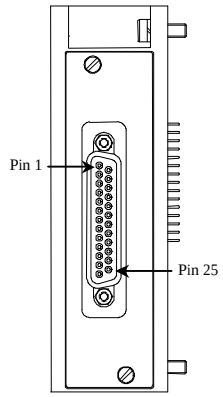


Part #	*Description*
239-1869	**16 Inputs (Sinking-NPN) – 16 Inputs/Connector**



INPUT MODULE
25 PIN SUB-D FEMALE CONNECTOR
PINS 1-16 INPUTS (SINKING)
PIN 21 0VDC
PINS 23-24 24 VDC
PIN 25 EARTH GROUND
239-1869

Part #	*Description*
239-1871	**16 Inputs (Sourcing-PNP) – 16 Inputs/Connector**



INPUT MODULE
25 PIN SUB-D FEMALE CONNECTOR
PINS 1-16 INPUTS (SOURCING)
PIN 21 0VDC
PINS 23-24 24 VDC
PIN 25 EARTH GROUND
239-1871

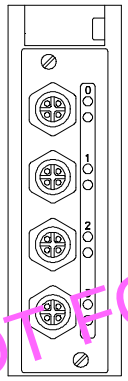


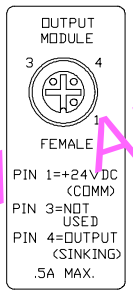
Damage will occur if modules are removed or inserted while power is applied!

Output Modules

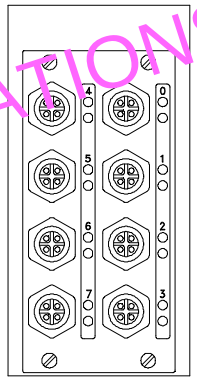
- **0.5 Amps per Output. (Consult factory for output loads greater than 0.5 Amps.)**
- **Over current, short circuit protected and integrated spike suppression.**

Part #	Description
239-1306	4 Outputs (Sinking-NPN) - 1 Output/Connector



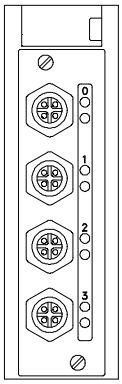


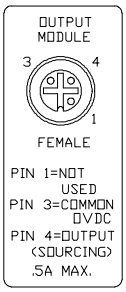
Part #	Description
239-1314	8 Outputs (Sinking-NPN) - 1 Output/Connector



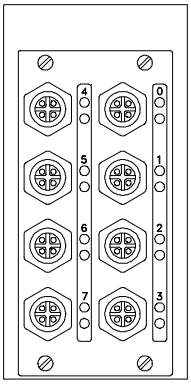
NOT FOR NEW APPLICATIONS

Part #	Description
239-1307	4 Outputs (Sourcing-PNP) - 1 Output/Connector





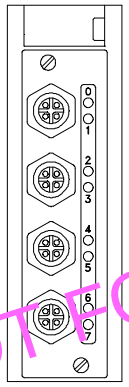
Part #	Description
239-1315	8 Outputs (Sourcing-PNP) - 1 Output/Connector

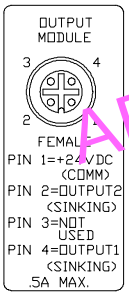


ATTENTION

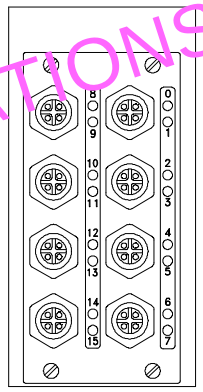
Damage will occur if modules are removed or inserted while power is applied!

Part #	Description
239-1310	8 Outputs (Sinking-NPN) – 2 Outputs/Connector



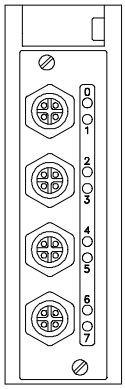


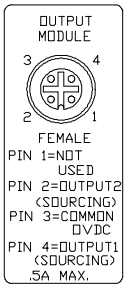
Part #	Description
239-1318	16 Outputs (Sinking-NPN) - 2 Outputs/Connector



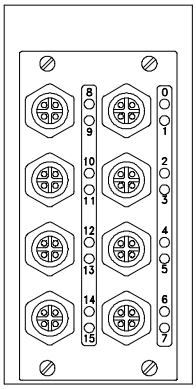
NOT FOR NEW APPLICATIONS

Part #	Description
239-1311	8 Outputs (Sourcing-PNP) - 2 Outputs/Connector

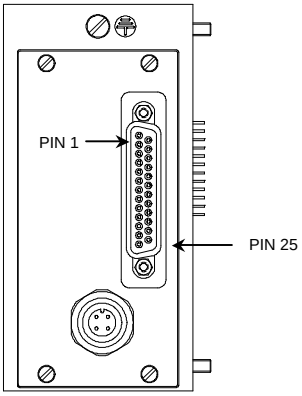


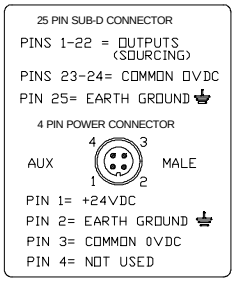


Part #	Description
239-1319	16 Outputs (Sourcing-PNP) - 2 Outputs/Connector



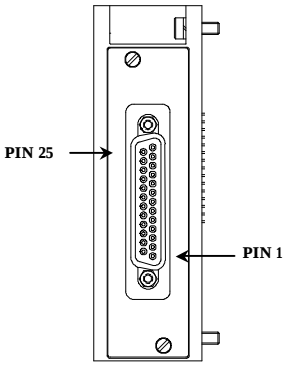
Part #	Description
239-1460	22 Outputs (Sourcing-PNP) – 22 Outputs/Connector

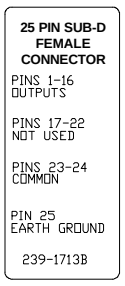




Part #	Description
239-1713	16 Outputs (Sinking-NPN) – 16 Outputs/Connector (Valve side only)

Valve Side Sub-D

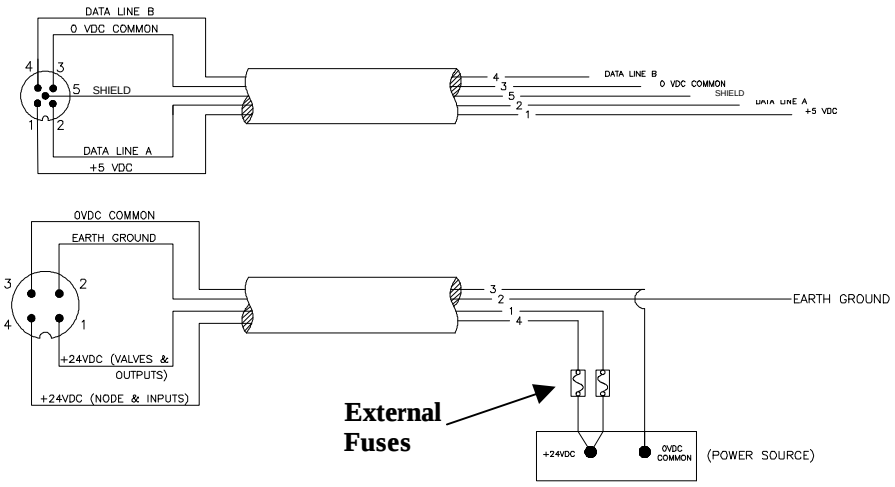




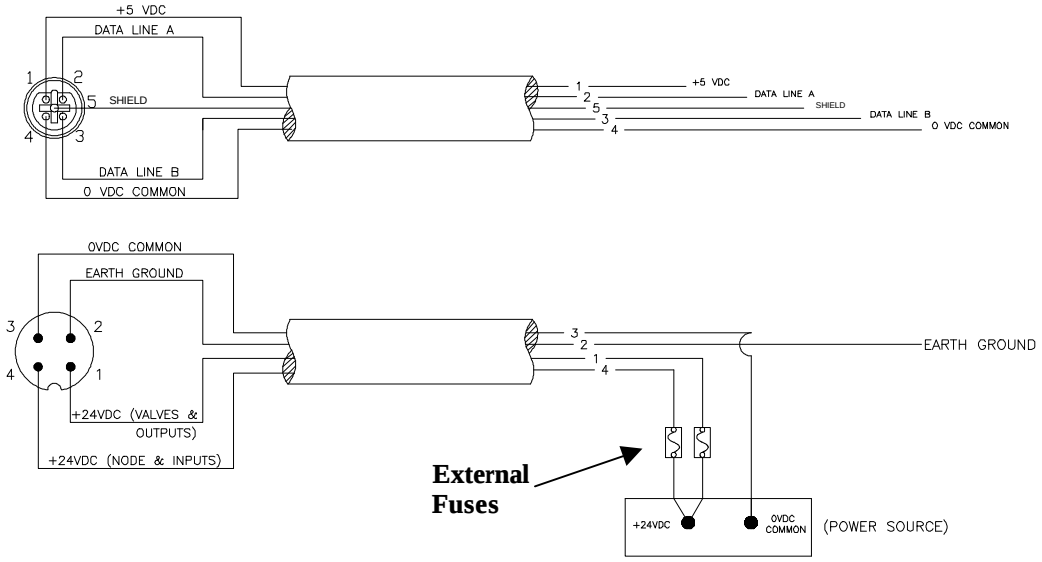
Electrical Connections

Power Supply Wiring Diagrams

1.5 Mbps Communication Connector (Male connector view on module)



12 Mbps Communication Connector (Female connector view on module)



ATTENTION

- ***Please see page 27 for external fuse sizing guideline chart.***
- ***When using molded connector power cables, <u>Do Not</u> rely on wire colors for Pin-Out. <u>Always use pin number references.</u>***

Power Consumption

Auxiliary Power Connector

Aux. Power Connector Pin #	*Description*
1	24 VDC Power for Valves & Discrete Outputs
4	24 VDC Power for Inputs & Node Electronics

Discrete I/O Module(s) Power Jumper

All of Numatics, Inc., G2-2 I/O modules have a selectable power source jumper. This jumper determines which Aux. Power connector pin (1 or 4) will power these modules.

This option allows the user to select how each specific module will be powered during different conditions (i.e. E-Stop). Each I/O board can be set-up independently allowing individual Output and/or Input modules to remain active if needed.

Power Ratings

- **Maximum system current capability is 8 amps. Care should be taken not to exceed 8 amp draw through pin #3 0VDC common (Current of pin #1 and pin #4 combined).**
- **Discrete I/O current draw is dependent on the device(s) connected. It is critical to know what these values are in order to remain safely within the 8 amp limitation.**
- **Loads should not draw more than 0.5 amps of current from any one individual discrete output point. (Contact factory for higher current capabilities)**

Auxiliary Power Connector	*Volts*	*Tolerance*	*Current*	*Power*
Pin 1 +24VDC (Valves & Outputs)				
Solenoid Valve Coil 2012 (Each)	24VDC	+10%/-15%	0.105 A	2.5 Watts
Solenoid Valve Coil 2005 (Each)	24VDC	+10%/-15%	0.042A	1.0 Watts
Discrete Output	24VDC	-	0.5 A max. *	12 Watts max. *
Pin 4 +24VDC (Node & Inputs)				
Node	24VDC	+/- 10%	0.040 A	0.96 Watts
Discrete I/O Module (Each)	24VDC	-	0.006 A	0.14 Watts
Discrete I/O Status LEDs (Each)	24VDC	-	0.015 A	0.36 Watts

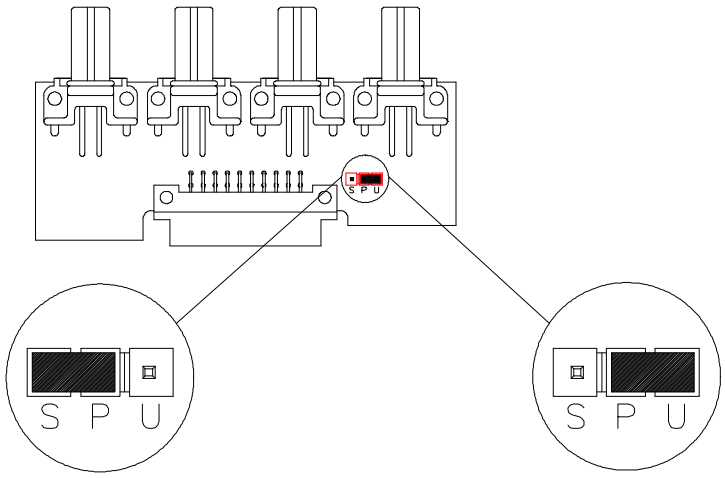


**** Power consumption of each Discrete I/O is device dependent on specific current draw of input sensor devices and output loads. Please consult the factory for output loads greater than 0.5 amps.***

Recommended External Fuses:

External fuses should be chosen based upon the physical manifold configuration. Please refer to the following pages and the fuse sizing chart on page 27.

Discrete I/O Power Jumper

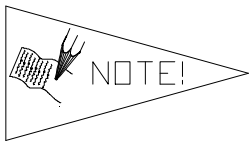


I/O Power from pin # 1 of Aux. Power Connector

I/O Power from pin #4 of Aux. Power Connector

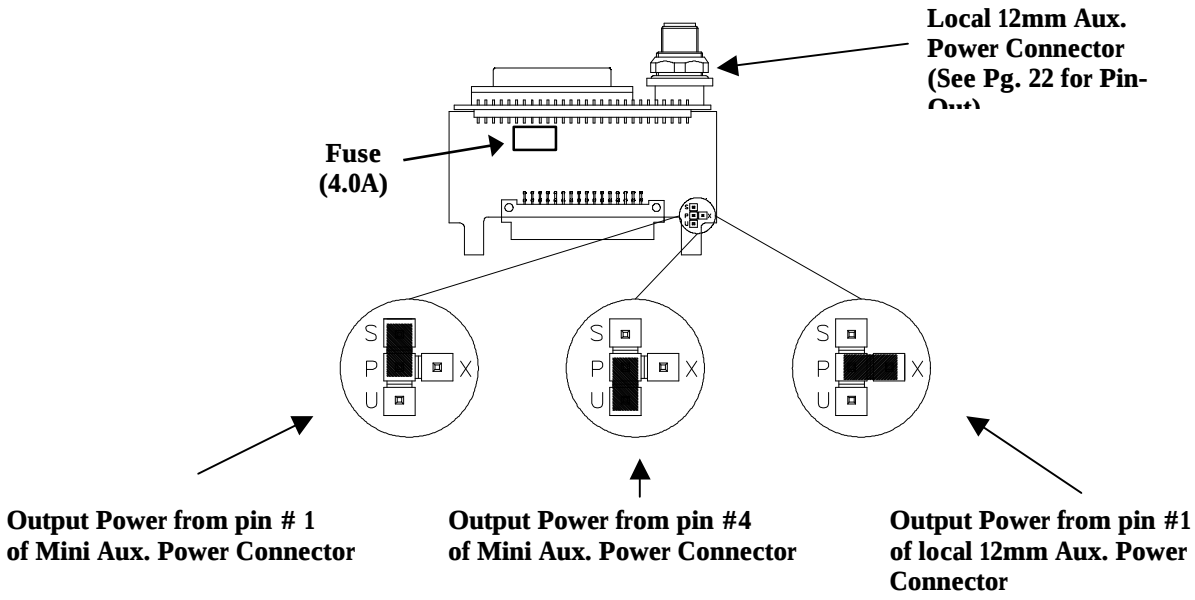
Please refer to the table below for jumper setting and description.

		Jumper Setting	*Jumpered Pins*	*Description*
Output Module	**Jumper Pos 1 "SP"**		**"S" & "P"**	***Factory Default* - Output power is supplied by Pin # 1 of Aux. Power Connector. This allows discrete outputs to be disabled without disabling power to communication node.**
	Jumper Pos 2 "UP"		**"U" & "P"**	**Output power is supplied by Pin # 4 of Aux Power Connector. This allows discrete outputs to be supplied by the same connection that powers the communication node. Outputs will not be disabled separately from the communication node.**
Input Module	**Jumper Pos 2 "UP"**		**"U" & "P"**	***Factory Default* - Input power is supplied by Pin # 4 of Aux. Power Connector. This allows Input power to be supplied by the same connection which powers the communication node.**
	Jumper Pos 1 "SP"		**"S" & "P"**	**Input power is supplied by Pin # 1 of Aux Power connector. This allows Input power to be supplied by the same connection that powers the valve coils and discrete outputs.**

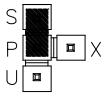
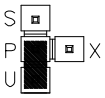
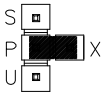


Wide I/O Modules (Modules with 8 12mm connectors) contain two jumpers; one for each group of four connectors.

Discrete Sub-D Output Power Jumper



Please refer to the table below for jumper setting and description.

		Jumper Setting	*Jumpered Pins*	*Description*
Output Module	**Jumper Pos 1 "SP"**		**"S" & "P"**	**Output power is supplied by Pin # 1 of Aux. Power Connector. This allows all valves and discrete outputs to be disabled without disabling power to communication node.**
	Jumper Pos 2 "UP"		**"U" & "P"**	**Output power is supplied by Pin # 4 of Aux Power Connector. This allows all valves and discrete outputs to be supplied by the same connection that powers the communication node. Outputs will not be disabled separately from the communication node.**
	Jumper Pos 3 "XP"		**"X" & "P"**	***Factory Default* - Output power is supplied by pin #1 of local 12mm Aux Power Connector. Outputs can be enabled/disabled via Local 12mm Aux Power Connector.**

Power Consumption and External Fuse Sizing Guide Chart

Power Consumption - Aux. Power Connector Pin #1 – (Valves and Outputs)		
Description		***Current***
Number of Solenoid Valve Coils Energized Simultaneously		
___ X 0.105 A (2012 Series)	**=**	**_____Amps**
___ X 0.042 A (2005 Series)	**=**	**_____Amps**
		+
Total load current drawn by simultaneously energized Discrete Outputs with Discrete Outputs Power Jumper in "SP" Position (Factory Default).	**=**	**_____Amps**
Total load current drawn by Sensor Devices from Discrete Inputs source		**+**
with Discrete Input Power Jumper in "SP" Position.	**=**	**_____Amps**
Total:		**_____Amps**
Surge Compensation:	**X**	**1.25**
Suggested External Pin #1 Fuse Value:		**_____Amps**

Power Consumption - Aux. Power Connector Pin #4 – (Node and Inputs)		
Description		***Current***
Communication Node Power Consumption	**=**	**.040 Amps**
		+
Total load current drawn by simultaneously energized Discrete Outputs with Discrete Outputs Power Jumper in "UP" Position.	**=**	**_____Amps**
Total load current drawn by Sensor Devices from Discrete Inputs source		**+**
with Discrete Inputs Power Jumper in "UP" Position (Factory Default).	**=**	**_____Amps**
		+
Number of I/O modules installed ___ X 0.006 A	**=**	**_____Amps**
		+
Number of Discrete I/O Status LEDs simultaneously on ___ X 0.015 A	**=**	**_____Amps**
Total:		**_____Amps**
Surge Compensation:	**X**	**1.25**
Suggested External Pin #4 Fuse Value:		**_____Amps**



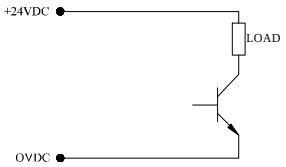
- ***The standard power jumper configuration for all Output Modules is "SP".***
- ***The standard power jumper configuration for all Input Modules is "UP".***
- ***At any given moment in time, the <u>combined</u> current draw through pin #1 (Valves & Outputs) <u>and</u> pin #4 (Node & Inputs) cannot exceed 8 amperes. Therefore, the combined value of the two fuses on pin #1 and pin #4 should not exceed 10 amperes (8 ampere max by 1.25 surge compensation).***

I/O Module(s) Wiring Diagrams

Definitions

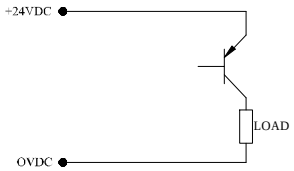
Sinking Description

- **NPN**
- **Switching Negative**
- **Positive Common**



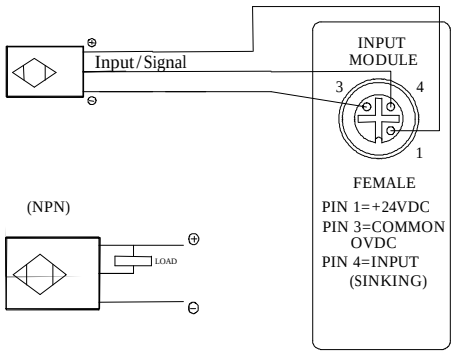
Sourcing Description

- **PNP**
- **Switching Positive**
- **Negative Common**

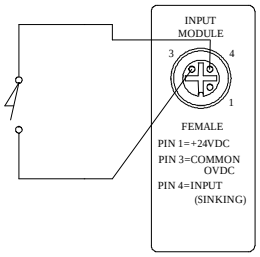


Sinking (NPN) Input Connection

Electronic Sensor Type

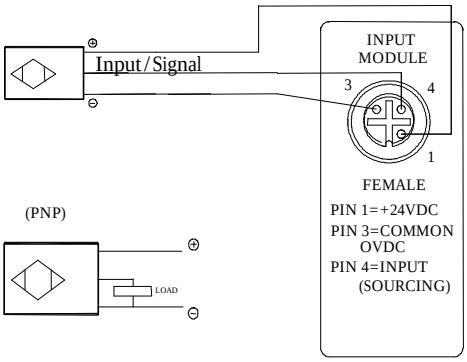


Mechanical Sensor Type

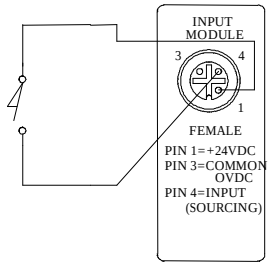


Sourcing (PNP) Input Connection

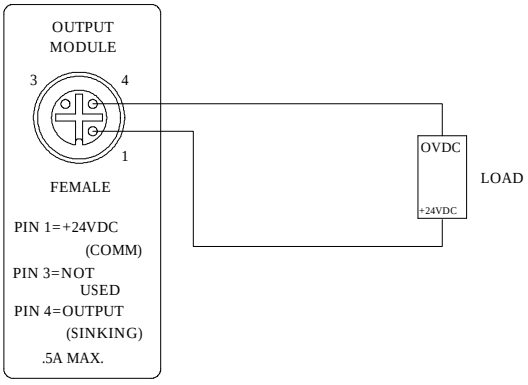
Electronic Sensor Type



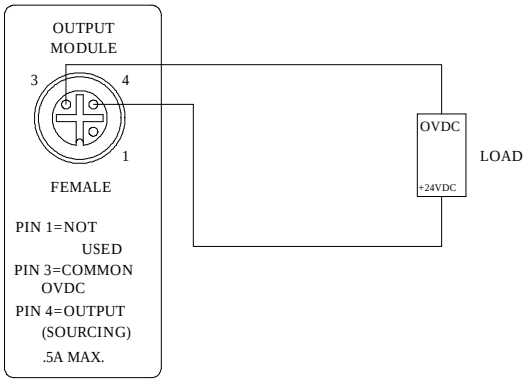
Mechanical Sensor Type



Sinking (NPN) Output Connection



Sourcing (PNP) Output Connection



Profibus DP Configuration and Mapping

GSD File

The GSD file contains configuration information required to establish communication to a node on a Profibus DP network. The GSD file is available on the Numatics, Inc., website at www.numatics.com or on the Profibus website at www.profibus.com.

I/O Setup

Outputs

Outputs are defined as any valve solenoid coil and/or any output point from a discrete Output module. The total number of Output bytes depend upon the physical configuration of the manifold as well as the manifold Output Configuration settings (see the following page for an explanation of Manifold Valve Output Configuration). Please reference the following pages for a detailed explanation for calculating the Output byte size.

Inputs

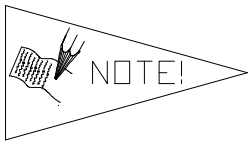
Inputs are defined as discrete points from discrete Input modules. The total number of Input Bytes depend upon the physical configuration of the manifold's discrete I/O section. Please reference the following pages for a detailed explanation for calculating the Input byte size.

Manifold Valve Output Configuration

The Manifold Valve Output Configuration is a user programmable option that allows the user to choose the number of valve solenoid coil drivers, which are allocated to the valve side of the manifold. This allows the user to optimize the number of I/O bytes to meet any application requirement.

The Manifold Valve Output Configuration can be set via software by choosing the appropriate selection from the GSD file when configuring the node.

GSD file selections	*Configured Number of Solenoid Coil Outputs*
Slot 1 (up to 32 coil outputs)	**32**
Slot 1 (up to 24 coil outputs)	**24**
Slot 1 (up to 16 coil outputs)	**16**
Slot 1 (up to 08 coil outputs)	**8**



- ***The Manifold Valve Configuration Setting affects only the solenoid coil outputs on the valve side of the manifold.***
- ***Although output configurations must be declared in software, only specific outputs may be mapped to the scanner to conserve memory space.***

I/O Sizes

Manifold

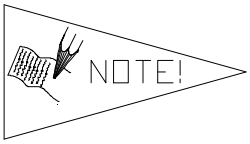
The overall size of the Input/Output data for the manifold consists of the valve side size plus Discrete I/O side size. In the G2-2 Series Profibus DP node, the Input/Output size can vary from 1 to 22 bytes.

Valve Side

The total number of Output bytes for the valve side of the manifold consists of an output bit for each valve solenoid coil driver. The value for the valve side byte count is determined by the (user configurable) Manifold Valve Output Configuration.

Discrete I/O Side

Byte totals for the Discrete I/O side is configured based on the I/O modules installed. The output sizing will consist of an output bit for each output point. The input size will consist of an input bit for each input point.



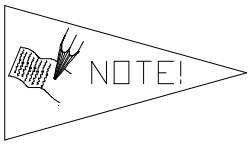
- ***The Manifold Valve Output Configuration affects only the solenoid coil outputs on the valve side of the manifold. Discrete side I/O sizes are self configuring as I/O modules are added or removed.***

Bit Mapping Rules

The bit mapping for a G2-2 manifold varies with the physical configuration of the manifold and the Manifold Valve Output Configuration setting. The following is a breakdown of the bit mapping rules associated with the 2005/2012 valve manifold.

Valve Side

1. **Solenoid coil outputs are distributed to the valve coils using the Z-Boards™.**
2. **The valve solenoid coil output portion for the total output bytes is dependent only on the Manifold Valve Output Configuration. Refer to page 34- 39 for examples.**
3. **Solenoid coil output addressing begins at the 1st sub base nearest the node and continues in ascending order away from the communication node.**
4. **Each sub base is allocated 1 or 2 output bits, depending on the Z-Board™ type installed. Single Z-Board™ allocates 1 output bit, double Z-Board™ allocate 2 output bits.**
5. **Z-Boards™ can be used in any arrangement (all singles, all doubles, or any combination) as long as output group #1 and output group #2 bits do not overlap (i.e. combinations of Z-Boards™ could exist where the physical configuration of the manifold could exceed the output quantity capacity, see page 9).**
6. **Valve Side Sub-D output module uses Output Byte 2 & 3 (second Output Word).**



Single solenoid valves can be used with double* Z-Boards™*. However, one of the 2 available outputs will remain unused.

Discrete I/O Side

Outputs

1) **The discrete output byte totals are self-configuring in byte increments, after an output module is plugged into back plane, and power is applied.**
2) **Discrete output bits are mapped, in ascending order (away from the communication node), starting after the highest valve side output bit, which is dependant upon the Manifold Valve Output Configuration (see page 31).**
3) **Output bits are always configured in byte increments, thus output bits configured as a group of four will always utilize a full byte (8 bits) when mapped. Although not used, the additional four bits in that byte are allocated and reserved.**

Inputs

1) **The discrete input byte size totals are self-configuring in byte increments, after an input module is plugged into back plane, and power is applied.**
2) **Discrete inputs are mapped in byte increments. A four (4) point Input module uses four bits and the remaining four bits are allocated and reserved.**

I/O Mapping

Example #1

Assumed Settings

- **Valve Output Configuration Setting = 32 Coils**
- **Single Z-Boards™ used with single solenoid valves**
- **Double Z-Boards™ used with double solenoid valves**

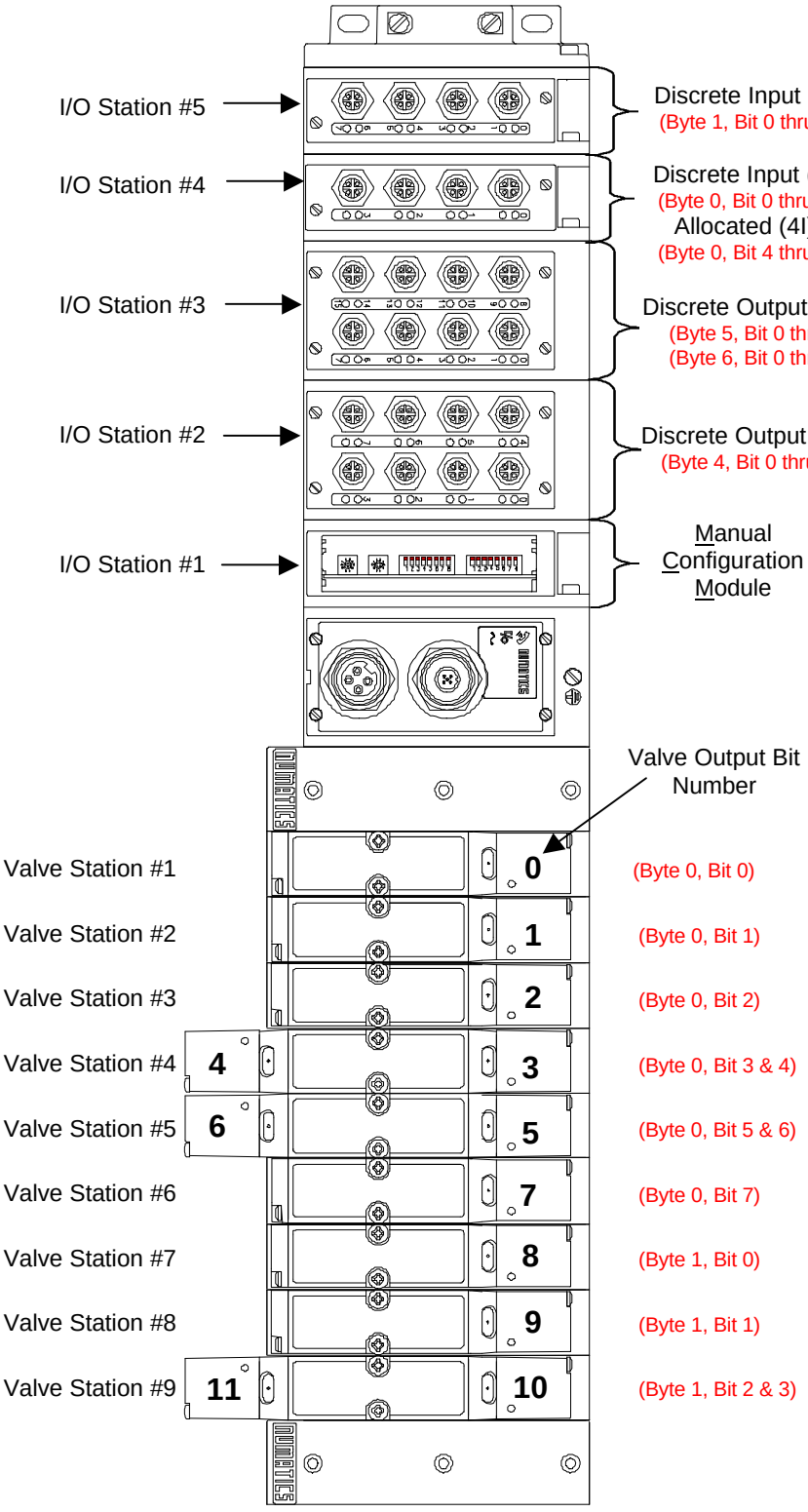
Discrete I/O Configuration

Pos #	Module Type	Part #	In	Out
1	MCM	239-1384	--	--
2	8O Sourcing (PNP)	239-1315	--	8
3	16O Sourcing (PNP)	239-1319	--	16
4	4I Sinking (NPN)	239-1304	4	--
5	8I Sinking (NPN)	239-1308	8	--

Manifold I/O Configuration

Outputs and Mapping Location	
Total Outputs = 56	
-Valve Outputs = 12	Byte 0, Bits 0-7 Byte 1, Bits 0-3
-Allocated Unused Valve Outputs = 20	Byte 1, Bits 4-7 Bytes 2 & 3, Bits 0-7
-Discrete Outputs = 24	Bytes 4, 5 and 6 Bits 0-7

Inputs and Mapping Location	
Total Inputs = 16	
-Discrete Inputs = 12	Byte 0, Bits 0-3 Byte 1, Bits 0-7
-Allocated and Reserved Inputs = 4	Byte 0, Bits 4-7



I/O Mapping Tables

Example #1 Table

Manifold Valve Output Configuration value set to 32 coils.

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil #8	Valve Coil #7	Valve Coil #6	Valve Coil #5	Valve Coil #4	Valve Coil #3	Valve Coil #2	Valve Coil #1
1	Valve Coil #16	Valve Coil #15	Valve Coil #14	Valve Coil #13	Valve Coil #12	Valve Coil #11	Valve Coil #10	Valve Coil #9
2	Valve Coil #24	Valve Coil #23	Valve Coil #22	Valve Coil #21	Valve Coil #20	Valve Coil #19	Valve Coil #18	Valve Coil #17
3	Valve Coil #32	Valve Coil #31	Valve Coil #30	Valve Coil #29	Valve Coil #28	Valve Coil #27	Valve Coil #26	Valve Coil #25
4	Discrete Output #8	Discrete Output #7	Discrete Output #6	Discrete Output #5	Discrete Output #4	Discrete Output #3	Discrete Output #2	Discrete Output #1
5	Discrete Output #16	Discrete Output #15	Discrete Output #14	Discrete Output #13	Discrete Output #12	Discrete Output #11	Discrete Output #10	Discrete Output #9
6	Discrete Output #24	Discrete Output #23	Discrete Output #22	Discrete Output #21	Discrete Output #20	Discrete Output #19	Discrete Output #18	Discrete Output #17

Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Discrete Input #4	Discrete Input #3	Discrete Input #2	Discrete Input #1
1	Discrete Input #12	Discrete Input #11	Discrete Input #10	Discrete Input #9	Discrete Input #8	Discrete Input #7	Discrete Input #6	Discrete Input #5
2								
3								
4								
5								
6								

I/O Mapping

Example #2

Assumed Settings

- **Valve Output Configuration Setting = 24 Coils**
- **Double Z-Boards™ used all valve stations**

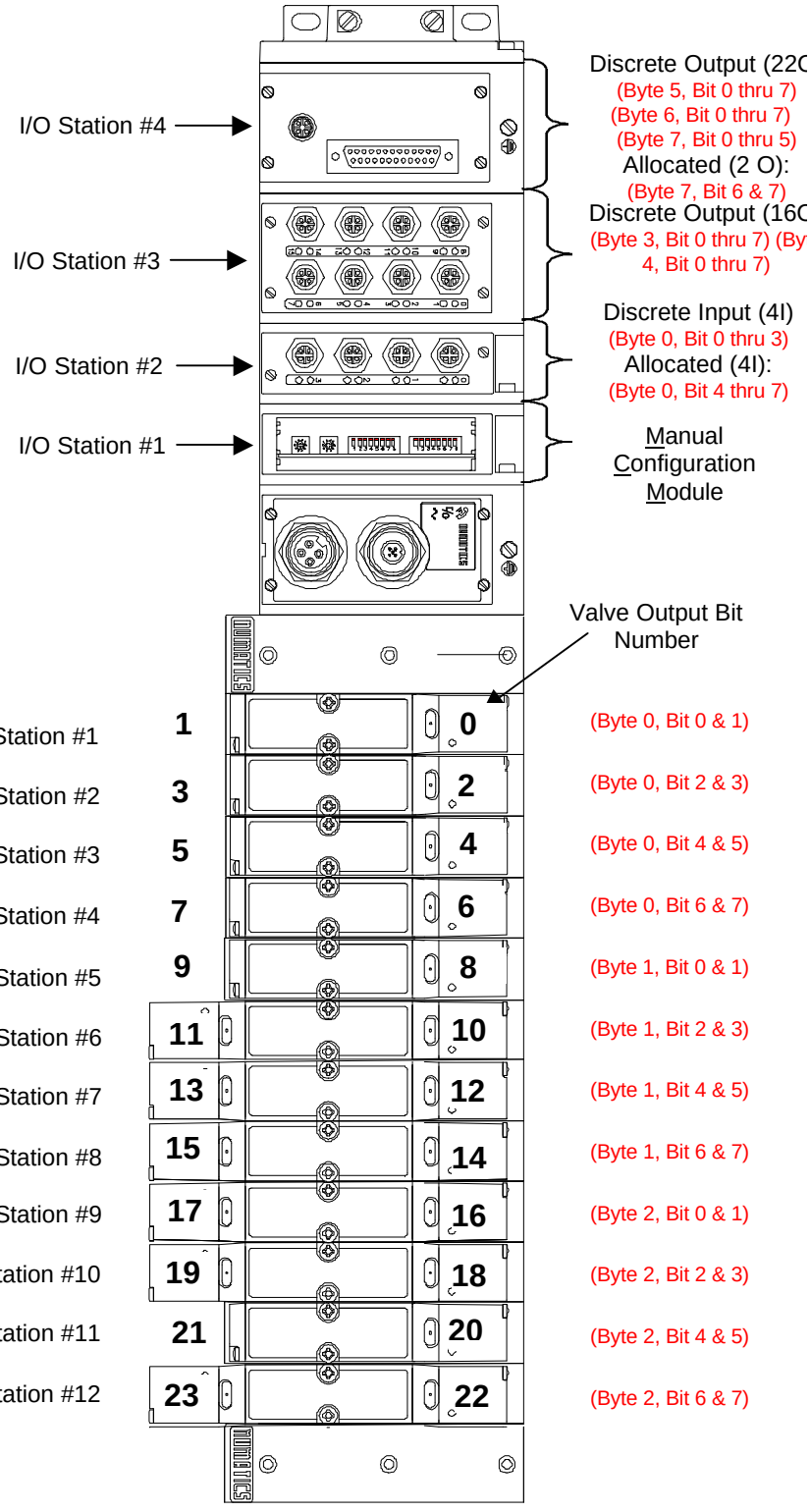
Discrete I/O Configuration

Pos #	Module Type	Part #	In	Out
1	MCM	239-1384	--	--
2	4I Sourcing (PNP)	239-1304	4	--
3	16O Sourcing (PNP)	239-1319	--	16
4	22O Sourcing (PNP)	239-1460	--	22

Manifold I/O Configuration

Outputs and Mapping Location	
Total Outputs = 64	
-Valve Outputs = 24	Bytes 0, 1 and 2 Bits 0-7
-Discrete Outputs = 38	Bytes 3,4,5 and 6 Bits 0-7 Byte 7, Bits 0-5
-Allocated Unused Discrete Outputs = 2	Byte 7, Bits 6 & 7

Inputs and Mapping Location	
Total Inputs = 8	
-Discrete Inputs = 4	Byte 0, Bits 0-3
-Allocated and Reserved Inputs = 4	Byte 0, Bits 4-7



I/O Mapping Tables

Example #2 Table

Manifold Valve Output Configuration value set to 24 coils.

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil #8	Valve Coil #7	Valve Coil #6	Valve Coil #5	Valve Coil #4	Valve Coil #3	Valve Coil #2	Valve Coil #1
1	Valve Coil #16	Valve Coil #15	Valve Coil #14	Valve Coil #13	Valve Coil #12	Valve Coil #11	Valve Coil #10	Valve Coil #9
2	Valve Coil #24	Valve Coil #23	Valve Coil #22	Valve Coil #21	Valve Coil #20	Valve Coil #19	Valve Coil #18	Valve Coil #17
3	Discrete Output #8	Discrete Output #7	Discrete Output #6	Discrete Output #5	Discrete Output #4	Discrete Output #3	Discrete Output #2	Discrete Output #1
4	Discrete Output #16	Discrete Output #15	Discrete Output #14	Discrete Output #13	Discrete Output #12	Discrete Output #11	Discrete Output #10	Discrete Output #9
5	Discrete Output #24	Discrete Output #23	Discrete Output #22	Discrete Output #21	Discrete Output #20	Discrete Output #19	Discrete Output #18	Discrete Output #17
6	Discrete Output #32	Discrete Output #31	Discrete Output #30	Discrete Output #29	Discrete Output #28	Discrete Output #27	Discrete Output #26	Discrete Output #25
7	Allocated & Reserved	Allocated & Reserved	Discrete Output #38	Discrete Output #37	Discrete Output #36	Discrete Output #35	Discrete Output #34	Discrete Output #33

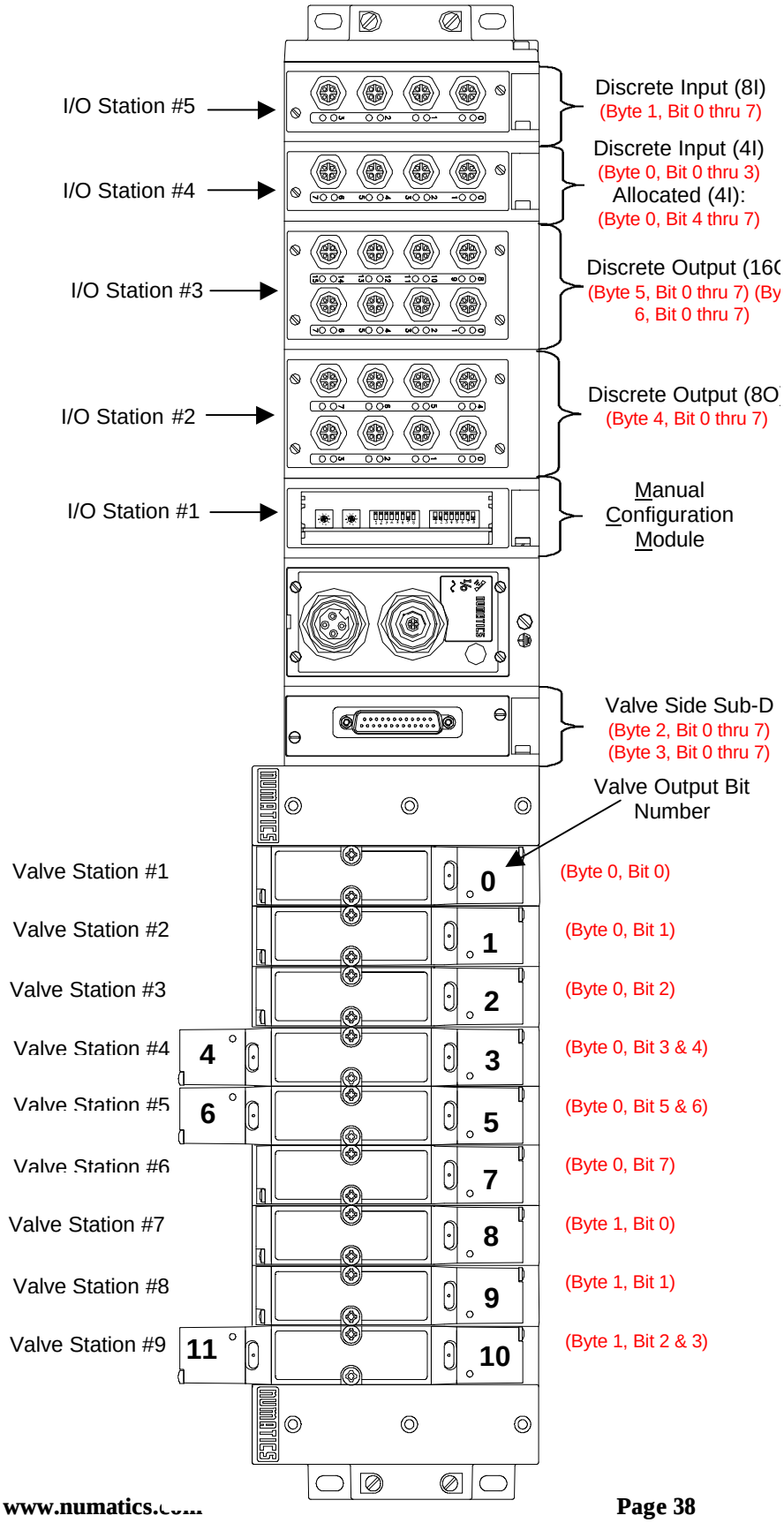
Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Discrete Input #4	Discrete Input #3	Discrete Input #2	Discrete Input #1
1								
2								
3								
4								
5								
6								
7								

I/O Mapping

Example #3

Assumed Settings

- **Valve Output Configuration Setting = 32 Coils**
- **Single Z-Boards™ used with single solenoid valves**
- **Double Z-Boards™ used with double solenoid valves**



Discrete I/O Configuration

Pos #	Module Type	Part #	In	Out
1	MCM	239-1384	--	--
2	8O Sourcing (PNP)	239-1315	--	8
3	16O Sourcing (PNP)	239-1319	--	16
4	4I Sinking (NPN)	239-1304	4	--
5	8I Sinking (NPN)	239-1308	8	--

Manifold I/O Configuration

Outputs and Mapping Location	
Total Outputs = 56	
-Valve Outputs = 12	Byte 0, Bits 0-7 Byte 1, Bits 0-3
-Allocated Unused Valve Outputs = 20	Byte 1, Bits 4-7 Bytes 2 & 3, Bits 0-7
-Discrete Outputs = 24	Bytes 4, 5 and 6 Bits 0-7

Inputs and Mapping Location	
Total Inputs = 16	
-Discrete Inputs = 12	Byte 0, Bits 0-3 Byte 1, Bits 0-7
-Allocated and Reserved Inputs = 4	Byte 0, Bits 4-7

I/O Mapping Tables

Example #3 Table

Manifold Valve Output Configuration value set to 32 coils

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil #8	Valve Coil #7	Valve Coil #6	Valve Coil #5	Valve Coil #4	Valve Coil #3	Valve Coil #2	Valve Coil #1
1	Valve Coil #16	Valve Coil #15	Valve Coil #14	Valve Coil #13	Valve Coil #12	Valve Coil #11	Valve Coil #10	Valve Coil #9
2	Valve Side Sub-D Coil #8	Valve Side Sub-D Coil #7	Valve Side Sub-D Coil #6	Valve Side Sub-D Coil #5	Valve Side Sub-D Coil #4	Valve Side Sub-D Coil #3	Valve Side Sub-D Coil #2	Valve Side Sub-D Coil #1
3	Valve Side Sub-D Coil #16	Valve Side Sub-D Coil #15	Valve Side Sub-D Coil #14	Valve Side Sub-D Coil #13	Valve Side Sub-D Coil #12	Valve Side Sub-D Coil #11	Valve Side Sub-D Coil #10	Valve Side Sub-D Coil #9
4	Discrete Output #8	Discrete Output #7	Discrete Output #6	Discrete Output #5	Discrete Output #4	Discrete Output #3	Discrete Output #2	Discrete Output #1
5	Discrete Output #16	Discrete Output #15	Discrete Output #14	Discrete Output #13	Discrete Output #12	Discrete Output #11	Discrete Output #10	Discrete Output #9
6	Discrete Output #24	Discrete Output #23	Discrete Output #22	Discrete Output #21	Discrete Output #20	Discrete Output #19	Discrete Output #18	Discrete Output #17

Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Allocated & Reserved	Discrete Input #4	Discrete Input #3	Discrete Input #2	Discrete Input #1
1	Discrete Input #12	Discrete Input #11	Discrete Input #10	Discrete Input #9	Discrete Input #8	Discrete Input #7	Discrete Input #6	Discrete Input #5
2								
3								
4								

User Configurable Parameters

Output Status During Fail Safe Mode

Parameters are used to describe characteristics or behaviors of specific output points (bits). The parameters shown below are used to determine what happens to a particular output, depending on what occurs in the communication system. The action that provides for output determination Fail Safe Mode. The Fail Safe Mode parameters allow individual control of each output point on the manifold.

The user, through configuration software, can determine how a specific output behaves when a Diagnostic error occurs. These settings are non-volatile and thus will not change upon loss of power.

The 3 behavior options are:

1. **Hold Last State**
2. **De-Energize**
3. **Energize**



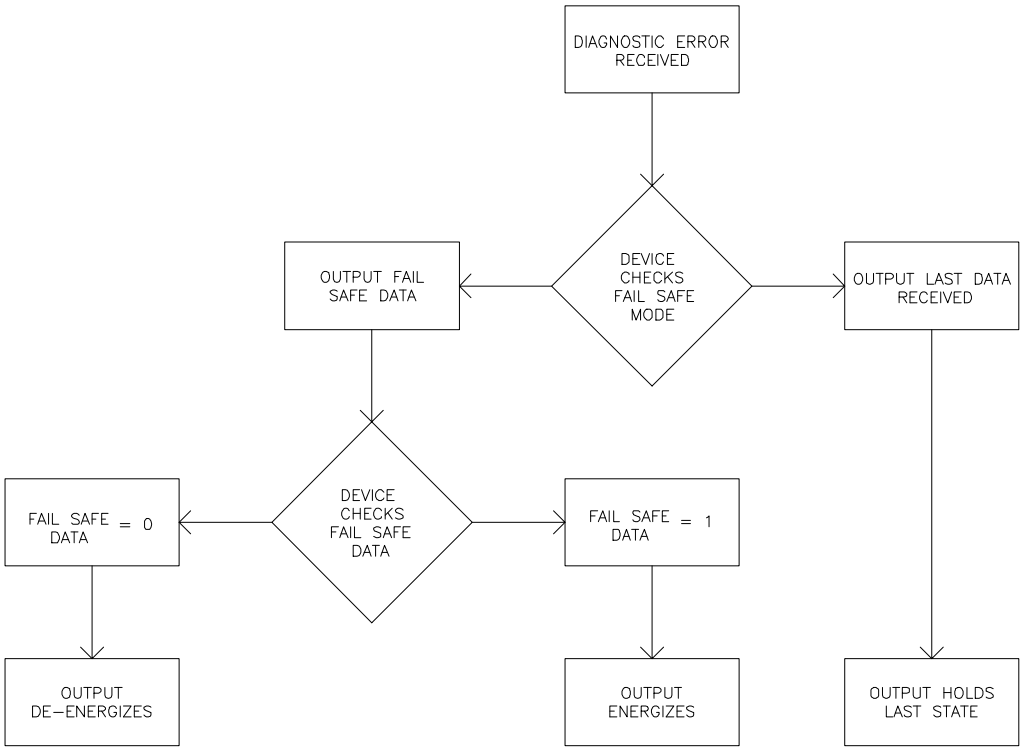
If the Communication Module's Configuration Parameters are changed from factory default settings, the user must recommission a replacement node to ensure fail safe mode compatibility.

Fail Safe Sequence

Fail Safe attributes determine what the outputs do if the device encounters a diagnostic error.
A Diagnostic Error occurs when a slave's watchdog expires, for example, this could occur when the master no longer communicates with the slave.

The process for determining the output status during an Idle Action is as follows:

1. **The device receives an Diagnostic Error.**
2. **The device determines what action to take based on the Fail Safe Mode attribute setting.**
3. **If the Fail Safe Data attribute is Output Last Data Received, the output holds its last state.**
4. **If the Fail Safe Data attribute is Output Fail Safe Data, the Fail Safe Data is checked.**
    a. **If the Fail Safe Data is 0, the output de-energizes (This is the factory default)**
    b. **If the Fail Safe Data is 1, the output energizes**



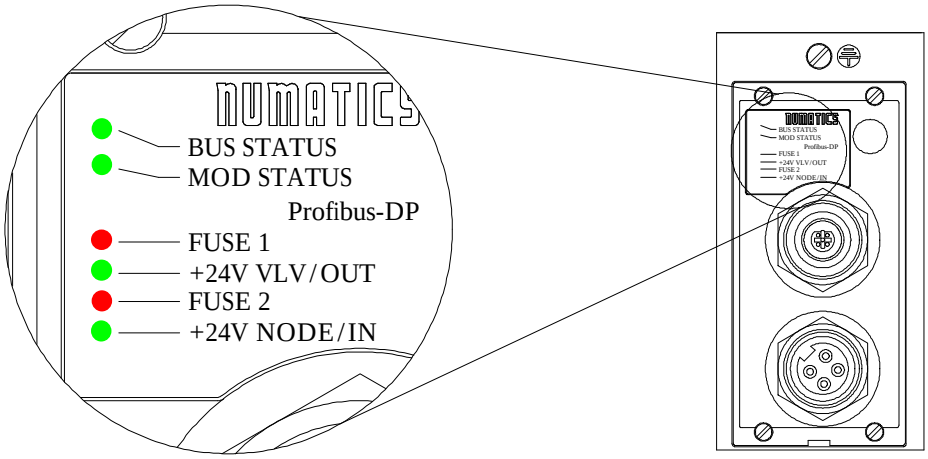
ATTENTION

If the Communication Module's Configuration Parameters are changed from factory default settings, the user must recommission a replacement node to ensure fail safe mode compatibility.

Diagnostics – Comm. Module

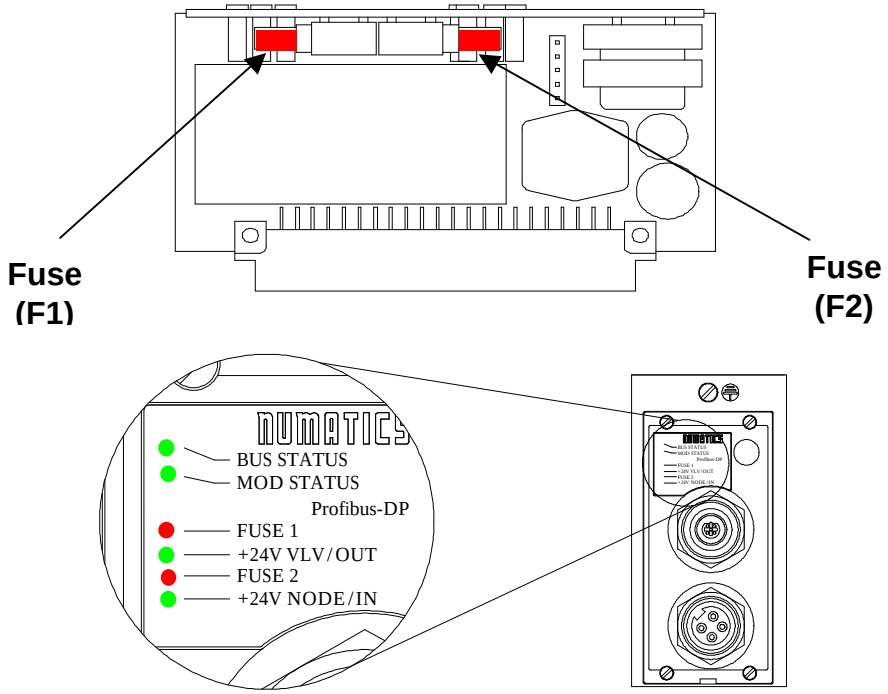
LED Functions

Upon power up, the LEDs indicate the status of the unit. There are six LEDs on the G2-2 Series Profibus-DP node; one for Bus Status, one for Module Status, two for internal Fuse Integrity and two new LEDs for Aux. Power status.



LED Name	Color	Status	Description
Bus Status	Green/ Red	FLASHING	The module configuration (I/O and valves) in the user application is different than the physical configuration of the manifold.
	Green	ON	Normal operation. The bus link is OK. Baud rate detected, parameterization and configuration OK; Unit is in data exchange mode.
	Red	ON	Bus Error. Bus connection failed or off-line; Invalid parameterization or configuration.
Mod Status	Green	ON	Normal operation. Node hardware OK.
	Red	ON	Critical hardware fault. The microprocessor is not running.
Fuse 1	Red	ON	Internal fuse *F1* is open; No power is internally provided to valves or outputs. Communication NOT affected.
		OFF	Internal fuse *F1* is OK (valid only when power is applied to *+24V VLV / OUT* pin on Aux. Power connector.
+24V VLV / OUT	Green	ON	DC Power applied to *+24V VLV / OUT* pin on Aux. Power Connector.
		OFF	No DC Power present at *+24V VLV / OUT* pin on Aux. Power connector.
Fuse 2	Red	ON	Internal fuse *F2* is open; No power is internally provided to node electronics or inputs. Communication Node will not function.
		OFF	Internal fuse *F2* is OK (valid only when power is applied to *+24V NODE / IN* pin on Aux. Power connector.
+24V NODE / IN	Green	ON	DC Power applied to*+24V NODE / IN* pin on Aux. Power connector.
		OFF	No DC Power present at *+24V NODE / IN* pin on Aux. Power connector.

Internal Fuses



Fuse Function and Description			
Fuse #	*Description*	*Size*	*Type*
F1	Fuse for Aux. Power connector Pin #1 (Valves & Outputs).	10 A max. fast acting	Mini ATO
F2	Fuse for Aux. Power connector Pin #4 (Node & Inputs).	4-10 A max. fast acting	Mini ATO

Fuse Status LED - Indicates the internal fuse integrity		
Status	*Indication*	*Description*
Off	Internal Fuse is Intact	Condition normal.
Red	Internal Fuse is Blown	Electrical Overload / Over Current Condition

Appendix

System Specifications

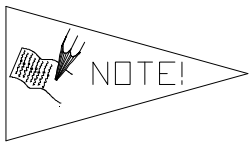
Electrical	
Supply Voltage	**Valves: 24 VDC + 10%, -15%** **Node and Discrete I/O: 24 VDC +/- 10%**
Current	**Total current on the Aux. Power Connector (Pin 1 - "Valves & Outputs" and Pin 4 - "Node & Inputs") must not exceed 8 amperes.**
Internal Fuses	**Pins #1 and #4 on the Auxiliary Power Connector are each internally fused with a 4 and 10 ampere (maximum) MINI ATO type fuses.**
Recommended External Fuse	**External fuses should be chosen depending upon manifold configuration. Please refer to power consumption chart on page 27 for additional fuse sizing information.**
Spike Suppression	**Output spike suppression is internally provided for both discrete and valve outputs.**
Discrete Outputs (Sinking (NPN) or Sourcing (PNP))	**Maximum 0.5 amperes per output (Sinking (NPN) or Sourcing (PNP)). All outputs are short circuit protected and have internal spike supression. Contact factory for higher current requirements.**
Valve Solenoid Coil Output Drivers	**Maximum 0.5 amperes per output. All output points are short circuit protected and have internal spike supression.**
Operating Temperature for Electronic Components	**23 to 114°F (-5 to 46°C)**

Factory Defaults Settings

Description	*Default*
Node Address	**126**
Baud Rate	**Autobaud**
Input Module Power Jumper	**UP (Input sensor power supplied by auxiliary power connector pin #4)**
Output Module Power Jumper	**SP (Output module power supplied by auxiliary power connector pin #1)**
Diagnostic Messaging	**0**
Fail Safe Mode	**0**
Fail Safe Data	**0**

Troubleshooting

Symptom	*Possible Cause*	*Solution*
Won't go on-line. Bus Status LED is Red & Device Status LED is Green	**Parameterization Problem**	**Check configuration and Parameterization settings on Profibus configuration software**
All LEDs off	**Power not properly applied**	**Power must be present between pin #2 and pin #3 on the communication connector and between pin #4 and pin #3 on the auxiliary power connector for the node to function properly.** **24VDC must be present between pin #4 and pin #3 of the auxiliary power connector even if Discrete I/O modules are not installed** **See page 13 for Details**
Fuse 2 LED displays red	**Blown F2 internal fuse**	**Check for external shorts to Input connector from external sensor devices or cable and repair. Replace internal fuse. If problem persists contact factory.**
The wrong valve solenoid coils are being energized.	**Z-Board™ type mismatch. Single Z-Board™ present where double Z-Board™ expected or vice versa.**	**Check that correct Z-Board™ types are installed. Check that ribbon cable (output group #2) is connected to appropriate valve station.** **See page 33 for bit mapping rules**
Valve outputs do not energize. All node LEDs normal.	**Output power not present or connected in properly on Aux. Power connector.**	**Check for 24VDC on pin #1 of Aux. Power connector of Comm. module.** **Check for 24VDC on Pin #1 of 12mm local Aux Power connector of 25 Pin Sub-D Discrete Output Module, if applicable**



Refer to page 42 for comm. module LED functions

Glossary of Terms

The following is a list and description of common terms and symbols used throughout this document:

Auto-Baud	**A technology that enables the communication node to automatically set its own baud rate to match the DeviceNet scanners' baud rate**
Bit	**Smallest unit of digital information either a "0" or "1"**
Bit mapping	**Chart showing which bit is connected to which physical input or output point**
Byte	**8 bits (1/2 word)**
Bus Fault	**Communication from Master to Slave has stopped**
Discrete I / O	**The Inputs / Outputs that are available via the "Discrete I/O" side of manifold**
GSD file	**A text file, which contains specific product information, definitions of product capabilities and configurable parameters necessary for operation on a Profib us-DP network.**
G2-2	**A Numatics product series of electronics which features modular backplane technology that allows various Discrete I/O components and Communication modules to be added, removed or changed in the field**
Ground	**This term is used to indicate an earth ground**
I/O	**Any combination of Inputs and Outputs**
MCM	**Manual Configuration Module. A module that allows MAC ID, baud rates and other configurable parameters to be set manually via DIP switches and rotary switches. Not required if software configuration is used.**
NEMA	**National Electrical Manufacturers Association**
Sinking (NPN)	**Method of connecting electrical circuits in which the zero (0) volt DC side is switched and the common is positive**
Sourcing (PNP)	**Method of connecting electrical circuits in which the positive side is switched and the common is zero (0) volts DC.**
Status Input bit	**A bit in the input table that reports the health of a corresponding output. Indicates short circuit or open coil (load) diagnostics**
Valve Output Configuration	**A Numatics' term describing a user definable parameter that allows user to allocate the number of valve coil output drivers. A 0, 8, 16, 24, 32 option is available and is helpful if there are I/O memory constraints in the PLC.**
Word	**2 Bytes (16 bits)**
Z-Board™	**Circuit board installed in the valve sub-base which electrically connects the valve solenoid to the electrical /electronics interface. Available in single or double solenoid versions.**

Technical Support

For technical support, contact your local Numatics distributor. Additional assistance is available from Numatics Inc. at (248) 887-4111 and ask for Technical Support.

Issues relating to network set-up, PLC programming, sequencing, software related functions, etc… should be handled with the appropriate product vendor.

Information on EDS files, local distributors, and other Numatics, Inc. products and support issues can be found on the Numatics, Inc. WEB site at: http://www.numatics.com

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