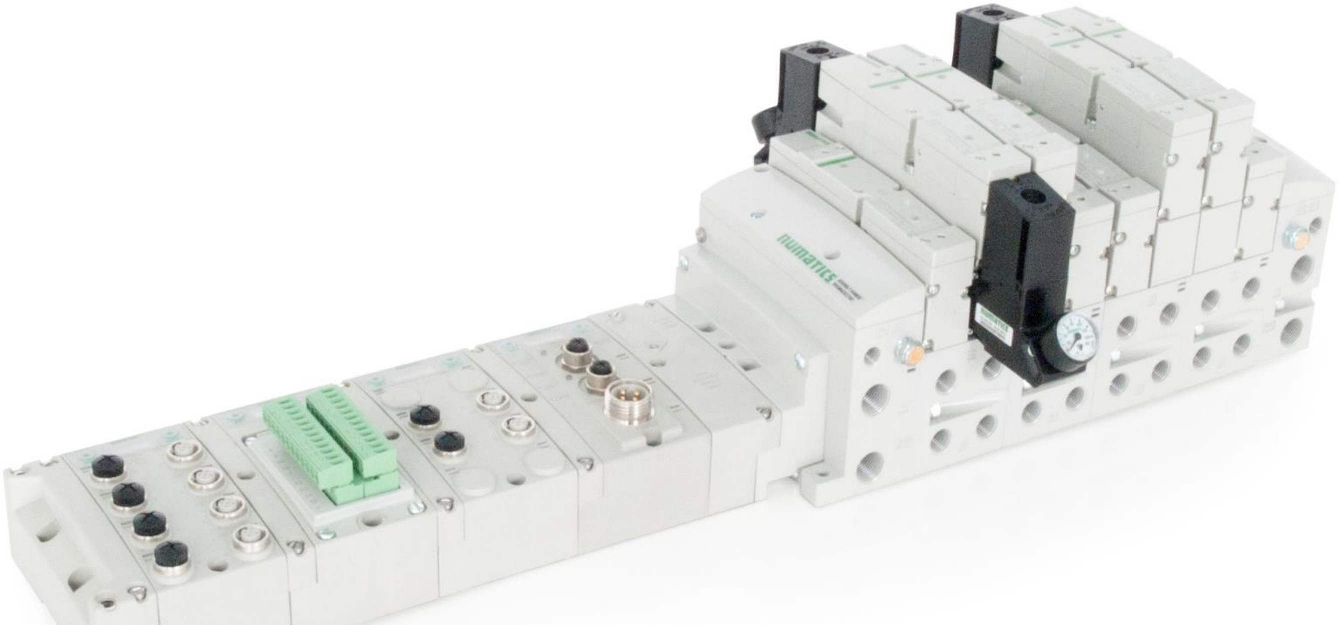
NUMATICS®

G3 Series
DeviceNet™
Technical Manual

DeviceNet™

DeviceNet®
CONFORMANCE TESTED



Conditions for use of this product

(1) Numatics G3 Manifold ("the PRODUCT") shall be used in conditions;
i) Where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident.

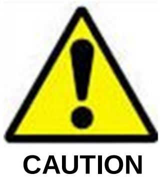
ii) Where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

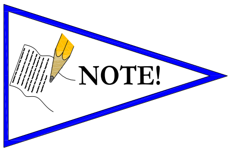
Numatics Incorporated shall have no responsibility or liability including but not limited to any and all responsibility or liability based on contract, warranty, tort, product liability for any injury or death to persons, loss or damage to property caused by the product that are operated or used in application not intended or excluded by instructions, precautions or warnings contained in Numatics Inc. Technical, User, Instruction, Safety manuals or bulletins.

Safety precautions

Before using this product, please read this manual and the relevant manuals carefully and pay attention to safety and product application. The following symbols are used in the manual to identify important safety, installation and application information.



Caution symbol indicates a possible hazard which may cause injury or equipment damage.



Note symbol indicates important information regarding equipment installation and setup

Electrical installation and operational guidelines

- *To be connected to Class 2 power source only*
- *All Numatics Inc. communication nodes should be grounded during the installation process. These grounding guidelines can be found in National Electrical code IEC 60204-1 or EN 60204-1.*
- *All Numatics G3 Electronics Products to be installed or wired in accordance with Numatics's published instructions and applicable electrical codes.*
- *MULTIPLE CLASS 2 POWER SOURCES: When interconnects, class 2 sources shall be Listed and rated suitable for parallel interconnection*
- *Sources shall be Listed and rated suitable for parallel interconnection*
- *CLASS 2 WIRING: All field wiring shall be suitable for Class 1, Electric Light and Power, or Class 2, 3 wirings are routed separately and secured to maintain separation between 1) Class 2 wiring and all other class wiring, and 2) Limited energy circuit conductors from unlimited energy circuit conductors*
- *Class 2 Device Wiring Only – Do Not Reclassify and Install as Class 1, 3 or Power and Lighting Wiring*
- *When using molded connector power cables, Do Not rely on wire colors for Pin-Out. Always use pin number references.*
- *Wire connections shall be rated suitable for the wire size (lead and building wiring) employed*
- *MULTIPLE CLASS 2 POWER SOURCES: When interconnects, class 2 sources shall be Listed and rated suitable for parallel interconnection*
- *Sources shall be Listed and rated suitable for parallel interconnection*

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1. About DeviceNet

1.1 Overview

DeviceNet is a serial communication protocol used to network industrial devices to eliminate labor intensive and expensive point to point wiring schemes. It is based on the CAN (Controller Area Network) protocol. Allen Bradley originally developed DeviceNet, but it is now supported by a multitude of manufacturers.

The ODVA (Open DeviceNet Vendor Association) is an independent organization that governs the DeviceNet specification and oversees conformance testing for products, which will be used in a DeviceNet system.

DeviceNet uses a powered 4-wire (plus shield) network and can have up to 64 nodes. The protocol can transfer a maximum of 8 bytes of data per node cycle with three selectable communication (baud) rates of 125 Kbps, 250 Kbps, or 500 Kbps. Maximum distance is dependent upon baud rate and cable media type. Refer to the section below for details.

More information about DeviceNet and ODVA can be obtained from the ODVA web site www.odva.org

1.2 G3 DeviceNet Features

Features	*Description*
DeviceNet Spec. Supported	Designed to DeviceNet Specification Revision 2.0
Bus Topology	Straight with restricted drops; trunkline-dropline configuration
Baud Rates Supported	125 Kbps, 250 Kbps and 500 Kbps and Autobaud
Duplicate address detection	If duplicate address detected on power up, duplicates will not progress to run mode
Error Correction	Yes, if error detected, sender is requested to repeat the message
Address Setting	Via graphic display, software, or optional Manual Configuration Module (MCM)
Termination Resistor (external)	A 121 ohms, 1%, ¼ Watt resistor is required at each end of the trunk line
ADR support	Auto-Device Replacement is supported when the MCM is not present
Connection Types Supported	Polled, Cyclic, Change of State (COS) or Combinations
Conformance Tested	Tested by ODVA for conformance

1.3 Cabling and Drop Line Lengths (as defined by DeviceNet specification)

Maximum Main Trunk Cable Length

Baud Rate	*Thick Trunk Cable*	*Thin Trunk Cable*	*Flat Trunk Cable*
125 Kbps	1640 ft (500 m)	328 ft (100 m)	1246 ft (380 m)
250 Kbps	820 ft (250 m)	328 ft (100 m)	656 ft (200 m)
500 Kbps	328 ft (100 m)	328 ft (100 m)	246 ft (75 m)

Maximum Drop Line Cable Length

Baud Rate	*Maximum Drop Length*	*Cumulative Drop Length*
125 Kbps	20 ft (6 m)	512 ft (156 m)
250 Kbps	20 ft (6 m)	256 ft (78 m)
500 Kbps	20 ft (6 m)	128 ft (39 m)

2. G3 Introduction

The G3 Series is an electronic product platform that features an integrated graphic display for simple commissioning and displaying of diagnostic information. In addition it has an innovative distribution capability which allows the same I/O components that make up a centralized manifold configuration to be used as the distribution components as well, decreasing the need for duplicate components on centralized and distributed applications. The G3 platform interfaces to a variety of valve series and fieldbus interface protocols and is capable of addressing a total of 1200 I/O points (150 bytes). With proper assembly and termination the G3 modules will have an IP65 / IP67 rating.

The manifold can be viewed as having two sections to it, the *Valve Side* and the *Discrete I/O Side*. The *Valve Side* supports a maximum of 32 solenoid coils and the *Discrete I/O Side* supports a maximum of 16 modules capable of addressing up to 1200 outputs, 1200 inputs or various combinations.

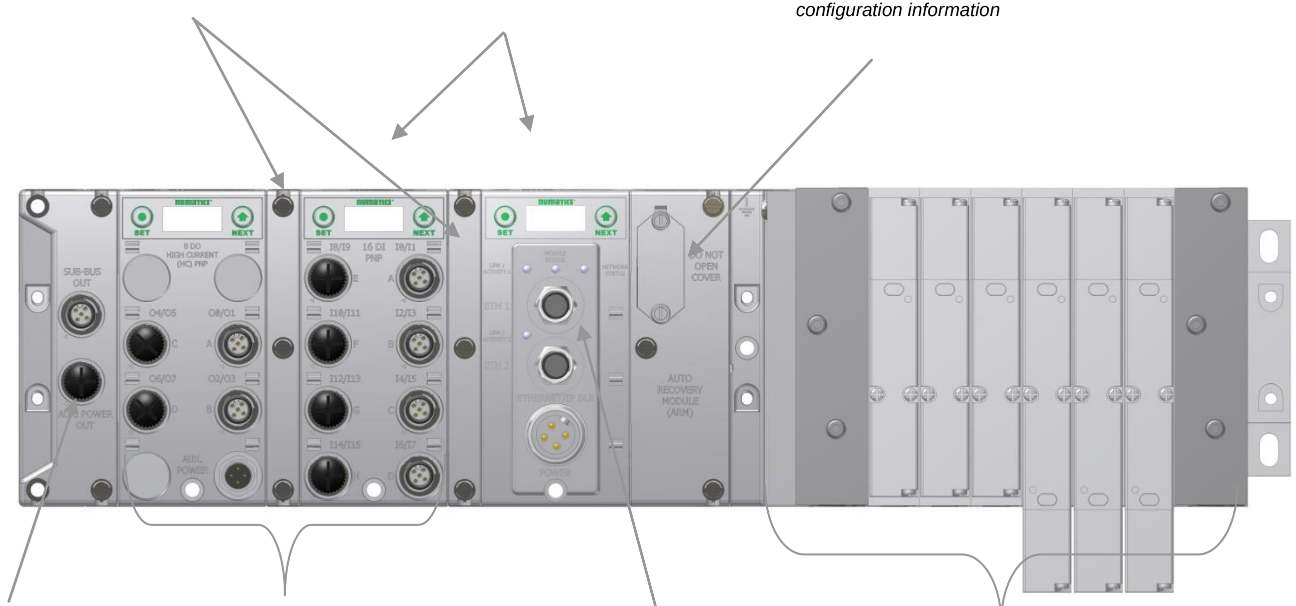
Various discrete modules with integrated graphic display are available. They include digital I/O, analog I/O, and specialty modules which cover various application needs. Pin-outs for all connectors are labeled on the side of the respective modules and are also detailed in the module section of this document.

This manual details specific information for configuring and commissioning the Numatics G3 Series product line. For more information relating to pneumatic valves and valve manifold assemblies, please refer to the Numatics "*In Control*" catalog at www.numatics.com.

Clips
Allows easy field changes of electronic modules.

Graphic Display
Allows Easy Configuration & Diagnostic reporting

ARM
(Auto Recovery Module)
Automatically stores & reprograms configuration information



Sub-Bus OUT
Used to distribute additional I/O and manifolds

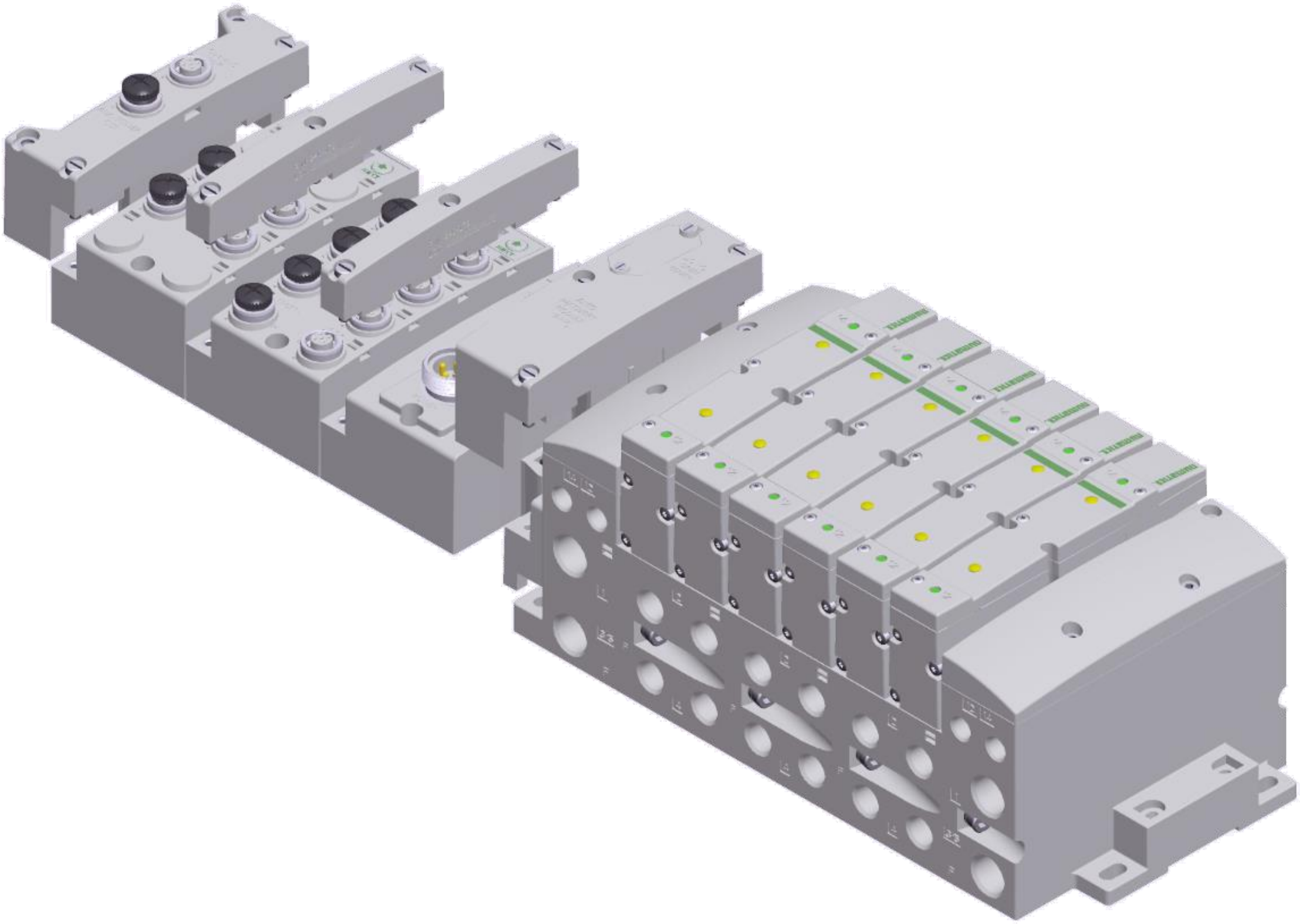
Discrete I/O Side
Accepts up to 16 modules in centralized or distributed configuration

Communication Module (Node)
Available with various Industrial protocols

Valve Side
Drives up to 32 coils

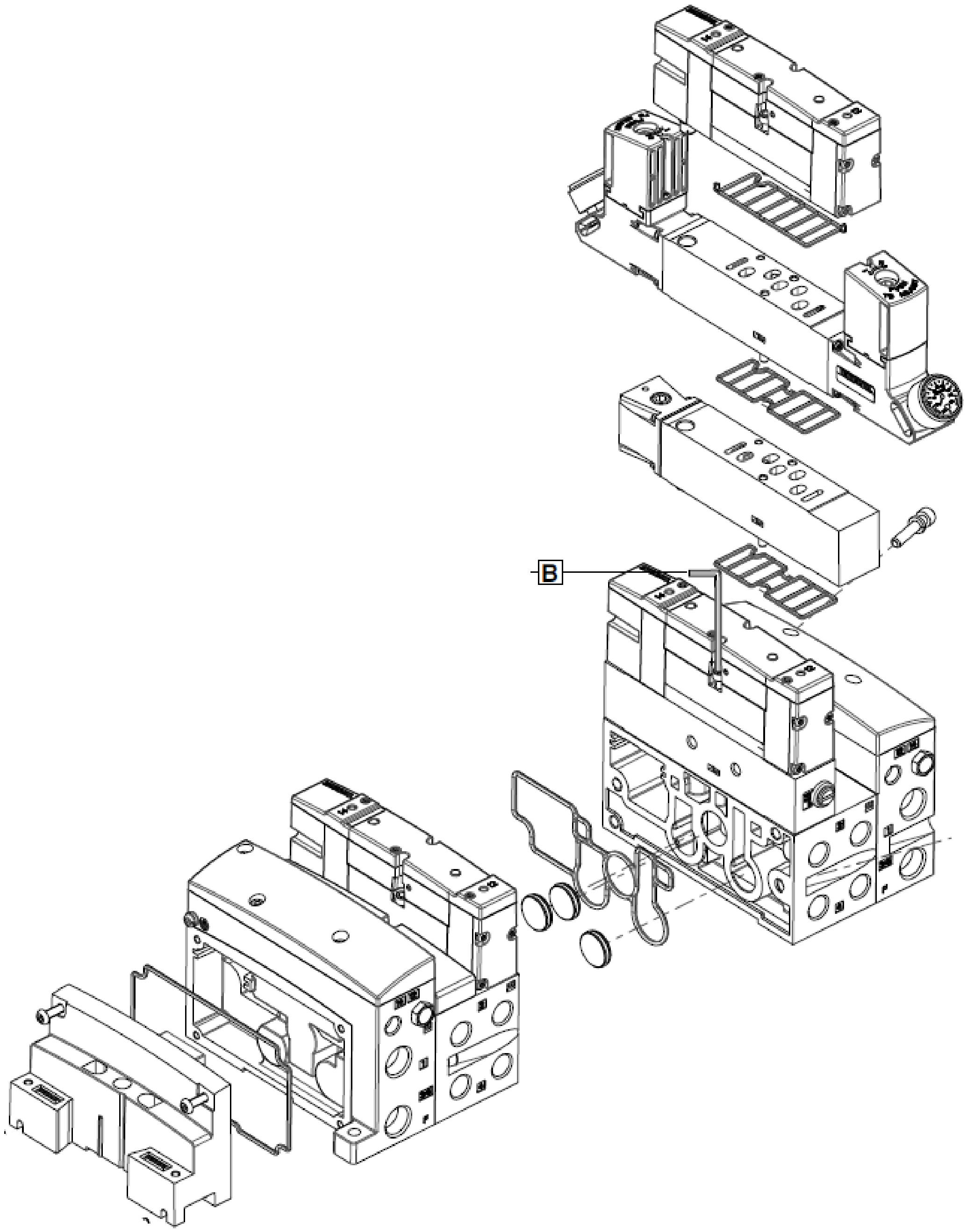
2.1 G3 Electronics Modularity

The G3 Series product line is a completely modular and scalable system. As shown below, all of the G3 electronic modules plug together, via mechanical clips, allowing for easy assembly and field changes.



2.2 500 Series Pneumatic Valve Manifold

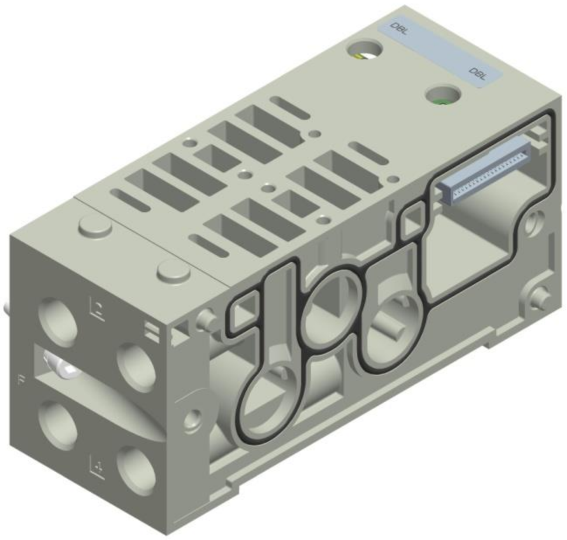
The pneumatic valve manifold with internal circuit board technology is also modular. The valve solenoid coil connections are automatically made using Z-Board™ technology (plug together PC boards), which allow internal connection from solenoid coils to output drivers without the use of wires). This allows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

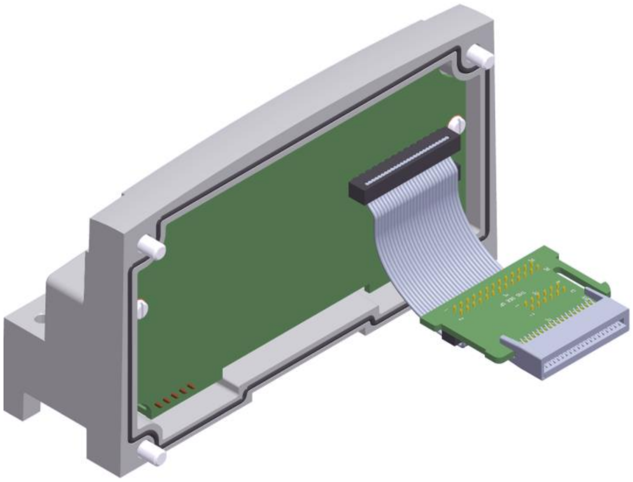


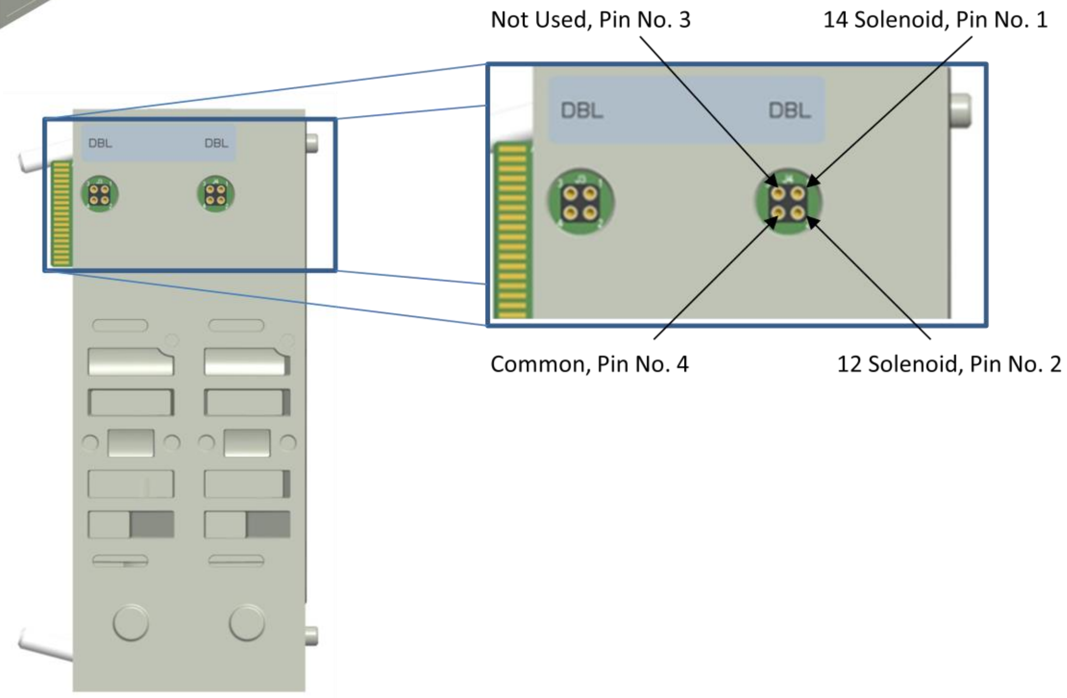
2.3 500 Series Manifold Stations

Solenoid Coil Connections using Z-Board™ Technology for 50x valve series

Z-Board™ plug together technology connects all valve solenoids to the valve coil output driver board, located in the valve adapter. There is a maximum of 32 coil outputs available on the complete manifold assemblies. The 32 available outputs are accessed on the 501 series valves utilizing 4 station manifolds and on the 502 and 503 series utilizing 2 station manifolds.






Not Used, Pin No. 3
14 Solenoid, Pin No. 1
DBL
DBL
DBL
DBL
Common, Pin No. 4
12 Solenoid, Pin No. 2

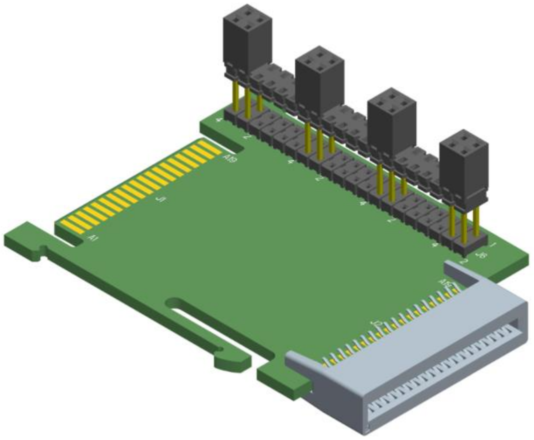
NOTE!

A single solenoid valve's coil designated as the "14"

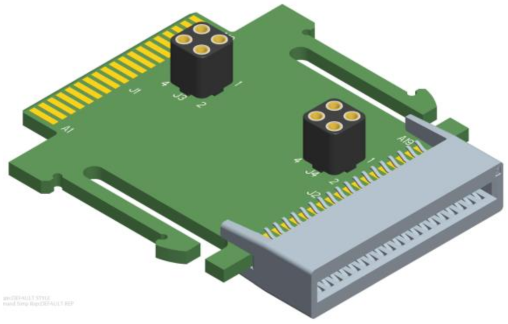
2.4 500 Series Z-Board™ Connectors

The 501, 502 and 503 valve series utilize 2 different Z-Board™ designs to achieve the single and double solenoid output functions. This yields the possible 32 single, 16 double, or various combinations of valve coil output capabilities.

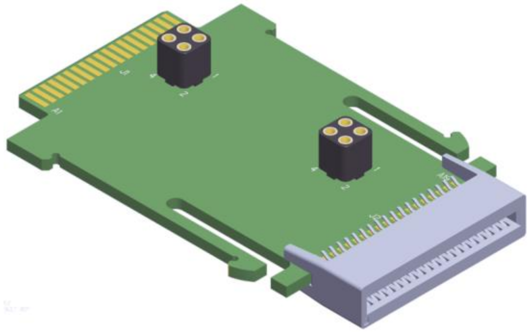
501 Series



502 Series

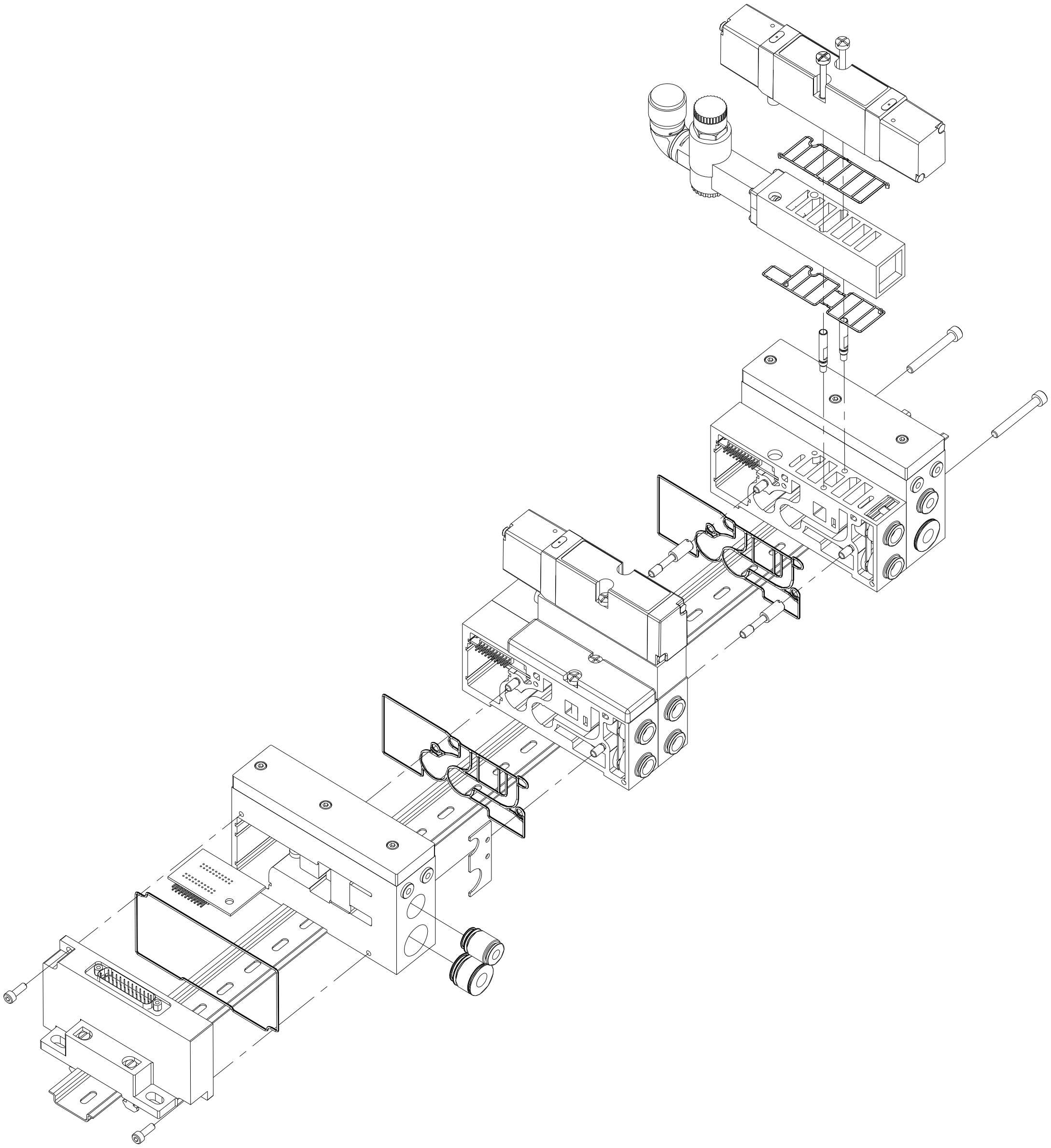


503 Series



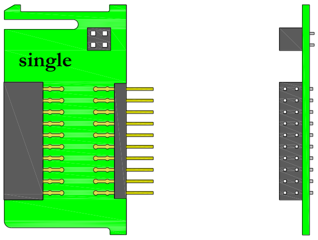
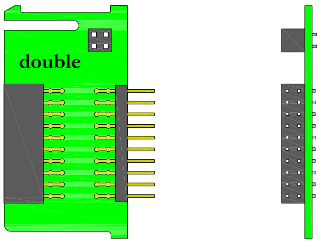
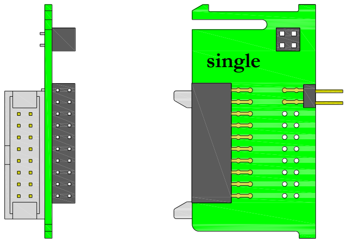
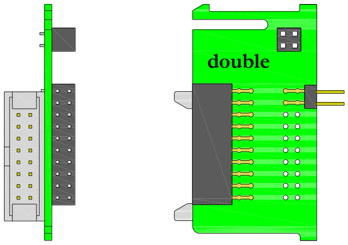
2.5 2000 Series Pneumatic Valve Manifold

The pneumatic valve manifold with internal circuit board technology is also modular. The valve solenoid coil connections are automatically made 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.



2.6 2000 Series Z-Board™ Connectors

The 2005/2012/2035 valve series utilize 2 different Z-Board™ designs to achieve the single and double solenoid output functions. This yields the possible 32 single, 16 double, or various combinations of valve coil output capabilities.

Single Z-Board™	*Double Z-Board™*
	
Ribbon Connection *Single Z-Board™*	*Ribbon Connection* *Double Z-Board™*
	

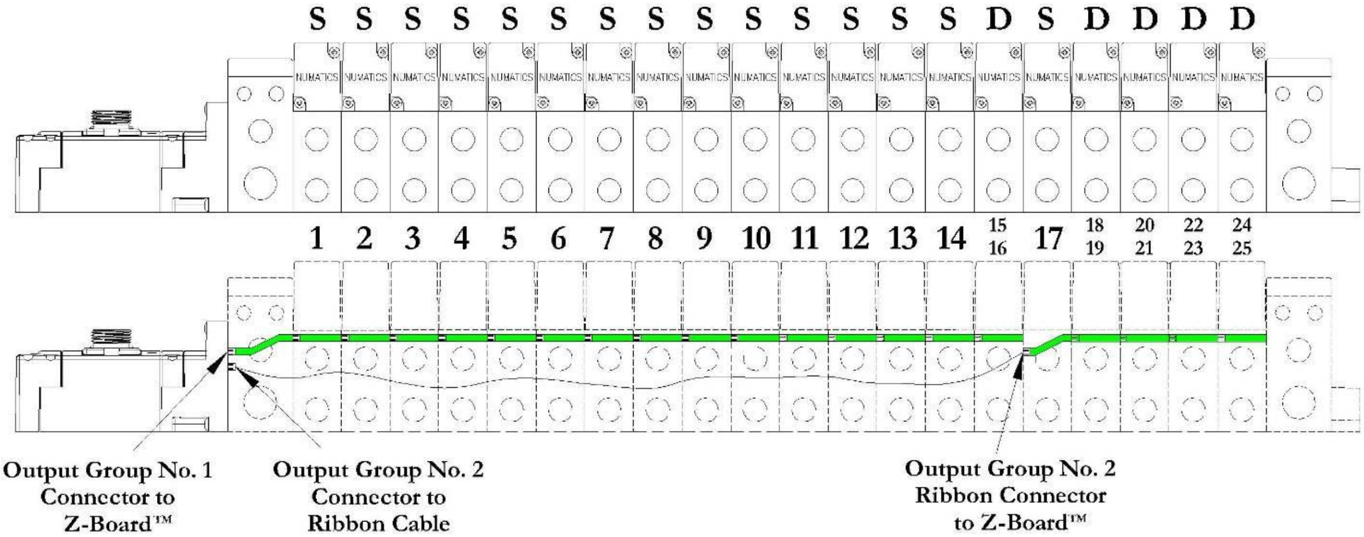
NOTE!

The 17th solenoid (output group No. 2's first bit) must be accessed via either the valve side Sub-D output module or a ribbon connector type Z-board.

2.7 2000 Series Z-Board™ and Ribbon Cable Example

If fourteen (14) single solenoid and one (1) double solenoid valves are connected directly to the communication node via their Z-Boards™, and one (1) single solenoid and four (4) double solenoid valves are connected to the communication node via the ribbon cable, the following would be the valve side bit map:

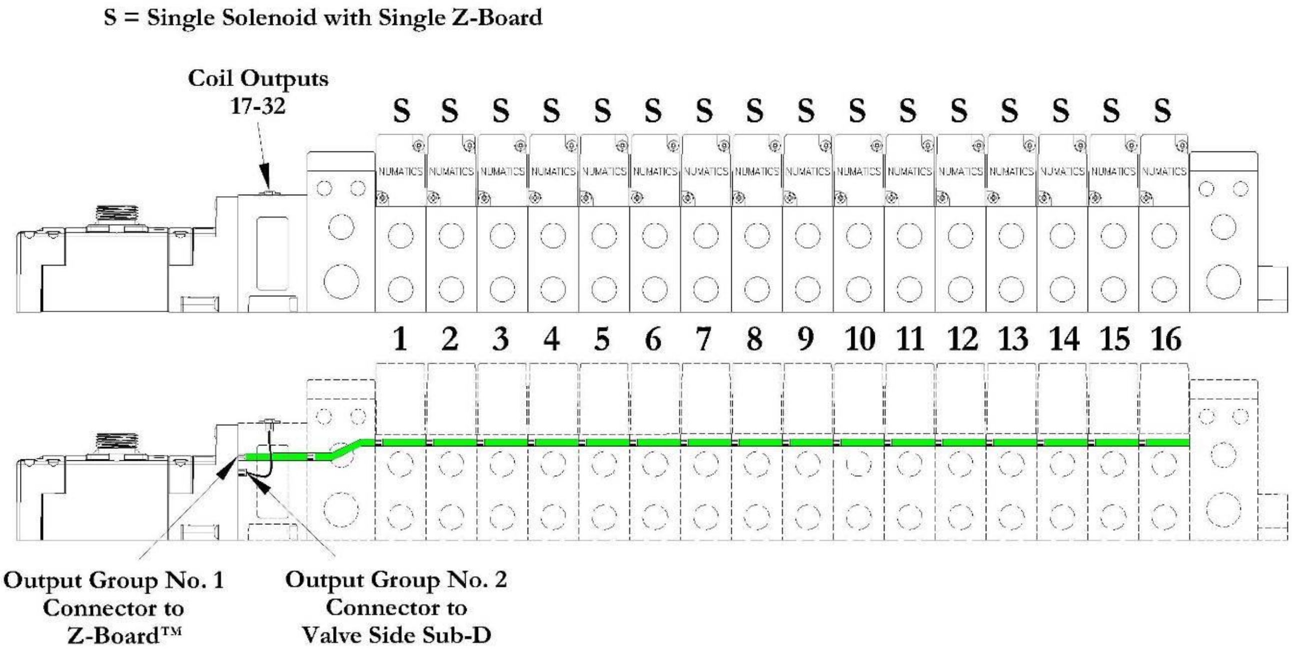
S = Single Solenoid with Single Z-Board™
D = Double Solenoid With Double Z-Board ™


S S S S S S S S S S S S S S D S D D D D
NUMATICS
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
Output Group No. 1 Connector to Z-Board™
Output Group No. 2 Connector to Ribbon Cable
Output Group No. 2 Ribbon Connector to Z-Board™

Output Word	0																1															
Output Byte	0								1								2								3							
Output Bit No.	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 No.	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	n/a						

2.8 2000 Series Z-Board™ with Valve Side Sub-D Example

If sixteen (16) single solenoid valves are connected directly to the communication node via Z-Boards™ and a valve side Sub-D connector is connected to the communication node via the output Group No. 2 connector then the following would be the valve side bit map:


S = Single Solenoid with Single Z-Board
Coil Outputs
17-32
S S S S S S S S S S S S S S S S
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Output Group No. 1
Connector to
Z-Board™
Output Group No. 2
Connector to
Valve Side Sub-D

Output Word	0																1															
Output Byte	0								1								2								3							
Output Bit No.	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 No.	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

3. Communication Module

3.1 DeviceNet Communication Module (Node)

This module is the communication interface to the manifold. It contains communication electronics and internal short circuit protection for power. It can be configured via software, via the graphic display or manually via DIP switches through the optional Manual Configuration Module (MCM).

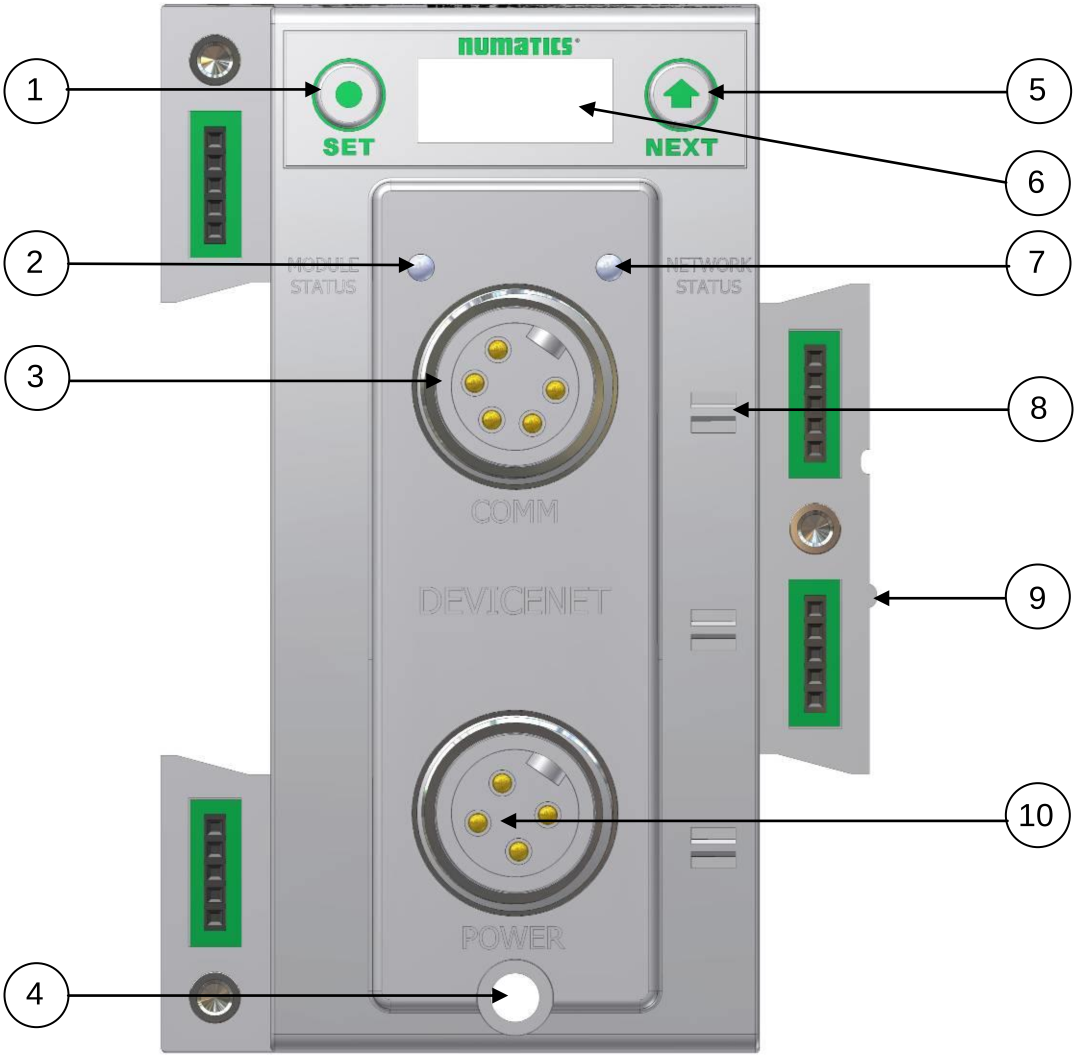
The Numatics G3 DeviceNet node is tested by the ODVA to ensure DeviceNet compatibility and interoperability. The G3 DeviceNet node supports Polled, Change of State (COS), Cyclic and Combination (i.e. Outputs can be set for Polled while Inputs can be set for COS for greater system response time) I/O Message types. DeviceNet Quick Connect functionality is also user selectable in this unit.

Communication Module	*Part Number*
DeviceNet Communication module	240-180

SET
NEXT
NETWORK STATUS
COMM
DEVICENET
POWER

3.2 Communication Module Description

Detail No.	Description
1	"Set" Button – used to navigate through user menus and to set parameters
2	Module Status LED
3	5 Pin MINI Male Communication Connector per ODVA specification
4	Mounting Hole
5	"Next" Button – used to navigate through user menus and to set parameters
6	Graphic Display – used to display parameter information
7	Network Status LED
8	Slot for text ID tags
9	Keying for preventing I/O module insertion
10	4 Pin MINI Male Power Connector


1
2
3
4
5
6
7
8
9
10
numatics
SET
NEXT
MODULE STATUS
NETWORK STATUS
COMM
DEVICENET
POWER

3.3 Connector Pin-Outs

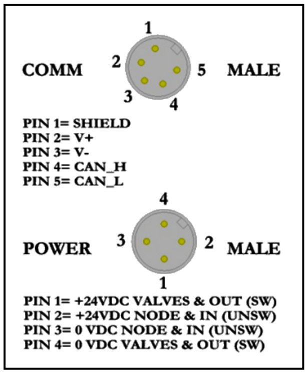
Industry standard 7/8" MINI connectors are used for communication and power.
The DeviceNet communication connector is a single keyway 5 pin male connector.
The Power connector is a single keyway 4 pin male connector.

DeviceNet Communication Connector Pin-Out

Pin No.	*Function*	*Description*
1	Shield	Cable shield
2	V+	Bus Power 11-25VDC
3	V-	Bus Power Common (0 VDC)
4	CAN_H	Controller Area Network High Communication Line
5	CAN_L	Controller Area Network Low Communication Line

Power Connector with CENELEC Style Pin-Out

CENELEC Pin No.	*Function*	*Description*
1	+24 VDC (Valves and Outputs)	Voltage used to power outputs (valve coils and discrete outputs) SW
2	+24 VDC (Node and Inputs)	Voltage used to power discrete inputs and node electronics UNSW
3	0 VDC Common (Node and Inputs)	0 VDC (-V) Voltage used to power discrete inputs and node electronics UNSW
4	0 VDC Common (Valves and Outputs)	0 VDC Voltage used to power outputs (valve coils and discrete outputs) SW


COMM
1
2
5
3
4
MALE
PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L
POWER
4
3
2
1
MALE
PIN 1= +24VDC VALVES & OUT (SW)
PIN 2= +24VDC NODE & IN (UNSW)
PIN 3= 0 VDC NODE & IN (UNSW)
PIN 4= 0 VDC VALVES & OUT (SW)

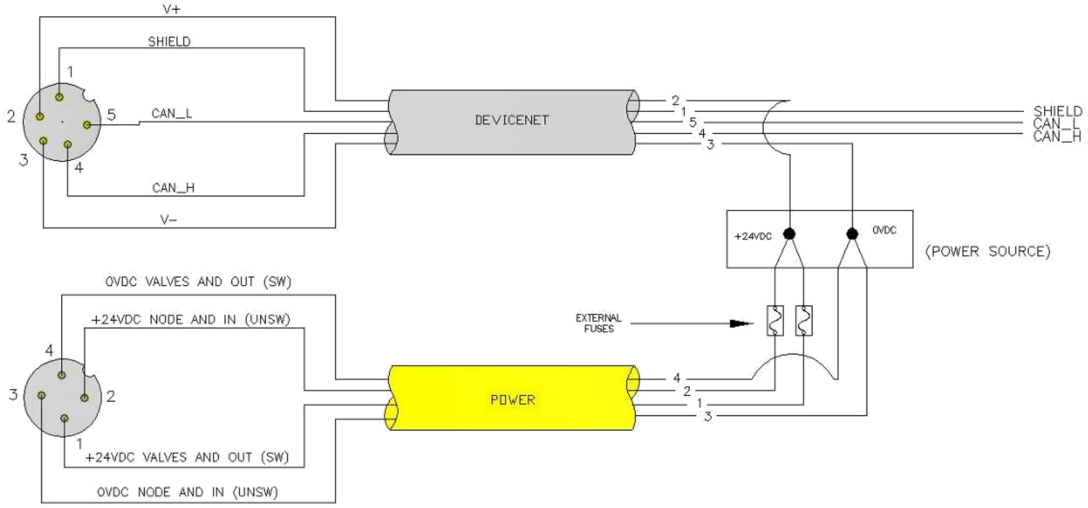
ATTENTION

- *Power common (0 VDC) pins 3 and 4 are isolated from each other to allow separate (isolated) power supply connection if required. However, they can be tied together if a single common, non-isolated, application is preferred.*
- *The draw of the +24VDC Valves and Outputs and +24VDC Node and Inputs pins cannot exceed 8 Amps, at any given moment in time.*
- *The Node and Inputs pins supplies power to the node electronics. These pins must be powered at all times for communication node to be functional.*
- *"To be connected to Class 2 power source only"*

3.4 Electrical Connections

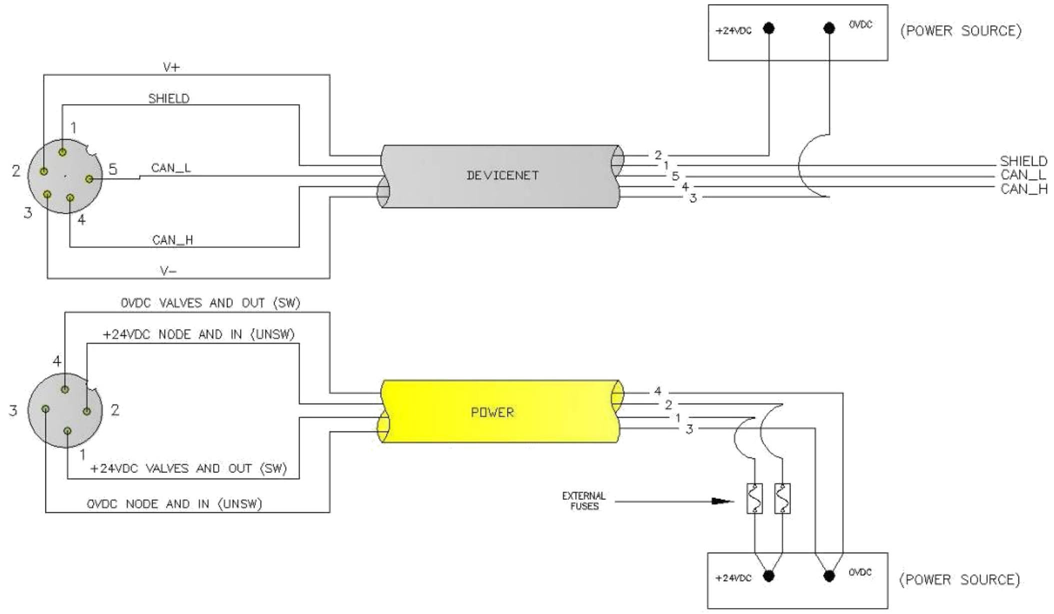
Standard Power Connector Wiring Diagram Examples

Single Power Supply Example (Non-isolated commons)


V+
SHIELD
1
2
5
CAN_L
3
4
CAN_H
V-
DEVICENET
2
1
5
4
3
SHIELD
CAN_L
CAN_H
+24VDC
0VDC
(POWER SOURCE)
0VDC VALVES AND OUT (SW)
+24VDC NODE AND IN (UNSW)
EXTERNAL FUSES
4
3
2
1
POWER
4
2
1
3
+24VDC VALVES AND OUT (SW)
0VDC NODE AND IN (UNSW)

Male connector view

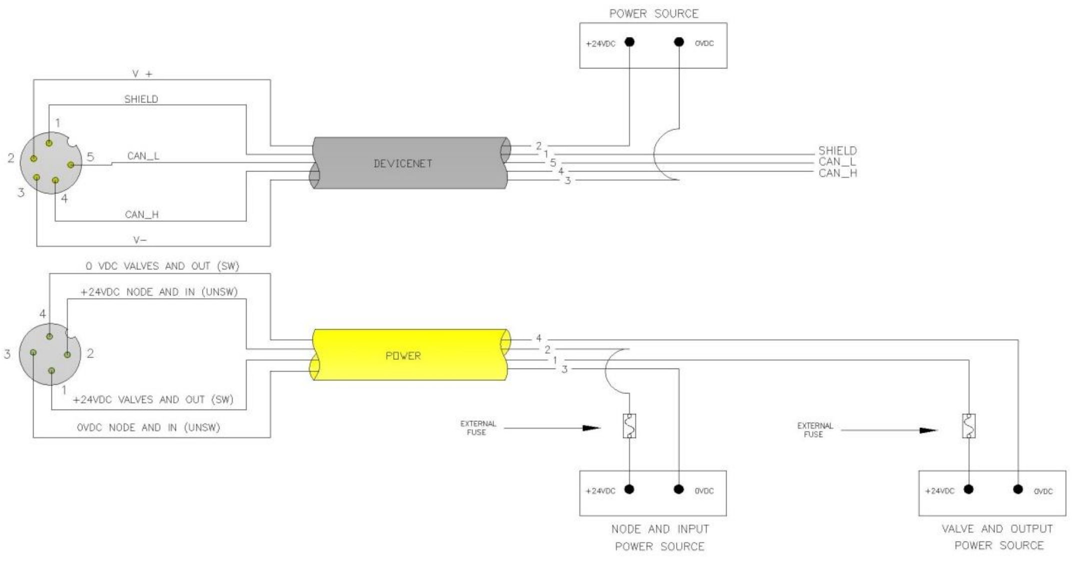
Separate Power Supply Example (Non-isolated commons)


+24VDC
0VDC
(POWER SOURCE)
V+
SHIELD
1
2
5
CAN_L
3
4
CAN_H
V-
DEVICENET
2
1
5
4
3
SHIELD
CAN_L
CAN_H
0VDC VALVES AND OUT (SW)
+24VDC NODE AND IN (UNSW)
4
3
2
1
POWER
4
2
1
3
+24VDC VALVES AND OUT (SW)
0VDC NODE AND IN (UNSW)
EXTERNAL FUSES
+24VDC
0VDC
(POWER SOURCE)

Male connector view

Separate Power Supply Example (Isolated commons)

Male connector view

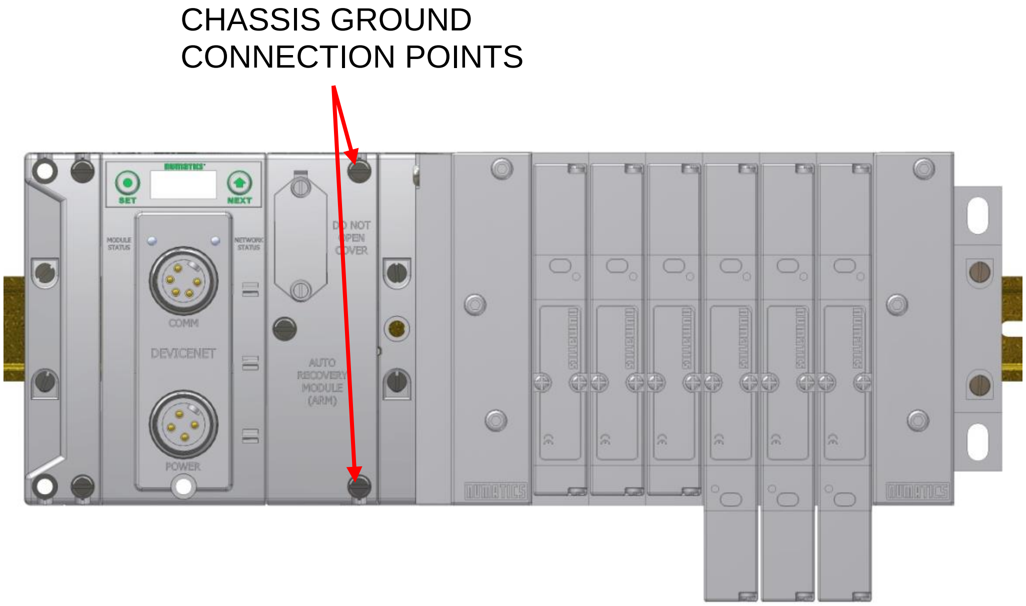

POWER SOURCE
+24VDC
0VDC
V +
SHIELD
1
2
5
CAN_L
3
4
CAN_H
V−
DEVICENET
2
1
5
4
3
SHIELD
CAN_L
CAN_H
0 VDC VALVES AND OUT (SW)
+24VDC NODE AND IN (UNSW)
4
3
2
1
+24VDC VALVES AND OUT (SW)
0VDC NODE AND IN (UNSW)
POWER
4
2
1
3
EXTERNAL FUSE
EXTERNAL FUSE
+24VDC
0VDC
NODE AND INPUT POWER SOURCE
+24VDC
0VDC
VALVE AND OUTPUT POWER SOURCE

ATTENTION

- *Please see page 18 for external fuse sizing guide.*
- *When using molded connector power cables, Do Not rely on wire colors for Pin-Out. Always use pin number references.*
- *"Class 2 Device Wiring Only – Do Not Reclassify and Install as Class 1, 3 or Power and Lighting Wiring."*
- *"Wire connections shall be rated suitable for the wire size (lead and building wiring) employed."*
- "CLASS 2 WIRING; All filed wiring shall be suitable for class 1, Electric Light and Power, or Class 2, Class 3 wiring are routed separately and secured to maintain separation between 1) Class 2 wiring and all other class wiring, and 2) limited energy circuit conductors from unlimited energy circuit conductors."
- "MULTIPLE CLASS 2 POWER SOURCES: when interconnects, Class 2 sources shall be listed and rated suitable for parallel interconnection."

3.5 Ground Wiring

All Numatics Inc. communication nodes should be grounded during the installation process. These grounding guidelines can be found in National Electrical code IEC 60204-1 or EN 60204-1.


CHASSIS GROUND
CONNECTION POINTS
SET
NEXT
MODULE STATUS
NETWORK STATUS
COMM
DEVICENET
POWER
DO NOT OPEN COVER
AUTO RECOVERY MODULE (ARM)

ATTENTION

- *Proper grounding will alleviate and prevent many intermittent problems with network communication.*
- *When grounding to a machine frame, please ensure that the machine frame itself is already properly grounded.*
- *Better grounding can be achieved when larger diameter (lower gauge) wire is used.*

3.6 Power Consumption

Power Connection

CENELEC Pin No.	*Function*	*Description*
1	+24 VDC (Valves and Outputs)	Voltage used to power outputs (valve coils and discrete outputs) SW
2	+24 VDC (Node and Inputs)	Voltage used to power discrete inputs and node electronics UNSW
3	0 VDC Common (Node and Inputs)	0 VDC (-V) Voltage used to power discrete inputs and node electronics UNSW
4	0 VDC Common (Valves and Outputs)	0 VDC (-V) Voltage used to power outputs (valve coils and discrete outputs) SW

Power Rating

- For maximum supply current capability please refer to page Error! Bookmark not defined..
- Loads should not draw more than 0.5 Amps of current from any one individual discrete output point (Contact factory for higher current capability requirements).

Component	*Voltage*	*Tolerance*	*+24VDC (Valves and Outputs) Pins 1 and 4*		*+24VDC (Node and Inputs) Pins 2 and 3*	
			Current	*Power*	*Current*	*Power*
Solenoid Valve Coil 501 (Each)	24 VDC	+10%/-15%	0.03 A	0.80 W	0 A	0 W
Solenoid Valve Coil 503 (Each)	24 VDC	+10%/-15%	0.07 A	1.70 W	0 A	0 W
Solenoid Valve Coil 2002 (Each)	24 VDC	+10%/-15%	0.02 A	0.48 W	0 A	0 W
Solenoid Valve Coil 2005 (Each)	24 VDC	+10%/-15%	0.06 A	1.44 W	0 A	0 W
Solenoid Valve Coil 2012 (Each)	24 VDC	+10%/-15%	0.11 A	2.64 W	0 A	0 W
Solenoid Valve Coil 2035 (Each)	24 VDC	+10%/-15%	0.11 A	2.64 W	0 A	0 W
Solenoid Valve Coil ISO 5599/2- SPA	24 VDC	+10%/-15%	0.17 A	4.08 W	0 A	0 W
Valve Adapter (Driver)	24 VDC	+/- 10%	0.03A	0.72 W	0.02 A	0.48 W
Digital Module	24 VDC	+/- 10%	0.04 A	0.96 W	0.05 A*	1.20 W*
Analog Module	24 VDC	+/- 10%	0.01 A	0.24 W	0.08 A*	1.92 W*
Sub-Bus Hub	24 VDC	+/- 10%	0 A	0 W	0.06 A	1.44 W*
RTD Module	24 VDC	+/- 10%	0.01 A	0.24 W	0.06 A	1.44 W*
Communication Module (Node)	24 VDC	+/- 10%	0.01 A	0.24 W	0.10 A*	2.40 W*
Sub-Bus Valve Module	24 VDC	+/- 10%	0.01 A	0.24 W	0.03 A*	0.72 W*
Auto Recovery Module (ARM)	24 VDC	+/- 10%	0 A	0 W	0.03 A	0.72 W
Manual Configuration Module (MCM)	24 VDC	+/- 10%	0 A	0 W	0.03 A	0.72 W

* Current depends on graphic display brightness setting. Max. value shown with high brightness.
Values decrease by approx. 5% for Medium and 11% for Low brightness settings.

NOTE!

- Total power consumption for each Discrete I/O point is dependent on the specific current draw of input sensor devices and output loads.

Recommended External Fuses

External fuses should be chosen based upon the physical manifold configuration. Please refer to the following table for the fuse sizing chart.

External Fuse Sizing Chart

Power Consumption - Power Connector Pin for Valves and Outputs		
Description		***Current***
Number of Solenoid Valve Coils Energized Simultaneously		
___ X 0.17 A (ISO - SPA Series)	=	__________Amps
___ X 0.11 A (2012 and 2035 Series)	=	__________Amps
___ X 0.06 A (2005 Series)	=	__________Amps
___ X 0.02 A (2002 Series)	=	__________Amps
		+
Total load current drawn by simultaneously energized Discrete Outputs	=	__________Amps
		+
Number of I/O modules installed ___ X 0.04 A	=	__________Amps
		+
Valve Adapter	=	0.03 Amps
		+
Communication Node Power Consumption	=	0.01 Amps
		+
Total:		__________Amps
Surge Compensation:	X	1.25
Suggested External +24 VDC (Valves and Outputs) Fuse Value:		__________Amps

Power Consumption – Power Connector Pin for Node and Inputs		
Description		***Current***
Communication Node Power Consumption	=	0.10 Amps
		+
Total load current drawn by Sensor Devices from Discrete Inputs source	=	__________Amps
		+
Number of I/O modules installed ___ X 0.08 A	=	__________Amps
		+
Total:		__________Amps
Surge Compensation:	X	1.25
Suggested External Pin +24 VDC (Node and Inputs) Fuse Value:		__________Amps

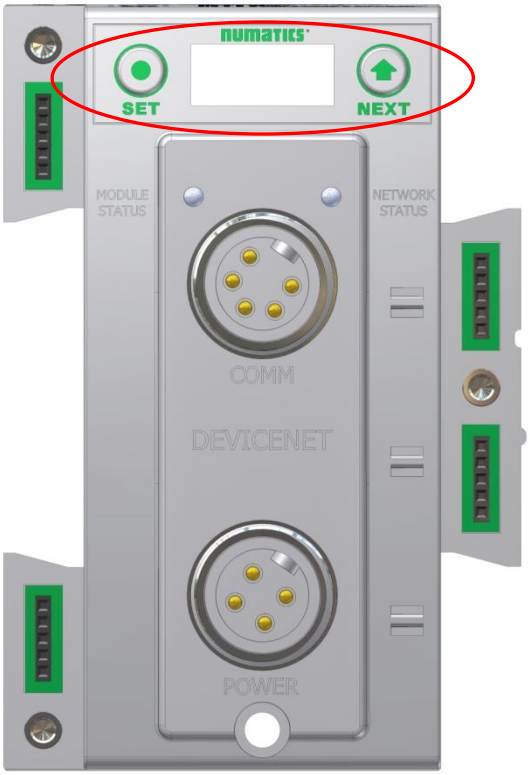
*Factory Default Settings

NOTE!

- The Node and Inputs Aux Power pins supply power to the node electronics. These pins must be powered at all times for communication node and Inputs to be functional.
- The internal electronic fuses exist to protect against damage due to catastrophic failure of internal components. External fuses are always recommended for protection against power supply failure, over-current conditions, etc…

3.7 Diagnostics - Communication Module LED Functions

Upon power up, the Module and Network Status LEDs indicate the state of the unit. There are two LEDs on the G3 DeviceNet node. The LEDs functions are described in the table below.



LED Name	*Color*	*Status*	*Description*
NETWORK STATUS	Off	OFF	Device is not on-line; Bus power not applied if Module Status also flashing green; Physical problem with network; Improper baud rate.
	Green	ON	Normal operation. Device is on-line and has established a connection.
		FLASHING	Device is on-line but has no established connections.
	Red	ON	The device has detected a bus error that has rendered it incapable of communicating on the network; Duplicate MAC ID; “Bus Off” condition; Physical problem with network.
		FLASHING	Communication failure – one or more I/O connections have timed out.
MODULE STATUS	Off	OFF	Critical hardware fault. Microprocessor is not running.
	Green	ON	Normal operation. The device is operating properly.
		FLASHING	Network power is absent.
	Green Red	FLASHING	Module is in self-test mode. Cycle power to end self-test mode.

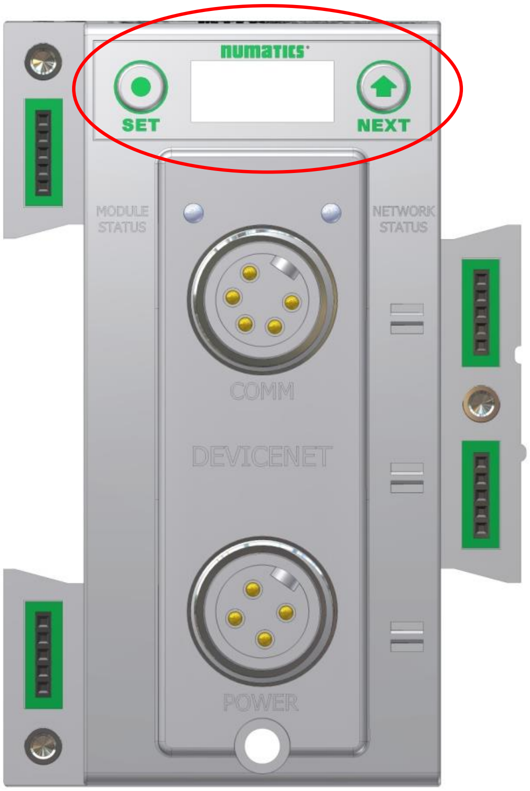
3.8 Output / Short Circuit Protection Diagnostic Status Bits

Diagnostic Status Bit Action during Fault Condition

Output Type	*Output State*	*Fault Condition*	*Status Bit*
Valve Solenoid Coil Driver	**ON**	**No Fault**	**0**
		Fault - Short Circuit, Over Temp/Over Current	**1**
Valve Solenoid Coil Driver	**OFF**	**No Fault**	**0**
		Fault - Open Load	**1**
Discrete Outputs	**ON**	**No Fault**	**0**
		Fault - Short Circuit, Over Temp/Over Current	**1**

4. G3 Node Graphic Display

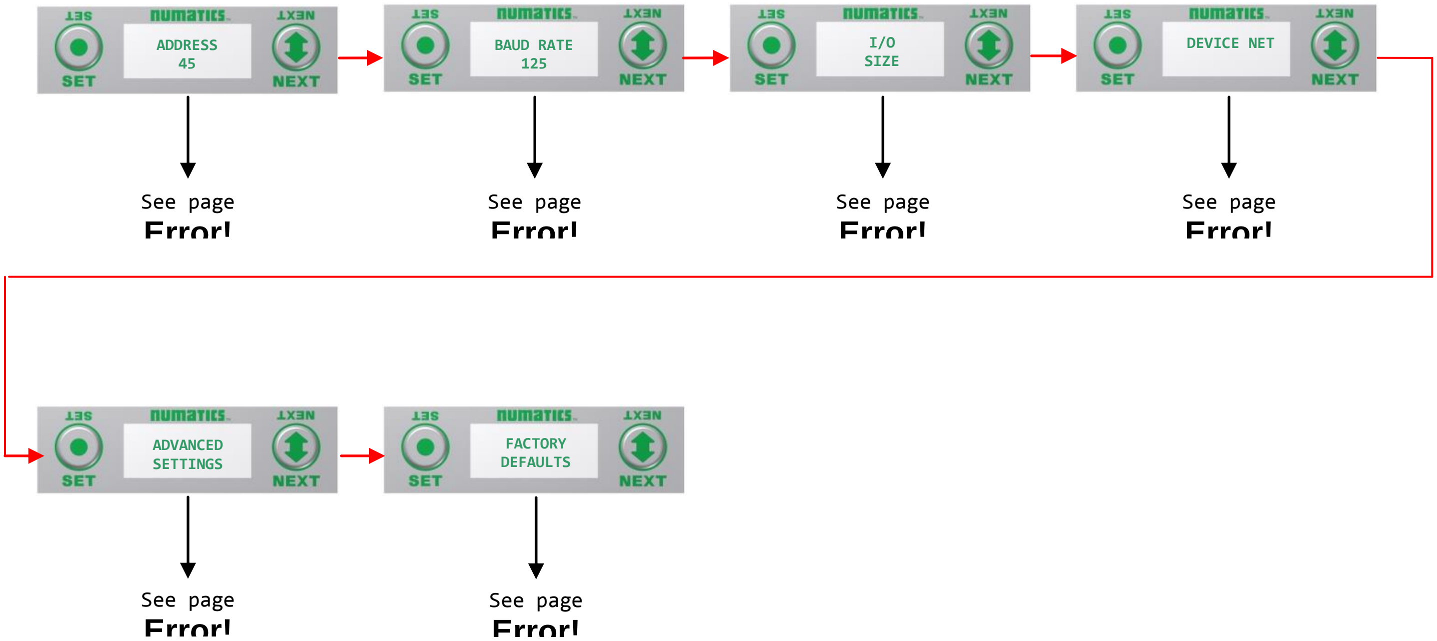
The G3 Communication and I/O modules have an integrated graphic display that may be used to configure the parameters of the modules as well as showing diagnostic information.



The following graphic displays represent the main menu selections of the DeviceNet communication module (node). Use the NEXT button to scroll through the Main menu headings shown below. At this level pressing the SET button allows access to the Sub-Menus. Please see the appropriate pages referenced below for further details and descriptions of the Sub-Menus. Note that many of these settings can also be adjusted via software with EDS file parameters. ***NOTE: WHEN A NETWORK I/O CONNECTION IS ESTABLISHED MANUAL CHANGES TO NODE PARAMETERS ARE NOT ALLOWED!***

4.1 Main Menu Structure

Use the NEXT button to scroll through the Main menu headings shown below. At this level pressing the SET button allows access the Sub-Menus. Please see the appropriate pages referenced below for further details and descriptions of the Sub-Menus.
NOTE: When a network I/O connection is established manual changes to node parameters are not allowed!

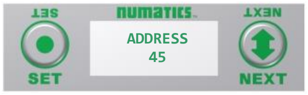

SET
numatics
NEXT
ADDRESS
45
See page
Error!
BAUD RATE
125
See page
Error!
I/O
SIZE
See page
Error!
DEVICE NET
See page
Error!
ADVANCED
SETTINGS
See page
Error!
FACTORY
DEFAULTS
See page
Error!

NOTE!

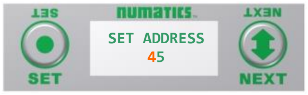
- When a network I/O connection is established manual changes to node parameters are not allowed!

4.2 Network Address Sub-Menu

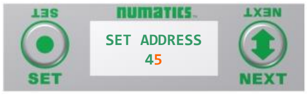
Steps to Set Address



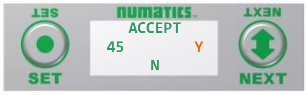
1. Press the SET button to enter the ADDRESS sub-menu.



2. Press the NEXT button to scroll through the choices for the tens digit of the node address.
   Press the SET button to select the tens digit and move into the ones digit selection.

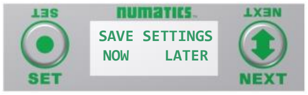


3. Press the NEXT button to scroll through the choices for the ones digit of the node address.
   Press the SET button to select the ones digit.



4. Press the NEXT button to select **Y**es or **N**o to accept the address shown on the display,
   a. Selecting **N**o will bring you back to the main Address menu.
   b. Selecting **Y**es will take you to the following SAVE SETTINGS menu.

   Press the SET button to confirm your choice.



5. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new Address to be saved in temporary memory , and allow you to make additional parameter changes before the node is reset. However, you must ACCEPT the saved changes before your next power cycle otherwise they will be lost.

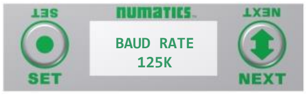
   Press the SET button to confirm your choice.

NOTE!

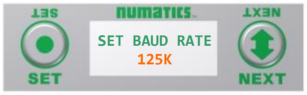
- ***Only addresses 0- 63 are valid.***
- ***Address 0 is typically reserved for the master (i.e. PLC, IPC, etc…)***
- ***Address 62 is typically reserved for network programming devices (i.e. Rockwell 1770-KFD, 1784-U2DN).***
- ***Address 63 is reserved for new replacement devices.***
- ***Address 63 is the Factory Default node address.***

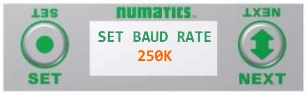
4.3 Baud Rate Sub-Menu

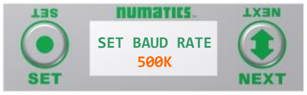
Steps to Set Baud Rate

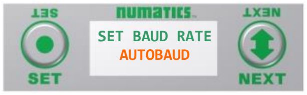

SET
numatics
NEXT
BAUD RATE
125K

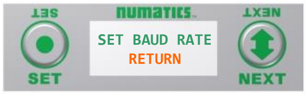
1. Press the SET button to enter the BAUD RATE sub-menu.


SET
numatics
NEXT
SET BAUD RATE
125K


SET
numatics
NEXT
SET BAUD RATE
250K

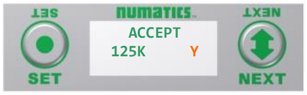

SET
numatics
NEXT
SET BAUD RATE
500K

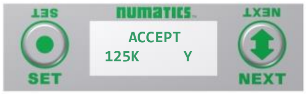

SET
numatics
NEXT
SET BAUD RATE
AUTOBAUD


SET
numatics
NEXT
SET BAUD RATE
RETURN

2. Press the NEXT button to scroll through the choices for the baud rate of the node:
   a. 125K
   b. 250K
   c. 500K
   d. AUTOBAUD (Factory Default)
   e. RETURN (this will return you to the top of BAUD RATE menu)

   Press the SET button to confirm your choice.

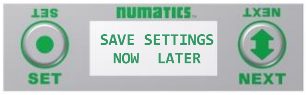

SET
numatics
NEXT
ACCEPT
125K Y


SET
numatics
NEXT
ACCEPT
125K Y

3. Press the NEXT button to select **Y**es or **N**o to accept the baud rate shown on the display..
   a. Selecting **N**o will bring you back to the main Baud Rate menu.
   b. Selecting **Y**es will take you to the following SAVE SETTINGS menu.

   Press the SET button to confirm your choice

Saved Setting Steps


SET
numatics
NEXT
SAVE SETTINGS
NOW LATER

4. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new Baud Rate to be saved in temporary memory ,and allow you to make additional parameter changes before the node is reset. However, you must ACCEPT the saved changes before your next power cycle otherwise they will be lost.

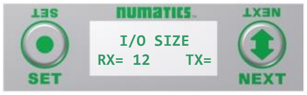
   Press the SET button to confirm your choice.

NOTE!

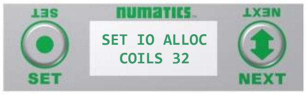
- ***Node must be set to the same baud rate as the network master (i.e. PLC scanner, controller's communication module, etc…)***
- ***More than one device (slave) on the network is required for AUTOBAUD to function.***

4.4 I/O Size - Coils Sub-Menu

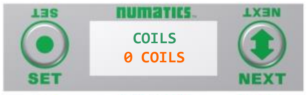
I/O Size Steps

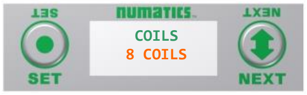

numatics
I/O SIZE
RX= 12 TX=
SET
NEXT

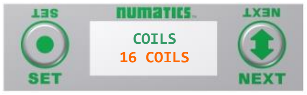
1. Press the SET button to enter the I/O SIZE sub-menu.

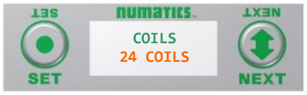

numatics
SET IO ALLOC
COILS 32
SET
NEXT

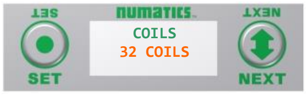
2. Press the SET button to enter the I/O ALLOC COILS menu.


numatics
COILS
0 COILS
SET
NEXT


numatics
COILS
8 COILS
SET
NEXT


numatics
COILS
16 COILS
SET
NEXT

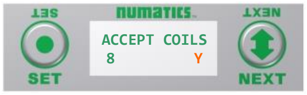

numatics
COILS
24 COILS
SET
NEXT

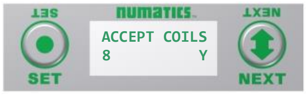

numatics
COILS
32 COILS
SET
NEXT

numatics
COILS
RETURN
SET
NEXT

3. Press the NEXT button to scroll through the choices for the number of allocated valve coils:
    a. 0 COILS
    b. 8 COILS
    c. 16 COILS
    d. 24 COILS
    e. 32 COILS (Factory Default)
    f. RETURN (this will return you to the I/O ALLOC menu)

   Press the SET button to confirm your choice.

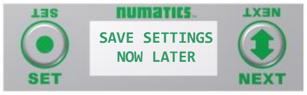

numatics
ACCEPT COILS
8 Y
SET
NEXT


numatics
ACCEPT COILS
8 Y
SET
NEXT

4. Press the NEXT button to select **Y**es or **N**o to accept the number of allocated coils shown.
    a. Selecting **N**o will bring you back to the main I/O ALLOC menu.
    b. Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.

Save Setting Steps


numatics
SAVE SETTINGS
NOW LATER
SET
NEXT

5. Press the NEXT button to select either NOW or LATER.
    a. Selecting NOW will cause the node to reset and apply the new setting.
    b. Selecting LATER will cause the new Coil Allocation to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

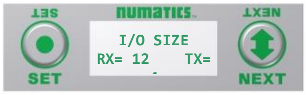
   Press the SET button to confirm your choice.

NOTE!

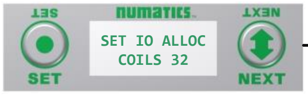
- ***Choose the appropriate number of valve coils to optimize the number of I/O bytes allocated for the manifold.***
- ***Optimizing number of coils may cause extra coil output not to be allocated for future expansion. Thus, adding valves in the future would require this parameter to be adjusted.***

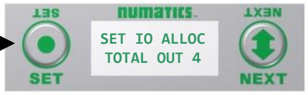
4.5 I/O Size - Allocation Menu

I/O Allocation Steps

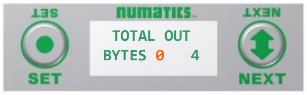

SET
numatics
NEXT
I/O SIZE
RX= 12 TX=
SET
NEXT

1. Press the SET button to enter the I/O SIZE sub-menu.

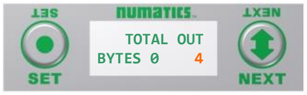

SET
numatics
NEXT
SET IO ALLOC
COILS 32
SET
NEXT


SET
numatics
NEXT
SET IO ALLOC
TOTAL OUT 4
SET
NEXT

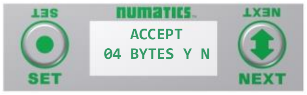
2. Press the NEXT button to scroll to the I/O ALLOC TOTAL OUT menu.
3. Press the SET button to enter the I/O ALLOC TOTAL OUT menu.


SET
numatics
NEXT
TOTAL OUT
BYTES 0 4
SET
NEXT

4. Press the NEXT button to scroll through the choices for the tens digit of the total output size.
   Press the SET button to confirm the tens digit and move into the ones digit selection.

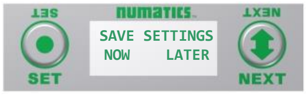

SET
numatics
NEXT
TOTAL OUT
BYTES 0 4
SET
NEXT

5. Press the NEXT button to scroll through the choices for the ones digit of the total output size.
   Press the SET button to confirm the ones digit.


SET
numatics
NEXT
ACCEPT
04 BYTES Y N
SET
NEXT

6. Press the NEXT button to select **Y**es or **N**o to accept the number of outputs shown.
   a. Selecting **N**o will bring you back to the main I/O ALLOC menu.
   b. Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.


SET
numatics
NEXT
SAVE SETTINGS
NOW LATER
SET
NEXT

Save Setting Steps

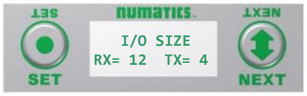
7. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new Total Output size to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

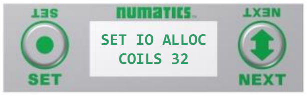
   Press the SET button to confirm your choice

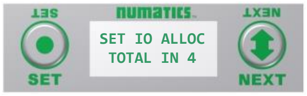
NOTE!

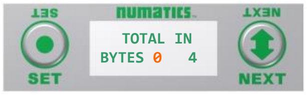
- ***Setting this value will turn off the default condition in the manifold of Auto Configuring its total I/O size based on installed modules.***
- ***This value will allow you to set a preset I/O size for the manifold configuration regardless of modules installed as long the value is greater than the actual physical configuration.***

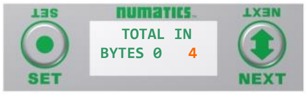
4.6 I/O Size - Allocation Sub-Menu Cont.

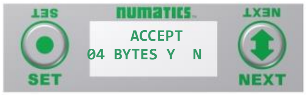

SET
numatics
NEXT
I/O SIZE
RX= 12 TX= 4
SET
NEXT

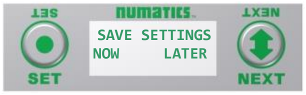

SET
numatics
NEXT
SET IO ALLOC
COILS 32
SET
NEXT


SET
numatics
NEXT
SET IO ALLOC
TOTAL IN 4
SET
NEXT


SET
numatics
NEXT
TOTAL IN
BYTES 0 4
SET
NEXT


SET
numatics
NEXT
TOTAL IN
BYTES 0 4
SET
NEXT


SET
numatics
NEXT
ACCEPT
04 BYTES Y N
SET
NEXT


SET
numatics
NEXT
SAVE SETTINGS
NOW LATER
SET
NEXT

I/O Allocation Steps

1. Press the SET button to enter the I/O SIZE sub-menu.
2.
3. Press the SET button to enter the I/O ALLOC TOTAL IN menu.
4. Press the NEXT button to scroll through the choices for the tens digit of the total input size.
   Press the SET button to confirm the tens digit and move into the ones digit selection.
5. Press the NEXT button to scroll through the choices for the ones digit of the total input size.
   Press the SET button to confirm the ones digit.
6. Press the NEXT button to select **Y**es or **N**o to accept the number of input bytes shown.
   a. Selecting **N**o will bring you back to the main I/O ALLOC menu.
   b. Selecting **Y**es will take you to the following saved settings menu.

Press the SET button to confirm your choice.

Save Setting Steps

7. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new Total Input size to be saved in memory, you must accept the saved changes before your next power cycle otherwise they will be lost.

Press the SET button to confirm your choice.

4.7 DeviceNet with Quick Connect Sub-Menu

DeviceNet / Quick Connect Steps

SET
DEVICENET
NEXT

1. Press the SET button to enter the DEVICENET Quick Connect feature sub-menu.

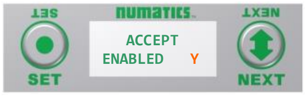
SET
QUICK CONNECT
DISABLED
NEXT

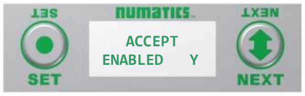
SET
QUICK CONNECT
RETURN
NEXT

SET
QUICK CONNECT
ENABLED
NEXT

2. Press the NEXT button to scroll through to choose standard DeviceNet or DeviceNet with Quick Connect feature.
   a. ENABLED
   b. DISABLED (Factory Default)
   c. RETURN (this will return you to the DEVICENET menu)

   Press the SET button to confirm your choice.


SET
ACCEPT
ENABLED Y
NEXT


SET
ACCEPT
ENABLED Y
NEXT

3. Press the NEXT button to select **Y**es or **N**o to accept the selection.
   a. Selecting **N**o will bring you back to the main DEVICENET protocol menu.
   b. Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.

Save Setting Steps

SET
SAVE SETTINGS
NOW LATER
NEXT

4. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new Total Input size to be saved in memory, you must accept the saved changes before your next power cycle otherwise they will be lost.

   Press the SET button to confirm your choice.

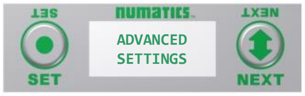
NOTE!

- ***This setting allows the DeviceNet with QUICK CONNECT feature to be enabled or disabled.***
- ***The QUICK CONNECT feature allows a node to quickly go into operation by shortening the time required to make the logical connection between the node and the DeviceNet scanner.***
- ***This feature has benefits in many applications including those needing to make on the fly tool changes.***
- ***The DeviceNet scanner must also support this feature.***

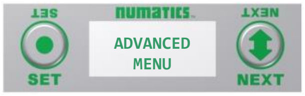
4.8 Advanced Settings - I/O Diag. Menu

This menu allows the enabling / disabling of all the I/O status bits. The I/O status bits include valve coil, discrete outputs, input short circuit, and alarm status bits. The default condition is Enabled

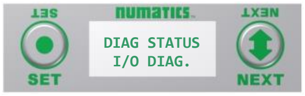
I/O Status Steps


SET
numatics
NEXT
ADVANCED
SETTINGS
SET
NEXT

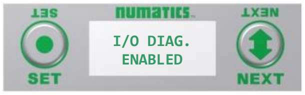
1. Press the SET button to enter the ADVANCED SETTINGS sub-menu.

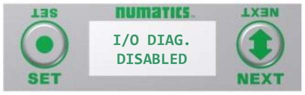

SET
numatics
NEXT
ADVANCED
MENU
SET
NEXT

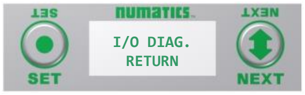
2. Press the SET button to enter the CONFIG MENU / DIAG. STATUS.


SET
numatics
NEXT
DIAG STATUS
I/O DIAG.
SET
NEXT

3. Press the SET button to enter the DIAG. STATUS I/O DIAG.

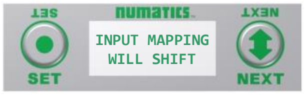

SET
numatics
NEXT
I/O DIAG.
ENABLED
SET
NEXT


SET
numatics
NEXT
I/O DIAG.
DISABLED
SET
NEXT

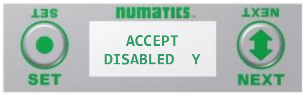

SET
numatics
NEXT
I/O DIAG.
RETURN
SET
NEXT

4. Press the NEXT button to scroll through the choices to enable/disable the Diagnostic status for I/O.
   a. ENABLED (Factory Default)
   b. DISABLED
   c. RETURN (this will return you to the DIAG. STATUS menu)

   Press the SET button to confirm your choice.


SET
numatics
NEXT
INPUT MAPPING
WILL SHIFT
SET
NEXT

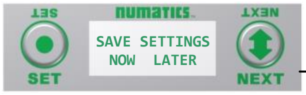
5. Press NEXT to confirm the warning message.


SET
numatics
NEXT
ACCEPT
DISABLED Y
SET
NEXT

6. Press the NEXT button to select **Y**es or **N**o to accept the selection
   a. Selecting **N**o will bring you back to the main SET STATUS menu.
   b. Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.

Save Settings Steps


SET
numatics
NEXT
SAVE SETTINGS
NOW LATER
SET
NEXT

7. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new I/O STATUS selection to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

   Press the SET button to confirm your choice.

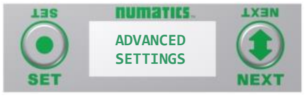
NOTE!

I/O Status Bits are diagnostic bits. They include the valve coil status bits, AUX Power status bits, and Short Circuit & Alarm status bits of various I/O modules.

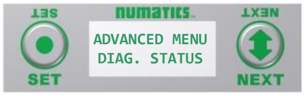
4.9 Advanced Settings – Node Diagnostics (Diagnostic Word)

This menu allows the enabling / disabling of the diagnostic word status bits. The Diagnostic word bits include power status and sub-bus related status bits. Detail information regarding these bits can found on page . The diagnostic word comes enabled from the factory.

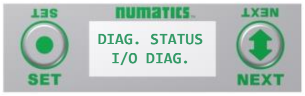
Diag. Word Status Settings

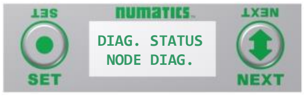

SET
ADVANCED
SETTINGS
NEXT

1. Press the SET button to enter the ADVANCED SETTINGS menu.

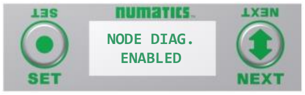

SET
ADVANCED MENU
DIAG. STATUS
NEXT

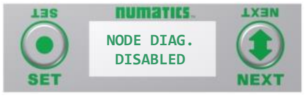
2. Press the SET button to enter the ADVANCED MENU / DIAG. STATUS.

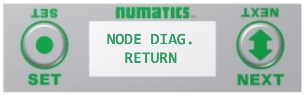

SET
DIAG. STATUS
I/O DIAG.
NEXT


SET
DIAG. STATUS
NODE DIAG.
NEXT

3. Press the NEXT button to scroll to the DIAG. STATUS / NODE DIAG. menu.
   Press the SET button to enter the DIAG. STATUS / NODE DIAG. menu.

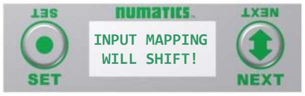

SET
NODE DIAG.
ENABLED
NEXT


SET
NODE DIAG.
DISABLED
NEXT

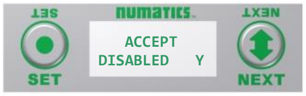

SET
NODE DIAG.
RETURN
NEXT

4. Press the NEXT button to scroll the choices to enable/disable the I/O status.
   a. ENABLED (Factory Default)
   b. DISABLED
   c. RETURN (this will return you to the DIAG. STATUS menu)

   Press the SET button to confirm your choice.


SET
INPUT MAPPING
WILL SHIFT!
NEXT

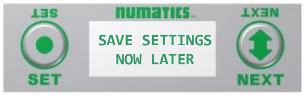
5. Press Next to confirm the warning message.


SET
ACCEPT
DISABLED Y
NEXT

6. Press the NEXT button to select **Y**es or **N**o to accept the selection
   a. Selecting **N**o will bring you back to the main SET STATUS menu.
   b. Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.

Save Settings Steps


SET
SAVE SETTINGS
NOW LATER
NEXT

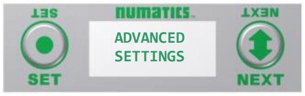
7. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new NODE DIAG selection to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

   Press the SET button to confirm your choice.

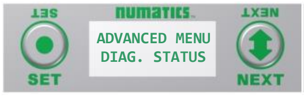
4.10 Advanced Settings - Fault Action

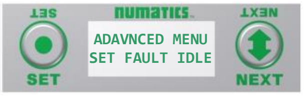
This menu allows the enabling / disabling of the fault action parameter. The fault action parameter determines the behavior of the outputs during a communication fault. Please see page 112 for more details.

Fault Action Settings

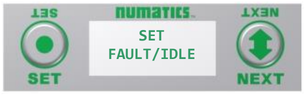

SET
numatics
NEXT
ADVANCED
SETTINGS
SET
NEXT

1. Press the SET button to enter the ADVANCED SETTINGS menu.

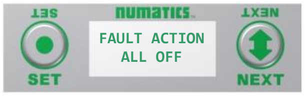

ADVANCED MENU
DIAG. STATUS
SET
NEXT

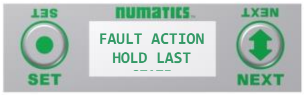

ADAVNCED MENU
SET FAULT IDLE
SET
NEXT

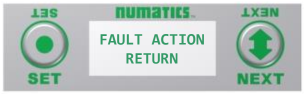
2. Press the NEXT button to scroll to the ADVANCED MENU / SET FAULT IDLE.
3. Press the SET button to enter the ADVANCED MENU / SET FAULT IDLE.


SET
FAULT/IDLE
SET
NEXT

4. Press the SET button to enter the SET FAULT IDLE / FAULT ACTION menu.

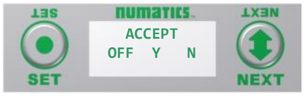

FAULT ACTION
ALL OFF
SET
NEXT


FAULT ACTION
HOLD LAST
SET
NEXT


FAULT ACTION
RETURN
SET
NEXT

5. Press the NEXT button to scroll the choices for the desired output action during a fault state.
    a. ALL OFF (Factory Default)
    b. HOLD LAST STATE
    c. RETURN (this will return you to the SET FAULT/IDLE menu)

   Press the SET button to confirm your choice.


ACCEPT
OFF Y N
SET
NEXT

6. Press the NEXT button to select **Y**es or **N**o to accept the selection
   Press the SET button to confirm your choice
    a. Selecting **N**o will bring you back to the main SET FAULT/IDLE menu.
    b. Selecting **Y**es will take you to the following saved settings menu.

Save Settings Steps

7. Press the NEXT button to select either NOW or LATER.
   Press the SET button to confirm your choice.
    a. Selecting NOW will cause the node to reset and apply the new setting
    b. Selecting LATER will cause the new FAULT ACTION selection to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

   Press the SET button to confirm your choice.

SAVE SETTINGS
NOW LATER

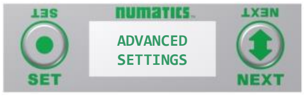
NOTE!

- *See page 63 for more details.*
- *Factory Default is "ALL OFF"*

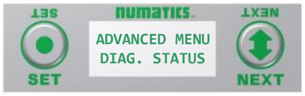
4.11 Advanced Settings - Idle Action

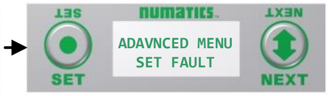
This menu allows the enabling / disabling of the fault action parameter. The fault action parameter determines the behavior of the outputs during a communication fault. Please see page 112 for more details.

Idle Action Settings

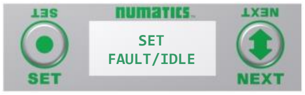

SET
ADVANCED
SETTINGS
NEXT

1. Press the SET button to enter the ADVANCED SETTINGS sub-menu.

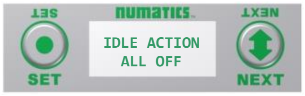

SET
ADVANCED MENU
DIAG. STATUS
NEXT

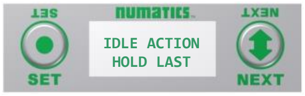

SET
ADAVNCED MENU
SET FAULT
NEXT

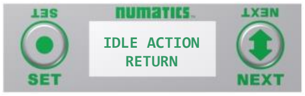
2. Press the NEXT button to scroll to the ADVANCED MENU / SET FAULT IDLE.
   Press the SET button to enter the ADVANCED MENU / SET FAULT IDLE.


SET
SET
FAULT/IDLE
NEXT

3. Press the NEXT button to scroll to the SET FAULT IDLE / IDLE ACTION.
   Press the SET button to enter the SET FAULT IDLE / IDLE ACTION menu.

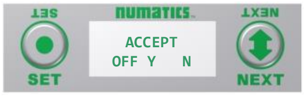

SET
IDLE ACTION
ALL OFF
NEXT


SET
IDLE ACTION
HOLD LAST
NEXT


SET
IDLE ACTION
RETURN
NEXT

4. Press the NEXT button to scroll the choices for the desired output action during an idle state.
   a. ALL OFF (Factory Default)
   b. HOLD LAST STATE
   c. RETURN (this will return you to the SET FAULT/IDLE menu)

   Press the SET button to confirm your choice.


SET
ACCEPT
OFF Y N
NEXT

5. Press the NEXT button to select **Y**es or **N**o to accept the selection.
   a. Selecting **N**o will bring you back to the main SET FAULT/IDLE menu.
   Selecting **Y**es will take you to the following saved settings menu.

   Press the SET button to confirm your choice.

Save Settings Steps

SET
SAVE SETTINGS
NOW LATER
NEXT

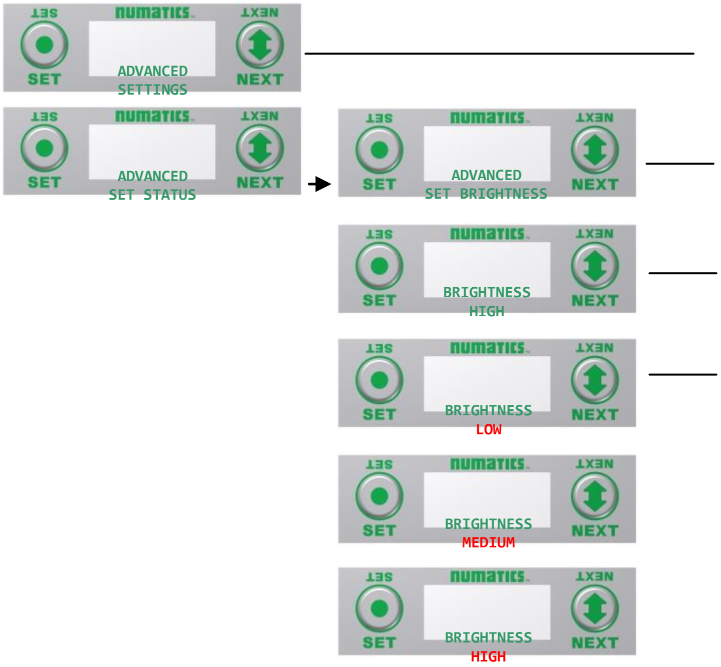
6. Press the NEXT button to select either NOW or LATER.
   a. Selecting NOW will cause the node to reset and apply the new setting.
   b. Selecting LATER will cause the new IDLE ACTION selection to be saved in memory, you must Accept the saved changes before your next power cycle otherwise they will be lost.

   Press the SET button to confirm your choice.

NOTE!

- *Factory Default is ALL OFF*

4.12 Advanced Settings - Brightness


SET
NEXT
ADVANCED
SETTINGS
ADVANCED
SET STATUS
ADVANCED
SET BRIGHTNESS
BRIGHTNESS
HIGH
BRIGHTNESS
LOW
BRIGHTNESS
MEDIUM
BRIGHTNESS
HIGH

Brightness Settings

1. Press the SET button to enter the ADVANCED SETTINGS menu.
2. Press the NEXT button to scroll to the CONFIG MENU / SET BRIGHTNESS.
   Press the SET button to enter the CONFIG MENU / SET BRIGHTNESS.
3. The current state of the parameter is shown
4. Press the SET button to change this parameter
   Press the NEXT button to scroll the choices for the desired brightness of the graphic display for all modules on the G3 system.
   a. LOW
   b. MEDIUM
   c. HIGH (Factory Default)

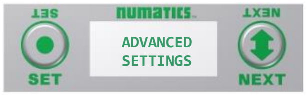
   Press the SET button to confirm your choice. The changes will take effect immediately.

NOTE!

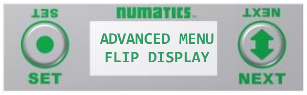
- *This a global setting that affects all modules*
- *Each module, however, has its own setting if different settings are required.*

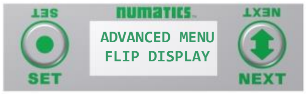
4.13 Advanced Settings – Flip Display

Flip Display Settings


numatics
SET
ADVANCED
SETTINGS
NEXT

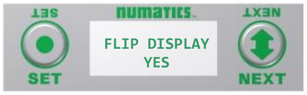
1. Press the SET button to enter the ADVANCED SETTINGS menu.


numatics
SET
ADVANCED MENU
FLIP DISPLAY
NEXT

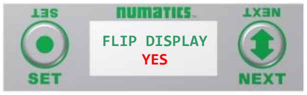

numatics
SET
ADVANCED MENU
FLIP DISPLAY
NEXT

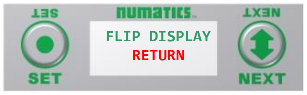
2. Press the NEXT button to scroll to the CONFIG MENU / FLIP DIPLAY.

   Press the SET button to enter the CONFIG MENU / FLIP DIPLAY.


numatics
SET
FLIP DISPLAY
YES
NEXT

3. The current state of the parameter is shown


numatics
SET
FLIP DISPLAY
YES
NEXT


numatics
SET
FLIP DISPLAY
RETURN
NEXT

4. Press the NEXT button to change this parameter

   a. YES
   b. RETURN

   Press the SET button to confirm your choice.

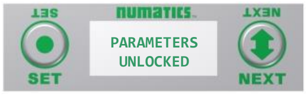
A.

NOTE!

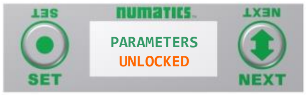
- **This a global setting that affects all modules**
- **Each module, however, has its own setting if different settings are required.**

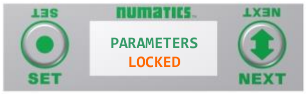
4.14 Advanced Settings – Parameters Lock

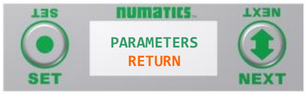
PARAMETER Steps


SET
numatics
NEXT
PARAMETERS
UNLOCKED
SET
NEXT

1. Press the SET button to enter the Parameters sub-menu.


SET
numatics
NEXT
PARAMETERS
UNLOCKED
SET
NEXT

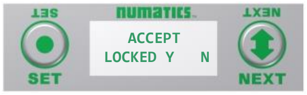

SET
numatics
NEXT
PARAMETERS
LOCKED
SET
NEXT

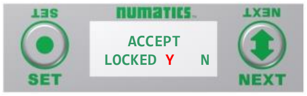

SET
numatics
NEXT
PARAMETERS
RETURN
SET
NEXT

2. Press the NEXT button to scroll through the choices to enable or disable the feature.
    a. UNLOCKED (Factory Default)
    b. LOCKED
    c. RETURN (this will return you to the main menu)

    Press the SET button to confirm your choice.

    By choosing LOCKED, all settable parameters will be read only via the graphic display. UNLOCKED, the factory default, will allow all parameters to be settable through the graphic display.
    Please note that all parameters are read only, regardless of this setting, when an IO connection between the communication module and the controller (PLC) is present

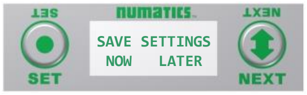

SET
numatics
NEXT
ACCEPT
LOCKED Y N
SET
NEXT


SET
numatics
NEXT
ACCEPT
LOCKED Y N
SET
NEXT

3. Press the NEXT button to select **Y**es or **N**o to accept the selection.
    a. Selecting **N**o will bring you back to the main menu.
    b. Selecting **Y**es will take you to the following apply changes menu.

    Press the SET button to confirm your choice.

Apply Changes Steps

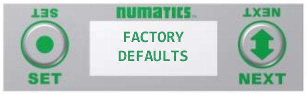

SET
numatics
NEXT
SAVE SETTINGS
NOW LATER
SET
NEXT

4. Press the NEXT button to select either NOW or LATER.
    a. Selecting NOW will cause the node to reset and apply the new setting.
    b. Selecting LATER will cause the new setting to be saved in memory, you must accept the saved changes before your next power cycle otherwise they will be lost.

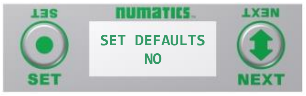
    Press the SET button to confirm your choice.

4.15 Factory Defaults

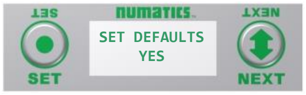
Factory Default Settings


SET
numatics
NEXT
FACTORY
DEFAULTS
SET
NEXT

1. Press the SET button to enter the FACTORY DEFAULTS sub-menu.


SET
numatics
NEXT
SET DEFAULTS
NO
SET
NEXT

2. Press the SET button to change this parameter


SET
numatics
NEXT
SET DEFAULTS
YES
SET
NEXT

3. Press the NEXT button to select Yes or No.
   a. Selecting No will bring you back to the main FACTORY DEFAULTS menu.
   b. Selecting Yes will cause the node to reset and return all parameters to the factory default conditions.
   c. Selecting RETUTN will bring you back to the main FACTORY DEFAULS menu

Press the SET button to confirm your choice.

FACTORY DEFAULT SETTINGS

Description	*Default*
Node Address	63
Baud Rate	Auto-Baud enabled
Valve Side Output Bytes	4 Bytes (32 Allocated Valve Coil Outputs)
Rx/Tx Values	Self-Configuring
Diagnostic Word	Enabled
I/O Diagnostic Status	Enabled
DeviceNet Quick Connect	Disabled
Fault Action	Reset to All Off
Idle Action	Reset to All Off
Brightness	Medium
Parameters	Unlocked

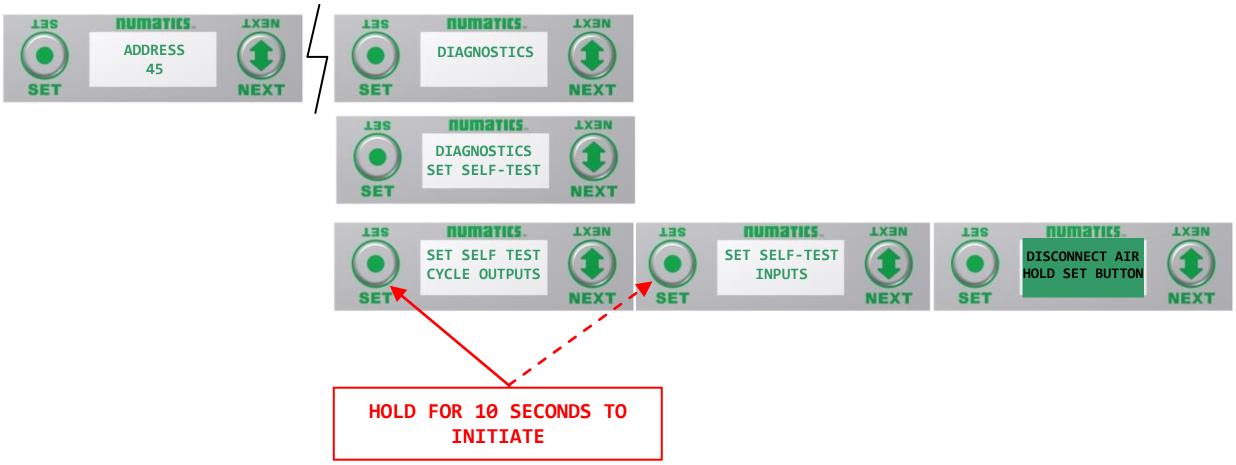
4.16 Diagnostics - Self Test Mode

An internal diagnostic tool can be enabled on the communication module (node) using the graphic display. This tool allows the user to confirm that all of the inputs and outputs on the manifold and any of the distributed modules are fully functional without needing a network connection or controller. There are two test modes that the user can choose. The **"CYCLE OUTPUTS"** test mode tests all the outputs by sequentially turning them ON and OFF for approximately .5 seconds. The **"INPUTS"** test mode tests the inputs by causing all of the outputs to toggle between even and odd values when any input is made. The Self Test mode on the communication module (node) is a global setting and will test all devices connected on the main manifold as well as any distributed modules and/or manifolds.

Similar "local" self tests are available on all output modules types. This "local" self test function allows any output module to be tested without affecting any other output module.
NOTE: The number of Valve outputs that are tested are affected by the I/O size settings.

To use the Self Test Mode, the user must first set some initial conditions. Follow these steps to initiate the self-test mode.

1) Disconnect Air and Communication from the manifold!
2) Select the desired test mode using the graphic display. (See example below)
3) Starting at the Home Screen, navigate the menus by selecting the NEXT button until the **DIAGNOSTICS** menu is shown.
4) Select the SET button to access the **DIAGNOSTICS** menu and then again to access the **SELF-TEST** menu
5) Push NEXT to navigate to the desired test mode: **CYCLE OUTPUTS or INPUTS**
6) Push SET to select the desired test mode.
7) A message will appear: **DISCONNECT AIR HOLD SET BUTTON**
8) Hold the SET button down for approximately 10 seconds to enable the test. The Display will flash the above message while the button is pushed.
9) When the display stops flashing, the self-test mode will run and the Module Status LED will flash Red/Green while the display shows **SELF TEST RUNNING.**
10) The global self-test mode can only be disabled by disconnecting the power to the manifold.

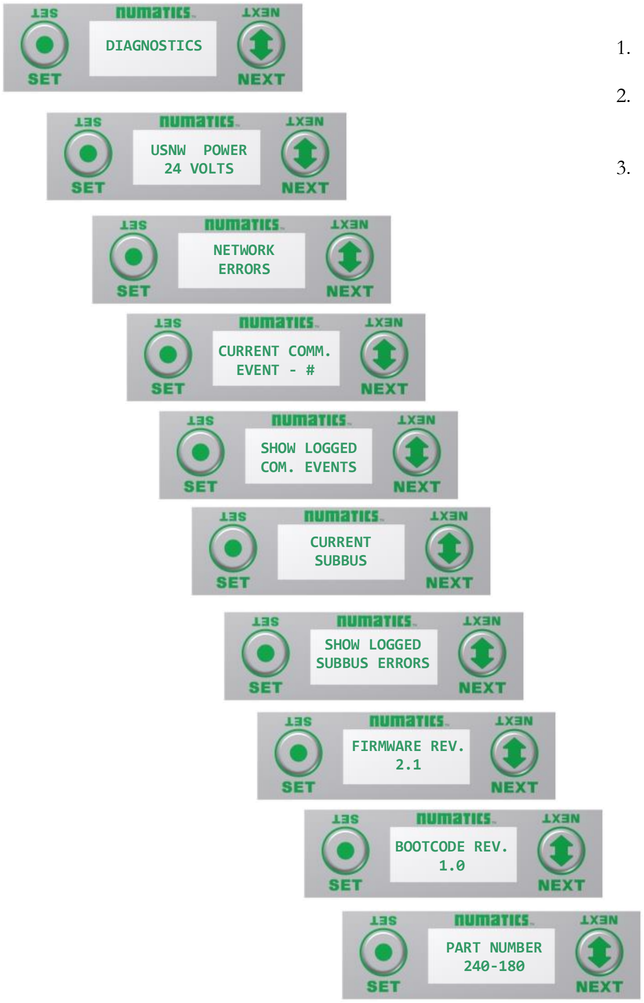


HOLD FOR 10 SECONDS TO INITIATE

NOTE!

- Please be aware of the original position of detented valves so that they can be returned to the correct position after the self-test is disabled.

4.17 Diagnostics Cont.


DIAGNOSTICS
USNW POWER
24 VOLTS
NETWORK
ERRORS
CURRENT COMM.
EVENT - #
SHOW LOGGED
COM. EVENTS
CURRENT
SUBBUS
SHOW LOGGED
SUBBUS ERRORS
FIRMWARE REV.
2.1
BOOTCODE REV.
1.0
PART NUMBER
240-180
SET
NEXT
numatics

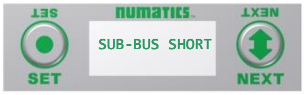
1. All diagnostic information is read only
2. Press the SET button to enter DIAGNOSTICS sub-menu.
3. Press the NEXT button to scroll through the main diagnostic menu choices.
   a. UNSW POWER
      . - Displays voltage level of unswitched power (Node & Inputs)
   b. NETWORK ERRORS - ERROR CODE
      . - Displays fieldbus network errors
   c. CURRENT COMM. EVENT NUMBER
      . - Displays
   d. SHOW LOGGED COMM. EVENTS
      . - Displays log of network errors
   e. CURRENT SUBBUS ERROR
      . - Displays sub bus errors
   f. SHOW LOGGED SUBBUS ERRORS
      . - Displays log of sub bus errors
   g. FIRMWARE REV.
      . - For service personnel
   h. BOOTCODE REV.
      . -For service personnel
   i. PART NUMBER
      . - Displays replacement part number of module

NOTE!

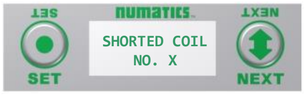
- **The UNSW POWER screen indicates the voltage level present on the UNSW (Node & Input) power pins (Pin No. 2 and 3) of the main power connector.**
- **A voltage level less than 19 volts will generate an error screen and an associated diagnostic bit (see 'Diagnostic' section for more details).**

4.18 Error Messages

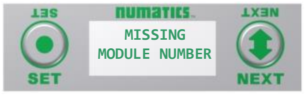
The following are automatic error messages that are displayed when specific faults occur during operation:


numatics
SET
SUB-BUS SHORT
NEXT

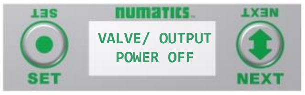
Displayed when a short circuit condition is detected on the Sub-Bus power lines.


numatics
SET
SHORTED COIL
NO. X
NEXT

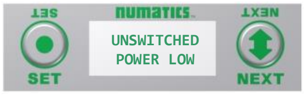
Displayed when a short circuit condition is detected on a valve coil


numatics
SET
MISSING
MODULE NUMBER
NEXT

Displayed when a Sub-Bus module that had been previously installed becomes absent from the configuration

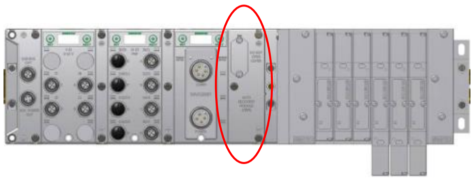

numatics
SET
VALVE/ OUTPUT
POWER OFF
NEXT

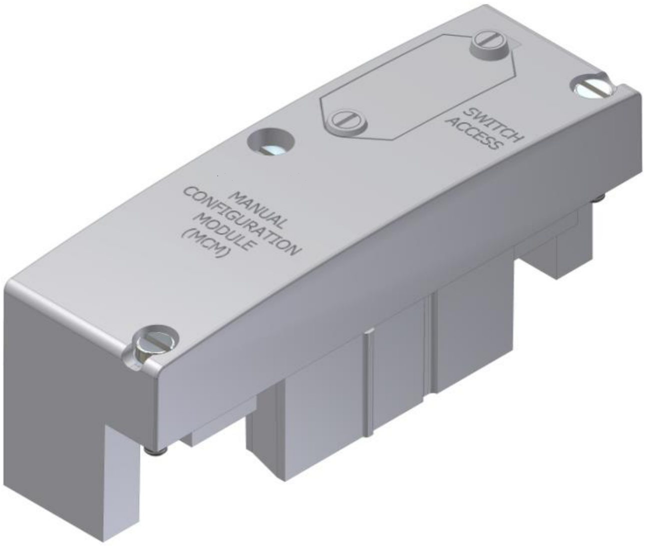
Displayed when +24 VDC on
Pin No. 1 & 4 (Valves and Outputs) is not present or below 22 VDC


numatics
SET
UNSWITCHED
POWER LOW
NEXT

Displayed when +24 VDC on
Pin No. 2 & 3 (Node and Inputs) is below 19 VDC

5. MCM – Manual Configuration Module (Optional)

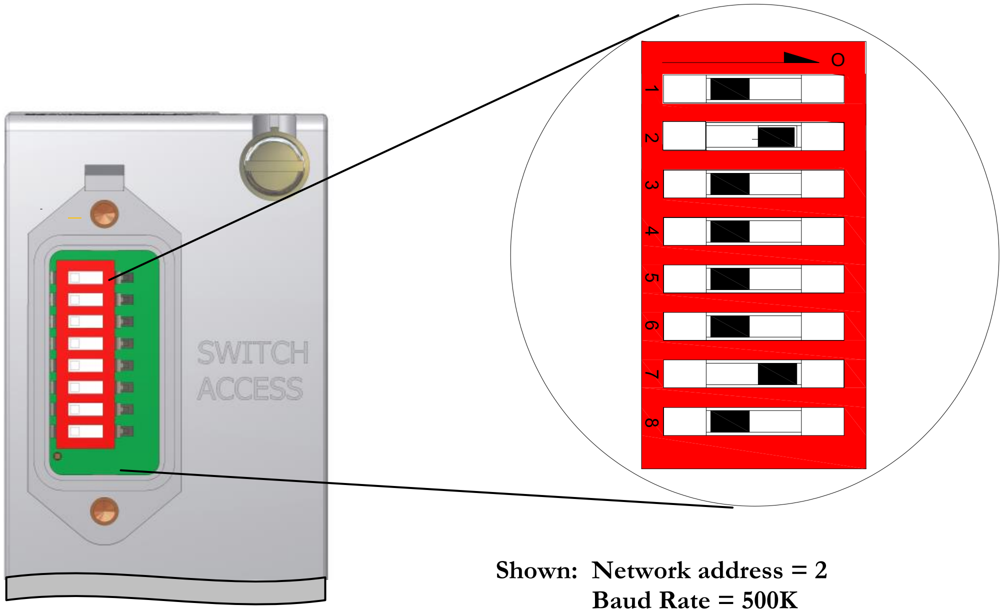




The MCM is an optional module that is installed between the node and the valve adapter module and allows the user to manually set, via DIP switches, the node address and baud rate without the need for software configuration or the use of the integrated graphic display in the node. If software configuration or configuration via the integrated graphic display in the node is preferred, this module is not necessary.

Description	*Replacement Part Number*
Complete Module	240-186

5.1 DIP Switch Settings



Shown: Network address = 2
Baud Rate = 500K

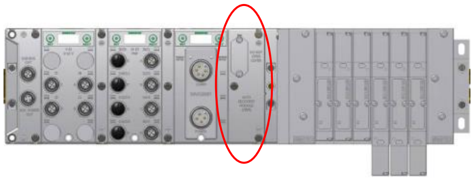
Network Address:

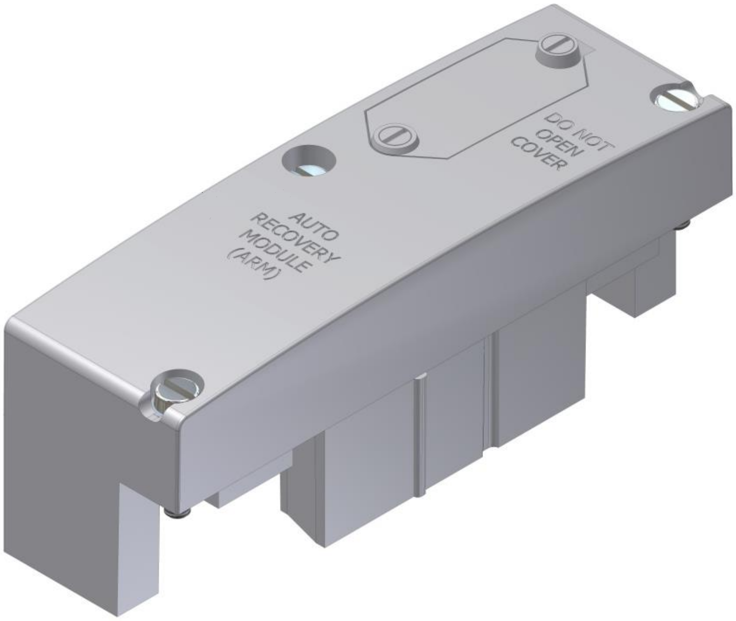
2^5=32 *SW-6*	2^4=16 *SW-5*	2^3=8 *SW-4*	2^2=4 *SW-3*	2^1=2 *SW-2*	2^0=1 *SW-1*	*Address Value (Decimal)*
OFF	OFF	OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	OFF	ON	ON	3
OFF	OFF	OFF	ON	OFF	OFF	4
ON	ON	ON	OFF	OFF	OFF	56
ON	ON	ON	ON	OFF	ON	61
ON	ON	ON	ON	ON	OFF	62
ON	ON	ON	ON	ON	ON	63

Baud Rate:

SW-7	*SW-8*	*Baud Rate*
Off	Off	125K
Off	On	250K
On	Off	500K
On	On	Auto-Baud

6. ARM – Auto Recovery Module (Optional)

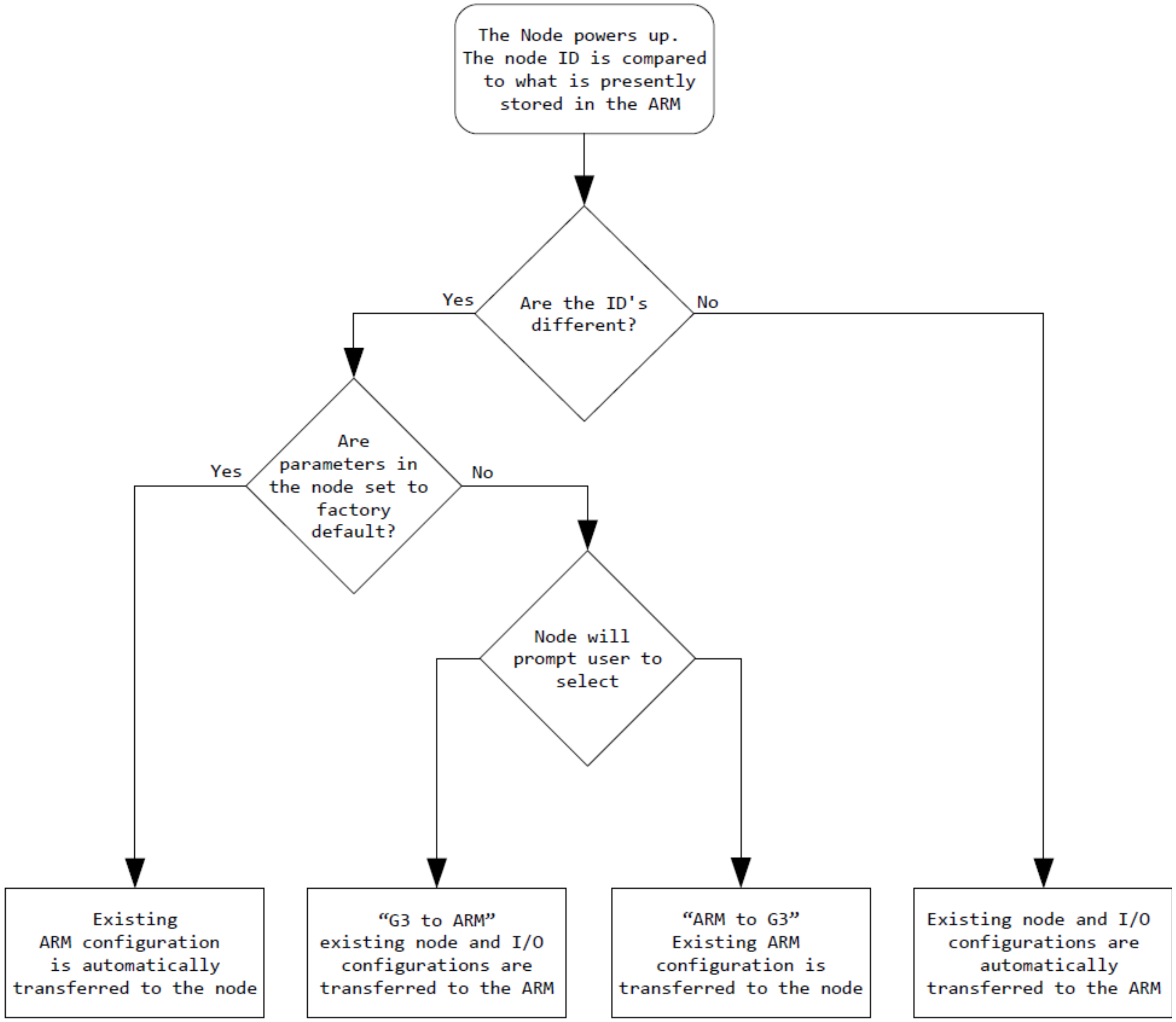




The Auto Recovery Module (ARM) is an optional memory module that is installed between the node and the valve adapter module and is used to preserve the manifold system parameters even during catastrophic failure. During the power-up process it reads the configuration of the manifold, including any user settable parameters of I/O modules, and stores the information in its non volatile memory. Once the information is stored, it automatically disconnects itself from the power circuits while still mechanically attached to the manifold.

Description	*Replacement Part Number*
Complete ARM Module	240-182

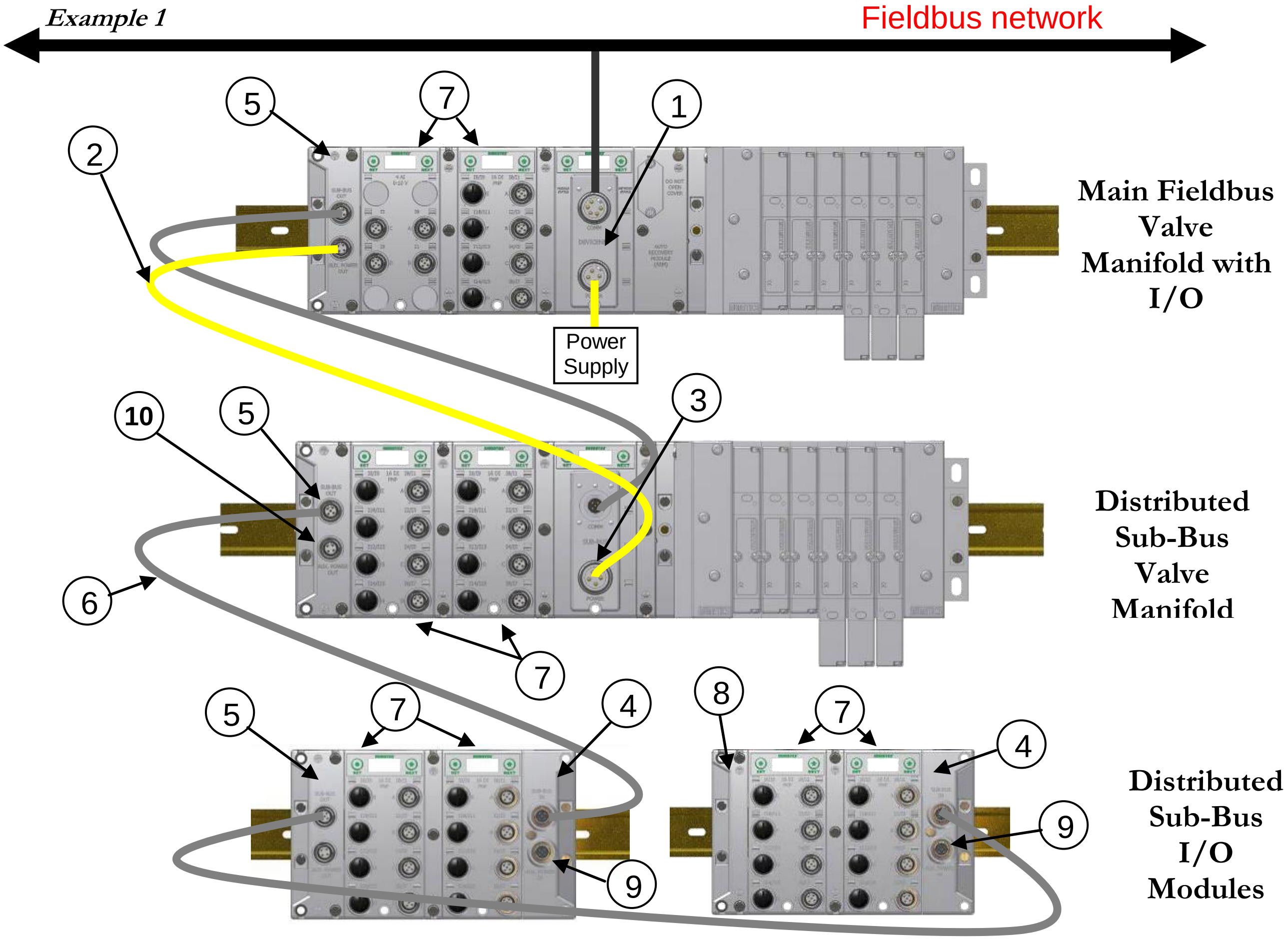
6.1 ARM process flowchart


The Node powers up. The node ID is compared to what is presently stored in the ARM
Are the ID's different?
Yes
No
Are parameters in the node set to factory default?
Yes
No
Node will prompt user to select
Existing ARM configuration is automatically transferred to the node
"G3 to ARM" existing node and I/O configurations are transferred to the ARM
"ARM to G3" Existing ARM configuration is transferred to the node
Existing node and I/O configurations are automatically transferred to the ARM

7. Distribution

Distribution of I/O capability can be easily achieved with the G3 platform by means of Sub-Bus modules. I/O modules, valve manifolds and/or a combination of both can be simply separated from the main manifold and distributed via a sub-bus communication cable. The G3 platform uses the same I/O modules on the main manifold as on the distribution chain. The main communication module can control up to 16 I/O modules either on the main manifold or as part of the sub-bus connections. To utilize the sub-bus distribution capabilities the Sub-Bus OUT module must be located on the end of the main communication manifold and a Terminator Module must be located at the last sub-bus component.

Example 1


Fieldbus network
5
7
1
2
Main Fieldbus Valve Manifold with I/O
Power Supply
10
5
3
Distributed Sub-Bus Valve Manifold
6
7
5
7
4
8
7
4
9
9
Distributed Sub-Bus I/O Modules

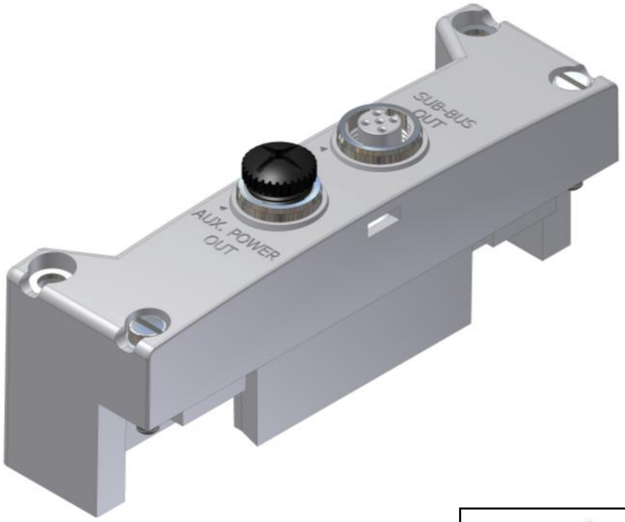
Detail No.	Description
1	Main Communication Module (Node)
2	Sub-Bus Power Cable (Can be connected to separate power supply for isolated power control)
3	Distributed Sub-Bus Valve Module
4	Sub-Bus IN module
5	Sub-Bus OUT module
6	Sub-Bus Communication Cable
7	I/O Modules
8	Terminator Module (Used to terminate sub-bus)
9	Aux. Power IN (Used to augment Input power and/or supply power to Output modules)
10	Aux. Power OUT (Can be used to supply power to distributed modules)

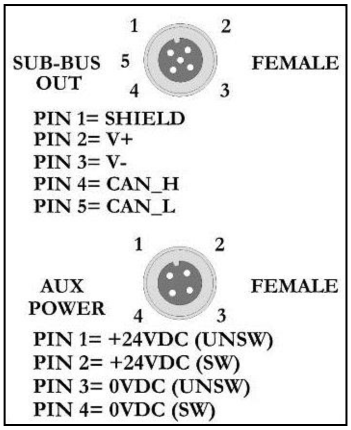
7.1 Sub-Bus Distribution Modules

Sub-Bus OUT Module

- **Used only when distributing the Sub-Bus to another assembly is required.**
- **Sub-Bus OUT - 5 pin M12 female communication connector.**
  - **Used to distribute the Sub-Bus to the next Sub-Bus assembly.**
  - **Carries 24 VDC power for electronics of the next module.**
- **AUX. POWER OUT - 4 pin M12 female aux. power connector.**
  - **Optional connection.**
  - **Used as a convenient way to distribute the power connection to the next Sub-Bus assembly.**

Description	*Replacement Part Number*
Sub-Bus OUT Module with Din Rail Mounting	240-244
Sub-Bus OUT module without Din Rail Mounting	240-183





PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L

PIN 1= +24VDC (UNSW)
PIN 2= +24VDC (SW)
PIN 3= 0VDC (UNSW)
PIN 4= 0VDC (SW)

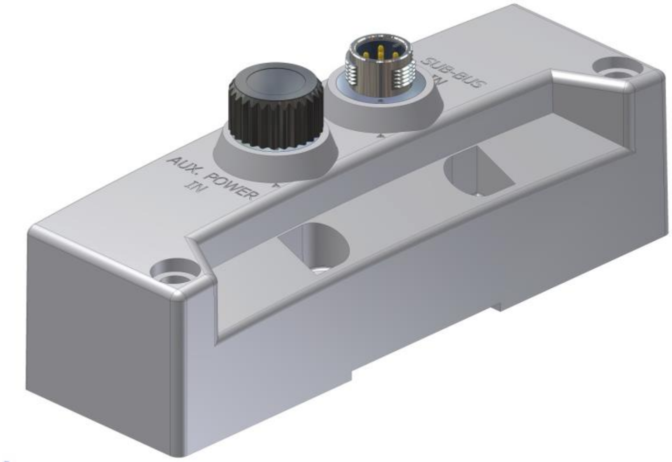
Sub-Bus IN Modules

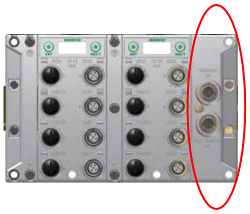
- Used to distribute I/O assemblies that do not have valves
    - Must be installed to the right of the I/O modules.

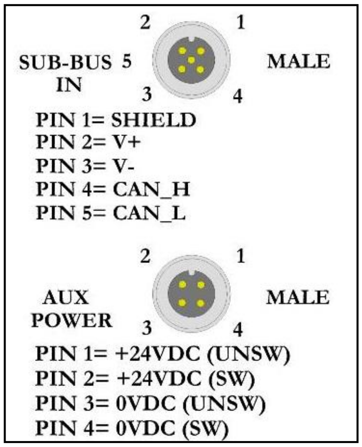
- SUB-BUS IN - 5 pin M12 male communication connector.
    - Must be connected to the Sub-Bus Out connector of the previous assembly
    - Carries 24 VDC power for electronics of module

- AUX. POWER IN - 4 pin M12 male connector.
    - Aux power is required for Output modules. This connection also allows Output power to be interrupted to all Output modules connected to this module.
    - Aux. Power is optional for Inputs. Power from the SUN-BUS IN connection is used to power sensors but can be augmented, if necessary, by adding additional power to this connector.

Description	*Part Number*
Sub-Bus IN module with Din Rail Mounting	240-246
Sub-Bus IN module without Din Rail Mounting	240-185







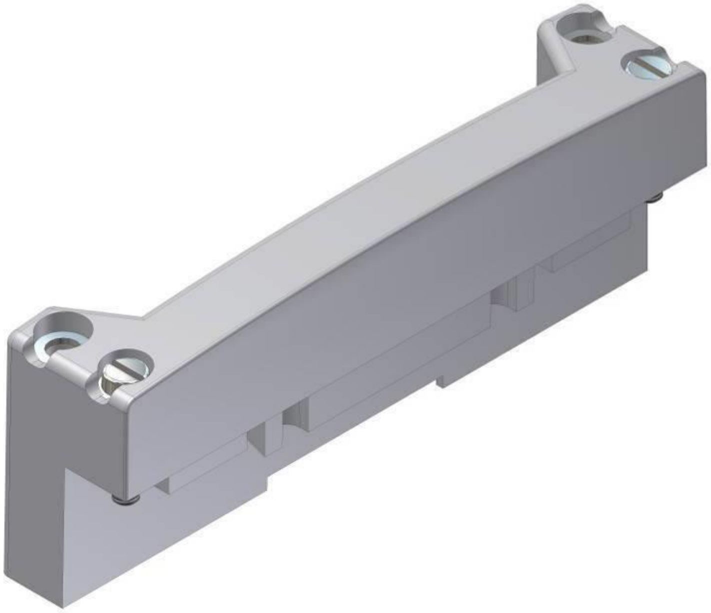
PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L

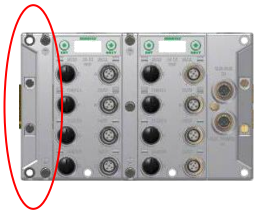
PIN 1= +24VDC (UNSW)
PIN 2= +24VDC (SW)
PIN 3= 0VDC (UNSW)
PIN 4= 0VDC (SW)

Terminator Module

- **Used to terminate SUB-BUS connections.**
    - **Must be installed on the left side of the last Sub-Bus module.**

Description	*Part Number*
Terminator Module with Din Rail Mounting	240-245
Terminator Module without Din Rail Mounting	240-184





NOTE!

The terminator module is required to be installed in the G3 system for proper operation

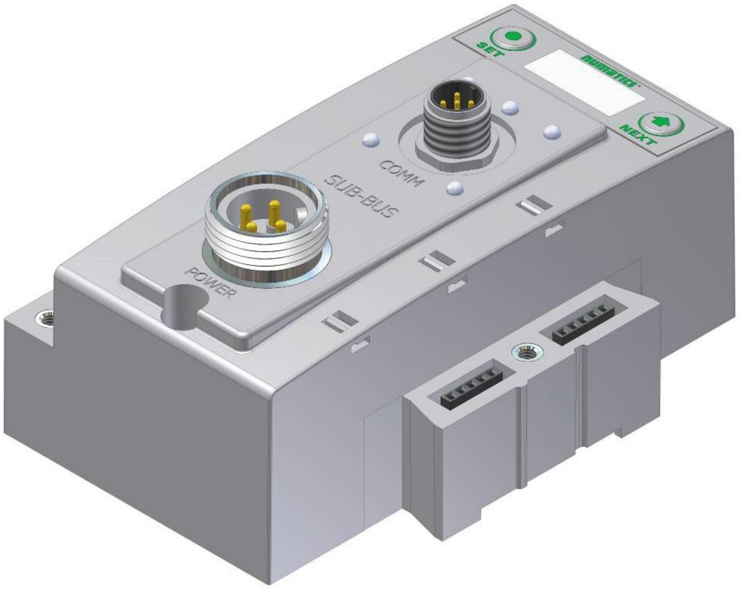
Sub-Bus Valve Module

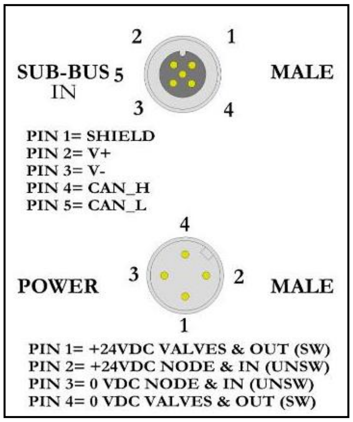
- COMM - 5 pin M12 male Sub-Bus input communication connector.
  - Must be connected to the SUB-BUS OUT connector of the previous assembly
  - Carries 24 VDC power for electronics of module

- POWER - 4 pin MINI male power connector.
  - Power is required for Outputs

- Used to distribute Valves on the Sub-Bus.
  - Can accept discrete I/O module to allow a Sub-Bus Valve manifold with I/O

Description	*Part Number*
Sub-Bus Valve Module	240-241





PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L

PIN 1= +24VDC VALVES & OUT (SW)
PIN 2= +24VDC NODE & IN (UNSW)
PIN 3= 0 VDC NODE & IN (UNSW)
PIN 4= 0 VDC VALVES & OUT (SW)

NOTE!

There is a 0.8 VDC drop in power across this module.
Please consider this when distributing the Aux. Power after this module.

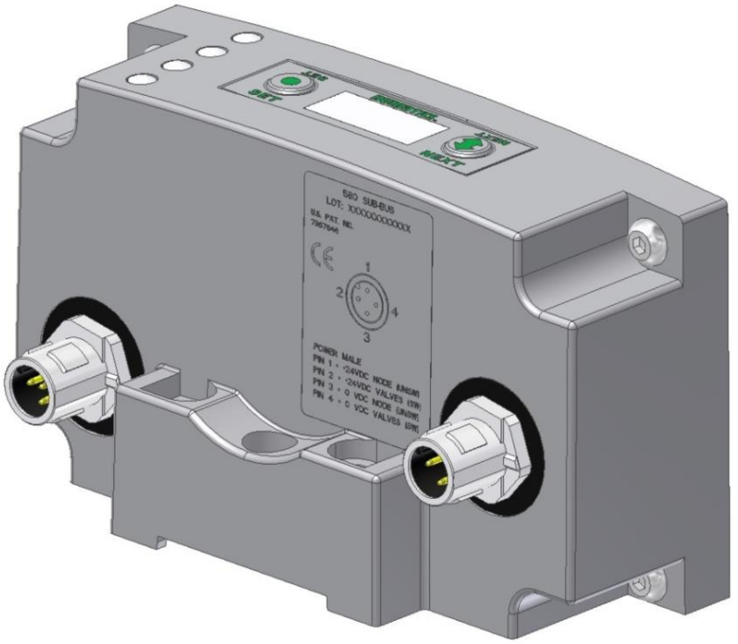
Sub-Bus Valve Module

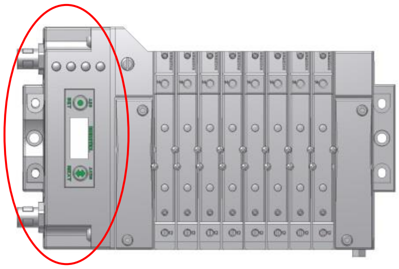
- COMM - 5 pin M12 male Sub-Bus communication connector.
  - Must be connected to the SUB-BUS OUT connector of the previous assembly
  - Carries 24 VDC power for electronics of module

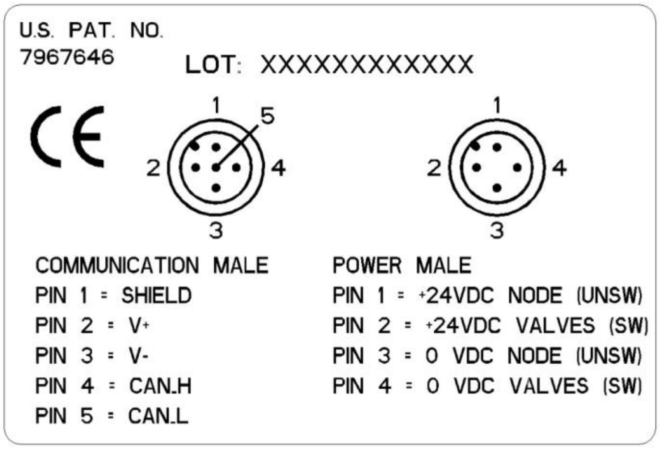
- POWER - 4 pin M12 male power connector.
  - Power is required for Outputs

- Used to distribute Valves on the Sub-Bus.
  - Does not allow connection to G3 I/O modules.

Description	*Part Number*
Sub-Bus Valve Module without I/O	P580AEDS4010A00







U.S. PAT. NO.
7967646
LOT: XXXXXXXXXXXX

COMMUNICATION MALE
PIN 1 = SHIELD
PIN 2 = V+
PIN 3 = V-
PIN 4 = CAN.H
PIN 5 = CAN.L

POWER MALE
PIN 1 = +24VDC NODE (UNSW)
PIN 2 = +24VDC VALVES (SW)
PIN 3 = 0 VDC NODE (UNSW)
PIN 4 = 0 VDC VALVES (SW)

Sub-Bus Hub Module

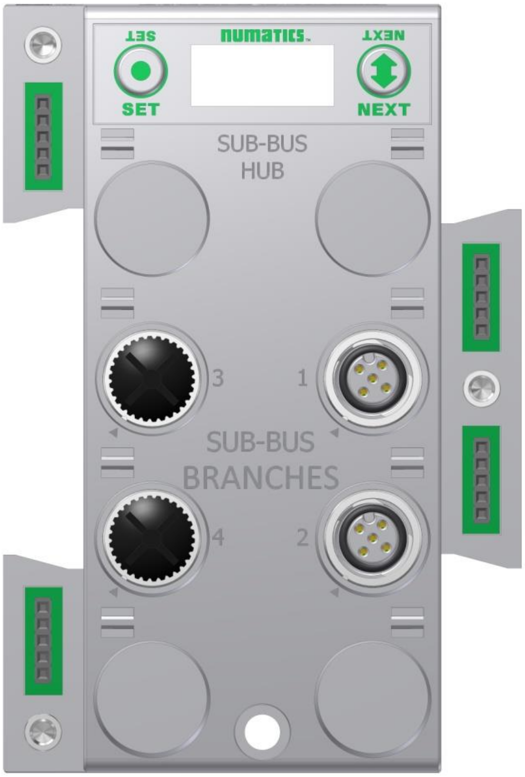
The G3 HUB module allows for branch distribution from the I/O side of the G3 System and can be integrated into the existing G3 Series Sub-Bus configuration. Auto Addressing allows for trouble free set up and configuration. Input, Output, as well as Valve manifolds can be attached to the available four Branches on a HUB module. Each G3 System can support up to two HUB modules, allowing for maximum flexibility. The HUB module is transparent to the I/O side of the G3 and does not reserve one of the potential sixteen positions.

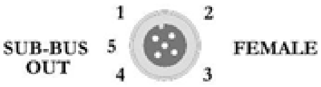
- Used when distributing the Sub-Bus to another assembly.

- SUB-BUS OUT - 5 pin M12 female communication connector.
  - Used to distribute the Sub-Bus to the next Sub-Bus assembly.
  - Carries 24 VDC power (up to 3A) for electronics of the next module.

- Cannot connect a Hub to a branch of another Hub
- Each branch of the Hub can accommodate a sub-bus cable length of 30 meters.

Description	*Part Number*
Sub-Bus Hub Module	240-326





PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L

7.2 Sub-Bus Cables

M12 STRAIGHT 5 PIN MALE TO FEMALE SUB-BUS CABLE - SHIELDED
TA0501MGDTC0571P – 1 Meter
TA0505MGDTC0571P – 5 Meter
TA0510MGDTC0571P – 10 Meter

M12 STRAIGHT 5 PIN FEMALE FIELD WIREABLE CONNECTOR, SPRING CAGE
TC05F2000000071V – PG9

M12 STRAIGHT 5 PIN MALE FIELD WIREABLE CONNECTOR, SPRING CAGE
TA05F2000000071V – PG9

M12 90° 5 PIN FEMALE FIELD WIREABLE CONNECTOR, SPRING CAGE
TD05F2000000071V – PG9

M12 90° 5 PIN MALE FIELD WIREABLE CONNECTOR, SPRING CAGE
TB05F2000000071V – PG9

BULK SUB-BUS CABLE	*NOTE
000550MGD0005000 – 50 Meter Length	
0005A0MGD0005000 – 100 Meter Length	

* Note:
Length of field wired cables should not exceed the maximum length of 30 meters for total sub-bus communications link. See appropriate technical manual for sub-bus length requirements. The cable assemblies and Bulk cable are the only approved cables for the G3 Sub-Bus link. See technical document TDG3SBWD1-0EN for proper installation and wiring of field wireable connectors.

Technical Data

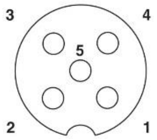
TECHNICAL DATA	CABLE	CONNECTORS	BULK CABLE
Molded Body / Insert	TPU	Zinc - Nickel Plated	N/A
Coupling Nut	Zinc - Nickel Plated	Brass - Nickel Plated	N/A
Cable Jacket Material	PUR	N/A	Gray RAL 7001
Cable O.D.	6.70 mm	N/A	6.70 mm
Voltage Rating (Nominal)	60 Volts	60 Volts	60 Volts
Current Rating	4.0 Amps	4.0 Amps	4.0 Amps
Degree of Protection	IP65 (mated)	IP65 (mated)	IP65 (terminated)
Operating Temperature	-40° C - 80° C	-40° C - 80° C	-20° C - 75° C
Conductor Gauge	24 AWG Signal 22 AWG Power	26-20 AWG	24 AWG Signal 22 AWG Power
Bend Radius	67 mm	N/A	67 mm
No. of Bending Cycles	5 Million	N/A	5 Million

G3 Sub-Bus Field Wiring Directions

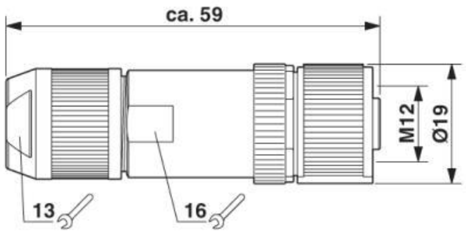
The purpose of this document is to instruct the end user of the proper wiring techniques required to make a G3 Sub-Bus cable from the available bulk cable and field wireable ends. The effectiveness of the resultant assembly remains on the end user and may have bearing on the proper functionality of the G3 Sub-Bus operation; please follow the manufacturer's Cable Assembly Procedure properly.

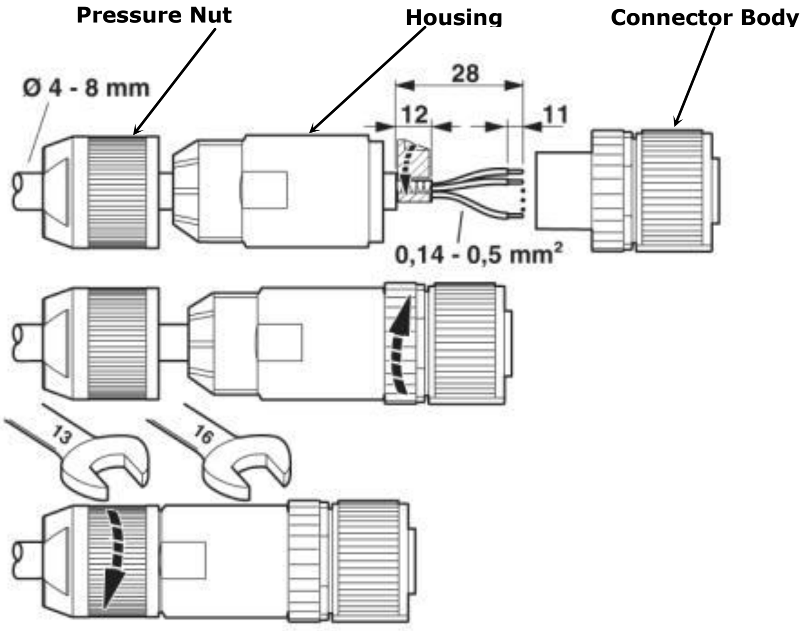
Cable Assembly Procedure

Step No.1 Cut cable to desired length.
Step No.2 Run cable through Pressure Nut and Housing.
Step No.3 Strip cable jacket back 28mm (1.10") for straight connectors and 35mm (1.38") for 90° connectors.
Step No.4 Remove shielding from end of wires back approximately 16mm (.630").
Step No.5 Apply shielding foil provided, around the shortened end of the shielding.
Step No.6 Strip individual conductors back approximately 11mm (.433").
Step No.7 Push stranded wires into appropriate colored terminal.
Step No.8 Attach the connector body onto the housing and tighten.
Step No.9 Attach the pressure nut on the back side and tighten
Step No.10 Confirm Continuity between all pins.



1 = Shield Wire (must be connected)
2 = Red
3 = Black
4 = White
5 = Blue



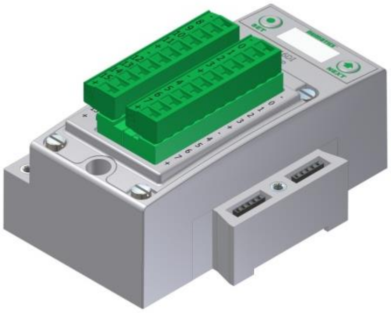


8. Digital I/O Modules

8.1 Digital I/O Module Rules

The maximum number of modules that can be used on the Discrete I/O side of the manifold is 16. These modules can be centralized on the main fieldbus manifold, distributed or a combination of both. Modules can be connected in any combination of inputs, outputs and specialty up to the physical limitation of 16 modules.

Input Module Types



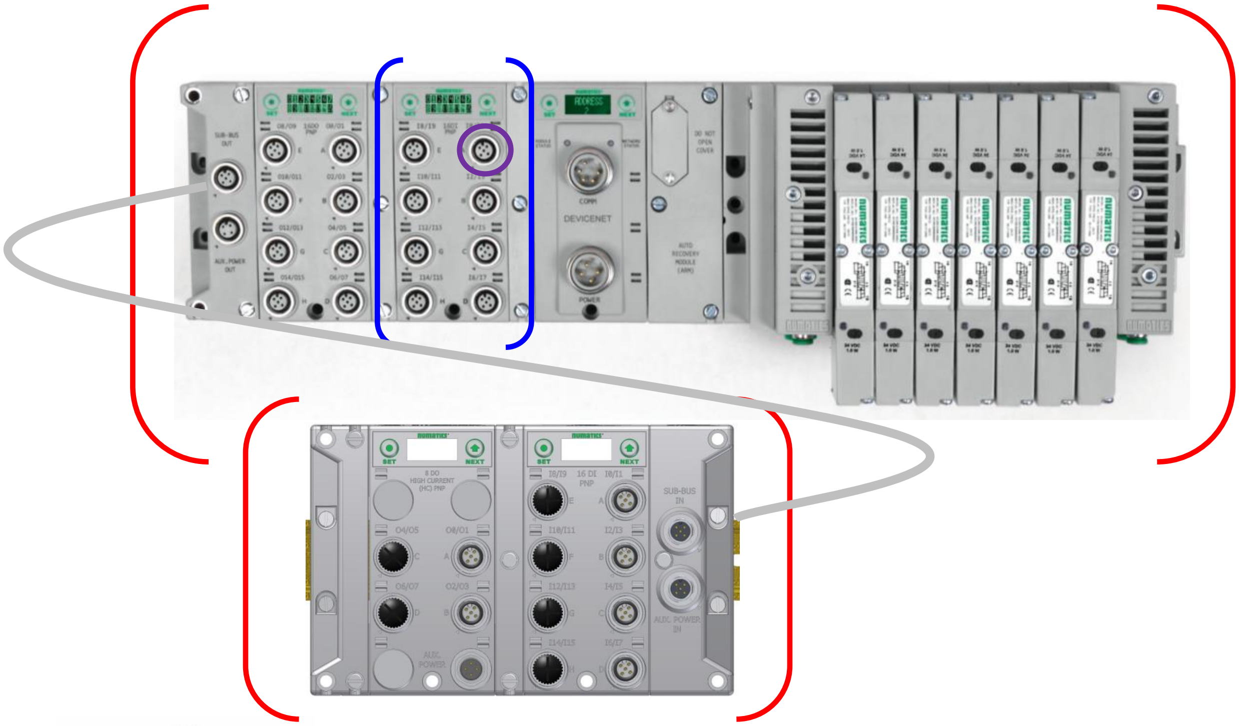
Output Module Types

Input/Output Module Types

Valve Side Output Module Types

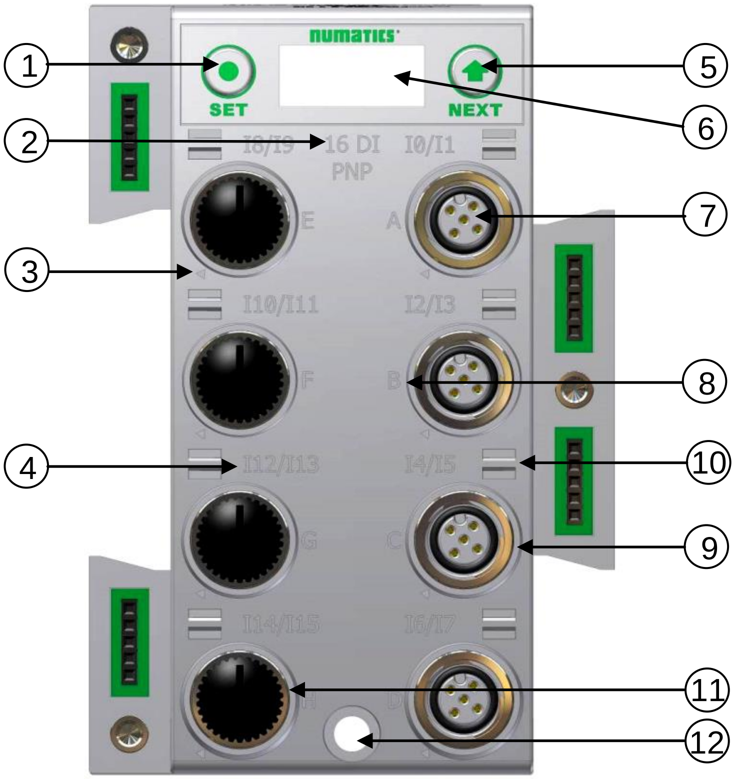
8.2 I/O Module Technical Data

Module No.	Description	Connector Type	Current Limitation for Module	Current Limitation for connector	Current Limitation for manifold assy.
240-203	16 PNP Inputs	Terminal Strip	1.2A	.30A for each +24VDC terminal	4A for +24 Valves and Outputs 4A for +24 Node and Inputs
240-204	16 NPN Inputs				
240-205	16 PNP Inputs	M12	1.2A	.15A (Pin 1 to Pin 3)	
240-206	8 PNP Inputs	M12	1.2A	.15A (Pin 1 to Pin 3)	
240-207	16 PNP Outputs	M12	1.2A	.50A (Pin 3 to Pin 2/4)	
240-208	8 PNP Outputs	M12	1.2A	.50A (Pin 3 to Pin 2/4)	
240-209	16 NPN Inputs	M12	1.2A	.15A (Pin 1 to Pin 3)	
240-210	8 NPN Inputs	M12	1.2A	.15A (Pin 1 to Pin 3)	
240-211	8 PNP Input and 8 PNP Outputs	M12	1.2A	.50A / output connector (Pin 3 to Pin 2/4) .15A / input connector (Pin 1 to Pin 3)	
240-212 240-213 240-214 240-215	Analog IO modules	M12	1.2A	.15A (Pin 1 to Pin 3)	
240-300	8 High Current Outputs	M12	8A (From Aux. Power Conn.)	2.0A / output connector (1.0A Pin 3 to Pin 2) (1.0A Pin 3 to Pin 4)	N/A
240-307	2 Analog Inputs and 2 High Current Analog Outputs	M12	4A (From Aux. Power Conn.)	2.0A (Pin 3 to Pin 4)	N/A
240-311	RTD	M12	1.2A	N/A	4A for +24 Valves and Outputs 4A for +24 Node and Inputs
240-316	8 PNP Inputs	Terminal Strip	1.2A	.30A for each +24VDC terminal	
240-323	16 PNP Inputs	Terminal Strip	1.2A	.30A for each +24VDC terminal	
240-330	16 PNP Outputs	Terminal Strip	1.2A	.50A / output connector	



8.3 I/O Module Descriptions & Menus

Detail No.	Description
1	"Set" Button – used to navigate through user menus and set parameters
2	Module Function (I/O Type)
3	Alignment arrow for SPEEDCON connector
4	Bit Designation for I/O
5	"Next" Button – used to navigate through user menus and set parameters
6	Graphic Display
7	5 Pin M12 female I/O connector
8	Connector designation
9	Metal threads for SPEEDCON connector
10	Slot for text ID tags
11	Dust Cover
12	Mounting hole


1
2
3
4
5
6
7
8
9
10
11
12
numatics
SET
NEXT
I8/I9
16 DI
PNP
I0/I1
E
A
I10/I11
I2/I3
F
B
I12/I13
I4/I5
G
C
I14/I15
I6/I7
H
D

NOTE All dust covers must be tightened to a torque of 4-6 in. lbs. to maintain the IP65 integrity.

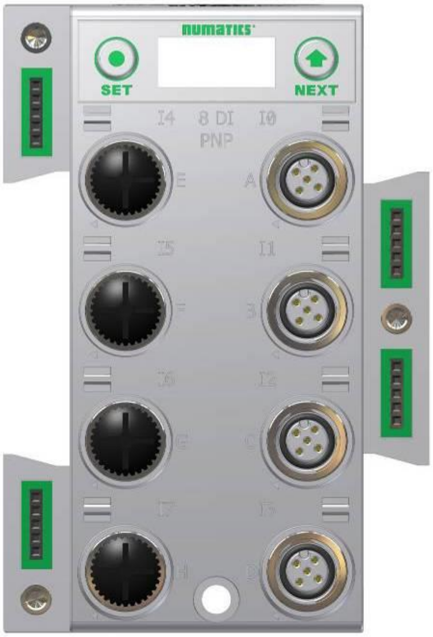
8.4 Digital Input Modules

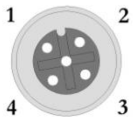
One Digital Input per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Input Points*
240-210	NPN (Sinking)	YES – Visual	YES – Optional	8
240-206	PNP (Sourcing)			

Input Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X+1 (Selectable)	Conn. H SCP Status	Conn. G SCP Status	Conn. F SCP Status	Conn. E SCP Status	Conn. D SCP Status	Conn. C SCP Status	Conn. B SCP Status	Conn. A SCP Status

SET
NEXT
I4
8 DI
PNP
E
F
G
H
I5
I6
I7





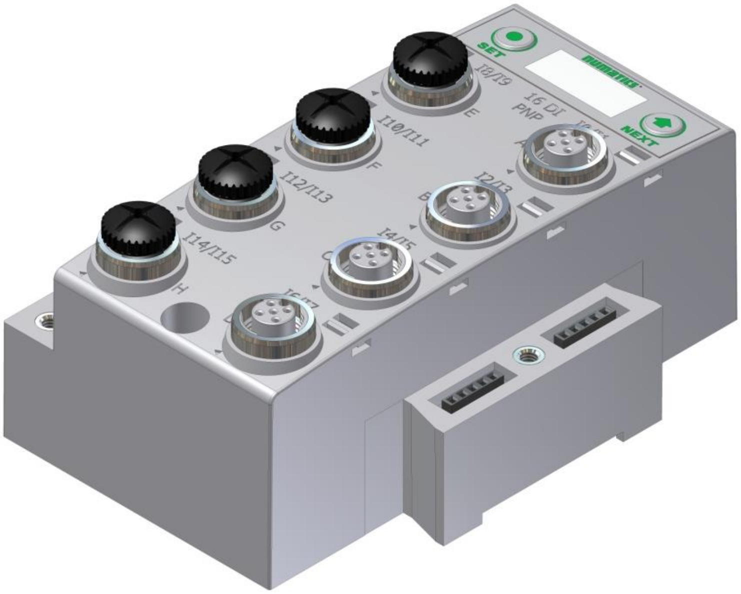
FEMALE

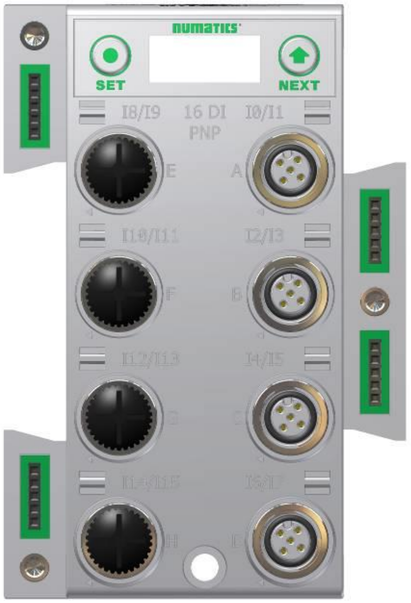
PIN 1= +24VDC (UNSW)
PIN 2= NOT USED
PIN 3= 0VDC (UNSW)
PIN 4= INPUT 1

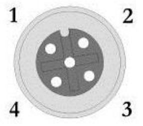
Two Digital Inputs per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Input Points*
240-209	NPN (Sinking)	YES – Visual	YES – Optional	16
240-205	PNP (Sourcing)			

Input Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X+1 (Required)	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8
X+2 (Selectable)	Conn. H SCP Status	Conn. G SCP Status	Conn. F SCP Status	Conn. E SCP Status	Conn. D SCP Status	Conn. C SCP Status	Conn. B SCP Status	Conn. A SCP Status


SET
NEXT
I8/I9
16 DI PNP
I10/I11
I12/I13
I14/I15
I2/I3
I4/I5
E
F
G
H
A
B


SET
NEXT
I8/I9
16 DI PNP
I0/I1
E
A
I10/I11
I2/I3
F
B
I12/I13
I4/I5
I14/I15
I6/I7
H



FEMALE

PIN 1= +24VDC (UNSW)
PIN 2= INPUT 2
PIN 3= 0VDC (UNSW)
PIN 4= INPUT 1

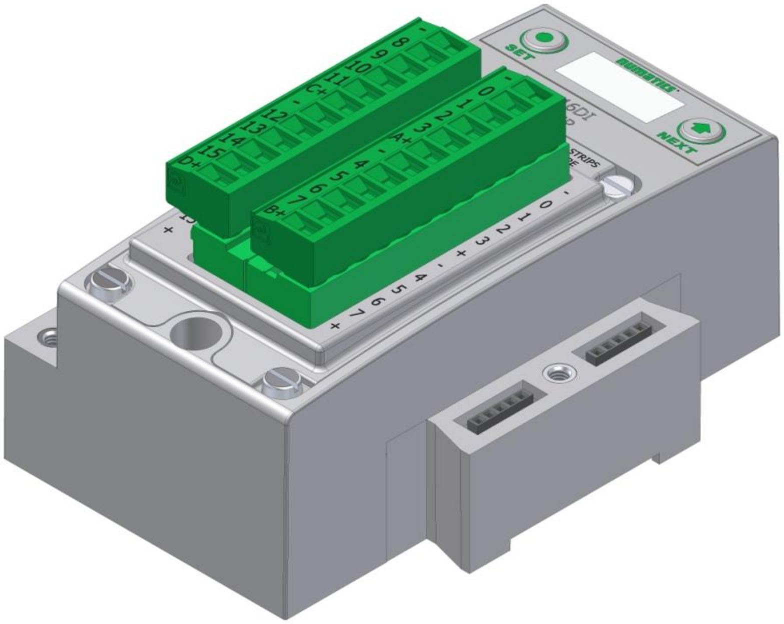
Sixteen Digital Inputs – Terminal Strip Modules

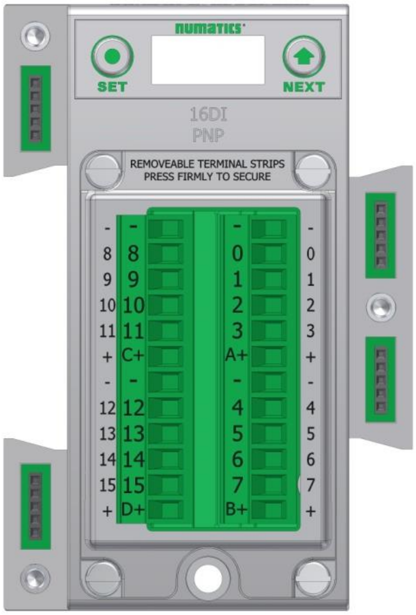
Specifications
- Wire Size Range: 12 to 24 AWG
- Strip Length: 7mm
- Terminal Tightening Torque: 0.5 Nm

Module Part No.	*I/O Type*	*Short Circuit Protection (SCP)*	*Short Circuit Protection Status Bits*	*Input Points*
240-203	PNP (Sourcing)	YES Visual and Logical Status Bits	4 user enabled bits monitor Short Circuits on the four different + voltage connections of terminal strip	16
240-204	NPN (Sinking)			

Input Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X+1 (Required)	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8
X+2 (Selectable)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	SCP Status 1 = Fault D+	SCP Status 1 = Fault C+	SCP Status 1 = Fault B+	SCP Status 1 = Fault A+


SET
NEXT
16DI


SET
NEXT
16DI
PNP
REMOVEABLE TERMINAL STRIPS
PRESS FIRMLY TO SECURE
8
9
10
11
C+
12
13
14
15
D+
0
1
2
3
A+
4
5
6
7
B+

Eight Digital Inputs – Terminal Strip Modules

Specifications

- Wire Range: 12 to 24 AWG
- Strip Length: 7mm
- Tightening Torque: 0.5 Nm

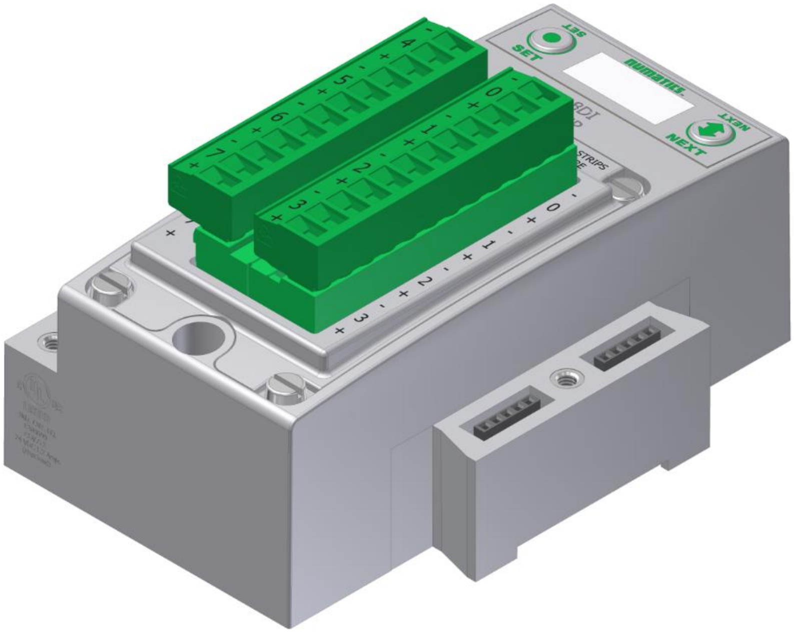
Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Input Points*
240-316	PNP (Sourcing)	YES	YES	8

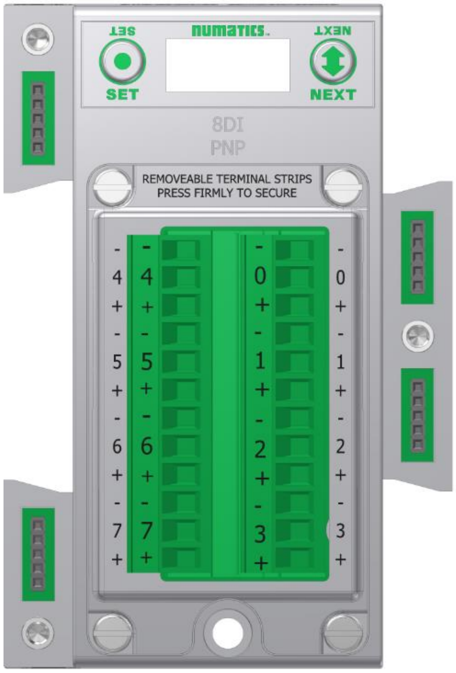
Input Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0

Diagnostic Telegram

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Selectable)	Input 7 SCP Status	Input 6 SCP Status	Input 5 SCP Status	Input 4 SCP Status	Input 3 SCP Status	Input 2 SCP Status	Input 1 SCP Status	Input 0 SCP Status


SET
NEXT
numatics
8DI


SET
numatics
NEXT
SET
NEXT
8DI
PNP
REMOVEABLE TERMINAL STRIPS
PRESS FIRMLY TO SECURE
4
5
6
7
0
1
2
3

Intrinsically safe [Ex ia] NAMUR Compatible Input Module

One Digital Input per Connector – M12 Female

Input module is for use with NAMUR certified intrinsically safe (IS) sensors. The module can be placed in any G3 I/O position available, but must be used in conjunction with appropriate clips with partition plates (see picture on page 70). This module is for use with (IS) sensors (certified to EN 60947-5-6) where the sensor is placed within the hazardous area, (e.g. ATEX 0-20, 1-21, and 2-22). This [Ex ia] module is part of the G3 electronics platform, which is designed to reside outside of the hazardous environment or in Zone 2-22, inside of a cabinet with appropriate ingress protection. The partition plate clips, used between standard G3 modules and [Ex ia] modules, are required to maintain ATEX approval. The 8.2 V sensor supply for each input connector is short circuit protected.

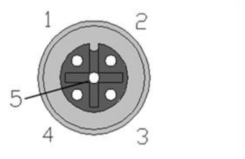
Part Numbers and Mapping

Module Part No.	*I/O Type*	*Short Circuit /Open Circuit Protection*	*Short Circuit /Open Circuit Present Status Bits*	*Input Points*
240-320	NAMUR	YES - Visual	YES - Optional	8

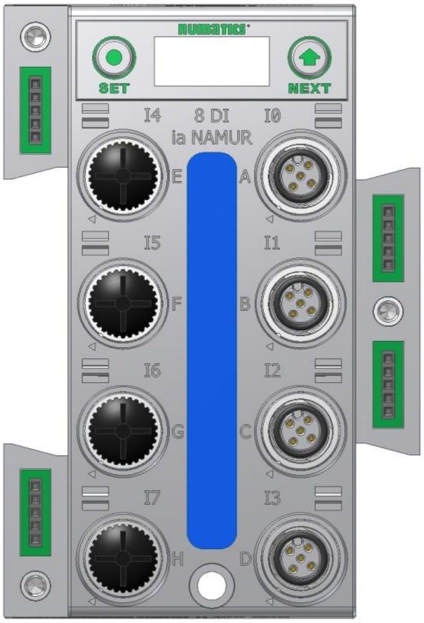
Input Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X	Conn. H SC Status	Conn. G SC Status	Conn. F SC Status	Conn. E SC Status	Conn. D SC Status	Conn. C SC Status	Conn. B SC Status	Conn. A SC Status
X + 1	Conn. H Open Status	Conn. G Open Status	Conn. F Open Status	Conn. E Open Status	Conn. D Open Status	Conn. C Open Status	Conn. B Open Status	Conn. A Open Status

B.

I4
I5
I6
I7
E
F
G
H
8 DI
ia NAMUR
SET
NEXT



FEMALE
PIN 1 = SENSOR +
PIN 2 = SENSOR –
PIN 3 = Not Connected
PIN 4 = Not Connected
PIN 5 = Not Connected

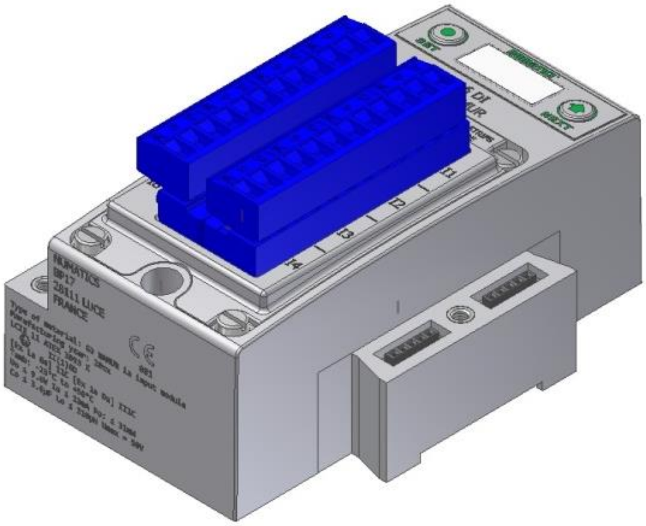


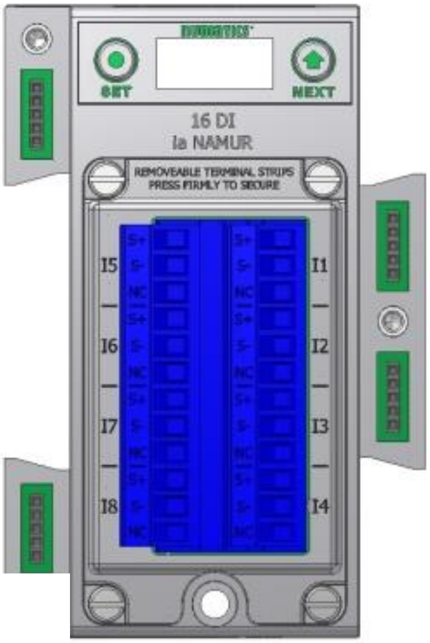
Intrinsically safe [Ex ia] NAMUR Compatible Input terminal strip module

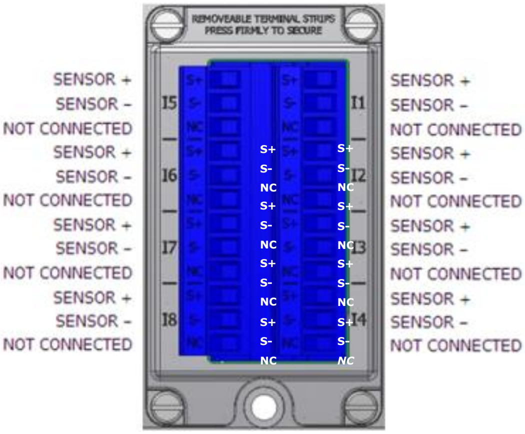
Module Part No.	*I/O Type*	*Short Circuit /Open Circuit Protection*	*Short Circuit /Open Circuit Present Status Bits*	*Input Points*
240-322	NAMUR	YES - Visual	YES - Optional	8

Input Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X	Conn. H SC Status	Conn. G SC Status	Conn. F SC Status	Conn. E SC Status	Conn. D SC Status	Conn. C SC Status	Conn. B SC Status	Conn. A SC Status
X + 1	Conn. H Open Status	Conn. G Open Status	Conn. F Open Status	Conn. E Open Status	Conn. D Open Status	Conn. C Open Status	Conn. B Open Status	Conn. A Open Status

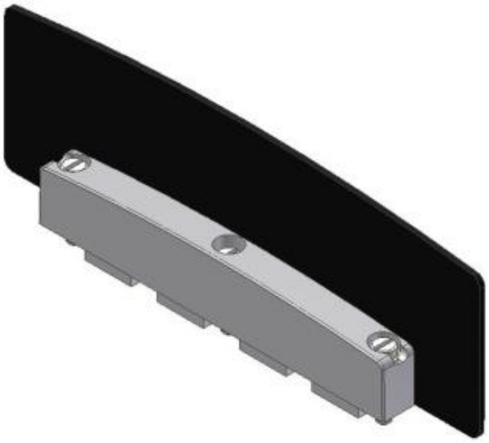

SET
NEXT
I1
I2
I3
I4


SET
NEXT
16 DI
Ia NAMUR
REMOVEABLE TERMINAL STRIPS
PRESS FIRMLY TO SECURE
I5
I6
I7
I8
I1
I2
I3
I4

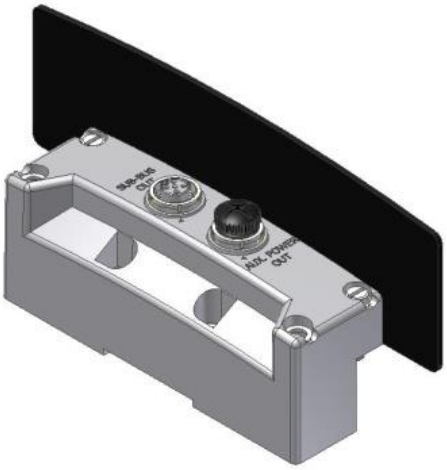

REMOVEABLE TERMINAL STRIPS
PRESS FIRMLY TO SECURE
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED
I5
I6
I7
I8
S+
S-
NC
I1
I2
I3
I4
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED
SENSOR +
SENSOR -
NOT CONNECTED

Intrinsically safe [Ex ia] Support Modules

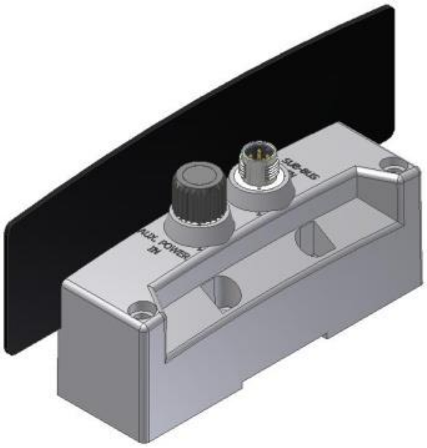
Mechanical isolation between standard and [Ex ia] modules is mandatory to fulfill ATEX certification. Clips with Partition Plates are available to achieve the required isolation.



G3 [Ex ia] Clip 240-317


SUB-BUS OUT
AUX. POWER OUT

G3 [Ex ia] Sub-Bus Out 240-318


AUX. POWER IN
SUB-BUS IN

G3 [Ex ia] Sub-Bus In 240-319

19 Pin M23 Input Module

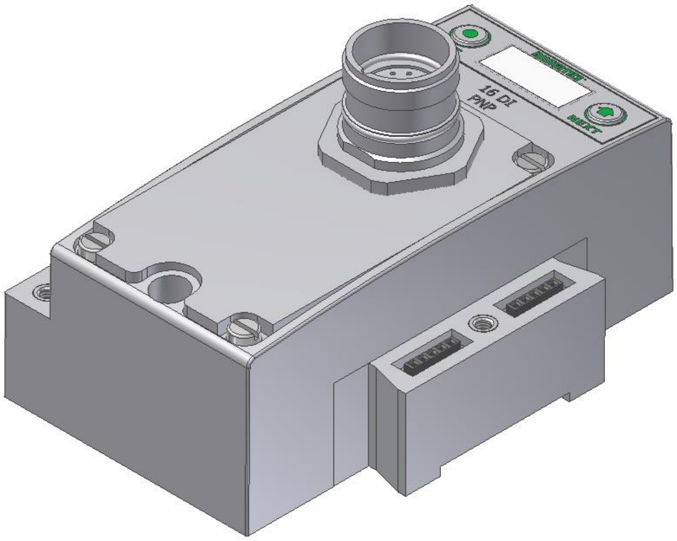
The 19 Pin M23 Input module is for use with any Input block available from Phoenix Contact, Turck, Brad Harrison, etc. It can also be used with a single ended 19 Pin Cable.

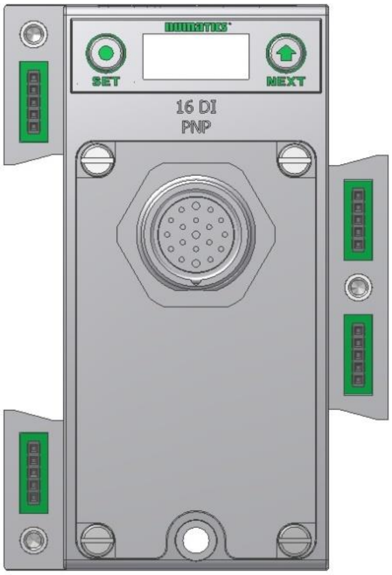
Part Numbers and Mapping

Module Part No.	*I/O Type*	*Short Circuit /Open Circuit Protection*	*Short Circuit /Open Circuit Present Status Bits*	*Input Points*
240-323	Digital	YES - Visual	YES - Optional	16

Input Mapping

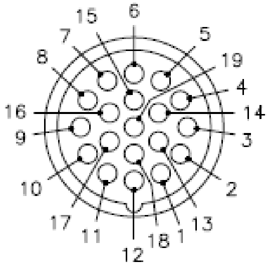
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8
X + 1	Short Circuit	Short Circuit	Short Circuit	Short Circuit	Short Circuit	Short Circuit	Short Circuit	Short Circuit





Pin Out Information

Pin 1 = Input 14
Pin 2 = Input 10
Pin 3 = Input6
Pin 4 = Input 3
Pin 5 = Input 2
Pin 6 = 0 VDC
Pin 7 = Input 1
Pin 8 = Input 5
Pin 9 = Input 9
Pin 10 = Input 13
Pin 11 = Input 12
Pin 12 = P.E.
Pin 13 = Input 11
Pin 14 = Input 7
Pin 15 = Input 0
Pin 16 = Input 4
Pin 17 = Input 8
Pin 18 = Input 15
Pin 19 = + 24 VDC



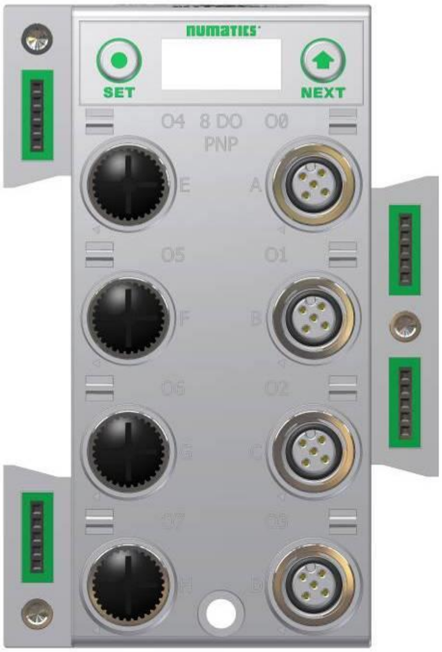
8.5 Digital Output Modules

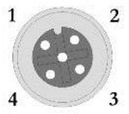
One Digital Output per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*
240-208	PNP (Sourcing)	YES – Visual	YES (8) – Optional	8

Output Mapping								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
X (Required)	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0
Input Mapping								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
X (Selectable)	Output 7 Status	Output 6 Status	Output 5 Status	Output 4 Status	Output 3 Status	Output 2 Status	Output 1 Status	Output 0 Status

SET
NEXT
O4 8 DO PNP
O5
O6
O7
O1
O2
O3
E
F
G
H





FEMALE

PIN 1= +24VDC (SW)
PIN 2= NOT USED
PIN 3= 0VDC (SW)
PIN 4= OUTPUT 1

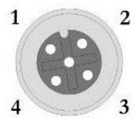
Two Digital Outputs per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*
240-207	PNP (Sourcing)	YES – Visual	YES (8) – Optional	16

Output Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0
X+1 (Required)	Output 15	Output 14	Output 13	Output 12	Output 11	Output 10	Output 9	Output 8
Input Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Selectable)	Output 7 Status	Output 6 Status	Output 5 Status	Output 4 Status	Output 3 Status	Output 2 Status	Output 1 Status	Output 0 Status
X+1 (Selectable)	Output 15 Status	Output 14 Status	Output 13 Status	Output 12 Status	Output 11 Status	Output 10 Status	Output 9 Status	Output 8 Status

SET
O8/O9
16 DO
PNP
NEXT
O10/O11
O12/O13
O14/O15
O2/O3
O4/O5
O6/O7

SET
NEXT
O8/O9
16 DO
PNP
O0/O1
E
A
O10/O11
O2/O3
F
B
O12/O13
O4/O5
G
C
O14/O15
O6/O7



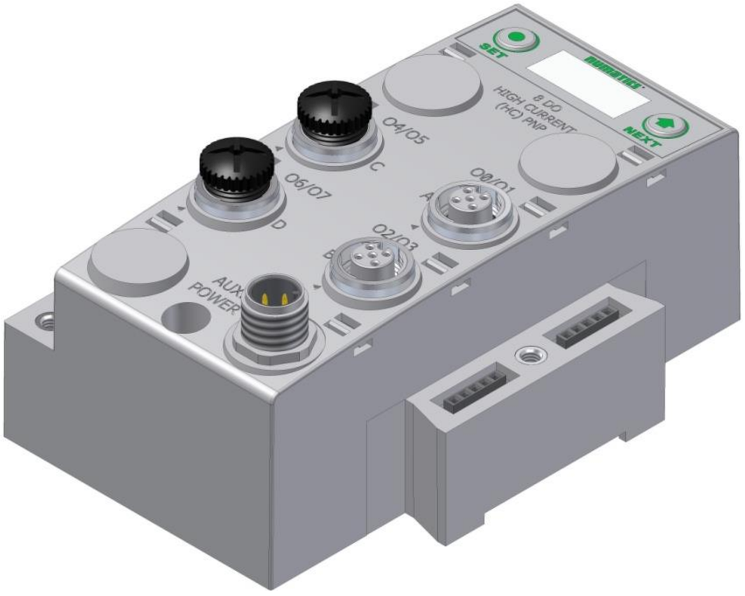
FEMALE

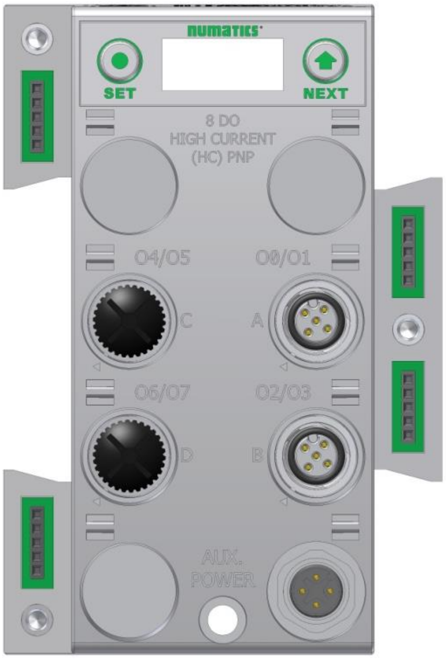
PIN 1= +24VDC (SW)
PIN 2= OUTPUT 2
PIN 3= 0VDC (SW)
PIN 4= OUTPUT 1

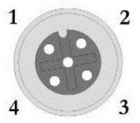
Two Digital High Current Outputs per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*
240-300	PNP (Sourcing)	YES – Visual	YES (8) – Optional	8

<table>
<tr><th colspan="9"><i>Output Mapping</i></th></tr>
<tr><td>BYTE</td><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr>
<tr><td>X
(Required)</td><td>Output 7</td><td>Output 6</td><td>Output 5</td><td>Output 4</td><td>Output 3</td><td>Output 2</td><td>Output 1</td><td>Output 0</td></tr>
<tr><th colspan="9"><i>Input Mapping</i></th></tr>
<tr><td>BYTE</td><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr>
<tr><td>X
(Selectable)</td><td>Output 7 Status</td><td>Output 6 Status</td><td>Output 5 Status</td><td>Output 4 Status</td><td>Output 3 Status</td><td>Output 2 Status</td><td>Output 1 Status</td><td>Output 0 Status</td></tr>
</table>

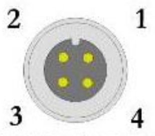

SET
numatics
8 DO
HIGH CURRENT
(HC) PNP
NEXT
04/05
06/07
00/01
02/03
A
B
C
D
AUX.
POWER


numatics
SET
NEXT
8 DO
HIGH CURRENT
(HC) PNP
04/05
00/01
C
A
06/07
02/03
D
B
AUX.
POWER



FEMALE

PIN 1= +24VDC (SW)
PIN 2= OUTPUT 2
PIN 3= 0VDC (SW)
PIN 4= OUTPUT 1



AUX
POWER

MALE

PIN 1= +24VDC (UNSW)
PIN 2= +24VDC (SW)
PIN 3= 0VDC (UNSW)
PIN 4= 0VDC (SW)

Sub-Bus Valve Module

Used to control a distributed valve manifold through the Sub-Bus. See page 55 for more information.

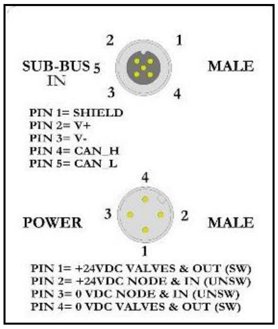
Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*
240-241	NPN (Sinking)	YES – Visual	YES (32) – Optional	32

Output Mapping								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
X (Required)	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
X+1 (Required)	Valve Coil No. 15	Valve Coil No. 14	Valve Coil No. 13	Valve Coil No. 12	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
X+2 (Required)	Valve Coil No. 23	Valve Coil No. 22	Valve Coil No. 21	Valve Coil No. 20	Valve Coil No. 19	Valve Coil No. 18	Valve Coil No. 17	Valve Coil No. 16
X+3 (Required)	Valve Coil No. 31	Valve Coil No. 30	Valve Coil No. 29	Valve Coil No. 28	Valve Coil No. 27	Valve Coil No. 26	Valve Coil No. 25	Valve Coil No. 24

Input Mapping								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
X (Selectable)	Coil 7 Status	Coil 6 Status	Coil 5 Status	Coil 4 Status	Coil 3 Status	Coil 2 Status	Coil 1 Status	Coil 0 Status
X+1 (Selectable)	Coil 15 Status	Coil 14 Status	Coil 13 Status	Coil 12 Status	Coil 11 Status	Coil 10 Status	Coil 9 Status	Coil 8 Status
X+2 (Selectable)	Coil 23 Status	Coil 22 Status	Coil 21 Status	Coil 20 Status	Coil 19 Status	Coil 18 Status	Coil 17 Status	Coil 16 Status
X+3 (Selectable)	Coil 31 Status	Coil 30 Status	Coil 29 Status	Coil 28 Status	Coil 27 Status	Coil 26 Status	Coil 25 Status	Coil 24 Status

SET
numatics
NEXT
COMM
SUB-BUS
POWER

numatics
SET
NEXT
COMM
SUB-BUS
POWER



PIN 1= SHIELD
PIN 2= V+
PIN 3= V-
PIN 4= CAN_H
PIN 5= CAN_L

PIN 1= +24VDC VALVES & OUT (SW)
PIN 2= +24VDC NODE & IN (UNSW)
PIN 3= 0 VDC NODE & IN (UNSW)
PIN 4= 0 VDC VALVES & OUT (SW)

8.6 Sub-bus Valve Module without Distribution and I/O

Used to control a distributed valve manifold through the Sub-Bus. See page **Error! Bookmark not defined.** for more information.

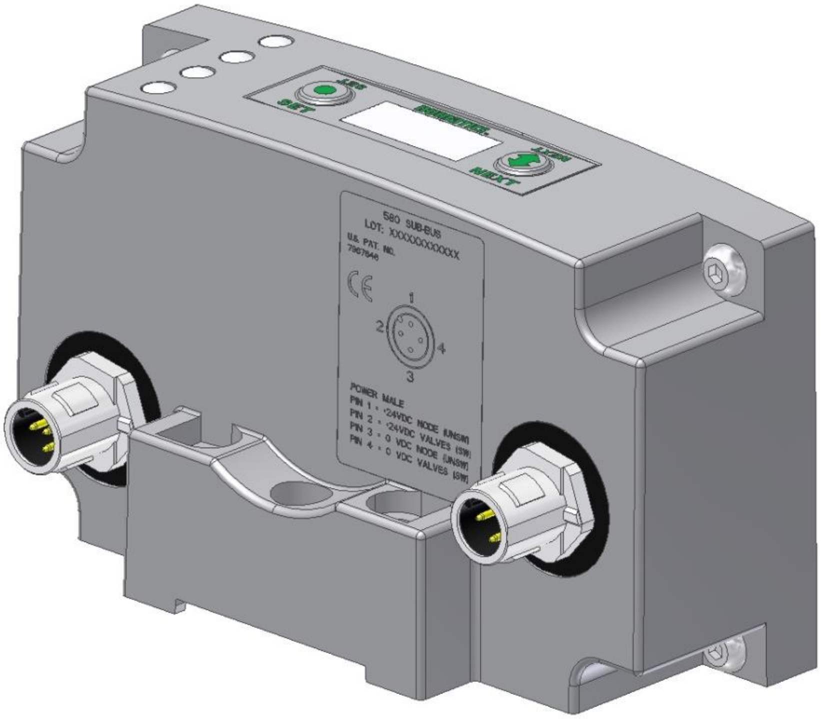
Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*
P580AEDS4010A00	NPN (Sinking)	YES – Visual	YES (32) – Optional	32

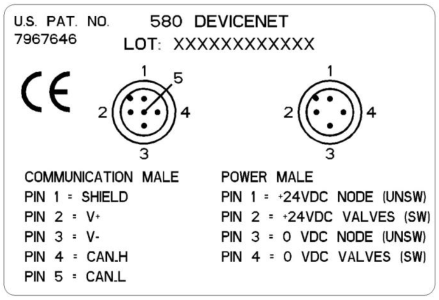
Output Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
X+1 (Selectable)	Valve Coil No. 15	Valve Coil No. 14	Valve Coil No. 13	Valve Coil No. 12	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
X+2 (Selectable)	Valve Coil No. 23	Valve Coil No. 22	Valve Coil No. 21	Valve Coil No. 20	Valve Coil No. 19	Valve Coil No. 18	Valve Coil No. 17	Valve Coil No. 16
X+3 (Selectable)	Valve Coil No. 31	Valve Coil No. 30	Valve Coil No. 29	Valve Coil No. 28	Valve Coil No. 27	Valve Coil No. 26	Valve Coil No. 25	Valve Coil No. 24

Diagnostics

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Selectable)	Coil 7 Status	Coil 6 Status	Coil 5 Status	Coil 4 Status	Coil 3 Status	Coil 2 Status	Coil 1 Status	Coil 0 Status
X+1 (Selectable)	Coil 15 Status	Coil 14 Status	Coil 13 Status	Coil 12 Status	Coil 11 Status	Coil 10 Status	Coil 9 Status	Coil 8 Status
X+2 (Selectable)	Coil 23 Status	Coil 22 Status	Coil 21 Status	Coil 20 Status	Coil 19 Status	Coil 18 Status	Coil 17 Status	Coil 16 Status
X+3 (Selectable)	Coil 31 Status	Coil 30 Status	Coil 29 Status	Coil 28 Status	Coil 27 Status	Coil 26 Status	Coil 25 Status	Coil 24 Status


SET
NUMATICS
NEXT
580 SUB-BUS
LOT: XXXXXXXXXXXX
U.S. PAT. NO.
7967646
CE
1
2
4
3
POWER MALE
PIN 1 = +24VDC NODE (UNSW)
PIN 2 = +24VDC VALVES (SW)
PIN 3 = 0 VDC NODE (UNSW)
PIN 4 = 0 VDC VALVES (SW)


U.S. PAT. NO.
7967646
580 DEVICENET
LOT: XXXXXXXXXXXX
CE
1
5
2
4
3
1
2
4
3
COMMUNICATION MALE
PIN 1 = SHIELD
PIN 2 = V+
PIN 3 = V-
PIN 4 = CAN.H
PIN 5 = CAN.L
POWER MALE
PIN 1 = +24VDC NODE (UNSW)
PIN 2 = +24VDC VALVES (SW)
PIN 3 = 0 VDC NODE (UNSW)
PIN 4 = 0 VDC VALVES (SW)

8.7 Digital Input/Output Modules

Two Digital I/O per Connector - M12 Female Modules

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*	*Input Points*
240-211	PNP (Sourcing)	YES – Visual	YES (8) – Optional	8	8

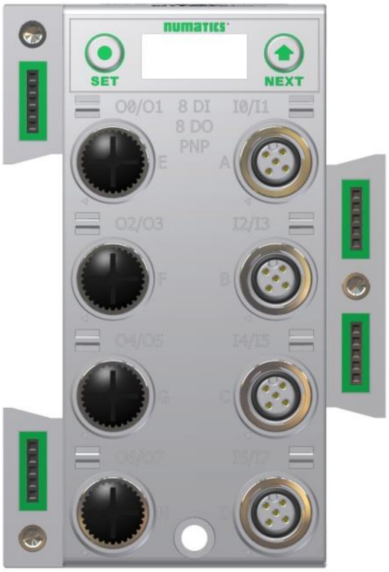
Output Mapping

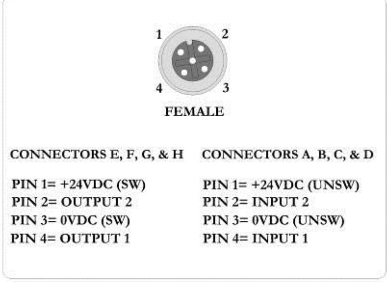
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0

Input Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X+1 (Selectable)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Conn. D SCP Status	Conn. C SCP Status	Conn. B SCP Status	Conn. A SCP Status
X+2 (Selectable)	Output 7 Status	Output 6 Status	Output 5 Status	Output 4 Status	Output 3 Status	Output 2 Status	Output 1 Status	Output 0 Status

SET
numatics
NEXT
O0/O1
8 DI
8 DO
PNP
E
O2/O3
F
O4/O5
G
O6/O7
H
I2/I3
B
I4/I5
C
D


numatics
SET
NEXT
O0/O1
8 DI
8 DO
PNP
I0/I1
E
A
O2/O3
I2/I3
F
B
O4/O5
I4/I5
G
C
O6/O7
I6/I7
H
D


1
2
4
3
FEMALE

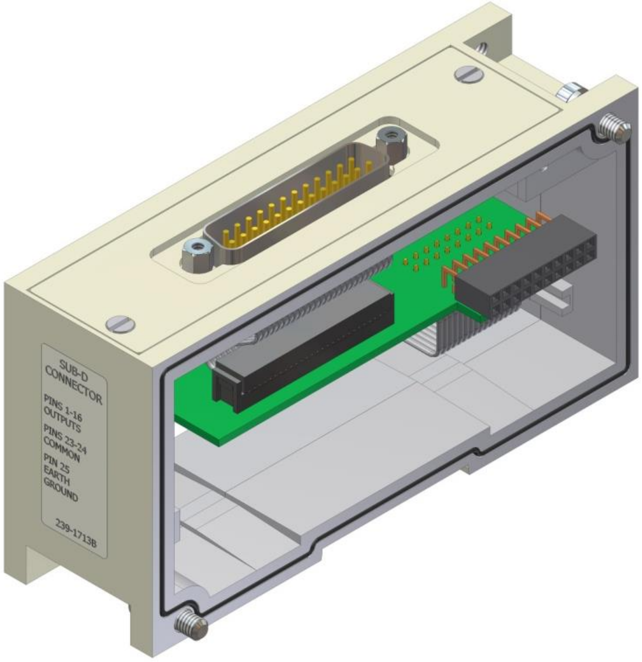
CONNECTORS E, F, G, & H	CONNECTORS A, B, C, & D
PIN 1= +24VDC (SW)	PIN 1= +24VDC (UNSW)
PIN 2= OUTPUT 2	PIN 2= INPUT 2
PIN 3= 0VDC (SW)	PIN 3= 0VDC (UNSW)
PIN 4= OUTPUT 1	PIN 4= INPUT 1

8.8 Valve Side Digital Output Modules

The valve side output module is used to distribute available valve side output points via a Sub-D connector (i.e. when a Sub-D valve manifold is located away from the rest of the electronics). This module goes to the right of the G3 valve adapter. The 16 bit output module utilizes the last 16 output bits on the valve side of the manifold (bits 16-31). Refer to page Error! Bookmark not defined. **for more information.**

Sixteen Outputs per Connector - Sub-D 25 Pin Female Module

Module Part No.	*I/O Type*	*Short Circuit Protection*	*Internal Status Bits*	*Output Points*	*Module Size*
239-1713	NPN (Sinking)	Yes	16 – Optional	16	Narrow



9. Analog I/O Modules

9.1 Analog I/O Module Rules

The analog I/O modules follow the same rules as the digital I/O modules. The maximum total number of modules on the Sub-Bus is 16. The analog boards allow the user to control devices using an analog signal. The analog modules also allow the user to relay analog information from input devices. These modules are available in two analog signal types: 0-10 V and 4-20 mA. These two signal types are offered in two different I/O configurations: 2 analog input channels/ 2 analog outputs channels and 4 analog input channels.

Four I/O - 12mm Female Modules

Specifications

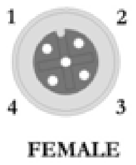
- **Input Resolution: 16 bit (65,536 Counts),**
- **Output Resolution: 16 bit (65,536 Counts)**
- **Settling Time: 3 ms Max**
- **Absolute Precision: ≤ 1.0% of Signal**
- **Voltage Input Impedance: 0-10VDC – 40K Ohms**
- **Current Input Impedance: 250 Ohms**
- **Input Cutoff Frequency: 100 Hz**

Module Part No.	*Signal Type*	*Input Points*	*Output Points*	*Short Circuit Protection*
240-212	0 - 10V	4	0	Yes
240-213	0 - 10V	2	2	
240-214	4 - 20mA	4	0	
240-215	4 - 20mA	2	2	
240-307	0 – 10V	2	2	

One Analog Input per Connector – M12 Female Modules

Module Part No.	*Signal Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Input Points*
240-212	0-10 VDC	YES – Visual	YES (4) – Selectable	4
240-214	4-20 mA			

Input Mapping								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
X (Required)	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1 (LSB)
X+1 (Required)	Input No. 1 (MSB)	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1
X+2 (Required)	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2 (LSB)
X+3 (Required)	Input No. 2 (MSB)	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2
X+4 (Required)	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3 (LSB)
X+5 (Required)	Input No. 3 (MSB)	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3	Input No. 3
X+6 (Required)	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4 (LSB)
X+7 (Required)	Input No. 4 (MSB)	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4	Input No. 4
Diagnostics								
X	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Power Status for Conn. D	Power Status for Conn. C	Power Status for Conn. B	Power Status for Conn. A
X+1	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A



PIN 1= +24VDC (UNSW)
PIN 2= NOT USED
PIN 3= 0VDC (UNSW)
PIN 4= INPUT 1

SET
NUMATICS
4 AI
0-10 V
NEXT
I2
C
I3
D
I0
A
I1
B

One Analog I/O per Connector – M12 Female Modules

Module Part No.	*Signal Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*	*Input Points*
240-213	0-10 VDC	YES – Visual	YES (4) – Selectable	2	2
240-215	4-20 mA				

Output Mapping

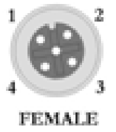
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1 (LSB)
X+1	Output No. 1 (MSB)	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1
X+2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2 (LSB)
X+3	Output No. 2 (MSB)	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2

Input Mapping

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1 (LSB)
X+1	Input No. 1 (MSB)	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1
X+2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2 (LSB)
X+3	Input No. 2 (MSB)	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2

Diagnostics

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Power Status for Conn. D	Power Status for Conn. C	Power Status for Conn. B	Power Status for Conn. A
X+1	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A



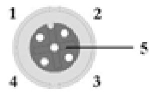
CONNECTORS C & D	CONNECTORS A & B
PIN 1= +24VDC (UNSW)	PIN 1= +24VDC (UNSW)
PIN 2= OUTPUT	PIN 2= NOT USED
PIN 3= 0VDC (UNSW)	PIN 3= 0VDC (UNSW)
PIN 4= INPUT	PIN 4= INPUT

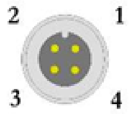
SET
NEXT
numatics
2 AI / 2 AO
0-10 V
O0/I0
O1/I1
A
B
C
D

One Analog I/O per Connector – M12 Female Modules

Module Part No.	*Signal Type*	*Short Circuit Protection*	*Short Circuit Protection Status Bits*	*Output Points*	*Input Points*
240-307	0-10 VDC	YES	YES	2	2

Output Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1 (LSB)
X+1	Output No. 1 (MSB)	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1	Output No. 1
X+2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2 (LSB)
X+3	Output No. 2 (MSB)	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2	Output No. 2
Input Mapping								
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1 (LSB)
X+1	Input No. 1 (MSB)	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1	Input No. 1
X+2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2 (LSB)
X+3	Input No. 2 (MSB)	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2	Input No. 2
Diagnostics								
X	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Power / Short Status for Conn. D	Power / Short Status for Conn. C	Allocated and Reserved	Allocated and Reserved
X+1	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A





I/O Connectors C & D (Female)
Pin 1 = +24 VDC
Pin 2 = OUTPUT
Pin 3 = 0 VDC
Pin 4 = INPUT
Pin 5 = NOT USED

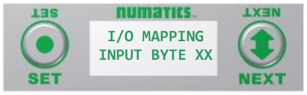
AUXILIARY POWER (Male)
Pin 1 = +24 VDC (For Conn. C)
Pin 2 = +24 VDC (For Conn. D)
Pin 3 = 0 VDC (For Conn. C)
Pin 4 = 0 VDC (For Conn. D)

Input Connectors A & B (Female)
Pin 1 = +10 VDC
Pin 2 = NOT USED
Pin 3 = 0 VDC
Pin 4 = INPUT
Pin 5 = NOT USED

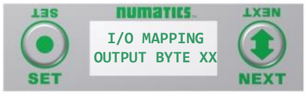
SET
NEXT
2AI/2AO
0-10V
O0/O1
O1/I1
I0
I1
A
B
C
D
AUX POWER

9.2 Analog Graphic Display

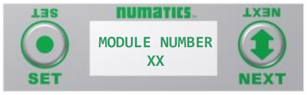
The G3 Analog I/O modules have an integrated graphic display that may be used to configure the parameters of the modules as well as show diagnostic information. Please see the following pages for detailed information regarding these displays.



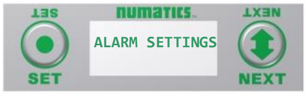
I/O MAPPING
INPUT BYTE XX



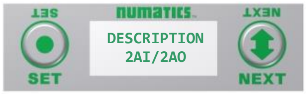
I/O MAPPING
OUTPUT BYTE XX



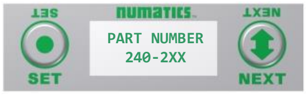
MODULE NUMBER
XX



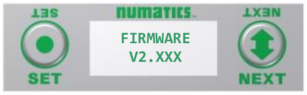
ALARM SETTINGS



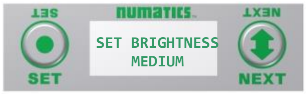
DESCRIPTION
2AI/2AO



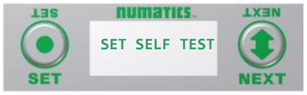
PART NUMBER
240-2XX



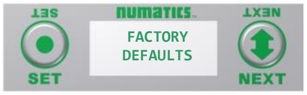
FIRMWARE
V2.XXX



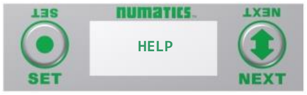
SET BRIGHTNESS
MEDIUM



SET SELF TEST



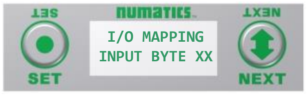
FACTORY
DEFAULTS

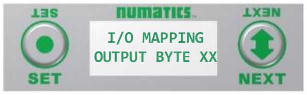


HELP

Analog Module / I/O Mapping

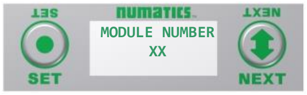
Displays the starting Input and Output byte address for the module


SET
numatics
NEXT
I/O MAPPING
INPUT BYTE XX
SET
NEXT


SET
numatics
NEXT
I/O MAPPING
OUTPUT BYTE XX
SET
NEXT

Analog Module / Module Number

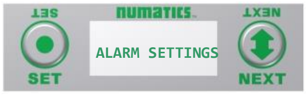
Displays the module number; identifying its position in the G3 I/O system.


SET
numatics
NEXT
MODULE NUMBER
XX
SET
NEXT

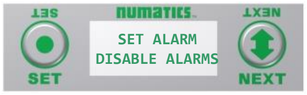
Analog Module / Alarm Settings

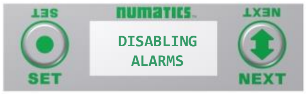
Allows the setting of low and high alarms for analog inputs and outputs

Alarm Settings Steps

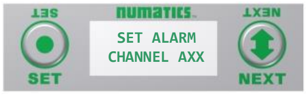

SET
numatics
NEXT
ALARM SETTINGS
SET
NEXT

1. Press the SET button to enter the Alarm Settings sub-menu.

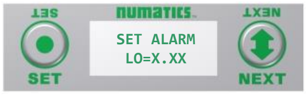

SET
numatics
NEXT
SET ALARM
DISABLE ALARMS
SET
NEXT


SET
numatics
NEXT
DISABLING
ALARMS
SET
NEXT

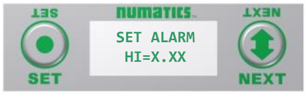
2. Press the SET button to Disable all alarms (default setting)
   *Note- Setting the Minimum value for Low alarm and the Maximum value for High alarm (for a channel) disables the alarm for that channel.

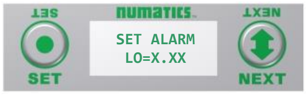

SET
numatics
NEXT
SET ALARM
CHANNEL AXX
SET
NEXT

3. Press the NEXT button to scroll to the appropriate analog channel.

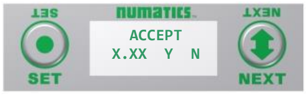

SET
numatics
NEXT
SET ALARM
LO=X.XX
SET
NEXT

4. Press the SET button to set the LO alarm setting
   a. Push the SET button to access the menu and enter the alarm value

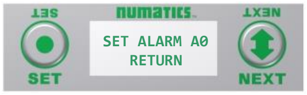

SET
numatics
NEXT
SET ALARM
HI=X.XX
SET
NEXT


SET
numatics
NEXT
SET ALARM
LO=X.XX
SET
NEXT

5. Press the NEXT button to SET the HI alarm setting.
   a. Push the SET button to access the menu and enter the alarm value


SET
numatics
NEXT
ACCEPT
X.XX Y N
SET
NEXT

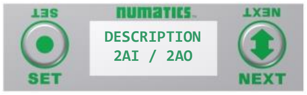
   b. Accept the changes by selecting Y and pushing SET


SET
numatics
NEXT
SET ALARM A0
RETURN
SET
NEXT

6. Press the SET button while in the RETURN screen to return to the main menu

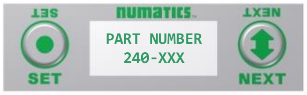
Analog Module / Description

Displays the quantity and type of I/O on the module
Ex. 2 analog Inputs and 2 analog outputs


SET
numatics
NEXT
DESCRIPTION
2AI / 2AO
SET
NEXT

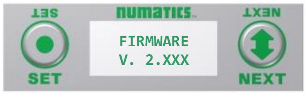
Analog Module / Part number

Displays the replacement part number of the module

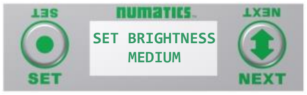

SET
numatics
NEXT
PART NUMBER
240-XXX
SET
NEXT

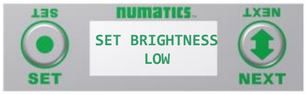
Analog Module / Firmware

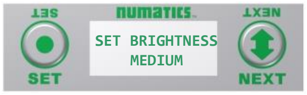
Displays the firmware revision level for the module

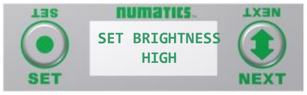

SET
numatics
NEXT
FIRMWARE
V. 2.XXX
SET
NEXT

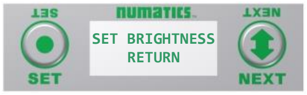
Analog Module / Brightness


SET
numatics
NEXT
SET BRIGHTNESS
MEDIUM
SET
NEXT


SET
numatics
NEXT
SET BRIGHTNESS
LOW
SET
NEXT


SET
numatics
NEXT
SET BRIGHTNESS
MEDIUM
SET
NEXT


SET
numatics
NEXT
SET BRIGHTNESS
HIGH
SET
NEXT


SET
numatics
NEXT
SET BRIGHTNESS
RETURN
SET
NEXT

Brightness Settings

1. Press the SET button to enter the SET BRIGHTNESS menu.

2. Press the NEXT button to scroll the choices for the desired brightness of the LCD display for the analog module.

    a. LOW
    b. MEDIUM (Factory Default)
    c. HIGH
    d. RETURN (this will return you to the main menu)

Press the SET button to confirm your choice. The changes will take effect immediately.

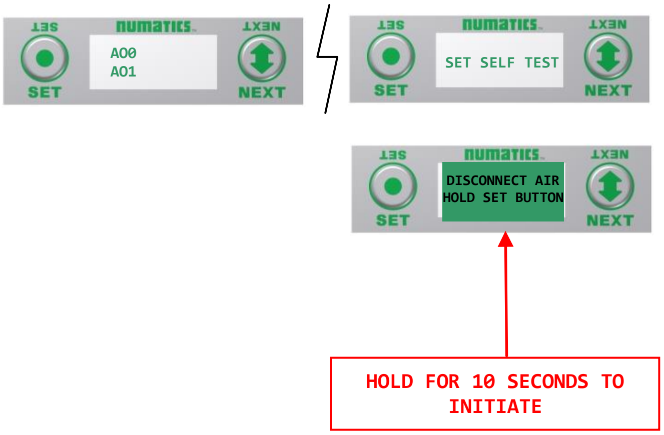
9.3 Analog Module / Self Test Mode

Self test mode is an internal diagnostic tool that can be enabled on the analog module using the graphic display. This tool allows the user to confirm that all of the outputs on the module are fully functional without needing a network connection or controller. The test will cycle the analog outputs. Starting with Output 0 it will increment the analog signal at 10% intervals; once it has reached 100% it will test the next available output. The self-test will continue to run until it is turned off by pressing the SET button.

To use the Self Test Mode, the user must first set some initial conditions. Follow these steps to initiate the self-test mode.

1) Disconnect Air and Communication from the manifold!
2) Starting at the Home Screen, navigate the menus by selecting the NEXT button until the **SELF-TEST** menu is shown.
3) Select the SET button to access the **SELF-TEST** menu
4) A message will appear: **DISCONNECT AIR HOLD SET BUTTON**
5) Hold the SET button down for approximately 10 seconds to enable the test. The Display will flash the above message while the button is pushed.
6) When the display stops flashing, the self-test mode will be running
7) Push or hold the NEXT button to cycle through the outputs. Holding the NEXT button will allow the analog outputs to cycle through the 10% intervals automatically. Pushing the NEXT button will allow the outputs to manually step through each 10% interval.
8) Releasing the NEXT button will keep the output in its current state.
9) The self-test mode can only be disabled by pushing the SET button

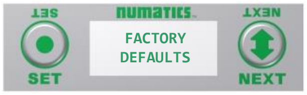
D.



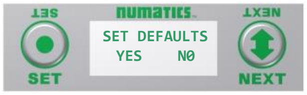
HOLD FOR 10 SECONDS TO INITIATE

9.4 Analog Module / Factory Defaults

Factory Default Settings


SET
numatics
NEXT
FACTORY
DEFAULTS
SET
NEXT

1. Press the SET button to enter the FACTORY DEFAULTS sub-menu.


SET
numatics
NEXT
SET DEFAULTS
YES NO
SET
NEXT

2. Press the NEXT button to select Yes or No.
   a. Selecting No will bring you back to the main FACTORY DEFAULTS menu.
   b. Selecting Yes will cause the module to reset and return all parameters to the factory default conditions.

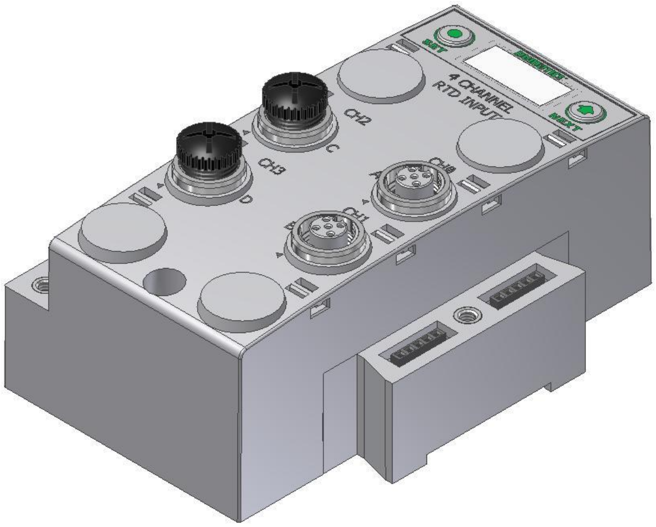
Press the SET button to confirm your choice.

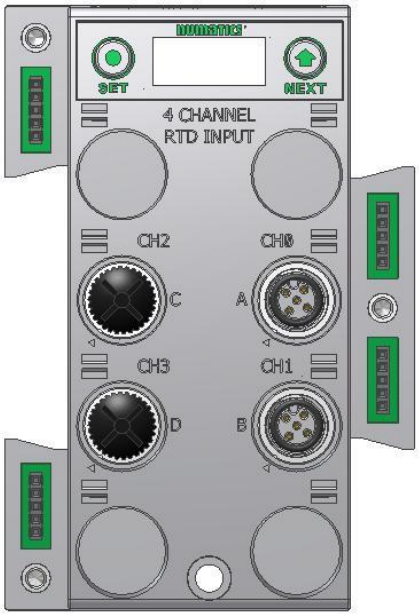
FACTORY DEFAULT SETTINGS	
Description	***Default***
Low Alarm Values	**0 V / 4 mA**
High Alarm Values	**10 V / 20 mA**
Brightness	**Medium**

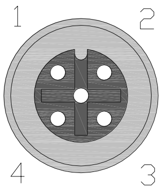
10. Specialty Modules

10.1 RTD Module

The G3 RTD Temperature module is used with Resistive Temperature Detectors (RTDs) and can support up to 4 RTD devices simultaneously. This module supports various RTD types including: Pt100, Pt200, Pt500, Pt1000, Ni100 and Ni1000. Standard M12 single key connector types are used; each connector/port supports one RTD device, but four different device types can be used simultaneously. User configuration of parameters include: RTD type, temperature scale (Celsius or Fahrenheit), Hi/Low temperature alarms, and filter times, and can be selected individually for each connector port using the integrated display. The G3 RTD module can be incorporated into any G3 electronic system regardless of the protocol or I/O module position.



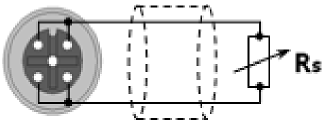




FEMALE
PIN 1 = Sensor Current Source (I+)
PIN 2 = Sense Voltage (VIN+)
PIN 3 = Sensor Current Source (I-)
PIN 4 = Sense Voltage (VIN-)
PIN 5 = Not Used

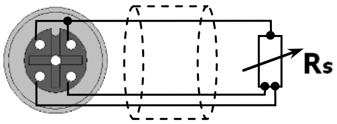
Sensor Wiring Diagrams

2 Wire Sensor Type
2 Wire Cable (Fig 1)



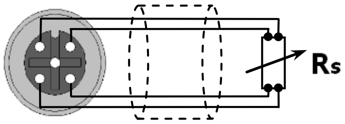
2 Wire
Sensor Type
Low Accuracy

3 Wire Sensor Type
3 Wire Cable (Fig 2)

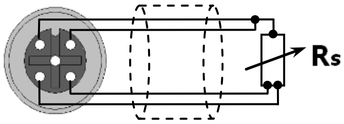


3 Wire
Sensor Type
Medium Accuracy

4 Wire Sensor Type
4 Wire Cable (Fig 4)



4 Wire
Sensor Type
High Accuracy



3 Wire Sensor Type
4 Wire Cable (Fig 3)

NOTE!

- **For maximum accuracy on a 3 wire sensor type make identified jumper connections at the sensor end (see Figure 3). Cable resistance, resulting from cable length, affects measuring error; therefore use cables that are as short as possible.**

Electrical Data	
Voltage	24 VDC Module Supply (Via G3 System Aux. Power Connection)
Input Type	RTD (Resistive Temperature Detector), 4 per Module
Supported Sensor Types	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Supported Temperature Coefficients	.00385; .00392; ….Ω/Ω/°C
Resolution	15 bits, plus sign.
Data Format	Signed Integer; Two's complement.
Calibration	Factory Calibrated. Field Calibration w/ high tolerance (± 0.005%) 100 ohm and 350 ohm resistor.
Input Update (filter) Rate	Adjustable (5-20mS), factory default: 5mS
Accuracy	0.1% of full scale @ 25° C
Mechanical Data	
I/O Connector	M12 4 Pin Female (Accepts 5 Pin)
Mass	247g / 8.7 oz
Operating Data	
Temperature Range	-10° to 115° F (-23° to 46° C)
Humidity	95% relative humidity: non-condensing
Ingress Protection	IP65 (with appropriate assembly and terminations)

Part Numbers and Mapping

Module Part No.	*I/O Type*	*Alarms*	*Diagnostics*	*Input Points*
240-311	RTD	Hi/Low Temp for each Channel	Open/Short, Out of Range	4

Input Mapping

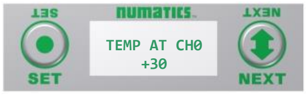
BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0
X + 1	Sign Bit Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0	RTD Channel 0
X + 2	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1
X + 3	Sign Bit Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1	RTD Channel 1
X + 4	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2
X + 5	Sign Bit Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2	RTD Channel 2
X + 6	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3
X + 7	Sign Bit Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3	RTD Channel 3
Diagnostic Telegram								
X + 8	Channel 3 Out of Range	Channel 2 Out of Range	Channel 1 Out of Range	Channel 0 Out of Range	Channel 3 Open/ Short	Channel 2 Open/ Short	Channel 1 Open/ Short	Channel 0 Open/ Short
X + 9	Channel 3 High Alarm	Channel 3 Low Alarm	Channel 2 High Alarm	Channel 2 Low Alarm	Channel 1 High Alarm	Channel 1 Low Alarm	Channel 0 High Alarm	Channel 0 Low Alarm

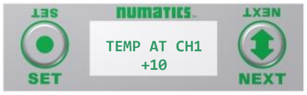
NOTE!

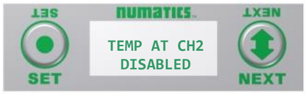
Data is represented by **Two's Complement**, in tenths of a degree.

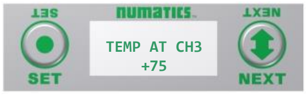
RTD Module Graphic display

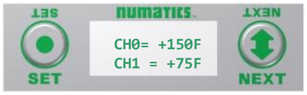
RTD Module / Temperature Monitoring


SET
numatics
NEXT
TEMP AT CH0
+30
SET
NEXT


SET
numatics
NEXT
TEMP AT CH1
+10
SET
NEXT


SET
numatics
NEXT
TEMP AT CH2
DISABLED
SET
NEXT


SET
numatics
NEXT
TEMP AT CH3
+75
SET
NEXT


SET
numatics
NEXT
CH0= +150F
CH1 = +75F
SET
NEXT

1) Press the NEXT button to scroll through the Temperature Monitoring display options.

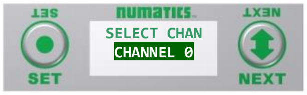
Pressing the SET button while in one of the Temperature Monitoring displays, will return the display back to the home screen.

If "DISABLED" is the temperature identified at any channel, advance the display to Sensor Type Select, to choose a sensor/Enable the channel, or press the "SET" button to jump directly to the selection display.

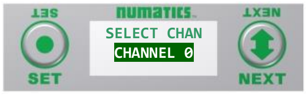
Unused channels should be left "DISABLED".

RTD Module / Sensor Type Select (Channel Enable)

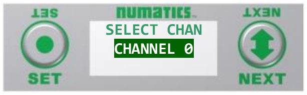
Allows the sensor type for each channel to be selected, and, enable the channel selected


SET
numatics
SELECT CHAN
CHANNEL 0
NEXT

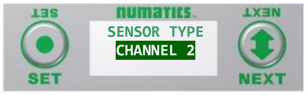
A) Press the SET button to enter the Sensor Type Select sub menu.


SET
numatics
SELECT CHAN
CHANNEL 0
NEXT

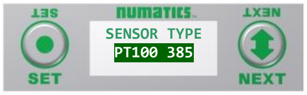
B) Press the NEXT button to scroll through the channels.


SET
numatics
SELECT CHAN
CHANNEL 0
NEXT

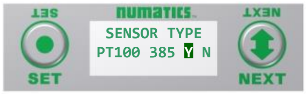
C) Press the SET button to select the desired channel. If "DISABLED" is the first selection, the channel is not enabled. Select a sensor type to enable the channel.


SET
numatics
SENSOR TYPE
CHANNEL 2
NEXT

D) Press the NEXT button to scroll through the available sensor types.

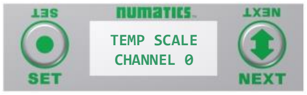

SET
numatics
SENSOR TYPE
PT100 385
NEXT

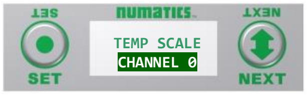
E) Press the SET button to select the desired sensor type.


SET
numatics
SENSOR TYPE
PT100 385 Y N
NEXT

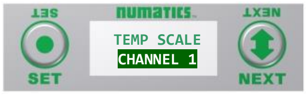
F) Press the SET button to load the selected sensor type.

RTD Module / Temperature Scale
Allows the temperature scale for each channel to be set to Celsius or Fahrenheit.

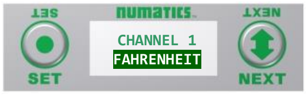

SET
numatics
NEXT
TEMP SCALE
CHANNEL 0
SET
NEXT


SET
numatics
NEXT
TEMP SCALE
CHANNEL 0
SET
NEXT

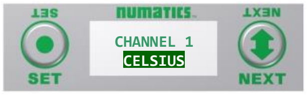
A) Press the SET button to enter the Temp Scale sub menu.


SET
numatics
NEXT
TEMP SCALE
CHANNEL 1
SET
NEXT

B) Press the NEXT button to scroll through the channels.


SET
numatics
NEXT
CHANNEL 1
FAHRENHEIT
SET
NEXT

C) Press the SET button to choose the desired channel.

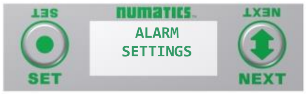

SET
numatics
NEXT
CHANNEL 1
CELSIUS
SET
NEXT

D) Press the NEXT button to choose the desired scale.

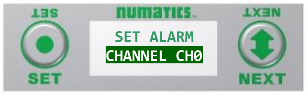
E) Press the SET button to load the selection.

RTD Module / Alarm Settings

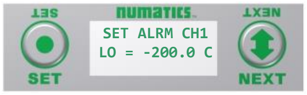
Allows the Low and High alarms of each RTD Input channel to be set. This parameter generates a visual and logical (bit) when set value is achieved.


SET
numatics
NEXT
SET
NEXT

ALARM
SETTINGS


SET
numatics
NEXT
SET
NEXT

SET ALARM
CHANNEL CH0


SET
numatics
NEXT
SET
NEXT

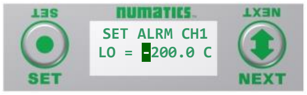
SET ALRM CH1
LO = -200.0 C

A) Press the SET button to enter the Alarm Settings sub-menu.

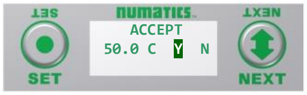
B) Press the NEXT button to scroll through the RTD Input channels.

C) Press the SET button to enter the alarm setting for the selected Input channel.

D) Press the NEXT button to select the Lo or High setting for the selected channel.


SET
numatics
NEXT
SET
NEXT

SET ALRM CH1
LO = -200.0 C


SET
numatics
NEXT
SET
NEXT

ACCEPT
50.0 C Y N

E) Press the SET button to select the change process for the chosen alarm. The first digit/sign will be highlighted.

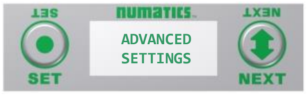
F) Press the NEXT button to choose the value, or the SET button to select and move to the next digit.

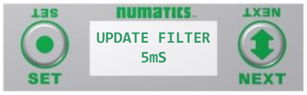
G) Press the NEXT button to choose "Y" or "N" Select. Then press the SET Button to Accept.

NOTE!

- When alarm values are set to maximum/minimum values, the alarm function is disabled.
- Factory default settings for all alarms are disabled.

RTD Module / Advanced Setting
Allows the Update Filters for each channel to be set.

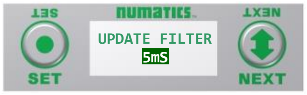

ADVANCED SETTINGS

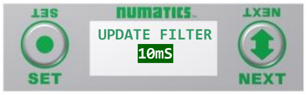

UPDATE FILTER 5mS

A) Press the SET button to enter the Advance Settings sub-menu.

B) Press the NEXT button to choose the option; Update Filters or Calibrate RTD.

Update Filters


UPDATE FILTER 5mS

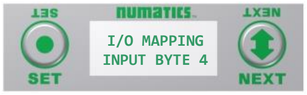

UPDATE FILTER 10mS

C) Press the SET button to choose the Update Filter setting.

D) Press the NEXT button to scroll through the filter times.

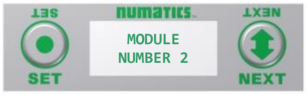
E) Press the SET button to select the desired Update Filter time.

RTD Module / I/O Mapping Input Byte


numatics
SET
NEXT

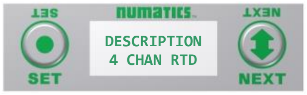
I/O MAPPING
INPUT BYTE 4

RTD Module / Module Number (Position)


numatics
SET
NEXT

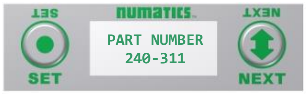
MODULE
NUMBER 2

RTD Module / Module Description


numatics
SET
NEXT

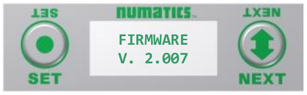
DESCRIPTION
4 CHAN RTD

RTD Module / Part Number


numatics
SET
NEXT

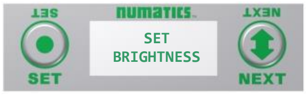
PART NUMBER
240-311

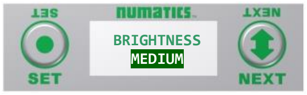
RTD Module / Firmware Revision


numatics
SET
NEXT

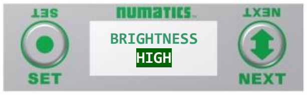
FIRMWARE
V. 2.007

RTD Module / Set Display Brightness
Allows the Brightness of the display to be changed


numatics
SET
BRIGHTNESS
SET
NEXT


numatics
BRIGHTNESS
MEDIUM
SET
NEXT

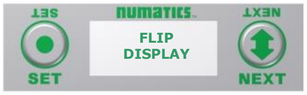
A) press the SET button to enter the Set Brightness sub menu.

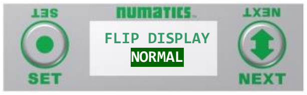

numatics
BRIGHTNESS
HIGH
SET
NEXT

B) Press the NEXT button to scroll through the brightness options

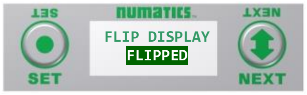
C) Press the SET button to load the selection.

RTD Module / Flip Display
Allows the Display to be flipped 180 degrees.

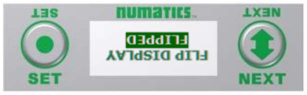

numatics
FLIP
DISPLAY
SET
NEXT


numatics
FLIP DISPLAY
NORMAL
SET
NEXT

A) press the SET button to enter the Flip Display sub menu.

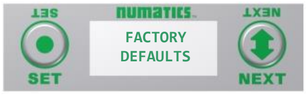

numatics
FLIP DISPLAY
FLIPPED
SET
NEXT

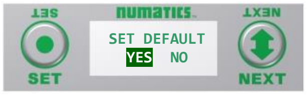
B) Press the NEXT button to choose the orientation.

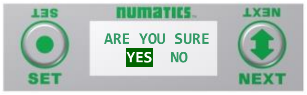

numatics
SET
NEXT

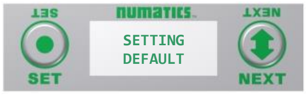
C) Press the SET button to load the selection.

RTD Module / Factory Defaults
Set all parameter settings to default values.


SET
numatics
NEXT
FACTORY
DEFAULTS
SET
NEXT


SET
numatics
NEXT
SET DEFAULT
YES NO
SET
NEXT


SET
numatics
NEXT
ARE YOU SURE
YES NO
SET
NEXT


SET
numatics
NEXT
SETTING
DEFAULT
SET
NEXT

A) Press the SET button to enter the Factory Defaults sub menu.

B) Presss the NEXT button to choose Yes or No.

C) Press the SET button to confirm.

D) Press the SET button again.

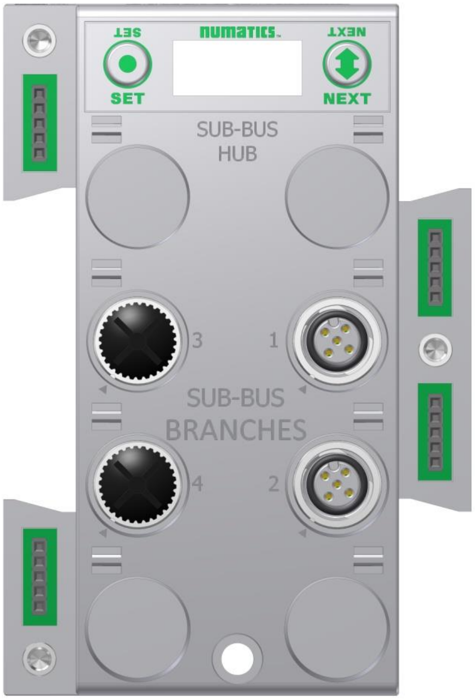
NOTE!

Factory Default Settings	
Alarm – High & Low	Disabled (Set to Min/Max for each chosen sensor)
Input Update Filter	5 mS
Sensor Type	Pt 100 385
Temp Scale	Celsius
Display Brightness	Medium
Flip Display	Normal

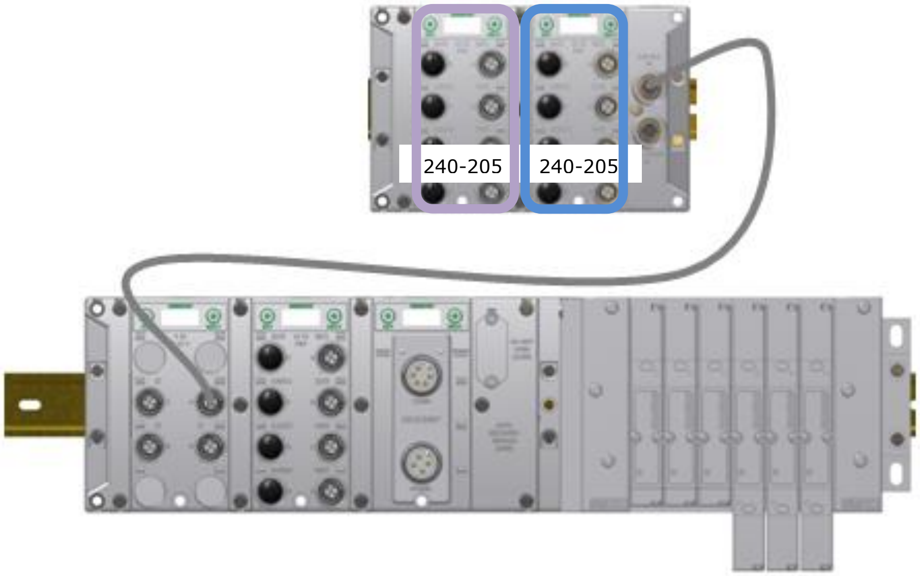
10.2 Sub-Bus Hub Module

The G3 HUB module allows for branch distribution from the I/O side of the G3 System and can be integrated into the existing G3 Series Sub-Bus configuration. Auto Addressing allows for trouble free set up and configuration. Input, Output, as well as Valve manifolds can be attached to the available four Branches on a HUB module. Each G3 System can support up to two HUB modules, allowing for maximum flexibility. The HUB module is transparent to the I/O side of the G3 and does not reserve one of the potential sixteen positions.

Module Part No.	*Module Type*	*Diagnostics*	*Input Size / Output Size*	*Branches*
240-326	HUB	Sub-Bus Short Circuit	0 / 0 – See Note	4


SET
numatics
NEXT
SET
NEXT
SUB-BUS
HUB
3
1
SUB-BUS
BRANCHES
4
2

SET
numatics
NEXT
SUB-BUS
HUB
3
4
SUB-BUS
BRANCHES



NOTE!

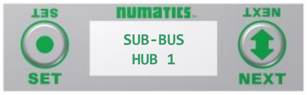
The Sub-bus hub module does not produce mapped diagnostics. The data table in this example represents what is physically attached to the HUB module. This will change as modules are added or removed.

Example I/O Mapping of Attached Modules

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X + 1 (Required)	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8
X + 2 (Selectable)	Conn. H SCP Status	Conn. G SCP Status	Conn. F SCP Status	Conn. E SCP Status	Conn. D SCP Status	Conn. C SCP Status	Conn. B SCP Status	Conn. A SCP Status
X + 3 (Required)	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
X + 4 (Required)	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8
X + 5 (Selectable)	Conn. H SCP Status	Conn. G SCP Status	Conn. F SCP Status	Conn. E SCP Status	Conn. D SCP Status	Conn. C SCP Status	Conn. B SCP Status	Conn. A SCP Status

Where **X** = starting byte

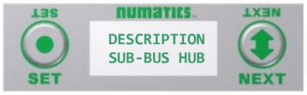
Hub Module / Identification


numatics
SET
NEXT

SUB-BUS
HUB 1

1) Identifies HUB module in G3 System.

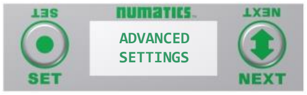
Hub Module / Description


numatics
SET
NEXT

DESCRIPTION
SUB-BUS HUB

2) Identifies Module type.

Hub Module / Advanced Settings

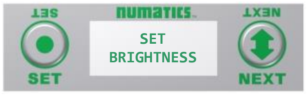

numatics
SET
NEXT

ADVANCED
SETTINGS

3) Allows the user to set/configure module parameters.

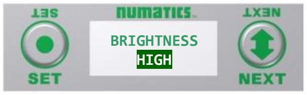
Press the SET button to advance to the first parameter/setting.

Brightness


numatics
SET
NEXT

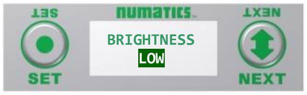
SET
BRIGHTNESS

A) **Press the SET button to enter** the Set Brightness sub-menu and highlight the selection.


numatics
SET
NEXT

BRIGHTNESS
HIGH

B) Press the NEXT button to select **the desired Brightness** selection, (**Low**, **Medium**, **High**).

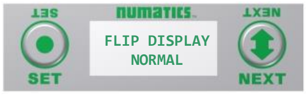

numatics
SET
NEXT

BRIGHTNESS
LOW

C) Press the SET button to slect the desired Brightness level.

Screen Jumps to Next Parameter/Selection

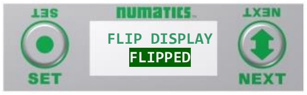
Flip Display


numatics
SET
NEXT

FLIP DISPLAY
NORMAL

D) Press the SET button to enter the Flip Display sub-menu and highlight the selection.

E) Press the NEXT button to select the desired Flip Display selection, (Normal, Flipped).

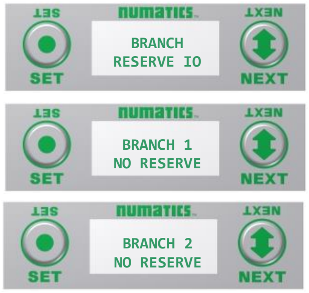

numatics
SET
NEXT

FLIP DISPLAY
FLIPPED

F) Press the SET button to select the desired display orientation.

G) Press NEXT to advance to the next parameter selection (Branch Reserve

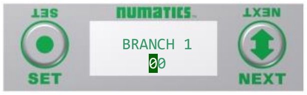
Branch Reserve I/O


SET
BRANCH
RESERVE IO
NEXT
BRANCH 1
NO RESERVE
BRANCH 2
NO RESERVE

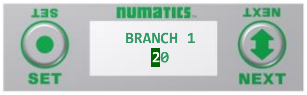
A) Press the SET button to enter the Branch Reserve IO sub-menu.

B) Press the NEXT button to select the desired Branch to reserve I/O bytes.

I/O data bytes can be reserved on each branch for future expansion within the G3 system. Space is reserved in Byte levels, and populates Input, Output, and Status depending on the protocol and configuration chosen (e.g. EtherNet/IP).

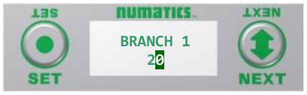

SET
BRANCH 1
00
NEXT

C) Press the SET button to enter the chosen Branch/Byte Selection screen.


SET
BRANCH 1
20
NEXT

D) Press the NEXT button to select the desired Tens value of reserved bytes.

E) Press the SET button to set the desired Tens value.


SET
BRANCH 1
20
NEXT

F) The screen will advance to the Ones selection

G) Press the NEXT button to select the desired Ones value for reserved bytes.

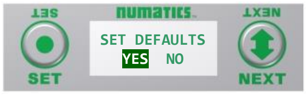
H) Press the SET button to set the desired Ones value.

Once the desired byte size is chosen for the selected branch, the screen will jump to the next branch. The same process is performed for the remaining branches, if desired. Press the NEXT button to skip over branches that do not require reserving I/O.

Factory Defaults

SET
numatics
NEXT
FACTORY
DEFAULTS
SET
NEXT

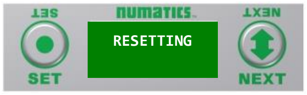
4) Allows all parameter settings to be set back to default values.


SET
numatics
NEXT
SET DEFAULTS
YES NO
SET
NEXT

A) Press the SET button to enter the Factory Defaults sub menu.

B) Press the NEXT button to choose Yes or No.

C) Press the SET button to confirm.

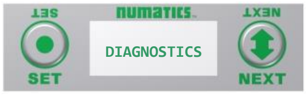

SET
numatics
NEXT
RESETTING
SET
NEXT

D) Press the SET button again.

NOTE!

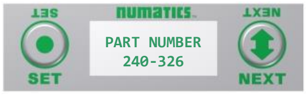
Factory Default Settings	
Brightness	Medium
Flip Display	Normal
Reserve I/O	No Reserve (all Branches)

Diagnostics


SET
numatics
NEXT
DIAGNOSTICS
SET
NEXT

5) Allows the user to refernce Part No., Firmware Rev., and Branch Connections.

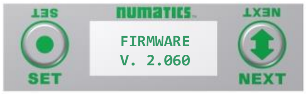
Part Number


SET
numatics
NEXT
PART NUMBER
240-326
SET
NEXT

A) Press the NEXT button to enter the Diagnostics sub-menu.

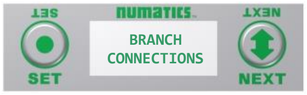
The Part Number screen is displayed (reference only).

Firmware Rev.

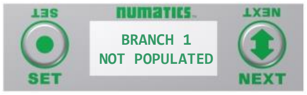

SET
numatics
NEXT
FIRMWARE
V. 2.060
SET
NEXT

B) Press the NEXT button to advance to the Firmware revision screen (reference only).

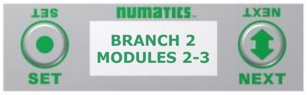
Branch Connections


SET
numatics
NEXT
BRANCH
CONNECTIONS
SET
NEXT

C) Press the NEXT button to advance to the Branch Connections screen.


SET
numatics
NEXT
BRANCH 1
NOT POPULATED
SET
NEXT

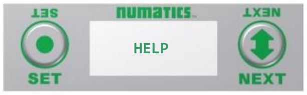
D) Press the SET button to enter the Branch Connections sub-menu.


SET
numatics
NEXT
BRANCH 2
MODULES 2-3
SET
NEXT

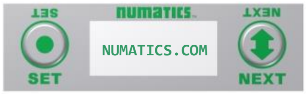
E) Press the NEXT button to advance through the Branches.

Each Branch screen indicates identifys the module numbers that are currently connected to that Branch.

HELP


SET
numatics
NEXT
HELP
SET
NEXT

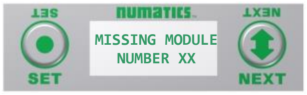
6) Directs the user to the Numatics website.


SET
numatics
NEXT
NUMATICS.COM
SET
NEXT

A) Press the SET button for website address.

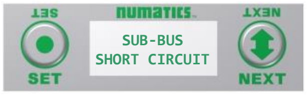
Error/Event Messages

The following are error messages that are displayed when specific faults/events occur during operation:



MISSING MODULE
NUMBER XX

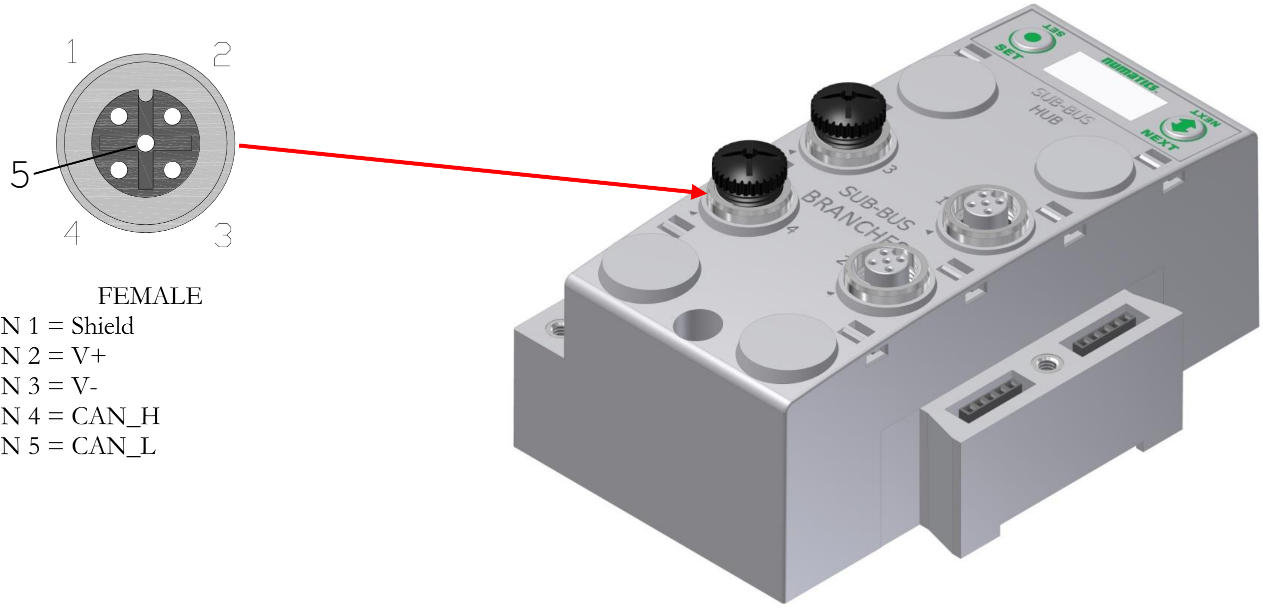
Displayed when a Sub-Bus module that had been previously installed becomes absent from the configuration



SUB-BUS
SHORT CIRCUIT

Displayed when a Sub-Bus power short circuit condition is detected

Connector Pin Out



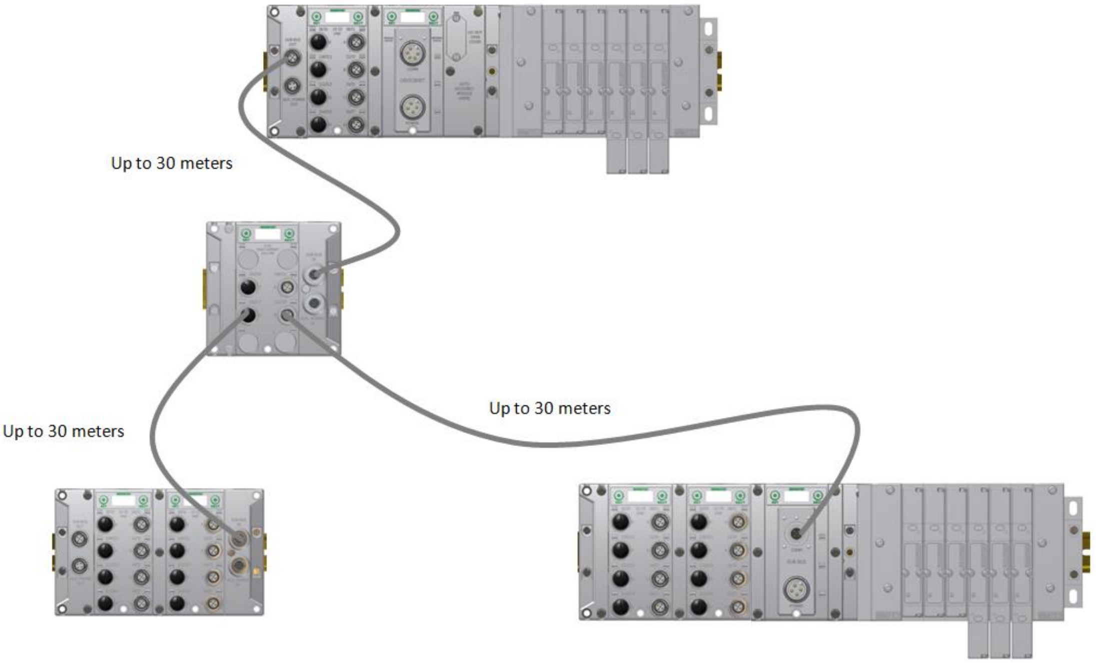
FEMALE

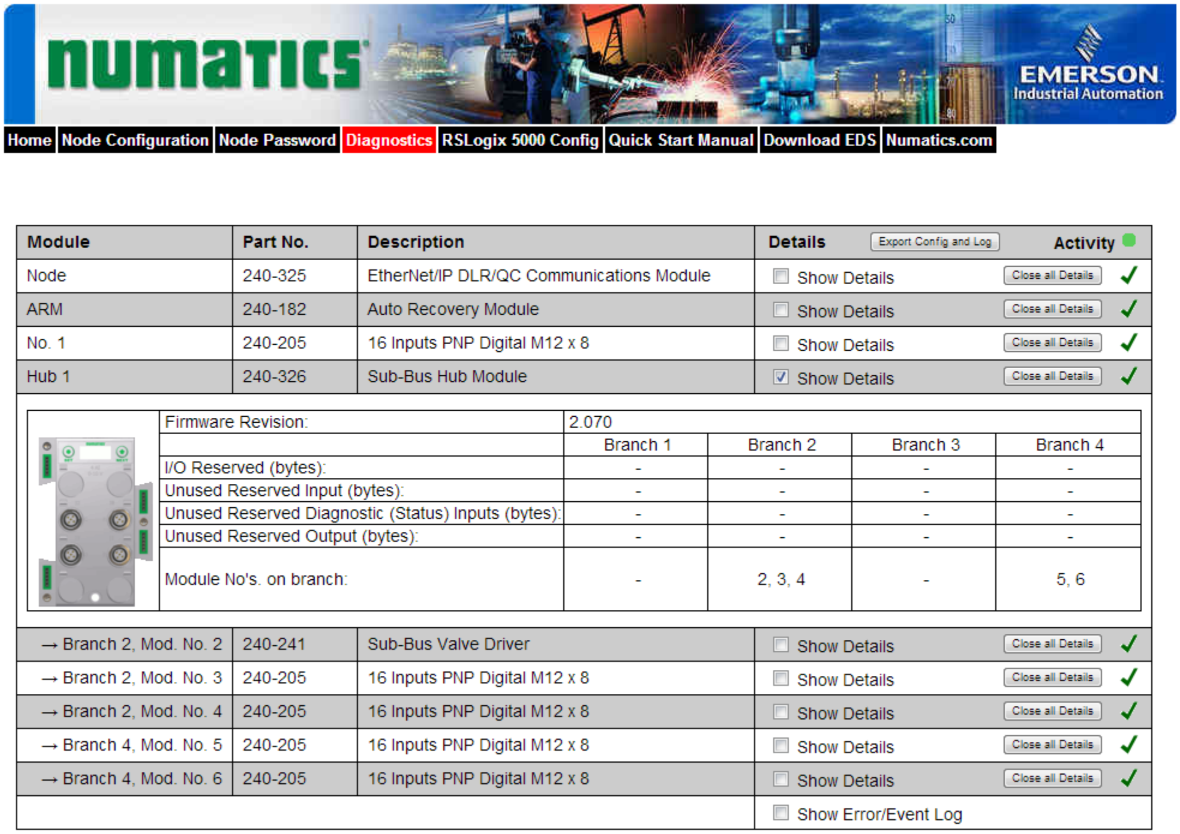
PIN 1 = Shield
PIN 2 = V+
PIN 3 = V-
PIN 4 = CAN_H
PIN 5 = CAN_L

NOTE!

- ***Length of molded or field wired Sub-Bus Branch cables should not exceed the maximum length of 30 meters per Sub-Bus Branch communication link.***
- ***The molded cable assemblies and bulk cable are the only approved cables for the G3 Sub-Bus and Branch Link. Please refer to the G3 Electronics catalog (LT-G3Catalog), for Sub-Bus cable and connectors options. See Technical Document TDG3SBWD1-0EN for proper installation and wiring of field wire-able connectors.***

HUB Integration - Example


Up to 30 meters
Up to 30 meters
Up to 30 meters


numatics
EMERSON Industrial Automation
Home
Node Configuration
Node Password
Diagnostics
RSLogix 5000 Config
Quick Start Manual
Download EDS
Numatics.com
Export Config and Log
Close all Details

Module	Part No.	Description	Details	Activity ●
Node	240-325	EtherNet/IP DLR/QC Communications Module	☐ Show Details	✓
ARM	240-182	Auto Recovery Module	☐ Show Details	✓
No. 1	240-205	16 Inputs PNP Digital M12 x 8	☐ Show Details	✓
Hub 1	240-326	Sub-Bus Hub Module	☑ Show Details	✓

Firmware Revision:	2.070			
	Branch 1	Branch 2	Branch 3	Branch 4
I/O Reserved (bytes):	-	-	-	-
Unused Reserved Input (bytes):	-	-	-	-
Unused Reserved Diagnostic (Status) Inputs (bytes):	-	-	-	-
Unused Reserved Output (bytes):	-	-	-	-
Module No's. on branch:	-	2, 3, 4	-	5, 6

Module	Part No.	Description	Details	Activity
→ Branch 2, Mod. No. 2	240-241	Sub-Bus Valve Driver	☐ Show Details	✓
→ Branch 2, Mod. No. 3	240-205	16 Inputs PNP Digital M12 x 8	☐ Show Details	✓
→ Branch 2, Mod. No. 4	240-205	16 Inputs PNP Digital M12 x 8	☐ Show Details	✓
→ Branch 4, Mod. No. 5	240-205	16 Inputs PNP Digital M12 x 8	☐ Show Details	✓
→ Branch 4, Mod. No. 6	240-205	16 Inputs PNP Digital M12 x 8	☐ Show Details	✓
			☐ Show Error/Event Log	

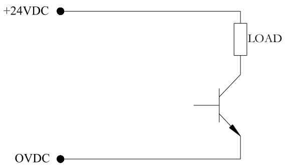
11. I/O Module(s) Wiring Diagrams

NPN/PNP Definitions

There is confusion between NPN, PNP, Sinking and Sourcing terminologies. Basically, if one is using sensors that provide a 24 VDC signal to the input module then a PNP input module type will be required. If one is using a sensor that supplies a 0 VDC signal to the input module then an NPN input module type will be required.

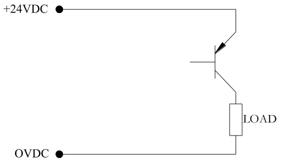
NPN Descriptions

- Sinking
- Switching Negative
- Positive Common


+24VDC
LOAD
OVDC

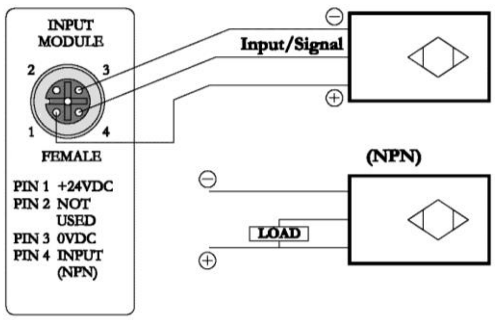
PNP Descriptions

- Sourcing
- Switching Positive
- Negative Common

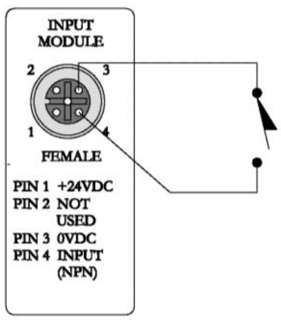

+24VDC
LOAD
OVDC

NPN (Sinking) Input Connection

Electric Sensor Type

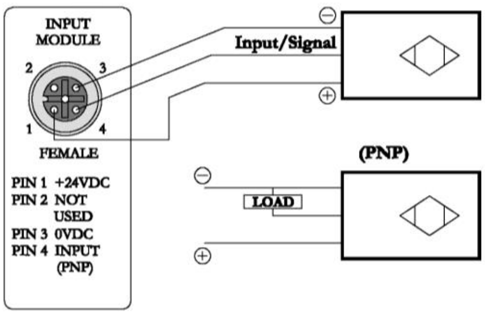

INPUT MODULE
2
3
1
4
FEMALE
PIN 1 +24VDC
PIN 2 NOT USED
PIN 3 0VDC
PIN 4 INPUT (NPN)
Input/Signal
⊖
⊕
(NPN)
⊖
LOAD
⊕

Mechanical Sensor Type

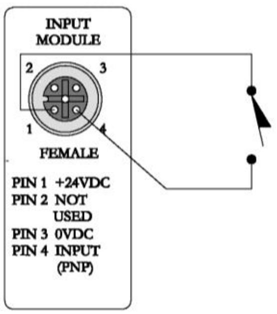

INPUT MODULE
2
3
1
4
FEMALE
PIN 1 +24VDC
PIN 2 NOT USED
PIN 3 0VDC
PIN 4 INPUT (NPN)

PNP (Sourcing) Input Connection

Electric Sensor Type

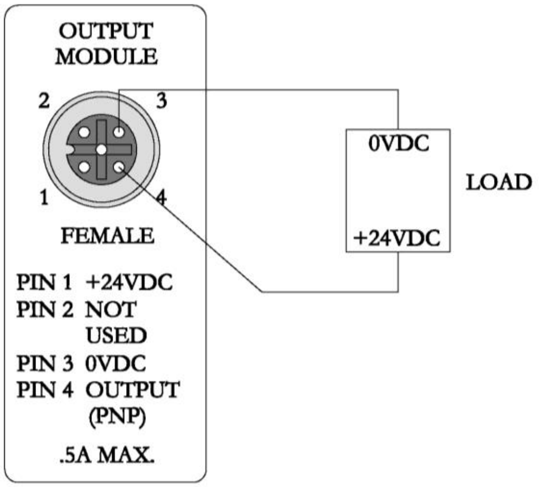

INPUT MODULE
2
3
1
4
FEMALE
PIN 1 +24VDC
PIN 2 NOT USED
PIN 3 0VDC
PIN 4 INPUT (PNP)
Input/Signal
⊖
⊕
(PNP)
⊖
LOAD
⊕

Mechanical Sensor Type


INPUT MODULE
2
3
1
4
FEMALE
PIN 1 +24VDC
PIN 2 NOT USED
PIN 3 0VDC
PIN 4 INPUT (PNP)

I/O Module(s) Wiring Diagrams Continued

NPN (Sinking) Output Connection


OUTPUT
MODULE
2
3
1
4
FEMALE
PIN 1 +24VDC
PIN 2 NOT USED
PIN 3 0VDC
PIN 4 OUTPUT (PNP)
.5A MAX.
0VDC
LOAD
+24VDC

12. DeviceNet Configuration and Mapping

12.1 EDS File

The EDS file contains configuration information required to establish communication to a node on a DeviceNet network. EDS files are available on the Numatics, Inc., website at www.numatics.com/fieldbus.

12.2 I/O Message Types

The Numatics, Inc. G3 series DeviceNet communication node supports 3 different I/O message types. Below are brief definitions for the supported types:

Polled

The poll command is an I/O message that is transmitted by the Master. A Poll Command is directed towards a single, specific Slave (point to point). A Master must transmit a separate Poll Command Message for each one of its Slaves that is to be polled. The slave can respond with an I/O Message that is transmitted back to the Master.

Cyclic

The Cyclic message is transmitted by either the Master or the Slave. An Acknowledge Message may be returned in response to this message. The message is sent based on the value of a cyclic timer, which is set by the user.

Change of State

The Change of State message is transmitted by either the Master or the Slave. An Acknowledge Message may be returned in response to this message. The message is sent whenever a change of state occurs (i.e. an input changes from “On” to “Off”).

12.3 User Configurable Device Parameters

The Numatics' G3 DeviceNet node allows the user to set many user options which define how the manifold behaves in certain instances. The following are descriptions of these device parameters. All of these configurable parameters can be adjusted using appropriate DeviceNet configuration software (i.e. RSNetWorx, DeviceNet Manager, etc…), selecting the appropriate parameters in the node's graphic display screen, or by initiating the explicit messaging function. The network address parameter can also be adjusted using the optional Manual Configuration Module (MCM) see page 47.

		Settable Via		
Parameter Name	*Description*	*Display*	*Software*	*MCM*
MAC ID	Node address	✓	✓	✓
Baud Rate	Network speed	✓	✓	✓
Autobaud	Enables/Disables Autobaud setting	✓	✓	✓
Diagnostic Word	Enables/Disables the diagnostic Input word	✓	✓	X
Quick Connect	Enables/Disables the Quick Connect feature	✓	✓	X
I/O Allocation Coils	Allocates how many valve output points are mapped (0, 8, 16, 24, 32)	✓	X	X
I/O Allocation Inputs	Allows a fixed value to be set for the number of Input Bytes allocated for the assembly	✓	X	X
I/O Allocation Output	Allows a fixed value to be set for the number of Output Bytes allocated for the assembly	✓	X	X
I/O Diagnostic Status	Allocates I/O diagnostic status bits	✓	✓	X
Output Idle Action	Determines whether to use idle value attribute or hold last state	✓	✓	X
Output Fault Action	Determines whether to use idle value attribute or hold last state	✓	✓	X

12.4 Explicit Messaging

			Explicit Message Information (values in decimal)			
Name	*Description*	*MCM Settings*	*Class*	*Instance*	*Attribute*	*Data*
MAC ID	Node address	SW 1-6	3	1	1	0 - 63
Baud Rate	Network speed	SW 7-8	3	1	2	0 = 125K 1 = 250K 2 = 500K
Autobaud	Enables/Disables Autobaud setting	SW 7-8	15	3	1	0 = Enabled 1 = Disabled
Assembly Parameter	Allocates how many valve output drivers are mapped (0, 8, 16, 24 or 32 outputs)	N/A	4	100	3	0 = 0 bytes 1 = 1 byte 2 = 2 bytes 3 = 3 bytes 4 = 4 bytes
Quick Connect		N/A	3	1	10	0 = Enabled 1 = Disabled
I/O Diagnostic Status	Enables/Disables I/O diagnostic status bits	N/A	15	5	1	0 = Enabled 1 = Disable
Diagnostic Word	Enables/Disables the diagnostic Input word	N/A	15	4	1	0 = Enabled 1 = Disable
MCM	Indicates whether the MCM module is installed or not.	N/A	15	6	1	Read only
Valve Driver Part Number	Valve Driver part number	N/A	15	7	1	Read only
I/O part number	Part numbers of all I/O modules installed	N/A	15	8-22	1	Read only
I/O serial number	Serial numbers of all I/O modules installed	N/A	15	23-37	1	Read only
Output Idle Action Attribute	Determines whether to use idle value attribute or hold last state	N/A	9	1	7	0 = Outputs Off 1 = Hold Last State
Output Fault Action Attribute	Determines whether to use idle value attribute or hold last state	N/A	9	1	5	0 = Outputs Off 1 = Hold Last State

Explicit messages provide multi-purpose, point-to-point communication paths between two devices. These messages use the typical request/response-oriented network communication to perform node configuration and problem diagnosis. Explicit messages typically use low priority identifiers and contain the specific meaning of the message as part of the data field; including the service to be performed and the specific object attribute address. Each explicit message uses a four level address scheme; Node Address (MAC ID), Object Class Identifier, Instance, Attribute and Data. Explicit messaging requires appropriate DeviceNet configuration software (i.e. RSNetWorx, DeviceNet Manager, etc…). It can also be used via control program (ladder logic, function block, etc…)

Changing Configurable Parameter Example

Change “Assembly Parameter” Setting of node

1. Using appropriate DeviceNet configuration software (i.e. Rockwell’s RSNetWorx for DeviceNet or similar) select the “Class Instance editor”
2. Select the appropriate node’s address (MAC ID), select service “Set Single Attribute” (code 10 hex), Insert “4” in the Class section (value from table); Instance “1” (value from table), Attribute “1” (value from table) and desired Data 0 or 1 or 2 or 4 (value from table).

12.5 Communication Fault/Idle Mode Parameter

This parameter is used to set the behaviors of output points (bits) during a communication fault or an "idle" event (when a PLC is "Idle mode" not in RUN mode). The parameter shown below is used to determine what state the outputs will have during an "Idle" event and a "Fault" event. It will allow control of all output points, valves and discrete I/O, on the manifold.

The user, through the graphic display or software, can determine how the outputs behave when a communication fault or idle actions occurs. These settings are non-volatile and thus will not change upon loss of power.

The two behavior options are:

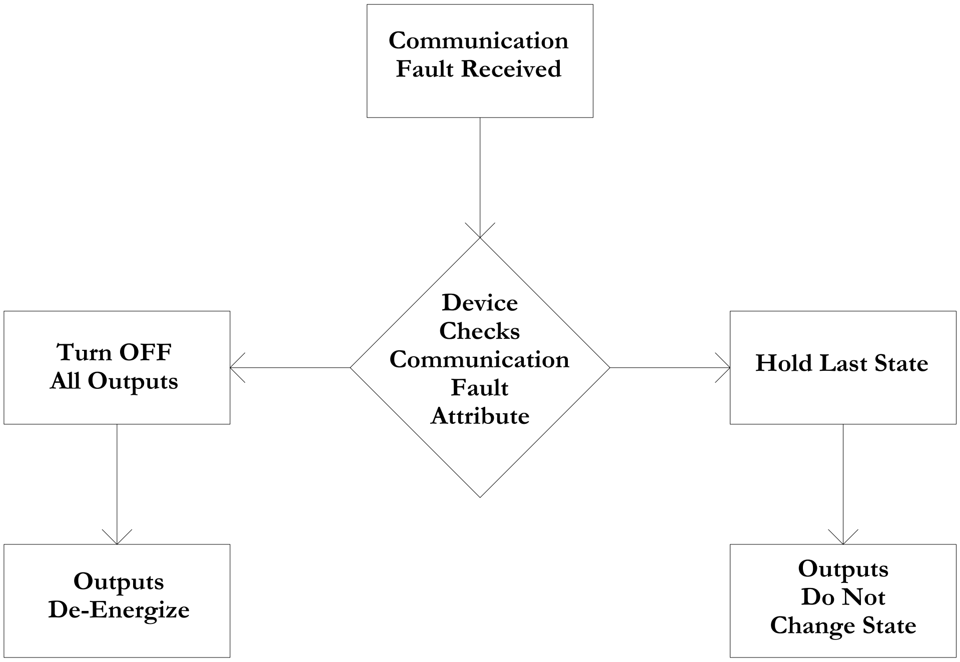
1. Hold Last State of Outputs
2. Turn Off All Outputs

Communication Fault/Idle Mode Sequence

The Communication Fault/Idle Mode parameter determines the output state if the device encounters a communication fault and/or idle action. A Communication Fault is defined as an inability for the master node to communicate with a slave node on a network. Idle Mode is a condition when the processor is in program mode.

The process for determining the output state during a Communication Fault/Idle Mode is as follows:

1. The device receives a Communication Fault/Idle Mode event.
2. The device determines what action to take based on the Communication Fault/Idle Mode attribute setting.
3. If the attribute is set to turn off all outputs, all of the outputs will turn off (Factory Default Setting).
4. If the attribute is set to hold last state, all of the outputs will hold their last state.


Communication Fault Received
Device Checks Communication Fault Attribute
Turn OFF All Outputs
Hold Last State
Outputs De-Energize
Outputs Do Not Change State

13. DeviceNet Mapping

13.1 I/O Sizes - Rx/Tx

Outputs

Outputs are defined as any valve solenoid coil and/or any discrete output point from any output module. The output size depends upon the physical configuration of the manifold (i.e. module type and how many are used). Please reference the following pages for a detailed explanation for calculating the output size.

Inputs

Inputs are defined as physical input bits from input modules and status bits (i.e. diagnostic word generated by the node, status input bits produced by output drivers and SCP status bits). Thus, the input size will include physical input points, as well as status input bits. Please reference the following pages for a detailed explanation for calculating the input size.

Valve Side

The size for the "valve side" of the manifold consists of an output bit for each valve solenoid coil driver and an input bit for the corresponding diagnostic status input bit. This value for the valve side size is configurable. See the following table:

Selection	Outputs Bytes	Inputs Bytes
0 Coils	0	0
8 Solenoid Coils	1	1
16 Solenoid Coils	2	2
24 Solenoid Coils	3	3
32 Solenoid Coils (factory default)	4	4

Please refer to page 30 for further details.

Discrete Side

The discrete side of the manifold is defined as all I/O modules connected to the left of the communication node. This includes physically attached modules as well as any distributed sub-bus modules. I/O sizes for the discrete side are automatically configured based on the I/O module type installed. However, the user can affect these sizes manually via settable parameters on the node. The output value consists of physical outputs (i.e. output bit for each output point). The input value consists of physical inputs (i.e. input bit for each input point) and user settable status input bits for corresponding physical outputs and SCP status bits.

Total I/O Size

The overall size of the I/O data for the manifold will consist of the valve size plus the discrete I/O size and all enabled Diagnostic bits. The I/O size can vary greatly, due to the many physical configuration and user settable parameters combinations. The worksheet on page 115 will allow accurate sizing of the I/O data.

13.2 Manifold and I/O Data Sizing Worksheet

Step	
1	: Choose corresponding *Rx* and *Tx* values based a chosen "*Valve Side Output Options"* and place the values in the boxes labeled, "Valve Side Byte Requirements" at the bottom of the page
2	: Choose up to sixteen modules to be included on the discrete I/O side of the manifold (including distributed modules) and place sum of the corresponding input bytes and output bytes in the boxes labeled, "Discrete Side Byte Requirements" at the bottom of the page.
3	: Add the input bytes and output bytes values from the boxes labeled "Discrete Side Byte Requirements" and "Valve Side Byte Requirements" and place total in the boxes labeled "Total I/O (*Rx/Tx*) Bytes for Manifold. This is the total input and output byte count values required for the configured manifold (total *Rx/Tx* values).

Valve Side

Step	*Valve Side Output Options (selected on node)*		*Input Bytes (Rx)*		*Output Bytes (Tx)*
			Status Enabled	*Status Disabled*	
1	0 Coils		0	0	0
	Up to 8 Solenoid Coils		1	0	1
	Up to 16 Solenoid Coils		2	0	2
	Up to 24 Solenoid Coils		3	0	3
	Up to 32 Solenoid Coils (factory default)		4	0	4

Digital Modules

Step	*Module Part Number*	*Description*	*Input Bytes (Rx)*		*Output Bytes (Tx)*
			Status Enabled	*Status Disabled*	
2	240-203/204	16 Inputs - Terminal Strip	3	2	0
	240-205/209	16 Inputs - 8 x M12	3	2	0
	240-206/210	8 Inputs - 8 x M12	2	1	0
	240-207	16 Outputs - 8 x M12	2	0	2
	240-208	8 Outputs - 8 x M12	1	0	1
	240-211	8 Inputs / 8 Outputs - 8 x M12	3	1	1
	240-241	Distributed Sub-Bus Valve & I/O Module	4	0	4
	240-300	8 Outputs – 8 x M12	1	0	1

Analog Modules

Step	*Module Part Number*	*Description*	*Input Bytes (Rx)*		*Output Bytes (Tx)*
			Status Enabled	*Status Disabled*	
2	240-212/214	4 Inputs – 4 x M12	10	8	0
	240-213/215 / 307	2 Inputs/ 2 Outputs – 4 x M12	6	4	4

Total Input/Output Size Calculation

Step	*Module Position (includes distributed modules)*	*Module Part Number*	*Input Bytes (Rx)*	*Output Bytes (Tx)*
2	1st			
	2nd			
	3rd			
	4th			
	5th			
	6th			
	7th			
	8th			
	9th			
	10th			
	11th			
	12th			
	13th			
	14th			
	15th			
	16th			
		Discrete Side Byte Requirements:		
		Optional Diagnostic Word:	2	0
1		Valve Side Byte Requirements:		
3		Total I/O (*Rx/Tx*) Bytes for Manifold		

13.3 Bit Mapping Rules

The bit mapping for a G3 manifold varies with the physical configuration of the manifold. The following is a breakdown of the bit mapping rules associated with the Numatics valve manifold.

Valve Side

1) Solenoid coil outputs are connected to the valve coils using the Z-Boards™.

2) The valve solenoid coil output portion of the total output size is adjustable from 0 to 4 bytes, with 4 bytes (32 bits) as the factory default.

3) Each solenoid coil output has an associated status input bit (refer to the section labeled, “Output Short Circuit Protection”, on page 25 for functional details). The solenoid coil status input size can be adjusted from 0 to 4 bytes, with 4 input bytes (32 bits) as the factory default.

4) Solenoid coil output addressing begins at the 1st manifold station nearest the node using “14” coil 1st and then, if applicable, the “12” coil, and continues in ascending order away from the communication node.

5) Each manifold station allocates 1 or 2 output bits. This is dependent on the Z-Board™ type installed. A single Z-Board™ allocates 1 output bit. A double Z-Board™ allocates 2 output bits.

6) Z-Boards™ can be used in any arrangement (all singles, all doubles, or any combination) as long as output group No.1 and output group No. 2 bits do not overlap (i.e. combinations of Z-Boards™ could exist where the physical configuration of the manifold could exceed the output capacity.

NOTE!

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

Discrete I/O Side

Outputs

1) The Sub-Bus output byte size portion is self-configuring in byte increments, after an output module is installed on the Sub-Bus and power is applied.

2) Outputs are mapped consecutively by module. The output bits from the 1st module will be mapped directly after the bits from the valve coils. The output bits from the second module will be mapped directly after the output bits from the 1st module and so on.

Inputs

1) The Sub-Bus input byte size portion is self-configuring in byte increments, after an input module is plugged into back plane and power is applied.

2) Inputs are mapped consecutively by module. The input bits from the 1st module will be mapped directly after the status bits from the valve side. The input bits from the second module will be mapped directly after the input bits from the 1st module and so on.

3) All of the modules have associated internal status bits, which will affect the total value of input bytes..

4) When a module has discrete and status inputs, the status bits are mapped after the discrete input bits.

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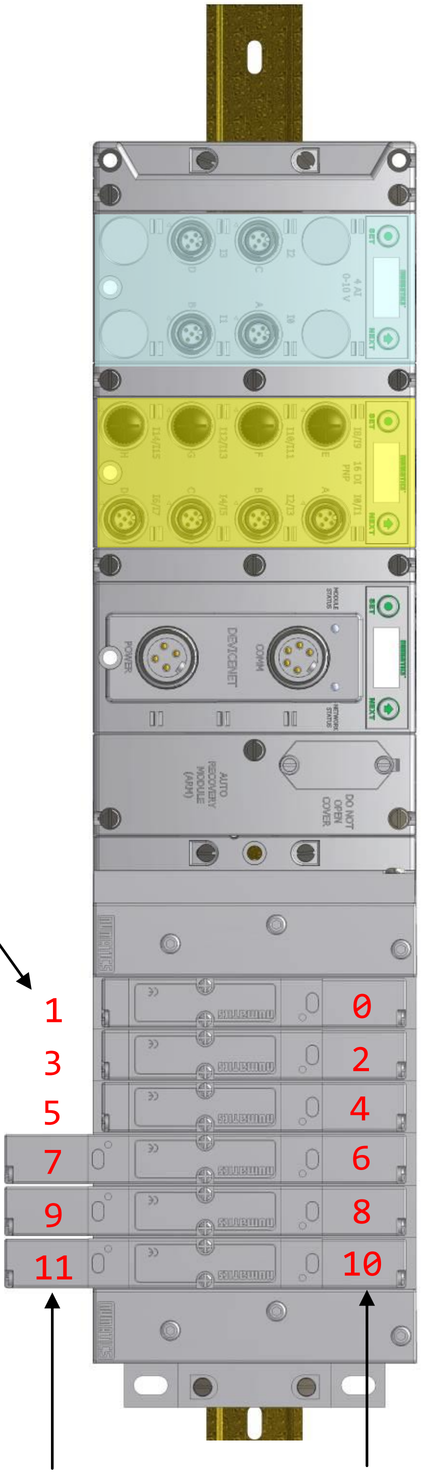
I/O Mapping Examples

13.4 Example No. 1

Assumed Settings

- Double Z-Boards™ used with all valves
- I/O Modules and mapping schemes are identified by their corresponding color.
- I/O Status bits are enabled
- Diagnostic Word is enabled
- 32 coils are allocated


Valve Coil Number
1
3
5
7
9
11
0
2
4
6
8
10
When the 12 End Solenoid is energized, the 2 port is pressurized
When the 14 End Solenoid is energized, the 4 port is pressurized

Manifold I/O Configuration

Pos No.	*Module Type*	*Part No.*	*In*	*Out*
			Bytes	
1	16I PNP	240-205	3	0
2	4AI Analog	240-212	10	0
		Diagnostic Word	2	0
		Local Valve Size	4	4

Total: 19 4

How to Order

Qty	*Part Number*
1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DN102R0G32
1	240-205
1	240-212
	ASSEMBLED

Example No. 1 Table

Output Table

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
1	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
2 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved

Input Table

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0 (Optional)	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit
1 (Optional)	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit
2 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
4 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
5 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
6	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
7	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
8 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
9	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1 (LSB)
10	Analog Input No. 1 (MSB)	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1
11	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2 (LSB)
12	Analog Input No. 2 (MSB)	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2
13	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3 (LSB)
14	Analog Input No. 3 (MSB)	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3
15	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4 (LSB)
16	Analog Input No.4 (MSB)	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4
17 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
18 (Optional)	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A

NOTE!

- *The Comm. Module Diagnostic Bits, Sub-Bus Diagnostic Bits, Coil Status Bits and Power Status Bits are optional. The factory default condition is Diagnostic bits enabled. These bits may be disabled to optimize the logical size of the manifold*
- *The number of Outputs Bytes Allocated for valve coils may be optimized and set to 0, 8, 16, 24 or 32 coils. (32 coils is the factory default setting.)*

13.5 Example No. 2

Assumed Settings

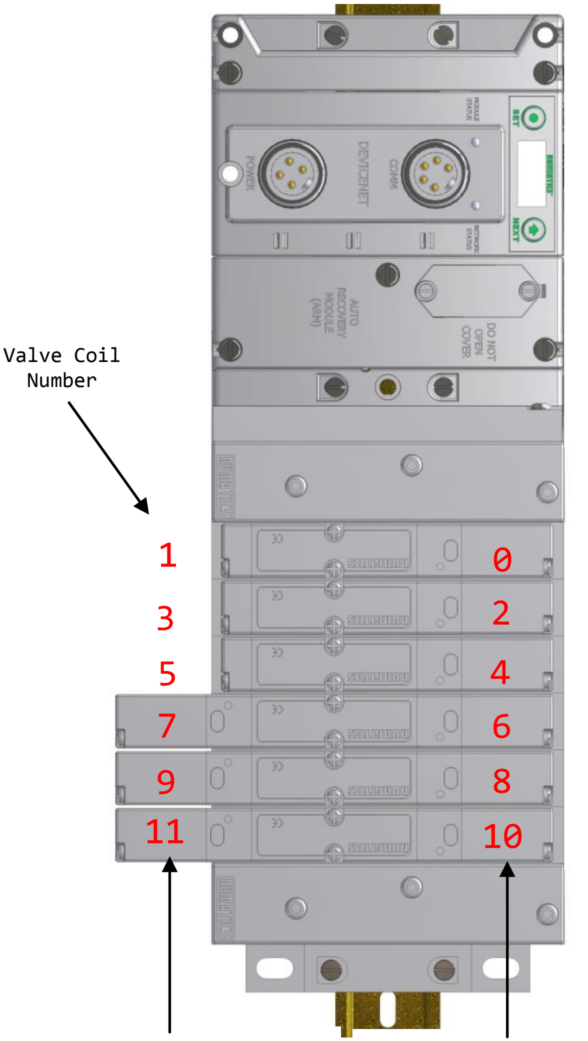
- Double Z-Boards™ used with all valves
- I/O Modules and mapping schemes are identified by their corresponding color.
- I/O Status bits are enabled
- Diagnostic Word is enabled
- 32 coils are allocated.

Manifold I/O Configuration

Pos. No.	*Module Type*	*Part No.*	*In*	*Out*
			Bytes	
	Diagnostic Word		2	0
	Local Valve Size:		4	4
	Total:		6	4

How to Order

Qty	*Part Number*
1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DN100R0G32
	ASSEMBLED



When the 12 End Solenoid is energized, the 2 port is pressurized

When the 14 End Solenoid is energized, the 4 port is pressurized

Example No. 2 Table

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
1	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
2 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved

Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0 (Optional)	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit
1 (Optional)	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit
2 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
3 (Optional)	Coil No. 15 Status	Coil No. 14 Status	Coil No. 13 Status	Coil No. 12 Status	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
4 (Optional)	Coil No. 23 Status	Coil No. 22 Status	Coil No. 21 Status	Coil No. 20 Status	Coil No. 19 Status	Coil No. 18 Status	Coil No. 17 Status	Coil No. 16 Status
5 (Optional)	Coil No. 31 Status	Coil No. 30 Status	Coil No. 29 Status	Coil No. 28 Status	Coil No. 27 Status	Coil No. 26 Status	Coil No. 25 Status	Coil No. 24 Status

NOTE!

- *The Comm. Module Diagnostic Bits, Sub-Bus Diagnostic Bits, Coil Status Bits and Power Status Bits are optional. The factory default condition is Diagnostic bits are enabled. These bits may be disabled to optimize the logical size of the manifold*
- *The number of Outputs Bytes Allocated for valve coils may be optimized and set to 0, 8, 16, 24 or 32 coils (32 coils is the factory default setting).*

13.6 Example No. 3

Assumed Settings

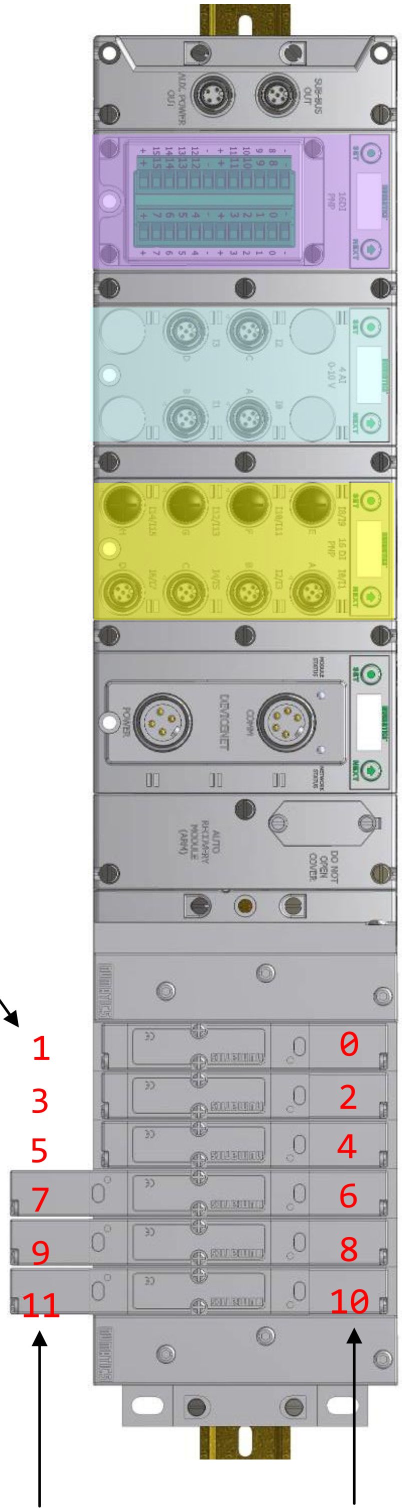
- Double Z-Boards™ used with all valves
- I/O Modules and mapping schemes are identified by their corresponding color.
- I/O Status bits are enabled
- Diagnostic Word is enabled
- 32 coils are allocated

Manifold I/O Configuration

Pos No.	Module Type	Part No.	In	Out
			Bytes	
1	16I PNP	240-205	3	0
2	4AI Analog	240-212	10	0
3	16I PNP	240-203	3	0
Diagnostic Word			2	0
Local Valves:			4	4
Total:			22	4

How to Order

Qty	Part Number
1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DN103D0G32
1	240-205
1	240-212
1	240-203
	ASSEMBLED



Valve Coil Number

When the 12 End Solenoid is energized, the 2 port is pressurized

When the 14 End Solenoid is energized, the 4 port is pressurized

Example No. 3 Table

Output Table

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
1	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
2 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved

Input Table

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0 (Optional)	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit
1 (Optional)	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit
2 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
3 (Optional)	Coil No. 15 Status	Coil No. 14 Status	Coil No. 13 Status	Coil No. 12 Status	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
4 (Optional)	Coil No. 23 Status	Coil No. 22 Status	Coil No. 21 Status	Coil No. 20 Status	Coil No. 19 Status	Coil No. 18 Status	Coil No. 17 Status	Coil No. 16 Status
5 (Optional)	Coil No. 31 Status	Coil No. 30 Status	Coil No. 29 Status	Coil No. 28 Status	Coil No. 27 Status	Coil No. 26 Status	Coil No. 25 Status	Coil No. 24 Status
6	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
7	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
8 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
9	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1 (LSB)
10	Analog Input No. 1 (MSB)	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1
11	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2 (LSB)
12	Analog Input No. 2 (MSB)	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2
13	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3 (LSB)
14	Analog Input No. 3 (MSB)	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3
15	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4 (LSB)
16	Analog Input No.4 (MSB)	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4
17 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
18 (Optional)	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A
19	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
20	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
21 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A

13.7 Example No. 4

Assumed Settings

- Double Z-Boards™ used with all valves
- I/O Modules and mapping schemes are identified by their corresponding color.
- I/O Status bits are enabled
- Diagnostic Word is enabled
- 32 coils are allocated

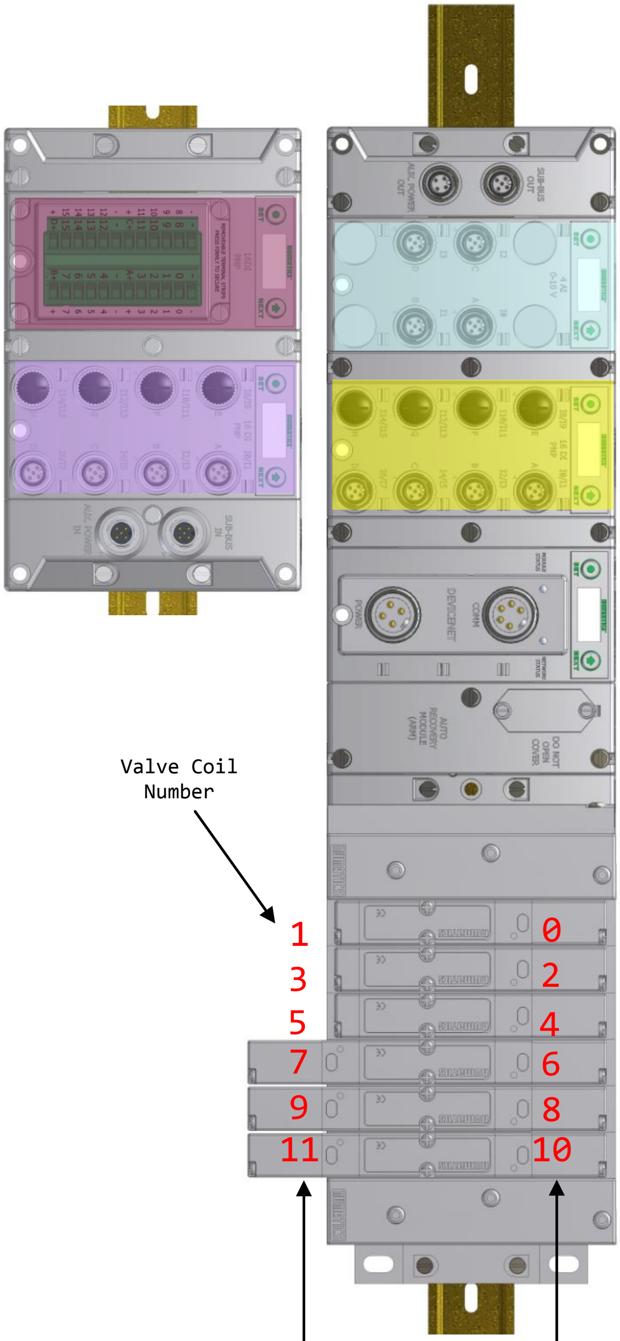
Manifold I/O Configuration

Pos No.	*Module Type*	*Part No.*	*In*	*Out*
			Bytes	
1	16I PNP	240-205	3	0
2	4I Analog	240-212	10	0
3	16I PNP	240-205	3	0
4	16I PNP	240-203	3	0
		Diagnostic Word	2	0
		Local Valves:	4	4
		Total:	25	4

How to Order

Qty	*Part Number*
1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DN102R0G32
1	240-205
1	240-212
	ASSEMBLED

1	G3DS302R0DRM
1	240-205
1	240-203
	ASSEMBLED



Valve Coil Number

When the 12 End Solenoid is energized, the 2 port is pressurized

When the 14 End Solenoid is energized, the 4 port is pressurized

Example No. 4 Table

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
1	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
2 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved

Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0 (Optional)	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit
1 (Optional)	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit
2 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
3 (Optional)	Coil No. 15 Status	Coil No. 14 Status	Coil No. 13 Status	Coil No. 12 Status	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
4 (Optional)	Coil No. 23 Status	Coil No. 22 Status	Coil No. 21 Status	Coil No. 20 Status	Coil No. 19 Status	Coil No. 18 Status	Coil No. 17 Status	Coil No. 16 Status
5 (Optional)	Coil No. 31 Status	Coil No. 30 Status	Coil No. 29 Status	Coil No. 28 Status	Coil No. 27 Status	Coil No. 26 Status	Coil No. 25 Status	Coil No. 24 Status
6	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
7	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
8 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
9	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1 (LSB)
10	Analog Input No. 1 (MSB)	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1
11	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2 (LSB)
12	Analog Input No. 2 (MSB)	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2
13	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3 (LSB)
14	Analog Input No. 3 (MSB)	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3
15	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4 (LSB)
16	Analog Input No.4 (MSB)	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4
17 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
18 (Optional)	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A
19	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
20	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
21 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
22	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
23	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
24 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A

13.8 Example No. 5

Assumed Settings

- Double Z-Boards™ used with all valves
- I/O Modules and mapping schemes are identified by their corresponding color.
- I/O Status bits are enabled
- Diagnostic Word is enabled
- 32 coils are allocated

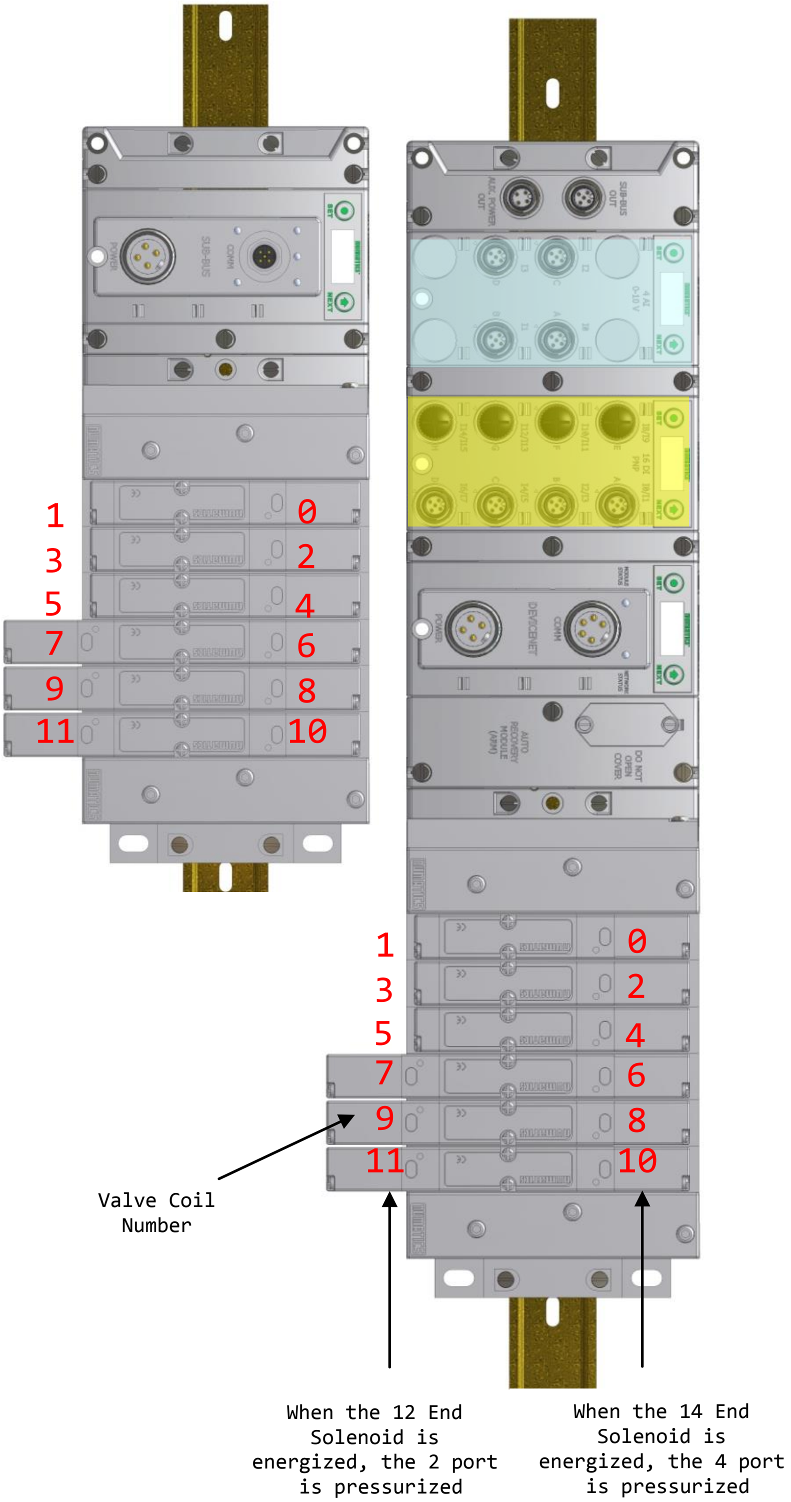
Manifold I/O Configuration

Pos No.	*Module Type*	*Part No.*	*In*	*Out*
			Bytes	
1	16I PNP	240-205	3	0
2	4I Analog	240-212	10	0
Diagnostic Word			2	0
Local Valves (DeviceNet)			4	4
Local Valves (Sub-Bus)			4	4
Total:			23	8

How to Order

Qty	*Part Number*
1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DN102D0G32
1	240-205
1	240-212
	ASSEMBLED

1	AK3EF00003NDRM
3	051BA4Z2MN00061
3	051BB4Z2MN00061
1	G3DS202R0DRM
	ASSEMBLED


1
0
3
2
5
4
7
6
9
8
11
10
1
0
3
2
5
4
7
6
9
8
11
10
Valve Coil Number
When the 12 End Solenoid is energized, the 2 port is pressurized
When the 14 End Solenoid is energized, the 4 port is pressurized

Example No. 5 Table

Output Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
1	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
2 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
3 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
4	Valve Coil No. 7	Valve Coil No. 6	Valve Coil No. 5	Valve Coil No. 4	Valve Coil No. 3	Valve Coil No. 2	Valve Coil No. 1	Valve Coil No. 0
5	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Valve Coil No. 11	Valve Coil No. 10	Valve Coil No. 9	Valve Coil No. 8
6 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved
7 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved

Input Table								
BYTE	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0 (Optional)	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit	Comm. Module Diagnostic Bit
1 (Optional)	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit	Sub-bus Diagnostic Bit
2 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
3 (Optional)	Coil No. 15 Status	Coil No. 14 Status	Coil No. 13 Status	Coil No. 12 Status	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
4 (Optional)	Coil No. 23 Status	Coil No. 22 Status	Coil No. 21 Status	Coil No. 20 Status	Coil No. 19 Status	Coil No. 18 Status	Coil No. 17 Status	Coil No. 16 Status
5 (Optional)	Coil No. 31 Status	Coil No. 30 Status	Coil No. 29 Status	Coil No. 28 Status	Coil No. 27 Status	Coil No. 26 Status	Coil No. 25 Status	Coil No. 24 Status
6	Discrete Input No. 7	Discrete Input No. 6	Discrete Input No. 5	Discrete Input No. 4	Discrete Input No. 3	Discrete Input No. 2	Discrete Input No. 1	Discrete Input No. 0
7	Discrete Input No. 15	Discrete Input No. 14	Discrete Input No. 13	Discrete Input No. 12	Discrete Input No. 11	Discrete Input No. 10	Discrete Input No. 9	Discrete Input No. 8
8 (Optional)	Short Circuit Status for Conn. H	Short Circuit Status for Conn. G	Short Circuit Status for Conn. F	Short Circuit Status for Conn. E	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
9	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1 (LSB)
10	Analog Input No. 1 (MSB)	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1	Analog Input No. 1
11	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2 (LSB)
12	Analog Input No. 2 (MSB)	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2	Analog Input No. 2
13	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3 (LSB)
14	Analog Input No. 3 (MSB)	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3	Analog Input No. 3
15	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4 (LSB)
16	Analog Input No.4 (MSB)	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4	Analog Input No. 4
17 (Optional)	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Allocated and Reserved	Short Circuit Status for Conn. D	Short Circuit Status for Conn. C	Short Circuit Status for Conn. B	Short Circuit Status for Conn. A
18 (Optional)	High Alarm for Conn. D	Low Alarm for Conn. D	High Alarm for Conn. C	Low Alarm for Conn. C	High Alarm for Conn. B	Low Alarm for Conn. B	High Alarm for Conn. A	Low Alarm for Conn. A
18 (Optional)	Coil No. 7 Status	Coil No. 6 Status	Coil No. 5 Status	Coil No. 4 Status	Coil No. 3 Status	Coil No. 2 Status	Coil No. 1 Status	Coil No. 0 Status
19 (Optional)	Coil No. 15 Status	Coil No. 14 Status	Coil No. 13 Status	Coil No. 12 Status	Coil No. 11 Status	Coil No. 10 Status	Coil No. 9 Status	Coil No. 8 Status
20 (Optional)	Coil No. 23 Status	Coil No. 22 Status	Coil No. 21 Status	Coil No. 20 Status	Coil No. 19 Status	Coil No. 18 Status	Coil No. 17 Status	Coil No. 16 Status
21 (Optional)	Coil No. 31 Status	Coil No. 30 Status	Coil No. 29 Status	Coil No. 28 Status	Coil No. 27 Status	Coil No. 26 Status	Coil No. 25 Status	Coil No. 24 Status

13.9 Diagnostic Word

Diagnostic Word Format

BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0 (Comm. Status)	Reserved	Reserved	Reserved	Reserved	Sub-Bus Short Circuit (1 = Error)	Sub-Bus Module Error (1=Error)	Un-Switched Power Status (1=Error)	Switched Power Status (1=Error)
1 (Sub-Bus Status)	Error Code	Error Code	Error Code	Module Address	Module Address	Module Address	Module Address	Module Address

Byte 0 (Communication Status)

Byte 0, Bit 0 Switched Power Status = Bit is high when valve / output power is not present on the comm. module.

Byte 0, Bit 1 Un-switched Power Status = Bit is high when node / input power is below 19VDC

Byte 0, Bit 2 Sub-Bus Module Error = Bit is high when there is an error on a Sub-Bus module; see “Byte 1” of diagnostic word for description.

Byte 0, Bit 3 Sub-Bus Short Circuit = A short circuit has been detected across the Sub-Bus

Diagnostic Word Cont.

Byte 1 (Sub-Bus Status)

Module Address

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Description
0	0	0	0	0	No error
0	0	0	0	1	Communication Module
0	0	0	1	0	I/O module No. 1
0	0	0	1	1	I/O module No. 2
0	0	1	0	0	I/O module No. 3
0	0	1	0	1	I/O module No. 4
0	0	1	1	0	I/O module No. 5
0	0	1	1	1	I/O module No. 6
0	1	0	0	0	I/O module No. 7
0	1	0	0	1	I/O module No. 8
0	1	0	1	0	I/O module No. 9
0	1	0	1	1	I/O module No. 10
0	1	1	0	0	I/O module No. 11
0	1	1	0	1	I/O module No. 12
0	1	1	1	0	I/O module No. 13
0	1	1	1	1	I/O module No. 14
1	0	0	0	0	I/O module No. 15
1	0	0	0	1	I/O module No. 16
1	0	0	1	1	Communication Valve driver
1	0	1	0	0	ARM
1	0	1	0	1	MCM
X	X	X	X	X	N/A

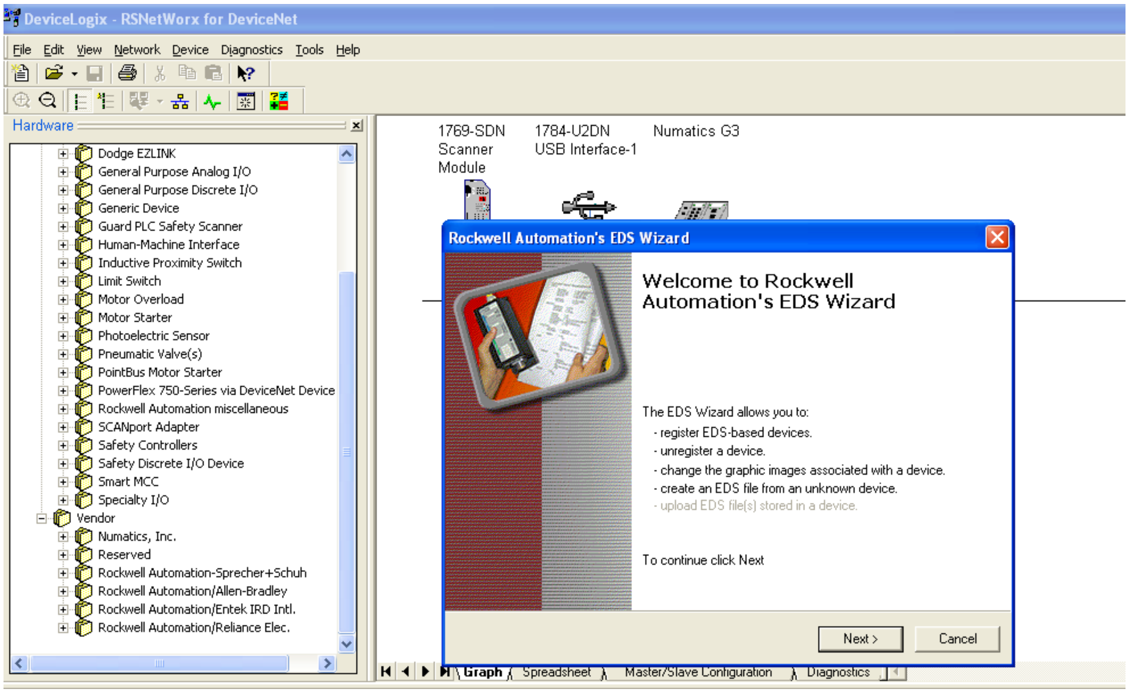
Sub-Bus Errors

Error Code	Bit 7	Bit 6	Bit 5
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

Error Code 0 = No Errors
Error Code 1 = Lost communications between I/O module and communications module
Error Code 2 = Valve / Output power is below 19VDC
Error Code 3…7 = not defined / reserved

13.10 Commissioning G3 DeviceNet with RSNetWorx software

Register the Numatics G3 EDS File
Download the Numatics G3 DeviceNet EDS file from Numatics.com. Open RS Networks for DeviceNet select “Tools” and run the “EDS Wizard” to register the Numatics G3 DeviceNet EDS file.


DeviceLogix - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
Hardware
Dodge EZLINK
General Purpose Analog I/O
General Purpose Discrete I/O
Generic Device
Guard PLC Safety Scanner
Human-Machine Interface
Inductive Proximity Switch
Limit Switch
Motor Overload
Motor Starter
Photoelectric Sensor
Pneumatic Valve(s)
PointBus Motor Starter
PowerFlex 750-Series via DeviceNet Device
Rockwell Automation miscellaneous
SCANport Adapter
Safety Controllers
Safety Discrete I/O Device
Smart MCC
Specialty I/O
Vendor
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
Rockwell Automation/Reliance Elec.
1769-SDN Scanner Module
1784-U2DN USB Interface-1
Numatics G3
Rockwell Automation's EDS Wizard
Next >
Cancel
Graph
Spreadsheet
Master/Slave Configuration
Diagnostics

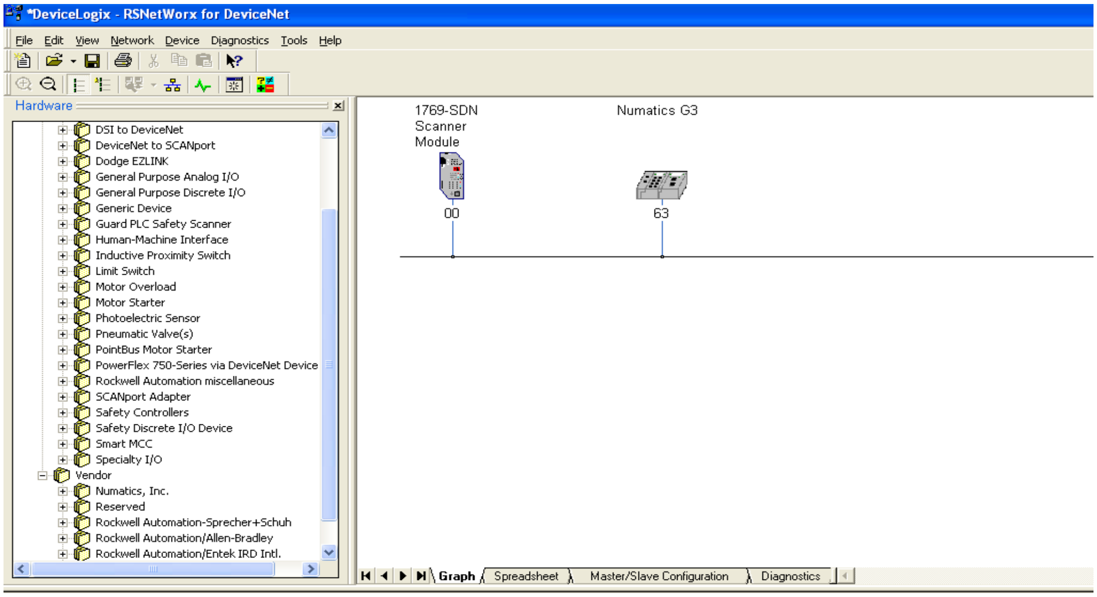
Welcome to Rockwell Automation's EDS Wizard

The EDS Wizard allows you to:
- register EDS-based devices.
- unregister a device.
- change the graphic images associated with a device.
- create an EDS file from an unknown device.
- upload EDS file(s) stored in a device.

To continue click Next

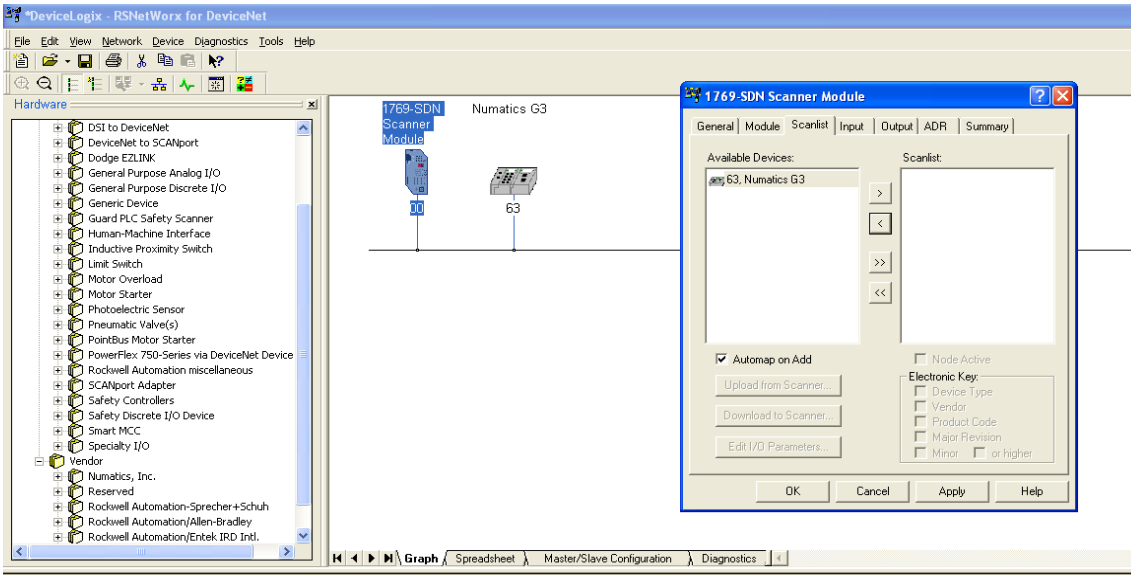
Add the G3 DeviceNet node to the RSNetWorx configuration

From RS Networks for DEVICENET and add the Numatics G3 Module. Double click on the Numatics address to modify the DeviceNet address. Enter the address for the G3 DeviceNet node.


*DeviceLogix - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
Hardware
DSI to DeviceNet
DeviceNet to SCANport
Dodge EZLINK
General Purpose Analog I/O
General Purpose Discrete I/O
Generic Device
Guard PLC Safety Scanner
Human-Machine Interface
Inductive Proximity Switch
Limit Switch
Motor Overload
Motor Starter
Photoelectric Sensor
Pneumatic Valve(s)
PointBus Motor Starter
PowerFlex 750-Series via DeviceNet Device
Rockwell Automation miscellaneous
SCANport Adapter
Safety Controllers
Safety Discrete I/O Device
Smart MCC
Specialty I/O
Vendor
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
1769-SDN Scanner Module
00
Numatics G3
63
Graph
Spreadsheet
Master/Slave Configuration
Diagnostics

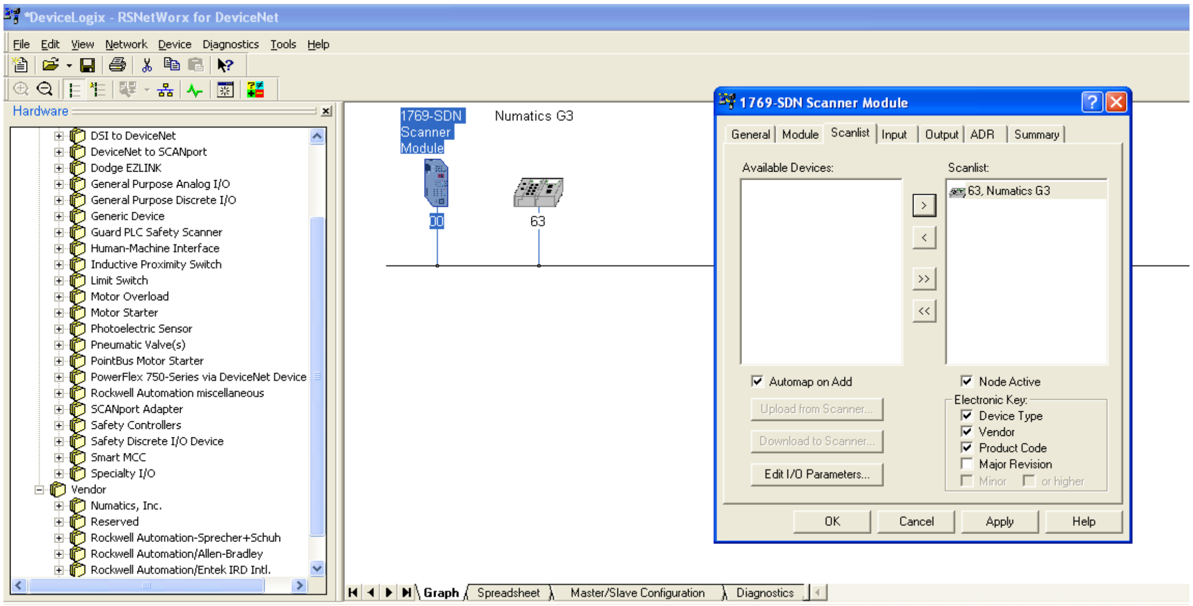
Configure the DeviceNet scanner module.

Double click on the DEVICENET scanner and select “Scanlist”.


*DeviceLogix - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
Hardware
DSI to DeviceNet
DeviceNet to SCANport
Dodge EZLINK
General Purpose Analog I/O
General Purpose Discrete I/O
Generic Device
Guard PLC Safety Scanner
Human-Machine Interface
Inductive Proximity Switch
Limit Switch
Motor Overload
Motor Starter
Photoelectric Sensor
Pneumatic Valve(s)
PointBus Motor Starter
PowerFlex 750-Series via DeviceNet Device
Rockwell Automation miscellaneous
SCANport Adapter
Safety Controllers
Safety Discrete I/O Device
Smart MCC
Specialty I/O
Vendor
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
1769-SDN Scanner Module
00
Numatics G3
63
1769-SDN Scanner Module
General
Module
Scanlist
Input
Output
ADR
Summary
Available Devices:
63, Numatics G3
Scanlist:
>
<
>>
<<
☑ Automap on Add
☐ Node Active
Upload from Scanner...
Download to Scanner...
Edit I/O Parameters...
Electronic Key:
☐ Device Type
☐ Vendor
☐ Product Code
☐ Major Revision
☐ Minor
☐ or higher
OK
Cancel
Apply
Help
Graph
Spreadsheet
Master/Slave Configuration
Diagnostics

Add the Numatics G3 node to the "Scanlist"

Select G3 Numatics under available devices. Select > to move G3 Numatics into the "Scanlist". Select Edit I/O Parameters.


*DeviceLogix - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
Hardware
DSI to DeviceNet
DeviceNet to SCANport
Dodge EZLINK
General Purpose Analog I/O
General Purpose Discrete I/O
Generic Device
Guard PLC Safety Scanner
Human-Machine Interface
Inductive Proximity Switch
Limit Switch
Motor Overload
Motor Starter
Photoelectric Sensor
Pneumatic Valve(s)
PointBus Motor Starter
PowerFlex 750-Series via DeviceNet Device
Rockwell Automation miscellaneous
SCANport Adapter
Safety Controllers
Safety Discrete I/O Device
Smart MCC
Specialty I/O
Vendor
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
1769-SDN Scanner Module
00
Numatics G3
63
Graph
Spreadsheet
Master/Slave Configuration
Diagnostics
1769-SDN Scanner Module
General
Module
Scanlist
Input
Output
ADR
Summary
Available Devices:
Scanlist:
>
<
>>
<<
Upload from Scanner...
Download to Scanner...
Edit I/O Parameters...
OK
Cancel
Apply
Help

Scanlist: 63, Numatics G3

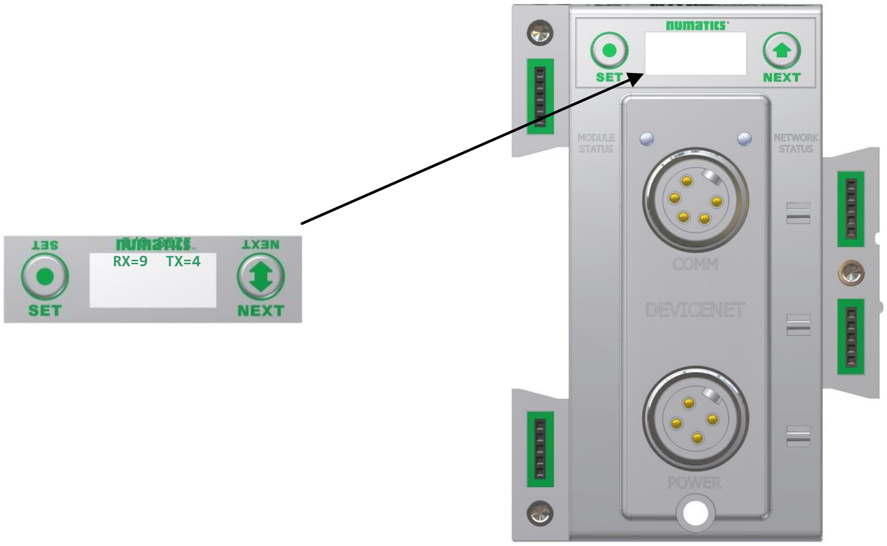
☑ Automap on Add

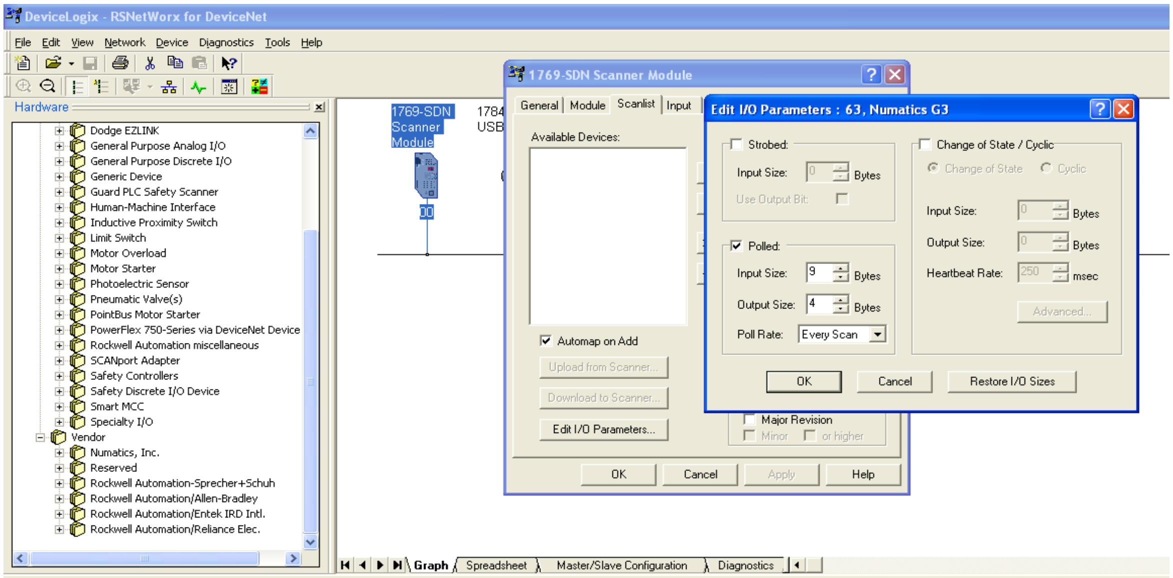
☑ Node Active

Electronic Key:
☑ Device Type
☑ Vendor
☑ Product Code
☐ Major Revision
☐ Minor ☐ or higher

I/O sizes - RX and TX Values

The I/O sizes (RX and TX bytes) are determined by the G3 manifold configuration. These I/O sizes are automatically calculated by the G3 DeviceNet node on power up. These values must be assigned in the scan list (see next step).


numatics
SET
NEXT
RX=9 TX=4
MODULE STATUS
NETWORK STATUS
COMM
DEVICENET
POWER


DeviceLogix - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
Hardware
Dodge EZLINK
General Purpose Analog I/O
General Purpose Discrete I/O
Generic Device
Guard PLC Safety Scanner
Human-Machine Interface
Inductive Proximity Switch
Limit Switch
Motor Overload
Motor Starter
Photoelectric Sensor
Pneumatic Valve(s)
PointBus Motor Starter
PowerFlex 750-Series via DeviceNet Device
Rockwell Automation miscellaneous
SCANport Adapter
Safety Controllers
Safety Discrete I/O Device
Smart MCC
Specialty I/O
Vendor
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
Rockwell Automation/Reliance Elec.
1769-SDN Scanner Module
1784 USB
00
Graph Spreadsheet Master/Slave Configuration Diagnostics
1769-SDN Scanner Module
General Module Scanlist Input
Available Devices:
Upload from Scanner...
Download to Scanner...
Edit I/O Parameters...
Major Revision
Minor
or higher
OK Cancel Apply Help
OK Cancel Restore I/O Sizes
Advanced...

Edit I/O Parameters : 63, Numatics G3

☐ Strobed:
Input Size: 0 Bytes
Use Output Bit: ☐

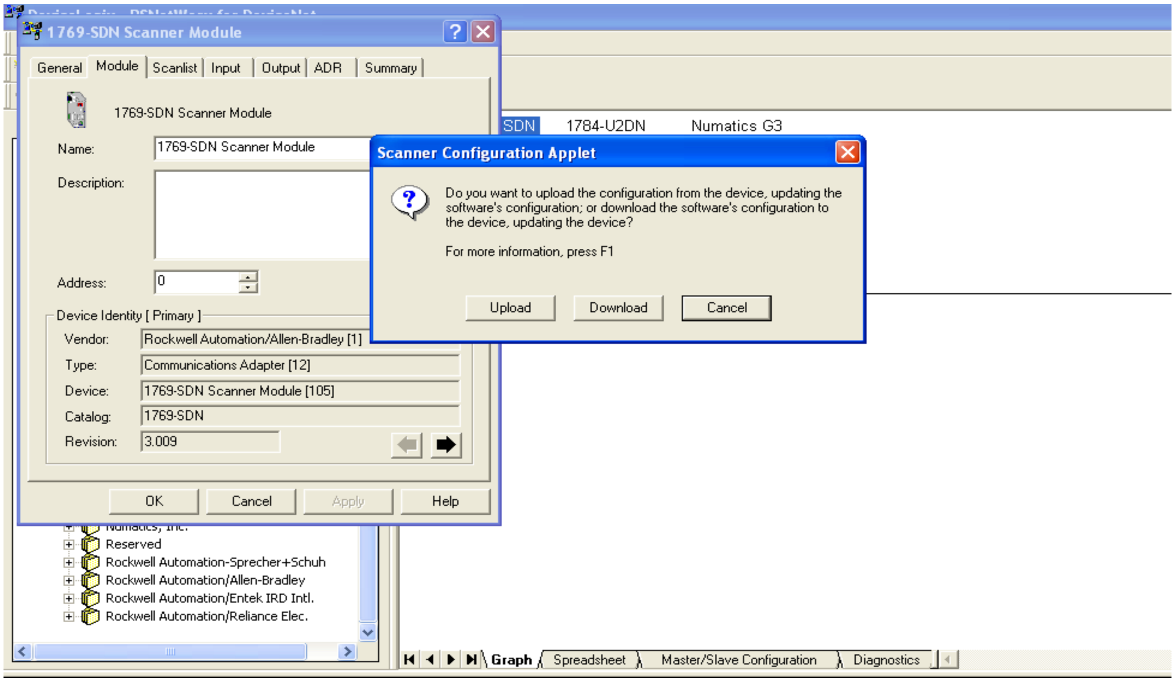
☑ Polled:
Input Size: 9 Bytes
Output Size: 4 Bytes
Poll Rate: Every Scan

☐ Change of State / Cyclic
○ Change of State ○ Cyclic
Input Size: 0 Bytes
Output Size: 0 Bytes
Heartbeat Rate: 250 msec

☑ Automap on Add

Enter the I/O sizes as Scan List Parameters

The required I/O sizes obtained from the G3 display in the previous step (RX=9 TX=4 in this example) are assigned in the polled section of the scan list. Select OK to exit 63, Numatics G3 I/O parameters.


1769-SDN Scanner Module
General Module Scanlist Input Output ADR Summary
1769-SDN Scanner Module
SDN 1784-U2DN Numatics G3
OK Cancel Apply Help
Upload Download Cancel
Numatics, Inc.
Reserved
Rockwell Automation-Sprecher+Schuh
Rockwell Automation/Allen-Bradley
Rockwell Automation/Entek IRD Intl.
Rockwell Automation/Reliance Elec.
Graph Spreadsheet Master/Slave Configuration Diagnostics

Name: 1769-SDN Scanner Module
Description:
Address: 0
Device Identity [Primary]
Vendor: Rockwell Automation/Allen-Bradley [1]
Type: Communications Adapter [12]
Device: 1769-SDN Scanner Module [105]
Catalog: 1769-SDN
Revision: 3.009

Scanner Configuration Applet

Do you want to upload the configuration from the device, updating the software's configuration; or download the software's configuration to the device, updating the device?

For more information, press F1

Download the scanner module parameters

Go online and download the scanner parameters (includes "ScanList") to the scanner module.

14. Appendix

14.1 System Specifications

Electrical	
Supply Voltage	Valves (2005, 2012, 2035): 24 VDC + 10%, -15% Node and Discrete I/O: 24 VDC ± 10%
Current	Total current on the Auxiliary Power Connector (“Valves and Outputs” and “Node and Inputs” Pins) must not exceed 8 Amps.
Internal Electronic Resettable Fuses	The Auxiliary Power Connector pins are each internally fused with an electronically resettable fuse. These fuses are set to the maximum current allowable through the G3 electronics.
Recommended External Fuse	External fuses should be chosen depending upon manifold configuration. Please refer to power consumption chart on page **Error! Bookmark not defined.** for additional fuse sizing information.
Spike Suppression	Output spike suppression is internally provided for both discrete and valve outputs.
Discrete Outputs (NPN (Sinking) or PNP (Sourcing))	Maximum 0.5 Amps per output. All outputs are short circuit protected and have internal spike suppression. Contact factory for higher current requirements.
Valve Solenoid Coil Output Drivers	Maximum 0.5 Amps per output. All output points are short circuit protected and have internal spike suppression.
Operating Temperature for Electronic Components	23 to 114°F (-5 to 46°C)

14.2 Factory Default Settings

Description	*Default*
Node Address	63
Baud Rate	Auto-Baud enabled
Valve Side Output Bytes	4 Bytes (32 Allocated Valve Coil Outputs)
	4/4
Rx/Tx Values	Self-Configuring
Diagnostic Word	Enabled
I/O Status	Enabled
DeviceNet Quick Connect	Disabled
Fault Action	Reset to Off
Idle Action	Reset to Off

14.3 Troubleshooting

Communication Node

Symptom	*Possible Cause*	*Solution*
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 No. 2) is connected to appropriate valve station. See page 113 for bit mapping rules.
Valve outputs do not energize.	Output power not present or connected improperly on Auxiliary Power connector.	Check for 24VDC on the +24 VDC (Valves and Outputs) pin of the MINI Auxiliary Power connector of the Comm. module.

I/O Modules

Symptom	*Possible Cause*	*Solution*
Outputs remain on when communication is lost and/or PLC is in "Program" mode.	Communication Fault parameters are set incorrectly. See pages 112.	Check the communication fault/idle mode parameter setting to ensure that it is not set to "Hold Last Output State".

14.4 Glossary of Terms

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

Term	Description
ADR	Auto-Device Replacement is a feature (enabled by Allen Bradley scanners) that consists of Configuration Recovery and Auto-Address Recovery. Configuration Recovery (CF) refers to the scanner's ability to store a device's configuration. Auto-Address Recovery (AAR) refers to the ability of the scanner to change a device's node address from 63 to that desired by the scanner. Please refer to Allen Bradley's Release Notes No. 1747-5.8-RN1 for additional information.
Assembly parameter	A Numatics' term describing a user definable parameter that allows user to allocate the number of valve output drivers. A 0, 8, 16, 24, 32 option is available and is helpful if there are I/O memory constraints in the PLC.
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).
CAN_H	Controller Area Network – High; Communication Line.
CAN_L	Controller Area Network – Low; Communication Line.
CANBUS	Serial communication BUS network based on CAN protocol.
Change of State	I/O message type in which either the expiration of the transmission timer or a change in input state triggers data production.
Comm. Fault	One or more of the I/O connections have timed out.
Cyclic	I/O message type in which data production is triggered by the expiration of the transmission timer.
DeviceNet Manager	Allen-Bradley's DeviceNet configuration software.
Discrete I / O	The Inputs / Outputs that are available via the "Discrete I/O" side of manifold.
EDS file	Electronic Data Sheet. A text file, which contains specific product information, definitions of product capabilities and configurable parameters necessary for operation on a DeviceNet network.
EDS Stub file	An abridged version of the EDS file, which contains only the minimum information necessary to make the product functional on a DeviceNet network.
Ground	This term is used to indicate an earth ground.
Group 2	DeviceNet message group applicable to Numatics' Serial/Bus products.
I/O	Any combination of Inputs and Outputs.
Idle	A zero (0) length poll message (i.e.: scanner in program mode).
MAC ID	Media Access Connection Identification (00-63) – Node (network drop) address.
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.
ODVA	Open DeviceNet Vendor Association (www.odva.org)
Polled	I/O message type in which the devise consumes I/O data from its master and produces I/O data when the master requests it.
RS NetWorx	Allen-Bradley's DeviceNet configuration software.

Glossary of Terms Continued

Term	Description
Rx/Tx	Rx = Consumed byte size; analogous to Input byte size. Tx = Produced byte size; analogous to Output byte size.
Sinking (NPN)	Method of connecting electrical circuits in which the zero (0) volt DC side is switched and the common is positive
SCP	Short Circuit Protection
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
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.

14.5 Technical Support

For technical support, contact your local Numatics distributor. If further information is required, please call Numatics Inc. Technical Support Department at (248) 596-3333.

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

Information on device files, technical manuals, local distributors, and other Numatics, Inc. products and support issues can be found on the Numatics, Inc's. WEB site at www.numatics.com