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G2-1 Fieldbus Communications Electronics

Why use Numatics Fieldbus communication electronics? **Modular Reality...**

- No internal wiring
- Up to 40 valve solenoids
- Discrete I/O status with short circuit protection
- Software or manual configuration
- Plug-together flexibility
- Conformance tested
- Shorted and open load diagnostics
- Universal input technology allows NPN or PNP sensor types with same input module.
- NEMA4/IP65
- Up to 16 discrete output points and 16 input points per communication node
- Low cost distribution options
- Used with 2002 Series

Supported Protocols:
- DeviceNet
- Allen Bradley 1771 Remote I/O
- Profibus DP 1.5 MBps & 12MBps
- DeviceLogix
- CANopen - Consult Factory
DeviceNet

DeviceNet is an open protocol bus communication system developed by Allen-Bradley based on Controller Area Network (CAN) technology. The governing body for DeviceNet is the Open DeviceNet Vendor Association (ODVA). The ODVA controls the DeviceNet specification and oversees product conformance testing.

Numatics G2-1 DeviceNet modes have been tested and approved for conformance by the ODVA.

More information about DeviceNet and the ODVA can be obtained from the following WEB site:

Open DeviceNet Vendors Association (ODVA)
www.odva.org

Technical Data

<table>
<thead>
<tr>
<th>ELECTRICAL DATA</th>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS Power</td>
<td>11-25 VDC</td>
<td>0.025 amps.</td>
</tr>
<tr>
<td>Valve &amp; Discrete I/O</td>
<td>24 VDC ±10%</td>
<td>4 amps. maximum</td>
</tr>
<tr>
<td>Aux Power Connector</td>
<td>Single key way 4 pole 12mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>Communication Connector</td>
<td>Single key way 5 pole 12 mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>LED’s</td>
<td>Module status, Network status, Ext fault &amp; Aux power</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPERATING DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range</td>
<td>+32˚ to +115˚ F (0˚ to +46˚ C)</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% relative humidity, non-condensing</td>
</tr>
<tr>
<td>Moisture</td>
<td>Design to meet NEMA 4 / IP65 requirements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONFIGURATION DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Module</td>
<td>Contains all communication electronics as well as short circuit protected driver circuitry for up to 24 valve solenoids. Supports auto-baud detection and auto-device replacement (ADR) feature.</td>
</tr>
<tr>
<td>Manual Configuration Module (MCM)</td>
<td>Optional module for use when a manual configuration method is preferred.</td>
</tr>
<tr>
<td>Maximum Valve Solenoid Outputs</td>
<td>24</td>
</tr>
<tr>
<td>Maximum Discrete I/O Points</td>
<td>16</td>
</tr>
</tbody>
</table>

Numatics’ DeviceNet modules features polled, change of state (COS), cyclic and combinations message capability.

Electronic Data Sheet (EDS) file and technical manuals are available in the download section of the Numatics, Inc. web site at: www.numatics.com/fieldbus
Allen Bradley 1771 Remote I/O

Allen Bradley 1771 Remote I/O is a proprietary protocol based on a patented chipset. This chipset is obtained from Allen-Bradley and incorporated into the Numatics RIO module.

Technical Data

<table>
<thead>
<tr>
<th>ELECTRICAL DATA</th>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve &amp; Discrete I/O</td>
<td>24 VDC +/-10%</td>
<td>4 amps. maximum</td>
</tr>
<tr>
<td>Aux Power Connector</td>
<td>Single key way 4 &amp; 5 pole 12mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>Communication Connector</td>
<td>Single key way 5 pole 12 mm (Micro) connector, Bus in and out</td>
<td></td>
</tr>
<tr>
<td>LED’s</td>
<td>Communications status, ext. fault and auxiliary power</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPERATING DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range</td>
<td>+32˚ to +115˚ F (0˚ to +46˚ C)</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% relative humidity, non-condensing</td>
</tr>
<tr>
<td>Moisture</td>
<td>Designed to meet NEMA 4 / IP65 requirements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONFIGURATION DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Module</td>
<td>Contains all communication electronics as well as short circuit protected driver circuitry for up to 24 valve solenoids.</td>
</tr>
<tr>
<td>Manual Configuration Module (MCM)</td>
<td>Module contains DIP and rotary switches for setting device configuration data</td>
</tr>
<tr>
<td>Maximum Valve Solenoid Outputs</td>
<td>24</td>
</tr>
<tr>
<td>Maximum Discrete I/O Points</td>
<td>16</td>
</tr>
<tr>
<td>Rack Size</td>
<td>Rack size set automatically to 1/4 rack</td>
</tr>
</tbody>
</table>
Profibus DP (1.5 MBps & 12 MBps)

Profibus-DP is a vendor-independent, open fieldbus designed for communication between automation control systems and distributed I/O at the device level.

The 2002 Series - Profibus product is designed to conform to the Profibus standard EN50170. Certification is by the Profibus Interface Center (PIC) according to the guidelines determined by the Profibus Trade Organization (PTO). The certification process ensures interoperability for all Profibus devices.

More information about Profibus can be obtained at the following web sites:

**Profibus Interface Center**
www.aut.sea.siemens.com/pic/index.htm

**Profibus Trade Organization**
www.profibus.com

---

**Technical Data**

<table>
<thead>
<tr>
<th>ELECTRICAL DATA</th>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve &amp; Discrete I/O</td>
<td>24 VDC +/- 10%</td>
<td>4 amps. maximum</td>
</tr>
<tr>
<td>Aux. Power Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 MBps</td>
<td>Single key way 4 pole 12 mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>12 MBps</td>
<td>Single key way 4 pole 12 mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>Communication Connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 MBps</td>
<td>5 pole 12 mm (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>12 MBps</td>
<td>5 pole reverse key female (Micro) connector</td>
<td></td>
</tr>
<tr>
<td>LED’s</td>
<td>Module status, Network status, Ext fault and Auxiliary power</td>
<td></td>
</tr>
</tbody>
</table>

| OPERATING DATA                   |                     |                    |
| Temperature Range                | +32˚ to +115˚ F (0˚ to +46˚ C) |
| Humidity                         | 95% relative humidity, non-condensing |
| Moisture                         | Designed to meet NEMA 4 / IP65 requirements |

**CONFIGURATION DATA**

| Communication Module             | Contains all communication electronics as well as short circuit protected driver circuitry for up to 24 valve solenoids. |
| Manual Configuration Module (MCM) | Module containing DIP and rotary switches for setting device configuration data. |
| Maximum Valve Solenoid Outputs   | 24 |
| Maximum Discrete I/O Points      | 16, available with 12mm (micro) connectors or 25 pin sub-D styles |

(GSD) File and technical manuals are available in the download section of the Numatics, Inc. website at: www.numatics.com/fieldbus.
Discrete I/O Modules

Discrete I/O modules are used to connect additional I/O devices to the valve manifold node. This provides for more efficient use of system resources when configuring a communication system.

Universal input modules feature technology that allows the same module to automatically recognize PNP or NPN type sensors without the need to add external pull-up resistors or manually select sensor type.

Input and output modules have two 12mm (micro) connectors. Each can be used individually (i.e. 1 I/O point per connector) or can be used for double point (i.e. connector 1 has two points of I/O). This standard feature further simplifies external I/O wiring.

Sub-D output module can be used to drive 16 additional coils on a separate manifold or 16 discrete output points.

Sub-D I/O module can be used for inputs and or up to a total of 16 I/O points.

Technical Data

**ELECTRICAL DATA**

<table>
<thead>
<tr>
<th>Inputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>24 VDC ± 10%</td>
</tr>
<tr>
<td>Type</td>
<td>Sourcing (PNP), Sinking (NPN) or contact closure (universal input technology)</td>
</tr>
<tr>
<td>LED Indicator</td>
<td>Input status</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24 VDC +/- 10%</td>
</tr>
<tr>
<td>Current</td>
<td>0.5 amperes per output (4A max. per manifold)</td>
</tr>
<tr>
<td>Type</td>
<td>Sinking (NPN)</td>
</tr>
<tr>
<td>LED Indicator</td>
<td>Output status</td>
</tr>
</tbody>
</table>

**OPERATING DATA**

| Temperature Range                           | +32˚ to +115˚ F (0˚ to +46˚ C) |
| Humidity                                    | 95% relative humidity, non-condensing |
| Moisture                                    | Designed to meet NEMA 4 / IP65 requirements |
| Connectors                                  | Single keyway 5 pole female 12mm (micro) connector or 25 pin sub-D female |

**CONFIGURATION DATA**

The maximum number of modules connected to the discrete I/O side is 8. A fully configured manifold assembly would require 2 master modules with 6 slaves.
How to Order

1) Assembly Kit Selection

<table>
<thead>
<tr>
<th>A</th>
<th>K</th>
<th>C</th>
<th>6</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>

**Electrical / Electronic Type & Location**
- **C** = Communication Module

**Valve Series**
- 6 = 2002 Series

**Number of Valve Stations**
- A = 1
- B = 2
- C = 3
- D = 4
- E = 5
- F = 6
- G = 7
- H = 8

**Port Size**
- 2 = 1/4
- H = 8mm (5/16)

**Port Type**
- L = Push In
- D = Barbed Fitting

**Options**
- STD = Standard
- DRM = DIN Rail Mounting (Std. 35mm)
- MUF = Muffler in End Plates
- DWM = DIN Rail with MUF
- A01 = 25 Pin Sub-D 16 Discrete Outputs Sinking (NPN)
- D01 = A01 + DRM
- D03 = A01 + MUF
- F01 = A01 + DRM + MUF
- A17 = 25 Pin Sub-D 16 I/O Points Inputs Sourcing (PNP) Outputs Sinking (NPN)
- D18 = A17 + DRM
- D19 = A17 + MUF
- F07 = A17 + DRM + MUF

---

**2) Valve Model Number Selection**

Valve model number with plug-in manifold base and “G” wiring option.

**3) Electronic Interface**

**Fieldbus Protocols**
- DN = DeviceNet™
- AB = Allen Bradley RIO
- PB = Prolific DP 1.5 MBps
- PT = Prolific DP 12 MBps
- DL = DeviceLogix

**Number of Discrete Inputs**

**Number of Discrete Outputs**

**Options**
- E02 = Separate Power (Valve and I/O)
- G08 = With MCM if Not Standard
- STD = Standard

**Voltage**
- F = 24 VDC

**I/O Type**
- D = Digital

---

**4) I/O Per I/O Station – Electronic Interface Option Only (See I/O table below)**

When ordering up to eight (8) I/O you must order one (1) Master I/O (which contains two (2) points I/O itself). The balance required is made up of Slaves, two (2) points per I/O station (total 3 Slave modules). A maximum of sixteen (16) I/O points can be configured by using two (2) Master modules and six (6) Slave modules. Total number of discrete inputs plus total number of discrete outputs must be less than or equal to 16. (See I/O table below).

Input master modules can be used with Output Slave Modules.
Output master Modules can be used with Input Slave Modules.
Sub-D outputs and I/O types do not require additional master modules when used alone

**I/O Table: Note 2 I/O per station**

<table>
<thead>
<tr>
<th>HOUSING TYPE</th>
<th>SINKING (NPN) OUTPUT</th>
<th>SINKING (NPN) or SOURCING (PNP) INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Kit No.</td>
<td>239-1800</td>
<td>239-1802</td>
</tr>
<tr>
<td>Slave Kit No.</td>
<td>239-1801</td>
<td>239-1803</td>
</tr>
</tbody>
</table>

---

* Maximum number of valve stations is determined by the combination of single and double Z-Boards types installed in the manifold sub-bases. All G2-1 communication modules support 24 output drivers for valve solenoid coils.

---

Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.
AKC Communication Module

- Shaded components described by Assembly Kit (AK) model number designation (see #1, pg. 8), with the exception of the Communication module and number of I/O stations that are described by Electronic Interface (NX6) model number designation. (see #3, pg. 8)
- Each valve manifold station is listed in sequential order from left to right when facing the port side of the manifold as indicated.
- Each discrete I/O station is listed in sequential order from RIGHT to LEFT starting from the Communication module as indicated.

NOTE: I/O stations #1 and #5 (if required) must always be a MASTER KIT. (see #4, pg. 8)

Stations 2,3,4,6,7 and 8 must be either input or output Slave kits.

NOTE: Total of 24 solenoid outputs available. Either 24 single solenoid valves or 12 double solenoid valves or any combination of singles or doubles, not to exceed 24 solenoid outputs for AKC Serial/Bus are allowed.

Example order: AKC6D00002LSTD
021BW4Z3GL00061
021BW4Z3GL00061
021BB4Z4GL00061
021BB4Z4GL00061
NX6DN0808DFE02

I/O station 1 239-1802 Input Master Sinking (NPN) Kit
I/O station 2 239-1803 Input Slave Sinking (NPN) Kit
I/O station 3 239-1803 Input Slave Sourcing (PNP) Kit
I/O station 4 239-1803 Input Slave Sourcing (PNP) Kit
I/O station 5 239-1800 Output Master Sinking (NPN) Kit
I/O station 6 239-1801 Output Slave Sinking (NPN) Kit
I/O station 7 239-1801 Output Slave Sinking (NPN) Kit
I/O station 8 239-1801 Output Slave Sinking (NPN) Kit

ASSEMBLED

LH Mounting Cover Kit

<table>
<thead>
<tr>
<th>DET. NO.</th>
<th>NO. REQ’D</th>
<th>PART NAME</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>LH DIN Rail Mtg Cover</td>
<td>105-381</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Screw</td>
<td>127-844</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Lockwasher</td>
<td>128-192</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Screw</td>
<td>127-472</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Spring</td>
<td>115-355</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Clamp</td>
<td>125-720</td>
</tr>
</tbody>
</table>

LH MOUNTING COVER KIT

<table>
<thead>
<tr>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>239-1819</td>
</tr>
<tr>
<td>239-1820</td>
</tr>
</tbody>
</table>
Fieldbus Communication Module and Manual Configuration Module Assemblies

Communication Module

1. Gasket
2. Screw
3. Nameplate (DeviceNet)
4. Nameplate (Profibus)
5. Nameplate (Allen Bradley RIO)
6. Screw
7. Lockwasher
8. Housing
9. Cup Washer
10. Transfer Board

Communication Module Kits (w/o End Plates)

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
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<tbody>
<tr>
<td>DeviceNet</td>
<td>239-1794</td>
</tr>
<tr>
<td>Remote I/O</td>
<td>239-1804</td>
</tr>
<tr>
<td>Profibus 1.5 Mbps</td>
<td>239-1805</td>
</tr>
<tr>
<td>Profibus 12 Mbps</td>
<td>239-1806</td>
</tr>
<tr>
<td>DeviceLogix</td>
<td>239-2108</td>
</tr>
<tr>
<td>CANopen</td>
<td>Consult Factory</td>
</tr>
</tbody>
</table>

Manual Configuration Module (MCM)

1. Switch Housing w/ conn.
2. Switch Housing w/o conn.
3. Screw
4. Screw
5. Cover w/ conn.
6. Cover w/o conn.
7. Gasket w/conn.
8. Gasket
9. Gasket
10. Screw
11. Screw
12. Lockwasher
13. Nameplate (Conn Ver. Only)

Optional Bus Out Connector (A-B 1771 RIO only)
### I/O Modules Assemblies
#### I/O Module Kit with Input LED Indicator (2 I/O per module)

<table>
<thead>
<tr>
<th>DET. NO.</th>
<th>NO. REQ'D</th>
<th>PART NAME</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Gasket</td>
<td>113-503</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Screw</td>
<td>127-795</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Lockwasher</td>
<td>128-192</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Housing</td>
<td>125-807</td>
</tr>
</tbody>
</table>

#### HOUSING TYPE

<table>
<thead>
<tr>
<th>OUTPUT TYPE</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output - Sinking (NPN)</td>
<td>239-1800</td>
</tr>
<tr>
<td>Input - Sinking (NPN) or Sourcing (PNP)</td>
<td>239-1802</td>
</tr>
</tbody>
</table>

#### Connector Type

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>239-1801</td>
<td>Master Kit No.</td>
</tr>
<tr>
<td>239-1802</td>
<td>Slave Kit No.</td>
</tr>
</tbody>
</table>

#### Dust cover available for connectors:

**PART NO. 230-647**

---

### 25 Pin Female Sub-D Discrete Output and I/O Module

<table>
<thead>
<tr>
<th>DET. NO.</th>
<th>NO. REQ'D</th>
<th>PART NAME</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Housing</td>
<td>105-379</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Hex Screw</td>
<td>127-825</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Gasket</td>
<td>113-507</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Screw</td>
<td>127-794</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Nameplate</td>
<td>122-1057</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>Screw</td>
<td>127-499</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>Lockwasher</td>
<td>128-192</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Screw (w/DIN)</td>
<td>127-472</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>Spring (w/DIN)</td>
<td>115-355</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>Clamp (w/DIN)</td>
<td>125-720</td>
</tr>
</tbody>
</table>

#### Discrete output and I/O Module Kit

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 pt. Output Sinking (NPN) with DIN Rail</td>
<td>239-1225</td>
</tr>
<tr>
<td>16 pt. Output Sinking (NPN) w/o DIN Rail</td>
<td>239-1221</td>
</tr>
<tr>
<td>16 pt. Input Sourcing (PNP) and/or Output Sinking (NPN) with DIN Rail</td>
<td>239-1866</td>
</tr>
<tr>
<td>16 pt. Input Sourcing (PNP) and/or Output Sinking (NPN) w/o DIN Rail</td>
<td>239-1865</td>
</tr>
</tbody>
</table>

Note: When ordering this module in an assembled manifold “AK” use the corresponding option code in the “AK” model number. Do not list the module part number under the Electronic Interface model number “NX.”
FlexiBlok® Manifold with Fieldbus Electronics Dimensional Drawing

Dimensions

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.50</td>
<td>1.00</td>
<td>0.72</td>
<td>1.20</td>
<td>1.50</td>
<td>1.50</td>
<td>2.38</td>
<td>2.32</td>
</tr>
<tr>
<td></td>
<td>(12.7)</td>
<td>(25.4)</td>
<td>(18.3)</td>
<td>(30.5)</td>
<td>(38.1)</td>
<td>(38.1)</td>
<td>(60.5)</td>
<td>(59.0)</td>
</tr>
</tbody>
</table>

top dimensions = inches
bottom dimensions (in parenthesis) = millimeters