MAC VALVES, INC.

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TITLE: User's Manual for MAC Valves DeviceNet Serial Input Manifold

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User's Manual
for
MAC Valves DeviceNet
Serial Input Manifold

12/1/97

1. SYSTEM OVERVIEW

1-1 DeviceNet

The DeviceNet System is an open architure control system based on the Bosch CAN format which supports high speed transfer of control information. A DeviceNet network consists of one or more master devices and multiple slave devices.

The master (PLC with its network scanner) and slave devices are connected via a standard five conductor cable which has both node power and communications on the same line. There are a number of DeviceNet approved cables which may be used for network wiring.

The scanner communicates with each slave device on the network in an exchange referred to as polled I/O. Data transferred on the network is organized by node addresses. There can be up to 63 slaves on a given network (62 if you have a network PC along with a PLC master scanner). Each slave device is assigned a node number (or address) so it can communicate with the network.

1-2 MAC Valves Serial Input Manifold

The MAC Serial Input Manifold (SIM) is a slave device within the DeviceNet network. Thus, it will respond to all of the commands associated with the network like any other node of its type. The PLC programmer will not have to make any special allowances with the Serial Input Manifold.

Since the MAC SIM Unit is nothing more than a node on the DeviceNet network, it can also be used in conjunction with our Outputs Only Serial Interface (SM) product or any other DeviceNet compatible system.

Each SIM Unit occupies a single node in the network. The output portion consumes 4 bytes (32 bits) so that the system can control up to 24 MAC solenoid valves plus 8 additional user defined outputs. These user outputs can control remote valve stacks or any other output within the current and voltage specification of the output modules. There can be up to two output modules with 4 outputs per module. The location and addressing of these words will be

discussed later in this document.

Along with 32 output channels, the SIM unit has the capability to read 32 input channels. These inputs are controlled through four module of eight inputs per module which are located on the top of the SIM unit. The SIM produces 4 bytes (32 bits) which are read back into the master PLC in the same manner as the outputs. The inputs also can be specified so that they can accept inputs from either an NPN or PNP type switches along with traditional mechanical switches.

Each SIM Unit is mounted directly to the MAC Valve manifold and is connected to the PLC network via the five conductor cable rather than individual wires for each solenoid and each input. This greatly reduces both the distance between the input switches and the controller (the signal for the inputs are also on the same five conductor cable as the outputs) and the number of wires compared with a conventionally wired system.

MAC Valve Serial Input Manifold Units have pre-wired solenoid connections. It is only necessary to make the communication and power connections to the Serial Interface terminals and to set DIP switches in the SIM Unit at the time of installation. The MAC SIM system comes with a standard five pin Mini type communications cable and with many optional power connectors. Thus, the amount of wiring by way of the connectors is minimal.

In the event additional valves need to be included at some future date, they can be easily installed (if add-a-unit is available) by simply adding valve(s) to the stack and connecting the mating electrical connector to the SIM ribbon cable.

Another feature of the SIM unit is the ability to add Input Modules or Output Modules anytime after installation. This is easily performed by removing the blanking plate(s) on the top of the SIM unit, placing the new Module in the slot, and securing the two screws on top.

2. SYSTEM STRUCTURE

2.1 Applicable PLCs

The following is a partial list of scanners and cabling approved by the DeviceNet governing body at the time of this wiring. Please consult the ODVA for a complete list of current DeviceNet products.

Table 1

Company	Product
Allen-Bradley	Scanners, PC Cards, Cabling
Belden Wire and Cable	Cables
Crouse-Hinds	Connectors
Daniel Woodhead	Cables, Connectors
Lumberg	Connectors
Molex	Cables, Connectors
Turck	Cables, Connectors
Omron	Scanners
S-S Technologies	Scanners
Huron Networks	Scanners
Synergetic Micro Systems	Scanners
Toshiba	Scanners
Hilscher GmbH	Scanners

2.2 Applicable MAC Valve Series for the SIM Unit

The following are the valves which can be used with the Serial Input Manifold:

34 Series
35 Series
44 Series
45 Series
82 Series
92 Series
6200 Series
6300 Series
6500 Series
6600 Series
ISO Series

Since additional valves can be used outside the manifold by way of the optional output modules, please refer to Table 2 for some application examples. The absolute maximum wattage per channel is 6.0W which corresponds to 0.25A at 24VDC, (higher wattage is available through a MOD., consult the factory). The total current load is a maximum of 8.0A. The SIM unit also has a capability for AC operation. Please consult the factory for specifications for AC use.

Table 2

Stack and Output Module Wiring	Number/Type of Valves (Output Module Valves)	Coil Designation	Voltage	Wattage	Total Current For Complete SIM Unit (Amps)
On SIM Stack	8 Dbl 45	DA	24VDC	5.4W	6.0
"	8 Sgl 45	DA		5.4W	
Output Module	(8 Sgl 82)	DA		5.4W	
On SIM Stack	6 Dbl 92	FF	24VDC	2.4W	4.1
"	5 Sgl 6300	50		6.0W	
"	3 Sgl 82	DA		5.4W	
Output	(4 4.0W Lights)			4.0W	
Module	(4 Sgl 45)	FB		1.8W	
"					

On SIM Stack Output Module	24 Sgl 6300 (8 Sgl 6300)	50 50	24VDC	6.0W 6.0W	8.0
On SIM Stack Output Module “	24 Sgl 34 (4 Sgl 6500) (2 Dbl 82)	DF 59 DA	24VDC	4.0W 2.5W 5.4W	5.3

From the above table, it can be see some of the many different combinations of valves which can be operated with the Serial Input Manifold. Please consult the factory for other valve series to be made available and additional options.

3. SPECIFICATIONS

3-1 General Specifications Table 3

Item	**Specifications**
Operating ambient temperature	0~+50°C (consult the factory for higher temperature operation)
Operating ambient humidity	10~90% RH (no condensation)
Vibrating resistance	5G (10~55 Hz, 0.5mm)
Impact resistance	10G
Dielectric strength	500VAC 60 Hz for 1 sec. (between external terminal and case)
Insulation resistance	10Mohm
Operating atmosphere	No corrosive gases

3-2 Performance Specifications Table 4

Item	Specification
Applicable PLC	Refer to Table 1
DeviceNet Processor/Scanner	Refer to Table 1
Max. # of SI Units per Master Station	(Refer to Table 1)
Transmission Speed	125k/ 250k/ 500k
Transmission Distance	300m @125k 100m @250k 100m @500k
Transmission Path	Five Conductor Cable Refer to Table 1

3-3 SIM Unit Specifications Table 5

Item	Specification
Power supply voltage	For solenoid valves 24VDC +/-10% For SIM Unit (internal) 24VDC +/-10%
Power consumption	For solenoid valves and Output Modules Max. 8.0A For SI Unit (internal) Max. 300mA For Input Modules Max. 3.0A
Output points	32 points 6.0W/Channel Max (24VDC)
Input points	32 points
Residual voltage	1.0 V or less
Weight	3.6kg with six Modules
Dimensions	152x126x187mm (6.0x5.0x7.4")

4 Dip Switch Settings/Electronic Data Sheet (EDS)

4-1 Addressing

The DeviceNet system uses node numbers as a bases for addressing. The system has a capacity of 64 addresses. Of these addresses, one is used for the master scanner, and one could be used for the system monitor (this arrangement depends on the company used for the communications). From this, we can as many as 62 SIMs on a given system. Each SIM must have a unique address for this to work correctly. Please consult the company from which the scanner is obtained for complete scanner specifications and operational methods.

With the power supply OFF, open the end access plate and locate the dip switches in the left half of the mother board as shown in the Figure 1.

Use a small anti-static screwdriver to set the positions of the 8 bit switch for the unit's node address and baud rate as described below. The Least Significant Bit (LSB) is the left most dip switch and the Most Significant Bit (MSB) is the 6^{th} switch from the left. Note, when the switch is in the position closest to the circuit board it means it is translated as a logic 1 (On).

(1) Address (Bits 1-6)

The address setting establishes the SI Unit's "identity" within the DeviceNet network. The setting range is 0-63 (64 different settings). The addresses are refer to in decimal format but the dip switches are set up as binary. The following are some examples of decimal to binary conversion and their corresponding dip switches. Refer to Figure 2.

Address 55Dec = 111011Bin
=Switches 1,2,4,5, and 6 ON

Address 12Dec = 001100Bin
=Switches 3 and 4 ON

(2) Baud Rate (Bits 7,8)

It is important to note that all of the units on a particular network must operate at the same baud rate. Thus, the speed which is set into the Scanner Card must be duplicated by all of the nodes on the net or a bus error will occur.

With the power supply OFF, use a small anti-static screwdriver to set the positions of the two right most dip switches.

Table 6

Switch Position	Data Rate	Max. I/O Transmission Distance
00	125k	500m
10	250k	250m
01	500k	100m
11	not used	-------

4-2 Electronic Data Sheet (EDS)

The second part of commissioning a node in the DeviceNet is to attached the Electronic Data Sheet (EDS) to the software in the scanner. Due to the differences in the software for a given scanner, please consult the scanner company's manual for instructions on EDS usage.

The following is a printed copy of the EDS used for the MAC Valves/DeviceNet SIM. A disk copy is available upon request.

```
**********************************************************************************************
$ DeviceNet Manager Generated Electronic Data Sheet
$

[File]


[Device]
        VendCode    = 90;                   $ Vendor Code
        ProdType    = 7;                    $ Product Type
        ProdCode    = 2;                    $ Product Code

        MajRev      = 0;                    $ Major Rev
        MinRev      = 0;                    $ Minor Rev
        VendName    = "HMS";
        ProdTypeStr = "Discrete I/O";
        ProdName    = "AB64I/O";
        Catalog     = "";
        Ucmm        = "0";

[IO_Info]
        Default     = 0X0001;
        PollInfo    = 0X0001, 1, 1;

        Input1      = 4;
        Output1     = 4;

[ParamClass]
        MaxInst=66;
        Descriptor=0;
```



```
        CfgAssembly=0;
```

```
$ Parameter Class Section


$ Parameter Section

[Params]

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
Param1 =                                    $ Idle State selection
0,                                                  $ reserved
6,                                                  $ Link Path Size
"20 1E 24 01 30 09",    $ Link Path to DOG object's idle state attribute.
0x02,                                       $ No support for settable path, scaling, scaling links, or
                                                    $ real time update of value.  Value is gettable and
                                                    $ Settable.  Enumerated strings are supported.
4,                                                  $ Data Type - boolean
1,                                                  $ Data Size
"Idle State",                   $ Parameter Name
"",                                         $ Units String
                                                    $$$$$$$$$$ Help string $$$$$$$$$$$
"Defines output behavior during program mode.",
0,1,0;                                  $ Min, Max (max enumeration #), and Default values
1,1,1,0,0,0,0,0,0; $ Not Used



Param2 =                                    $ Fault State selection
0,                                                  $ reserved
6,                                                  $ Link Path Size
"20 1E 24 01 30 07",    $ Link Path to DOG object's fault state attribute.
0x02,                                       $ No support for settable path, scaling, scaling links, or
                                                    $ real time update of value.  Value is gettable and
                                                    $ Settable.  Enumerated strings are supported.
4,                                                  $ Data Type - boolean
1,                                                  $ Data Size
"Fault State",                  $ Parameter Name
"",                                         $ Units String
                                                    $$$$$$$$$$ Help string $$$$$$$$$$$
"Defines output behavior in the event of a communication fault.",
0,1,0;                                  $ Min, Max (max enumeration #), and Default values
1,1,1,0,0,0,0,0,0; $ Not Used
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
Param3 =                $ Output
0,                          $ Data Placeholder
6, "20 09 24 01 30 03",     $ Path size and Path to Output Attribute
0x02,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
```



```
"Output1",                  $ Name
" ",                        $ Units (Not Used)
```

```
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param4 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 02 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output2",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param5 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 03 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output3",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param6 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 04 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output4",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places
Param7 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 05 30 03",  $ Path size and Path to Output Attribute
```



```
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output5",              $ Name
```

```
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param8 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 06 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output6",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param9 =                $ Output
0,                      $ Data Placeholder
6, "20 09 24 07 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output7",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param10 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 08 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output8",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places
```



```
Param11 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 09 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
```

```
4, 1,                   $ Data Type and Size - (Boolean)
"Output9",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param12 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 0A 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output10",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param13 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 0B 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output11",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param14 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 0C 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output12",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
```



```
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param15 =               $ Output
0,                      $ Data Placeholder
```

```
6, "20 09 24 0D 30 03",    $ Path size and Path to Output Attribute
0x02,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Output13",                $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,           $ mult, div, base, offset scaling (Not Used)
1,1,1,0,           $ mult, div, base, offset links (Not Used)
0;                         $ decimal places

Param16 =                  $ Output
0,                         $ Data Placeholder
6, "20 09 24 0E 30 03",    $ Path size and Path to Output Attribute
0x02,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Output14",                $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,           $ mult, div, base, offset scaling (Not Used)
1,1,1,0,           $ mult, div, base, offset links (Not Used)
0;                         $ decimal places

Param17 =                  $ Output
0,                         $ Data Placeholder
6, "20 09 24 0F 30 03",    $ Path size and Path to Output Attribute
0x02,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Output15",                $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,           $ mult, div, base, offset scaling (Not Used)
1,1,1,0,           $ mult, div, base, offset links (Not Used)
0;                         $ decimal places

Param18 =                  $ Output
0,                         $ Data Placeholder
6, "20 09 24 10 30 03",    $ Path size and Path to Output Attribute
0x02,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Output16",                $ Name
" ",                       $ Units (Not Used)
```



```
"The state of the device connected to AB64",                    $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,           $ mult, div, base, offset scaling (Not Used)
1,1,1,0,           $ mult, div, base, offset links (Not Used)
0;                         $ decimal places
```

```
Param19 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 11 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output17",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param20 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 12 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output18",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param21 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 13 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output19",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param22 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 14 30 03", $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
```



```
4, 1,                   $ Data Type and Size - (Boolean)
"Output20",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
```

```
0;                      $ decimal places

Param23 =           $ Output
0,                      $ Data Placeholder
6, "20 09 24 15 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output21",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param24 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 16 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output22",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param25 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 17 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output23",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param26 =               $ Output
```



```
0,                      $ Data Placeholder
6, "20 09 24 18 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output24",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
```

```
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param27 =         $ Output
0,                $ Data Placeholder
6, "20 09 24 19 30 03",   $ Path size and Path to Output Attribute
0x02,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Output25",       $ Name
" ",              $ Units (Not Used)
"The state of the device connected to AB64",        $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param28 =         $ Output
0,                $ Data Placeholder
6, "20 09 24 1A 30 03",   $ Path size and Path to Output Attribute
0x02,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Output26",       $ Name
" ",              $ Units (Not Used)
"The state of the device connected to AB64",        $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param29 =         $ Output
0,                $ Data Placeholder
6, "20 09 24 1B 30 03",   $ Path size and Path to Output Attribute
0x02,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Output27",       $ Name
" ",              $ Units (Not Used)
"The state of the device connected to AB64",        $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
```



```
0;                $ decimal places

Param30 =         $ Output
0,                $ Data Placeholder
6, "20 09 24 1C 30 03",   $ Path size and Path to Output Attribute
0x02,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Output28",       $ Name
" ",              $ Units (Not Used)
```

```
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param31 =           $ Output
0,                      $ Data Placeholder
6, "20 09 24 1D 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output29",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param32 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 1E 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output30",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param33 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 1F 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Output31",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                    $ Help
```



```
0,1,0,                  $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param34 =               $ Output
0,                      $ Data Placeholder
6, "20 09 24 20 30 03",  $ Path size and Path to Output Attribute
0x02,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
```

```
"Output32",             $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to AB64",                $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param35 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 01 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input1",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param36 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 02 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input2",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param37 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 03 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
```



```
"Input3",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places
Param38 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 04 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
```

```
4, 1,                   $ Data Type and Size - (Boolean)
"Input4",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param39 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 05 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input5",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param40 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 06 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input6",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places
Param41 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 07 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
```



```
4, 1,                   $ Data Type and Size - (Boolean)
"Input7",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param42 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 08 30 03", $ Path size and Path to Input Attribute
```

```
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input8",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param43 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 09 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input9",               $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places
Param44 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 0A 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input10",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param45 =       $ Input
0,                      $ Data Placeholder
```



```
6, "20 08 24 0B 30 03", $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input11",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param46 =       $ Intput
0,                      $ Data Placeholder
```

```
6, "20 08 24 0C 30 03",    $ Path size and Path to Input Attribute
0x12,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Input12",                 $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                         $ decimal places

Param47 =         $ Input
0,                         $ Data Placeholder
6, "20 08 24 0d 30 03",    $ Path size and Path to Input Attribute
0x12,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Input13",                 $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                         $ decimal places

Param48 =         $ Input
0,                         $ Data Placeholder
6, "20 08 24 0E 30 03",    $ Path size and Path to Input Attribute
0x12,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Input14",                 $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                         $ decimal places
```



```
Param49 =         $ Intput
0,                         $ Data Placeholder
6, "20 08 24 0F 30 03",    $ Path size and Path to Input Attribute
0x12,                      $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                      $ Data Type and Size - (Boolean)
"Input15",                 $ Name
" ",                       $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                     $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                         $ decimal places
```

```
Param50 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 10 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input16",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param51 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 11 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input17",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;              $ decimal places

Param52 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 12 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input18",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
```



```
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param53 =       $ Input
0,                      $ Data Placeholder
6, "20 08 24 13 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input19",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
```

```
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param54 =         $ Input
0,                $ Data Placeholder
6, "20 08 24 14 30 03",   $ Path size and Path to Input Attribute
0x12,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Input20",        $ Name
" ";              $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param55 =         $ Intput
0,                $ Data Placeholder
6, "20 08 24 15 30 03",   $ Path size and Path to Input Attribute
0x12,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Input21",        $ Name
" ";              $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param56 =         $ Input
0,                $ Data Placeholder
6, "20 08 24 16 30 03",   $ Path size and Path to Input Attribute
0x12,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
```



```
"Input22",        $ Name
" ";              $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,            $ min, max, default values
1,1,1,0,          $ mult, div, base, offset scaling (Not Used)
1,1,1,0,          $ mult, div, base, offset links (Not Used)
0;                $ decimal places

Param57 =         $ Input
0,                $ Data Placeholder
6, "20 08 24 17 30 03",   $ Path size and Path to Input Attribute
0x12,             $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,             $ Data Type and Size - (Boolean)
"Input23",        $ Name
" ";              $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
```

```
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param58 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 18 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input24",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",              $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param59 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 19 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input25",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",              $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param60 =       $ Intput
0,                      $ Data Placeholder
```



```
6, "20 08 24 1A 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input26",              $ Name
" ",                    $ Units (Not Used)
"The state of the device connected to DeviceLink",              $ Help
0,1,0,                  $ min, max, default values
1,1,1,0,        $ mult, div, base, offset scaling (Not Used)
1,1,1,0,        $ mult, div, base, offset links (Not Used)
0;                      $ decimal places

Param61 =       $ Intput
0,                      $ Data Placeholder
6, "20 08 24 1B 30 03",  $ Path size and Path to Input Attribute
0x12,                   $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                   $ Data Type and Size - (Boolean)
"Input27",              $ Name
```

```
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places

Param62 =           $ Intput
0,                          $ Data Placeholder
6, "20 08 24 1C 30 03",     $ Path size and Path to Input Attribute
0x12,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
"Input28",                  $ Name
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places

Param63 =           $ Intput
0,                          $ Data Placeholder
6, "20 08 24 1D 30 03",     $ Path size and Path to Input Attribute
0x12,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
"Input29",                  $ Name
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places
```



```
Param64 =           $ Intput
0,                          $ Data Placeholder
6, "20 08 24 1E 30 03",     $ Path size and Path to Input Attribute
0x12,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
"Input30",                  $ Name
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places

Param65 =           $ Intput
0,                          $ Data Placeholder
6, "20 08 24 1F 30 03",     $ Path size and Path to Input Attribute
0x12,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
```

```
"Input31",                  $ Name
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places

Param66 =           $ Intput
0,                          $ Data Placeholder
6, "20 08 24 20 30 03",     $ Path size and Path to Input Attribute
0x12,                       $ Descriptor - (Support Enumerated Strings, Read-only)
4, 1,                       $ Data Type and Size - (Boolean)
"Input32",                  $ Name
" ",                        $ Units (Not Used)
"The state of the device connected to DeviceLink",          $ Help
0,1,0,                      $ min, max, default values
1,1,1,0,            $ mult, div, base, offset scaling (Not Used)
1,1,1,0,            $ mult, div, base, offset links (Not Used)
0;                          $ decimal places

[Groups]

[EnumPar]
Param1="Reset Outputs","Hold Last State";
Param2="Reset Outputs","Hold Last State";
Param3="OFF","ON";
Param4="OFF","ON";
Param5="OFF","ON";
Param6="OFF","ON";
Param7="OFF","ON";
```



```
Param8="OFF","ON";
Param9="OFF","ON";
Param10="OFF","ON";
Param11="OFF","ON";
Param12="OFF","ON";
Param13="OFF","ON";
Param14="OFF","ON";
Param15="OFF","ON";
Param16="OFF","ON";
Param17="OFF","ON";
Param18="OFF","ON";
Param19="OFF","ON";
Param20="OFF","ON";
Param21="OFF","ON";
Param22="OFF","ON";
Param23="OFF","ON";
Param24="OFF","ON";
Param25="OFF","ON";
Param26="OFF","ON";
```

```
Param27="OFF","ON";
Param28="OFF","ON";
Param29="OFF","ON";
Param30="OFF","ON";
Param31="OFF","ON";
Param32="OFF","ON";
Param33="OFF","ON";
Param34="OFF","ON";
Param35="OFF","ON";
Param36="OFF","ON";
Param37="OFF","ON";
Param38="OFF","ON";
Param39="OFF","ON";
Param40="OFF","ON";
Param41="OFF","ON";
Param42="OFF","ON";
Param43="OFF","ON";
Param44="OFF","ON";
Param45="OFF","ON";
Param46="OFF","ON";
Param47="OFF","ON";
Param48="OFF","ON";
Param49="OFF","ON";
Param50="OFF","ON";
Param51="OFF","ON";
Param52="OFF","ON";
Param53="OFF","ON";
Param54="OFF","ON";
Param55="OFF","ON";
Param56="OFF","ON";
```



```
Param57="OFF","ON";
Param58="OFF","ON";
Param59="OFF","ON";
Param60="OFF","ON";
Param61="OFF","ON";
Param62="OFF","ON";
Param63="OFF","ON";
Param64="OFF","ON";
Param65="OFF","ON";
Param66="OFF","ON";

  $ Discrete Input Point Object Parameters



$ Parameter Groups Section
[Groups]
$Group1= "IO Assembly",     2,   1,  2;

$ End of ABDT EDS File
```

[

****

5 Wiring/Installation

All Wiring and installation steps should be performed with the system power supply off.

5-1 Communications

The communications and basic node power comes from the 5 pin connector on the outside of the SIM box. The wiring to the SIM from the connector is performed by the factory. The user must only connect a five pin DeviceNet compatible cable to establish communications. Refer to Figure 3 for terminal identification during installation.

5-2 Valve/Input Power

There are two sets of terminal blocks visible when the cover plate is removed. The six contact terminal block on the far right is for DC power. The four contact terminal block in the middle is for future AC use.

Because of the wide variety of connectors and wiring that may be employed for DC power to the valves and optional Input/Output Modules, the terminals only will be identified here. Please refer to Figure 4 for the terminal identification.

5-3 AC Power Wiring

In the SIM, it is possible for future models to drive AC valves. Consult the factory for AC specifications and availability.

5-4 Input Module Wiring

If your system has Input Modules installed, the wiring for the detectors should follow the pattern shown in Figure 5. The detector manufacturer's recommendations should be follow for the type of module used and the wiring which should be followed.

In some cases damage to the switch or detector could result from incorrect wiring. If there are questions, please consult the factory. Care should be exercised to ensure inputs are wired to an Input Module and not an Output Module.

The MAC SIM unit employs the industry standard Eurostyle micro four pin female connector for the modules. There are many companies which have lines of pre-assembled wire harnesses which will connect the modules to a variety of sensors.

5-6 DC Output Module Wiring

If your system has DC Output Modules installed, the wiring for the loads whether additional valves, lights, or other outputs should follow the pattern shown in Figure 6. The channel capacity is the same as the valve channels for the manifold. Thus, 6W at 24VDC per channel is the maximum load the modules can drive.

Like the Input Modules, the MAC SIM unit employs the industry standard Eurostyle micro four pin female connector for the Output Modules. The main difference is that all of the pins are not used for the Output Modules. There are many companies which have lines of pre-assembled wire harnesses which will connect the modules to a variety of loads.

5-7 Fusing/Circuit Protection

There are three protective circuits incorporated into the SIM unit. These being primary fusing, output electronic fusing, and reverse wiring protection. These are designed to protect the unit and the user's equipment in the event of either outside equipment failure, faulty installation, or SIM failure.

The first of these protective systems is the fusing across all of the incoming power. Please refer to Figure 7 for fuse identification and Table 8 for size and replacement guide.

Table 7
Fuse Size/Replacement

Fuse Designation	Value	Protects	Connector Ref.	Replace P/N
F1	1A	Input Module Device Power (AC)	CN3-4 (Hot) CN3-3 (Neutral)	Littelfuse 273 001
F2	1A	Valve/Output Module Device	CN3-2 (Hot) CN3-1 (Neutral)	Littelfuse 273 001

		Power (AC)		
F3	3A	Input Module Device Power (DC)	CN2-4 (+) CN2-3 (-)	Littelfuse 273 003
F4	1A	SIM Primary Power (DC)	CN2-6 (+) CN2-5 (-)	Littelfuse 273 001
F5	8A	Valve/Output Module Device Power (DC)	CN2-2 (+) CN2-1 (-)	Littelfuse 218 008

The next protective system engineered into your SIM unit is a reverse wiring protective circuit which, in the event of placing 24VDC (+) and 24VDC (-) on the wrong connector pins, will prevent the unit from being damaged by not allowing operation.

The last protective circuit is a series of electronic self-resetting fuses located on the outputs of both the valve drivers and Output Modules. In the event of a short on the valve or output side of the system, these fuses will open and remain open until the short has been cleared. Upon removal of the short, the fuses will reset and operation will continue. One of the methods for detecting an output short is by watching the channel in question's LED and observe during channel operation on whether the unit "flashes" or remains on. If it flashes, then the problem is in that channel.

6 Output Programming/Bit Map

The outputs to the SIM unit are mapped according to the node address inside the DeviceNet scanner. Due to the large variety of scanners, please refer to their User's Manual for complete programming instructions.

The MAC Valves SIM will consume or produce four consecutive bytes (32 bits) which are assigned for use by the output section of the SIM unit to the PLC memory for programming.

Table 8 is a mapping using Class 9 and Attribute 3.

Table 8

Instance	Location	Channel
1	Valve 1	1
2	Valve 2	2
3	Valve 3	3
4	Valve 4	4
5	Valve 5	5
6	Valve 6	6
7	Valve 7	7

8	Valve 8	8
9	Valve 9	9
10	Valve 10	10
11	Valve 11	11
12	Valve 12	12
13	Valve 13	13
14	Valve 14	14
15	Valve 15	15
16	Valve 16	16
17	Valve 17	17
18	Valve 18	18
19	Valve 19	19
20	Valve 20	20
21	Valve 21	21
22	Valve 22	22
23	Valve 23	23
24	Valve 24	24
25	Output Module 1 Channel 1	25
26	Output Module 1 Channel 2	26
27	Output Module 1 Channel 3	27

28	Output Module 1 Channel 4	28
29	Output Module 2 Channel 1	29
30	Output Module 2 Channel 2	30
31	Output Module 2 Channel 3	31
32	Output Module 2 Channel 4	32

7 Input Programming/Bit Map

Like the outputs, the inputs to the SIM unit are mapped according to the node address. The SIM will produce four consecutive bytes (32 bits) which are assigned for use by the input section of the SIM unit to the PLC memory for programming. Refer to Table 9 for a memory map for the input channels using Class 8 and Attribute 3.

Table 9

Instance	Location	Channel
1	Input Module 1 Channel 1	1
2	Input Module 1 Channel 2	2
3	Input Module 1 Channel 3	3
4	Input Module 1 Channel 4	4

5	Input Module 1 Channel 5	5
6	Input Module 1 Channel 6	6
7	Input Module 1 Channel 7	7
8	Input Module 1 Channel 8	8
9	Input Module 2 Channel 1	9
10	Input Module 2 Channel 2	10
11	Input Module 2 Channel 3	11
12	Input Module 2 Channel 4	12
13	Input Module 2 Channel 5	13
14	Input Module 2 Channel 6	14
15	Input Module 2 Channel 7	15
16	Input Module 2 Channel 8	16
17	Input Module 3 Channel 1	17
18	Input Module 3 Channel 2	18
19	Input Module 3 Channel 3	19
20	Input Module 3 Channel 4	20
21	Input Module 3 Channel 5	21
22	Input Module 3 Channel 6	22

23	Input Module 3 Channel 7	23
24	Input Module 3 Channel 8	24
25	Input Module 4 Channel 1	25
26	Input Module 4 Channel 2	26
27	Input Module 4 Channel 3	27
28	Input Module 4 Channel 4	28
29	Input Module 4 Channel 5	29
30	Input Module 4 Channel 6	30
31	Input Module 4 Channel 7	31
32	Input Module 4 Channel 8	32

The location of the Input Modules can be see in Figure 5. Notice each connector has assignments for two input channels as noted in the above table.

There are two basic types of inputs based on the direction of current flow. We call the two types Positive Common and Negative Common. The Input Module is factory set by way of a jumper to either of these type. One word of caution, by setting the jumper for the mode of operation for the module, the whole module is that type (Positive Common or Negative Common). There is no option for connector by connector setting of type.

Refer to Figure 5 in selecting the desired mode of operation for the Input Modules. The terms “sinking” and “sourcing” are not used due to the possibility of confusion. In our terminology, Positive Common is used when the load is

connected between the signal pins 2 or 4 and the positive voltage terminal pin 1. Negative Common is used when the load is connected between the signal pins 2 or 4 and the negative voltage terminal pin 3.

8 Troubleshooting Guide

In the event of difficulties in either operation or installation of the Serial Input Manifold, your local MAC Valves Distributor and the factory are ready and able to assist you in solving any problems which might be encountered.

Below is a table of some typical problems, symptoms, and their solutions. Also note there are two sets of LEDs to assist in troubleshooting. One set is visible from the top of the unit near the Input Modules. These are identified below as Power, Net, and Mod. The second set is located on the Mother board near the communications connector. These are identified below as Pwr and Netstatus.

Table 10

Problem	Symptoms	Solutions
SIM does not operate	Power LED off Pwr LED off Net LED off Mod LED off Netstatus LED off No Output LEDs on No Valve operation No Module LEDs on	1. Verify primary 24VDC supply 2. Check fuse F4/ replace if blown
SIM does not operate	Power LED on	1. Verify communications cable

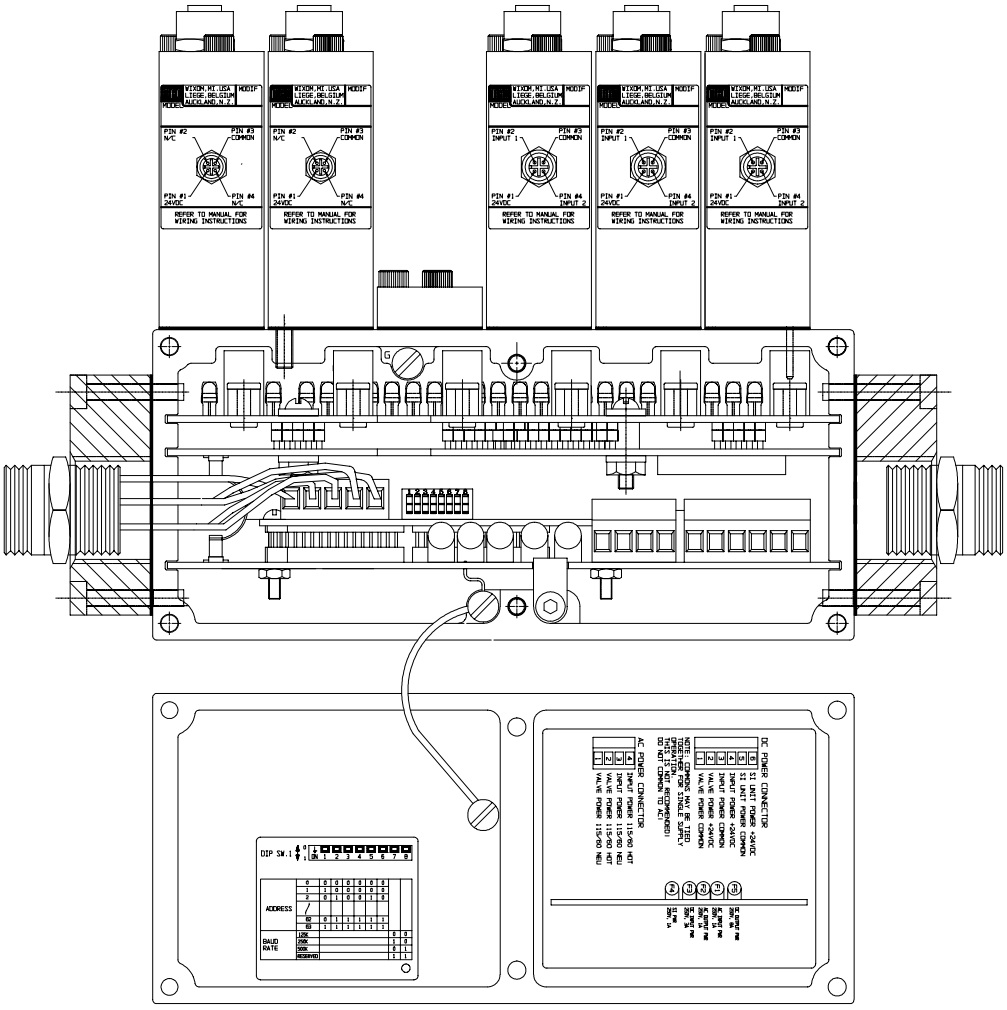
	Pwr LED on Netstatus LED red Net LED off No Output LEDs on No Valve Operation No Module LEDs on	properly connected 2. Verify network is active 3. Verify correct address and baud rate is set on the dip switches
SIM does not operate	Power LED on Pwr LED on Netstatus LED flashing green Net LED flashing green No Output LEDs on No Valve Operation No Module LEDs on	1. Verify correct address and baud rate is set on the dip switches 2. Unit On-line but not connected

SIM is active/does not drive valves	Pwr LED on Power LED on Netstatus LED green Output LEDs active No Valve Operation Output Module LEDs active	1. Check Output fuse F2 if using AC or F4 if using DC 2. Check wiring for power Check valve ribbon cable if no modules present
SIM is active/individual valve does not operate	Pwr LED on Power LED on Valve Output LED Activity Normal Input Module Activity Normal	1. Check connection of valve 2. If channel flashes when fired, fault is due to short or reversed wiring in valve circuit or cable If valve does not operate and SIM Valve LED is normal, possible open in valve wiring.
SIM is active/Input Channel does not sense change in input detector on PLC	Pwr LED on Power LED on Netstatus LED green Valve Operation Normal Output Module Operation Normal	1. Check Input power fuse F2 (for DC) or F1 (for AC) 2. Check whether correct module type (positive common or negative common) is used for

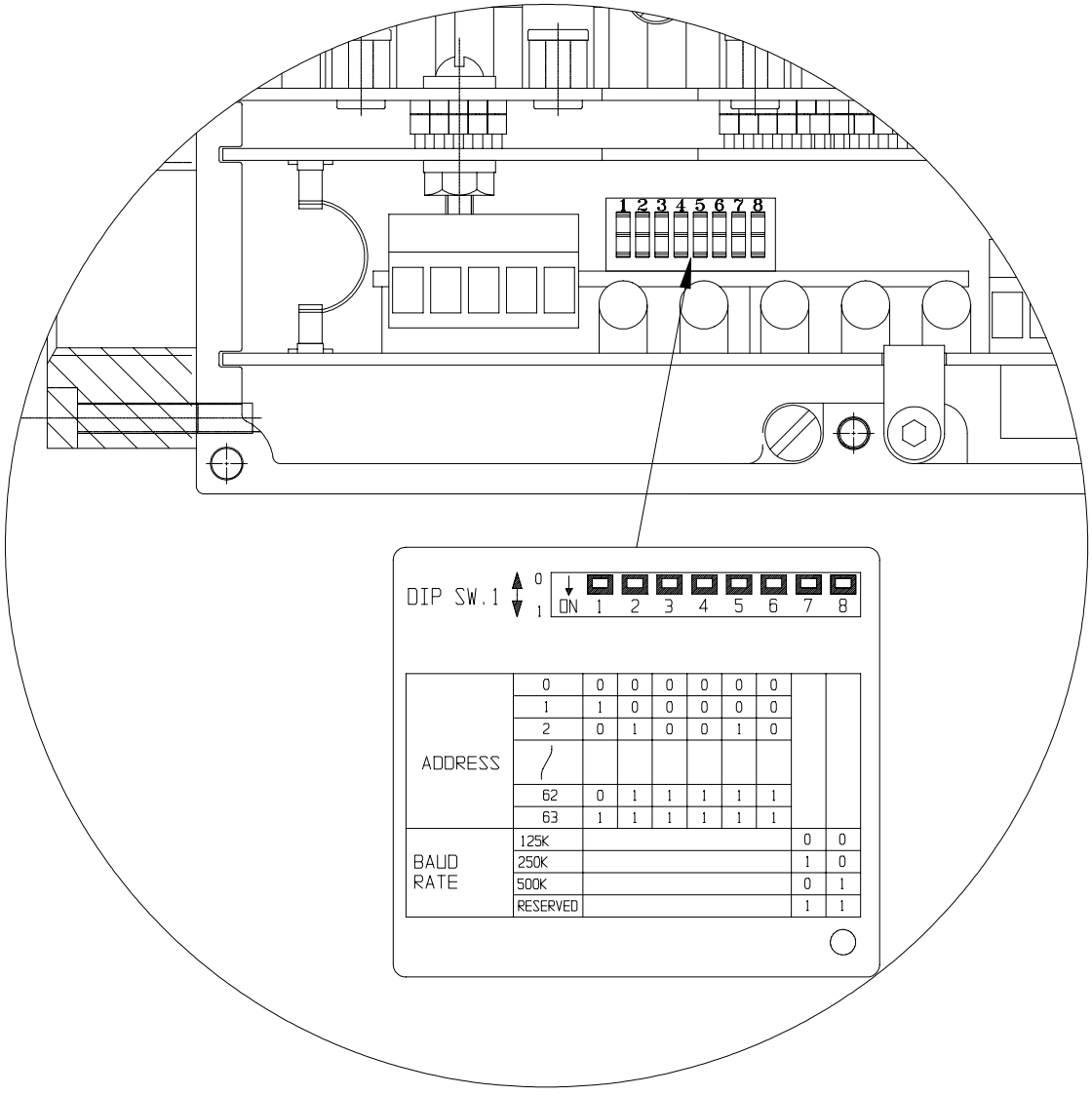
	Input Module no activity	application

Figure 1

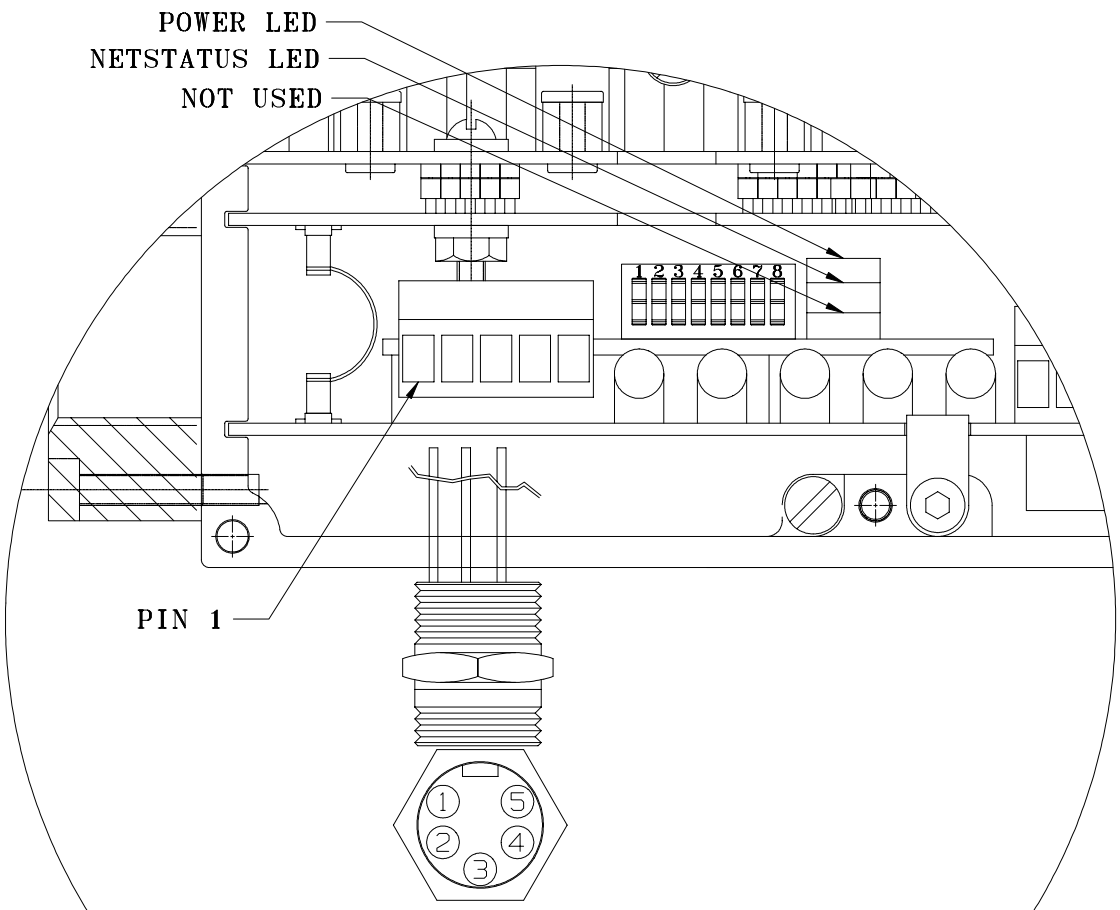
Typical Serial Interface
w/ 3 Input Modules and
2 Output Modules shown



DIP SWITCHES
FIGURE 2

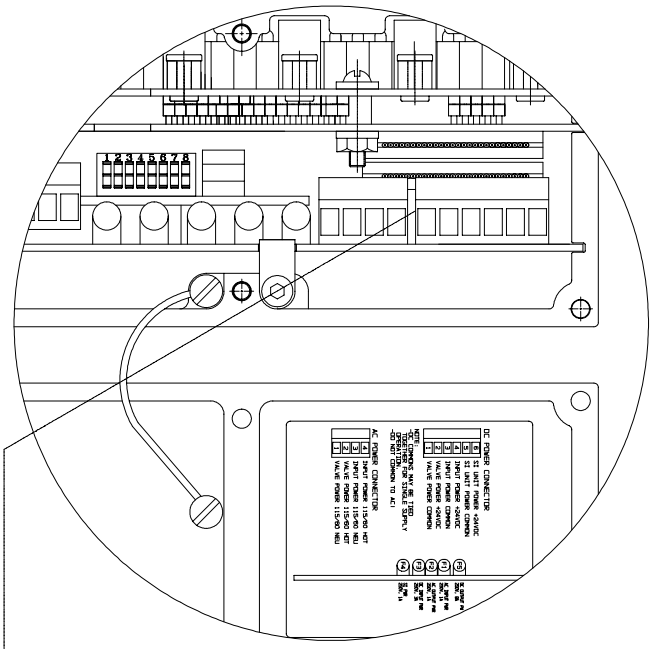


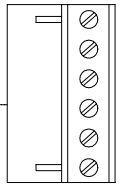
DEVICENET CONNECTOR FIGURE 3



WIRE COLOR CODE		
SIM PINS	BRAD-HAR PINS	WIRE COLOR/FUNCTION
3	1	WHITE/DRAIN
5	2	RED/V+
1	3	GREEN/V-
4	4	ORANGE/CAN_H
2	5	BLACK/CAN_L

DC POWER WIRING
FIGURE 4



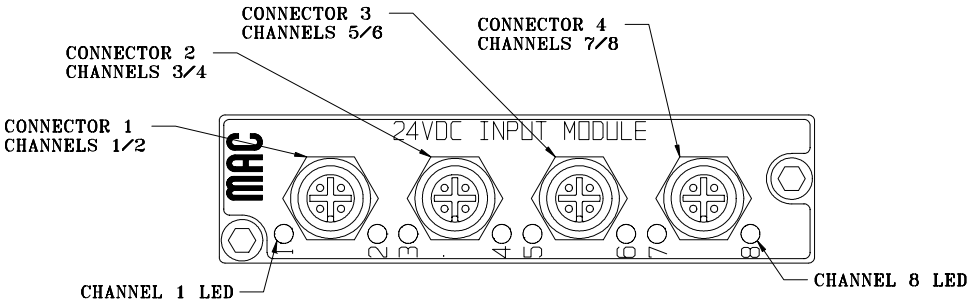


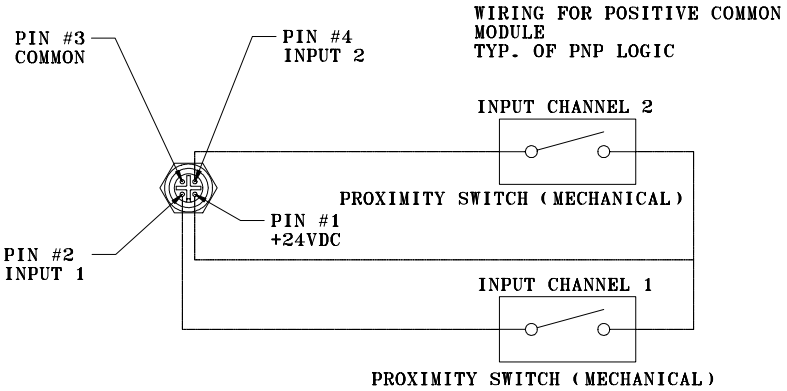
6	SERIAL INPUT MANIFOLD +24VDC
5	SERIAL INPUT MANIFOLD RETURN
4	INPUT MODULE +24VDC
3	INPUT MODULE RETURN
2	VALVE/OUTPUT MODULE +24VDC
1	VALVE/OUTPUT MODULE RETURN

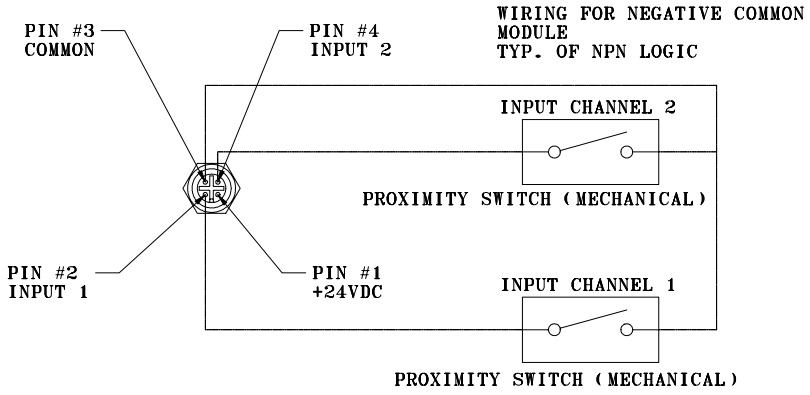
MULTIPLE POWER SUPPLY OPERATION
WIRING CHART

NUMBER OF POWER SUPPLIES	JUMPERS
3 (SEPARATE)	NONE
2 (SI -INPUT, VALVES/OUTPUT)	PIN 6 TO 4 PIN 5 TO 3
2 (INPUT - VALVES/OUTPUT, SI)	PIN 4 TO 2 PIN 3 TO 1
1 (SINGLE PS OPERATION)	PIN 6 TO 4 PIN 4 TO 2 PIN 5 TO 3 PIN 3 TO 1

INPUT MODULE GUIDE
FIGURE 5



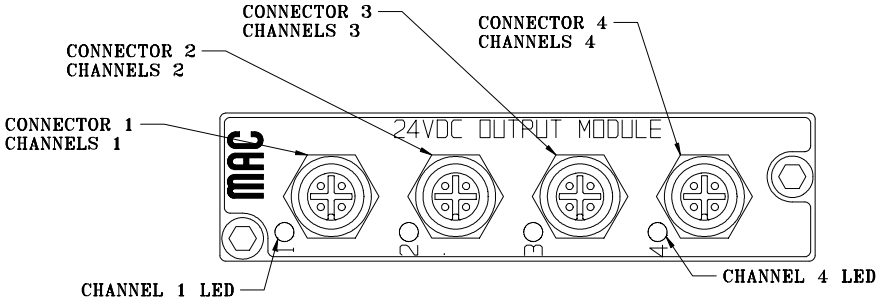


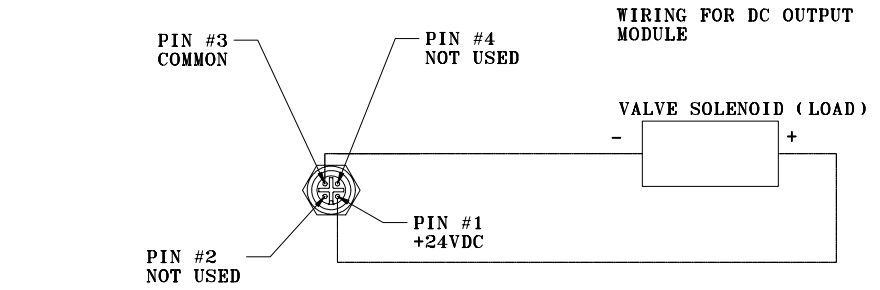


NOTE, FOR ELECTRONIC SWITCHES, CONSULT THE MANUFACTURER'S RECOMMENDED WIRING PROCEDURE.

DC OUTPUT MODULE GUIDE

FIGURE 6





FUSE GUIDE
FIGURE 7