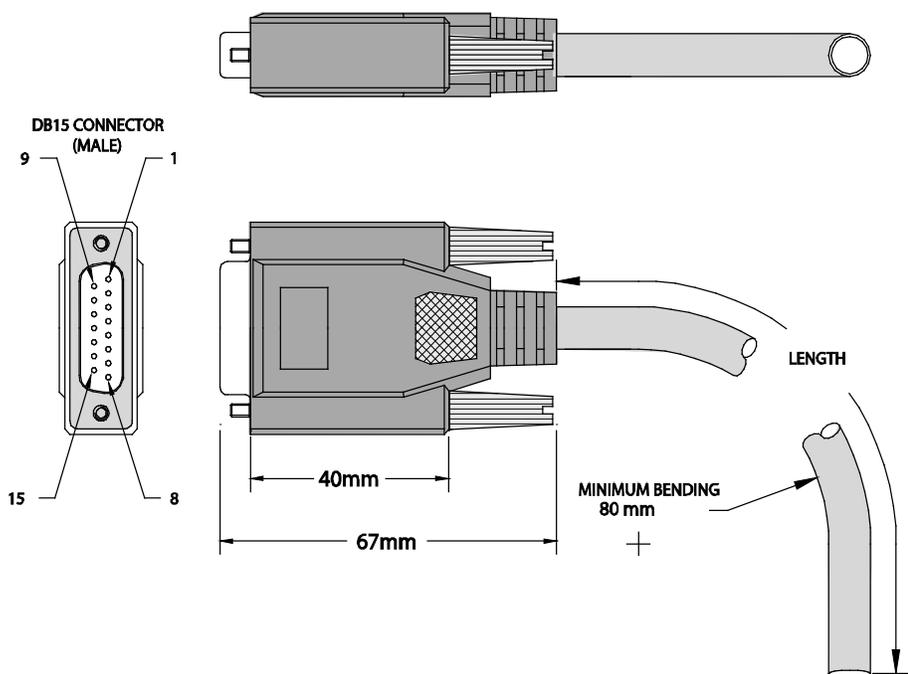


CBLIO-ISO1-xM

Application Note



Revised: 11/9/2016

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Application Note: CBLIO-ISO1-xM Cables for the Class 5 D-Style SmartMotor™, Revised: 11/9/2016.

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Purpose

This document provides mechanical drawings, internal schematics and application information for the CBLIO-ISO1-xM cables.

Additional Resources

The following are additional resources that you may find helpful:

- For more details on the Class 5 D-style SmartMotor:
<http://www.animatics.com/cl-5-install-startup-guide>
- For more details on SmartMotor programming:
<http://www.animatics.com/smartmotor-developers-guide>
- For product information, support, etc., see the Moog Animatics website at:
<http://www.animatics.com>

Equipment Required

You will need the following equipment for this procedure:

HARDWARE

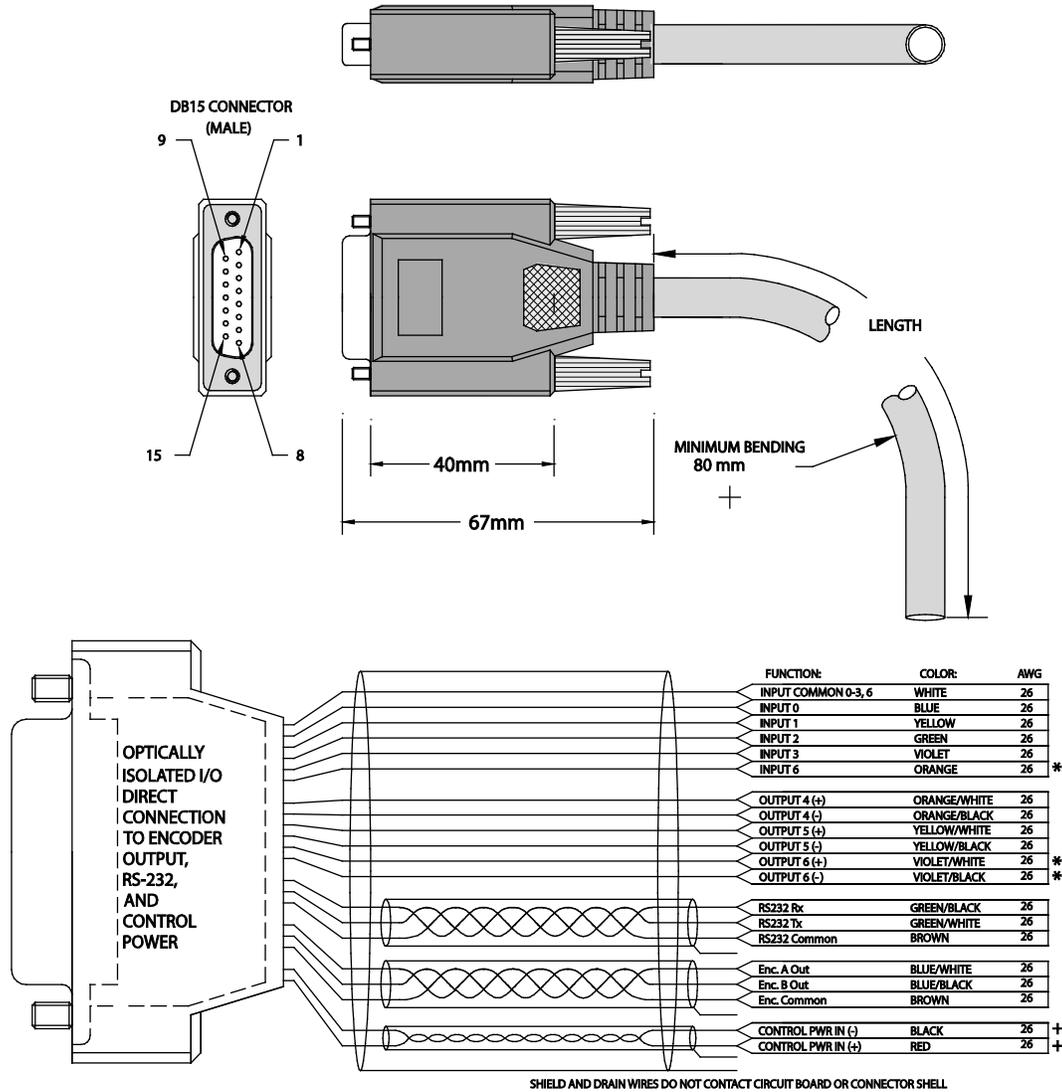
- Class 5 D-Style SmartMotor with appropriate power supply
- Microsoft® Windows® based PC

SOFTWARE

- Moog Animatics SMI software

Overview

The CBLIO-ISO1-xM¹ is a cable with a DB15 connector that converts 5 VDC SmartMotor I/O to 24 VDC I/O. The user has the option of using the cable with four digital inputs and three digital outputs or five digital inputs and two outputs and brings 24 VDC or 48 VDC to the SmartMotor's control for SmartMotor with the DE option. This will allow user to remove power from the motor but retain power to the controller. This cable connects directly into the DB15 I/O connector (CN2) on the D-style SmartMotor (SM23xxD and SM34xxD series).



All I/Os are diode protected, isolated and 24 Volt. Outputs sink or source as much as 100 mA each.

Typical output connection puts common to ground, the output to one leg of the device with the other leg to 24 Volts. Sourcing also works.

Input common can be connected to +24V or GND. Inputs are triggered with plus or minus 24V between them and the input common.

*Port 6 can only be used as either input or output, it cannot be used as both at the same time.

Input cannot be used if it exceeds 30 Volts 8 mA. Output cannot be used if it exceeds 30 Volts 100 mA.

+To be used with DE option SmartMotor for keeping controller alive during E-stop. Input voltage ranges from 24 VDC to 48 VDC. DO NOT EXCEED 48 VDC!

¹If x is 3, cable is 3m long; if x is 5, cable is 5m long; if x is 10, cable is 10m long.

Inputs 0 to 3 can be set to either all sourcing or sinking inputs. Port 6 input shares the same INPUT COMMON signal (White wire) as inputs 0 to 3. Outputs 4, 5, and 6 are wired independently so they can either be sourcing or sinking.



CAUTION: Damage may occur if the following maximum ratings are exceeded.

INPUT	Min voltage	24 VDC
	Max voltage	30 VDC
	Min current	5 mA
	Max current	8 mA
OUTPUT	Max voltage	30 VDC
	Max current	100 mA

SmartMotor Interface

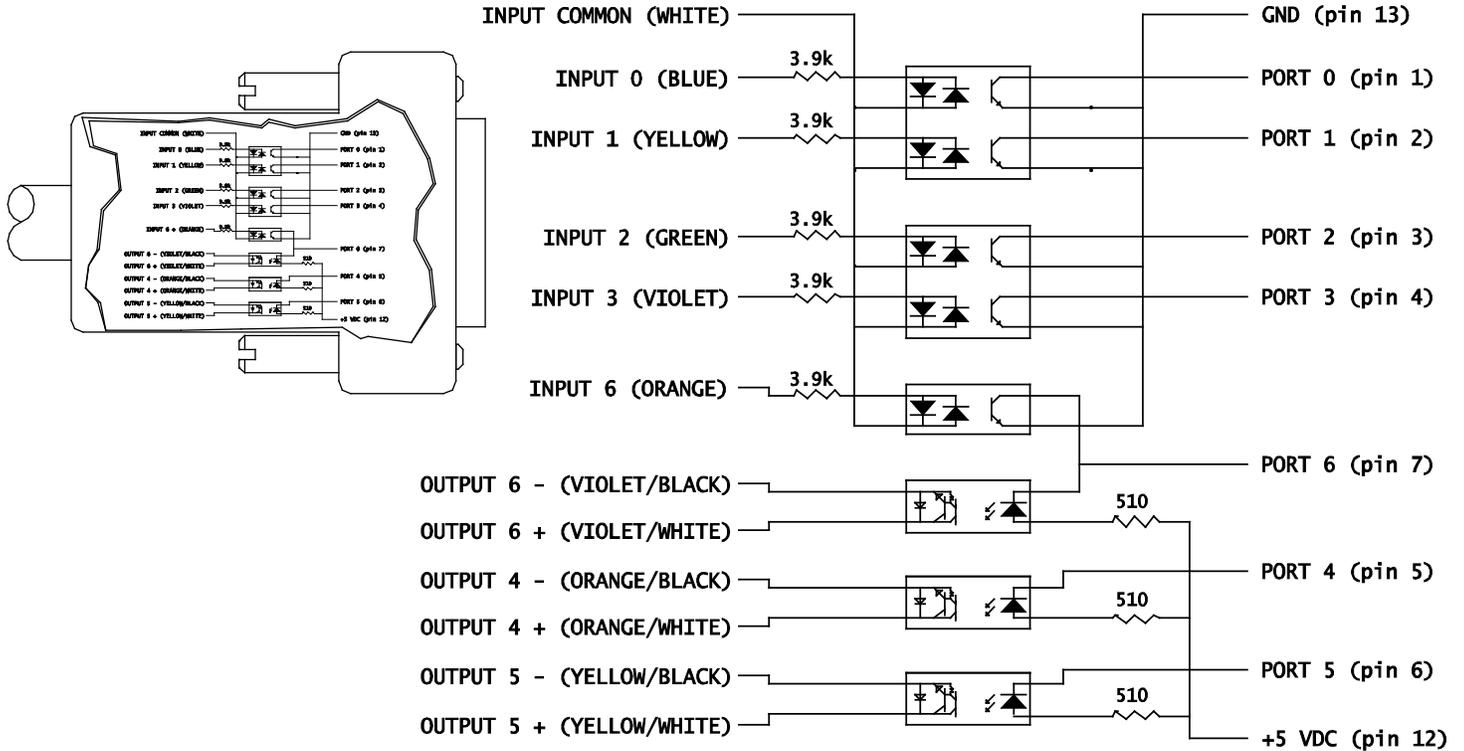
The CBLIO-ISO1-xM cable uses I/O pins on the SmartMotor's P2 DB-15 D-sub connector. The following table provides a brief description of the corresponding pins.

PIN	SIGNAL	DESCRIPTION
1	input 0	Digital input 0 / Encoder input A / Step input (input frequency 50 kHz)
2	input 1	Digital input 1 / Encoder input B / direction input (input frequency 50 kHz)
3	input 2	Digital input 2 / Positive Limit
4	input 3	Digital input 3 / Negative Limit
5	output 4	Digital output 4
6	output 5	Digital output 5
7	input/output 6	Digital input 6 / Digital output 6 (can only use either input or output)
12	+5 VDC	+5 VDC output
13	GND	Signal Ground
14	CNTR GND	for SmartMotor with DE option, Control GND
15	CNTR PWR	for SmartMotor with DE option, Control POWER

For a detailed description of the P2 connector pins and the other D-style SmartMotor connectors, see the [SmartMotor Installation & Startup Guide](#).

Internal Connector Head Schematic

The following figure shows a schematic diagram of the CBLIO-ISO1-xM cable internal connector head.



DE Control Power Input Rating

The following table contains information on the minimum and maximum DE Control Power input.

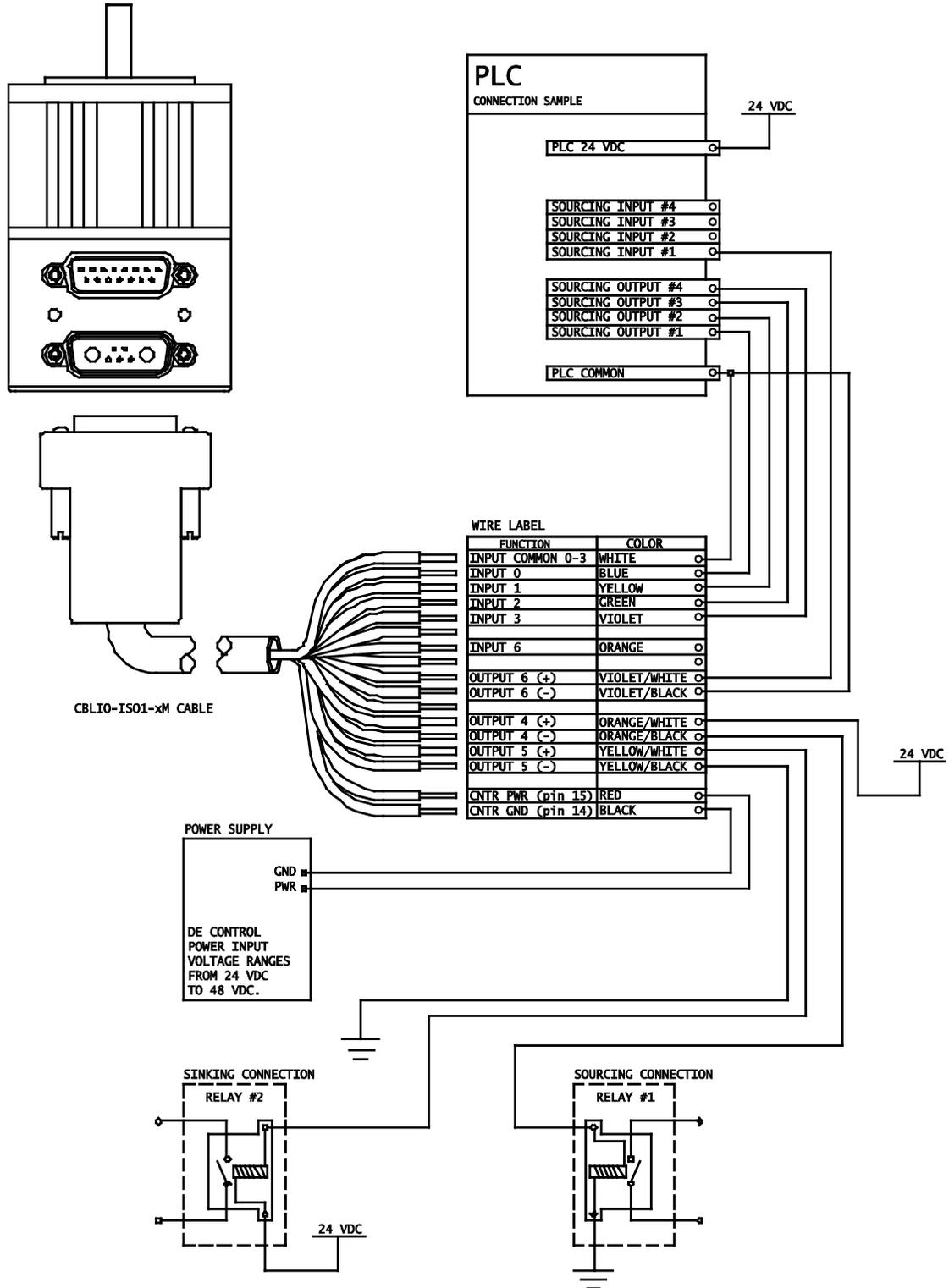


CAUTION: Damage may occur if the following maximum ratings are exceeded.

INPUT	Min voltage	24 VDC	Min current	20 mA
		Max voltage	48 VDC	Max current

Application

The CBLIO-ISO1-xM cable is used to interface the SmartMotor with a PLC and some coil relays. A sample application wiring is shown in the following figure.



The previous figure is an example of using the CBLIO-ISO1-xM cable to interface the SmartMotor with a PLC. The sample program below reads output signal from the PLC to determine which predefined profile to run. After a move completed, the SmartMotor will signal back to the PLC. Also, the SmartMotor will set the fault signal high and send a message to the terminal if an error occurs.

NOTE: The outputs and inputs shown in the following code example are correct. The logic is reversed by the CBLIO-ISO1 cable.

```

1  'SAMPLE PROGRAM USING I/O
2  'INPUT 0 to 2 for PLC profile selection
3  'INPUT 3 for read ready
4  'OUTPUT 6 motor signal PLC after motion completed
5  'OUTPUT 4 and 5 to turn on/off pump and valve
6  '
7  'initialize I/O ports
8  EIGN(0)      'initialize port 0 as input, signal input bit 0
9  EIGN(1)      'initialize port 1 as input, signal input bit 1
10 EILP        'initialize port 3 as RT Limit input
11 EILN        'initialize port 4 as LT Limit input
12 OUT(4)=1    'set output 4 off
13            'initialize port 4 as output, trajectory
14            'start(high)/ended(low)
15 OUT(5)=1    'set output 5 off
16            'initialize port 5 as output, fault(high)
17 EIGN(6)     'initialize port 6 as input, read ready trigger
18            'set Acceleration/velocity
19 MP          'set motor to Mode Position
20 ADT=8*100   'set acceleration
21 VT=32212*30 'set velocity
22 WHILE 1    'infinite WHILE LOOP
23     WHILE IN(6)==1 LOOP 'gate, waiting for PLC read ready signal
24     OUT(5)=1 'reset the fault output if any
25     ab[0]=IN(0) 'if input A triggered, IN(0) will read 0,
26                ' otherwise ab[0] is 1
27     ab[1]=IN(1)*2 'if input B triggered, IN(1) will read 0,
28                ' otherwise ab[1] is 2
29     a=ab[0]+ab[1] 'summing up the binary values
30     SWITCH a 'comparing each binary value with the
31             ' SWITCH/CASE
32             ' statement
33     CASE 0 'CASE 0 when B A triggered ( 0 0 )
34         PRINT("CASE 0 move to PT=8000",#13)
35         PT=8000 'set position value
36         GOSUBO 'GO to SUBroutine C0 to start motion and
37              ' error handling
38     BREAK 'BREAK out of SWITCH statement
39     CASE 1 'CASE 1 when B _ triggered ( 0 1 )
40         PRINT("CASE 1 move to PT=10000",#13)
41         PT=10000 'set position value
42         GOSUBO 'GO to SUBroutine C0 to start motion and
43              ' error handling
44     BREAK
45     CASE 2 'CASE 2 when _ A triggered ( 1 0 )
46         PRINT("CASE 2 move to PT=-8000",#13)
47         PT=-8000 'set position value
48         GOSUBO 'GO to SUBroutine C0 to start motion and

```

```

49                                     ' error handling
50     BREAK
51     CASE 3                           'CASE 3 when __ triggered ( 0 0 )
51         PRINT ("CASE 3 move to PT=-10000",#13)
52         PT=-10000                     'set position value
53         GOSUBO                         'GO to SUBroutine C0 to start motion and
54                                     ' error handling
55     BREAK
56     ENDS                             'ENDS for closing SWITCH statement
57     LOOP                              'LOOP for closing WHILE statement
58     END                                'END marks end of program
59
60     C0                                'Label for subroutine C0
61     OUT(4)=0                          'output high, trajectory started
62     G                                  'start trajectory (motion)
63     TWAIT                             'wait until trajectory ends (motion stopped)
64     OUT(4)=1                          'reset signal to RESET MOTION (low) signal to PLC
65     IF Be                              'checking excessive position error bit
66         PRINT ("excessive position error occured",#13) 'print to terminal window
67         OUT(5)=0                      'set fault signal (high)
68     ENDIF
69     IF Bp                              'checking RT limit bit
70         PRINT ("RT Limit reached",#13) 'print to terminal window
71         OUT(5)=0                      'set fault signal (high)
72     ENDIF
73     IF Bm                              'checking LT limit bit
74         PRINT ("LT Limit reached",#13) 'print to terminal window
75         OUT(5)=0                      'set fault signal (high)
76     ENDIF
77     IF Bh                              'checking over temperature bit
78         PRINT ("Over Temperature Occured",#13) 'print to terminal window
79         OUT(5)=0                      'set fault signal (high)
80     ENDIF
81     RETURN                            'RETURN to main program

```

As noted, the motor is reading the signal low when high signal is being sent to the CBLIO-ISO1-xM cable. If you prefer the motor to read a high signal when high signal is being sent to the cable, you can mask the input value by using the following command:

```

a=EIGN(0)==0    'this sets a to 1 if EIGN(0) is true, which in this case if EIGN(0)
                'is 0 (low)

```

I/O Commands

The following are examples of some I/O commands. For more details, see the [SmartMotor Developer's Guide](#).

NOTE: The outputs and inputs shown in the following code example are correct. The logic is reversed by the CBLIO-ISO1 cable.

```
EIGN(0)    'initialize port 0 as input
EIGN(1)    'initialize port 1 as input
EIGN(2)    'initialize port 2 as input
EIGN(3)    'initialize port 3 as input
EILP      'initialize port 2 as Right Limit (Port 2 is right/pos limit by default)
EILN      'initialize port 3 as Left Limit (Port 3 is left/neg limit by default)
EIGN(6)    'initialize port 6 as input (port 6 can only be used as either
           'an input OR output, but not both simultaneously)
'initialize port 6 as output or input
OUT(6)=1   'set output 6 off (output line open)
OUT(6)=0   'set output 6 on (output line close)
'initialize port 4 as output or input
OUT(4)=1   'set output 4 off (output line open)
OUT(4)=0   'set output 4 on (output line close)
'initialize port 5 as output or input
OUT(5)=1   'set output 5 off (output line open)
OUT(5)=0   'set output 5 on (output line close)

d=IN(2)    'store the input state value of port 2 into variable d

IF IN(0)==1 'using with IF statement, true => IN(0) is 1
ENDIF

IF IN(0)==0 'using with IF statement, true => IN(0) is 0
ENDIF
```

Document History

2016-10-25:

1. Originated.

2016-11-9:

2. Changed Copyright page to add new office contact info.