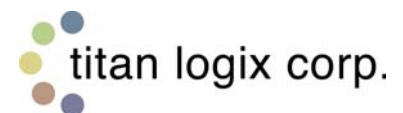


Data Input/Output Card

Manual



Head Office
4130 – 93 Street
Edmonton, AB Canada T6E 5P5

Saskatchewan Branch
Box 460, 103 Cenaiko Street
Lampman, SK Canada S0C 1N0

 Manufactured in Canada

Toll Free 1-877-462-4085

Web Site www.titanlogix.com

E-Mail sales@titanlogix.com

Data Input/Output Card

WARRANTY STATEMENT

WARRANTY: Titan Logix Corp. warrants all equipment of its own manufacture to be free of defects in material and workmanship for a period of twelve (12) months from date of shipment. Titan Logix Corp.'s sole obligation hereunder shall be expressly limited to repair or exchange free of charge, F.O.B. Edmonton, Alberta, Canada, of such defective equipment (alternatively, Titan Logix Corp. will, at its option, refund the purchase price). Titan Logix Corp.'s obligation under this warranty is limited to the above and does not apply to exchange or repairs which are required as a result of improper installation, misuse, maladjustment, abnormal operating conditions, or lack of routine maintenance. Nor does the warranty include the furnishing of service for maintenance or problems arising from the foregoing causes. No claims for labour, installation, removal, transportation, or other expenses will be recognized. Notwithstanding any stipulation of the purchaser to the contrary, all other obligations, representations, warranties and conditions, express or implied, statutory or otherwise, including any implied warranties or conditions of merchantability, quality or fitness are hereby excluded and, Titan Logix Corp. shall not be liable for any loss, cost or damages, of any kind whatsoever, whether consequential, indirect, special or otherwise, arising out of or in connection with the equipment or any defect therein, even if caused by the negligence of, Titan Logix Corp., its employees or agents. The provisions hereof relating to the warranty and limitations hereon and limitation of liability shall continue to be enforceable between the parties notwithstanding termination of the within agreement for any reason including fundamental breach. Equipment not of, Titan Logix Corp. manufacture will carry the vendor's or manufacturer's standard warranty.

Table of Contents

1.0 Introduction.....	3
2.0 Specifications/Features	3
3.0 Operation.....	3
3.1 MODE 1 (Multiple Digital Inputs).....	4
3.2 MODE 2 (Single Digital Input).....	4
4.0 Jumpers.....	4
5.0 Communications.....	4
6.0 Appendix.....	6

Digital Input / Output Card (DIO)

1.0 Introduction

The DIO card was developed to act as an interface between the devices that don't have a Modbus communications interface and the MP800 Valve Positioning System. With the use of output relays for control and digital inputs for feedback a PLC has the ability to position a rotary valve into one of eight positions. The DIO card is certified to CSA 22.2 No. 1010.1-92 and is mounted in an explosion-proof enclosure.

2.0 Specifications/Features

- Mounted in a NEMA 4 explosion proof housing
- -40 Deg C. to +65 Deg C. Operation
- +9V to 26V DC or 9V to 20VAC power supply input
- Digital inputs capable of 24VDC or 120VAC (Jumper selectable)
- All inputs have LEDES to indicate actual status
- Digital outputs capable of switching up to 250V at 100mA
- All Digital Outputs have LEDES to indicate current status
- RS485 Modbus interface to communicate to the MP800 or MP08 unit
- A "RUN" LED to indicate correct CPU operation.
- A "Tx" and "Rx" LED to indicate proper communications
- CSA -C22.2 No. 1010.1-92 certified.

3.0 Operation

Wiring up the DIO card is easily accomplished as indicated by Figure#1 for 24VDC systems or as Figure#2 for 120VAC systems. In Mode#1, jumper J2 OUT, all eight digital inputs (DI's) are being used for system control but only one input is being pulled to ground or neutral at any one time. In Mode#2, jumper J2 IN only a single DI is used. In both modes the appropriate digital output (DO) contact will close to indicate the current port position. Later in this section will be a more elaborate explanation on each mode of control.

With the DI's and DO's providing control and feedback to the PLC the RS485 communications port provides an interface to the MP800/MP08 board. The MP800/MP08 actually performs the motor control and valve position monitoring. The DIO card sends the instructions using a Modbus interface to alter port positions and to read back the current port position. After reading back through the communications the current port position the DIO microprocessor indicates this position on one of the DO contacts. These output contacts are rated for 400Vpk at 140mA. Jumper J1 is used to regulate the voltage being switched by the PLC for the digital inputs. Jumper J1 MUST be in the "A" position for 24VDC systems and in the "B" position for 120VAC systems. The most voltage the PLC will ever need to switch is 7VDC whether or not the jumper is in the "A" or "B" position.

Once every 500mS the DIO card communicates to the MP800/MP08 card. If there is an error in the communication data or communications does not exist. The "COM FAIL" output contact will close indicating an error. Monitoring the Tx and Rx LEDs will indicate which type of error exists. If the communications is good this contact will remain open. A bit located in the received data indicates the current status of the rotary encoder. If this bit indicates that there is a problem with the rotary encoder the "ENC FAIL" output contact will energize closed allowing the PLC to read the error.

3.1 MODE 1 (Multiple Digital Inputs)

Jumper J2 must be out when applying power to the DIO card to enter Mode 1. In Mode 1 the PLC controls which port the DIO tells the MP800/MP08 card to move to. If DI 1 is energized by the PLC the DIO will communicate to the MP800/MP08 to operate the motor to port 1. If the valve is already positioned at port 1 the no communications will take place. If the DIO senses that the MP800/MP08 is in Local mode by reading the status register back no communications will be sent to move the valve to any port. In this mode only one digital input may be selected at one time. If multiple digital inputs are selected the DIO card reads this as an error and will not send a command to alter the current valve position. The same applies to no digital input being selected. If the PLC energizes a digital input to move the valve to a disabled port position no command will be sent to rotate the valve to that position. The digital outputs will always represent the current port position of the valve as indicated by the MP800/MP08 device through the Modbus communications.

3.2 MODE 2 (Single Digital Input)

In this mode Jumper J2 must be shorted. Instead of using all 8 digital inputs to indicated and move to the desired port position as done in mode 1, only DI 1 is used to accomplish this. This input is used to tell the DIO card to rotate the valve one position. Once reaching the next valve position, the DIO card will wait 500mS and then check to see if the PLC has de-energized DI 1. If not the DIO will send the Modbus command to rotate the valve position one more time. The PLC will know when to de-energize DI 1 by reading back the current position as indicated on the digital outputs. If there is an error and DI 1 remains energized the valve will rotate a maximum of three revolutions before coming to a stop on the original port position. Any disabled port positions will be skipped over when an rotate valve signal is given. As in Mode 1 if the DIO senses that the MP800/MP08 is in Local mode by reading the status register back no communications will be sent to move the valve to any port . If any other DI's are energized they will be ignored.

4.0 Jumpers

The DIO card has two jumpers that are being used, J1 and J2. The remaining jumpers are for future options.

- J1 A = 24VDC digital input operation.
 B = 120VAC digital input operation.

- J2 IN = Single digital input operation. (See Mode 2)
 OUT = Multiple digital input operation. (See Mode 1)

5.0 Communications

The DIO card acts as the host when communicating to the MP800 system. A Modbus protocol is used with a RS485 interface. Communications take place at 9600 baud, 8 data bits, and one stop bit. If at any time the MP800 does not respond to messages being sent by the DIO card the Communication output contact will close indicating an error. In the communications that comes from the MP800 is a status bit for the encoder. If there is a problem with the encoder the Encoder Fail output contact will close . The communications uses Modbus function 3 for reading data from the MP800/MP08 and Modbus function 16 for transmitting data to the MP800/MP08 unit. All the MP800/MP08 units should be set up as address 1 due to the DIO card only expecting one card on the RS485 communication bus. Below is a list of register addresses that the DIO card accesses on MP800/MP08 to receive and transmit data to.

Addr	40001	HIGH BYTE	For setting Position
Addr	40001	LOW BYTE	
Addr	40002	HIGH BYTE	Current Position and Status
Addr	40002	LOW BYTE	
Addr	40003	HIGH BYTE	Disabled Ports
Addr	40003	LOW BYTE	

Register 40001 * Set Position.

- Setting bits 1 to 8 in this register will move the valve to the required position.
- The bit will be cleared when the position is reached.
- If controller is not in REMOTE mode, the motor will not start and the bit will be cleared.
- Bit 16 = STOP MOTOR

Register 40002 * Read current position and status.

- Bits 1 to 8 will indicate the position the valve is near (1 = Near or On Position).
- Bit 9 set in LOCAL JOG mode.
- Bit 10 set in LOCAL STEP mode.
- Bit 11 set in REMOTE mode.
- Bit 12 indicates motor running.
- Bit 13 indicates motor running but no movement (equipment failure).
- Bit 14 indicates motor running but no find position (equipment failure).
- Bit 15 indicates faulty encoder (backward counting) (equipment failure).
- Bit 16 Set will indicate the the valve is directly over any port position with bits 1 to 8 indicating which port position the valve is on. If bit 16 is not set the valve is near a position.

Register 40003 * Read disable positions.

- Bits 1 to 8 indicate which positions are disabled.

Register 40004 * Contains current position
 -0 to 1023 where 0=home

6.0 Appendix

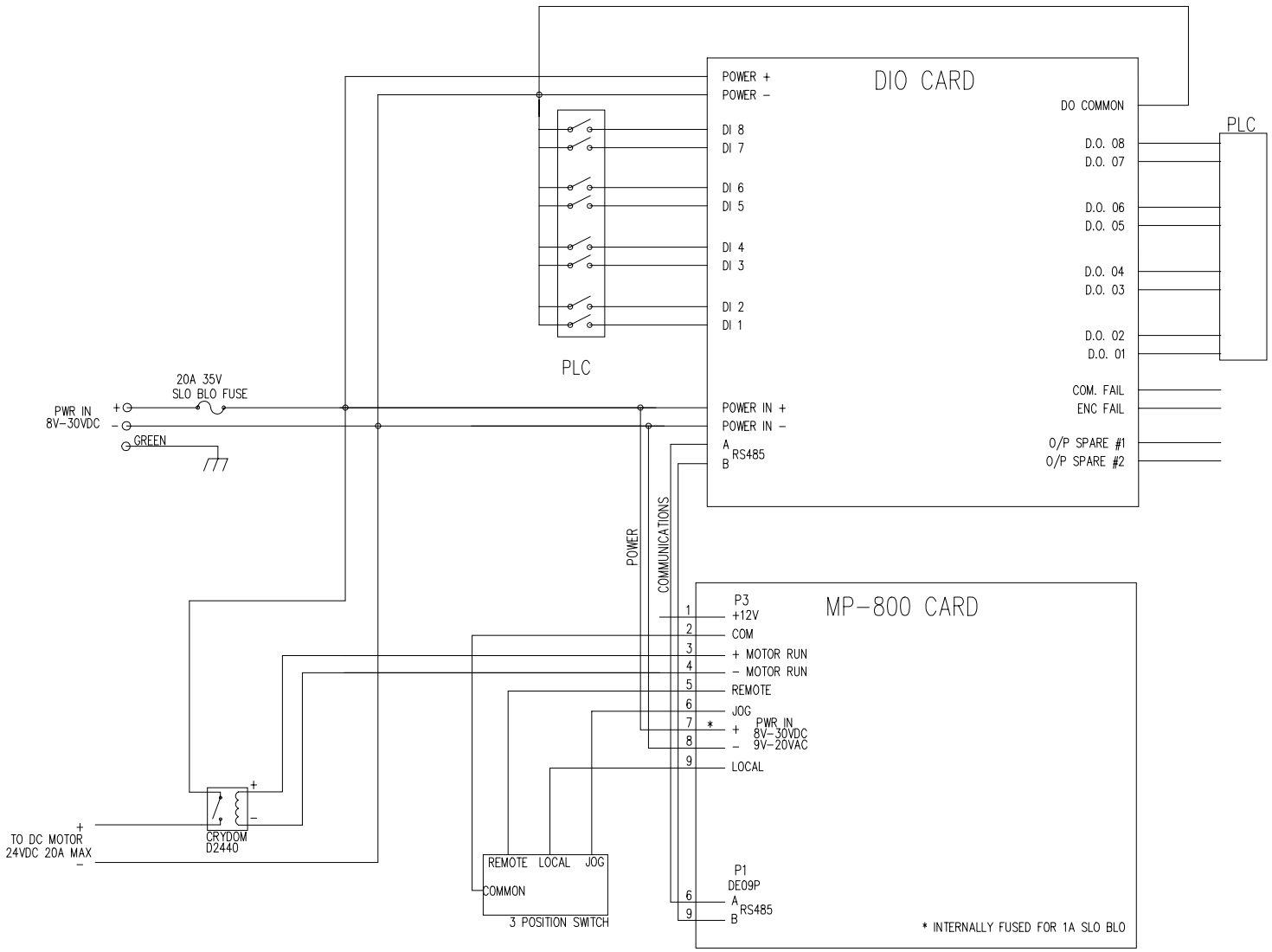


Figure 1

REV		DESCRIPTION		BY	DATE	TITAN LOGIX CORP. TEL: 780-462-4085	
DIMENSION UNITS: INCHES [mm]		TOLERANCES EXCEPT AS NOTED		SCALE NTS			
.X	±0.05	125 RMS	BREAK SHARP EDGES	DESIGN JJ		CHK	DIO CARD FIELD WIRING 24V
.XX	±0.01	63 RMS	CHAMFER FIRST	DRAWN JJ		CHK	
.XXX	±0.005	32 RMS	THRD	DATE 2002NOV05		PART NO.	
ANGLES ±1°		PROJECTION		MATERIAL		REVISION SHT	
				FINISH		1000410SEL00 1/1	

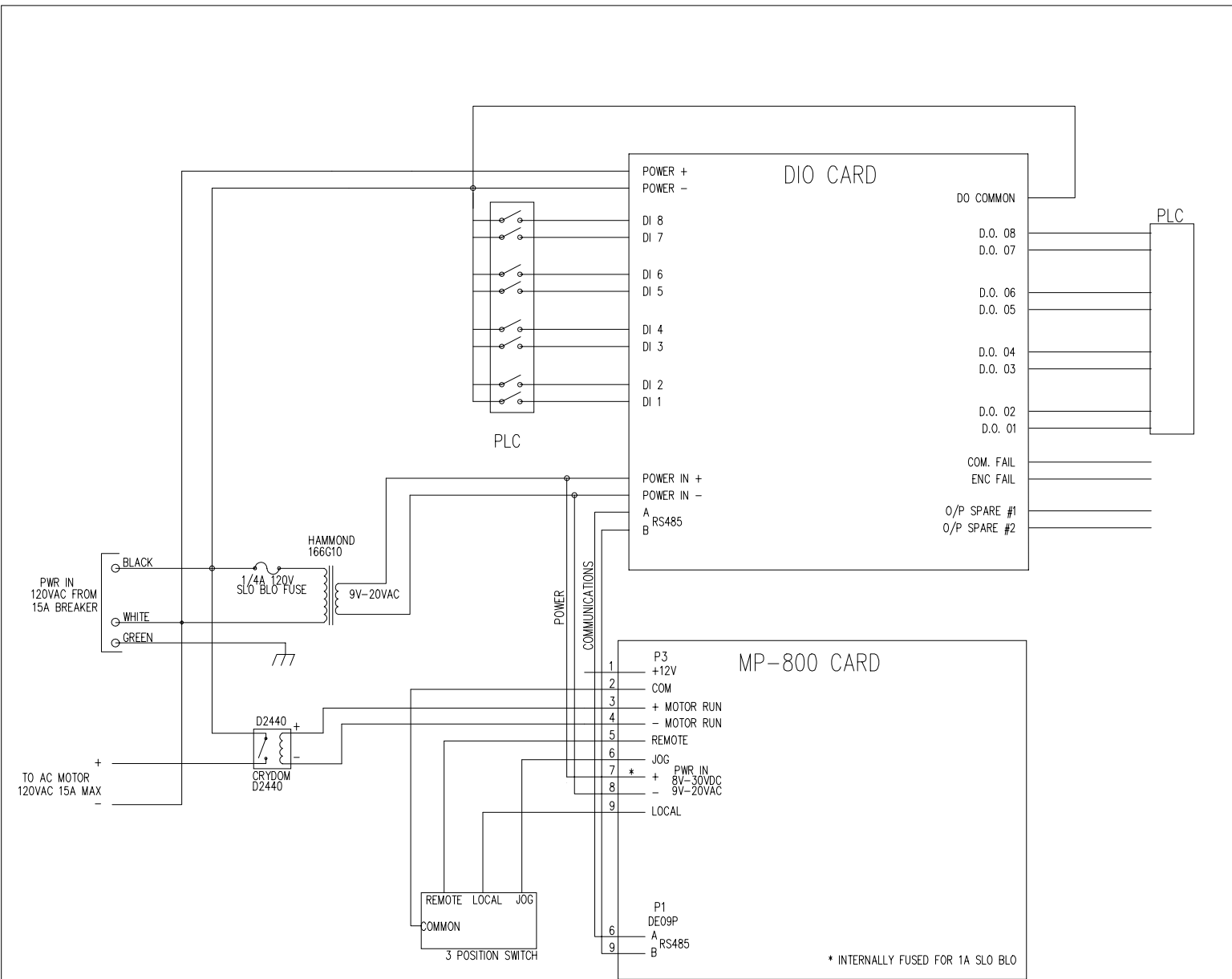


Figure 2

REV		DESCRIPTION		BY	DATE	TITAN LOGIX CORP. TEL: 780-462-4085		
DIMENSION UNITS: INCHES [mm]		TOLERANCES EXCEPT AS NOTED		SCALE NTS				DWG. TITLE
.X	±0.05	125	RMS	BREAK SHARP EDGES CHAMFER FIRST THRD		DESIGN	JJ	CHK
.XX	±0.01	63	RMS	REMOVE ALL BURRS		DRAWN	JJ	CHK
.XXX	±0.005	32	RMS	MATERIAL		DATE	NOV 5 2002	
ANGLES ±1°		PROJECTION		FINISH		FILE	PART NO.	
				XXX		1000411SEL00		REVISION SHT 1/1

© 2002 Titan Logix Corp.



Manufactured in Canada