LMI®

an Accudyne Industries brand

Excel® XR Series

Electronic Metering Pump
PROFIBUS DP-V0 Manual

Manual No.: 55313
Revision : 03
Rev. Date: 07/2017

Note: For enhanced control features see manual 54772 and enhanced control features see manual 54630

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1.0 Precautions

The following precautions should be taken when working with LMI metering pumps. Please read this section carefully prior to installation.

Protective Clothing

ALWAYS wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on the solution being pumped. Refer to Safety Data Sheets (SDS) precautions from your solution supplier.

Water Pre-Prime

All LMI pumps are pre-primed with water when shipped from the factory. If your solution is not compatible with water, disassemble the Pump Head Assembly. Thoroughly dry the pump head, valves, O-rings, balls and diaphragm. Reassemble head assembly tightening screws in a crisscross pattern. Refill the pump head with the solution to be pumped before priming the pump. (This will aid in priming.)

Liquid Compatibility

CAUTION: The evaluation performed by ETL was tested with water only. The pumps are certified to NSF 61 with: sodium hypochlorite (12.5%), sulfuric acid (98.5%), sodium hydroxide (50%), and hydrochloric acid (30%). Determine if the materials of construction included in the liquid handling portion of your pump are adequate for the solution (chemical) to be pumped. Always refer to the solution supplier and the LMI Chemical Resistance Chart for compatibility of your specific LMI metering pump. Contact your local LMI distributor for further information.

Tubing Connections

Inlet and outlet tubing or pipe sizes must not be reduced. Outlet tubing size must not be increased. Make certain that all tubing is SECURELY ATTACHED to fittings prior to start-up (see section 3.3 Tubing Connections). ALWAYS use LMI supplied tubing with your pump, as the tubing is specifically designed for use with the pump fittings. It is recommended that all tubing be shielded and secure to prevent possible injury in case of rupture or accidental damage. If tubing is exposed to sunlight, black UV resistant tubing should be installed. Check tubing frequently for cracks and replace as necessary.

Fittings and Machine Threads

All fittings should be hand-tightened. An additional 1/8 - 1/4 turn after the fitting is snug may be necessary to provide a leak-proof seal. Excessive overtightening or use of a pipe wrench can cause damage to the fittings, seals, or pump head.

Most LMI pumps have straight screw machine threads on the head and fittings and are sealed by the O-rings. DO NOT use PTFE tape or pipe dope to seal these threads. PTFE Tape may only be used on NPT threads.

Plumbing

Always adhere to your local plumbing codes and requirements. Be sure installation does not constitute a cross connection. Check local plumbing codes for guidelines. LMI is not responsible for improper installations.

PRECAUTIONS

Back Pressure/Anti-Syphon Valve

If you are pumping downhill or into low or no system pressure, a backpressure /anti-syphon device should be installed to prevent over pumping or syphoning. Contact your LMI distributor for further information.

Electrical Connections

WARNING: To reduce the risk of electrical shock, the metering pump must be plugged into a properly grounded grounding-type receptacle with ratings conforming to the data on the pump control panel. The pump must be connected to a good ground. ***Do not use adapters!*** All wiring must conform to local electrical codes. If the supply cord is damaged, it must be replaced by the manufacturer, stocking distributor, or authorized repair center in order to avoid a hazard.

Fuse and Battery

CAUTION: Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire. The battery and fuse are internal, factory serviceable parts, and must be replaced by the factory or a qualified distributor with parts of the same type and rating.

Flooding

WARNING: Install this pump in a location where flooding cannot occur.

Ground Fault Circuit Interrupter

WARNING: To reduce the risk of electric shock, install only on a circuit protected by a Ground Fault Circuit Interrupter (GFCI).

Line Depressurization

To reduce the risk of chemical splash during disassembly or maintenance, all installations should be equipped with line depressurization capability.

Over Pressure Protection

To ensure safe operation of the pump it is recommended that some type of safety / pressure-relief valve be installed to protect the piping and other system components from failing due to excessive pressure.

Chemical Concentration

There is a potential for elevated chemical concentration during periods of no flow, for example, during backwash in the system. Steps, such as turning the pump off, should be taken during operation or installation to prevent this.

See your distributor about other external control options to help mitigate this risk.

Retightening Components

Plastic materials will typically exhibit creep characteristics when under pressure over a period of time and to insure a proper fit it may be necessary to retighten the head bolts periodically. To insure proper operation, we recommend tightening the bolts to 25 inch-pounds after the first week of operation and on a monthly basis thereafter.

Flow Display

The accuracy of the flow value as shown on the pump display is highly dependent on the specific application. Calibration is necessary in order to display an accurate measure of the flow.

Spills

CAUTION: Spills of Dangerous chemicals should be cleaned up immediately.

2.0 Introduction

LMI's metering pumps deliver the highest level of repetitive accuracy and reliability with the capability to pump a wide range of chemicals. Our comprehensive selection of pumps means you get the right pump for the right application. Every one of our pumps is engineered to exceed expectations and is backed by a global network of highly trained field engineers and aftersales support.

The PROFIBUS DP interface conforms to the PROFIBUS DP-V0 standard for cyclic data transmission. This manual assumes the reader is familiar with commissioning and programming PROFIBUS devices.

2.1 Specifications

Table 1: PROFIBUS DP Specifications

PROFIBUS Implementation Class	DP-V0
PROFIBUS Connector	5 Pin Reverse Key Female M12 (B-Code)
Maximum Cable Length	1200 meters at 9.6 Kbits/s 1000 meters at 115.2 Kbits/s 200 meters at 1.5 Mbits/s 100 meters at 12 Mbits/s
Slave Address Range	1-125
Line Termination	On/Off (Software Configurable)
Supported transmission speeds	9600 to 12 Mbit/s (auto detected)

3.0 Local Operation

This manual covers basic features supported in the Excel® XR Series pumps and complete descriptions of PROFIBUS features.

3.1 Display Navigation

Navigation through display screens is done using the **Up**, **Down,** and **Multi-Function** buttons. The settings screen is shown in the example below (Figure 1: Display Navigation). The scroll bar on the side of the display screen indicates there are more settings available on another page.

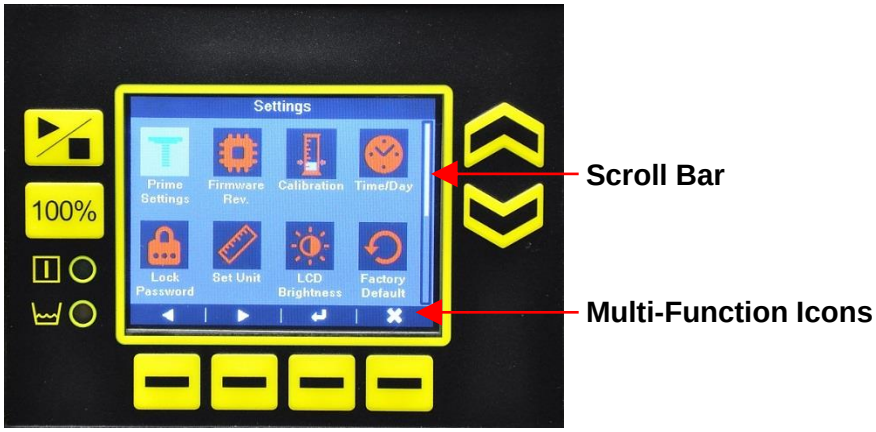


Figure 1: Display Navigation

3.2 Settings

To access the settings screen (Figure 2) press **Settings** in the home screen. Navigate to the function desired and press **Enter**. Follow the prompts to enter new settings. New settings will need to be saved by pressing **Save**. Press **Exit** to return to the previous screen without saving.

Figure 2: Settings

3.2.1 PROFIBUS Communication Settings

From the *Settings* screen, navigate to the **Communication Settings** icon and press **Enter** ↵. The *Communication Settings* screen (Figure 4) will allow for the following settings to be adjusted:

- The Slave Address can be configured via software in the range of 1-125.
- The Internal Line Termination can also be enabled/disabled on this screen. The final device on the communication bus must have line termination enabled. This can be accomplished externally or using the software enabled internal line termination. The Internal Line Termination will engage the following internal termination resistors:

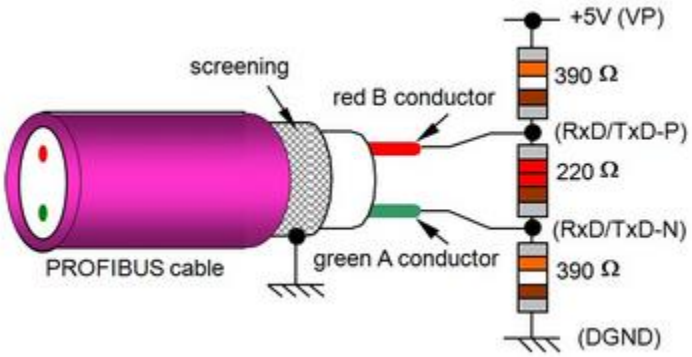


Figure 3: Internal Termination Resistors

Figure 4: Communication Settings

4.0 PROFIBUS Software Definition

4.1 PROFIBUS Configuration

Each function available via the PROFIBUS is defined in a Module. Each Module must be loaded sequentially. If any Modules are skipped or loaded in the wrong order, the configuration will fail.

4.1.1 Modules 0-8: Basic Control

Module	Name	Description	Direction	Data Type
0	Device Control	Bitmask. Set the desired bit high execute the associated function: Bit 0 - Toggle OnOff Bit 1 - Toggle Prime Mode Bit 2 - Toggle 100pct Mode Bit 3 - Force IntExt Bit 4 - Toggle Slow Mode Bit 5 - Toggle Units Bit 6 - Reset Totalizer Bit 7 - Force Homescreen Display	Input/Output	UINT8
1	Operation Mode	Bitmask. Set the desired bit high force the associated operation mode: Bit 0 = Manual (Local only) Bit 1 = Analog (External) Bit 2 = Pulse (External) Bit 3 = Batch (External) Bit 4 = Cycle Timer (Internal) Bit 5 = Timed Event (Internal)	Input/Output	UINT8
2	Manual Flow Rate Control	XX.XX in the current units (i.e. GPH/LPH). The range is 0-9999.	Input/Output	UINT16
3	Prime Flow Rate Control	XX.XX in the current units (i.e. GPH/LPH). The range is 0-9999.	Input/Output	UINT16
4	Prime Flow Duration	Seconds. The range is 1-3600.	Input/Output	UINT16
5	Power Loss Mode	Bitmask. Set the desired bit high set the associated option: Bit 0 = Resume Operation Bit 1 = Stay Idle Bit 2 = Run at a configured speed	Input/Output	UINT8
6	Power Loss Resume Speed	XX.XX GPH/LPH format. The range is 0-9999. This flowrate is applied on power up if the power loss option is set to 'Run at a configured speed'.	Input/Output	UINT16
7	Slow Mode Setpoint	Range of 10-90 in increments of 10.	Input/Output	UINT8

8	Alarm Status	Returned as a bitmask with a high bit to indicate the status of each item: Bit 0 - Global Alarm Bit 1 - User Alarm Bit 2 - Tank Empty Bit 3 - Tank Low Bit 4 - Internal System Error Bit 5 - Motor Stall Bit 6 - Analog Loss of Signal Bit 7 - Analog Overrange Bit 8 - Motor Homing Error Bit 9 - Pulse Signal not Present Bit 10 - Pulse Signal Overrange	Output	UINT16

4.1.2 Modules 9-24: Operation Mode Configuration

Module	Name	Description	Direction	Data Type
9	Pulse Mode Count	Range of 1-10,000.	Input/Output	UINT16
10	Pulse Mode Volume	XXXXX.XX mL. Range is 0 to 1000000.	Input/Output	UINT32
11	Pulse Mode Units	Enumeration (0=Small, 1=Large). Large will use Gallons or Liters based on global units setting. Small will use fl oz. or mL based on global units setting.	Input/Output	BOOL
12	Pulse Mode Pulse Width	msec. The valid range is 4 - 60 in increments of 4.	Input/Output	UINT8
13	Batch Mode Volume	XXXXX.XX mL. The valid range is 0 to 1000000.	Input/Output	UINT32
14	Batch Mode Time	Seconds. Range is 1-86400.	Input/Output	UINT32
15	Batch Mode Units	Enumeration (0=Small, 1=Large). Large will use Gallons or Liters based on global units setting. Small will use fl oz. or mL based on global units setting.	Input/Output	BOOL
16	Batch Mode Pulse Width	msec. Range is 4 - 60 in increments of 4.	Input/Output	UINT8
17	Batch Mode Accumulate	Enumeration (0 = Off, 1 = On).	Input/Output	BOOL
18	Analog Mode P1 Flowrate	XX.XX in the current units (i.e. GPH/LPH). The range is 0-9999.	Input/Output	UINT16
19	Analog Mode P1 Current	XX.X mA. Range is 0.0-20.0.	Input/Output	UINT8
20	Analog Mode P2 Flowrate	XX.XX in the current units (i.e. GPH/LPH). Range is 0-9999.	Input/Output	UINT16
21	Analog Mode P2 Current	XX.X mA. Range is 0-200.	Input/Output	UINT8
22	Cycle Timer Mode Status	Minutes. Range is 1-1439. The Cycle Time is the period of active pumping.	Input/Output	UINT16
23	Cycle Timer Duration	Minutes. Range is 1-1439. The Duration is the inactive period.	Input/Output	UINT16

24	Cycle Timer Delay Timer	Minutes. Range is 1-1439. The Delay Timer is the first inactive period prior to starting the cycle.	Input/Output	UINT16
25	Cycle Timer Flow Rate	XX.XX in the current units (i.e. GPH/LPH). The range is 0-9999.	Input/Output	UINT16

4.1.3 Modules 26-42: Timed Event Configuration

Module	Name	Description	Direction	Data Type
26	Timed Event Day Select	Integer (1-7) that represents a day of the week. This must be set prior to configuring event parameters. The other timed events will be based on the set day.	Input/Output	UINT8
27	Timed Event1 Start Time	4 decimal digit format (HHMM). Range HH = Hour (00-23), MM = Minute (00-59).	Input/Output	UINT16
28	Timed Event1 Duration	Integer representing minutes with a valid range of 1-1439.	Input/Output	UINT16
29	Timed Event1 Flow	Integer representing XX.XX GPH/LPH format. The range is 0-9999.	Input/Output	UINT16
30	Timed Event1 Enabled	Enumeration (0 = OFF, 1 = ON).	Input/Output	BOOL
31	Timed Event2 Start Time	4 decimal digit format (HHMM). Range HH = Hour (00-23), MM = Minute (00-59).	Input/Output	UINT16
32	Timed Event2 Duration	Integer representing minutes with a valid range of 1-1439.	Input/Output	UINT16
33	Timed Event2 Flow	Integer representing XX.XX GPH/LPH format. The range is 0-9999.	Input/Output	UINT16
34	Timed Event2 Enabled	Enumeration (0 = OFF, 1 = ON).	Input/Output	BOOL
35	Timed Event3 Start Time	4 decimal digit format (HHMM). Range HH = Hour (00-23), MM = Minute (00-59).	Input/Output	UINT16
36	Timed Event3 Duration	Integer representing minutes with a valid range of 1-1439.	Input/Output	UINT16
37	Timed Event3 Flow	Integer representing XX.XX GPH/LPH format. The range is 0-9999.	Input/Output	UINT16
38	Timed Event3 Enabled	Enumeration (0 = OFF, 1 = ON).	Input/Output	BOOL
39	Timed Event4 Start Time	4 decimal digit format (HHMM). Range HH = Hour (00-23), MM = Minute (00-59).	Input/Output	UINT16
40	Timed Event4 Duration	Integer representing minutes with a valid range of 1-1439.	Input/Output	UINT16
41	Timed Event4 Flow	Integer representing XX.XX GPH/LPH format. The range is 0-9999.	Input/Output	UINT16
42	Timed Event4 Enabled	Enumeration (0 = OFF, 1 = ON).	Input/Output	BOOL

4.1.4 Modules 43-57: Input/Output Configuration

Module	Name	Description	Direction	Data Type
43	Digital Input 1 Config	Enumeration with a range 0-5. The enumeration is as follows: 0: Digital Input = Disabled 1: Digital Input = RemoteOnOff 2: Digital Input = FloatSwitch_Empty 3: Digital Input = FloatSwitch_Low 4: Digital Input = RemoteIntExtMode 5: Digital Input = PacingPulse	Input/Output	UINT8
44	Digital Input 1 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
45	Digital Input 2 Config	Enumeration with a range 0-5. The enumeration is as follows: 0: Digital Input = Disabled 1: Digital Input = RemoteOnOff 2: Digital Input = FloatSwitch_Empty 3: Digital Input = FloatSwitch_Low 4: Digital Input = RemoteIntExtMode 5: Digital Input = PacingPulse	Input/Output	UINT8
46	Digital Input 2 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
47	Digital Input 3 Config	Enumeration with a range 0-5. The enumeration is as follows: 0: Digital Input = Disabled 1: Digital Input = RemoteOnOff 2: Digital Input = FloatSwitch_Empty 3: Digital Input = FloatSwitch_Low 4: Digital Input = RemoteIntExtMode 5: Digital Input = PacingPulse	Input/Output	UINT8
48	Digital Input 3 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
49	Digital Input 4 Config	Enumeration with a range 0-5. The enumeration is as follows: 0: Digital Input = Disabled 1: Digital Input = RemoteOnOff 2: Digital Input = FloatSwitch_Empty 3: Digital Input = FloatSwitch_Low 4: Digital Input = RemoteIntExtMode 5: Digital Input = PacingPulse	Input/Output	UINT8
50	Digital Input 4 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
51	Analog Input 1 Config	Enumeration with a range 0-2. The enumeration is as follows: 0: Analog Input = Disabled 1: Analog Input = Pacing 2: Analog Input = Level	Input/Output	UINT8
52	Analog Input 2 Config	Enumeration with a range 0-2. The enumeration is as follows: 0: Analog Input = Disabled 1: Analog Input = Pacing 2: Analog Input = Level	Input/Output	UINT8

53	Digital Output 1 Config	Enumeration with a range 0-8. The enumeration is as follows: 0: Digital Output = Disabled 1: Digital Output = StrokePulse 2: Digital Output = PumpRunning 3: Digital Output = PumpStandby 4: Digital Output = AlarmOut 5: Digital Output = INTEXTMode 6: Digital Output = UserAlarmOut 7: Digital Output = PumpStopped 8: Digital Output = TimedEvent	Input/Output	UINT8
54	Digital Output 1 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
55	Digital Output 2 Config	Enumeration with a range 0-8. The enumeration is as follows: 0: Digital Output = Disabled 1: Digital Output = StrokePulse 2: Digital Output = PumpRunning 3: Digital Output = PumpStandby 4: Digital Output = AlarmOut 5: Digital Output = INTEXTMode 6: Digital Output = UserAlarmOut 7: Digital Output = PumpStopped 8: Digital Output = TimedEvent	Input/Output	UINT8
56	Digital Output 2 State	Enumeration (0=NO - Normally Open, 1=NC - Normally Closed).	Input/Output	BOOL
57	Analog Output Config	Enumeration with a range 0-2. The enumeration is as follows: 0: Analog Output = Disabled 1: Analog Output = Flow 2: Analog Output = MirrorInput	Input/Output	UINT8

4.1.5 Modules 58-64: System Settings

Module	Name	Description	Direction	Data Type
58	Remote Internal Mode	Enumeration 0 = Manual 1 = Cycle Timer 2=Weekly Timer	Input/Output	UINT8
59	Remote External Mode	Enumeration 0= mA 1= Pulse 2 = Batch	Input/Output	UINT8
60	Lock Style	Enumeration 1=No_Lock 2=All_Lock, 3=All_Lock_Power_Unlock, 4=All_Lock_Password, 5=All_Lock_Power_Password).	Input/Output	UINT8
61	Password	Integer with a range of 0000-9999.	Input/Output	UINT8

62	Clock	7 decimal digit format (DHHMMSS): D = Day of week (1-7) HH = Hour (01-24) MM = Minute (00-59) SS = Seconds (00-59)	Input/Output	UINT32
63	User Alarm Mask	Bitmask. Set desired bits high to trigger user alarm when associated alarm is active. Bit 0 - Reserved Bit 1 - Reserved Bit 2 - Tank Empty Bit 3 - Tank Low Bit 4 - Internal System Error Bit 5 - Motor Stall Bit 6 - Analog Loss of Signal Bit 7 - Analog Overrange Bit 8 - Motor Homing Error Bit 9 - Pulse Signal not Present Bit 10 - Pulse Signal Overrange	Input/Output	UINT16
64	System Units	Enumeration (0 = English, 1 = Metric).	Input/Output	UINT8

4.1.6 Modules 65-68: Read-Only Version Information

Module	Name	Description	Direction	Data Type
65	Main Firmware Version	Range is 0-65535 as an integer that must be converted to hex to be read as 0000-FFFF representing X.X.X.X.	Output	UINT16
66	I/O Firmware Version	Range is 0-65535 as an integer that must be converted to hex to be read as 0000-FFFF representing X.X.X.X.	Output	UINT16
67	Display Firmware Version	Range is 0-65535 as an integer that must be converted to hex to be read as 0000-FFFF representing X.X.X.X.	Output	UINT16
68	Display EEPROM Firmware Version	Range is 0-65535 as an integer that must be converted to hex to be read as 0000-FFFF representing X.X.X.X.	Output	UINT16

4.1.7 Modules 69-94: Read-Only Information

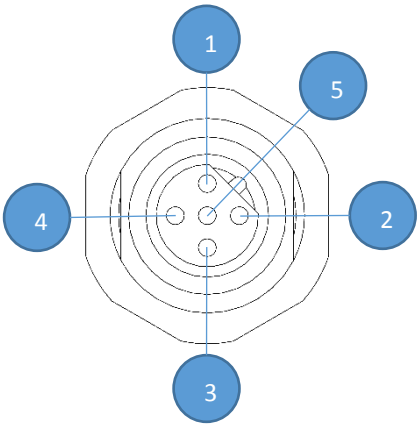
Module	Name	Description	Direction	Data Type
69	LCD Contrast	Integer representing 0-100%.	Output	UINT8

70	Model ID	Enumeration for the pump output code. The output code is associated with the maximum flow rate of the pump: 2: Output Code 2 - 5.6 GPH (21.2 l/h) 175 psi (12.0 bar) 3: Output Code 3 - 14.0 GPH (53.0 l/h) 75 psi (5.0 bar) 4: Output Code 4 - 18.0 GPH (68.1 l/h) 50 psi (3.5 bar)	Output	UINT8
71	Language	Enumeration 1=English 2=French 3=Portuguese 4=Spanish 5=Chinese	Output	UINT8
72	Current Flow Rate	Integer representing XX.XX GPH/LPH format.	Output	UINT16
73	Flow Percentage	Integer representing XXX.XX%.	Output	UINT16
74	Analog Input 1	Integer representing XX.X mA.	Output	UINT16
75	Analog Input 2	Integer representing XX.X mA.	Output	UINT16
76	Analog Output	Integer representing XX.X mA.	Output	UINT16
77	Totalizer User Strokes	Integer representing number of strokes.	Output	UINT32
78	Totalizer User Volume	Integer representing Gal or L depending on current unit setting.	Output	UINT64
79	Totalizer User Hours	Integer representing number of hours.	Output	UINT32
80	Totalizer User Power Cycles	Integer representing the number of Power Cycles.	Output	UINT16
81	Totalizer Unit Strokes	Integer representing number of strokes.	Output	UINT32
82	Totalizer Unit Volume	Integer representing Gal or L depending on current unit setting.	Output	UINT64
83	Totalizer Unit Hours	Integer representing number of hours.	Output	UINT32
84	Totalizer Unit Power Cycles	Integer representing the number of Power Cycles.	Output	UINT16
85	Calibrated Volume	This is the maximum flow rate of the pump based on the calibration and is stored as an integer representing XX.XX GPH/LPH.	Output	UINT16
86	Batch Mode Remaining Volume	Integer representing Gal or L depending on current unit setting.	Output	UINT32
87	Batch Mode Remaining Dosing Time	Integer representing number of seconds.	Output	UINT32

88	Cycle Time Mode Startup Delay Left	Integer representing number of seconds.	Output	UINT32
89	Cycle Time Mode Run Time Left	Integer representing number of seconds.	Output	UINT32
90	Cycle Time Mode Cycle Time Left	Integer representing number of seconds.	Output	UINT32
91	Weekly Event Remaining Run Time	Integer representing number of seconds.	Output	UINT32
92	Pump Statuses	Returned as a bitmask with a high bit to indicate the status of each item: Bit 0: Running Status (0 = stopped, 1 = running) Bit 1: Internal/External Operating Mode (0 = internal, 1 = external) Bit 2: Tank Low (0 = Not low, 1 = Tank Low) Bit 3: Tank Empty (0 = Not empty, 1 = Tank empty) Bit 4: 100% Mode (0 = No, 1 = Yes) Bit 5: Prime Mode (0 = No, 1 = Yes) Bit 6: Slow Mode (0 = No, 1 = Yes) Bit 7: Current Units (0 = English, 1 = Metric) Bit 8: Pump Calibration Status (0 = No, 1 = Yes) Bit 9: Keypad Locked Status (0 = No, 1 = Yes) Bit 10: Home Screen Displayed (0 = No, 1 = Yes) Bit 11: Batch Mode Dosing Active (0 = No, 1 = Yes) Bit 12: Cycle Timer Startup Delay (0 = No, 1 = Yes) Bit 13: Cycle Timer Pump Active (0 = No, 1 = Yes) Bit 14: Weekly Timed Event Active (0 = No, 1 = Yes)	Output	UINT16
93	Digital Input Status	Returned as a bitmask with a high bit to indicate the status of each item: Bit 1: Digital Input 1 (0 = Unswitched, 1 = Switched) Bit 2: Digital Input 2 (0 = Unswitched, 1 = Switched) Bit 3: Digital Input 3 (0 = Unswitched, 1 = Switched) Bit 4: Digital Input 4 (0 = Unswitched, 1 = Switched)	Output	UINT16
94	Digital Outputs Status	Returned as a bitmask with a high bit to indicate the status of each item: Bit 1: Digital Output 1 (0 = Unswitched, 1 = Switched) Bit 2: Digital Output 2 (0 = Unswitched, 1 = Switched)	Output	UINT16

5.0 Cable Wiring

The Excel® XR pump provides a 5-pin Reverse Key Female M12 (B-Code) connector with the following pin-out:



Connector	Pin #	Function
C	1	VP (5 V)
	2	RxD/TxD-N
	3	DGND
	4	RxD/TxD-P
	5	N/A
	Thread: Shield (earth ground)	

Figure 5: Connector C Pin Diagram

The M12 circular connector conforms to IEC 60947-5-2 or IEC 61076-2-101 per the PROFIBUS Interconnection Technology Guideline 2.142 Version 1.4. The shield of the cable should be connected to protective ground on both sides and with good conductivity.

PROFIBUS DP compliant connectors and cables should be used. The following parts have been verified:

Description	Manufacturer	Part Number
2 meter cable with M12 Mating connector and Flying Leads	Turck	RSSW 590-2M

6.0 Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
Configuration Fault	1. Not all modules included	1. Include all PROFIBUS Data Modules
	2. Modules in wrong order	2. Include all PROFIBUS Data Modules in sequential order
Slave not found	1. Incorrect Slave Address	1. Verify the slave address on the pump UI matches the slave address on the master
	2. Improper line termination	2. If the pump is the last slave on the bus, enable the internal line termination or use an external terminating resistor
	3. Incorrect Wiring	3. Verify wiring is correct per Figure 5: Connector C Pin Diagram
	4. Pump not powered	4. Verify the pump is powered on
Pump does not start when commanded via PROFIBUS	1. Homescreen is not displayed on pump	1. Check the pump display and press the X button to return to the homescreen. Alternatively, use Module 90 to query whether the homescreen is displayed and Module 0 to force the homescreen to be displayed.
	2. Pump is not in manual mode	2. If the pump is in an external mode or a timed event or timed cycle mode, starting the pump will activate the pump, but the pump will not run unless the external trigger is provided (i.e. pulse, analog input, time of day). Change the pump to manual mode with Module 1.

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