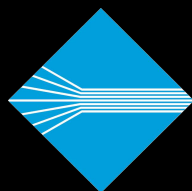


MXPB3

Profibus
Communications
Module

User's Manual

890041-02-00



BENSHAW[®]
ADVANCED CONTROLS & DRIVES



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1 - Introduction

Technical Support	Technical Support personnel are available to answer questions and provide technical support, including information regarding start-up services and fees, over the telephone. Refer to the following page for contact information.
Documentation	<p>Benshaw can provide all customers with:</p> <ul style="list-style-type: none">• Operation Manuals• Wiring Diagrams <p>All drawings are produced in AutoCAD™ and are available on CD / DVD or via e-mail by contacting Benshaw Customer Service.</p>
On-Line Documentation	All MXPB3 documentation is available on-line at http://www.benshaw.cwfc.com
Replacement Parts	Spare and replacement parts can be purchased from Benshaw Technical Support.
Publication History	Refer to the inside back cover.
Warranty	Benshaw provides a standard 1 Year factory warranty on the MXPB3 Communications Module.

MXPB3 Profibus Communications Module

Contacting Benschaw Information about Benschaw products and services is available by contacting Benschaw at one of the following offices:

Benschaw Corporate Headquarters

615 Alpha Drive
Pittsburgh, PA 15116
Phone: 412-968-0100
Tech Support: 1-800-203-2416
Fax: 412-968-5415

Benschaw Canada

550 Bright Street East
Listowel, Ontario N4W 3W3
Phone: 519-291-5112
Tech Support: 1-877-291-5112
Fax: (519) 291-2595

Technical support for the MXPB3 Communications Module is available at no charge by contacting Benschaw Customer Service at any of the above telephone numbers. A service technician is available Monday through Friday from 8:00 a.m. to 5:00 p.m. EST.

NOTE: An on-call technician is available after normal business hours and on weekends by calling Benschaw and following the recorded instructions.

To help assure prompt and accurate service, please have the following information available when contacting Benschaw:

- Name of Company
- Telephone number where the caller can be contacted
- Fax number of caller
- Benschaw product name
- Benschaw model number
- Benschaw serial number
- Name of product distributor
- Approximate date of purchase
- A brief description of the application

Overview

MXPB3 Communications Module

The Benshaw MXPB3 Communications Module is designed to make communicating with an MX² or MX³ starter a simple and easy task. The MXPB3 requires only a few simple configuration parameters to connect with a Profibus-DP network. Configuration parameters are easily accessed from the built in web server (refer to “Quickstart - Web Page Based Setup” in Section 2).



CAUTION: When using the MXPB3 on a Profibus-DP network, the serial timeout function of the MX²/MX³ must be enabled. Refer to the Communications Timeout parameters in an MX² or MX³ User Manual for details on enabling the serial time-out function.

Technical Specifications

Network Interface

RJ-45 10/100Base-T Ethernet port

Protocols Supported

Profibus-DP V0 / V1

LEDs

Nine LEDs for device and communication status.

Refer to Section 5 for Diagnostic Codes

Physical Characteristics

Dimensions: 4.2"x 3.75"x 1"

Power Requirements

DC Input Voltage: 260mA @ 7V to 75mA @ 24V

Environmental

Operating Temperature: -10°C to +50°C

MXPB3 Kit Part Number

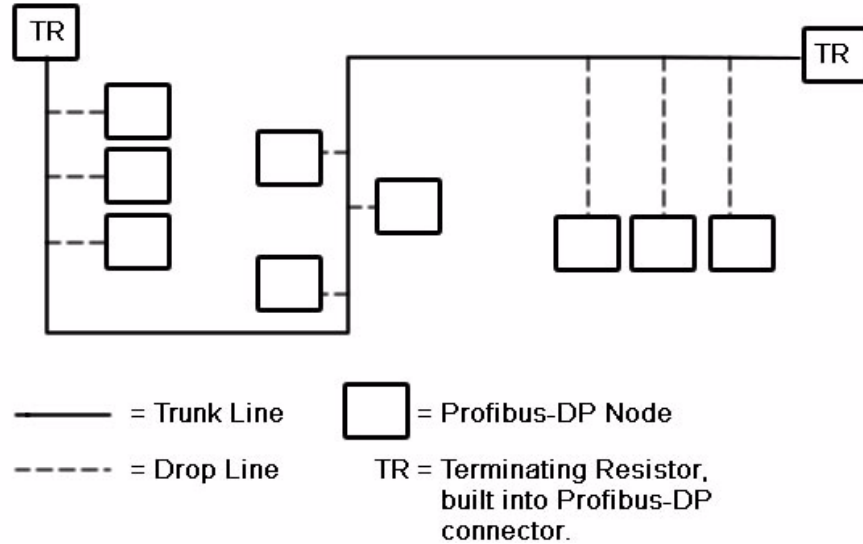
Profibus-DP Communications Kit: COM-100000-02



2 - Installation

Profibus-DP Considerations

The MXPB3 adheres to the connection/cabling standards of Profibus-DP.



There are physical specifications to consider when installing a Profibus-DP network or adding a new Profibus-DP device. The table below outlines a few key considerations in planning your Profibus-DP network.

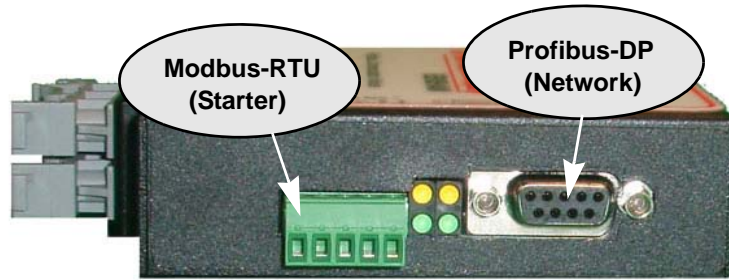
Profibus-DP Specification

Table 1: Profibus-DP Specifications

Comm Speed	93.75 Kbps	187.5 Kbps	500 Kbps	1500 Kbps	12000 Kbps
Cable Length	1200m (3937ft)	1000m (3280ft)	400m (1312ft)	200m (656ft)	100m (328ft)
Number of Devices	32 per segment; Up to 126 with 4 repeaters				
Bus Power	Must have auxiliary 24VDC supply				
Device Identity	Specific ID Number for each device				

MXPB3 Profibus Communications Module

LEDs and Connectors



Profibus Connector

Table 2: Profibus-DP Connector Pinout

PIN	Profibus-DP
Housing	Shield (Protective earth)
1	Not Connected
2	Not Connected
3	B-Line (+ Rx/TxD)
4	RTS (request to send)
5	GND BUS (Isolated GND)
6	+5V BUS (Isolated +5V)
7	Not Connected
8	A-Line (- Rx/TxD)
9	Not Connected

Modbus RTU Connector

The Starter Connector is used to connect the MXPB3 to a Benshaw starter. Refer to the example wiring diagram in this section.

Table 3: Modbus RTU Connector Pinout

PIN	RS-485 (TB-4)
1	Not Connected
2	A -
3	Common
4	B +
5	Not Connected

Ethernet (RJ45) Connector

The Ethernet Connector is located next to the Power LED on the back panel of the MXPB3. Connect an RJ45 cable into the jack (shown below) on the MXPB3 communications module.



There are two LEDs associated with the Ethernet connection; Speed (on the right) and Link (on the left). The Speed LED indicates the current communication speed. If the Speed LED is off, the connection speed is 10 MB. If the Speed LED is illuminated, the connection speed is 100 MB. The Link LED indicates that a valid link is established and there is activity on the connection.

NOTE: For the MXPB3 to function, the module must be powered by 7 to 24 VDC using one of the supplied connectors

Power Connector

The dual Power jack is located next to the Power LED (only one power connection can be made, either the barrel or cage-clamp connector must be selected). Insert the power connection from the supplied 24VDC power supply into one of the jacks. The Power LED should be illuminated whenever power is applied.



MXPB3 Profibus Communications Module

Activity LEDs

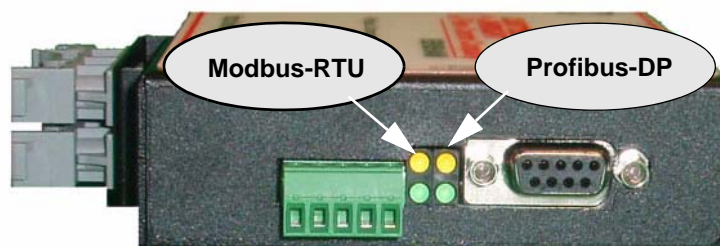
There are two communication activity LEDs on the MXPB3 communications module, located on the side opposite the DIN rail mounting hardware (pictured below). Both LEDs are two color, and indicate various states of Modbus RTU and Profibus communications. LED1 flashes red-off during Profibus parameterization, red-green during Profibus configuration, and steady green during Profibus data exchange. LED2 flashes red-off when Modbus-RTU is not communicating with the Soft Starter and steady green when Modbus-RTU is communicating with the Soft Starter.



There are two sets of Tx/Rx LEDs located on the front of the MXPB3 module, between the green Modbus-RTU plug-in connector and the 9 pin Profibus-DP connector. Facing the MXPB3 as seen in the image below; the left side Rx LED (yellow), Tx LED (green) represents Modbus-RTU, while the right side Rx LED (yellow), Tx LED (green) represents Profibus-DP.

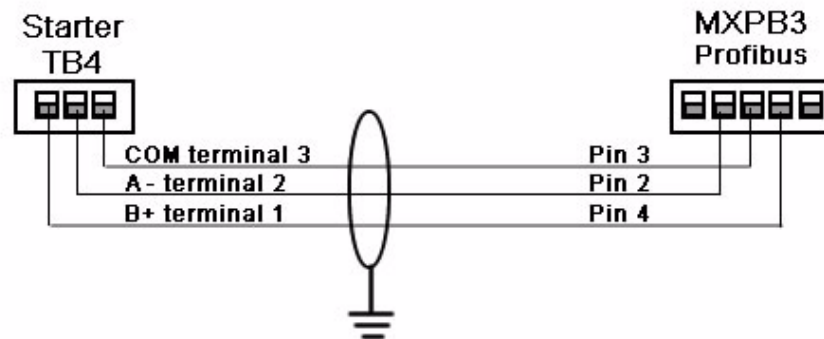
Modbus-RTU: Tx LED is illuminated when a message(s) is being transmitted to the Soft Starter. Rx LED is ON when response data is being received from the Soft Starter.

Profibus-DP: Tx LED is illuminated during Data Exchange, and blinks during parameterization. Rx LED flashes at 1 Hz when Modbus is communicating and Profibus is in Data Exchange mode.

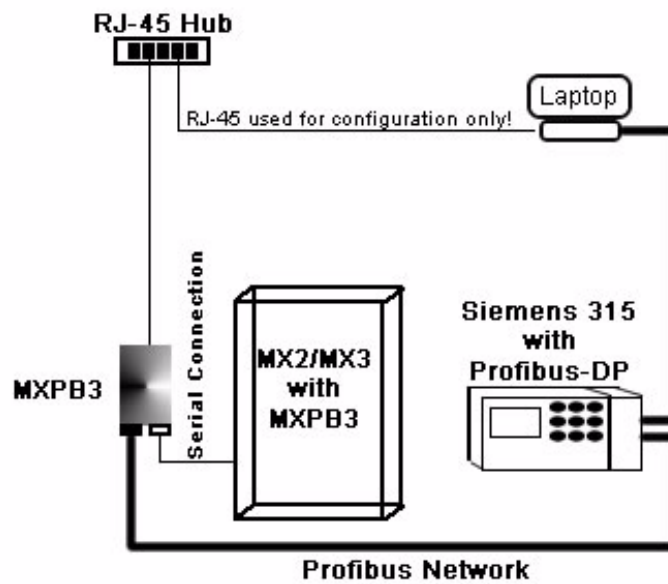


Wiring Examples

Serial



Profibus-DP



Quickstart - Web Page Based Setup

Web Page

The Web Page Based Setup tool is designed to make both monitoring and basic configuration intuitive and simple. Enter IP Address 192.168.0.100 (Default) into a connected web browser; the Benshaw Soft Starter Controller web-page shown below will be displayed.

NOTE: The MXPB3 must be connected to the starter, and a computer to the MXPB3 ethernet port before accessing the web based configuration tool.

**CURTISS
WRIGHT
Flow Control Company**
BENSHAW

Benshaw Soft Starter Controller

Description
MX3 Soft Starter

Profibus Parameters
Slave ID: 7

Modbus RTU Parameters
Baud Rate: 19200
Stop Bits: 1
Parity: Even

Watchdog Timer
Watchdog: 0 milliseconds

[Configure Profibus](#)

Network Settings
IP address: 10.92.4.110
Subnet mask: 255.255.240.0
Default gateway: 10.92.0.1

[Edit](#)

MAC address: 00-03-F4-03-A9-C8
Revision: 2.11

[Diagnostics](#)

The Web Page Based Setup tool is divided into 4 sections: Profibus Configuration, Network Configuration, Device Info, and Diagnostics.

Profibus Configuration

Selecting the Configure Profibus button on the Home Page will enable the Profibus Configuration web-page below.

Benshaw Soft Starter Controller

Configuration

Description:

Enter up to 80 characters.

Profibus Communication
Slave Address =
Enter a value between 1 and 126

Watchdog Configuration, PCCC and Modbus TCP
Watchdog =
Enter a value between 0 and 30000 milliseconds.

The Profibus Configuration screen enables access to a Controller Description, Profibus Communication slave address, and Watchdog Configuration Timer.

To enter a description, click within the Description field and enter the new description. Specifying a new slave address number (1-31 or 1-126 with a repeater) is accomplished in the same manner. To change the Watchdog timer click in the box, enter a number between 0 and 30000 milliseconds. Click Store Parameters to save the changes.

MXPB3 Profibus Communications Module

Ethernet Configuration

Click the Edit button within the Network Settings box on the home page to access the Network Setup web-page shown below.

Benshaw Soft Starter Controller

Network Setup

IP Address:
 . . .

Subnet Mask:
 . . .

Default Gateway:
 . . .

From the Network Setup screen the IP Address, Subnet Mask, and Default Gateway can be configured. Click within the first box of the parameter to be changed, erase the current value, then enter the required value. After the first three digits are entered, the next box will automatically highlight. Continue to enter new values to overwrite the current values, and each subsequent box will highlight when the current box is full. Conversely, double-clicking on any box enables overwriting of a current value. When changes are complete, click Store Parameters to save the changes and return to the Main screen.

Diagnostics

Clicking on the Diagnostics button at the bottom of the home page enables access to the Diagnostics web page below.

Benshaw Soft Starter Controller

Diagnostics

Description
Enter a description .

Modbus Timeout

Enable:
Enter a value, either 1 to enable or 0 to disable.

Timeout:
Enter a value between 1 and 120 seconds

Counters

Read Success: 124	Read Timeouts: 0	Read Errors: 0
Write Success: 2	Write Timeouts: 0	Write Errors: 0

Bit Number	Starter Control Register Name	Starter Control Register Value	Starter Status Register Name	Starter Status Register Value
Bit 0:	Run/Stop	0	Ready	1
Bit 1:	Fault Reset	0	Running	0
Bit 2:	Emrg Overload Reset	0	UTS	0
Bit 3:	Local/Remote	0	Alarm	0
Bit 4:	Heat Disable	0	Fault	0
Bit 5:	Ramp Select	0	Lockout	0
Bit 6:	Reserved	0	Reserved	0
Bit 7:	Reserved	0	Reserved	0
Bit 8:	Reserved	0	Reserved	0
Bit 9:	Reserved	0	Reserved	0
Bit 10:	Relay 6	0	Reserved	0
Bit 11:	Relay 5	0	Reserved	0
Bit 12:	Relay 4	0	Reserved	0
Bit 13:	Relay 3	0	Reserved	0
Bit 14:	Relay 2	0	Reserved	0
Bit 15:	Relay 1	0	Reserved	0

Information on the Diagnostics page pertains only to the RS485 Modbus connection between the MXPB3 and the starter.

The MXPB3 must be connected to the starter. Use the web page shown above to ensure that Enable is set to 1 and Timeout is set to 2 in the Modbus Timeout box.

In the Counters box, the current number of read/write successes, read/write timeouts and read/write errors can be monitored. A communications timeout occurs if there is no response within the timeout limit after a read or write is requested. On-screen data is not automatically updated, and must be refreshed by pressing F5 on the PC keyboard. Clicking on the Clear Counters button at the bottom of this screen will reset all counters to zero.

The current state of the Starter Control and Status Registers can be viewed in the Register Status box. The Starter Control Register provides the current states of various digital inputs and relay outputs. The Starter Status Register provides the current state of the starter. On-screen data is not automatically updated, and must be refreshed by pressing F5 on the PC keyboard.

Clicking on the Return to Main Page button will return the display to the Main page.



3 - Profibus Object Model

Table 4: Device ID

	Name	Data Type	Data Value	Access Rule
	Manufacturer ID	UINT	(From Benshaw)	Get
	Order ID	SHORT STRING20	455PBS03	Get
	Serial Number	SHORT STRING16		Get
	Hardware Revision	UINT		Get
	Software Revision	USINT[4]		Get
	Revision Counter	UINT		Get
	Profile ID	UINT	(none applicable)	Get
	Profile Specific Type	UINT	(none applicable)	Get
	I&M Version	UINT		Get
	I&M Supported (bit array)	UINT		Get
	Tag Function	SHORT STRING32	0x20	
	Tag Location	SHORT STRING22	0x20	
	Installation Date	SHORT STRING16	0x20	
	Descriptor	SHORT STRING54	0x20	
	Signature	SHORT STRING54	0	

Table 5: PROFIBUS-DP V0 Input Data (126 Bytes)

Byte	Description	Range	Units
0,1	Starter Status	<i>Bit Description</i> 0 Ready 1 Running 2 UTS 3 Alarm 4 Fault 5 Lockout 6 Reserved 7 Reserved 8 Reserved 9 Reserved 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Reserved	
2,3	Input Status	<i>Bit Description</i> 0 Start 1 DI 1 2 DI 2 3 DI 3 4 DI 4 (MX3 only) 5 DI 5 (MX3 only) 6 DI 6 (MX3 only) 7 DI 7 (MX3 only) 8 DI 8 (MX3 only) 9 Reserved 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Reserved	
4,5	Alarm Status 1	<i>Bit Description</i> 0 "A OL" – Motor overload 1 "A 5" – Motor PTC (MX3 only) 2 "A 6" – Stator RTD (MX3 only) 3 "A 7" – Bearing RTD (MX3 only) 4 "A 8" – Other RTD (MX3 only) 5 "A 10" – Phase rotation not ABC 6 "A 11" – Phase rotation not CBA 7 "A 12" – Low Line Frequency 8 "A 13" – High Line Frequency 9 "A 14" – Phase rotation not 1PH 10 "A 15" – Phase rotation not 3PH 11 "A 21" – Low line L1-L2 12 "A 22" – Low line L2-L3 13 "A 23" – Low line L3-L1 14 "A 24" – High line L1-L2 15 "A 25" – High line L2-L3	

Table 5: PROFIBUS-DP V0 Input Data (126 Bytes) (Continued)

Byte	Description	Range	Units
6,7	Alarm Status 2	<i>Bit Description</i> 0 "A 26" – High line L3-L1 1 "A 27" – Phase loss 2 "noL" – No line 3 "A 29" – PORT Timeout (MX3 only) 4 "A 31" – Overcurrent 5 "A 34" – Undercurrent 6 "A 35" – PF Too Leading (MX3 only) 7 "A 36" – PF Too Lagging (MX3 only) 8 "A 37" – Current imbalance 9 "A 38" – Ground fault 10 "A 47" – Stack overtemperature 11 "A 53" – Tach Loss (MX3 only) 12 "A 60" – DI 1 13 "A 61" – DI 2 14 "A 62" – DI 3 15 "A 63" – DI 4 (MX3 only)	
8,9	Alarm Status 3	<i>Bit Description</i> 0 "A 64" – DI 5 (MX3 only) 1 "A 65" – DI 6 (MX3 only) 2 "A 66" – DI 7 (MX3 only) 3 "A 67" – DI 8 (MX3 only) 4 "A 71" – Analog Input Trip 5 Reserved 6 Reserved 7 Reserved 8 Reserved 9 Reserved 10 Reserved 11 Reserved 12 Reserved 13 Reserved 14 Reserved 15 Reserved	
10,11	Lockout Status	<i>Bit Description</i> 0 "L OL" – Motor overload 1 "LPtc" – Motor PTC (MX3 only) 2 "Lrtd" – RTD Stator (MX3 only) 3 "Lrtd" – RTD Bearing (MX3 only) 4 "Lrtd" – RTD Other (MX3 only) 5 "L rl" – Run Interlock 6 "L dS" – Disconnect open 7 "L Ot" – Stack overtemperature 8 "L CP" – Control power 9 "Lrtd" – RTD Open/Short (MX3 only) 10 "LtbS" – Time between starts (MX3 only) 11 "L bS" – Backspin (MX3 only) 12 "LSph" – Starts per hour (MX3 only) 13 "Lrtd" – RTD Comm Loss (MX3 only) 14 Reserved 15 Reserved	
12,13	Present Fault Code		-
14,15	Average Current		Arms
16,17	L1 Current		Arms
18,19	L2 Current		Arms
20,21	L3 Current		Arms
22,23	Current Imbalance		0.1 %

Table 5: PROFIBUS-DP V0 Input Data (126 Bytes) (Continued)

Byte	Description	Range	Units
24,25	Residual Ground Fault Current		% FLA
26,27	Zero Sequence Ground Fault Current (MX3 only)		0.001 Arms
28,29	Average Voltage		Vrms
30,31	L1-L2 Voltage		Vrms
32,33	L2-L3 Voltage		Vrms
34,35	L3-L1 Voltage		Vrms
36,37	Motor Overload		%
38,39	Power Factor	-99 - +100 (in 16-bit two's compliment signed format)	0.01
40,41,42,43	Watts	(in 32-bit unsigned integer format)	W
44,45,46,47	VA	(in 32-bit unsigned integer format)	VA
48,49,50,51	vars	(in 32-bit two's compliment signed integer format)	var
52,53	kW hours	(in 32-bit unsigned integer format)	kWh
56,57	Phase Order	0: no line 1: ABC 2: CBA 3: SPH	
58,59	Line Frequency	230 - 720, or 0 if no line	0.1 Hz
60,61	Analog Input	-1000 - +1000 (in 16-bit two's compliment signed format)	0.1 %
62,63	Analog Output	-1000 - +1000 (in 16-bit two's compliment signed format)	0.1 %
64,65	Running Time	0 - 65535	hours
66,67	Running Time	0 - 59	minutes
68,69	Starts		-
70,71	TruTorque		%
72,73	Power		%
74,75	Peak Starting Current		Arms
76,77	Last Starting Duration		0.1 Sec
78,79 (MX3 only)	Hottest Stator RTD Temperature	0 -200	°C
80,81 (MX3 only)	Hottest Bearing RTD Temperature	0 - 200	°C
82,83 (MX3 only)	Hottest Other RTD Temperature	0 - 200	°C
84,85 (MX3 only)	RTD 1 Temperature	0 - 200	°C
86,87 (MX3 only)	RTD 2 Temperature	0 - 200	°C

Table 5: PROFIBUS-DP V0 Input Data (126 Bytes) (Continued)

Byte	Description	Range	Units
88,89 (MX3 only)	RTD 3 Temperature	0 - 200	°C
90,91 (MX3 only)	RTD 4 Temperature	0 - 200	°C
92,93 (MX3 only)	RTD 5 Temperature	0 - 200	°C
94,95 (MX3 only)	RTD 6 Temperature	0 - 200	°C
96,97 (MX3 only)	RTD 7 Temperature	0 - 200	°C
98,99 (MX3 only)	RTD 8 Temperature	0 - 200	°C
100,101 (MX3 only)	RTD 9 Temperature	0 - 200	°C
102,103 (MX3 only)	RTD 10 Temperature	0 - 200	°C
104,105 (MX3 only)	RTD 11 Temperature	0 - 200	°C
106,107 (MX3 only)	RTD 12 Temperature	0 - 200	°C
108,109 (MX3 only)	RTD 13 Temperature	0 - 200	°C
110,111 (MX3 only)	RTD 14 Temperature	0 - 200	°C
112,113 (MX3 only)	RTD 15 Temperature	0 - 200	°C
114,115 (MX3 only)	RTD 16 Temperature	0 - 200	°C
116,117 (MX3 only)	RTDs with Open Leads	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD has an open lead.	
118,119 (MX3 only)	RTDs with Shorted Leads	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD has shorted lead.	
120,121 (MX3 only)	Remaining Lockout Time		Sec
122,123, 124,125 (MX3 only)	Date/Time (lower 16 bits)	(in 32-bit unsigned integer format)	Sec

Table 6: PROFIBUS-DP V0 Output Data (2 Bytes)

Byte	Modbus Register	Description	Range	Units
0,1	30020/40020	Starter Control	<i>Bit Description</i> 0 Run/Stop 1 Fault Reset 2 Emergency Overload Reset 3 Local/Remote 4 Heat Disable 5 Ramp Select 6 Reserved 7 Reserved 8 Reserved 9 Reserved 10 Relay 6 (MX3 only) 11 Relay 5 (MX3 only) 12 Relay 4 (MX3 only) 13 Relay 3 14 Relay 2 15 Relay 1	

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³

Slot Num	Index	Modbus Register	Description	Range	Units
01	01	30101/40101	Motor FLA	1 - 6400	A rms
01	02	30102/40102	Motor Service Factor	100 - 199	0.01
01	03	30103/40103	Independent Start/ Run Motor Overloads	0 Disabled 1 Enabled	
01	04	30104/40104	Motor Overload Running Enable	0 Disabled 1 Enabled	
01	05	30105/40105	Motor Overload Running Class	1 - 40	
01	06	30106/40106	Motor Overload Starting Enable	0 Disabled 1 Enabled	
01	07	30107/40107	Motor Overload Starting Class	1 - 40	
01	08	30108/40108	Motor Overload Hot/Cold Ratio	0 - 99	%
01	09	30109/40109	Motor Overload Cooling Time	10 - 9999	0.1 Min
01	10	30110/40110	Local Source	0 Keypad 1 Terminal 2 Serial	
01	11	30111/40111	Remote Source	0 Keypad 1 Terminal 2 Serial	
01	12	30112/40112	Start Mode	0 Open Loop Voltage Ramp 1 Closed Loop Current Ramp 2 TruTorque Ramp 3 Power Ramp 4 Tach Ramp (MX3 only)	
01	13	30113/40113	Initial Motor Current 1	50 - 600	% FLA
01	14	30114/40114	Maximum Motor Current 1	100 - 800	% FLA
01	15	30115/40115	Ramp Time 1	0 - 300	Sec
01	16	30116/40116	Initial Motor Current 2	50 - 600	% FLA
01	17	30117/40117	Maximum Motor Current 2	100 - 800	% FLA
01	18	30118/40118	Ramp Time 2	0 - 300	Sec
01	19	30119/40119	UTS Time	1 - 900	Sec
01	20	30120/40120	Initial V/T/P	1 - 100	%
01	21	30121/40121	Max T/P	10 - 325	%
01	22	30122/40122	Stop Mode	0 Coast 1 Voltage Decel 2 TruTorque Decel 3 DC Brake	
01	23	30123/40123	Decel Begin Level	100 - 1	%
01	24	30124/40124	Decel End Level	99 - 1	%
01	25	30125/40125	Decel Time	1 - 180	Sec

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	26	30126/40126	DC Brake Level	10 - 100	%
01	27	30127/40127	DC Brake Time	1 - 180	Sec
01	28	30128/40128	DC Brake Delay	1 - 30	100 mSec
01	29	30129/40129	Kick Enable 1	0 Disabled 1 Enabled	
01	30	30130/40130	Kick Current Level 1	100 - 800	% FLA
01	31	30131/40131	Kick Time 1	1 - 100	100 mSec
01	32	30132/40132	Kick Enable 2	0 Disabled 1 Enabled	
01	33	30133/40133	Kick Current Level	100 - 800	% FLA
01	34	30134/40134	Kick Time 2	1 - 100	100 mSec
01	35	30135/40135	Slow Speed Enable 1	0 Disabled 1 Enabled	
01	36	30136/40136	Slow Speed 1		%
01	37	30137/40137	Slow Speed Current Level 1	10 - 100	% FLA
01	38	30138/40138	Slow Speed Time Limit Enable	0 Disabled 1 Enabled	
01	39	30139/40139	Slow Speed Time Limit	1 - 900	Sec
01	40	30140/40140	Slow Speed Kick Enable	0 Disabled 1 Enabled	
01	41	30141/40141	Slow Speed Kick Level	100 - 800	% FLA
01	42	30142/40142	Slow Speed Kick Time	1 - 100	100 mSec
01	43	30143/40143	Rated RMS Voltage		V rms
01	44	30144/40144	Input Phase Sensitivity	0 Ins 1 ABC 2 CBA 3 SPH	
01	45	30145/40145	Motor Rated Power Factor	1 - 100	
01	46	30146/40146	Overcurrent Enable	0 Disabled 1 Enabled	
01	47	30147/40147	Overcurrent Level	50 - 800	% FLA
01	48	30148/40148	Overcurrent Delay Time Enable	0 Disabled 1 Enabled	
01	49	30149/40149	Overcurrent Delay Time	1 - 900	100 mSec
01	50	30150/40150	Undercurrent Trip Enable	0 Disabled 1 Enabled	
01	51	30151/40151	Undercurrent Trip Level	5 - 100	% FLA
01	52	30152/40152	Undercurrent Trip Delay Time Enable	0 Disabled 1 Enabled	

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	53	30153/40153	Undercurrent Trip Delay Time	1 - 900	100 mSec
01	54	30154/40154	Current Imbalance Trip Enable	0 Disabled 1 Enabled	
01	55	30155/40155	Current Imbalance Trip Level	5 - 40	%
01	56	30156/40156	Residual Ground Fault Trip Enable	0 Disabled 1 Enabled	
01	57	30157/40157	Residual Ground Fault Trip Level	5 - 100	% FLA
01	58	30158/40158	Over Voltage Trip Enable	0 Disabled 1 Enabled	
01	59	30159/40159	Over Voltage Trip Level	1 - 40	%
01	60	30160/40160	Under Voltage Trip Enable	0 Disabled 1 Enabled	
01	61	30161/40161	Under Voltage Trip Level	1 - 40	%
01	62	30162/40162	Over/Under Voltage Delay Time	1 - 900	100 mSec
01	63	30163/40163	Digital Input Trip Delay Time	1 - 900	100 mSec
01	64	30164/40164	Auto Fault Reset Enable	0 Disabled 1 Enabled	
01	65	30165/40165	Auto Fault Reset Delay Time	1 - 900	Sec
01	66	30166/40166	Auto Fault Reset Count Enable	0 Disabled 1 Enabled	
01	67	30167/40167	Auto Fault Reset Count	1 - 10	
01	68	30168/40168	Controlled Fault Stop	0 Disabled 1 Enabled	

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	69	30169/40169	DI 1 Configuration	<i>Value / Description</i> 0 Off	
01	70	30170/40170	DI 2 Configuration	1 Stop 2 Fault High 3 Fault Low 4 Fault Reset 5 Disconnect 6 Inline Feedback (F49) 7 Bypass / 2M Feedback (F48) 8 Emergency Motor OL Reset 9 Local / Remote Control Source	
01	71	30171/40171	DI 3 Configuration	10 Heat Disable 11 Heat Enable 12 Ramp Select 13 Slow Speed Forward 14 Slow Speed Reverse 15 DC Brake Disable 16 DC Brake Enable 17 Run Enable 18 Run Disable 19 Speed Switch Normally Open (MX3 only) 20 Speed Switch Normally Closed (MX3 only)	
01	72	30172/40172	R1 Configuration	<i>Value / Description</i> 0 Off	
01	73	30173/40173	R2 Configuration	1 Fault Fail Safe 2 Fault Non Fail Safe 3 Running 4 Up To Speed 5 Alarm 6 Ready 7 Locked Out 8 Over Current Alarm 9 Under Current Alarm 10 Overload Alarm 11 Shunt Trip Fail Safe 12 Shunt Trip Non Fail Safe 13 Faulted on Ground Fault 14 In Energy Saver Mode	
01	74	30174/40174	R3 Configuration	15 Heating 16 Slow Speed 17 Slow Speed Forward 18 Slow Speed Reverse 19 DC Braking 20 Cooling Fan 21 PORT (MX3 only) 22 Tach Loss (MX3 only) 23 RTD Alarm (MX3 only) 24 RTD Trip (MX3 only) 25 RTD Fail (MX3 only)	
01	75	30175/40175	Analog Input Trip Enable	0 Disabled 1 Enabled	
01	76	30176/40176	Analog Input Trip Type	0 Fault below preset level 1 Fault above preset level	
01	77	30177/40177	Analog Input Trip Level	0 - 100	%
01	78	30178/40178	Analog Input Trip Delay Time	1 - 900	100 mSec
01	79	30179/40179	Analog Input Span	1 - 100	%
01	80	30180/40180	Analog Input Offset	0 - 99	%

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	81	30181/40181	Analog Output Function	<i>Value / Description</i> 0 Off (no output) 1 0–100% Current 2 0–200% Current 3 0–800% Current 4 0–150% Voltage 5 0–150% Overload 6 0–10kW 7 0–100kW 8 0–1MW 9 0–10MW 10 1–100% Analog Input 11 0–100% Firing 12 Calibration (full output)	%
01	82	30182/40182	Analog Output Span	1 - 150	%
01	83	30183/40183	Analog Output Offset	0 - 99	
01	84	30184/40184	Inline Enable	0 Disabled 1 Enabled	
01	85	30185/40185	Inline Delay Time	10 - 100	100 mSec
01	86	30186/40186	Bypass Feedback Time	1 - 50	100 mSec
01	87	30187/40187	Keypad Stop	0 Disabled 1 Enabled	
01	88	30188/40188	Modbus Timeout Enable	0 Disabled 1 Enabled	
01	89	30189/40189	Modbus Timeout	1 - 120	Sec
01	90	30190/40190	CT Ratio	<i>Value / Description</i> 0 72:1 1 96:1 2 144:1 3 288:1 4 864:1 5 2640:1 6 3900:1 7 5760:1 8 8000:1 9 14400:1 10 28800:1 11 50:5 (MX3 only) 12 150:5 (MX3 only) 13 250:5 (MX3 only) 14 400:5 (MX3 only) 15 600:5 (MX3 only) 16 800:5 (MX3 only) 17 2000:5 (MX3 only) 18 5000:5 (MX3 only)	
01	91	30191/40191	Auto Start	<i>Value / Description</i> 0 Disabled 1 Start after power applied 2 Start after fault reset 3 Starter after power applied and after fault reset	
01	92	30192/40192	Energy Saver Enable	0 Disabled 1 Enabled	

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	93	30193/40193	Heater / Anti-Windmill Enable	0 Disabled 1 Enabled	
01	94	30194/40194	Heater / Anti-Windmill Level	1 - 40	% FLA
01	95	30195/40195	Starter Type	<i>Value / Description</i> 0 Normal (Outside Delta) 1 Inside Delta 2 Wye-Delta 3 Phase Controller 4 Current Follower 5 Across the Line (Full Voltage)	
01	96	30196/40196	LED Display Meter	<i>Value / Description</i> 0 Status 1 Avg. Current 2 L1 Current 3 L2 Current 4 L3 Current 5 Current Imbalance % 6 Residual Ground Current 7 Avg. Volts 8 L1-L2 Volts 9 L2-L3 Volts 10 L3-L1 Volts 11 Overload 12 Power Factor 13 Watts 14 VA 15 vars 16 kW hours 17 MW hours 18 Phase Order 19 Line Frequency 20 Analog Input 21 Analog Output 22 Running Days 23 Running Hours 24 Starts 25 TruTorque % 26 Power % 27 Peak Starting Current 28 Last Starting Duration 29 Zero Sequence Ground Current (MX3 only) 30 Hottest Stator RTD Temperature (MX3 only) 31 Hottest Bearing RTD Temperature (MX3 only) 32 Hottest Other RTD Temperature (MX3 only) 33 Hottest RTD Temperature (MX3 only)	

Table 7: PROFIBUS-DP V1, Parameters - MX² and MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
01	97	30197/40197	LCD Display Meter 1	<i>Value / Description</i>	
				1 Avg. Current 2 L1 Current 3 L2 Current 4 L3 Current 5 Current Imbalance % 6 Residual Ground Current 7 Avg. Volts 8 L1-L2 Volts 9 L2-L3 Volts 10 L3-L1 Volts 11 Overload 12 Power Factor 13 Watts 14 VA 15 vars 16 kW hours 17 MW hours	
01	98	30198/40198	LCD Display Meter 2	18 Phase Order 19 Line Frequency 20 Analog Input 21 Analog Output 22 Running Days 23 Running Hours 24 Starts 25 TruTorque % 26 Power % 27 Peak Starting Current 28 Last Starting Duration 29 Zero Sequence Ground Current (MX3 only) 30 Stator RTD Temperature (MX3 only) 31 Bearing RTD Temperature (MX3 only) 32 Other RTD Temperature (MX3 only) 33 Hottest RTD Temperature (MX3 only)	
01	99	30199/40199	Misc Commands	<i>Value / Description</i> 0 None 1 Standard BIST 2 Powered BIST 3 Reset Run Time 4 Reset kWh 5 Enter Reflash Mode 6 Store Parameters 7 Load Parameters 8 Factory Reset	
01	100	30200/40200	Bypass Feedback Enable	0 Disabled 1 Enabled	

Table 8: PROFIBUS-DP V1, Parameters - Unique to MX³

Slot Num	Index	Modbus Register	Description	Range	Units
02	01	30221/40221	Acceleration Profile	0 Linear 1 Squared 2 S-Curve	
02	02	30222/40222	Deceleration Profile		
02	03	30223/40223	PORT Bypass Enable	0 Disabled 1 Enabled	
02	04	30224/40224	PORT Bypass Delay Time	1 - 50	100 mSec
02	05	30225/40225	PORT Recovery Method		
02	06	30226/40226	Tachometer Full Speed Voltage	100 - 1000	10 mV
02	07	30227/40227	Tachometer Loss Delay Time	1 - 900	100 mSec
02	08	30228/40228	Tachometer Loss Action	<i>Value / Description</i> 0 Fault 1 Closed Loop Current Ramp 2 TruTorque Ramp 3 Power Ramp	
02	09	30229/40229	Time/Date Format	<i>Value / Description</i> 0 mm/dd/yy 1 mm/dd/yy 2 yy/mm/dd 3 yy/mm/dd 4 dd/mm/yy 5 dd/mm/yy	
02	10	30230/40230	Current Imbalance Delay Time	1 - 900	100 mSec
02	11	30231/40231	Zero Sequence Ground Fault Trip Enable	0 Disabled 1 Enabled	
02	12	30232/40232	Zero Sequence Ground Fault Trip Level	10 - 250	100 mA rms
02	13	30233/40233	Ground Fault Delay Time	1 - 900	100 mSec
02	14	30234/40234	Phase Loss Delay Time	1 - 50	100 mSec
02	15	30235/40235	Over Frequency Trip Level	24 - 72	Hz
02	16	30236/40236	Under Frequency Trip Level	23 - 71	Hz
02	17	30237/40237	Over/Under Frequency Delay Time	1 - 900	100 mSec
02	18	30238/40238	Power Factor Leading Trip Enable	0 Disabled 1 Enabled	
02	19	30239/40239	Power Factor Leading Trip Level	80 - 99 = -0.80 - -0.99 lag 100 - 199 = 1.00 - +0.01 lead	

Table 8: PROFIBUS-DP V1, Parameters - Unique to MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
02	20	30240/40240	Power Factor Lagging Trip Enable	0 Disabled 1 Enabled	
02	21	30241/40241	Power Factor Lagging Trip Level	1 - 99 = -0.01 - -0.99 lag 100 - 120 = 1.00 - +0.80 lead	
02	22	30242/40242	Power Factor Delay Time	1 - 900	100 mSec
02	23	30243/40243	Backspin Timer Enable	0 Disabled 1 Enabled	
02	24	30244/40244	Backspin Time	1 - 180	Min
02	25	30245/40245	Time Between Starts Enable	0 Disabled 1 Enabled	
02	26	30246/40246	Time Between Starts	1 - 180	Min
02	27	30247/40247	Starts per Hour Enable	0 Disabled 1 Enabled	
02	28	30248/40248	Starts per Hour	1 - 6	
02	29	30249/40249	Speed Switch Enable	0 Disabled 1 Enabled	
02	30	30250/40250	Speed Switch Delay Time	1 - 250	Sec
02	31	30251/40251	Motor PTC Enable	0 Disabled 1 Enabled	
02	32	30252/40252	Motor PTC Delay Time	1 - 5	Sec
02	33	30253/40253	PORT Trip Enable	0 Disabled 1 Enabled	
02	34	30254/40254	PORT Trip Delay Time	1 - 900	100 mSec
02	35	30255/40255	Motor Overload Alarm Level	1 - 100	%
02	36	30256/40256	Motor Overload Lockout Level	1 - 99	%
02	37	30257/40257	Motor Overload Auto Lockout Calculation	0 Disabled 1 Enabled	
02	38	30258/40258	Motor Overload RTD Biasing Enable	0 Disabled 1 Enabled	
02	39	30259/40259	Motor Overload RTD Biasing Minimum	1 - 198	°C
02	40	30260/40260	Motor Overload RTD Biasing Middle	1 - 199	°C
02	41	30261/40261	Motor Overload RTD Biasing Maximum	105 - 200	°C

Table 8: PROFIBUS-DP V1, Parameters - Unique to MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
02	42	30262/40262	DI 4 Configuration	Same as DI 1 through DI 3 configuration in the Parameters Common to the MX2 andMX3	
02	43	30263/40263	DI 5 Configuration		
02	44	30264/40264	DI 6 Configuration		
02	45	30265/40265	DI 7 Configuration		
02	46	30266/40266	DI 8 Configuration		
02	47	30267/40267	R4 Configuration	Same as R1 through R3 configuration in the Parameters Common to the MX2 andMX3	
02	48	30268/40268	R5 Configuration		
02	49	30269/40269	R6 Configuration		
02	50	30270/40270	RTD Module 1 Enable	0 Disabled 1 Enabled	
02	51	30271/40271	RTD Module 1 Address	16 - 23	
02	52	30272/40272	RTD Module 2 Enable	0 Disabled 1 Enabled	
02	53	30273/40273	RTD Module 2 Address	16 - 23	
02	54	30274/40274	RTD 1 Group	<i>Value / Description</i> 0 Off 1 Stator 2 Bearing 3 Other	
02	55	30275/40275	RTD 2 Group		
02	56	30276/40276	RTD 3 Group		
02	57	30277/40277	RTD 4 Group		
02	58	30278/40278	RTD 5 Group		
02	59	30279/40279	RTD 6 Group		
02	60	30280/40280	RTD 7 Group		
02	61	30281/40281	RTD 8 Group		
02	62	30282/40282	RTD 9 Group		
02	63	30283/40283	RTD 10 Group		
02	64	30284/40284	RTD 11 Group		
02	65	30285/40285	RTD 12 Group		
02	66	30286/40286	RTD 13 Group		
02	67	30287/40287	RTD 14 Group		
02	68	30288/40288	RTD 15 Group		
02	69	30289/40289	RTD 16 Group		
02	70	30290/40290	RTD Stator Alarm Level	1 - 200	°C
02	71	30291/40291	RTD Bearing Alarm Level		
02	72	30292/40292	RTD Other Alarm Level		
02	73	30293/40293	RTD Stator Trip Level		
02	74	30294/40294	RTD Bearing Trip Level		
02	75	30295/40295	RTD Other Trip Level		
02	76	30296/40296	RTD Voting Enable	0 Disabled 1 Enabled	

Table 8: PROFIBUS-DP V1, Parameters - Unique to MX³ (Continued)

Slot Num	Index	Modbus Register	Description	Range	Units
02	77	30297/40297	Slow Speed Enable 2	0 Disabled 1 Enabled	
02	78	30298/40298	Slow Speed 2	Same as Slow Speed 1 in the Parameters Common to the MX2 and MX3	%
02	79	30299/40299	Slow Speed Current Level 2	10 - 400	% FLA

Table 9: PROFIBUS-DP V1, Fault Log

Slot Num	Index	Modbus Register	Description	Range	Units
10	1-9	30601/40601	Fault Code	(see below)	
11	1-9	30611/40611	System State	Starter state when fault occurred: <i>State / Description</i> 0 Initializing 1 Locked Out 2 Faulted 3 Stopped 4 Heating 5 Kicking 6 Ramping 7 Slow Speed 8 Not UTS 9 UTS 10 Phase Control / Current Follower 11 Decelerating 12 Braking 13 Wye 14 PORT 15 BIST 16 Shorted SCR Test 17 Open SCR Test	
12	1-9	30621/40621	L1 Currents	The current that the load is drawing from Line 1 when a fault occurs	Amps
13	1-9	30631/40631	L2 Currents	The current that the load is drawing from Line 2 when a fault occurs	Amps
14	1-9	30641/40641	L3 Currents	The current that the load is drawing from Line 3 when a fault occurs	Amps
15	1-9	30651/40651	L1-L2 Voltages	The line voltage that is present between Lines 1 and 2 when a fault occurs	Volts
16	1-9	30661/40661	L2-L3 Voltages	The line voltage that is present between Lines 2 and 3 when a fault occurs	Volts
17	1-9	30671/40671	L3-L1 Voltages	The line voltage that is present between Lines 3 and 1 when a fault occurs	Volts
18	1-9	30681/40681	Kilowatts	The power that the load is drawing when a fault occurs	kW
19	1-9	30691/40691	Line Periods	The line period (1/frequency) that is present when a fault occurs	uS
20	1-9	30701/40701	Runtime Hours	The value of the running time meter when a fault occurs	Hr

Table 10: Fault Codes

Fault Code	Description
00	No fault
01	UTS Time Limit Expired
02	Motor Thermal Overload Trip
03	Slow Speed Time Limit Expired
04	Speed Switch
05	Motor PTC
06	Stator RTD
07	Bearing RTD
08	Other RTD
10	Phase Rotation Error, not ABC
11	Phase Rotation Error, not CBA
12	Low Line Frequency
13	High Line Frequency
14	Input power not single phase
15	Input power not three phase
21	Low Line L1-L2
22	Low Line L2-L3
23	Low Line L3-L1
24	High Line L1-L2
25	High Line L2-L3
26	High Line L3-L1
27	Phase Loss
28	No Line
29	PORT Time Limit Expired
30	I.O.C.
31	Overcurrent
34	Undercurrent
35	Power Factor Leading
36	Power Factor Lagging
37	Current Imbalance
38	Ground Fault
39	No Current at Run
40	Shorted / Open SCR
41	Current at Stop
46	Disconnect Open
47	Stack Protection Fault (stack thermal overload)
48	Bypass Contactor Fault

Table 10: Fault Codes (Continued)

Fault Code	Description
49	Inline Contactor Fault
50	Control Power Low
51	Current Sensor Offset Error
53	Tachometer Loss
54	BIST Fault
55	BIST CT Fault
56	Open or Shorted RTD
60	External Fault on DIN#1 Input
61	External Fault on DIN#2 Input
62	External Fault on DIN#3 Input
63	External Fault on DIN#4 Input
64	External Fault on DIN#5 Input
65	External Fault on DIN#6 Input
66	External Fault on DIN#7 Input
67	External Fault on DIN#8 Input
71	Analog Input Level Fault Trip
80	RTD Communication Fault
81	Keypad Communication Fault
82	Modbus Timeout Fault
84	Interboard Communication Fault
85	IO Card – SW Fault
86	IO Card – Current Sensor Offset Error
87	IO Card – Real Time Clock Error
88	IO Card – Illegal Instruction Trap
89	IO Card – SW Watchdog Fault
90	IO Card – Spurious Interrupt
91	IO Card – Program EPROM Checksum Fault
94	CPU Error – SW Fault
95	CPU Error – Parameter EEPROM Checksum Fault
96	CPU Error – Illegal Instruction Trap
97	CPU Error – SW Watchdog Fault
98	CPU Error – Spurious Interrupt
99	CPU Error – Program EPROM Checksum Fault

Table 11: PROFIBUS-DP V1, Event Log

Slot Num	Index	Modbus Register	Description	Range	Units
30	1-99	30801/40801	Event Code	(see below)	
31	1-99	30901/40901	System State	The state that the starter was in when an event occurs	
32	1-99	31001/41001	Time and Date Stamp	32-bit unsigned integer representing the number of seconds elapsed since 12:00 AM on January 1st, 1972.	

Table 12: Event Codes

Event Code	Description
101	Start Commanded
102	Slow Speed Commanded
103	Up to Speed
104	Energy Saver Entered
105	Energy Saver Exited
106	Stop Commanded
107	Stop Complete
110	Motor Overload Warning
111	Motor Overload Lockout Entered
112	Motor Overload Lockout Cleared
113	Stack Overload Warning
114	Stack Overload Lockout Entered
115	Stack Overload Lockout Cleared
116	Emergency Overload Reset
117	Stator RTD Warning
118	Bearing RTD Warning
119	Other RTD Warning
140	Disconnect Opened
141	Disconnect Closed
170	PORT Entered due to Low Voltage
171	PORT Entered due to Low Current
172	PORT Bypass Contactor Opened
173	PORT Power Returned
174	PORT Recovery Completed
180	Parameters Reset to Defaults
181	Time/Date Changed
182	Passcode Enabled
183	Passcode Cleared

Table 12: Event Codes (Continued)

Event Code	Description
184	Factory Passcode Entered
185	Event Log Cleared
186	Run Time Reset
187	kWh Reset
188	Reflash Mode Entered
190	System Powered Up
191	System Powered Down
192	Low Control Power Detected
193	Standard BIST Entered
194	Powered BIST Entered
195	BIST Passed

Table 13: PROFIBUS-DP V1, Comm Settings

Slot Num	Index	Description	Range	Units
37	1	Modbus Slave ID	1-247	
37	2	<i>Baud Rate</i> 0 4800 1 9600 2 19200	0-2	Bits per second
37	3	<i>Parity</i> 0 8N 1 8E 2 8O	0-2	
37	4	<i>Stop Bits</i> 0 1 Stop Bit 1 2 Stop Bits	0-1	
37	5	Communication Timeout	10-1000	mS

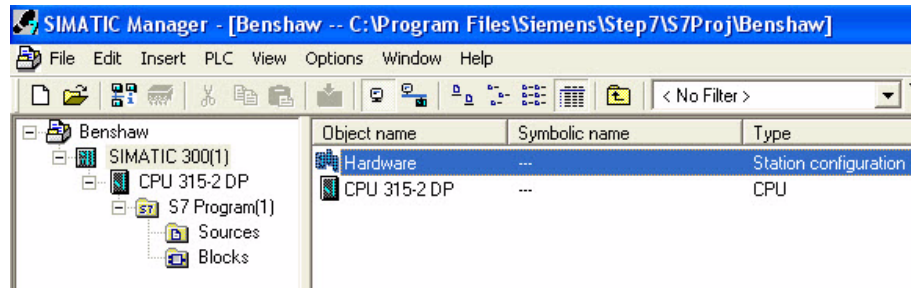


4 - Installing the Benshaw GSD File

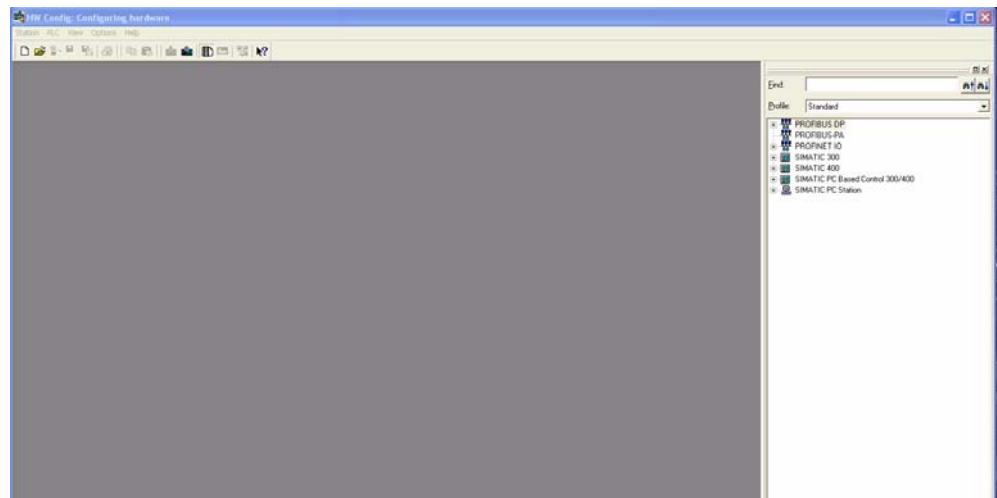
Example

The Benshaw GSD file named “BENS0CFB.gsd” (the name cannot be changed) must be installed into the Siemens STEP 7 SIMATIC Manager application; the version of SIMATIC Manager used for this example is V5.4 + SP5 + HF1.

Open the SIMATIC Manager, then double-click the “Hardware” object as shown below.

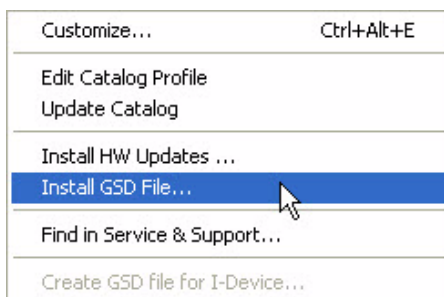


Once the HW-Config screen has opened, verify that there are NO active configurations open by selecting the “Station” drop down menu, then selecting “Close”. The HW-Config will then appear as shown below without an active hardware configuration displayed in the grey area.

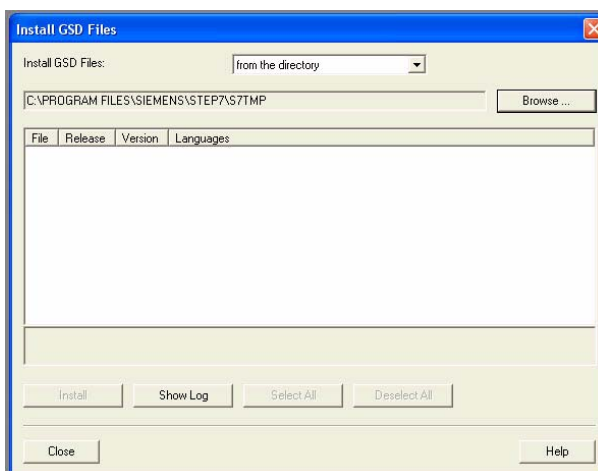


MXPB3 Profibus Communications Module

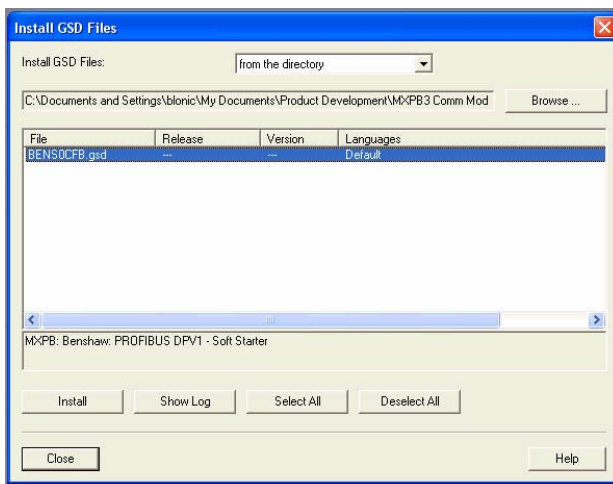
From the HW-Config screen, select “Install GSD File” from the “Options” drop down menu.



The “Install GSD File” option box will appear. Click on the “Browse” button then navigate to the folder where the “BENS0CFB.gsd” file is located on your computer.

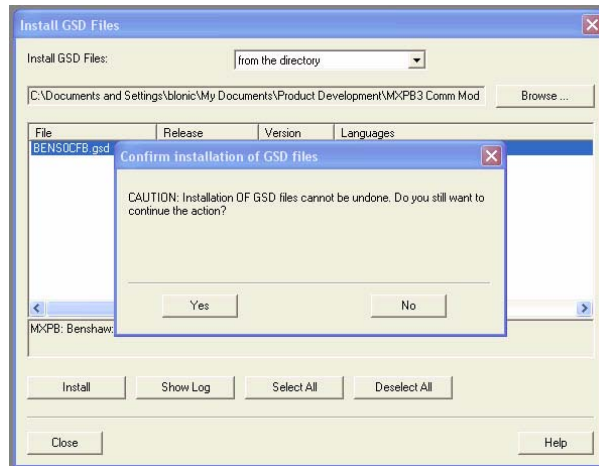


After selecting the directory where “BENS0CFB.gsd” is located, the file appears in the “Install GSD Files” dialog box as shown below. Click on the file, then click “Install”.

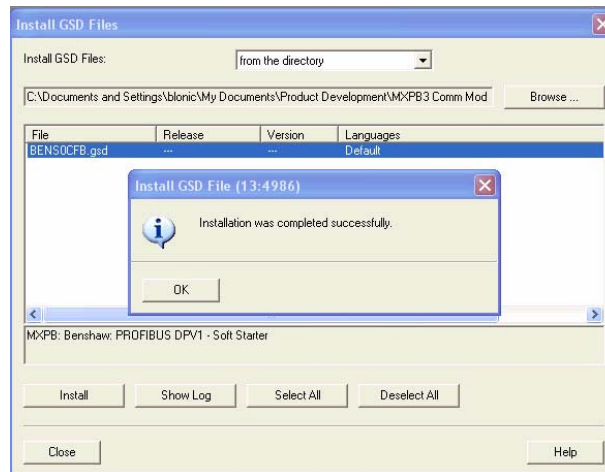


4 - Installing the Benshaw GSD File

After clicking the “Install” button, the “Confirm Installation of GSD Files” dialog box will be displayed. Click “Yes”.

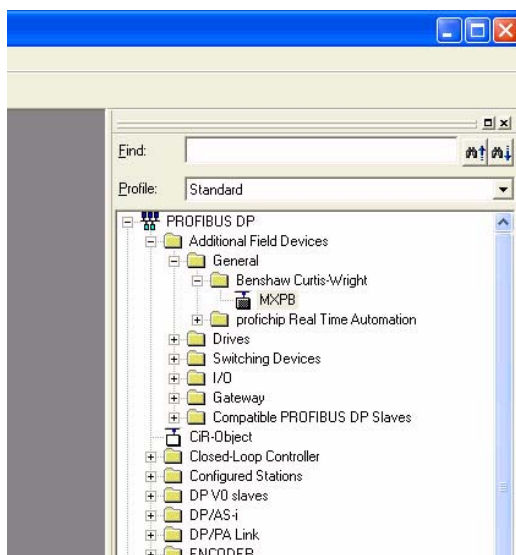


If the GSD file has previously been installed, or is being updated, it will be necessary to acknowledge overriding the existing file before the “Installation was completed successfully” dialog box will be displayed. Click “OK”.



MXPB3 Profibus Communications Module

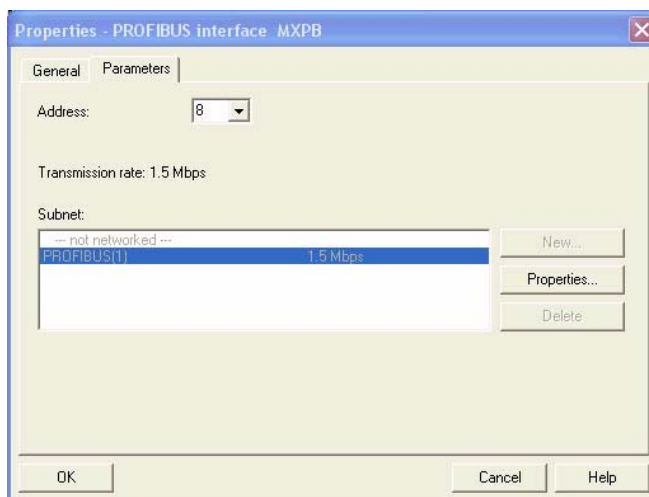
Close the HW-Config application and return to the SIMATIC Manager, then double-click the Hardware object. Inside the HW-Config application, access the catalog of PROFIBUS-DP devices. Locate the “MXPB” device under PROFIBUS-DP -- Additional Field Devices -- General -- Benshaw Curtiss-Wright.



Drag this device to the PROFIBUS-DP master network line; the following “Properties” dialog box will be displayed. Use the “Properties” dialog box to set the parameters for this instance of the MXPB:

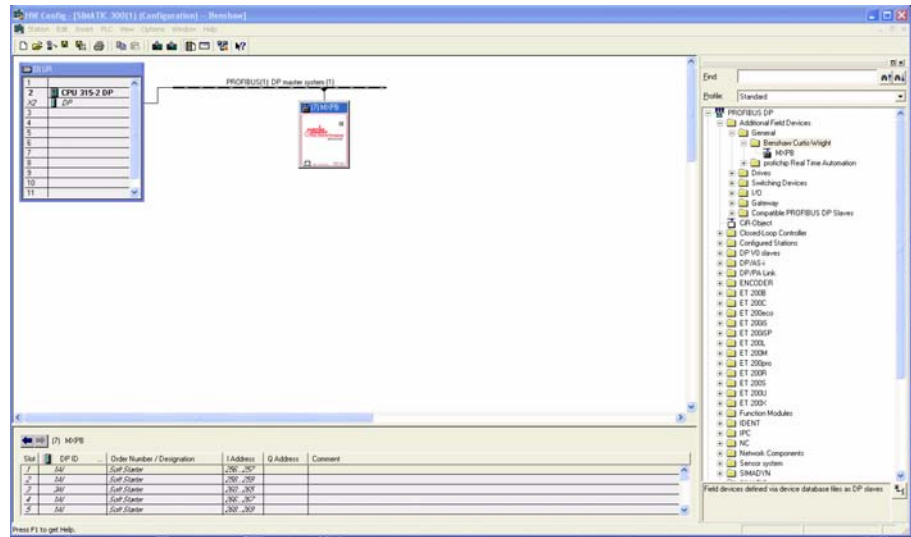
- Address (7 was used for this example)
- Transmission Rate

Once the parameters have been entered click “OK”.



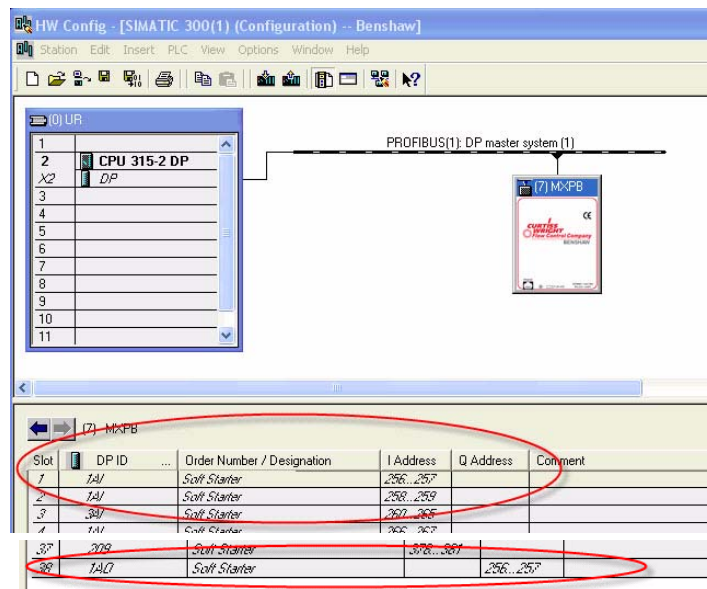
4 - Installing the Benshaw GSD File

After setting the MXPB parameters and clicking “OK”, the “HW-Config” shown below will be displayed. The instance (Address) of the MXPB has been added to the “HW-Config” and is ready for use. Click on the MXPB (7) to display the memory locations assigned in the CPU.



Example: DP-V0

The MXPB3 contains 126 bytes of cyclic data. Once the MXPB has been added to the HW-Config network dialog box, the “I Address” and “Q Address” memory locations can be found and the bottom portion of the screen.



MXPB3 Profibus Communications Module

The DP-V0 example moves the cyclic data to DB2. The following VAT_1 example displays the results of some of the cyclic data being read during every bus scan. The first line of VAT_1 displays a “READY” status of the soft starter in real time.

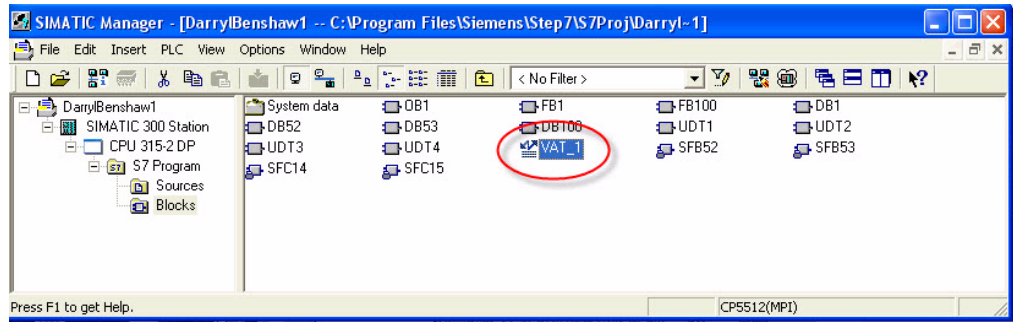
Address	Symbol	Display format	Status value	Modify value
1	DB2.DBX 5.0	"SS_NO_1" STARTER_STATUS_READY	BOOL true	
2	DB2.DBX 5.1	"SS_NO_1" STARTER_STATUS_RUNNING	BOOL false	
3	DB2.DBX 5.2	"SS_NO_1" STARTER_STATUS_UTS	BOOL false	
4	DB2.DBX 5.3	"SS_NO_1" STARTER_STATUS_ALARM	BOOL false	
5	DB2.DBX 5.4	"SS_NO_1" STARTER_STATUS_FAULT	BOOL false	
6	DB2.DBX 5.5	"SS_NO_1" STARTER_STATUS_LOCKOUT	BOOL false	
7	DB2.DBX 5.6	"SS_NO_1" STARTER_STATUS_RES_BIT06	BOOL false	
8	DB2.DBX 5.7	"SS_NO_1" STARTER_STATUS_RES_BIT07	BOOL false	
9	DB2.DBX 6.0	"SS_NO_1" STARTER_STATUS_RES_BIT08	BOOL false	
10	DB2.DBX 6.1	"SS_NO_1" STARTER_STATUS_RES_BIT09	BOOL false	
11	DB2.DBX 6.2	"SS_NO_1" STARTER_STATUS_RES_BIT10	BOOL false	
12	DB2.DBX 6.3	"SS_NO_1" STARTER_STATUS_RES_BIT11	BOOL false	
13	DB2.DBX 6.4	"SS_NO_1" STARTER_STATUS_RES_BIT12	BOOL false	
14	DB2.DBX 6.5	"SS_NO_1" STARTER_STATUS_RES_BIT13	BOOL false	
15	DB2.DBX 6.6	"SS_NO_1" STARTER_STATUS_RES_BIT14	BOOL false	
16	DB2.DBX 6.7	"SS_NO_1" STARTER_STATUS_RES_BIT15	BOOL false	
17	DB2.DBX 130.0	"SS_NO_1" RES_CTRL_BIT_0	BOOL false	
18	DB2.DBX 130.1	"SS_NO_1" RES_CTRL_BIT_1	BOOL false	
19	DB2.DBX 130.2	"SS_NO_1" CTRL_RELAY_6	BOOL false	
20	DB2.DBX 130.3	"SS_NO_1" CTRL_RELAY_5	BOOL false	
21	DB2.DBX 130.4	"SS_NO_1" CTRL_RELAY_4	BOOL false	
22	DB2.DBX 130.5	"SS_NO_1" CTRL_RELAY_3	BOOL false	
23	DB2.DBX 130.6	"SS_NO_1" CTRL_RELAY_2	BOOL false	
24	DB2.DBX 130.7	"SS_NO_1" CTRL_RELAY_1	BOOL false	
25	DB2.DBX 131.0	"SS_NO_1" CTRL_RUN_STOP	BOOL false	false
26	DB2.DBX 131.1	"SS_NO_1" CTRL_FAULT_RESET	BOOL false	
27	DB2.DBX 131.2	"SS_NO_1" CTRL_EMER_OL_RESET	BOOL false	
28	DB2.DBX 131.3	"SS_NO_1" CTRL_LOC_REM	BOOL false	
29	DB2.DBX 131.4	"SS_NO_1" CTRL_HEAT_DISABLE	BOOL false	
30	DB2.DBX 131.5	"SS_NO_1" CTRL_RAMP_SEL	BOOL false	
31	DB2.DBX 131.6	"SS_NO_1" RES_CTRL_BIT_2	BOOL false	
32	DB2.DBX 131.7	"SS_NO_1" RES_CTRL_BIT_3	BOOL false	
33	DB2.DBW 80	"SS_NO_1" PARAM_STATUS_ARRAY_2[10]	HEX	
34				

Line 25 of the example below is used to “Start” the soft starter, the status of the start command is displayed in lines 1-3 (“READY”, “RUNNING”, and “UTS”).

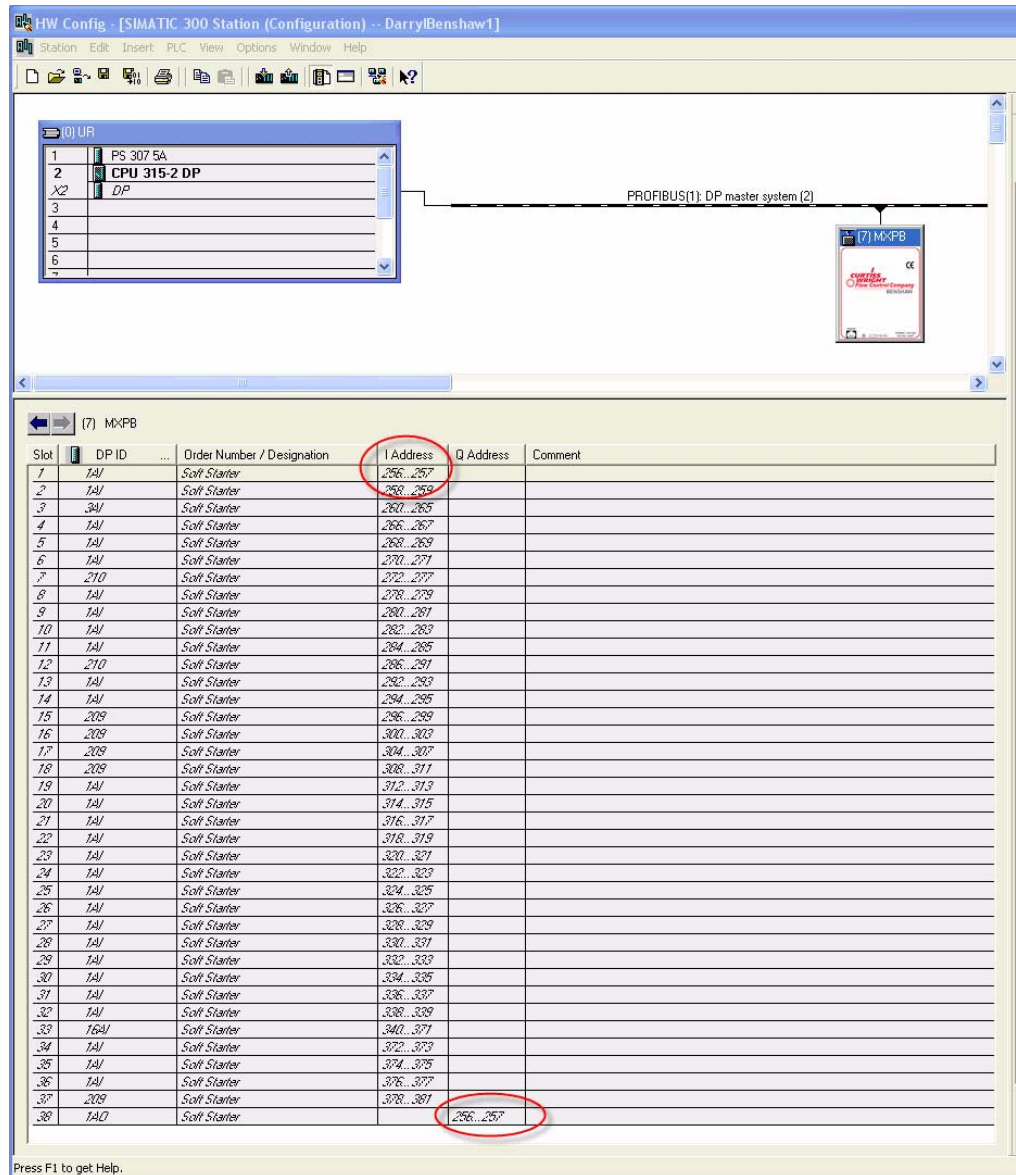
Address	Symbol	Display format	Status value	Modify value
1	DB2.DBX 5.0	"SS_NO_1" STARTER_STATUS_READY	BOOL true	
2	DB2.DBX 5.1	"SS_NO_1" STARTER_STATUS_RUNNING	BOOL true	
3	DB2.DBX 5.2	"SS_NO_1" STARTER_STATUS_UTS	BOOL true	
4	DB2.DBX 5.3	"SS_NO_1" STARTER_STATUS_ALARM	BOOL false	
5	DB2.DBX 5.4	"SS_NO_1" STARTER_STATUS_FAULT	BOOL false	
6	DB2.DBX 5.5	"SS_NO_1" STARTER_STATUS_LOCKOUT	BOOL false	
7	DB2.DBX 5.6	"SS_NO_1" STARTER_STATUS_RES_BIT06	BOOL false	
8	DB2.DBX 5.7	"SS_NO_1" STARTER_STATUS_RES_BIT07	BOOL false	
9	DB2.DBX 6.0	"SS_NO_1" STARTER_STATUS_RES_BIT08	BOOL false	
10	DB2.DBX 6.1	"SS_NO_1" STARTER_STATUS_RES_BIT09	BOOL false	
11	DB2.DBX 6.2	"SS_NO_1" STARTER_STATUS_RES_BIT10	BOOL false	
12	DB2.DBX 6.3	"SS_NO_1" STARTER_STATUS_RES_BIT11	BOOL false	
13	DB2.DBX 6.4	"SS_NO_1" STARTER_STATUS_RES_BIT12	BOOL false	
14	DB2.DBX 6.5	"SS_NO_1" STARTER_STATUS_RES_BIT13	BOOL false	
15	DB2.DBX 6.6	"SS_NO_1" STARTER_STATUS_RES_BIT14	BOOL false	
16	DB2.DBX 6.7	"SS_NO_1" STARTER_STATUS_RES_BIT15	BOOL false	
17	DB2.DBX 130.0	"SS_NO_1" RES_CTRL_BIT_0	BOOL false	
18	DB2.DBX 130.1	"SS_NO_1" RES_CTRL_BIT_1	BOOL false	
19	DB2.DBX 130.2	"SS_NO_1" CTRL_RELAY_6	BOOL false	
20	DB2.DBX 130.3	"SS_NO_1" CTRL_RELAY_5	BOOL false	
21	DB2.DBX 130.4	"SS_NO_1" CTRL_RELAY_4	BOOL false	
22	DB2.DBX 130.5	"SS_NO_1" CTRL_RELAY_3	BOOL false	
23	DB2.DBX 130.6	"SS_NO_1" CTRL_RELAY_2	BOOL false	
24	DB2.DBX 130.7	"SS_NO_1" CTRL_RELAY_1	BOOL false	
25	DB2.DBX 131.0	"SS_NO_1" CTRL_RUN_STOP	BOOL true	true
26	DB2.DBX 131.1	"SS_NO_1" CTRL_FAULT_RESET	BOOL false	
27	DB2.DBX 131.2	"SS_NO_1" CTRL_EMER_OL_RESET	BOOL false	
28	DB2.DBX 131.3	"SS_NO_1" CTRL_LOC_REM	BOOL false	
29	DB2.DBX 131.4	"SS_NO_1" CTRL_HEAT_DISABLE	BOOL false	
30	DB2.DBX 131.5	"SS_NO_1" CTRL_RAMP_SEL	BOOL false	
31	DB2.DBX 131.6	"SS_NO_1" RES_CTRL_BIT_2	BOOL false	
32	DB2.DBX 131.7	"SS_NO_1" RES_CTRL_BIT_3	BOOL false	
33	DB2.DBW 80	"SS_NO_1" PARAM_STATUS_ARRAY_2[10]	HEX	
34				

Example: DP-V1

From the SIMATIC Manager, select the variable VAT_1.



Select the slot number by referencing the addresses listed in the HW Config for each slot.



MXPB3 Profibus Communications Module

Note that this example references slot 1 (address 0x100=256 decimal). Index 7 is the Motor Overload Starting Class. Modify Slot, Index, and Length and set Request to FALSE, then press F9. Your selected values should be copied to the "Status Value" column and "Error" should remain FALSE.

The screenshot shows a SIMATIC Manager window titled "Var - [VAT_1 -- DarrylBenshaw1\SIMATIC 300 Station\CPU 315-2 DP\57 Program]". The main area displays a table with the following data:

Address	Symbol	Displa	Status value	Modify value
1	/READ			
2	MW 100	DEC	0	0
3	M 0.0 "Request"	BOOL	false	false
4	M 20.0 "Valid"	BOOL		
5	M 20.1 "Busy"	BOOL		
6	M 20.2 "Error"	BOOL		
7	MD 22 "Status"	HEX		
8	MW 26 "Length"	DEC		
9	MW 10 "Index"	HEX		VW#16#0001
10	MW 12 "MLength"	HEX		VW#16#0002
11	MD 40 "Slot"	HEX		DW#16#00000100
12				
13	//WRITE			
14	MW 32	DEC	6060	6060
15	M 1.0 "Write"	BOOL	false	false
16	M 20.3 "Write_Done"	BOOL		
17	M 20.4 "Write_Busy"	BOOL		
18	M 20.5 "Write_Error"	BOOL		
19	MD 36 "Write_Stats"	HEX		
20	MW 14 "Write_Index"	HEX		VW#16#0001
21	MW 16 "Write_Length"	HEX		VW#16#0002
22	MD 44 "Write Slot"	HEX		DW#16#00000100
23				

At the bottom of the window, it says "Press F1 for help." and "Offline Abs < 5.2".

Now change the Read request to TRUE, then press ENTER, then F9 to activate. The read-data result should be displayed on Line 2.

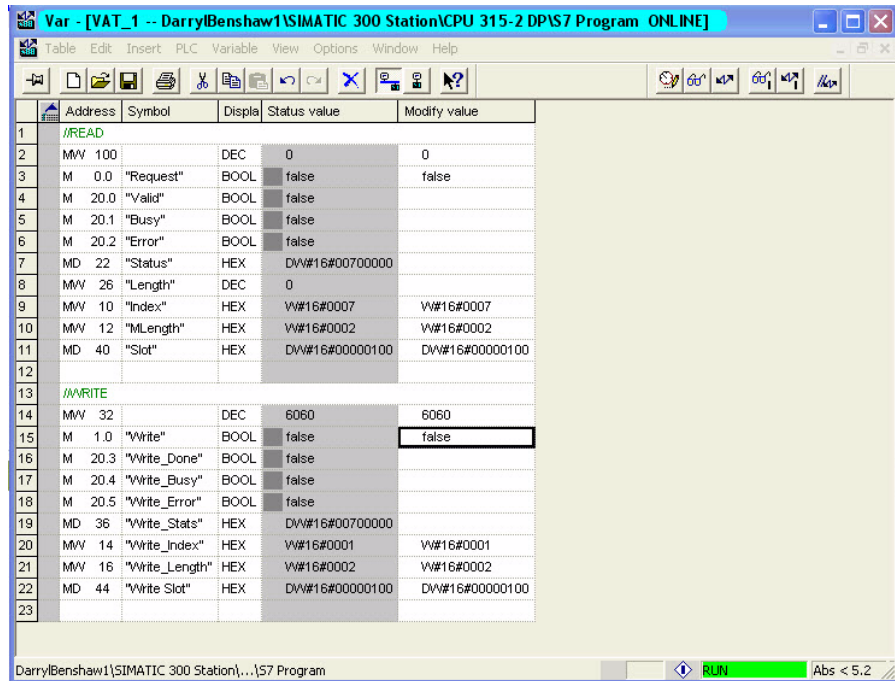
The screenshot shows the same SIMATIC Manager window, but now titled "Var - [VAT_1 -- @DarrylBenshaw1\SIMATIC 300 Station\CPU 315-2 DP\57 Program ONLINE]". The table data is updated as follows:

Address	Symbol	Displa	Status value	Modify value
1	/READ			
2	MW 100	DEC	10	0
3	M 0.0 "Request"	BOOL	true	true
4	M 20.0 "Valid"	BOOL	false	
5	M 20.1 "Busy"	BOOL	false	
6	M 20.2 "Error"	BOOL	false	
7	MD 22 "Status"	HEX	DW#16#00700000	
8	MW 26 "Length"	DEC	0	
9	MW 10 "Index"	HEX	VW#16#0007	VW#16#0007
10	MW 12 "MLength"	HEX	VW#16#0002	VW#16#0002
11	MD 40 "Slot"	HEX	DW#16#00000100	DW#16#00000100
12				
13	//WRITE			
14	MW 32	DEC	6060	6060
15	M 1.0 "Write"	BOOL	false	false
16	M 20.3 "Write_Done"	BOOL	false	
17	M 20.4 "Write_Busy"	BOOL	false	
18	M 20.5 "Write_Error"	BOOL	false	
19	MD 36 "Write_Stats"	HEX	DW#16#00700000	
20	MW 14 "Write_Index"	HEX	VW#16#0001	VW#16#0001
21	MW 16 "Write_Length"	HEX	VW#16#0002	VW#16#0002
22	MD 44 "Write Slot"	HEX	DW#16#00000100	DW#16#00000100
23				

At the bottom of the window, it says "DarrylBenshaw1\SIMATIC 300 Station\...|57 Program" and "RUN Abs < 5.2".

4 - Installing the Benshaw GSD File

Similarly for write, ensure that "Write" is false, then enter the write data, with slot, index and length as before, then press F9.



Address	Symbol	Displa	Status value	Modify value
1	//READ			
2	MW 100	DEC	0	0
3	M 0.0	"Request"	BOOL false	false
4	M 20.0	"Valid"	BOOL false	
5	M 20.1	"Busy"	BOOL false	
6	M 20.2	"Error"	BOOL false	
7	MD 22	"Status"	HEX DW#16#00700000	
8	MW 26	"Length"	DEC 0	
9	MW 10	"Index"	HEX V#16#0007	V#16#0007
10	MW 12	"MLength"	HEX V#16#0002	V#16#0002
11	MD 40	"Slot"	HEX DW#16#00000100	DW#16#00000100
12				
13	//WRITE			
14	MW 32	DEC	6060	6060
15	M 1.0	"Write"	BOOL false	false
16	M 20.3	"Write_Done"	BOOL false	
17	M 20.4	"Write_Busy"	BOOL false	
18	M 20.5	"Write_Error"	BOOL false	
19	MD 36	"Write_Stats"	HEX DW#16#00700000	
20	MW 14	"Write_Index"	HEX V#16#0001	V#16#0001
21	MW 16	"Write_Length"	HEX V#16#0002	V#16#0002
22	MD 44	"Write Slot"	HEX DW#16#00000100	DW#16#00000100
23				



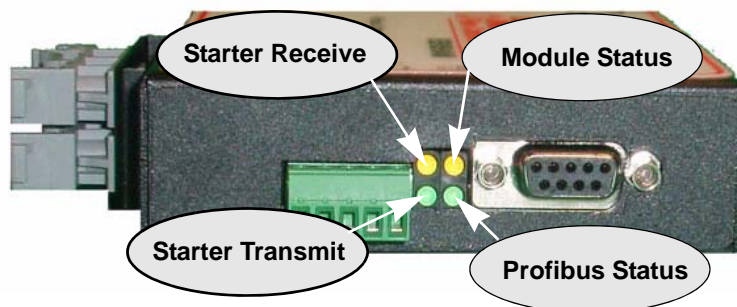
5 - Troubleshooting

Communications Troubleshooting

Table 14: Communications Troubleshooting

Condition	Possible Cause	Possible Solutions
Unable to Communicate with Starter	Loose connection or damaged cable	Check all communication and power cables for loose connections or damage. Replace or correct.
	No power to device	Device not getting power: Check Power LED and correct for absence of proper voltage.
	No Profibus-DP or Serial communication established	Check cables. Verify state of Profibus Master. Verify presence of control power to MXPB3 and Soft Starter.
	No Communication with Starter	Check Rx/Tx LEDs on MX ² or MX ³ Card. LEDs should be blinking if communication is established between the starter and the MXPB3. Verify that the starter has control power. Verify that the starter has been configured for serial connections.
Unable to Access Web-Page Setup	Incorrect IP Address	Verify correct IP Address

Status LEDs



Starter Transmit LED (Green): Illuminated when messages are being transmitted to the Soft Starter.

Starter Receive LED (Yellow): illuminated when response data is being received from the Soft Starter.

Profibus LED (Green): Illuminated during data exchange, and flashing during parameterization. This LED is driven directly by the Profibus chip.

Module Status LED (Yellow): Flashing at 1 Hz when the Modbus is communication, and the Profibus is in Data Exchange.



Status LED 1:

- Flashes Red during Profibus parameterization
- Alternates Red-Green during Profibus configuration
- Is illuminated Green during Profibus data exchange.

Status LED 2:

- Flashes Red when the Modbus RTU is *not* communicating with the Soft Starter
- Is illuminated Green when the Modbus RTU is communicating with the Soft Starter.

Advanced PROFIBUS-DP Troubleshooting

Network Voltage Requirements (V+ to V-)

Verify that the MXPB3 device has been provided the proper voltage, and that the power indicator is illuminated.

Network Health

A good indicator of the health of the PROFIBUS-DP network is the number of “retries”. Ideally, this number should be zero.

The physical layer is the most common source of network problems. There are two approaches to testing the physical layer, with best practices utilizing both.

1. Utilize a variety of diagnostic devices designed to verify the physical layer.
2. Use an oscilloscope. Although the oscilloscope lacks the more modern analytical approach to diagnostics, it can provide the experienced user with a great deal of valuable information.

Test for Termination Resistors

Verify that the first and last node of the PROFIBUS-DP network connectors have the resistors set to the ON position.

Diagnostic References

[Catching the Process Fieldbus - An Introduction to PROFIBUS for Process Automation](#)

By James Powell, P. Eng. and Henry Vandelinde, PhD.

[The New Rapid Way to PROFIBUS DP From DP-V0 to DP-V2](#)

By Manfred Popp



Appendix A - Modbus Registers

Starter Status and Control Common to the MX² and MX³

The following set of registers contains status and control information that exists in both the MX² and MX³. All of these registers are read-only, with the exception of the Starter Control register.

Table 15: Modbus Registers - Starter Status & Control

Absolute Register Address	Description	Range	Units
30020/40020	Starter Control	Bit Mask: Bit 0: Run/Stop Bit 1: Fault Reset Bit 2: Emergency Overload Reset Bit 3: Local/Remote Bit 4: Heat Disable Bit 5: Ramp Select Bit 10: Relay 6 (<i>MX³ only</i>) Bit 11: Relay 5 (<i>MX³ only</i>) Bit 12: Relay 4 (<i>MX³ only</i>) Bit 13: Relay 3 Bit 14: Relay 2 Bit 15: Relay 1	-
30021/40021	Starter Status	Bit Mask: Bit 0: Ready Bit 1: Running Bit 2: UTS Bit 3: Alarm Bit 4: Fault Bit 5: Lockout	-
30022/40022	Input Status	Bit Mask: Bit 0: Start Bit 1: DI 1 Bit 2: DI 2 Bit 3: DI 3 Bit 4: DI 4 (<i>MX³ only</i>) Bit 5: DI 5 (<i>MX³ only</i>) Bit 6: DI 6 (<i>MX³ only</i>) Bit 7: DI 7 (<i>MX³ only</i>) Bit 8: DI 8 (<i>MX³ only</i>)	-
30023/40023	Alarm Status 1	Bit Mask: Bit 0: "A OL" - Motor Overload Bit 1: "A 5" - Motor PTC (<i>MX³ only</i>) Bit 2: "A 6" - RTD Stator (<i>MX³ only</i>) Bit 3: "A 7" - RTD Bearing (<i>MX³ only</i>) Bit 4: "A 8" - RTD Other (<i>MX³ only</i>) Bit 5: "A 10" - Phase Rotation not ABC Bit 6: "A 11" - Phase Rotation not CBA Bit 7: "A 12" - Low Line Frequency Bit 8: "A 13" - High Line Frequency Bit 9: "A 14" - Phase Rotation not 1PH Bit 10: "A 15" - Phase Rotation not 3PH Bit 11: "A 21" - Low Line L1 L2 Bit 12: "A 22" - Low Line L2 L3 Bit 13: "A 23" - Low Line L3 L1 Bit 14: "A 24" - High Line L1 L2 Bit 15: "A 25" - High Line L2 L3	-

Table 15: Modbus Registers - Starter Status & Control (Continued)

Absolute Register Address	Description	Range	Units
30024/40024	Alarm Status 2	Bit Mask: Bit 0: "A 26" - High Line L3-L1 Bit 1: "A 27" - Phase Loss Bit 2: "noL" - No Line Bit 3: "A 29" - PORT Timeout (<i>MX³ only</i>) Bit 4: "A 31" - Overcurrent Bit 5: "A 34" - Undercurrent Bit 6: "A 35" - PF Too Leading (<i>MX³ only</i>) Bit 7: "A 36" - PF Too Lagging (<i>MX³ only</i>) Bit 8: "A 37" - Current Imbalance Bit 9: "A 38" - Ground Fault Bit 10: "A 47" - Stack Overtemperature Bit 11: "A 53" - Tach Loss (<i>MX³ only</i>) Bit 12: "A 60" - DI 1 Bit 13: "A 61" - DI 2 Bit 14: "A 62" - DI 3 Bit 15: "A 63" - DI 4 (<i>MX³ only</i>)	-
30025/40025	Alarm Status 3	Bit Mask: Bit 0: "A 64" - DI 5 (<i>MX³ only</i>) Bit 1: "A 65" - DI 6 (<i>MX³ only</i>) Bit 2: "A 66" - DI 7 (<i>MX³ only</i>) Bit 3: "A 67" - DI 8 (<i>MX³ only</i>) Bit 4: "A 71" - Analog Input Trip	-
30026/40026	Lockout Status	Bit Mask: Bit 0: "L OL" - Motor Overload Bit 1: "LPtc" - Motor PTC (<i>MX³ only</i>) Bit 2: "Lrtd" - RTD Stator (<i>MX³ only</i>) Bit 3: "Lrtd" - RTD Bearing (<i>MX³ only</i>) Bit 4: "Lrtd" - RTD Other (<i>MX³ only</i>) Bit 5: "L rl" - Run Interlock Bit 6: "L dS" - Disconnect Open Bit 7: "L Ot" - Stack Overtemperature Bit 8: "L CP" - Control Power Bit 9: "Lrtd" - RTD Open/Short (<i>MX³ only</i>) Bit 10: "LtbS" - Time Between Starts (<i>MX³ only</i>) Bit 11: "L bS" - Backspin (<i>MX³ only</i>) Bit 12: "LSph" - Starts per Hour (<i>MX³ only</i>) Bit 13: "Lrtd" - RTD Comm Loss (<i>MX³ only</i>)	
30027/40027	Present Fault Code		
30028/40028	Average Current		Arms
30029/40029	L1 Current		Arms
30030/40030	L2 Current		Arms
30031/40031	L3 Current		Arms
30032/40032	Current Imbalance		0.1%
30033/40033	Residual Ground Fault Current		% FLA
30034/40034	Zero Sequence Ground Fault Current (<i>MX³ only</i>)		0.001 Arms
30035/40035	Average Voltage		Vrms
30036/40036	L1-L2 Voltage		Vrms
30037/40037	L2-L3 Voltage		Vrms
30038/40038	L3-L1 Voltage		Vrms
30039/40039	Motor Overload		0.01

Table 15: Modbus Registers - Starter Status & Control (Continued)

Absolute Register Address	Description	Range	Units
30040/40040	Power Factor	-99 - +100 (in 16-bit two's compliment signed format)	0.01
30041/40041	Watts (lower 16 bits)	(in 32-bit unsigned integer format)	W
30042/40042	Watts (upper 16 bits)		
30043/40043	VA (lower 16 bits)	(in 32-bit unsigned integer format)	VA
30044/40044	VA (upper 16 bits)		
30045/40045	vars (lower 16 bits)	(in 32-bit two's compliment signed integer format)	var
30046/40046	vars (upper 16 bits)		
30047/40047	kW hours (lower 16 bits)	(in 32-bit unsigned integer format)	kWh
30048/40048	kW hours (upper 16 bits)		
30049/40049	Phase Order	0: no line 1: ABC 2: CBA 3: SPH	-
30050/40050	Line Frequency	230 - 720, or 0 if no line	0.1 Hz
30051/40051	Analog Input %	1000 - +1000 (in 16-bit two's compliment signed format)	0.1%
30052/40052	Analog Output %		0.1%
30053/40053	Running Time	0 - 1000	hours
30054/40054	Running Time	0 - 65535	minutes
30055/40055	Starts	0 - 59	-
30056/40056	TruTorque %		%
30057/40057	Power %		%
30058/40058	Peak Starting Current		Arms
30059/40059	Last Starting Duration		0.1 Sec

Table 16: Starter Control Register

Bit 0 - Run/Stop	0 - Stop 1 - Run
Bit 1 - Fault Reset	0 - No action 1 - Fault Reset
Bit 2 - Emergency Overload Reset	0 - No Action 1 - Emergency Overload Reset
Bit 3 - Local/Remote	0 - Local 1 - Remote
Bit 4 - Heat Disable	0 - Heat Enabled 1 - Heat Disabled
Bit 5 - Ramp Select	0 - Ramp 1 1 - Ramp 2

Table 16: Starter Control Register (Continued)

Bit 10 - Relay 6	0 - De-energize 1 - Energize
Bit 11 - Relay 5	
Bit 12 - Relay 4	
Bit 13 - Relay 3	
Bit 14 - Relay 2	
Bit 15 - Relay 1	

Starter Status and Control Unique to the MX³

The following set of registers contains status and control information that exists only in the MX³. All of these registers are read-only with the exception of the Date and Time registers.

Table 17: Starter Status and Control (Unique to the MX³)

Absolute Register Address	Description	Range	Units
30060/40060	Hottest Stator RTD Temperature	0 - 200	°C
30061/40061	Hottest Bearing RTD Temperature	0 - 200	°C
30062/40062	Hottest Other RTD Temperature	0 - 200	°C
30063/40063	RTD 1 Temperature	0 - 200	°C
30064/40064	RTD 2 Temperature	0 - 200	°C
30065/40065	RTD 3 Temperature	0 - 200	°C
30066/40066	RTD 4 Temperature	0 - 200	°C
30067/40067	RTD 5 Temperature	0 - 200	°C
30068/40068	RTD 6 Temperature	0 - 200	°C
30069/40069	RTD 7 Temperature	0 - 200	°C
30070/40070	RTD 8 Temperature	0 - 200	°C
30071/40071	RTD 9 Temperature	0 - 200	°C
30072/40072	RTD 10 Temperature	0 - 200	°C
30073/40073	RTD 11 Temperature	0 - 200	°C
30074/40074	RTD 12 Temperature	0 - 200	°C
30075/40075	RTD 13 Temperature	0 - 200	°C
30076/40076	RTD 14 Temperature	0 - 200	°C
30077/40077	RTD 15 Temperature	0 - 200	°C
30078/40078	RTD 16 Temperature	0 - 200	°C
30079/40079	RTDs Enabled	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD is enabled. Bit 0 represents RTD 1. Bit 15 represents RTD 16.	-
30080/40080	RTDs Assigned as Stator	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD is assigned to the Stator group.	-

Table 17: Starter Status and Control (Unique to the MX³) (Continued)

Absolute Register Address	Description	Range	Units
30081/40081	RTDs Assigned as Bearing	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD is assigned to the Bearing Group.	-
30082/40082	RTDs Assigned as Other	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD is assigned to the Other group.	-
30083/40083	RTDs with Open Leads	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD has an open lead.	-
30084/40084	RTDs with Shorted Leads	Bit Mask: Each of the sixteen bits represents an RTD. A 1 indicates the RTD has a shorted lead.	-
30085/40085	Remaining Lockout Time		Sec
30086/40086	Date/Time (lower 16 bits)	(in unsigned integer format)	Sec
30087/40087	Date/Time (upper 16 bits)		

Date/Time Registers Date and Time are expressed as the number of seconds elapsed since 12:00 AM on January 1st, 1972 in an unsigned 32 bit number.

Parameters Common to the MX² and MX³ The following set of registers contains parameters that exist both in the MX² and the MX³, some of which may have differing ranges between the systems.

All parameter registers are both readable and writable. Certain parameters may not be written to while the starter is running.

Table 18: Parameters Common to MX² and MX³

Absolute Register Address	Description	Range	Units
30101/40101	Motor FLA	1 - 6400	Arms
30102/40102	Motor Service Factor	100 - 199	0.01
30103/40103	Independent Start/Run Motor Overloads	0: Disabled 1: Enabled	-
30104/40104	Motor Overload Running Enable	0: Disabled 1: Enabled	-
30105/40105	Motor Overload Running Class	1 - 40	-
30106/40106	Motor Overload Starting Enable	0: Disabled 1: Enabled	-
30107/40107	Motor Overload Starting Class	1 - 40	-
30108/40108	Motor Overload Hot/Cold Ratio	0 - 99	%

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30109/40109	Motor Overload Cooling Time	10 - 9999	0.1 min
30110/40110	Local Source	0: Keypad 1: Terminal	-
30111/40111	Remote Source	2: Serial	-
30112/40112	Start Mode	0: Open Loop Voltage Ramp 1: Closed Loop Current Ramp 2: TruTorque Ramp 3: Power Ramp 4: Tach Ramp (<i>MX³ only</i>)	-
30113/40113	Initial Motor Current 1	50 - 600	% FLA
30114/40114	Maximum Motor Current 1	100 - 800	% FLA
30115/40115	Ramp Time 1	0 - 300	Sec
30116/40116	Initial Motor Current 2	50 - 600	% FLA
30117/40117	Maximum Motor Current 2	100 - 800	% FLA
30118/40118	Ramp Time 2	0 - 300	Sec
30119/40119	UTS Time	1 - 900	Sec
30120/40120	Initial V/T/P	1 - 100	%
30121/40121	Max T/P	10 - 325	%
30122/40122	Stop Mode	0: Coast 1: Voltage Decel 2: TruTorque Decel 3: DC Brake	-
30123/40123	Decel Begin Level	100 - 1	%
30124/40124	Decel End Level	99 - 1	%
30125/40125	Decel Time	1 - 180	Sec
30126/40126	DC Brake Level	10 - 100	%
30127/40127	DC Brake Time	1 - 180	Sec
30128/40128	DC Brake Delay	1 - 30	100 mSec
30129/40129	Kick Enable 1	0: Disabled 1: Enabled	-
30130/40130	Kick Current Level 1	100 - 800	% FLA
30131/40131	Kick Time 1	1 - 100	100 mSec
30132/40132	Kick Enable 2	0: Disabled 1: Enabled	-
30133/40133	Kick Current Level 2	100 - 800	%FLA
30134/40134	Kick Time 2	1-100	100 mSec
30135/40105	Slow Speed Enable 1	0: Disabled 1: Enabled	-

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range		Units
		MX ²	MX ³	
30136/40136	Slow Speed 1	0: 7.1 1: 14.3	0: 1.0 1: 1.5 2: 1.6 3: 1.7 4: 1.9 5: 2.0 6: 2.5 7: 2.6 8: 2.8 9: 2.9 10: 3.1 11: 3.3 12: 3.5 13: 3.8 14: 4.2 15: 4.5 16: 5.0 17: 5.5 18: 6.2 19: 7.1 20: 8.3 21: 9.1 22: 10.0 23: 11.1 24: 12.5 25: 14.3 26: 16.7 27: 20.0 28: 25.0 29: 33.3 30: 37.5 31: 40.0	%
30137/40137	Slow Speed Current Level 1	10 - 400		% FLA
30138/40138	Slow Speed Time Limit Enable	0: Disabled 1: Enabled		-
30139/40139	Slow Speed Time Limit	1 - 900		Sec
30140/40140	Slow Speed Kick Enable	0: Disabled 1: Enabled		-
30141/40141	Slow Speed Kick Level	100 - 800		% FLA
30142/40142	Slow Speed Kick Time	1 - 100		100 mSec

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30143/40143	Rated RMS Voltage	0: 100 1: 110 2: 120 3: 200 4: 208 5: 220 6: 230 7: 240 8: 350 9: 380 10: 400 11: 415 12: 440 13: 460 14: 480 15: 500 16: 525 17: 575 18: 600 19: 660 20: 690 21: 800 22: 1000 23: 1140 24: 2200 (MX ³ only) 25: 2300 (MX ³ only) 26: 2400 (MX ³ only) 27: 3300 (MX ³ only) 28: 4160 (MX ³ only) 29: 4600 (MX ³ only) 30: 4800 (MX ³ only) 31: 6000 (MX ³ only) 32: 6600 (MX ³ only) 33: 6900 (MX ³ only) 34: 10000 (MX ³ only) 35: 11000 (MX ³ only) 36: 11500 (MX ³ only) 37: 12000 (MX ³ only) 38: 12470 (MX ³ only) 39: 13200 (MX ³ only) 40: 13800 (MX ³ only)	Vrms
30144/40144	Input Phase Sensitivity	0: Ins 1: ABC 2: CBA 3: SPH	-
30145/40145	Motor Rated Power Factor	1 - 100	-
30146/40146	Overcurrent Enable	0: Disabled 1: Enabled	-
30147/40147	Overcurrent Level	50 - 800	-
30148/40148	Overcurrent Delay Time Enable	0: Disabled 1: Enabled	-
30149/40149	Overcurrent Delay Time	1 - 900	100 mSec
30150/40150	Undercurrent Trip Enable	0: Disabled 1: Enabled	-
30151/40151	Undercurrent Trip Level	5 - 100	% FLA
30152/40152	Undercurrent Trip Delay Time Enable	0: Disabled 1: Enabled	-

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30153/40153	Undercurrent Trip Delay Time	1 - 900	100 mSec
30154/40154	Current Imbalance Trip Enable	0: Disabled 1: Enabled	-
30155/40155	Current Imbalance Trip Level	5 - 100	% FLA
30156/40156	Residual Ground Fault Trip Enable	0: Disabled 1: Enabled	-
30157/40157	Residual Ground Fault Trip Level	5 - 100	% FLA
30158/40158	Over Voltage Trip Enable	0: Disabled 1: Enabled	-
30159/40159	Over Voltage Trip Level	1 - 40	%
30160/40160	Under Voltage Trip Enable	0: Disabled 1: Enabled	-
30161/40161	Under Voltage Trip Level	1 - 40	%
30162/40162	Over/Under Voltage Delay Time	1 - 900	100 mSec
30163/40163	Digital Input Trip Delay Time	1 - 900	100 mSec
30164/40164	Auto Fault Reset Enable	0: Disabled 1: Enabled	-
30165/40165	Auto Fault Reset Delay Time	1 - 900	Sec
30166/40166	Auto Fault Reset Count Enable	0: Disabled 1: Enabled	-
30167/40167	Auto Fault Reset Count	1 - 10	-
30168/40168	Controlled Fault Stop	0: Disabled 1: Enabled	-
30169/40169	DI 1 Configuration	0: Off 1: Stop 2: Fault High 3: Fault Low 4: Fault Reset 5: Disconnect 6: Inline Feedback (F29) 7: Bypass / 2M Feedback (F48) 8: Emergency Motor OL Reset 9: Local / Remote Control Source 10: Heat Disable 11: Heat Enable 12: Ramp Select 13: Slow Speed Forward 14: Slow Speed Reverse 15: DC Brake Disable 16: DC Brake Enable 17: Run Enable 18: Run Disable 19: Speed Switch Normally Open (MX ³ only) 20: Speed Switch Normally Closed (MX ³ only)	-
30170/40170	DI 2 Configuration		
30171/40171	DI 3 Configuration		

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30172/40172	R1 Configuration	0: Off 1: Fault Fail Safe 2: Fault Non Fail Safe 3: Running 4: Up To Speed 5: Alarm 6: Ready 7: Locked Out 8: Over Current Alarm 9: Under Current Alarm 10: Overload Alarm 11: Shunt Trip Fail Safe 12: Shunt Trip Non Fail Safe 13: Faulted on Ground Fault 14: In Energy Saver Mode 15: Heating 16: Slow Speed 17: Slow Speed Forward 18: Slow Speed Reverse 19: DC Braking 20: Cooling Fan 21: PORT (<i>MX³ only</i>) 22: Tach Loss (<i>MX³ only</i>)	-
30173/40173	R2 Configuration		
30174/40174	R3 Configuration		
30175/40175	Analog Input Trip Enable	0: Disabled 1: Enabled	-
30176/40176	Analog Input Trip Type	0: Low - Fault below preset level 1: High - Fault above preset level	-
30177/40177	Analog Input Trip Level	0 - 100	%
30178/40178	Analog Input Trip Delay Time	1 - 900	100 mSec
30179/40179	Analog Input Span	1 - 100	%
30180/40180	Analog Input Offset	0 - 99	%
30181/40181	Analog Output Function	0: Off (no output) 1: 0 - 100% Current 2: 0 - 200% Current 3: 0 - 800% Current 4: 0 - 150% Voltage 5: 0 - 150% Overload 6: 0 - 10kW 7: 0 - 100kW 8: 0 - 1MW 9: 0 - 10MW 10: 1 - 100% Analog Input 11: 0 - 100% Firing 12: Calibration (full output)	-
30182/40182	Analog Output Span	1 - 125	%
30183/40183	Analog Output Offset	0 - 99	%
30184/40184	Inline Enable	0: Disabled 1: Enabled	-
30185/40185	Inline Delay Time	10 - 100	100 mSec
30186/40186	Bypass Feedback Time	1 - 50	100 mSec
30187/40187	Keypad Stop	0: Disabled 1: Enabled	-

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30188/40188	Modbus Timeout Enable	0: Disabled 1: Enabled	-
30189/40189	Modbus Timeout	1 - 120	Sec
30190/40190	CT Ratio	0: 72:1 1: 96:1 2: 144:1 3: 288:1 4: 864:1 5: 2640:1 6: 3900:1 7: 5760:1 8: 8000:1 9: 14400:1 10: 28800:1 11: 50:5 12: 150:5 13: 250:5 14: 400:5 15: 600:5 16: 800:5 17: 2000:5 18: 5000:5	-
30191/40191	Auto Start	0: Disabled 1: Start after power applied 2: Start after fault reset 3: Start after power applied and fault reset	-
30192/40192	Energy Saver Enable	0: Disabled 1: Enabled	-
30193/40193	Heater / Anti-Windmill Enable	0: Disabled 1: Enabled	-
30194/40194	Heater / Anti-Windmill Level	1 - 40	% FLA
30195/40195	Starter Type	0: Normal (Outside Delta) 1: Inside Delta 2: Wye-Delta 3: Phase Controller 4: Current Follower 5: Across the Line (Full Voltage)	-

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30196/40196	LED Display Meter	0: Status 1: Avg Current 2: L1 Current 3: L2 Current 4: L3 Current 5: Current Imbalance % 6: Residual Ground Current 7: Avg Volts 8: L1-L2 Volts 9: L2-L3 Volts 10: L3-L1 Volts 11: Overload 12: Power Factor 13: Watts 14: VA 15: vars 16: kW hours 17: MW hours 18: Phase Order 19: Line Frequency 20: Analog Input 21: Analog Output 22: Running Days 23: Running Hours 24: Starts 25: TruTorque % 26: Power % 27: Peak Starting Current 28: Last Starting Duration 29: Zero Sequence Ground Current (<i>MX³ only</i>) 30: Hottest Stator RTD Temperature (<i>MX³ only</i>) 31: Hottest Bearing RTD Temperature (<i>MX³ only</i>) 32: Hottest Other RTD Temperature (<i>MX³ only</i>) 33: Hottest RTD Temperature (<i>MX³ only</i>)	-
30197/40197	LCD Display Meter 1	1: Avg Current 2: L1 Current 3: L2 Current 4: L3 Current 5: Current Imbalance % 6: Residual Ground Current 7: Avg Volts 8: L1-L2 Volts 9: L2-L3 Volts 10: L3-L1 Volts 11: Overload 12: Power Factor 13: Watts 14: VA 15: vars 16: kW hours 17: MW hours 18: Phase Order 19: Line Frequency 20: Analog Input 21: Analog Output 22: Running Days 23: Running Hours 24: Starts 25: TruTorque % 26: Power % 27: Peak Starting Current 28: Last Starting Duration 29: Zero Sequence Ground Current (<i>MX³ only</i>) 30: Hottest Stator RTD Temperature (<i>MX³ only</i>) 31: Hottest Bearing RTD Temperature (<i>MX³ only</i>) 32: Hottest Other RTD Temperature (<i>MX³ only</i>) 33: Hottest RTD Temperature (<i>MX³ only</i>)	-
30198/40198	LCD Display Meter 2	1: Avg Current 2: L1 Current 3: L2 Current 4: L3 Current 5: Current Imbalance % 6: Residual Ground Current 7: Avg Volts 8: L1-L2 Volts 9: L2-L3 Volts 10: L3-L1 Volts 11: Overload 12: Power Factor 13: Watts 14: VA 15: vars 16: kW hours 17: MW hours 18: Phase Order 19: Line Frequency 20: Analog Input 21: Analog Output 22: Running Days 23: Running Hours 24: Starts 25: TruTorque % 26: Power % 27: Peak Starting Current 28: Last Starting Duration 29: Zero Sequence Ground Current (<i>MX³ only</i>) 30: Hottest Stator RTD Temperature (<i>MX³ only</i>) 31: Hottest Bearing RTD Temperature (<i>MX³ only</i>) 32: Hottest Other RTD Temperature (<i>MX³ only</i>) 33: Hottest RTD Temperature (<i>MX³ only</i>)	-

Table 18: Parameters Common to MX² and MX³ (Continued)

Absolute Register Address	Description	Range	Units
30199/40199	Misc. Commands	0: None 1: Standard BIST 2: Powered BIST 3: Reset Run Time 4: Reset kWh 5: Enter Reflash Mode 6: Store Parameters 7: Load Parameters 8: Factory Reset	-

Misc Command

The Misc Command register allows various commands to be performed. Writing a value of 0 to the register has no effect. Writing any other value to the register causes the command to execute. Reading the register always returns a value of 0.

- Writing a 1 to the register causes the Standard BIST mode to be entered.
- Writing a 2 to the register causes the Powered BIST mode to be entered.
- Writing a 3 to the register causes the run time meter to be reset to 0. Note that in addition to the resettable run time meters, a non-resettable run time meter also exists in the factory register space.
- Writing a 4 to the register causes the kWh and MWh meters to be reset to 0.
- Writing a 5 to the register causes the starter to enter the re-flash mode.
- Writing a 6 to the register causes the current set of parameter values to be stored in a secondary storage area.
- Writing a 7 to the register causes the parameter values to be loaded from data previously stored in the secondary storage area. This may only be done when the starter is stopped.
- Writing an 8 to the register causes the User parameter values to be restored to factory defaults. *Factory parameters will not be restored.*

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Parameters Unique to the MX³ The following set of registers contains parameters that are unique to the MX³. All parameter registers are both readable and writable. Certain parameters may not be written to while the starter is running.

Table 19: Unique MX³ Parameters

Absolute Register Address	Description	Range	Units
30221/40221	Acceleration Profile	0: Linear 1: Squared	-
30222/40222	Deceleration Profile	2: S-Curve	-
30223/40223	PORT Bypass Enable	0: Disabled 1: Enabled	-
30224/40224	PORT Bypass Delay Time	1 - 50	100 mSec
30225/40225	PORT Recovery Method	0: Voltage Ramp 1: Fast Recover 2: Current Ramp 3: Current Ramp 2 4: Ramp Select 5: Tach Ramp	-
30226/40226	Tachometer Full Speed Voltage	100-1000	10 mV
30227/40227	Tachometer Loss Delay Time	1-900	100 mSec
30228/40228	Tachometer Loss Action	0: Fault 1: Closed Loop Current Ramp 2: TruTorque Ramp 3: Power Ramp	-
30229/40229	Time/Date Format	0: mm/dd/yy, 12 Hour 1: mm/dd/yy, 24 Hour 2: yy/mm/dd, 12 Hour 3: yy/mm/dd, 24 Hour 4: dd/mm/yy, 12 Hour 5: dd/mm/yy, 24 Hour	-
30230/40230	Current Imbalance Delay Time	1 - 900	100 mSec
30231/40231	Zero Sequence Ground Fault Trip Enable	0: Disabled 1: Enabled	-
30232/40232	Zero Sequence Ground Fault Trip Level	10 - 250	100 mArms
30233/40233	Ground Fault Delay Time	1 - 900	100 mSec
30234/40234	Phase Loss Delay Time	1 - 50	100 mSec
30235/40235	Over Frequency Trip Level	24 - 72	Hz
30236/40236	Under Frequency Trip Level	23 - 71	Hz
30237/40237	Over/Under Frequency Delay Time	1 - 900	100 mSec
30238/40238	Power Factor Leading Trip Enable	0: Disabled 1: Enabled	-
30239/40239	Power Factor Leading Trip Level	80 - 99 = -0.80 - -0.99 lag 100 - 199 = 1.00 - +0.01 lead	-
30240/40240	Power Factor Lagging Trip Enable	0: Disabled 1: Enabled	-
30241/40241	Power Factor Lagging Trip Level	1 - 99 = -0.01 - -0.99 lag 100 - 120 = 1.00 - +0.80 lead	-

Table 19: Unique MX³ Parameters (Continued)

Absolute Register Address	Description	Range	Units
30242/40242	Power Factor Delay Time	1 - 900	100 mSec
30243/40243	Backspin Timer Disable	0: Disabled 1: Enabled	-
30244/40244	Backspin Time	1 - 180	Min
30245/40245	Time Between Starts Enable	0: Disabled 1: Enabled	-
30246/40246	Time Between Starts	1 - 180	Min
30247/40247	Starts per Hour Enable	0: Disabled 1: Enabled	-
30248/40248	Starts per Hour	1 - 6	-
30249/40249	Speed Switch Enable	0: Disabled 1: Enabled	-
30250/40250	Speed Switch Delay Time	1 - 250	Sec
30251/40251	Motor PTC Enable	0: Disabled 1: Enabled	-
30252/40252	Motor PTC Delay Time	1 - 5	Sec
30253/40253	PORT Trip Enable	0: Disabled 1: Enabled	-
30254/40254	PORT Trip Delay Time	1 - 900	100 mSec
30255/40255	Motor Overload Alarm Level	1 - 100	%
30256/40256	Motor Overload Lockout Level	1 - 99	%
30257/40257	Motor Overload Auto Lockout Calculation	0: Disabled 1: Enabled	-
30258/40258	Motor Overload RTD Biasing Enable	0: Disabled 1: Enabled	-
30259/40259	Motor Overload RTD Biasing Minimum	0 - 198	°C
30260/40260	Motor Overload RTD Biasing Middle	1 - 199	°C
30261/40261	Motor Overload RTD Biasing Maximum	105 - 200	°C
30262/40262	DI 4 Configuration	Same as DI 1 through DI 3 configuration in the Parameters Common to the MX ² and MX ³	-
30263/40263	DI 5 Configuration		
30264/40264	DI 6 Configuration		
30265/40265	DI 7 Configuration		
30266/40266	DI 8 Configuration		
30267/40267	R4 Configuration	Same as R1 through R3 configuration in the Parameters Common to the MX ² and MX ³	-
30268/40268	R5 Configuration		
30269/40269	R6 Configuration		
30270/40270	RTD Module 1 Enable	0: Disabled 1: Enabled	-
30271/40271	RTD Module 1 Address	16 - 23	-

Table 19: Unique MX³ Parameters (Continued)

Absolute Register Address	Description	Range	Units
30272/40272	RTD Module 2 Enable	0: Disabled 1: Enabled	-
30273/40273	RTD Module 2 Address	16 - 23	-
30274/40274	RTD 1 Group	0: Off 1: Stator 2: Bearing 3: Other	-
30275/40275	RTD 2 Group		
30276/40276	RTD 3 Group		
30277/40277	RTD 4 Group		
30278/40278	RTD 5 Group		
30279/40279	RTD 6 Group		
30280/40280	RTD 7 Group		
30281/40281	RTD 8 Group		
30282/40282	RTD 9 Group		
30283/40283	RTD 10 Group		
30284/40284	RTD 11 Group		
30285/40285	RTD 12 Group		
30286/40286	RTD 13 Group		
30287/40287	RTD 14 Group		
30288/40288	RTD 15 Group		
30289/40289	RTD 16 Group		
30290/40290	RTD Stator Alarm Level	1 - 200	°C
30291/40291	RTD Bearing Alarm Level		
30292/40292	RTD Other Alarm Level		
30293/40293	RTD Stator Trip Level		
30294/40294	RTD Bearing Trip Level		
30295/40295	RTD Other Trip Level		
30296/40296	RTD Voting Enable	0: Disabled 1: Enabled	-
30297/40297	Slow Speed Enable 2	0: Disabled 1: Enabled	-
30298/40298	Slow Speed 2	Same as Slow Speed 1 in the Parameters Common to the MX ² and MX ³	-
30299/40299	Slow Speed Current Level 2	10 - 400	% FLA

Fault Log and Data

The fault log and data associated with each fault is 9 records deep. As new faults occur, the oldest fault in the log is lost.

Fault Codes

The fault codes may be read from 30601/40601 (most recent) through 30609/40609 (oldest).

Table 20: Fault Codes

Fault Code	Description
0	No Fault
1	UTS Time Limit Expired
2	Motor Thermal Overload Trip
3	Slow Speed Time Limit Expired
4	Speed Switch
5	Motor PTC
6	Stator RTD
7	Bearing RTD
8	Other RTD
10	Phase Rotation Error, not ABC
11	Phase Rotation Error, not CBA
12	Low Line Frequency
13	High Line Frequency
14	Input Power Not Single Phase
15	Input Power Not Three Phase
21	Low Line L1-L2
22	Low Line L2-L3
23	Low Line L3-L1
24	High Line L1-L2
25	High Line L2-L3
26	High Line L3-L1
27	Phase Loss
28	No Line
29	PORT Time Limit Exceeded
30	I.O.C.
31	Overcurrent
34	Undercurrent
35	Power Factor Leading
36	Power Factor Lagging
37	Current Imbalance
38	Ground Fault
39	No Current at Run
40	Shorted / Open SCR
41	Current at Stop
46	Disconnect Open

Table 20: Fault Codes (Continued)

Fault Code	Description
47	Stack Protection
48	Bypass Contactor Fault
49	Inline Contactor Fault
50	Control Power Low
51	Current Sensor Offset Error
53	Tachometer Loss
54	BIST Fault
55	BIST CT Fault
56	Open or Shorted RTD
60	External Fault on DIN#1 Input
61	External Fault on DIN#2 Input
62	External Fault on DIN#3 Input
63	External Fault on DIN#4 Input
64	External Fault on DIN#5 Input
65	External Fault on DIN#6 Input
66	External Fault on DIN#7 Input
67	External Fault on DIN#8 Input
71	Analog Input Level Fault Trip
80	RTD Communication Fault
81	Keypad Communication Fault
82	Modbus Timeout Fault
84	Interboard Communication Fault
85	IO Card - SW Fault
86	IO Card - Current Sensor Offset Error
87	IO Card - Real Time Clock Error
88	IO Card - Illegal Instruction Trap
89	IO Card - SW Watchdog Fault
90	IO Card - Spurious Interrupt
91	IO Card - Program EPROM Checksum Fault
94	CPU Error - SW Fault
95	CPU Error - Parameter EEPROM Checksum Fault
96	CPU Error - Illegal Instruction Trap
97	CPU Error - SW Watchdog Fault
98	CPU Error - Spurious Interrupt
99	CPU Error - Program EPROM Checksum Fault

System States

The state that the starter was in when a fault occurs is recorded along with each fault. System States may be read from 30611/40611 (most recent) through 30619/40619 (oldest).

Table 21: System States

System State	Description
0	Initializing
1	Locked Out
2	Faulted
3	Stopped
4	Heating
5	Kicking
6	Ramping
7	Slow Speed
8	Not UTS
9	UTS
10	Phase Control / Current Follower
11	Decelerating
12	Braking
13	Wye
14	PORT
15	BIST
16	Shorted SCR Test
17	Open SCR Test

L1 Currents

Current drawn from Line 1 when a fault occurs is recorded along with each fault. The current (in Amps) may be read from 30621/40621 (most recent) through 30629/40629 (oldest).

L2 Currents

Current drawn from Line 2 when a fault occurs is recorded along with each fault. The current (in Amps) may be read from 30631/40631 (most recent) through 30639/40639 (oldest).

L3 Currents

Current drawn from Line 3 when a fault occurs is recorded along with each fault. The current (in Amps) may be read from 30641/40641 (most recent) through 30649/40649 (oldest).

L1-L2 Voltages

Line voltage present between Lines 1 and 2 when a fault occurs is recorded along with each fault. The voltage (in Volts) may be read from 30651/40651 (most recent) through 30659/40659 (oldest).

L2-L3 Voltages

Line voltage present between Lines 2 and 3 when a fault occurs is recorded along with each fault. The voltage (in Volts) may be read from 30661/40661 (most recent) through 30669/40669 (oldest).

L3-L1 Voltages

Line voltage present between Lines 3 and 1 when a fault occurs is recorded along with each fault. The voltage (in Volts) may be read from 30671/40671 (most recent) through 30679/40679 (oldest).

Kilowatts

Power drawn by the load when a fault occurs is recorded along with each fault. The power (in kilowatts) may be read from 30681/40681 (most recent) through 30689/40689 (oldest).

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- Line Periods** The line period (1/frequency) present when a fault occurs is recorded along with each fault. Line periods (in microseconds) may be read from 30691/40691 (most recent) through 30699/40699 (oldest).
- Run Time Hours** The value of the running time meter when a fault occurs is recorded along with each fault. Running time (in hours) may be read from 30701/40701 (most recent) through 30709/40709 (oldest).
- Event Log (MX³ Only)** The event log is 99 records deep. As new events occur, the oldest event in the log is lost. Faults are also stored in the event log. Each event is time and date stamped.
- Event Codes** Event Codes may be read from 30801/40801 (most recent) through 30899/40899 (oldest). Each of the 99 registers within this range contains a code for one event in the log.
- Since the event log contains both events (such as Start, Stop, Up To Speed, etc.) and faults, bit 15 indicates whether a record is an event or a fault. A 1 indicates a fault, and a 0 indicates an event. The remaining 15 bits contain either the event code or fault code.
- The faults codes are identical to those reported by the fault log and are defined in Table 85: Fault Log Object: Fault Codes.

Table 22: Event Codes

Event Code	Description
101	Start Commanded
102	Slow Speed Commanded
103	Up to Speed
104	Energy Saver Entered
105	Energy Saver Exited
106	Stop Commanded
107	Stop Complete
110	Motor Overload Warning
111	Motor Overload Lockout Entered
112	Motor Overload Lockout Cleared
113	Stack Overload Warning
114	Stack Overload Lockout Entered
115	Stack Overload Lockout Cleared
116	Emergency Overload Reset
117	Stator RTD Warning
118	Bearing RTD Warning
119	Other RTD Warning
140	Disconnect Opened
141	Disconnect Closed
170	PORT Entered due to Low Voltage
171	PORT Entered due to Low Current
172	PORT Bypass Contactor Opened
173	PORT Power Returned
174	PORT Recovery Completed

Table 22: Event Codes (Continued)

Event Code	Description
180	Parameters Reset to Default
181	Time/Date Changed
182	Passcode Enabled
183	Passcode Cleared
184	Factory Passcode Entered
185	Event Log Cleared
186	Run Time Reset
187	kWh Reset
188	Reflash Mode Entered
190	System Powered Up
191	System Powered Down
192	Low Control Power Detected
193	Standard BIST Entered
194	Powered BIST Entered
195	BIST Passed

System States

The System State when an event or fault occurred may be read from 30901/40901 (most recent) through 30999/40999 (oldest). System States are identical to those reported by the fault log and are defined in Table 99: Fault Codes, Page 115.

Event Time and Date Stamp

The event time and date stamp may be read from 31001/41001 (most recent) through 31198/41198 (oldest). The Time and Date stamp is stored as a 32 bit unsigned integer in two consecutive Modbus registers. Time and Date is expressed as the number of seconds elapsed since 12:00 AM on January 1st, 1972.

Table 23: Time and Date Stamp Registers

Absolute Register Address	Description
31001/41001	Date/Time (lower 16 bits) for most recent event
31002/41002	Date/Time (upper 16 bits) for most recent event
31003/41003	Date/Time (lower 16 bits)
31004/41004	Date/Time (upper 16 bits)
31197/41197	Date/Time (lower 16 bits) for oldest event
31198/41198	Date/Time (upper 16 bits) for oldest event



Appendix B - Reference Documents

Reference documents The following publications include technical details about PROFIBUS-DP. For a complete list of PROFIBUS-DP documentation, refer to:

<http://www.us.profibus.com/resources.aspx?pagetype=books>

Catching the Process Fieldbus - An Introduction to PROFIBUS for Process Automation

By James Powell, P. Eng. and Henry Vandelinde, PhD.

The New Rapid Way to PROFIBUS DP From DP-V0 to DP-V2

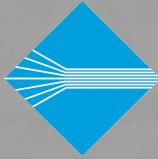
By Manfred Popp

Modbus-RTU Technical Publication

Standard Protocol Implementation as defined under "Modicon Modbus Reference Guide"
PI-MBUS-300. Refer to www.modbus.org.



Revision	Date	ECO	Description
02-00	Ocother 5, 2010	E2860	Initial Release



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