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3170-MBS

Flex Platform

Modbus Slave Interface Module

January 20, 2020

USER MANUAL

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3170-MBS User Manual

January 20, 2020

ProSoft Technology® Product Documentation

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Important Installation Instructions

Power, Input, and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

A WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;
B WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES
C WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
D THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY.

MVI (Multi Vendor Interface) Modules

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DÉCONNECTER L'ÉQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

Warnings

North America Warnings

A Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.
B Warning - Explosion Hazard - When in Hazardous Locations, turn off power before replacing or rewiring modules.
Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.
C Suitable for use in Class I, division 2 Groups A, B, C and D Hazardous Locations or Non-Hazardous Locations.

ATEX Warnings and Conditions of Safe Usage:

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction

A Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.
B Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
C These products are intended to be mounted in an IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%. This device must be used only with ATEX certified backplanes.
D DO NOT OPEN WHEN ENERGIZED.

Warning: This module is not hot-swappable! Always remove power from the rack before inserting or removing this module, or damage may result to the module, the processor, or other connected devices.

Markings

Electrical Ratings

- Backplane Current Load: 800 mA @ 5 Vdc
- Operating Temperature: 0°C to 60°C (32°F to 140°F)
- Storage Temperature: -40°C to 85°C (-40°F to 185°F)
- Shock: 30g Operational; 50g non-operational; Vibration: 5 g from 10 Hz to 150 Hz
- Relative Humidity 5% to 95% (without condensation)
- All phase conductor sizes must be at least 1.3 mm^2 and all earth ground conductors must be at least $4mm^2$

For professional users in the European Union

If you wish to discard electrical and electronic equipment (EEE), please contact your dealer or supplier for further information.

Warning – Cancer and Reproductive Harm – www.P65Warnings.ca.gov

Agency Approvals & Certifications

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Contents

1 Product Specifications

In This Chapter

The 3170-MBS Modbus Slave Communication Adapter can interface up to 8 Rockwell Automation FLEX and/or Integra I/O modules directly with any Modbus Master. The following functionality is available:

- Multi-drop on an RS-485 link with other Modbus compatible devices
- Interface Analog and/or Discrete I/O directly to a Host
- Add FLEX I/O into applications where other manufacturer's devices are already in use

The 3170-MBS module is simple to use, requiring only the setting of several dip-switch options. The Flex and Integra module data images are pre-mapped into Modbus addresses to simplify reading and writing using standard Modbus commands.

The 3170-MBS has read/write access to all Flex and Integra modules. This allows a Host system to perform all functions necessary to get all I/O modules functioning. All register data values can be accessed using Function Codes 3, 4, 6 and 16. Bit level Function Codes 1, 2, and 5 are also supported.

1.1 General Specifications

- I/O Capacity: 8 I/O modules (Flex and/or Integra)
- RS-485 Communication port - 3 screw termination
- Status LEDs
  - Power / Control Status
  - Serial TX, RX and ERROR Status
- Input Voltage: 24 VDC (19.2-31.2 VDC)
- Max Input Power: 8.6 W
- Max Backplane Output Current: 640 ma @ 5V
- Operating Temp.: 0 to 55°C
- Storage Temp.: -40 to 85°C
- Dimensions: 87x68x69 mm (3.4x2.7x2.7 inches)
- UL Class I Div 2 Groups A,B,C,D

1.2 Modbus Specifications

The 3170-MBS product support the following features:

- RTU mode (binary) with CRC-16 error checking
- ASCII 7 and 8-bit modes with LRC error checking
- Accepts broadcast commands from the Master
- Function codes:

  1: Read Output Coils (Horizontal addressing only)
  2: Read Discrete Inputs (Horizontal addressing only)
  3: Read Multiple Holding Registers
  4: Read Multiple Input Registers
  5: Force (Write) Single Coil (Horizontal addressing only)
  6: Preset (Write) Single Holding Register
  16: Preset (Write) Multiple Holding Registers

- Pre-assigned Modbus memory map
- Parameters configured via dip switches:
  - Address: 1 to 247
  - Parity: None, Odd or Even
  - Stop Bits: 1 or 2
  - Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400

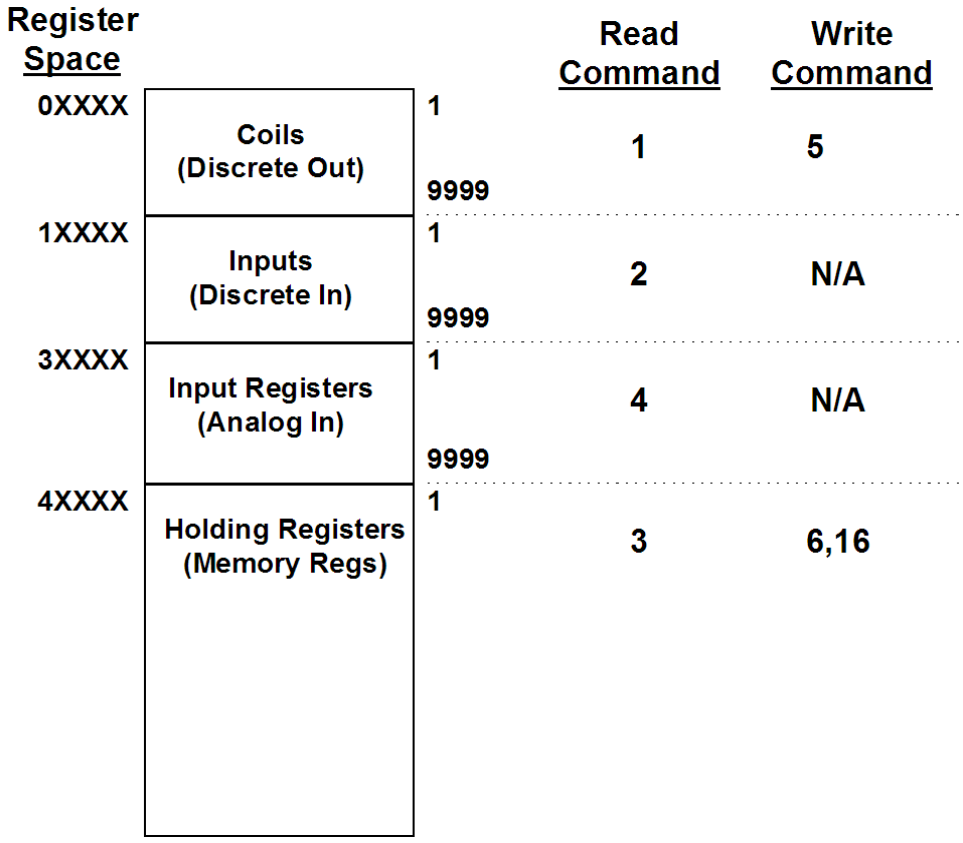
2 Functional Overview

2.1 Modbus Addressing Concepts

Modicon developed the Modbus addressing scheme around the data table and I/O structure in Modicon PLCs. As a result, the Modbus protocol supports access to the various data spaces in the Modicon PLC.

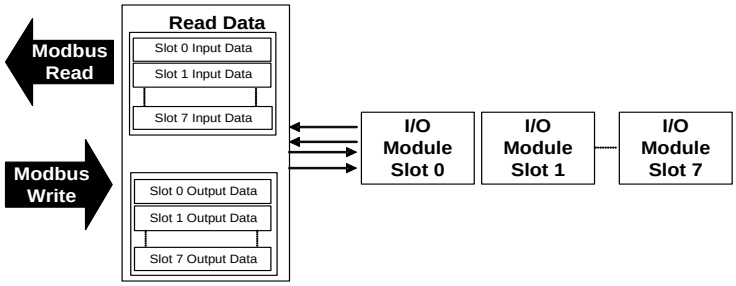
By far the most common data space used is the 4xxxx space using the Function Codes 3, 6 and 16. This space is used to transfer 16 bit register values and can be used to transfer bit mapped data. Using formal Modbus addressing terminology, this data space actually starts at address 40001.

Access to the different data spaces is determined by the Function Code that is used. The following chart shows the four different types of data spaces, the numerical range of these spaces, and the Function Codes that are used to execute read and write instructions within these data spaces. The following illustration shows the relationship between the Modbus Function Codes and the Modbus addressing scheme.



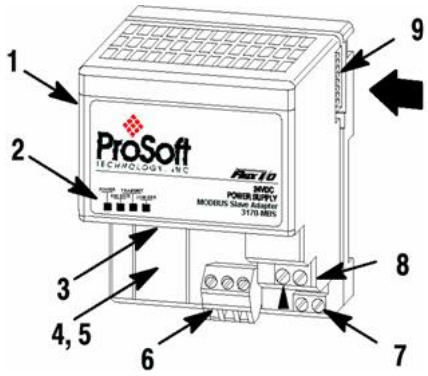
2.2 The Data Space in the module

One of the concepts, which are important to develop an understanding of, is the relationship between the data space in the module and how this data can be moved between the module and the Modbus Master.



3 Module Configuration and Installation

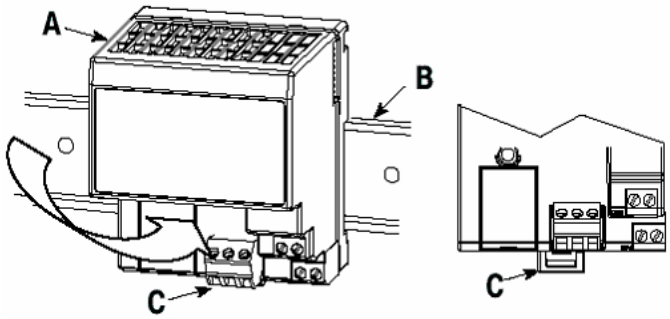
In This Chapter



Component Identification

1	Modbus Adapter Module
2	Indicators
3	Communication reset pushbutton (PRL)
4	Access door to switches S1 and S2
5	Switches S1 and S2 (behind access door)
6	Modbus cable connector
7	+24V dc connections
8	24V common connections
9	Flexbus connector

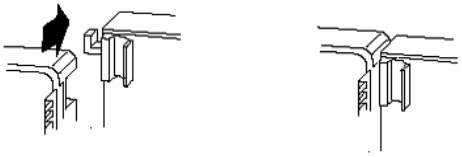
3.1 Mounting on a DIN-rail before installing the terminal base units



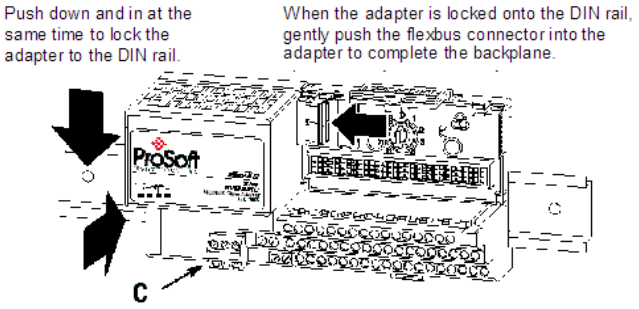
1. Position the Modbus adapter module **A** on a 35 X 7.5mm DIN-rail **B** (Rockwell Automation pt. no. 199-DR1: 46277-3; EN 50022) at a slight angle.
2. Hook the lip on the rear of the adapter (**A**) onto the top of the DIN-rail (**B**), and rotate the adapter module onto the rail.
3. Press the adapter module down onto the DIN-rail until flush. Locking tab (**C**) will snap into position and lock the adapter module to the DIN-rail.
4. If the adapter module does not lock in place, use a screwdriver or similar device to move the locking tab down while pressing the adapter module flush onto the DIN-rail and release the locking tab to lock the adapter module in place. If necessary, push up on the locking tab to lock.
5. Connect the adapter wiring as shown under "Wiring" later in this document.

3.2 Mounting (or Replacing) the module on an existing system

1. Remove the Modbus plug-in connector from the front of the adapter.
2. Disconnect any wiring jumpered to the adjacent terminal base.
3. Using a screwdriver or similar tool, open the lock and remove the module from the base unit to which the adapter will be attached.
4. Push the flexbus connector toward the right side of the terminal base to unplug the backplane connection.
5. Release the locking tab and remove the adapter.
6. Before installing the new adapter, notice the notch on the right rear of the adapter. This notch accepts the hook on the terminal base unit. The notch is open at the bottom. The hook and adjacent connection point keep the terminal base and adapter tight together, reducing the possibility of a break in communication over the backplane.
7. Complete the adapter mounting as shown below.

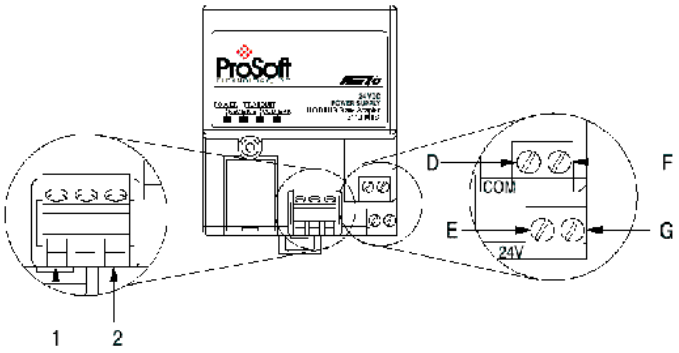


Attention: Make certain that the hook on the terminal base is properly hooked into the adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.



8. If the adapter module does not lock in place, use a screwdriver or similar device to move the locking tab **C** down while pressing the adapter module flush onto the DIN-rail. Then release the locking tab to lock the adapter module in place. If necessary, push up on the locking tab to lock.
9. Reinstall the module into the terminal base unit.

3.3 Wiring



Attention: When connecting wiring, torque terminal screws to 7 to 9 inch-pounds.

Connect	To
TxRxD-	1
TxRxD+	2

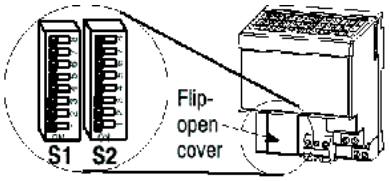
1 Connect the Modbus cable to the removable connector.
2 Connect +24V dc input to the left side of the lower connector, terminal **E**.
3 Connect 24V common to the left side of the upper connector, terminal **D**.
4 Connections **G** and **F** are used to pass 24V dc power (G) and 24V common (F) to the next module in the series (if required).

3.3.1 RS-485 Tip

If communication in the RS-485 mode does not work at first, despite all attempts, try switching termination polarities. Some manufacturers interpret + and -, or A and B, polarities differently.

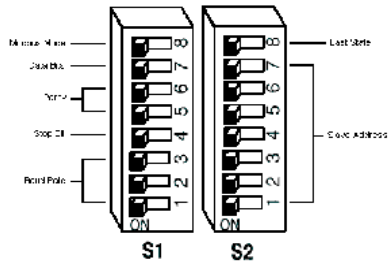
3.4 Setting the switches

The adapter switches are located under a flip-open cover on the front of the adapter Set the switches as shown below.



1. Lift the hinged switch cover on the front of the adapter to expose the switches.
2. Set the switches as shown below.
3. Cycle power to the adapter after setting the switches.

Baud Rate	**S1-1**	**S1-2**	**S1-3**
1200	OFF	OFF	OFF
2400	ON	OFF	OFF
4800	OFF	ON	OFF
9600	ON	ON	OFF
19200	OFF	OFF	ON
38400	ON	OFF	ON
62.5K	OFF	ON	ON
Undefined(Defaults to 19200)	ON	ON	ON
Stop Bit	**S1-4**		
1	OFF		
2	ON		
Parity	**S1-5**	**S1-6**	
None	OFF	OFF	
Odd	ON	OFF	
Even	OFF	ON	
Data Bits	**S1-7**		
8	OFF		
7	ON		
Modbus Mode	**S1-8**		
RTU	OFF		
ASCII	ON		



Address	S2-1	S2-2	S2-3	S2-4	S2-5	S2-6	S2-7
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF
4	ON	OFF	ON	OFF	OFF	OFF	OFF
5	OFF	ON	ON	OFF	OFF	OFF	OFF
6	ON	ON	ON	OFF	OFF	OFF	OFF
127	ON	ON	ON	ON	ON	ON	ON

Last State	S2-8
Off	OFF
Hold	ON

Address 0 - Test Mode - Puts unit into a transmit only mode. Connect a terminal at 19200 baud, 8N1 to view data.

Address 1 to 127 Valid Slave addresses.

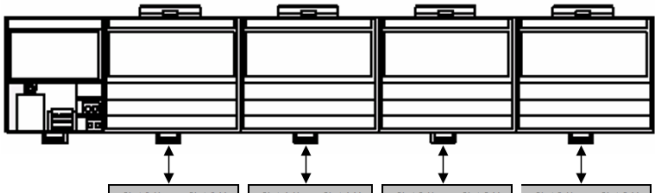
4 Module Addressing

In This Chapter

Each Flex or Integra module has 60 words of address space. 30 Input or Read address and 30 Output or Write addresses. Data is mapped in two ways Horizontal and Vertical.

With Horizontal addressing the adapter address the first input and output word for each module incrementally. 40001 for module 0, 40002 for module 1 and so on.

Vertical addressing increments the words for each module. For example, the vertical read words for slot 0 start with 41001 and increment to 41015.



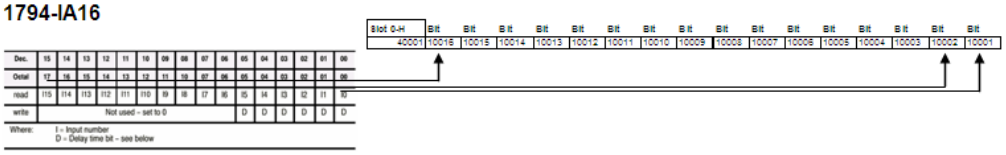
	Slot 0-H	Slot 0-V	Slot 1-H	Slot 1-V	Slot 2-H	Slot 2-V	Slot 3-H	Slot 3-V
READ	40001	41001	40002	41016	40003	41031	40004	41046
	40009	41002	40010	41017	40011	41032	40012	41047
	40017	41003	40018	41018	40019	41033	40020	41048
	40025	41004	40026	41019	40027	41034	40028	41049
	40033	41005	40034	41020	40035	41035	40036	41050
	40041	41006	40042	41021	40043	41036	40044	41051
	40049	41007	40050	41022	40051	41037	40052	41052
	40057	41008	40058	41023	40059	41038	40060	41053
	40065	41009	40066	41024	40067	41039	40068	41054
	40073	41010	40074	41025	40075	41040	40076	41055
	40081	41011	40082	41026	40083	41041	40084	41056
	40089	41012	40090	41027	40091	41042	40092	41057
	40097	41013	40098	41028	40099	41043	40100	41058
	40105	41014	40106	41029	40107	41044	40108	41059
	40113	41015	40114	41030	40115	41045	40116	41060
WRITE	40201	41201	40202	41216	40203	41231	40204	41246
	40209	41202	40210	41217	40211	41232	40212	41247
	40217	41203	40218	41218	40219	41233	40220	41248
	40225	41204	40226	41219	40227	41234	40228	41249
	40233	41205	40234	41220	40235	41235	40236	41250
	40241	41206	40242	41221	40243	41236	40244	41251
	40249	41207	40250	41222	40251	41237	40252	41252
	40257	41208	40258	41223	40259	41238	40260	41253
	40265	41209	40266	41224	40267	41239	40268	41254
	40273	41210	40274	41225	40275	41240	40276	41255
	40281	41211	40282	41226	40283	41241	40284	41256
	40289	41212	40290	41227	40291	41242	40292	41257
	40297	41213	40298	41228	40299	41243	40300	41258
	40305	41214	40306	41229	40307	41244	40308	41259
	40313	41215	40314	41230	40315	41245	40316	41260

4.1 Reading Discrete Inputs

Each word address consists of 16 bits. These bits can be read as discrete inputs. Word address 40001 corresponds to discrete inputs 10001 to 10016. 40002 corresponds to discrete inputs 10017 to 10032.

Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
40001	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	10016	10015	10014	10013	10012	10011	10010	10009	10008	10007	10006	10005	10004	10003	10002	10001

1794-IA16

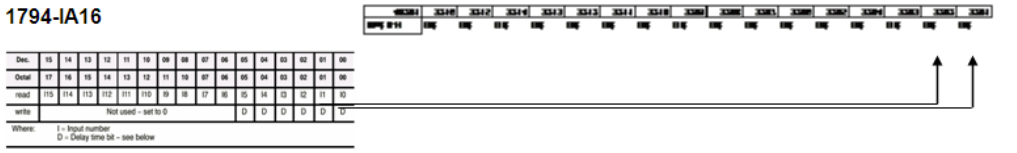


((Address - 40001) X 16) + 10001 This will give you Input address 0 of the word.

4.2 Writing Discrete Outputs

Each word address consists of 16 bits. These bits can be written as discrete outputs. Word address 40201 corresponds to discrete outputs 3201 to 3216. 40202 corresponds to discrete outputs 3217 to 3232.

Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
40201	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3216	3215	3214	3213	3212	3211	3210	3209	3208	3207	3206	3205	3204	3203	3202	3201



((Address - 40001) X 16) + 1 This will give you the Output address 0 of the word.

5 Status Information

In This Chapter

5.1 Adapter Status Word

																	Address
Bit:	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**40121**
	Not Used							I/O State	Slot 7	Slot 6	Slot 5	Slot 4	Slot 3	Slot 2	Slot 1	Slot 0	

The input status word consists of:

- I/O module fault bits - 1 status bit for each slot
- I/O Last state Dip Switch S2-8(See 3170-MBS installation manual)

Bit Description	Bit	Explanation
	0	This bit is set (1) when an error is detected in slot position 0.
	1	This bit is set (1) when an error is detected in slot position 1.
	2	This bit is set (1) when an error is detected in slot position 2.
I/O Module Fault	3	This bit is set (1) when an error is detected in slot position 3.
	4	This bit is set (1) when an error is detected in slot position 4.
	5	This bit is set (1) when an error is detected in slot position 5.
	6	This bit is set (1) when an error is detected in slot position 6.
	7	This bit is set (1) when an error is detected in slot position 7.
I/O Last State	8	= 1 for hold last state = 0 for off
	9 to 15	Not used set to 0

The adapter input status word bit descriptions are shown in the following table.

5.2 Module Status Words

- *Slot Status*: indicates the general health of the installed I/O module
- *Number of Words*: either 3 or 15 words indeterminate if slot is empty.
- *Number of Read Words*: the number of words which are to be read from the I/O module, indeterminate if slot is empty.

																	Address
Bit:	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**40122**
		Status		Total Words		Read Words						Type Identity					**to 40129**

- *Type ID*: a byte when combined with the Number of Words and Number of Read Words form the Module ID which uniquely identifies a specific module function, series and revision, indeterminate if slot is empty. **Note that all of bits 0 through 12 should be used in identifying a module.**

  Bit 15 1 = No answer, empty slot or dead module
  Bit 14 1 = Either positive edge of bit 15 or bit 13 detected
  Bit 13 1 = Bit failure, bad data on SerBus
  Bit 12 1 = Number of words is 15, = 0 number of words is 3
  Bits 11 to 8 Value = number of read words
  Bits 7 to 0 Value = Type ID

5.3 Module Information

3170-MBS Information	Address
3170-MBS Product Revision Level	40154
3170-MBS Product Batch Number	40155

5.4 Modbus Function Counters

Modbus Port Function Code Counter	Address
Function Code 1	40156
Function Code 2	40157
Function Code 3	40158
Function Code 4	40159
Function Code 5	40160
Function Code 6	40161
Reserved	40162
Function Code 16	40163

Modbus Status	Address
Modbus Port: Responses to Host	40171
Modbus Port: No Responses to Host	40172
Modbus Port: Last Detected Error Condition	40173

5.5 Modbus Status

Responses to Host: This rollover counter increments every time a response is issued by the 3170-MBS. Note that this counter increments whether the response is a data response or an error code response.

No Responses to Host: This rollover counter increments every time a command is seen on the Modbus port, which is not for this slave. This counter may be used as a network activity counter.

Last Detected Error Condition: This value is the last error code transmitted to the master by the 3170-MBS.

5.5.1 Error Codes

Code	Name	Description
0	All OK	The port is operating as desired
1	Illegal Function	An illegal function code request is being attempted
2	Bad Data Address	The address, or the range of addresses, covered by a request from the host is not within allowed limits
3	Bad Data Value	The value in the data field of the command from the host is not allowed.
4	Incomplete Response Detected	This error indicates that an incomplete query was received from a host query. This indicates that the slave port is timing out too quickly (that is, application may require some Inter-character Timeout Delay) or that the host query is getting abbreviated, possibly by the transmitting modem (last character getting dropped).
10	Buffer Overflow	The receive buffer has overflowed and reset the character count to 0. If this condition occurs try reading fewer parameters at one time
254	Checksum Error	The slave determined that the message checksum was in error, and therefore discarded the message

6 Diagnostics and Troubleshooting

In This Chapter

The module provides information on diagnostics and troubleshooting in the following forms:

- LED status indicators on the front of the module provide general information on the module's status.

Several hardware diagnostic capabilities have been implemented using the LED indicator lights on the front of the adapter module. The following topics explain the meaning of the individual LEDs and provide some troubleshooting tips.

6.1 LED Indicators

The following explains the operation of the LEDs.

LED	Color	Status	Indication
Power	Green	On	**Normal state**: The module is operating normally, with communications being detected on the link
		Blink	**Modbus Communication Timeout**: The port has not detected any communications on the link for over 1 second. If the HOLD LAST STATE dip switch is not set, the Input and Output images will be forced to zero(0).
			FLEX Backplane Communications Fail: The communication adapter either does not detect any I/O modules plugged into the backplane, or the backplane communications have failed.
Transmit	Green	Blink	The Modbus port is transmitting data.
Receive	Green	Blink	The Modbus port is receiving data. LED flashes on any character activity, valid or invalid.
COM ERR	Amber	Off	**Normal State**: When the error LED is off and the related port is actively transferring data, there are no communication errors
		Blink	Periodic communication errors are occurring during data communications. Error conditions that cause LED to blink include: ▪ Bad Function Code ▪ Invalid Register Address in command ▪ Invalid Count value in command ▪ Insufficient Characters in Modbus Packet ▪ Checksum Error detected in packet
			FLEX Backplane Communications Fail: The communication adapter either does not detect any I/O modules plugged into the backplane, or the backplane communications have failed
		On	This LED will stay on under several conditions: Configuration Error Recurring communication error

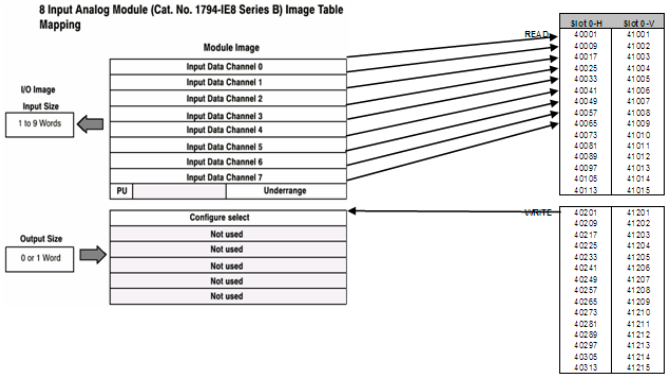
6.2 Troubleshooting: General

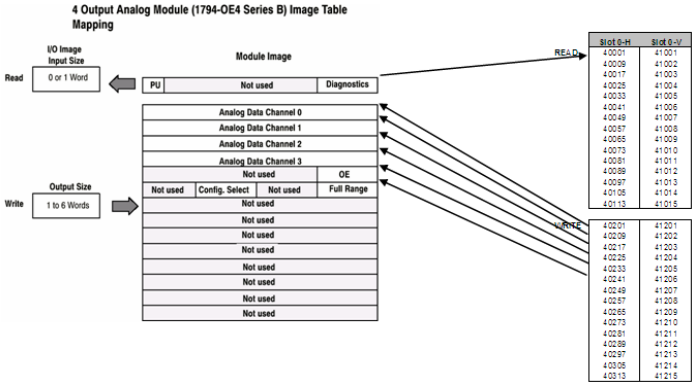
In order to assist in the troubleshooting of the adapter, the following table has been put together. Use the following table to assist in application of the module, but if additional questions or problems arise, please do not hesitate to contact us.

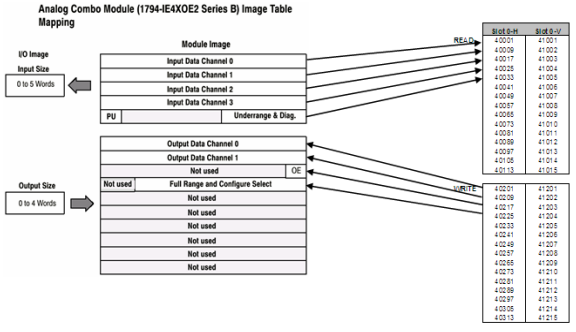
Problem Description	Steps to take
No communications with Host	If connected to the host and no communications are occurring, verify the following: ▪ Polarity of RS-485 cable connections (Either RX LED on continuously or not toggling at all) ▪ Slave Address: Valid addresses range from 1 to 127. Verify that the address is encoded into the dip switch correctly ▪ Baud Rate ▪ Stop Bits, Parity, and Modbus Mode. There are valid combinations of these parameters which are supported by the adapter hardware. Verify that the configuration is one of the following: Modbus RTU and ASCII Modes 8 Data Bits, No Parity, 1 Stop 8 Data Bits, No Parity, 2 Stop 8 Data Bits, Odd Parity, 1 Stop 8 Data Bits, Even Parity, 1 Stop Modbus ASCII Mode Only: 7 Data Bits, No Parity, 2 Stop 7 Data Bits, Odd Parity, 1 Stop 7 Data Bits, Even Parity, 1 Stop 7 Data Bits, Odd Parity, 2 Stop 7 Data Bits, Even Parity, 2 Stop Modbus Mode: Verify that the host and the adapter are talking the same implementation of the protocol, either RTU or ASCII.
RX LED on continuously	Verify the polarity of the RS-485 communications connections. Not all manufacturers adhere to the same +/- and A/B labeling conventions. Do not be afraid to experiment with swapping the polarity, no damage will occur to the hardware.
COMM ERR LED blinks periodically	Periodic communication errors are occurring during data communications. Error conditions which cause LED to blink include: ▪ Bad Function Code ▪ Invalid Register Address in command ▪ Invalid Count value in command ▪ Insufficient Characters in Modbus Packet ▪ Checksum Error detected in packet **FLEX Backplane Communications Fail**: The communication adapter either does not detect any I/O modules plugged into the backplane, or the backplane communications have failed
Outputs Toggle Off	If the HOLD LAST STATE dip switch is not set, the Output Image (and the Input Image) in the adapter will be forced to zero whenever communications with the host has not been detected for over 1 second. The Outputs will be re-established by the adapter as soon as a valid write command is received from the host. To prevent the Toggling of the outputs, either set the HOLD LAST STATE dip switch (S2 position 8), and/or assure the reliability of the communications.

7 Example Address Mapping

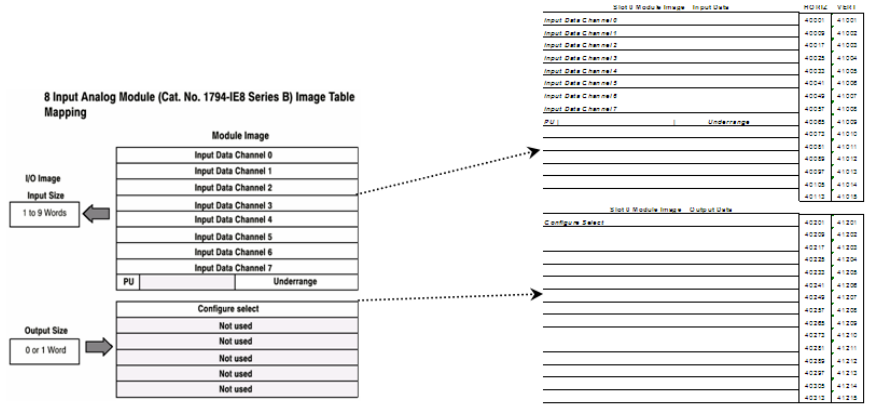
In This Chapter







7.1 Application Example

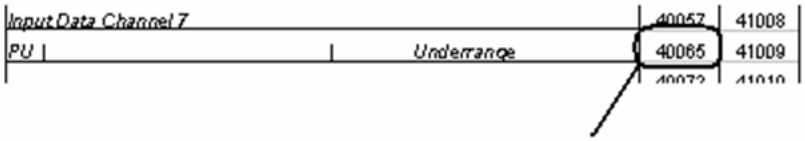


Use the information provided with your I/O to fill in the work sheets (page 38). This will help you to decide the best way to address each I/O block.

In most applications Analog I/O will be addressed using the Vertical method. Discrete I/O must be addressed using the Horizontal method only.

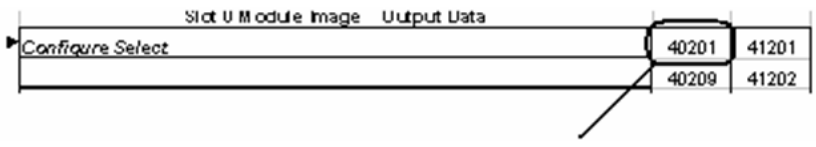
Slot 0 Module Image Input Data	HORIZ	VERT
Input Data Channel 0	40001	41001
Input Data Channel 1	40009	41002
Input Data Channel 2	40017	41003
Input Data Channel 3	40025	41004
Input Data Channel 4	40033	41005
Input Data Channel 5	40041	41006
Input Data Channel 6	40049	41007
Input Data Channel 7	40057	41008

The Input Data will be read vertically as holding registers



Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
40065	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	11040	11039	11038	11037	11036	11035	11034	11033	11032	11031	11030	11029	11028	11027	11026	11025	

The Underrange bits will be read as inputs



Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
40201	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	3216	3215	3214	3213	3212	3211	3210	3209	3208	3207	3206	3205	3204	3203	3202	3201	

The Configuration Selection bits will be written as coils.

7.2 Address Map

	Slot 0-H	Slot 0-V		Slot 1-H	Slot 1-V		Slot 2-H	Slot 2-V		Slot 3-H	Slot 3-V
READ	40001	41001		40002	41016		40003	41031		40004	41046
	40009	41002		40010	41017		40011	41032		40012	41047
	40017	41003		40018	41018		40019	41033		40020	41048
	40025	41004		40026	41019		40027	41034		40028	41049
	40033	41005		40034	41020		40035	41035		40036	41050
	40041	41006		40042	41021		40043	41036		40044	41051
	40049	41007		40050	41022		40051	41037		40052	41052
	40057	41008		40058	41023		40059	41038		40060	41053
	40065	41009		40066	41024		40067	41039		40068	41054
	40073	41010		40074	41025		40075	41040		40076	41055
	40081	41011		40082	41026		40083	41041		40084	41056
	40089	41012		40090	41027		40091	41042		40092	41057
	40097	41013		40098	41028		40099	41043		40100	41058
	40105	41014		40106	41029		40107	41044		40108	41059
	40113	41015		40114	41030		40115	41045		40116	41060

	Slot 4-H	Slot 4-V		Slot 5-H	Slot 5-V		Slot 6-H	Slot 6-V		Slot 7-H	Slot 7-V
READ	40005	41061		40006	41076		40007	41091		40008	41106
	40013	41062		40014	41077		40015	41092		40016	41107
	40021	41063		40022	41078		40023	41093		40024	41108
	40029	41064		40030	41079		40031	41094		40032	41109
	40037	41065		40038	41080		40039	41095		40040	41110
	40045	41066		40046	41081		40047	41096		40048	41111
	40053	41067		40054	41082		40055	41097		40056	41112
	40061	41068		40062	41083		40063	41098		40064	41113
	40069	41069		40070	41084		40071	41099		40072	41114
	40077	41070		40078	41085		40079	41100		40080	41115
	40085	41071		40086	41086		40087	41101		40088	41116
	40093	41072		40094	41087		40095	41102		40096	41117
	40101	41073		40102	41088		40103	41103		40104	41118
	40109	41074		40110	41089		40111	41104		40112	41119
	40117	41075		40118	41090		40119	41105		40120	41120

	Slot 0-H	Slot04-V		Slot 1-H	Slot 1-V		Slot 2-H	Slot 2-V		Slot 3-H	Slot 3-V

	Slot 0-H	Slot04-V		Slot 1-H	Slot 1-V		Slot 2-H	Slot 2-V		Slot 3-H	Slot 3-V
WRITE	40201	41201		40202	41216		40203	41231		40204	41246
	40209	41202		40210	41217		40211	41232		40212	41247
	40217	41203		40218	41218		40219	41233		40220	41248
	40225	41204		40226	41219		40227	41234		40228	41249
	40233	41205		40234	41220		40235	41235		40236	41250
	40241	41206		40242	41221		40243	41236		40244	41251
	40249	41207		40250	41222		40251	41237		40252	41252
	40257	41208		40258	41223		40259	41238		40260	41253
	40265	41209		40266	41224		40267	41239		40268	41254
	40273	41210		40274	41225		40275	41240		40276	41255
	40281	41211		40282	41226		40283	41241		40284	41256
	40289	41212		40290	41227		40291	41242		40292	41257
	40297	41213		40298	41228		40299	41243		40300	41258
	40305	41214		40306	41229		40307	41244		40308	41259
	40313	41215		40314	41230		40315	41245		40316	41260

	Slot 4-H	Slot 4-V		Slot 5-H	Slot 5-V		Slot 6-H	Slot 6-V		Slot 7-H	Slot 7-V
WRITE	40205	41261		40206	41276		40207	41291		40208	41306
	40294	41262		40214	41277		40215	41292		40216	41307
	40383	41263		40222	41278		40223	41293		40224	41308
	40472	41264		40230	41279		40231	41294		40232	41309
	40561	41265		40238	41280		40239	41295		40240	41310
	40650	41266		40246	41281		40247	41296		40248	41311
	40739	41267		40254	41282		40255	41297		40256	41312
	40828	41268		40262	41283		40263	41298		40264	41313
	40917	41269		40270	41284		40271	41299		40272	41314
	41006	41270		40278	41285		40279	41300		40280	41315
	41095	41271		40286	41286		40287	41301		40288	41316
	41184	41272		40294	41287		40295	41302		40296	41317
	41273	41273		40302	41288		40303	41303		40304	41318
	41362	41274		40310	41289		40311	41304		40312	41319
	41451	41275		40318	41290		40319	41305		40320	41320

7.3 Function Code Address Ranges

Function	Address Type	Horizontal Read	Modbus Address	Horizontal Write	Modbus Address	Vertical Read	Modbus Address	Vertical Write	Modbus Address
1	Bit	0 to 1919	40001 to 40120	N/A	N/A	N/A	N/A	N/A	N/A
	Bit	3200 to 5119	40200 to 40320	N/A	N/A	N/A	N/A	N/A	N/A
2	Bit	0 to 1919	40001 to 40120	N/A	N/A	N/A	N/A	N/A	N/A
	Bit	3200 to 5119	40200 to 40320	N/A	N/A	N/A	N/A	N/A	N/A
3	Register	0 to 119	40001 to 40120	N/A	N/A	1000 to 1119	41001 to 41120	N/A	N/A
	Register	200 to 319	40200 to 40320	N/A	N/A	1200 to 1319	41201 to 41320	N/A	N/A
4	Register	0 to 119	40001 to 40120	N/A	N/A	1000 to 1119	41001 to 41120	N/A	N/A
	Register	200 to 319	40200 to 40320	N/A	N/A	1200 to 1319	41201 to 41320	N/A	N/A
5	Bit	N/A	N/A	3200 to 5119	40201 to 40320	N/A	N/A	N/A	N/A
6	Register	N/A	N/A	200 to 319	40201 to 40320	N/A	N/A	1200 to 1319	41201 to 41320
16	Register	N/A	N/A	200 to 319	40201 to 40320	N/A	N/A	1200 to 1319	41201 to 41320

7.4 Work Sheets

Slot 0 Module Image Input Data	HORIZ	VERT
	40001	41001
	40009	41002
	40017	41003
	40025	41004
	40033	41005
	40041	41006
	40049	41007
	40057	41008
	40065	41009
	40073	41010
	40081	41011
	40089	41012
	40097	41013
	40105	41014
	40113	41015

Slot 0 Module Image Output Data	HORIZ	VERT
	40201	41201
	40209	41202
	40217	41203
	40225	41204
	40233	41205
	40241	41206
	40249	41207
	40257	41208
	40265	41209
	40273	41210
	40281	41211
	40289	41212
	40297	41213
	40305	41214
	40313	41215

Slot 1 Module Image Input Data	HORIZ	VERT
	40002	41016
	40010	41017
	40018	41018
	40026	41019

Slot 1 Module Image Input Data	HORIZ	VERT
	40034	41020
	40042	41021
	40050	41022
	40058	41023
	40066	41024
	40074	41025
	40082	41026
	40090	41027
	40098	41028
	40106	41029
	40114	41030

Slot 1 Module Image Output Data	HORIZ	VERT
	40202	41216
	40210	41217
	40218	41218
	40226	41219
	40234	41220
	40242	41221
	40250	41222
	40258	41223
	40266	41224
	40274	41225
	40282	41226
	40290	41227
	40298	41228
	40306	41229
	40314	41230

Slot 2 Module Image Input Data	HORIZ	VERT
	40003	41031
	40011	41032
	40019	41033
	40027	41034
	40035	41035
	40043	41036
	40051	41037
	40059	41038
	40067	41039
	40075	41040

Slot 2 Module Image Input Data	HORIZ	VERT
	40083	41041
	40091	41042
	40099	41043
	40107	41044
	40115	41045

Slot 2 Module Image Output Data	HORIZ	VERT
	40203	41231
	40211	41232
	40219	41233
	40227	41234
	40235	41235
	40243	41236
	40251	41237
	40259	41238
	40267	41239
	40275	41240
	40283	41241
	40291	41242
	40299	41243
	40307	41244
	40315	41245

Slot 3 Module Image Input Data	HORIZ	VERT
	40004	41046
	40012	41047
	40020	41048
	40028	41049
	40036	41050
	40044	41051
	40052	41052
	40060	41053
	40068	41054
	40076	41055
	40084	41056
	40092	41057
	40100	41058
	40108	41059
	40116	41060

Slot 3 Module Image Output Data	HORIZ	VERT
	40204	41246
	40212	41247
	40220	41248
	40228	41249
	40236	41250
	40244	41251
	40252	41252
	40260	41253
	40268	41254
	40276	41255
	40284	41256
	40292	41257
	40300	41258
	40308	41259
	40316	41260

Slot 4 Module Image Input Data	HORIZ	VERT
	40005	41061
	40013	41062
	40021	41063
	40029	41064
	40037	41065
	40045	41066
	40053	41067
	40061	41068
	40069	41069
	40077	41070
	40085	41071
	40093	41072
	40101	41073
	40109	41074
	40117	41075

Slot 4 Module Image Output Data	HORIZ	VERT
	40205	41261
	40213	41262
	40221	41263
	40229	41264
	40237	41265
	40245	41266

Slot 4 Module Image Output Data	HORIZ	VERT
	40253	41267
	40261	41268
	40269	41269
	41277	41270
	41285	41271
	41293	41272
	41301	41273
	41309	41274
	41317	41275

Slot 5 Module Image Input Data	HORIZ	VERT
	40006	41076
	40014	41077
	40022	41078
	40030	41079
	40038	41080
	40046	41081
	40054	41082
	40062	41083
	40070	41084
	40078	41085
	40086	41086
	40094	41087
	40102	41088
	40110	41089
	40118	41090

Slot 5 Module Image Output Data	HORIZ	VERT
	40206	41276
	40214	41277
	40222	41278
	40230	41279
	40238	41280
	40246	41281
	40254	41282
	40262	41283
	40270	41284
	40278	41285
	40286	41286
	40294	41287

Slot 5 Module Image Output Data	HORIZ	VERT
	40302	41288
	40310	41289
	40318	41290

Slot 6 Module Image Input Data	HORIZ	VERT
	40007	41091
	40015	41092
	40023	41093
	40031	41094
	40039	41095
	40047	41096
	40055	41097
	40063	41098
	40071	41099
	40079	41100
	40087	41101
	40095	41102
	40103	41103
	40111	41104
	40119	41105

Slot 6 Module Image Output Data	HORIZ	VERT
	40207	41291
	40215	41292
	40223	41293
	40231	41294
	40239	41295
	40247	41296
	40255	41297
	40263	41298
	40271	41299
	40279	41300
	40287	41301
	40295	41302
	40303	41303
	40311	41304
	40319	41305

Slot 7 Module Image Input Data	HORIZ	VERT
	40008	41106
	40016	41107
	40024	41108
	40032	41109
	40040	41110
	40048	41111
	40056	41112
	40064	41113
	40072	41114
	40080	41115
	40088	41116
	40096	41117
	40104	41118
	40112	41119
	40120	41120

Slot 7 Module Image Output Data	HORIZ	VERT
	40208	41306
	40216	41307
	40224	41308
	40232	41309
	40240	41310
	40248	41311
	40256	41312
	40264	41313
	40272	41314
	40280	41315
	40288	41316
	40296	41317
	40304	41318
	40312	41319
	40320	41320

8 Support, Service & Warranty

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

1. Product Version Number
2. System architecture
3. Network details

If the issue is hardware related, we will also need information regarding:

1. Module configuration and associated ladder files, if any
2. Module operation and any unusual behavior
3. Configuration/Debug status information
4. LED patterns
5. Details about the serial, Ethernet or Fieldbus devices interfaced to the module, if any.

Note: *For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues. Detailed contact information for all our worldwide locations is available on the following page.*

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8.1 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS, go to www.prosoft-technology.com/legal

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