Allen-Bradley Ethernet Driver Help

Table of Contents

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Help version 1.027

CONTENTS

Overview

The Allen-Bradley Ethernet Driver provides an easy and reliable way to connect Allen-Bradley Ethernet devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. This driver supports the Allen Bradley SLC5/05 series and PLC5 series PLCs. Address ranges are open to support future models for this series of PLCs.

Device Setup

Supported Devices

SLC5/05 processor*
PLC5 series (excluding the PLC5/250 series).

*Address ranges have been opened up in the driver to allow for future devices. Therefore, the driver may still support a device even if it is not listed above.

Communication Protocol

Allen-Bradley Ethernet

Timeout Parameters

Connect Timeout
This parameter specifies the time that the driver will wait for a connection to be made with a device. The valid range is 1 to 60 seconds.

Request Timeout
This parameter specifies the time that the driver will wait on a response from the device before giving up and going on to the next request. The valid range is 100 to 30000 milliseconds.

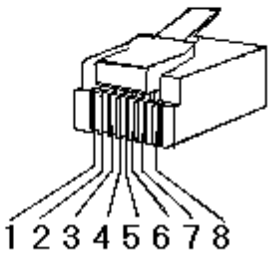
Retry Attempts
This parameter specifies the number of times that the driver will retry a message before giving up and going on to the next message. The valid range is 1 to 10.

Cable Connections

Patch Cable (Straight Through)

TD + 1	OR/WHT	OR/WHT	1	TD +
TD - 2	OR	OR	2	TD -
RD + 3	GRN/WHT	GRN/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	GRN	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	
RJ45			RJ45	

10 BaseT

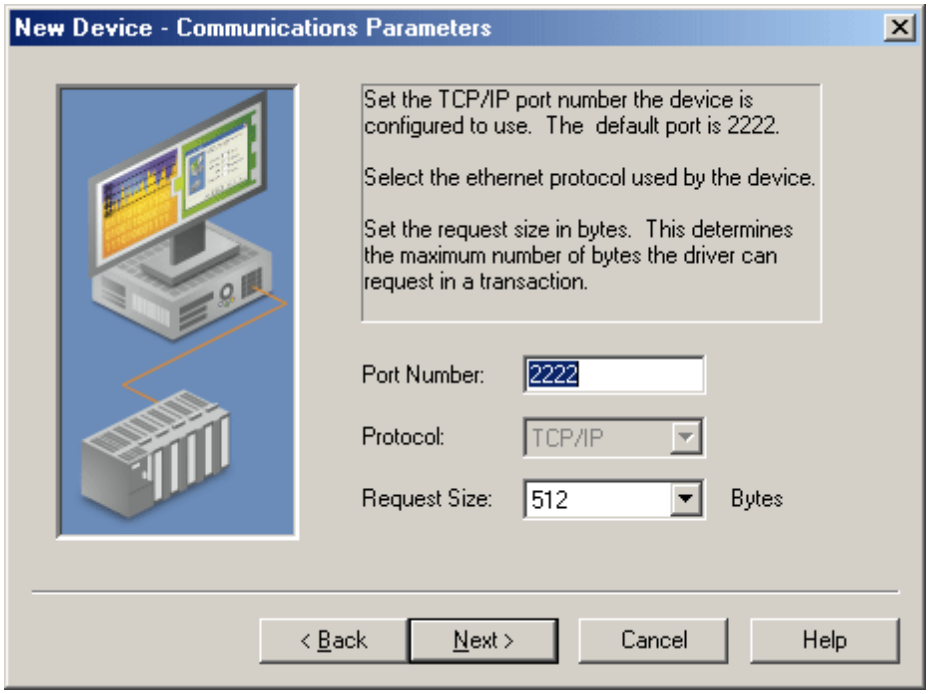


8-pin RJ45

Crossover Cable

TD + 1	OR/WHT	GRN/WHT	1	TD +
TD - 2	OR	GRN	2	TD -
RD + 3	GRN/WHT	OR/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	OR	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	
RJ45			RJ45	

Communications Parameters

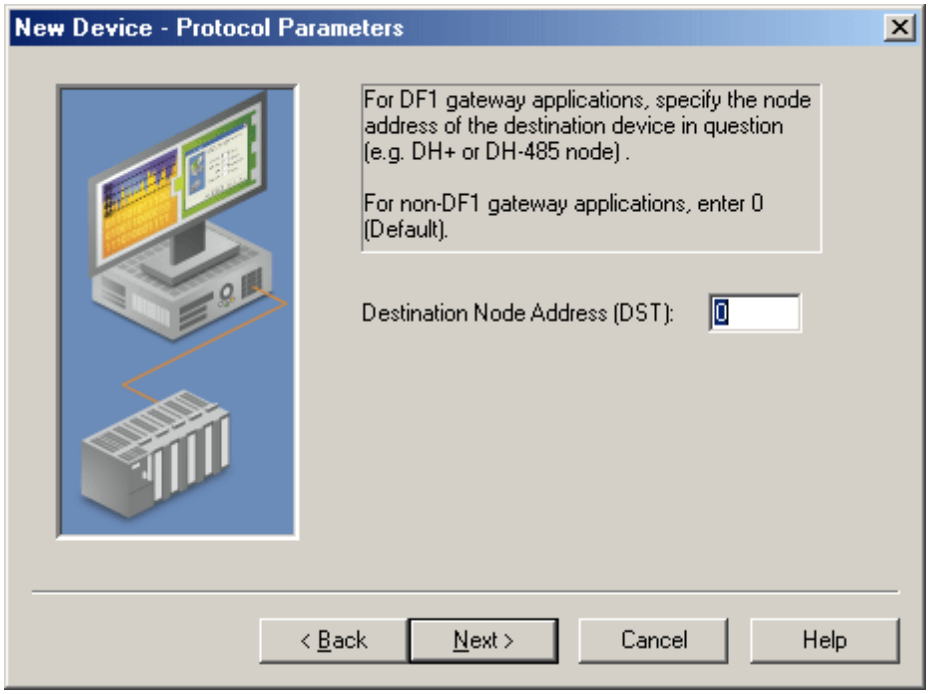


Descriptions of the parameters are as follows:

- **Port Number:** This parameter specifies the port number that the remote device will be configured to use. The default setting is 2222.
- **Protocol:** The Allen-Bradley Ethernet Driver connects to the supported devices using Transfer Control Protocol (TCP). Winsock V1.1 or higher is required.
- **Block Request Size:** This parameter specifies the number of bytes that may be requested from a device at one time. To refine the driver's performance, configure the request size to one of the following settings: 32, 64, 128, 256, 512, 1024 or 2000 bytes. The default setting is 512 bytes.

  Note: For Boolean arrays, the block size is the bit equivalent (or, block size multiplied by 8). For example, a block size of 512 bytes is equal to 512 * 8 = 4096 bits.

Protocol Parameters



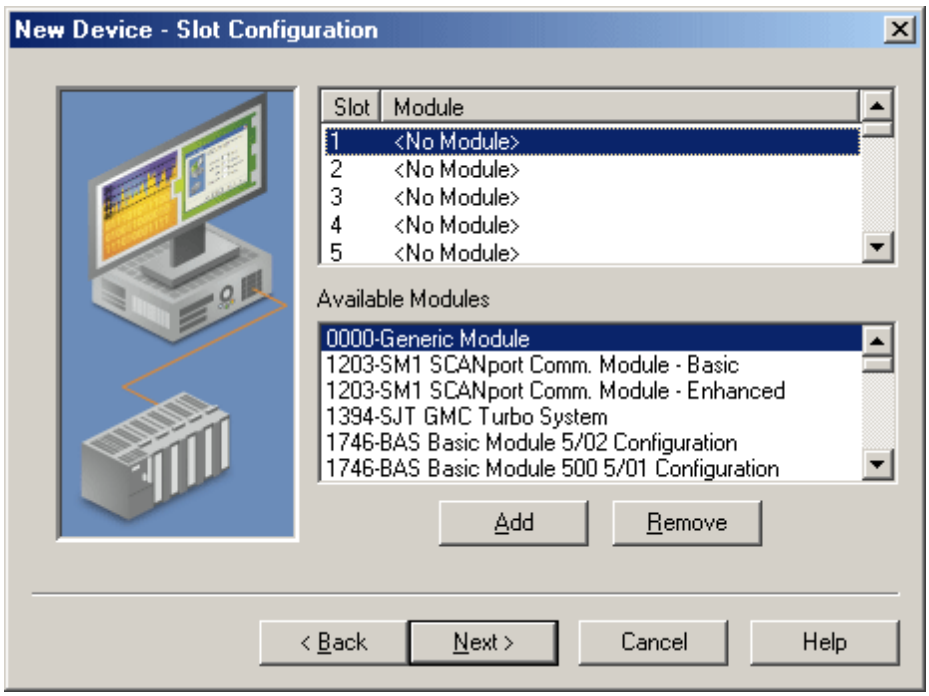
Descriptions of the parameters are as follows:

- **Destination Node Address (DST):** This parameter specifies the destination node address. For DF1 gateway applications, enter the node address of the destination device. For non-DF1 gateway applications, leave the node address at the default setting. The default setting is 0.

Note: The destination device is the DH+ or DH-485 device.

SLC500 Slot Configuration

SLC5/05 models (modular I/O racks) must be configured for use with the Allen-Bradley Ethernet Driver if the I/O will be accessed by the driver. Up to 30 slots may be configured per device.



Descriptions of the parameters are as follows:

- **Slot/Module:** This list-box is used to select the slot that will be configured.
- **Available Modules:** This list-box is used to select an available module. The module selections available are the same as those in the Allen Bradley APS software.
- **Add:** When clicked, the selected module will be added.
- **Remove:** When clicked, the selected module will be removed.

Important: Users must know the number of input and output words in each slot in order for the driver to correctly address the I/O. Only the number of input and output words in slots (up to the slot of interest) is needed to address I/O in that slot. For example, if only slot 3 will be accessed, users must configure slots 1 and 2 (if they contain any I/O) and slot 3, but not slot 4 or greater.

Note: For information on the number of input and output words available for each I/O module, refer to **Modular I/O Selection Guide**.

Modular I/O Selection Guide

The following table lists the number of input and output words available for each I/O module in the Slot Configuration list.

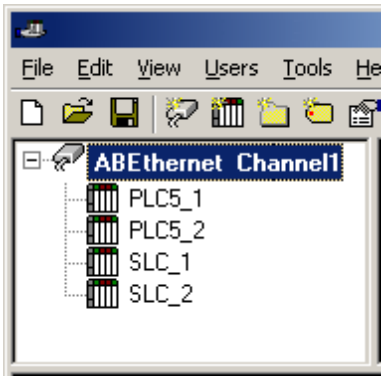
Module Type	Input Words	Output Words
1746-I*8 Any 8 pt Discrete Input Module	1	0
1746-I*16 Any 16 pt Discrete Input Module	1	0
1746-I*32 Any 32 pt Discrete Input Module	2	0
1746-O*8 Any 8 pt Discrete Output Module	0	1
1746-O*16 Any 16 pt Discrete Output Module	0	1
1746-O*32 Any 32 pt Discrete Output Module	0	2
1746-IA4 4 Input 100/120 VAC	1	0
1746-IA8 8 Input 100/120 VAC	1	0
1746-IA16 16 Input 100/120 VAC	1	0
1746-IB8 8 Input (Sink) 24 VDC	1	0
1746-IB16 16 Input (Sink) 24 VDC	1	0
1746-IB32 32 Input (Sink) 24 VDC	2	0
1746-IG16 16 Input [TTL] (Source) 5VDC	1	0
1746-IM4 4 Input 200/240 VAC	1	0
1746-IM8 8 Input 200/240 VAC	1	0
1746-IM16 16 Input 200/240 VAC	1	0
1746-IN16 16 Input 24 VAC/VDC	1	0
1746-ITB16 16 Input [Fast] (Sink) 24 VDC	1	0
1746-ITV16 16 Input [Fast] (Source) 24 VDC	1	0
1746-IV8 8 Input (Source) 24 VDC	1	0
1746-IV16 16 Input (Source) 24 VDC	1	0
1746-IV32 32 Input (Source) 24 VDC	2	0
1746-OA8 8 Output (Triac) 100/240 VAC	0	1
1746-OA16 16 Output (Triac) 100/240 VAC	0	1
1746-OB8 8 Output [Trans] (Source) 10/50 VDC	0	1
1746-OB16 16 Output [Trans] (Source) 10/50 VDC	0	1
1746-OB32 32 Output [Trans] (Source) 10/50 VDC	0	2
1746-OBP16 16 Output [Trans 1 amp] (SRC) 24 VDC	0	1
1746-OV8 8 Output [Trans] (Sink) 10/50 VDC	0	1
1746-OV16 16 Output [Trans] (Sink) 10/50 VDC	0	1
1746-OV32 32 Output [Trans] (Sink) 10/50 VDC	0	2
1746-OW4 4 Output [Relay] VAC/VDC	0	1
1746-OW8 8 Output [Relay] VAC/VDC	0	1
1746-OW16 16 Output [Relay] VAC/VDC	0	1
1746-OX8 8 Output [Isolated Relay] VAC/VDC	0	1
1746-OVP16 16 Output [Trans 1 amp] (Sink) 24VDC3	0	1
1746-IO4 2 In 100/120 VAC 2 Out [Rly] VAC/VDC3	1	1

1746-IO8 4 In 100/120 VAC 4 Out [Rly] VAC/VDC4	1	1
1746-IO12 6 In 100/120 VAC 6 Out [Rly] VAC/VDC	1	1
1746-NI4 4 Ch Analog Input	4	0
1746-NIO4I Analog Comb 2 in & 2 Current Out	2	2
1746-NIO4V Analog Comb 2 in & 2 Voltage Out	2	2
1746-NO4I 4 Ch Analog Current Output	0	4
1746-NO4V 4 Ch Analog Voltage Output	0	4
1746-NT4 4 Ch Thermocouple Input Module	8	8
1746-NR4 4 Ch Rtd/Resistence Input Module	8	8
1746-HSCE High Speed Counter/Encoder	8	1
1746-HS Single Axis Motion Controller	4	4
1746-OG16 16 Output [TLL] (SINK) 5 VDC	0	1
1746-BAS Basic Module 500 5/01 Configuration	8	8
1746-BAS Basic Module 5/02 Configuration	8	8
1747-DCM Direct Communication Module (1/4 Rack)	2	2
1747-DCM Direct Communication Module (1/2 Rack)	4	4
1747-DCM Direct Communication Module (3/4Rack)	6	6
1747-DCM Direct Communication Module (Full Rack)	8	8
1747-SN Remote I/O Scanner	32	32
1747-DSN Distributed I/O Scanner 7 Blocks	8	8
1747-DSN Distributed I/O Scanner 30 Blocks	32	32
1747-KE Interface Module, Series A	1	0
1747-KE Interface Module, Series B	8	8
1746-NI8 8 Ch Analog Input, Class 1	8	8
1746-NI8 8 Ch Analog Input, Class 3	16	12
1746-IC16 16 Input (Sink) 48 VDC	1	0
1746-IH16 16 Input [Trans] (Sink) 125 VDC	1	0
1746-OAP12 12 Output [Triac] 120/240 VDC	0	1
1746-OB6EI 6 Output [Trans] (Source) 24 VDC	0	1
1746-OB16E 16 Output [Trans] (Source) Protected	0	1
1746-OB32E 32 Output [Trans] (Source) 10/50 VDC	0	2
1746-OBP8 8 Output [Trans 2 amp] (Source) 24 VDC	0	1
1746-IO12DC 6 Input 12 VDC, 6 Output [Rly	1	1
1746-INI4I Analog 4 Ch. Isol. Current Input	8	8
1746-INI4VI Analog 4 Ch. Isol. Volt./Current Input	8	8
1746-INT4 4 Ch. Isolated Thermocouple Input	8	8
1746-NT8 Analog 8 Ch Thermocouple Input	8	8
1746-HSRV Motion Control Module	12	8
1746-HSTP1 Stepper Controller Module	8	8
1747-MNET MNET Network Comm Module	0	0
1747-QS Synchronized Axes Module	32	32
1747-QV Open Loop Velocity Control	8	8
1747-RCIF Robot Control Interface Module	32	32
1747-SCNR ControlNet SLC Scanner	32	32
1747-SDN DeviceNet Scanner Module	32	32
1394-SJT GMC Turbo System	32	32
1203-SM1 SCANport Comm Module - Basic	8	8
1203-SM1 SCANport Comm Module - Enhanced	32	32
AMCI-1561 AMCI Series 1561 Resolver Module	8	8

Optimizing Your Allen-Bradley Ethernet Communications

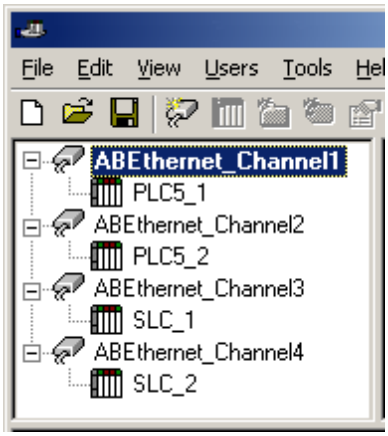
The Allen-Bradley Ethernet Driver has been designed to provide the best performance with the least amount of impact on the system's overall performance. While the Allen-Bradley Ethernet Driver is fast, there are a couple of guidelines that can be used in order to control and optimize the application and gain maximum performance.

Our server refers to communications protocols like Allen-Bradley Ethernet as a channel. Each channel defined in the application represents a separate path of execution in the server. Once a channel has been defined, a series of devices must then be defined under that channel. Each of these devices represents a single Allen-Bradley PLC from which data will be collected. While this approach to defining the application will provide a high level of performance, it won't take full advantage of the Allen-Bradley Ethernet Driver or the network. An example of how the application may appear when configured using a single channel is shown below.



Each device appears under a single Allen-Bradley Ethernet channel. In this configuration, the driver must move from one device to the next as quickly as possible in order to gather information at an effective rate. As more devices are added or more information is requested from a single device, the overall update rate begins to suffer.

If the Allen-Bradley Ethernet Driver could only define one single channel, then the example shown above would be the only option available; however, the Allen-Bradley Ethernet Driver can define up to 256 channels. Using multiple channels distributes the data collection workload by simultaneously issuing multiple requests to the network. An example of how the same application may appear when configured using multiple channels to improve performance is shown below.



Each device has now been defined under its own channel. In this new configuration, a single path of execution is dedicated to the task of gathering data from each device. If the application has 256 or fewer devices, it can be optimized exactly how it is shown here.

The performance will improve even if the application has more than 256 devices. While 256 or fewer devices may be ideal, the application will still benefit from additional channels. Although by spreading the device load across all channels will cause the server to move from device to device again, it can now do so with far less devices to process on a single channel.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8 bit value
Char	Signed 8 bit value
Word	Unsigned 16 bit value
Short	Signed 16 bit value
DWord	Unsigned 32 bit value
Long	Signed 32 bit value
BCD	Two byte packed BCD, four decimal digits
LBCD	Four byte packed BCD, eight decimal digits
Float	32 bit IEEE floating-point
String	Null terminated character array

Note: The DWord, Long and LBCD data types are not native to any of the PLC models. When referencing a 16 bit location as a 32 bit value, the location referenced will be the low word, and the next successive location will be the high word. For example, if N7:10 is selected as a DWord data type, N7:10 would be the low word and N7:11 the high word.

Address Descriptions

Address specifications vary depending on the model in use. Select a link from the following list to obtain specific address information for the model of interest.

General Addressing
SLC5/05 Open Addressing
PLC-5 Family Addressing

General Addressing

The general addresses below pertain to both SLC50/5 and PLC-5.

Output Files
Input Files
Status Files
Binary Files
Timer Files
Counter Files
Control Files
Integer Files
Float Files
ASCII Files
String Files

See Also: **SLC5/05 Open Addressing** and **PLC-5 Family Addressing**.

Output Files

The syntax for accessing data in the output file differs depending on the PLC model. Data locations are Read/Write for PLC-5 models and Read Only for all other models. The default data type for all syntax is shown in **bold**.

PLC-5 Model Syntax

Syntax	Data Type
O:<word>	Short, **Word**, BCD
O:<word>/<bit>	**Boolean**
O:<word>/<bit>[rows][cols]	**Boolean***
O:<word>/<bit>[cols]	**Boolean***
O/bit	**Boolean**
O/bit[rows][cols]	**Boolean***
O/bit[cols]	**Boolean***

*Array types.

Note: Word and bit address information is in octal for PLC-5 models. This follows the convention of the programming software.

SLC 5/05 Open Models (Modular I/O) Syntax

Syntax	Data Type
O:<slot>	Short, **Word**, BCD
O:<slot>.<word>	Short, **Word**, BCD
O:<slot>/<bit>	**Boolean**
O:<slot>/<bit>[rows][cols]	**Boolean***
O:<slot>/<bit>[cols]	**Boolean***
O:<slot>.<word>/<bit>	**Boolean**
O:<slot>.<word>/<bit>[rows][cols]	**Boolean***
O:<slot>.<word>/<bit>[cols]	**Boolean***

*Array types.

Slot and Word Configurations

The following slot and word locations are allowed for each model. For information, refer to **Device Setup**.

PLC Model	Min Slot	Max Slot	Max Word
SLC 5/05 Open	1	30	*
PLC-5 Family	NA	NA	277 (octal)

*The number of Input or Output words available for each I/O module can be found in the **Modular I/O Selection Guide**.

Examples
All addresses are in Octal.

PLC-5	Addresses
O:0	Word 0.
O:37	Word 31 (37 octal=31 decimal).
O/42	Bit 34 (42 octal=34 decimal).
O:2/2	Bit 2 word 2 (same as O/42).
O/20[9]	9 element Boolean array starting at bit 16 (20 octal=16 decimal).
O/37[8][11]	8 by 11 element Boolean array starting at bit 31 (37 octal=31 decimal).
O:47/5[3]	3 element Boolean array starting at bit 5 word 39 (47 octal=39 decimal).
O:11/13[3][7]	3 by 7 element Boolean array starting at bit 11 (13 octal=11 decimal) word 9 (11 octal=9 decimal).

SLC 5/05	Addresses
O:1	Word 0 slot 1.
O:1.0	Word 0 slot 1 (same as O:1).
O:12	Word 0 slot 12.
O:12.2	Word 2 slot 12.
O:4.0/0	Bit 0 word 0 slot 4.
O:4/0	Bit 0 slot 4 (same as O:4.0/0).
O:4.2/0	Bit 0 word 2 slot 4.
O:4/32	Bit 32 slot 4 (same as O:4.2/0).
O:2.12/3[17]	17 element Boolean array starting at bit 3 word 12 slot 2.
O:2.2/0[12][12]	12 by 12 element Boolean array starting at bit 0 word 2 slot 2.
O:2/43[5]	5 element Boolean array starting at bit 43 slot 2.
O:2/11[6][12]	6 by 12 element Boolean array starting at bit 11 slot 2.

Input Files
The syntax for accessing data in the input file differs depending on the PLC model. Data locations are Read/Write for PLC-5 models and Read Only for all other models. The default data type for all syntax is shown in **bold**.

PLC-5 Model Syntax

Syntax	Data Type
I:<word>	Short, **Word**, BCD
I:<word>/<bit>	**Boolean**
I:<word>/<bit>[rows][cols]	**Boolean***
I:<word>/<bit>[cols]	**Boolean***
I/bit	**Boolean**
I/bit[rows][cols]	**Boolean***
I/bit[cols]	**Boolean***

*Array types.

Note: Word and bit address information is in octal for PLC-5 models. This follows the convention of the programming software.

SLC 5/05 Open Models (Modular I/O) Syntax

Syntax	Data Type

I:<slot>	Short, **Word**, BCD
I:<slot>.<word>	Short, **Word**, BCD
I:<slot>/<bit>	**Boolean**
I:<slot>/<bit>[rows][cols]	**Boolean***
I:<slot>/<bit>[cols]	**Boolean***
I:<slot>.<word>/<bit>	**Boolean**
I:<slot>.<word>/<bit>[rows][cols]	**Boolean***
I:<slot>.<word>/<bit>[cols]	**Boolean***

*Array types.

Slot and Word Locations

The following slot and word locations are allowed for each model. For more information, refer to **Device Setup**.

PLC Model	Min Slot	Max Slot	Max Word
SLC 5/05 Open	1	30	*
PLC5 Family	NA	NA	277 (octal)

*The number of Input or Output words available for each I/O module can be found in the **Modular I/O Selection Guide**.

Examples

All addresses are in Octal.

PLC-5	Addresses
I:0	Word 0.
I:10	Word 8 (10 octal = 8 decimal).
I/20	Bit 16 (20 octal = 16 decimal).
I:1/0	Bit 0 word 1 (same as I/20).
I/20[9]	9 element Boolean array starting at bit 16 (20 octal = 16 decimal).
I/37[8][11]	8 by 11 element Boolean array starting at bit 31 (37 octal = 31 decimal).
I:47/5[3]	3 element Boolean array starting at bit 5 word 39 (47 octal = 39 decimal).
I:11/13[3][7]	3 by 7 element Boolean array starting at bit 11 (13 octal = 11 decimal) word 9 (11 octal = 9 decimal).

SLC 5/05	Addresses
I:1	Word 0 slot 1.
I:1.0	Word 0 slot 1 (same as I:1).
I:12	Word 0 slot 12.
I:12.2	Word 2 slot 12.
I:4.0/0	Bit 0 word 0 slot 4.
I:4/0	Bit 0 slot 4 (same as I:4.0/0).
I:4.2/0	Bit 0 word 2 slot 4.
I:4/32	Bit 32 slot 4 (same as I:4.2/0).
I:2.12/3[17]	17 element Boolean array starting at bit 3 word 12 slot 2.
I:2.2/0[12][12]	12 by 12 element Boolean array starting at bit 0 word 2 slot 2.
I:2/43[5]	5 element Boolean array starting at bit 43 slot 2.
I:2/11[6][12]	6 by 12 element Boolean array starting at bit 11 slot 2.

Status Files

To access Status files, specify a word (and optionally, a bit in the word). The default data type for all syntax is shown in **bold**.

Syntax	Data Type
S:<word>	Short, **Word**, BCD, DWord, Long, LBCD
S:<word> [rows][cols]	Short, **Word**, BCD, DWord, Long, LBCD*
S:<word> [cols]	Short, **Word**, BCD, DWord, Long, LBCD*

S:<word>/<bit>	**Boolean**
S:<word>/<bit> [rows][cols]	**Boolean***
S:<word>/<bit> [cols]	**Boolean***
S/bit	**Boolean**
S/bit [rows][cols]	**Boolean***
S/bit [cols]	**Boolean***

*Array types.

Note: The number of array elements (in bytes) cannot exceed the block request size specified. This means that array size cannot exceed 16 words given a block request size of 32 bytes. For more information, refer to **Block Request Size**.

Word Locations

The following Word locations are allowed for each model. The maximum word location is one less when accessing as a 32 bit data type (Long, DWord or Long BCD).

PLC Model	Max Word
SLC 5/05 Open	999
PLC-5 Family	999

Example	Description
S:0	Word 0.
S/26	Bit 26.
S:4/15	Bit 15 word 4.
S:10 [16]	16 element array starting at word 10.
S:0 [4][8]	4 by 8 element array starting at word 0.
S/9 [5]	5 element Boolean array starting at bit 9.
S/11 [3][7]	3 by 7 element Boolean array starting at bit 11.
S:6/1 [6]	6 element Boolean array starting at bit 1 word 6.
S:13/5 [2][3]	2 by 3 element Boolean array starting at bit 5 word 13.

Binary Files

To access Binary files, specify a file number and a word (and optionally, a bit in the word). The default data type for all syntax is shown in **bold**.

Syntax	Data Type
B<file>:<word>	Short, **Word**, BCD, DWord, Long, LBCD
B<file>:<word> [rows][cols]	Short, **Word**, BCD, DWord, Long, LBCD*
B<file>:<word> [cols]	Short, **Word**, BCD, DWord, Long, LBCD*
B<file>:<word>/<bit>	**Boolean**
B<file>:<word>/<bit> [rows][cols]	**Boolean***
B<file>:<word>/<bit> [cols]	**Boolean***
B<file>/bit	**Boolean**
B<file>/bit [rows][cols]	**Boolean***
B<file>/bit [cols]	**Boolean***

*Array types.

Note: The number of array elements (in bytes) cannot exceed the block request size specified. This means that array size cannot exceed 16 words given a block request size of 32 bytes. For more information, refer to **Block Request Size**.

File Numbers and Word Locations

The following file numbers and word locations are allowed for each model. The maximum word location is one less when accessing as a 32 bit data type (Long, DWord or Long BCD).

PLC Model	File Number	Max Word

SLC 5/05 Open	3, 9-999	999
PLC-5 Family	3-999	1999

Example	Description
B3:0	Word 0.
B3/26	Bit 26.
B12:4/15	Bit 15 word 4.
B3:10 [20]	20 element array starting at word 10.
B15:0 [6][6]	6 by 6 element array starting at word 0.
B3/7 [8]	8 element Boolean array starting at bit 7.
B3/32 [6][9]	6 by 9 element Boolean array starting at bit 32.
B3:11/2 [12]	12 element Boolean array starting at bit 2 word 11.
B3:23/4 [5][8]	5 by 8 element Boolean array starting at bit 4 word 23.

Timer Files

Timer files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
T<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	4, 9-999	999
PLC-5 Family	3-999	1999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
ACC	Short, **Word**	Read/Write
PRE	Short, **Word**	Read/Write
DN	**Boolean**	Read Only
TT	**Boolean**	Read Only
EN	**Boolean**	Read Only

Example	Description
T4:0.ACC	Accumulator of timer 0 file 4.
T4:10.DN	Done bit of timer 10 file 4.
T15:0.PRE	Preset of timer 0 file 15.

Counter Files

Counter files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
C<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	5, 9-999	999
PLC-5 Family	3-999	1999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
ACC	Short, **Word**	Read/Write
PRE	Short, **Word**	Read/Write
UA	**Boolean**	Read Only
UN	**Boolean**	Read Only
OV	**Boolean**	Read Only
DN	**Boolean**	Read Only
CD	**Boolean**	Read Only
CU	**Boolean**	Read Only

Example	Description
C5:0.ACC	Accumulator of counter 0 file 5.
C5:10.DN	Done bit of counter 10 file 5.
C15:0.PRE	Preset of counter 0 file 15.

Control Files

Control files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
R<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	6, 9-999	999
PLC-5 Family	3-999	1999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
LEN	Short, **Word**	Read/Write
POS	Short, **Word**	Read/Write
FD	**Boolean**	Read Only
IN	**Boolean**	Read Only
UL	**Boolean**	Read Only
ER	**Boolean**	Read Only
EM	**Boolean**	Read Only
DN	**Boolean**	Read Only
EU	**Boolean**	Read Only
EN	**Boolean**	Read Only

Examples	Description
R6:0.LEN	Length field of control 0 file 6.
R6:10.DN	Done bit of control 10 file 6.
R15:18.POS	Position field of control 18 file 15.

Integer Files

To access Integer files, specify a file number and a word (and optionally, a bit in the word). The default data type for all syntax is shown in **bold**.

Syntax	Data Type
N<file>:<word>	Short, **Word**, BCD, DWord, Long, LBCD
N<file>:<word> [rows][cols]	Short, **Word**, BCD, DWord, Long, LBCD*

N<file>:<word> [cols]	Short, **Word**, BCD, DWord, Long, LBCD*
N<file>:<word>/<bit>	**Boolean**
N<file>:<word>/<bit> [rows][cols]	**Boolean***
N<file>:<word>/<bit> [cols]	**Boolean***
N<file>/bit	**Boolean**
N<file>/bit [rows][cols]	**Boolean***
N<file>/bit [cols]	**Boolean***

*Array types.

Note: The number of array elements (in bytes) cannot exceed the block request size specified. This means that array size cannot exceed 16 words given a block request size of 32 bytes. For more information, refer to **Block Request Size**.

File Numbers and Word Locations

The following file numbers and maximum word locations are allowed for each model. The maximum word location is one less when accessing as a 32 bit data type (Long, DWord or Long BCD).

PLC Model	File Number	Max Word
SLC 5/05 Open	7, 9-999	999
PLC-5 Family	3-999	1999

Example	Description
N7:0	Word 0.
N7/26	Bit 26.
N12:4/15	Bit 15 word 4.
N7:10 [8]	8 element array starting at word 10.
N15:0 [4][5]	4 by 5 element array starting at word 0.
N7/12 [9]	9 element Boolean array starting at bit 12.
N7/19 [3][11]	3 by 11 element Boolean array starting at bit 19.
N7:7/0 [10]	10 element Boolean array starting at bit 0 word 7.
N7:29/13 [2][15]	2 by 15 element Boolean array starting at bit 13 word 29.

Float Files

To access Float files, specify a file number and an element. The only data type allowed is Float.

Syntax	Data Type
F<file>:<element>	Float
F<file>:<element> [rows][cols]	Float array
F<file>:<element> [cols]	Float array

Note: The number of array elements (in bytes) cannot exceed the block request size specified. This means array size cannot exceed 8 Floats given a block request size of 32 bytes. For more information, refer to **Block Request Size**.

File Numbers and Word Locations

The following file numbers and maximum word locations are allowed for each model.

PLC Model	File Number	Max Word
SLC 5/05 Open	8-999	999
PLC-5 Family	3-999	1999

Example	Description
F8:0	Float 0.
F8:10 [16]	16 element array starting at word 10.
F15:0 [4][4]	16 element array starting at word 0.

ASCII Files

To access ASCII file data, specify a file number and character location. The default data type for all syntax is shown in **bold**.

Syntax	Data Type
A<file>:<char>	**Char**, Byte*
A<file>:<char> [rows][cols]	**Char**, Byte*
A<file>:<char> [cols]	**Char**, Byte*
A<file>:<word offset>/length	**String****

Note: The number of array elements cannot exceed the block request size specified. For more information, refer to **Block Request Size**.

*The PLC packs two characters per word in the file, with the high byte containing the first character and the low byte containing the second character. The PLC programming software allows access at the word level or two-character level. The AB Ethernet driver allows accessing to the character level. Examples are as follows:

- Using the programming software A10:0=AB would result in 'A' being stored in the high byte of A10:0 and 'B' being stored in the low byte.
- Using the AB Ethernet driver, two assignments, A10:0=A and A10:1=B, would result in the same data being stored in the PLC memory.

**Referencing this file as string data allows access to data at word boundaries like the programming software. The length can be up to 236 characters. If a string that is sent to the device is smaller in length than the length specified by the address, the driver null terminates the string before sending it down to the controller.

File Numbers and Character Locations

The following file numbers and maximum character locations are allowed for each model.

PLC Model	File Number	Max Character
SLC 5/05 Open	9-999	1999
PLC-5 Family	3-999	1999

Note: All SLC 500 PLCs do not support ASCII file types. For more information, refer to the PLC's documentation.

Example	Description
A9:0	Character 0 (high byte of word 0).
A27:10 [80]	80 character array starting at character 10.
A15:0 [4][16]	4 by 16 character array starting at character 0.
A62:0/32	32 character string starting at word offset 0.

String Files

To access data in a String file, specify a file number and an element. The only data type allowed is string, which are 82 character null terminated arrays. The driver places the null terminator based on the string length returned by the PLC.

Syntax	Data Type
ST<file>:<element>.<field>	String

Note: Arrays of strings are not supported.

File Numbers and Word Locations

The following file numbers and maximum word locations are allowed for each model.

PLC Model	File Number	Max Word
SLC 5/05 Open	9-999	999
PLC-5 Family	3-999	999

Example	Description

ST9:0	String 0.
ST18:10	String 10.

SLC5/05 Open Addressing

Open Addressing

The actual number of addresses available depends on the model of the PLC. The ranges have been opened up to allow for maximum flexibility with future models. If the driver finds at Runtime that an address is not present in the device, it will post an error message and remove the tag from its scan list.

Note: This model has no specific addressing.

See Also: General Addressing

PLC-5 Family Addressing

General Addressing

General Addressing

Model Specific Addressing

BCD Files
PID Files
Message Files
Block Transfer Files

BCD Files

To access BCD files, specify a file number and a word. The only data types allowed are BCD and long BCD. The default data type is always BCD.

Syntax	Data Type
D<file>:<word>	**BCD**, LBCD
D<file>:<word> [rows][cols]	**BCD**, LBCD*
D<file>:<word> [cols]	**BCD**, LBCD*

*Array types.

Note: The number of array elements (in bytes) cannot exceed the block request size specified. This means array size cannot exceed 16 BCDs given a block request size of 32 bytes. For more information, refer to Block Request Size.

File Numbers and Word Locations

The following file numbers and maximum word locations are allowed for each model.

PLC Model	File Number	Max Word
SLC 5/05 Open	NA	NA
PLC-5 Family	3-999	999

Example	Description
D9:0	Word 0.
D27:10 [16]	16 element array starting at word 10.
D15:0 [4][8]	32 element array starting at word 0.

PID Files

PID files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
PD<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	NA	NA
PLC-5 Family	3-999	999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
SP	**Real**	Read/Write
KP	**Real**	Read/Write
KI	**Real**	Read/Write
KD	**Real**	Read/Write
BIAS	**Real**	Read/Write
MAXS	**Real**	Read/Write
MINS	**Real**	Read/Write
DB	**Real**	Read/Write
SO	**Real**	Read/Write
MAXO	**Real**	Read/Write
MINO	**Real**	Read/Write
UPD	**Real**	Read/Write
PV	**Real**	Read/Write
ERR	**Real**	Read/Write
OUT	**Real**	Read/Write
PVH	**Real**	Read/Write
PVL	**Real**	Read/Write
DVP	**Real**	Read/Write
DVN	**Real**	Read/Write
PVDB	**Real**	Read/Write
DVDB	**Real**	Read/Write
MAXI	**Real**	Read/Write
MINI	**Real**	Read/Write
TIE	**Real**	Read/Write
FILE	Short, **Word**	Read/Write
ELEM	Short, **Word**	Read/Write
EN	**Boolean**	Read/Write
CT	**Boolean**	Read/Write
CL	**Boolean**	Read/Write
PVT	**Boolean**	Read/Write
DO	**Boolean**	Read/Write
SWM	**Boolean**	Read/Write
CA	**Boolean**	Read/Write
MO	**Boolean**	Read/Write
PE	**Boolean**	Read/Write
INI	**Boolean**	Read/Write
SPOR	**Boolean**	Read/Write
OLL	**Boolean**	Read/Write
OLH	**Boolean**	Read/Write
EWD	**Boolean**	Read/Write
DVNA	**Boolean**	Read/Write
DVHA	**Boolean**	Read/Write
PVLA	**Boolean**	Read/Write
PVHA	**Boolean**	Read/Write

Example	Description
PD14:0.SP	Setpoint field of PD 0 file 14.
PD18:6.EN	Status enable bit of PD 6 file 18.

Message Files

Message files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
MG<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	NA	NA
PLC-5 Family	3-999	999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
ERR	Short, **Word**	Read/Write
RLEN	Short, **Word**	Read/Write
DLEN	Short, **Word**	Read/Write
EN	**Boolean**	Read/Write
ST	**Boolean**	Read/Write
DN	**Boolean**	Read/Write
ER	**Boolean**	Read/Write
CO	**Boolean**	Read/Write
EW	**Boolean**	Read/Write
NR	**Boolean**	Read/Write
TO	**Boolean**	Read/Write

Example	Description
MG14:0.RLEN	Requested length field of MG 0 file 14.
MG18:6.CO	Continue bit of MG 6 file 18.

Block Transfer Files

Block transfer files are a structured type whose data is accessed by specifying a file number, an element and a field. The default data type depends on the field being accessed. Integer fields receive a default data type of Word.

Syntax	Data Type
BT<file>:<element>.<field>	Depends on field

File Numbers and Elements

The following file numbers and maximum element are allowed for each model.

PLC Model	File Number	Max Element
SLC 5/05 Open	NA	NA
PLC-5 Family	3-999	1999

The following fields are allowed for each element. Refer to the PLC documentation for the meaning of each field.

Element Field	Data Type	Access
RLEN	Short, **Word**	Read/Write
DLEN	Short, **Word**	Read/Write
FILE	Short, **Word**	Read/Write
ELEM	Short, **Word**	Read/Write
RW	**Boolean**	Read/Write

ST	**Boolean**	Read/Write
DN	**Boolean**	Read/Write
ER	**Boolean**	Read/Write
CO	**Boolean**	Read/Write
EW	**Boolean**	Read/Write
NR	**Boolean**	Read/Write
TO	**Boolean**	Read/Write

Example	Description
BT14:0.RLEN	Requested length field of BT 0 file 14.
BT18:6.CO	Continue bit of BT 6 file 18.

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Missing address
Device address '<address>' contains a syntax error
Address '<address>' is out of range for the specified device or register
Device address '<address>' is not supported by model '<model name>'
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' is Read Only
Array size is out of range for address '<address>'
Array support is not available for the specified address: '<address>'

Communications Error Messages

Winsock initialization failed (OS Error = n)
Winsock V1.1 or higher must be installed to use the Allen-Bradley Ethernet device driver

Device Status Messages

Device '<device name>' is not responding
Unable to write to '<address>' on device '<device name>'

Device Specific Messages

Unable to read data starting at address <address> on device '<device name>'. Frame received contains errors
Unable to read data starting at address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]
Unable to write to address <address> on device '<device name>'. Frame received contains errors
Unable to write to address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Missing address
Device address '<address>' contains a syntax error
Address '<address>' is out of range for the specified device or register
Device address '<address>' is not supported by model '<model name>'
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' is Read Only
Array size is out of range for address '<address>'
Array support is not available for the specified address: '<address>'

Missing address

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has no length.

Solution:
Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically contains one or more invalid characters.

Solution:
Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically references a location that is beyond the range of supported locations for the device.

Solution:
Verify the address is correct; if it is not, re-enter it in the client application.

Device address '<address>' is not supported by model '<model name>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically references a location that is valid for the communications protocol but not supported by the target device.

Solution:
Verify the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

Data Type '<type>' is not valid for device address '<address>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has been assigned an invalid data type.

Solution:
Modify the requested data type in the client application.

Device address '<address>' is Read Only

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has a requested access mode that is not compatible with what the device supports for that address.

Solution:
Change the access mode in the client application.

Array size is out of range for address '<address>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically is requesting an array size that is too large for the address type or block size of the driver.

Solution:
Re-enter the address in the client application to specify a smaller value for the array or a different starting point.

Array support is not available for the specified address: '<address>'

Error Type:

Warning

Possible Cause:
A tag address that has been specified statically contains an array reference for an address type that doesn't support arrays.

Solution:
Re-enter the address in the client application to remove the array reference or correct the address type.

Communications Error Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Communications Error Messages
Winsock initialization failed (OS Error = n)
Winsock V1.1 or higher must be installed to use the Allen-Bradley Ethernet device driver

Winsock initialization failed (OS Error = n)

Error Type:
Fatal

OS Error:	Indication	Possible Solution
10091	Indicates that the underlying network subsystem is not ready for network communication.	Wait a few seconds and restart the driver.
10067	Limit on the number of tasks supported by the Windows Sockets implementation has been reached.	Close one or more applications that may be using Winsock and restart the driver.

Winsock V1.1 or higher must be installed to use the Allen-Bradley Ethernet device driver

Error Type:
Fatal

Possible Cause:
The version number of the Winsock DLL found on the system is less than 1.1.

Solution:
Upgrade Winsock to version 1.1 or higher.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages
Device '<device name>' is not responding
Unable to write to '<address>' on device '<device name>'

Device '<device name>' is not responding

Error Type:
Warning

Possible Cause:
1. The Ethernet connection between the device and the Host PC is broken.
2. The communication parameters for the Ethernet connection are incorrect.
3. The named device may have been assigned an incorrect IP address.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

Solution:
1. Verify the cabling between the PC and the device.
2. Verify that the correct port has been specified for the named device.

3. Verify that the IP address given to the named device matches that of the actual device.
4. Increase the Request Timeout setting so that the entire response can be handled.

Unable to write to '<address>' on device '<device name>'

Error Type:
Warning

Possible Cause:
1. The Ethernet connection between the device and the Host PC is broken.
2. The communication parameters for the Ethernet connection are incorrect.
3. The named device may have been assigned an incorrect IP address.

Solution:
1. Verify the cabling between the PC and the device.
2. Verify that the correct port has been specified for the named device.
3. Verify that the IP address given to the named device matches that of the actual device.

Device Specific Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Specific Messages
Unable to read data starting at address <address> on device '<device name>'. Frame received contains errors
Unable to read data starting at address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]
Unable to write to address <address> on device '<device name>'. Frame received contains errors
Unable to write to address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]

Unable to read data starting at address <address> on device '<device name>'. Frame received contains errors

Error Type:
Warning

The type of error could be:
1. An incorrect frame size received.
2. A TNS mismatch.
3. An invalid response command returned from the device.

Possible Cause:
1. Misalignment of packets due to connection/disconnection between the PC and device.
2. Bad cabling connecting the devices that is causing noise.

Solution:
The driver will recover from the error without intervention. If this error occurs frequently, there may be an issue with the cabling or the device itself.

Unable to read data starting at address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]

Error Type:
Warning

Possible Cause:
1. The address requested does not exist in the PLC.
2. The address requested cannot be accessed because the PLC is in an error state.
3. The communications parameters for the Ethernet connection are incorrect.

Solution:
1. Verify the address exists in the PLC.
2. Verify the PLC is not in an error state.
3. Verify the communications parameters for the Ethernet connection are correct.
4. Verify the correct port is specified for the named device.

5. Verify the IP address given to the named device matches that of the actual device.

Note:
Check the status and extended status codes that are being returned by the PLC. The extended status code may not always be returned; thus, error information is contained within the status code. The codes are displayed in hexadecimal.

Status code errors in the low nibble of the status code indicate errors found by the local node. The driver will continue to retry reading these blocks of data periodically. Errors found by the local node occur when the KF module cannot see the destination PLC on the network for some reason.

Status code errors in the high nibble of the status code indicate errors found by the PLC. These errors are generated when the block of data the driver is asking for is not available in the PLC. The driver will not ask for these blocks again after receiving this kind of error. This kind of error can be generated if the address does not exist in the PLC.

Unable to write to address <address> on device '<device name>'. Frame received contains errors

Error Type:
Warning

The Error Could Be:
1. Incorrect frame size received.
2. TNS mismatch.
3. Invalid response command returned from device.

Possible Cause:
1. Misalignment of packets due to connection/disconnection between PC and device.
2. There is bad cabling connecting the devices causing noise.

Solution:
The driver will recover from this error without intervention. If this error occurs frequently, there may be an issue with the cabling or the device itself.

Unable to write to address <address> on device '<device name>'. [STS=<value>, EXT STS=<value>]

Error Type:
Warning

Possible Cause:
The address written to does not exist in the PLC.

Solution:
Check the status and extended status codes that are being returned by the PLC. Note that an extended status code may not always be returned and thus the error information is contained within the status code. The codes are displayed in hexadecimal.

Status code errors in the low nibble of the status code indicate errors found by the local node. Errors found by the local node occur when the KF module cannot see the destination PLC on the network for some reason.

Status code errors in the high nibble of the status code indicate errors found by the PLC. These errors are generated when the data location is not available in the PLC or is not writeable.

Index

A

B

C

D

F

G

I

L

M

N

O

P

S

T

U

W