Yokogawa YS100 Driver

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Yokogawa YS100 Driver

Help version 1.014

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Overview

The Yokogawa YS100 Driver provides an easy and reliable way to connect Yokogawa YS100 Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with the Yokogawa YS100 family of serial devices.

Device Setup

Supported Devices
YS150
YS170

Communication Protocol
YS100 Command-Response Message Format

Supported Communication Parameters
Baud Rate: 1200, 2400, 4800, and 9600.
Parity: Odd, Even, and None.
Data Bits: 8
Stop Bits: 1 and 2.

Note: When using the RS-232 dedicated port with a RJ45 connected to the front of the unit (located beneath the swing out cover), the communication parameters will be fixed at 4800 Baud, No Parity, 8 Data Bits, and 1 Stop Bit.

Ethernet Encapsulation
This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network with a terminal server. It may be enabled through the Communications dialog in Channel Properties. For more information, refer to the server's help file.

Device ID (PLC Network Address)
Yokogawa YS100 Serial devices are assigned Device IDs in the range 1 to 16. When communicating with a device in Peer-to-Peer Mode, use the RS-232 dedicated port with a RJ45 connected to the front of the unit. The fixed address is 0.

Flow Control
When using a RS232/RS485 converter, the type of flow control that is required will depend on the converter's needs. Some do not require flow control, whereas others require RTS Flow. Consult the converter's documentation in order to determine its flow requirements. An RS485 converter that provides automatic flow control is recommended.

Note 1: When using the manufacturer's supplied communications cable, it is sometimes necessary to choose a flow control setting of **RTS** or **RTS Always** under the Channel Properties.

Note 2: The Yokogawa YS100 Driver supports the RTS Manual flow control option. This selection is used to configure the driver for operation with radio modems that require special RTS timing characteristics. For more information on RTS Manual flow control, refer to the server help file.

See Also: Settings

Modem Setup

This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

Settings

⊟ **Watchdog Timer Settings**	
Watchdog	Disable
Watchdog Timer (s)	1000

Descriptions of the properties are as follows:

- **Watchdog:** When Enable is specified, the watchdog command will be sent based on the interval specified in Watchdog Timer (s). The default setting is Disabled.

Note: Devices operating in DDC or SPC mode may require that the supervisory computer sends a watchdog command to the device at fixed intervals. If the watchdog command is not received by the device from the supervisory computer within the defined interval, the device will run in backup mode.

- **Watchdog Timer (s):** This property specifies the interval on which the watchdog command will be sent to the device. It is only available when the watchdog is enabled. The valid range is 0 to 9999 seconds. The default setting is 1000 seconds.

Note: If this property is set to 0 seconds while the watchdog is enabled, the Yokogawa YS100 Driver will send a watchdog command to the device that disables the supervisory computer watchdog function in the device.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	8 bit value bit 1 is the low bit bit 8 is the high bit
Word	Unsigned 16 bit value
Short	Signed 16 bit value
Float	32 bit floating point value.
String	Zero terminated character array

Address Descriptions

The Yokogawa YS100 Driver automatically generates tags for many important device parameters. Users can also manually create tags. Address specifications vary depending on the model in use. Select a link from the list below to obtain specific address information for the model of interest.

YS150
YS170

YS150 Addressing

The table below describes how to specify an address when creating a tag. The default data types for dynamically defined tags are shown in **bold**.

Note: The full range of addresses accepted by this driver may not be valid for a particular device.

Address	Range	Data Type	Access	Description
PV	1-2	**Float**	Read Only	Process variable
SV	1-2	**Float**	Read/Write	Setpoint value
CSV	1-2	**Float**	Read Only	Cascade setpoint value
DV	1-2	**Float**	Read Only	Deviation Value
MV	1-2	**Float**	Read/Write	Manipulated variable
LS	1-2	**String**	Read/Write	Action mode
SCH	1-2	**Float**	Read Only	Range high limit **1**
SCL	1-2	**Float**	Read Only	Range low limit **1**
SCDP	1-2	**Short**, Word, Byte	Read Only	Decimal point position **1**
PH	1-2	**Float**	Read/Write	Setpoint for high limit alarm **1**
PL	1-2	**Float**	Read/Write	Setpoint for low limit alarm **1**
DL	1-2	**Float**	Read/Write	Setpoint for deviation limit alarm **1**
VL	1-2	**Float**	Read/Write	Setpoint for velocity limit alarm **1**
VT	1-2	**Short**, Word, Byte	Read/Write	Time duration setpoint for velocity limit alarm **1**
MH	1-2	**Float**	Read/Write	Setpoint for manipulated variable high limit **1**
ML	1-2	**Float**	Read/Write	Setpoint for manipulated variable low limit **1**
RefreshALM	1-2	**Boolean**	Write Only	Refreshes the alarm setpoint values (PH, PL, DL, VL, VT, MH, and ML)
PB	1-2	**Float**	Read/Write	Proportional band **2**
TI	1-2	**Short**, Word, Byte	Read/Write	Integral time (seconds)**2**
TD	1-2	**Short**, Word, Byte	Read/Write	Derivative time (seconds) **2**
AG	1-2	**Float**	Read Only	Variable gain **2**
GG	1-2	**Float**	Read/Write	Nonlinear control gain **2**

Address	Range	Data Type	Access	Description
GW	1-2	**Float**	Read/Write	Nonlinear control dead band width **2**
MR	1-2	**Float**	Read/Write	Manual reset value **2**
RB	1-2	**Float**	Read/Write	Reset bias value **2**
DM	1-2	**Float**	Read Only	Input compensation value **2**
FF	1-2	**Float**	Read Only	Output compensation value **2**
TRK	1-2	**Float**	Read Only	Tracking output value **2**
PMV	1-2	**Float**	Read/Write	Preset output value **2**
PRCA	None	**Byte**, Short, Word	Read Only	Process alarm
PRCA.1	None	**Boolean**	Read Only	High limit alarm **1**
PRCA.2	None	**Boolean**	Read Only	Low limit alarm **1**
PRCA.3	None	**Boolean**	Read Only	Deviation alarm **1**
PRCA.4	None	**Boolean**	Read Only	Velocity alarm **1**
PRCA.5	None	**Boolean**	Read Only	High limit alarm **2**
PRCA.6	None	**Boolean**	Read Only	Low limit alarm **2**
PRCA.7	None	**Boolean**	Read Only	Deviation alarm **2**
PRCA.8	None	**Boolean**	Read Only	Velocity alarm **2**
SYSA	None	**Byte**, Short, Word	Read Only	System alarm
SYSA.1	None	**Boolean**	Read Only	Input open alarm
SYSA.2	None	**Boolean**	Read Only	Output current open alarm
SYSA.3	None	**Boolean**	Read Only	Invalid data
SYSA.4	None	**Boolean**	Read Only	Invalid data
SYSA.5	None	**Boolean**	Read Only	Computed overflow alarm
SYSA.6	None	**Boolean**	Read Only	RAM contents volatized alarm
SYSA.7	None	**Boolean**	Read Only	EEPROM contents volatized alarm
SYSA.8	None	**Boolean**	Read Only	Invalid data
CNT<x>.1	1-2	**Short**, Word, Byte	Read Only	Control type setting **1** (0=Standard PID, 1=Sample PI, 2=Batch PID, 3=Proportional PD)
CNT<x>.2	1-2	**Short**, Word, Byte	Read Only	Control computation setting **1** (0=PV proportional type, 1=PV derivative type, 2=Adjustable filter type)
CNT<x>.3	1-2	**Short**, Word, Byte	Read Only	Control action direction setting **1** (0=Reverse, 1=Direct)
CNT<x>.4	1-2	**Short**, Word, Byte	Read Only	Open valve direction setting **1** (0=C-O, 1=O-C)
CNT<x>.5	1-2	**Short**, Word,	Read Only	C mode setting **1**

Address	Range	Data Type	Access	Description
		Byte		(0=Off, 1=Cascade, 2=Computer)
CNT<x>.6	1-2	**Short**, Word, Byte	Read Only	Backup mode setting **1** (0=Manual, 1=Auto)
CNT<x>.7	1-2	**String**	Read Only	Engineering unit **1**
CNT<x>.8	1-2	**String**	Read Only	Tag number **1**
RefreshCNT	1-2	**Boolean**	Write Only	Refreshes the CNT1 or CNT2 setting values
SYS1.1	None	**Short**, Word, Byte	Read Only	Control mode **1** (0=Programmable, 1=Multifunction type single-loop, 2=Multifunction type cascade, 3=Multifunction type selector)
SYS1.2	None	**Short**, Word, Byte	Read Only	Recovery from power failure **1** (0= TIM1, 1=AUT, 2=TIM2)
SYS1.3	None	**Short**, Word, Byte	Read Only	Settable by comm. **1** (0=Enabled, 1=Inhibited)
SYS2.1	None	**Short**, Word, Byte	Read Only	PF key definition **1** (0=None, 2=STC ON/OFF)
SYS2.2	None	**Short**, Word, Byte	Read Only	DI1 function definition**1** (0=None, 1=A/M Toggle, 2=C/A Toggle, 3=Preset MV, 4=Tracking Toggle, 5=STC Toggle, 6=Internal CAS Toggle, 7=Selector Secondary Loop C/A Toggle)
SYS2.3	None	**Short**, Word, Byte	Read Only	DI1 set active **1** (0=Open for ON, 1=Closed for ON)
SYS2.4	None	**Short,** Word, Byte	Read Only	Alarm output status **1** (0=Open, 1=Closed)
SYS2.5	None	**Short,** Word, Byte	Read Only	SV tracking definition **1** (0=None, 1=SV, 2=PV)
SYS2.6	None	**Short,** Word, Byte	Read Only	Selector definition **1** (0=Low selector, 1=High Selector)
RefreshSYS	None	**Boolean**	Write Only	Refreshes the SYS1 and SYS2 setting values
Model	None	**String**	Read Only	Model name **1**
X*****	01-05	**Float**	Read Only	Analog input register
Y******	01-06	**Float**	Read Only	Analog output register
DI	01-06	**Boolean**	Read Only	Status input register
DO	01-16	**Boolean**	Read Only	Status output register
P	01-30	**Float**	Read/Write	Computation parameter register **3**
T	01-30	**Float**	Read Only	Temporary storage register **3**

Address	Range	Data Type	Access	Description
K	01-30	**Float**	Read Only	Constant register **3**

*The memory address X05 is only valid in Program Mode.
**The memory addresses Y04-Y06 are only valid in Program Mode.

Notes

- **Static Data:** The data is read once at start up in order to initialize the value. To refresh the data, use the applicable Refresh Tag for all static data (with the exception of 'Model').
- **Tuning Parameters:** To increase the speed of optimization, only reference the address for this data when needed. When tuning data is included in the application, it must be scanned between reads of the loop variable data.
- **Computation Temporary and Constant Registers:** Although register data is not generated during automatic tag generation, it can be added if needed. When register data is included in the application, it must be scanned between reads of the loop variable data.

YS170 Addressing

The table below describes how to specify an address when creating a tag. The default data types for dynamically defined tags are shown in **bold**.

Note: The full range of addresses accepted by this driver may not be valid for a particular device.

Address	Range	Data Type	Access	Description
PV	1-2	**Float**	Read Only	Process variable
SV	1-2	**Float**	Read/Write	Setpoint value
CSV	1-2	**Float**	Read Only	Cascade setpoint value
DV	1-2	**Float**	Read Only	Deviation Value
MV	1-2	**Float**	Read/Write	Manipulated variable
LS	1-2	**String**	Read/Write	Action mode
SCH	1-2	**Float**	Read Only	Range high limit **1**
SCL	1-2	**Float**	Read Only	Range low limit **1**
SCDP	1-2	**Short**, Word, Byte	Read Only	Decimal point position **1**
PH	1-2	**Float**	Read/Write	Setpoint for high limit alarm **1**
PL	1-2	**Float**	Read/Write	Setpoint for low limit alarm **1**
DL	1-2	**Float**	Read/Write	Setpoint for deviation limit alarm **1**
VL	1-2	**Float**	Read/Write	Setpoint for velocity limit alarm **1**
VT	1-2	**Short**, Word, Byte	Read/Write	Time duration setpoint for velocity limit alarm **1**
MH	1-2	**Float**	Read/Write	Setpoint for manipulated variable high limit **1**
ML	1-2	**Float**	Read/Write	Setpoint for manipulated variable low limit **1**
RefreshALM	1-2	**Boolean**	Write Only	Refreshes the alarm setpoint values (PH, PL, DL, VL, VT,

Address	Range	Data Type	Access	Description
				MH, and ML)
PB	1-2	**Float**	Read/Write	Proportional band **2**
TI	1-2	**Short**, Word, Byte	Read/Write	Integral time (seconds) **2**
TD	1-2	**Short**, Word, Byte	Read/Write	Derivative time (seconds) **2**
AG	1-2	**Float**	Read Only	Variable gain **2**
GG	1-2	**Float**	Read/Write	Nonlinear control gain **2**
GW	1-2	**Float**	Read/Write	Nonlinear control dead band width **2**
MR	1-2	**Float**	Read/Write	Manual reset value **2**
RB	1-2	**Float**	Read/Write	Reset bias value **2**
DM	1-2	**Float**	Read Only	Input compensation value **2**
FF	1-2	**Float**	Read Only	Output compensation value **2**
TRK	1-2	**Float**	Read Only	Tracking output value **2**
PMV	1-2	**Float**	Read/Write	Preset output value **2**
PRCA	None	**Byte**, Short, Word	Read Only	Process alarm
PRCA.1	None	**Boolean**	Read Only	High limit alarm **1**
PRCA.2	None	**Boolean**	Read Only	Low limit alarm **1**
PRCA.3	None	**Boolean**	Read Only	Deviation alarm **1**
PRCA.4	None	**Boolean**	Read Only	Velocity alarm **1**
PRCA.5	None	**Boolean**	Read Only	High limit alarm **2**
PRCA.6	None	**Boolean**	Read Only	Low limit alarm **2**
PRCA.7	None	**Boolean**	Read Only	Deviation alarm **2**
PRCA.8	None	**Boolean**	Read Only	Velocity alarm **2**
SYSA	None	**Byte**, Short, Word	Read Only	System alarm
SYSA.1	None	**Boolean**	Read Only	Input open alarm
SYSA.2	None	**Boolean**	Read Only	Output current open alarm
SYSA.3	None	**Boolean**	Read Only	Invalid data
SYSA.4	None	**Boolean**	Read Only	Invalid data
SYSA.5	None	**Boolean**	Read Only	Computed overflow alarm
SYSA.6	None	**Boolean**	Read Only	RAM contents volatized alarm
SYSA.7	None	**Boolean**	Read Only	EEPROM contents volatized alarm
SYSA.8	None	**Boolean**	Read Only	Invalid data
CNT<x>.1	1-2	**Short**, Word, Byte	Read Only	Control type setting **1** (0=Standard PID, 1=Sample PI, 2=Batch PID, 3=Proportional PD)
CNT<x>.2	1-2	**Short**,	Read Only	Control computation setting **1**

Address	Range	Data Type	Access	Description
		Word, Byte		(0=PV proportional type, 1=PV derivative type, 2=Adjustable filter type)
CNT<x>.3	1-2	**Short**, Word, Byte	Read Only	Control action direction setting **1** (0=Reverse, 1=Direct)
CNT<x>.4	1-2	**Short**, Word, Byte	Read Only	Open valve direction setting **1** (0=C-O, 1=O-C)
CNT<x>.5	1-2	**Short**, Word, Byte	Read Only	C mode setting **1** (0=Off, 1=Cascade, 2=Computer)
CNT<x>.6	1-2	**Short**, Word, Byte	Read Only	Backup mode setting **1** (0=Manual, 1=Auto)
CNT<x>.7	1-2	**String**	Read Only	Engineering unit **1**
CNT<x>.8	1-2	**String**	Read Only	Tag number **1**
RefreshCNT	1-2	**Boolean**	Write Only	Refreshes the CNT1 or CNT2 setting values
SYS1.1	None	**Short**, Word, Byte	Read Only	Control mode **1** (0=Programmable, 1=Multifunction type single-loop 2=Multifunction type cascade, 3=Multifunction type selector)
SYS1.2	None	**Short**, Word, Byte	Read Only	Recovery from power failure **1** (0= TIM1, 1=AUT, 2=TIM2)
SYS1.3	None	**Short**, Word, Byte	Read Only	Settable by comm. **1** (0=Enabled, 1=Inhibited)
SYS2.1	None	**Short**, Word, Byte	Read Only	PF key definition **1** (0=None, 2=STC ON/OFF)
SYS2.2	None	**Short**, Word, Byte	Read Only	DI1 function definition **1** (0=None, 1=A/M Toggle, 2=C/A Toggle, 3=Preset MV, 4=Tracking Toggle, 5=STC Toggle, 6=Internal CAS Toggle,7=Selector Secondary Loop C/A Toggle)
SYS2.3	None	**Short**, Word, Byte	Read Only	DI1 set active **1** (0=Open for ON, 1=Closed for ON)
SYS2.4	None	**Short**, Word, Byte	Read Only	Alarm output status **1** (0=Open, 1=Closed)
SYS2.5	None	**Short**, Word, Byte	Read Only	SV tracking definition **1** (0=None, 1=SV, 2=PV)

Address	Range	Data Type	Access	Description
SYS2.6	None	**Short**, Word, Byte	Read Only	Selector definition **1** (0=Low selector, 1=High Selector)
RefreshSYS	None	**Boolean**	Write Only	Refreshes the SYS1 and SYS2 setting values
Model	None	**String**	Read Only	Model name **1**
X*****	01-05	**Float**	Read Only	Analog input register
Y******	01-06	**Float**	Read Only	Analog output register
DI	01-06	**Boolean**	Read Only	Status input register
DO	01-16	**Boolean**	Read Only	Status output register
P	01-30	**Float**	Read/Write	Computation parameter register **3**
T	01-30	**Float**	Read Only	Temporary storage register **3**
K	01-30	**Float**	Read Only	Constant register **3**

*The memory address X05 is only valid in Program Mode.
**The memory addresses Y04-Y06 are only valid in Program Mode.

Notes

- **Static Data:** The data is read once at start up in order to initialize the value. To refresh the data, use the applicable Refresh Tag for all static data (with the exception of 'Model').
- **Tuning Parameters:** To increase the speed of optimization, only reference the address for this data when needed. When tuning data is included in the application, it must be scanned between reads of the loop variable data.
- **Computation Temporary and Constant Registers:** Although register data is not generated during automatic tag generation, it can be added if needed. When register data is included in the application, it must be scanned between reads of the loop variable data.

Automatic Tag Database Generation

The Yokogawa YS100 Driver utilizes the OPC server's Automatic Tag Database Generation feature by automatically creating tags through the use of a fixed database. When a device model is selected, tag and tag group generation will occur. For more information, refer to the server help file.

Note: The image below displays the results of Automatic Tag Database Creation for a YS150 device.
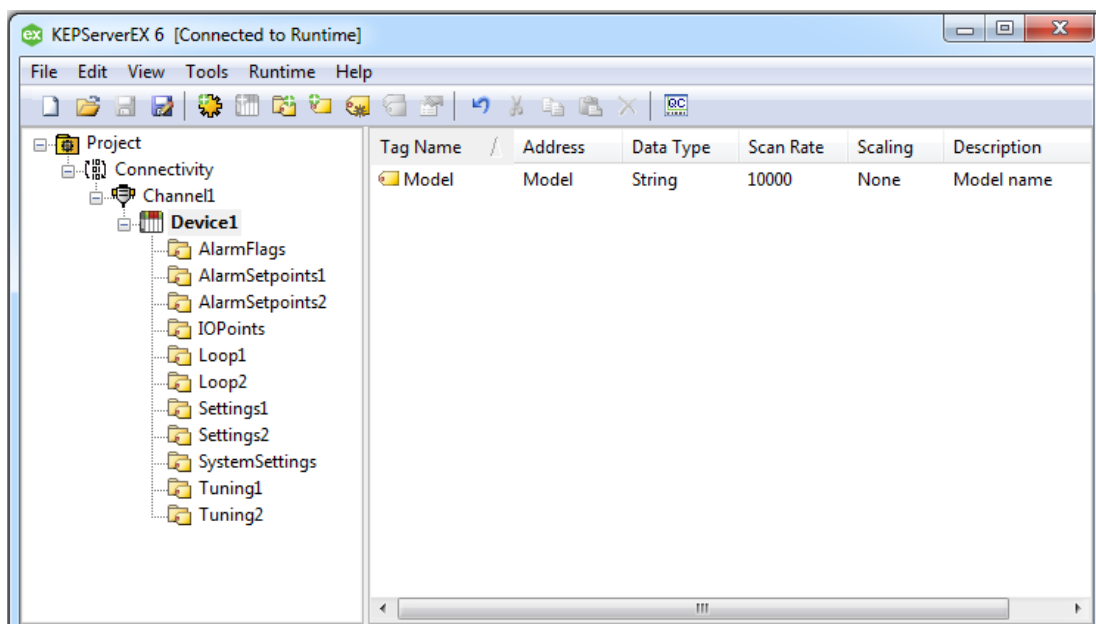
Error Descriptions

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

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

Serial Communications
Communications error on '<channel name>' [<error mask>]
COMn does not exist
COMn is in use by another application
Error opening COMn
Unable to set comm parameters on COMn

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

Device-Specific Messages
Failed to read static initialization data for device '<device name>'
No response to watchdog write on device '<device name>'
Received unexpected response for tag in block '<tag name>' on device '<device name>'

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.

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>' contains a syntax error

Error Type:
Warning

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

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.

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.

Missing address

Error Type:
Warning

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

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

Communications error on '<channel name>' [<error mask>]

Error Type:
Warning

Error Mask Definitions:
B = Hardware break detected.
F= Framing error.
E= I/O error.
O= Character buffer overrun.
R= RX buffer overrun.
P= Received byte parity error.
T= TX buffer full.

Possible Cause:

1. The serial connection between the device and the host PC is bad.

2. The communication parameters for the serial connection are incorrect.

3. There is a noise source disrupting communications in the cabling path between the PC and the device.

Solution:

1. Verify the cabling between the PC and the device.

2. Verify that the specified communication parameters match those of the device.

3. Re-route cabling to avoid sources of electrical interference; such as motors, generators or high voltage lines.

COMn does not exist

Error Type:
Fatal

Possible Cause:
The specified COM port is not present on the target computer.

Solution:
Verify that the proper COM port has been selected in the Channel Properties.

COMn is in use by another application

Error Type:
Fatal

Possible Cause:
The serial port assigned to a channel is being used by another application.

Solution:

1. Verify that the correct port has been assigned to the channel.

2. Close the other application that is using the requested COM port.

Error opening COMn

Error Type:
Fatal

Possible Cause:
The specified COM port could not be opened due to an internal hardware or software problem on the target computer.

Solution:
Verify that the COM port is functional and may be accessed by other Windows applications.

Unable to set communication parameters on COMn

Error Type:
Fatal

Possible Cause:
The serial parameters for the specified COM port are not valid.

Solution:
Verify the serial parameters and make any necessary changes.

Device '<device name>' is not responding

Error Type:
Serious

Possible Cause:

1. The serial connection between the device and the host PC is broken.

2. The communication parameters for the serial connection are incorrect.

3. The named device may have been assigned an incorrect Network ID.

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 specified communication parameters match those of the device.

3. Verify that the Network ID 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:
Serious

Possible Cause:

1. The serial connection between the device and the host PC is broken.

2. The communication parameters for the serial connection are incorrect.

3. The named device may have been assigned an incorrect Network ID.

Solution:

1. Verify the cabling between the PC and the device.

2. Verify that the specified communication parameters match those of the device.

3. Verify that the Network ID given to the named device matches that of the actual device.

Failed to read static sinitialization data for device '<device name>'

Error Type:
Serious

Possible Cause:

1. The serial connection between the device and the host PC is broken.

2. The communication parameters for the serial connection are incorrect.

3. The named device may have been assigned an incorrect Network ID.

Solution:

1. Verify the cabling between the PC and the device.

2. Verify that the specified communication parameters match those of the device.

3. Verify that the Network ID given to the named device matches that of the actual device.

No response to watchdog write on device '<device name>'

Error Type:
Serious

Possible Cause:

The driver did not receive a response to the watchdog timer command. Either the device is unable to accept the watchdog timer command or the device is not responding.

Solution:
Check communication parameters and cabling then restart the server.

Received unexpected response for tag in block '<tag name>' on device '<device name>'

Error Type:
Serious

Possible Cause:

1. An attempt has been made to reference a nonexistent location in the specified device.

2. If there was a break in connection between the driver and the device, the device may respond with a buffered response before responding to the current request.

Solution:

1. Verify the tags assigned to addresses in the specified range on the device and eliminate those that reference invalid locations.

2. If there was a cable disconnect, the driver will resynch with the device.

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