

# Yaskawa Memobus Plus Driver

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# Table of Contents

<b>Yaskawa Memobus Plus Driver</b> .....	<b>1</b>
<b>Table of Contents</b> .....	<b>2</b>
Welcome to the Yaskawa Memobus Plus Driver Help Center .....	4
Overview .....	4
External Dependencies .....	4
Setup .....	4
Channel Properties – General .....	5
Tag Counts .....	5
Channel Properties – Write Optimizations .....	6
Channel Properties – Advanced .....	7
Channel Properties – Adapter .....	7
Device Properties – General .....	7
Operating Mode .....	8
Tag Counts .....	9
Device ID (PLC Network Address) .....	9
Device Properties – Scan Mode .....	10
Device Properties – Timing .....	10
Device Properties – Auto-Demotion .....	11
Device Properties – Settings .....	12
Device Properties – Block Sizes .....	12
<b>Optimizing Communications</b> .....	<b>13</b>
<b>Data Types Description</b> .....	<b>15</b>
<b>Yaskawa Memobus Plus Driver Address Descriptions</b> .....	<b>16</b>
Output Coils .....	16
Input Coils .....	16
Internal Registers .....	17
Holding Registers .....	17
Global Data .....	19
Constant Registers .....	19
Link Coils .....	20
Link Registers .....	21
MC Coils .....	22
MC Control Coils .....	22
MC Relays .....	23
MC Control Relays .....	23
MC Code Relays .....	23
<b>Error Descriptions</b> .....	<b>25</b>
Missing address .....	25
Device address '<address>' contains a syntax error .....	25
Address '<address>' is out of range for the specified device or register .....	25
Data Type '<type>' is not valid for device address '<address>' .....	26

---

Device address '<address>' is Read Only .....	26
Array size is out of range for address '<address>' .....	26
Array support is not available for the specified address: '<address>' .....	26
Started MBPLUS.SYS device .....	26
Device '<device name>' is not responding .....	27
Unable to write to '<address>' on device '<device name>' .....	27
Unable to start MBPLUS.SYS device .....	27
Unable to communicate with MBPLUS.VXD .....	28
Unable to open MBPLUS server path .....	28
Error opening MBPLUS path: <ID> .....	28
Bad address in block [<start address> to <end address>] on device '<device name>' .....	28
<b>Index .....</b>	<b>29</b>

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## Welcome to the Yaskawa Memobus Plus Driver Help Center

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This help center is the user documentation for Kepware Yaskawa Memobus Plus Driver. This help center is updated regularly to reflect the latest functionality and information.

### [Overview](#)

What is the Yaskawa Memobus Plus Driver?

### [Device ID \(PLC Network Address\)](#)

How do I specify a Device ID for a Yaskawa Memobus Plus (SA85) device?

### [Optimizing Communications](#)

How do I get the best performance from the Yaskawa Memobus Plus Driver?

### [Data Types Description](#)

What data types does the Yaskawa Memobus Plus Driver support?

### [Yaskawa Memobus Plus \(SA85\) Address Descriptions](#)

How do I address a data location on a Yaskawa Memobus Plus device?

### [Error Descriptions](#)

What messages does the Yaskawa Memobus Plus Driver produce?

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## Overview

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The Yaskawa Memobus Plus Driver provides a reliable way to connect Yaskawa Memobus Plus (SA85) devices to OPC client applications; including HMI, SCADA, Historian, MES, ERP, and countless custom applications. It is intended for use with a Modicon SA85 Network card.

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## External Dependencies

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This driver has external dependencies. An SA85 or PCI-85 interface adapter and its device driver software (MBPLUS or MBX drivers) are required to communicate to the Modbus Plus network. The interface adapter and device drivers can be purchased from Modicon/Schneider. The OPC server can support up to 8 Modbus Plus channels per SA85 or PCI-85 card.

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## Setup

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The driver can poll multiple devices (PLCs) on a Memobus Plus network. It can also act as a single server device on the Memobus Plus network for other devices to poll. The maximum number of channels supported by this driver is 32. The maximum number of devices supported by this driver is 2048 per channel. It is only designed to use Adapter 0.

The Yaskawa Memobus Plus Driver supports the use of additional channel definitions for improved performance. These additional channels allow users to configure applications to take full advantage of the SA85 card. *For more information on using multiple channels, refer to [Optimizing Communications](#).*

## Channel Properties – General

This server supports the use of multiple simultaneous communications drivers. Each protocol or driver used in a server project is called a channel. A server project may consist of many channels with the same communications driver or with unique communications drivers. A channel acts as the basic building block of an OPC link. This group is used to specify general channel properties, such as the identification attributes and operating mode.

Property Groups	[-] <b>Identification</b>	
<b>General</b>	Name	
Write Optimizations	Description	
Advanced	Driver	
	[-] <b>Diagnostics</b>	
	Diagnostics Capture	Disable
	[-] <b>Tag Counts</b>	
	Static Tags	10

### Identification

**Name:** Specify the user-defined identity of this channel. In each server project, each channel name must be unique. Although names can be up to 256 characters, some client applications have a limited display window when browsing the OPC server's tag space. The channel name is part of the OPC browser information. The property is required for creating a channel.

• For information on reserved characters, refer to "How To... Properly Name a Channel, Device, Tag, and Tag Group" in the server help.

**Description:** Specify user-defined information about this channel.

• Many of these properties, including Description, have an associated system tag.

**Driver:** Specify the protocol / driver for this channel. Specify the device driver that was selected during channel creation. It is a disabled setting in the channel properties. The property is required for creating a channel.

• **Note:** With the server's online full-time operation, these properties can be changed at any time. This includes changing the channel name to prevent clients from registering data with the server. If a client has already acquired an item from the server before the channel name is changed, the items are unaffected. If, after the channel name has been changed, the client application releases the item and attempts to re-acquire using the old channel name, the item is not accepted. Changes to the properties should not be made once a large client application has been developed. Utilize proper user role and privilege management to prevent operators from changing properties or accessing server features.

### Diagnostics

**Diagnostics Capture:** When enabled, this option makes the channel's diagnostic information available to OPC applications. Because the server's diagnostic features require a minimal amount of overhead processing, it is recommended that they be utilized when needed and disabled when not. The default is disabled.

• **Note:** This property is not available if the driver or operating system does not support diagnostics.

• For more information, refer to *Communication Diagnostics and Statistics Tags* in server help.

### Tag Counts

**Static Tags:** Provides the total number of defined static tags at this level (device or channel). This information can be helpful in troubleshooting and load balancing.

## Channel Properties – Write Optimizations

The server must ensure that the data written from the client application gets to the device on time. Given this goal, the server provides optimization properties to meet specific needs or improve application responsiveness.

Property Groups	[-] <b>Write Optimizations</b>	
General	Optimization Method	Write Only Latest Value for All Tags
<b>Write Optimizations</b>	Duty Cycle	10

### Write Optimizations

**Optimization Method:** Controls how write data is passed to the underlying communications driver. The options are:

- **Write All Values for All Tags:** This option forces the server to attempt to write every value to the controller. In this mode, the server continues to gather write requests and add them to the server's internal write queue. The server processes the write queue and attempts to empty it by writing data to the device as quickly as possible. This mode ensures that everything written from the client applications is sent to the target device. This mode should be selected if the write operation order or the write item's content must uniquely be seen at the target device.
- **Write Only Latest Value for Non-Boolean Tags:** Many consecutive writes to the same value can accumulate in the write queue due to the time required to actually send the data to the device. If the server updates a write value that has already been placed in the write queue, far fewer writes are needed to reach the same final output value. In this way, no extra writes accumulate in the server's queue. When the user stops moving the slide switch, the value in the device is at the correct value at virtually the same time. As the mode states, any value that is not a Boolean value is updated in the server's internal write queue and sent to the device at the next possible opportunity. This can greatly improve the application performance.
  - **Note:** This option does not attempt to optimize writes to Boolean values. It allows users to optimize the operation of HMI data without causing problems with Boolean operations, such as a momentary push button.
- **Write Only Latest Value for All Tags:** This option takes the theory behind the second optimization mode and applies it to all tags. It is especially useful if the application only needs to send the latest value to the device. This mode optimizes all writes by updating the tags currently in the write queue before they are sent. This is the default mode.

**Duty Cycle:** is used to control the ratio of write to read operations. The ratio is always based on one read for every one to ten writes. The duty cycle is set to ten by default, meaning that ten writes occur for each read operation. Although the application is performing a large number of continuous writes, it must be ensured that read data is still given time to process. A setting of one results in one read operation for every write operation. If there are no write operations to perform, reads are processed continuously. This allows optimization for applications with continuous writes versus a more balanced back and forth data flow.

● **Note:** It is recommended that the application be characterized for compatibility with the write optimization enhancements before being used in a production environment.

## Channel Properties – Advanced

This group is used to specify advanced channel properties. Not all drivers support all properties; so the Advanced group does not appear for those devices.

Property Groups	[-] <b>Non-Normalized Float Handling</b>	
General	Floating-Point Values	Replace with Zero
Write Optimizations	[-] <b>Inter-Device Delay</b>	
<b>Advanced</b>	Inter-Device Delay (ms)	0

**Non-Normalized Float Handling:** A non-normalized value is defined as Infinity, Not-a-Number (NaN), or as a Denormalized Number. The default is Replace with Zero. Drivers that have native float handling may default to Unmodified. Non-normalized float handling allows users to specify how a driver handles non-normalized IEEE-754 floating point data. Descriptions of the options are as follows:

- **Replace with Zero:** This option allows a driver to replace non-normalized IEEE-754 floating point values with zero before being transferred to clients.
- **Unmodified:** This option allows a driver to transfer IEEE-754 denormalized, normalized, non-number, and infinity values to clients without any conversion or changes.

● **Note:** This property is disabled if the driver does not support floating-point values or if it only supports the option that is displayed. According to the channel's float normalization setting, only real-time driver tags (such as values and arrays) are subject to float normalization. For example, EFM data is not affected by this setting.

● *For more information on the floating-point values, refer to "How To ... Work with Non-Normalized Floating-Point Values" in the server help.*

**Inter-Device Delay:** Specify the amount of time the communications channel waits to send new requests to the next device after data is received from the current device on the same channel. Zero (0) disables the delay.

● **Note:** This property is not available for all drivers, models, and dependent settings.

## Channel Properties – Adapter

Property Groups	[-] <b>Adapter</b>	
General	Adapter Number	Adapter 0
Write Optimizations		Adapter 0
Advanced		Adapter 1
<b>Adapter</b>		Adapter 2
		Adapter 3

### Adapter

**Adapter Number:** Specify the adapter number to be used by the Memobus Plus card. Up to eight channels may be assigned the same adapter number. Valid adapter numbers are 0 to 3.

## Device Properties – General

A device represents a single target on a communications channel. If the driver supports multiple controllers, users must enter a device ID for each controller.

<table border="1"> <tr><td>Property Groups</td></tr> <tr><td>General</td></tr> </table>	Property Groups	General	<table border="1"> <tr><td><b>Identification</b></td></tr> <tr><td>Name</td><td></td></tr> <tr><td>Description</td><td></td></tr> <tr><td>Channel Assignment</td><td></td></tr> <tr><td>Driver</td><td></td></tr> <tr><td>Model</td><td></td></tr> <tr><td>ID Format</td><td>Decimal</td></tr> <tr><td>ID</td><td>2</td></tr> </table>	<b>Identification</b>	Name		Description		Channel Assignment		Driver		Model		ID Format	Decimal	ID	2
Property Groups																		
General																		
<b>Identification</b>																		
Name																		
Description																		
Channel Assignment																		
Driver																		
Model																		
ID Format	Decimal																	
ID	2																	

### Identification

**Name:** Specify the name of the device. It is a logical user-defined name that can be up to 256 characters long and may be used on multiple channels.

**Note:** Although descriptive names are generally a good idea, some OPC client applications may have a limited display window when browsing the OPC server's tag space. The device name and channel name become part of the browse tree information as well. Within an OPC client, the combination of channel name and device name would appear as "ChannelName.DeviceName".

*For more information, refer to "How To... Properly Name a Channel, Device, Tag, and Tag Group" in server help.*

**Description:** Specify the user-defined information about this device.

Many of these properties, including Description, have an associated system tag.

**Channel Assignment:** Specify the user-defined name of the channel to which this device currently belongs.

**Driver:** Selected protocol driver for this device.

**Model:** Specify the type of device that is associated with this ID. The contents of the drop-down menu depend on the type of communications driver being used. Models that are not supported by a driver are disabled. If the communications driver supports multiple device models, the model selection can only be changed when there are no client applications connected to the device.

**Note:** If the communication driver supports multiple models, users should try to match the model selection to the physical device. If the device is not represented in the drop-down menu, select a model that conforms closest to the target device. Some drivers support a model selection called "Open," which allows users to communicate without knowing the specific details of the target device. *For more information, refer to the driver documentation.*

**ID:** Specify the device's driver-specific station or node. The type of ID entered depends on the communications driver being used. For many communication drivers, the ID is a numeric value. Drivers that support a Numeric ID provide users with the option to enter a numeric value whose format can be changed to suit the needs of the application or the characteristics of the selected communications driver. The format is set by the driver by default. Options include Decimal, Octal, and Hexadecimal.

**Note:** If the driver is Ethernet-based or supports an unconventional station or node name, the device's TCP/IP address may be used as the device ID. TCP/IP addresses consist of four values that are separated by periods, with each value in the range of 0 to 255. Some device IDs are string based. There may be additional properties to configure within the ID field, depending on the driver.

### Operating Mode

<table border="1"> <tr><td>Property Groups</td></tr> <tr><td>General</td></tr> </table>	Property Groups	General	<table border="1"> <tr><td><b>Identification</b></td></tr> <tr><td><b>Operating Mode</b></td></tr> <tr><td>Data Collection</td><td>Enable</td></tr> <tr><td>Simulated</td><td>No</td></tr> </table>	<b>Identification</b>	<b>Operating Mode</b>	Data Collection	Enable	Simulated	No
Property Groups									
General									
<b>Identification</b>									
<b>Operating Mode</b>									
Data Collection	Enable								
Simulated	No								

**Data Collection:** This property controls the device's active state. Although device communications are enabled by default, this property can be used to disable a physical device. Communications are not attempted when a device is disabled. From a client standpoint, the data is marked as invalid and write operations are not accepted. This property can be changed at any time through this property or the device system tags.

**Simulated:** Place the device into or out of Simulation Mode. In this mode, the driver does not attempt to communicate with the physical device, but the server continues to return valid OPC data. Simulated stops physical communications with the device, but allows OPC data to be returned to the OPC client as valid data. While in Simulation Mode, the server treats all device data as reflective: whatever is written to the simulated device is read back and each OPC item is treated individually. The data is not saved if the server removes the item (such as when the server is reinitialized). The default is No.

● **Notes:**

1. Updates are not applied until clients disconnect and reconnect.
  2. The System tag (`_Simulated`) is read only and cannot be written to for runtime protection. The System tag allows this property to be monitored from the client.
  3. In Simulation mode, the item's memory map is based on client update rate(s) (Group Update Rate for OPC clients or Scan Rate for native and DDE interfaces). This means that two clients that reference the same item with different update rates return different data.
  4. When a device is simulated, updates may not appear faster than one (1) second in the client.
- ◆ Simulation Mode is for test and simulation purposes only. It should never be used in a production environment.

## Tag Counts

Property Groups	[-] Identification
General	[-] Operating Mode
	[-] Tag Counts
	Static Tags 130

**Static Tags:** Provides the total number of defined static tags at this level (device or channel). This information can be helpful in troubleshooting and load balancing.

## Device ID (PLC Network Address)

The Device ID specifies the path to a node on the network, and consists of a path type designator (either server or client) and five consecutive routing bytes. The **Data Client** address paths start with the prefix **DM** and are used to communicate with another node on the network. The host PC acts as the client in conversations of this type. A DM path can identify a PLC or any other devices that can respond to Memobus read and write commands, including another host PC running the Memobus Plus driver. The format of a DM path is **DM.r1.r2.r3.r4.r5**.

One **Data Server** path is allowed per project and has the format **DS.1.0.0.0.0**. A server path will enable the host PC running the Memobus Plus driver to simulate a PLC device on the network capable of responding to read/write requests from other devices. Other devices can communicate with this simulated device by opening a Data Client path to it. Addresses 1 to 65536 are implemented for output coils, input coils, internal registers and holding registers. The driver will respond to any valid request to read or write these values from external devices. These locations can also be accessed locally by the host PC as tags assigned to the server device.

If a server device is not defined in the project, the driver will ignore any unsolicited read or write requests it receives.

● **Note:** A TIO Module device does not support a server network address.

## Addressing Example

Suppose that the single network consists of four nodes such that nodes 1 and 4 are host PCs running software that uses the Memobus Plus driver and nodes 2 and 3 are PLCs. The following table identifies the addressing for the network as seen from each node.

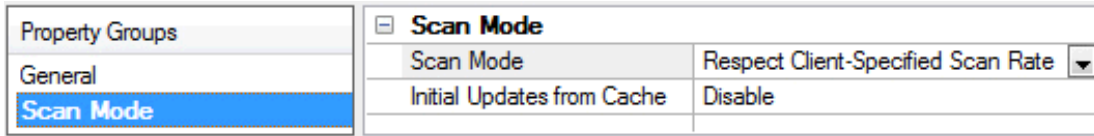
From	To Node 1	To Node 2	To Node 3	To Node 4
Node 1	-----	DM.2.0.0.0.0	DM.3.0.0.0.0	DM.4.1.0.0.0

From	To Node 1	To Node 2	To Node 3	To Node 4
Node 2	DM.1.1.0.0.0	-----	DM.3.0.0.0.0	DM.4.1.0.0.0
Node 3	DM.1.1.0.0.0	DM.2.0.0.0.0	-----	DM.4.1.0.0.0
Node 4	DM.1.1.0.0.0	DM.2.0.0.0.0	DM.3.0.0.0.0	-----

● **Note:** To access the simulated device on a host PC, the last non-zero number in the path must always be one. This indicates the server path the driver uses.

### Device Properties – Scan Mode

The Scan Mode specifies the subscribed-client requested scan rate for tags that require device communications. Synchronous and asynchronous device reads and writes are processed as soon as possible; unaffected by the Scan Mode properties.



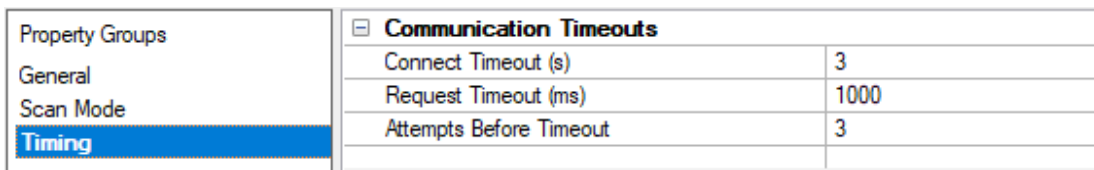
**Scan Mode:** Specify how tags in the device are scanned for updates sent to subscribing clients. Descriptions of the options are:

- **Respect Client-Specified Scan Rate:** This mode uses the scan rate requested by the client.
- **Request Data No Faster than Scan Rate:** This mode specifies the value set as the maximum scan rate. The valid range is 10 to 99999990 milliseconds. The default is 1000 milliseconds.
  - **Note:** When the server has an active client and items for the device and the scan rate value is increased, the changes take effect immediately. When the scan rate value is decreased, the changes do not take effect until all client applications have been disconnected.
- **Request All Data at Scan Rate:** This mode forces tags to be scanned at the specified rate for subscribed clients. The valid range is 10 to 99999990 milliseconds. The default is 1000 milliseconds.
- **Do Not Scan, Demand Poll Only:** This mode does not periodically poll tags that belong to the device nor perform a read to get an item's initial value once it becomes active. It is the OPC client's responsibility to poll for updates, either by writing to the `_DemandPoll` tag or by issuing explicit device reads for individual items. *For more information, refer to "Device Demand Poll" in server help.*
- **Respect Tag-Specified Scan Rate:** This mode forces static tags to be scanned at the rate specified in their static configuration tag properties. Dynamic tags are scanned at the client-specified scan rate.

**Initial Updates from Cache:** When enabled, this option allows the server to provide the first updates for newly activated tag references from stored (cached) data. Cache updates can only be provided when the new item reference shares the same address, scan rate, data type, client access, and scaling properties. A device read is used for the initial update for the first client reference only. The default is disabled; any time a client activates a tag reference the server attempts to read the initial value from the device.

### Device Properties – Timing

The device Timing properties allow the driver's response to error conditions to be tailored to fit the application's needs. In many cases, the environment requires changes to these properties for optimum performance. Factors such as electrically generated noise, modem delays, and poor physical connections can influence how many errors or timeouts a communications driver encounters. Timing properties are specific to each configured device.



### Communications Timeouts

**Connect Timeout:** This property (which is used primarily by Ethernet based drivers) controls the amount of time required to establish a socket connection to a remote device. The device's connection time often takes longer than normal communications requests to that same device. The valid range is 1 to 30 seconds. The default is typically 3 seconds, but can vary depending on the driver's specific nature. If this setting is not supported by the driver, it is disabled.

● **Note:** Due to the nature of UDP connections, the connection timeout setting is not applicable when communicating via UDP.

**Request Timeout:** Specify an interval used by all drivers to determine how long the driver waits for a response from the target device to complete. The valid range is 50 to 9999999 milliseconds (167 minutes). The default is usually 1000 milliseconds, but can vary depending on the driver. The default timeout for most serial drivers is based on a baud rate of 9600 baud or better. When using a driver at lower baud rates, increase the timeout to compensate for the increased time required to acquire data.

**Attempts Before Timeout:** Specify how many times the driver issues a communications request before considering the request to have failed and the device to be in error. The valid range is 1 to 10. The default is typically 3, but can vary depending on the driver's specific nature. The number of attempts configured for an application depends largely on the communications environment. This property applies to both connection attempts and request attempts.

## Timing

**Inter-Request Delay:** Specify how long the driver waits before sending the next request to the target device after receiving the response to the previous request. It overrides the normal polling frequency of tags associated with the device, as well as one-time reads and writes. This delay can be useful when dealing with devices with slow turn-around times and in cases where network load is a concern. Configuring a delay for a device affects communications with all other devices on the channel. It is recommended that users separate any device that requires an inter-request delay to a separate channel if possible. Other communications properties (such as communication serialization) can extend this delay. The valid range is 0 to 300,000 milliseconds; however, some drivers may limit the maximum value due to a function of their particular design. The default is 0, which indicates no delay between requests with the target device.

● **Note:** Not all drivers support Inter-Request Delay. This setting does not appear if it is not available.

Property Groups	[-] <b>Timing</b>	
General	Inter-Request Delay (ms)	0
Scan Mode		
<b>Timing</b>		

## Device Properties – Auto-Demotion

The Auto-Demotion properties can temporarily place a device off-scan in the event that a device is not responding. By placing a non-responsive device offline for a specific time period, the driver can continue to optimize its communications with other devices on the same channel. After the time period has been reached, the driver re-attempts to communicate with the non-responsive device. If the device is responsive, the device is placed on-scan; otherwise, it restarts its off-scan time period.

Property Groups	[-] <b>Auto-Demotion</b>	
General	Demote on Failure	Enable
Scan Mode	Timeouts to Demote	3
Timing	Demotion Period (ms)	10000
<b>Auto-Demotion</b>	Discard Requests when Demoted	Disable

**Demote on Failure:** When enabled, the device is automatically taken off-scan until it is responding again.

● **Tip:** Determine when a device is off-scan by monitoring its demoted state using the `_AutoDemoted` system tag.

**Timeouts to Demote:** Specify how many successive cycles of request timeouts and retries occur before the device is placed off-scan. The valid range is 1 to 30 successive failures. The default is 3.

**Demotion Period:** Indicate how long the device should be placed off-scan when the timeouts value is reached. During this period, no read requests are sent to the device and all data associated with the read requests are set to bad quality. When this period expires, the driver places the device on-scan and allows for another attempt at communications. The valid range is 100 to 3600000 milliseconds. The default is 10000 milliseconds.

**Discard Requests when Demoted:** Select whether or not write requests should be attempted during the off-scan period. Disable to always send write requests regardless of the demotion period. Enable to discard writes; the server automatically fails any write request received from a client and does not post a message to the Event Log.

### Device Properties – Settings

Property Groups	<input type="checkbox"/> <b>Settings</b>	
Auto-Demotion	Zero-Based Addressing	Enable
<b>Settings</b>	First Word Low	Enable
Block Sizes		

**Zero-Based Addressing:** If the address numbering convention for the device starts at one as opposed to zero, this property can be specified. By default, addresses have one subtracted when frames are constructed to communicate with a Yaskawa Memobus device. This means that if holding register 40001 is requested, the driver actually ask for the zero's holding register in the device. If the device doesn't follow this convention, disable **Zero-Based Addressing** in Device Properties. The default behavior follows the convention of the Yaskawa PLCs.

**First Word Low:** Two consecutive registers addresses in a Yaskawa Memobus device are used for 32-bit data types. Specify whether the driver should assume the first word is the low or the high word of the 32-bit value. The default, first word low, follows the convention of the Yaskawa Memosoft programming software.

### Device Properties – Block Sizes

Property Groups	<input type="checkbox"/> <b>Discretes</b>	
General	Output Discretes	32
Scan Mode	Input Discretes	32
Timing	<input type="checkbox"/> <b>Registers</b>	
TCP/IP	Output Registers	32
<b>Blocks</b>	Input Registers	32

#### Coils

**Coils:** Coils can be read from 8 to 800 points (bits) at a time. The default is 512 coils.

#### Registers

**Registers:** Registers can be read from 1 to 120 locations (words) at a time. The default is 120 registers.

#### Reasons to Change the Default Block Sizes

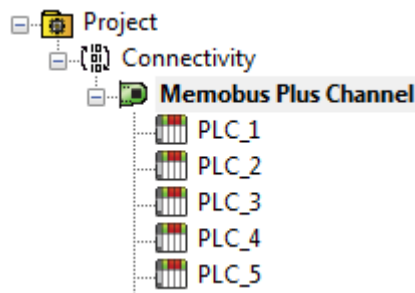
1. The device may not support block read/write operations of the default size. Smaller Yaskawa PLCs and non-Yaskawa devices may not support the maximum data transfer lengths supported by the Memobus Plus network.
2. The device may contain non-contiguous addresses. If this is the case and the driver attempts to read a block of data that encompasses undefined memory, the device will probably reject the request.

## Optimizing Communications

The Yaskawa Memobus Plus Driver has been redesigned to provide better throughput and take full advantage of the SA85 card. In the past, the Yaskawa Memobus Plus Driver restricted users to configuring a single channel in the server project. All Memobus Plus devices were defined under this one channel. In simple terms, this meant that the driver had to move between devices one at a time making requests. The OPC Server was already designed to be efficient and for most applications the single channel scheme provides more than enough performance. With the advent of OPC as an enabling technology, the size of projects have increased dramatically and have also caused a decrease in performance. To remedy this, the Yaskawa Memobus Plus Driver operates at a new level of efficiency and performance.

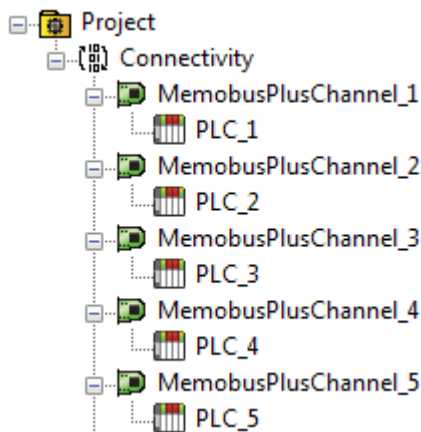
**Note:** Before implementing any changes, it is suggested that users make a backup of their existing OPC server project directory to return to the previous current settings quickly, if needed.

An example of how the application may appear when configured using a single channel is shown below.



Each device appears under a single channel. In this configuration, the driver must move from one device to the next as quickly as possible 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 Yaskawa Memobus Plus Driver could only define one single channel, then the example shown above would be the only option available; however, the Yaskawa Memobus Plus Driver can define up to 32 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.

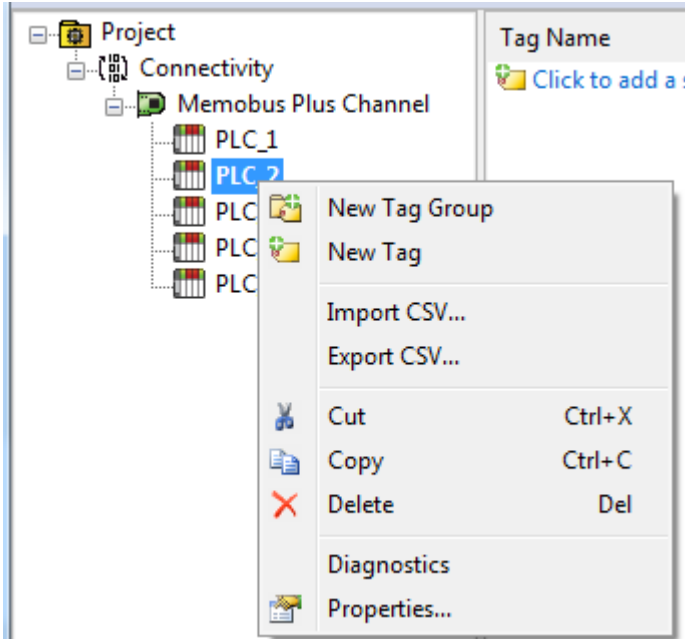


Each device can be defined under its own channel. In this configuration, a single path of execution is dedicated to the task of gathering data from each device. If the application has fewer devices, it can be optimized in this manner.

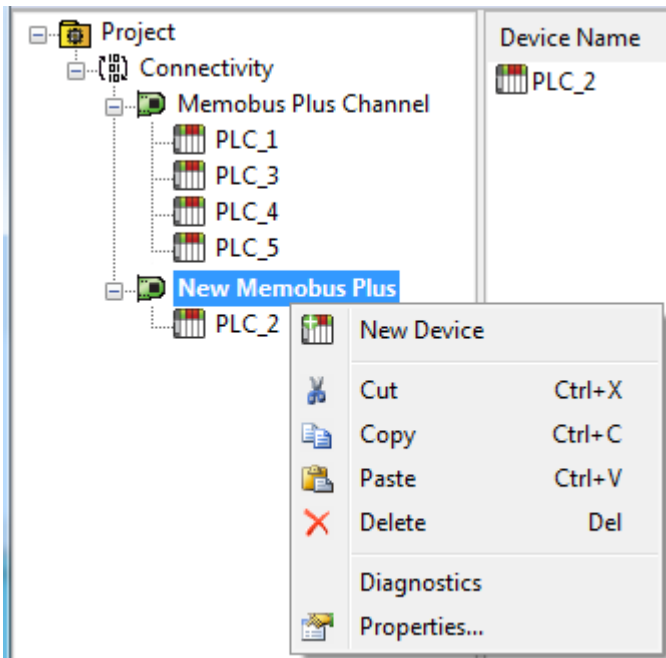
The performance will improve even if the application has more devices. While fewer devices may be ideal, the application will still benefit from additional channels. Although by spreading the device load across all channels will cause the server to move from device to device again, it can now do so with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

This application can support multiple channels even if it contains a large number of tags defined under each device. To do so, open the existing OPC Server project while it is still configured using a single channel. Next, add a new Memobus Plus channel. Name the channel as desired. In this example, NewMemobusPlus is used.

Next, use the cut and paste options available by right-clicking on a device or by using the Edit menu. In this example, PLC\_2 is cut from the existing channel and then pasted under the new channel.



PLC\_2 being cut from the Memobus Plus channel



PLC\_2 being pasted beneath the New Memobus Plus channel

Other possible optimizations include dedicating a single channel to just Global Data to receive fast Global Data updates. To do so, define a new set of device names for each device whose Global Data will be accessed under that new channel. The important thing to remember in this case is to only access Global Data from these newly defined device names. There are many possible configurations that may benefit the application; the new Memobus Plus driver gives users the opportunity to investigate them.

## Data Types Description

Data Type	Description
Boolean	Single bit
Word	Unsigned 16-bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16-bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
DWord*	Unsigned 32-bit value bit 0 is the low bit bit 31 is the high bit
Long*	Signed 32-bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
BCD	Two byte packed BCD Value range is 0-9999. Behavior is undefined for values beyond this range.
LBCD*	Four byte packed BCD Value range is 0-99999999. Behavior is undefined for values beyond this range.
Float*	32-bit floating point value. The driver interprets two consecutive registers as a floating point value by making the second register the high word and the first register the low word.
Float Example	If register 40001 is specified as a float, bit 0 of register 40001 would be bit 0 of the 32-bit word, and bit 15 of register 40002 would be bit 31 of the 32-bit word.
String	Null-terminated ASCII string. Includes Hi-Lo Lo-Hi byte order selection.

\*The descriptions of the bit significance assume default, 'first word low' setting for 32 bit data types.

## Yaskawa Memobus Plus Driver 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.

- [Output Coils](#)
- [Input Coils](#)
- [Internal Registers](#)
- [Holding Registers](#)
- [Global Data](#)
- [Constant Registers](#)
- [Link Coils](#)
- [Link Registers](#)
- [MC Coils](#)
- [MC Control Coils](#)
- [MC Relays](#)
- [MC Control Relays](#)
- [MC Code Relays](#)

### Output Coils

	Decimal Addressing
Type	Boolean
Format	0xxxxx
Security	Read/Write
Range	1-65536

### Array Support

Arrays are also supported for the output coil addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

0xxxxx[cols] with assumed row count of 1  
 0xxxxx[rows][cols]

The number of coils requested cannot exceed the coil block size set for the device.

### Examples

1. The 255th output coil would be addressed as '0255' using decimal addressing.
2. The 35005th output coil would be addressed as '035005' using decimal addressing.

### Input Coils

	Decimal Addressing
Type	Boolean
Format	1xxxxx
Security	Read
Range	1-65536

\*These locations are Read/Write for server devices.

### Array Support

Arrays are also supported for the input coil addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

1xxxx[cols] with assumed row count of 1  
1xxxx[rows][cols]

The number of coils requested cannot exceed the coil block size set for the device.

### Examples

1. The 127th input coil would be addressed as '10127' using decimal addressing.
2. The 35005th output coil would be addressed as '135005' using decimal addressing.

## Internal Registers

The default data types are shown in **bold**.

	<b>Decimal Addressing</b>
<b>Type</b>	<b>Word, Short, BCD</b>
<b>Format</b>	3xxxx
<b>Security</b>	Read Only*
<b>Range</b>	1-65536
<b>Type</b>	<b>Boolean</b>
<b>Format</b>	3xxxx.bb
<b>Security</b>	Read Only*
<b>Range</b>	xxxx.0-xxxx.15
<b>Type</b>	<b>Float, DWord, Long, LBCD</b>
<b>Format</b>	3xxxx
<b>Security</b>	Read Only*
<b>Range</b>	1-65535

\*These locations are Read/Write for Server Devices.

### Array Support

Arrays are also supported for the internal register addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

3xxxx[cols] with assumed row count of 1  
3xxxx[rows][cols]

For Word, Short and BCD arrays, the base address + (rows \* cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows \* cols \* 2) cannot exceed 65536.

For all arrays, the total number of registers being requested cannot exceed the register block size that was specified for this device.

### Examples

1. To access Internal Register 1000, enter 301000.
2. To access Internal Register 11000, enter 311000.
3. To access Internal Register 300 bit 11, enter 300300.11.

## Holding Registers

The default data types are shown in **bold**.

Decimal Addressing	
Type	Word, Short, BCD
Format	4xxxxx
Security	Read/Write
Range	1-65536
<b>Boolean</b>	
Type	Boolean
Format	4xxxxx.bb
Security	Read/Write
Range	xxxxx.0-xxxxx.15
<b>Float, DWord, Long, LBCD</b>	
Type	Float, DWord, Long, LBCD
Format	4xxxxx
Security	Read/Write
Range	1-65535
<b>String</b>	
Type	String
String with HiLo byte order	400001.2H-465536.240H .Bit is string length, range 2 to 240 bytes.
String with LoHi byte order	400001.2L-465536.240L .Bit is string length, range 2 to 240 bytes.
Security	Read/Write

### String Support

This driver supports reading and writing holding register memory as an ASCII string. When using holding registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. Appending either an "H" or "L" to the address specifies the byte order.

#### Examples

1. To access a string starting at 40200 with a length of 100 bytes and Hi-Lo byte order, enter: 40200.100H.
2. To access a string starting at 40500 with a length of 78 bytes and Lo-Hi byte order, enter: 40500.78L.

### Array Support

Arrays are also supported for the holding register addresses. The syntax for declaring an array (using decimal addressing) is as follows:

4xxxx[cols] with assumed row count of 1  
4xxxx[rows][cols]

For Word, Short and BCD arrays, the base address + (rows \* cols) cannot exceed 65536.  
For Float, DWord, Long and Long BCD arrays, the base address + (rows \* cols \* 2) cannot exceed 65535.  
For all arrays, the total number of registers being requested cannot exceed the register block size that was specified for this device.

#### Examples

1. To access Holding Register 5000, enter 405000.
2. To access Holding Register 14000, enter 414000.
3. To access Holding Register 500 bit 11, enter 400500.11.

## Global Data

The default data types are shown in **bold**.

● **Note:** Global Data is not supported for the server device.

	<b>Decimal Addressing</b>
<b>Type</b>	<b>Word</b> , Short, BCD
<b>Format</b>	Gxx
<b>Security</b>	Read/Write
<b>Range</b>	1-32
<b>Separator</b>	
<b>Type</b>	Float, DWord, Long, LBCD
<b>Format</b>	Gxx
<b>Security</b>	Read/Write
<b>Range</b>	1-31

## Array Support

Arrays are also supported for Global Data. The syntax for declaring an array (shown using decimal addressing) is as follows:

Gxx[cols] with assumed row count of 1  
 Gxx[rows][cols]

For Word, Short and BCD arrays, the base address + (rows \* cols) cannot exceed 32.

For Float, DWord, Long and Long BCD arrays, the base address + (rows \* cols \* 2) cannot exceed 32.

## Examples

1. To access Global Register 11, enter G11.
2. To access Global Register 30, enter G30.

## Constant Registers

The default data types are shown in **bold**.

	<b>Decimal Addressing</b>
<b>Type</b>	<b>Word</b> , Short, BCD
<b>Format</b>	7xxxxx
<b>Security</b>	Read/Write
<b>Range</b>	1-65536
<b>Separator</b>	
<b>Type</b>	<b>Boolean</b>
<b>Format</b>	7xxxxx.bb
<b>Security</b>	Read/Write
<b>Range</b>	xxxxx.0-xxxxx.15
<b>Separator</b>	
<b>Type</b>	Float, DWord, Long, LBCD
<b>Format</b>	7xxxxx
<b>Security</b>	Read/Write
<b>Range</b>	1-65535
<b>Separator</b>	
<b>Type</b>	<b>String</b>

	Decimal Addressing
String with HiLo byte order	700001.2H-765536.240H .Bit is string length, range 2 to 240 bytes.
String with LoHi byte order	700001.2L-765536.240L .Bit is string length, range 2 to 240 bytes.
<b>Security</b>	Read/Write

### String Support

This driver supports reading and writing constant register memory as an ASCII string. When using constant registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. Appending either an "H" or "L" to the address specifies the byte order.

#### Examples

1. To access a string starting at 70200 with a length of 100 bytes and Hi-Lo byte order, enter: 70200.100H.
2. To access a string starting at 70500 with a length of 78 bytes and Lo-Hi byte order, enter: 70500.78L.

### Array Support

Arrays are also supported for the constant register addresses. The syntax for declaring an array (using decimal addressing) is:

7xxxx[cols] with assumed row count of 1  
7xxxx[rows][cols]

For Word, Short and BCD arrays, the base address + (rows \* cols) cannot exceed 65536.  
For Float, DWord, Long and Long BCD arrays, the base address + (rows \* cols \* 2) cannot exceed 65535.  
For all arrays, the total number of registers being requested cannot exceed the register block size that was specified for this device.

#### Examples

1. To access Constant Register 300, enter 703000.
2. To access Constant Register 1400, enter 714000.
3. To access Constant Register 500 bit 11, enter 700500.11.

### Link Coils

	Decimal Addressing
<b>Type</b>	Boolean
<b>Format</b>	D1xxxx or D2xxxx
<b>Security</b>	Read/Write
<b>Range</b>	1-9999

### Array Support

Arrays are also supported for the link coil addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

D1xxxx[cols] with assumed row count of 1  
D1xxxx[rows][cols]

The number of coils requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th Link coil would be addressed as 'D10255' using decimal addressing.
2. The 20005th Link coil would be addressed as 'D20005' using decimal addressing.

## Link Registers

The default data types are shown in **bold**.

	<b>Decimal Addressing</b>
<b>Type</b>	<b>Word, Short, BCD</b>
<b>Format</b>	R1xxxx or R2xxxx
<b>Security</b>	Read/Write
<b>Range</b>	1-9999
<b>Type</b>	<b>Boolean</b>
<b>Format</b>	R1xxxx.bb or R2xxxx.bb
<b>Security</b>	Read/Write
<b>Range</b>	xxxx.0-xxxx.15
<b>Type</b>	<b>Float, DWord, Long, LBCD</b>
<b>Format</b>	R1xxxx or R2xxxx
<b>Security</b>	Read/Write
<b>Range</b>	1-9998
<b>Type</b>	<b>String</b>
String with HiLo byte order	R10001.2H-R19999.240H R20001.2H-R29999.240H .Bit is string length, range 2 to 240 bytes.
String with LoHi byte order	R10001.2L-R19999.240L R20001.2L-R29999.240L .Bit is string length, range 2 to 240 bytes.
<b>Security</b>	Read/Write

### String Support

This driver supports reading and writing link register memory as an ASCII string. When using link registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. Appending either an "H" or "L" to the address specifies the byte order.

#### Examples

1. To access a string starting at R10200 with a length of 100 bytes and Hi-Lo byte order, enter: R10200.100H.
2. To access a string starting at R10500 with a length of 78 bytes and Lo-Hi byte order, enter: R10500.78L.

### Array Support

Arrays are also supported for the holding register addresses. The syntax for declaring an array (using decimal addressing) is as follows:

R1xxxx[cols] with assumed row count of 1  
R1xxxx[rows][cols]

For Word, Short and BCD arrays, the base address + (rows \* cols) cannot exceed 9999.  
 For Float, DWord, Long and Long BCD arrays, the base address + (rows \* cols \* 2) cannot exceed 9998.  
 For all arrays, the total number of registers being requested cannot exceed the register block size that was specified for this device.

### Examples

1. To access Link Register 10500, enter R10500.
2. To access Link Register 21400, enter R21400.
3. To access Link Register 10500 bit 11, enter R10500.11

## MC Coils

	Decimal Addressing
Type	Boolean
Format	Y1xxxx or Y2xxxx
Security	Read/Write
Range	1-9999

### Array Support

Arrays are also supported for the MC coil addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

Y1xxxx[cols] with assumed row count of 1  
 Y1xxxx[rows][cols]

The number of coils requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th MC coil would be addressed as 'Y10255' using decimal addressing.
2. The 20005th MC coil would be addressed as 'Y20005' using decimal addressing.

## MC Control Coils

	Decimal Addressing
Type	Boolean
Format	Q1xxxx or Q2xxxx
Security	Read/Write
Range	1-9999

### Array Support

Arrays are also supported for the MC Control coil addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

Q1xxxx[cols] with assumed row count of 1  
 Q1xxxx[rows][cols]

The number of coils requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th MC Control coil would be addressed as 'Q10255' using decimal addressing.
2. The 20005th MC Control coil would be addressed as 'Q20005' using decimal addressing.

## MC Relays

	Decimal Addressing
Type	Boolean
Format	X1xxxx or X2xxxx
Security	Read Only
Range	1-9999

### Array Support

Arrays are also supported for the MC Relay addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

X1xxxx[cols] with assumed row count of 1  
 X1xxxx[rows][cols]

The number of relays requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th MC Relay would be addressed as 'X10255' using decimal addressing.
2. The 20005th MC Relay coil would be addressed as 'X20005' using decimal addressing.

## MC Control Relays

	Decimal Addressing
Type	Boolean
Format	P1xxxx or P2xxxx
Security	Read Only
Range	1-9999

### Array Support

Arrays are also supported for the MC Control Relay addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

P1xxxx[cols] with assumed row count of 1  
 P1xxxx[rows][cols]

The number of relays requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th MC Control Relay would be addressed as 'P10255' using decimal addressing.
2. The 20005th MC Control Relay coil would be addressed as 'P20005' using decimal addressing.

## MC Code Relays

	Decimal Addressing
Type	Boolean
Format	M1xxxx or M2xxxx
Security	Read Only
Range	1-9999

### Array Support

Arrays are also supported for the MC Code Relay addresses. The syntax for declaring an array (shown using decimal addressing) is as follows:

M1xxxx[cols] with assumed row count of 1

M1xxxx[rows][cols]

The number of relays requested cannot exceed the coil block size set for the device.

### Examples

1. The 10255th MC Code Relay would be addressed as 'M10255' using decimal addressing.
2. The 20005th MC Code Relay coil would be addressed as 'M20005' using decimal addressing.

## 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](#)

[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>'](#)

### Device Status Messages

[Started MBPLUS.SYS device](#)

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

### Device Specific Messages

[Unable to start MBPLUS.SYS device](#)

[Unable to communicate with MBPLUS.VXD](#)

[Unable to open MBPLUS server path](#)

[Error opening MBPLUS path: <ID>](#)

[Bad address in block \[<start address> to <end address>\] on device '<device name>'](#)

## Missing address

---

### Error Type:

Warning

### Possible Cause:

A tag address that has been specified dynamically 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 dynamically 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 dynamically 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 dynamically 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 dynamically 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 dynamically 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 dynamically 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.

---

**Started MBPLUS.SYS device**

---

**Error Type:**

Information

**Possible Cause:**

Posted by the driver when it successfully starts the MBPLUS.SYS device driver. This message will not be seen if the MBPLUS.SYS driver is already running when this driver starts.

**Solution:**

N/A

---

## Device '<device name>' is not responding

---

### Error Type:

Serious

### Possible Cause:

1. The PLC network card may not be correctly installed in the host PC.
2. The named device may not be connected to the PLC network.
3. The named device may have been assigned an incorrect Network ID.
4. The driver cannot open a path on the specified adapter.
5. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device property.

### Solution:

1. Verify the network card installation using the supplied utility software.
2. Check the PLC network connections.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Verify that no more than eight channels are assigned the same adapter number.
5. Increase the Request Timeout property so that the entire response can be handled.

---

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

---

### Error Type:

Serious

### Possible Cause:

1. The PLC network card may not be correctly installed in the host PC.
2. The named device may not be connected to the PLC network.
3. The named device may have been assigned an incorrect Network ID.

### Solution:

1. Verify the network card installation using the supplied utility software.
2. Check the PLC network connections.
3. Verify that the Network ID given to the named device matches that of the actual device.

---

## Unable to start MBPLUS.SYS device

---

### Error Type:

Fatal

### Possible Cause:

Probable cause is that the MBPLUS.SYS driver was not properly configured.

### Solution:

Verify that the MBPLUS device can be started and stopped manually using the Control Panel\Devices applet. Once the MBPLUS.SYS driver can be started manually, the Yaskawa\_Memobus\_Plus.dll driver will also be able to start the driver.

---

## Unable to communicate with MBPLUS.VXD

---

**Error Type:**

Fatal

**Possible Cause:**

Probable cause is that the MBPLUS.VXD driver was not properly configured or not installed.

**Solution:**

Install or properly setup the MBPLUS.VXD before running this driver. Proper configuration can be checked using the test programs that come with the VXD driver.

---

## Unable to open MBPLUS server path

---

**Error Type:**

Fatal

**Probable Cause:**

The driver was unable to open a server path with the MBPLUS.SYS or MBPLUS.VXD driver on Windows. Probable cause is that the MBPLUS driver is not properly installed.

**Solution:**

Install or properly setup the MBPLUS.VXD before running this driver. Proper configuration can be checked using the test programs that come with the VXD driver.

---

## Error opening MBPLUS path: <ID>

---

**Error Type:**

Serious

**Possible Cause:**

1. The MBPLUS.SYS or MBPLUS.VXD driver for Windows has not been properly configured.
2. The driver cannot open a path on the specified adapter.

**Solution:**

1. Follow the instructions for installing and configuring the MBPLUS driver.
2. Verify that no more than eight channels are assigned the same adapter number.

---

## Bad address in block [<start address> to <end address>] on device '<device name>'

---

**Error Type:**

Serious

**Possible Cause:**

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

**Solution:**

Verify the addresses of all tags assigned to the device and eliminate ones that reference invalid locations.

# Index

## A

Address '<address>' is out of range for the specified device or register 25  
Array size is out of range for address '<address>' 26  
Array support is not available for the specified address: '<address>' 26  
Attempts Before Timeout 11  
Auto-Demotion 11

## B

Bad address in block [<start address> to <end address>] on device '<device name>' 28  
BCD 15  
Block Sizes 12  
Boolean 15

## C

Channel Assignment 8  
Channel Properties – Adapter 7  
Channel Properties – Advanced 7  
Channel Properties – General 5  
Channel Properties – Write Optimizations 6  
Communications Timeouts 10  
Connect Timeout 11  
Constant Registers 19

## D

Data Collection 8  
Data Type '<type>' is not valid for device address '<address>' 26  
Data Types Description 15  
Demote on Failure 11  
Demotion Period 12  
Device '<device name>' is not responding 27  
Device address '<address>' contains a syntax error 25  
Device address '<address>' is Read Only 26  
Device ID (PLC Network Address 9  
Device Properties – Auto-Demotion 11  
Device Properties – General 7  
Device Properties – Timing 10

Diagnostics 5  
Discard Requests when Demoted 12  
Do Not Scan, Demand Poll Only 10  
Driver 8  
Duty Cycle 6  
DWord 15

## E

Error Descriptions 25  
Error opening MBPLUS path: <ID> 28  
Error Tag 16  
External Dependencies 4

## F

Float 15

## G

General 7  
Global Data 19

## H

Holding Registers 17

## I

ID 8  
Identification 5, 8  
Initial Updates from Cache 10  
Input Coil 16  
Inter-Device Delay 7  
Internal Register 17

## L

LBCD 15  
Link Coils 20  
Link Registers 21

Long 15

## M

MC Code Relay 23

MC Coils 22

MC Control Coils 22

MC Control Relays 23

MC Relays 23

Missing address 25

Model 8

## N

Name 8

Network Adapter 7

Non-Normalized Float Handling 7

## O

Operating Mode 8

Optimization Method 6

Optimizing Your Yaskawa Memobus Plus (SA85) Communicaitons 13

Output Coil 16

Overview 4

## R

Replace with Zero 7

Request Timeout 11

Respect Tag-Specified Scan Rate 10

## S

Scan Mode 10

Settings 12

Setup 4

Short 15

Simulated 9

Started MBPLUS.SYS device 26

String 18-19, 21

**T**

Tag Counts 5, 9

Timeouts to Demote 11

Timing 10

**U**

Unable to communicate with MBPLUS.VXD 28

Unable to open MBPLUS server path 28

Unable to start MBPLUS.SYS device 27

Unable to write to '<address>' on device '<device name>' 27

Unmodified 7

**W**

Word 15

Write All Values for All Tags 6

Write Only Latest Value for All Tags 6

Write Only Latest Value for Non-Boolean Tags 6

**Y**

Yaskawa Memobus Plus (SA85) Address Descriptions 16