

Yokogawa MW Driver

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Winsock V1.1 or higher must be installed to use the Yokogawa MW Ethernet Device Driver27

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Yokogawa MW Driver

Help version 1.024

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Overview

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Overview

The Yokogawa MW Driver provides a reliable way to connect Yokogawa MW Ethernet devices to OPC client applications; including HMI, SCADA, Historian, MES, ERP, and countless custom applications.

Setup

Supported Devices

MW100

Device ID

Yokogawa MW Ethernet series devices are networked using standard IP addressing. In general, the Device ID has the format *YYY.YYY.YYY.YYY*, where *YYY* designates the device IP address. Each *YYY* byte should be in the range of 0 to 255.

Timing

Device timing properties are common to the server and described in the server help under **Device Properties - Timing**.

Channel Properties - General

This server supports the use of simultaneous multiple 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	<input type="checkbox"/> Identification	
General	Name	
Write Optimizations	Description	
Advanced	Driver	
	<input type="checkbox"/> Diagnostics	
	Diagnostics Capture	Disable

Identification

Name: 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.

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

Description: User-defined information about this channel.

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

Driver: Selected protocol / driver for this channel. This property specifies the device driver that was selected during channel creation. It is a disabled setting in the channel properties.

● **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. With this in mind, changes to the properties should not be made once a large client application has been developed. Utilize the User Manager to prevent operators from changing properties and restrict access rights to server features.

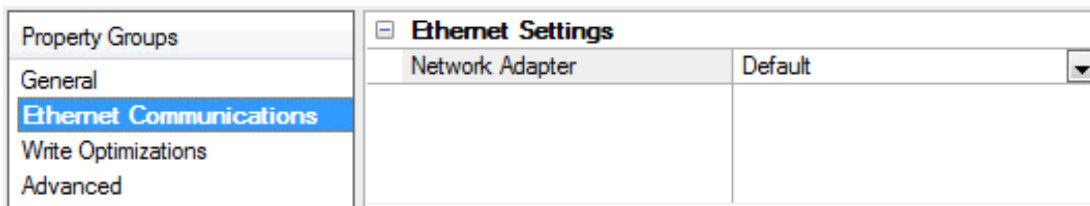
Diagnostics

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 disabled if the driver does not support diagnostics.
- For more information, refer to "Communication Diagnostics" in the server help.

Channel Properties - Ethernet Communications

Ethernet Communication can be used to communicate with devices.

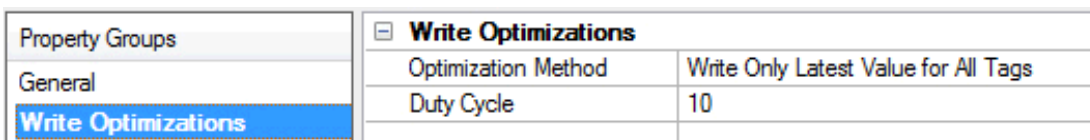


Ethernet Settings

Network Adapter: Specify the network adapter to bind. When Default is selected, the operating system selects the default adapter.

Channel Properties - Write Optimizations

As with any OPC server, writing data to the device may be the application's most important aspect. The server intends to ensure that the data written from the client application gets to the device on time. Given this goal, the server provides optimization properties that can be used to meet specific needs or improve application responsiveness.



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

Non-Normalized Float Handling: Non-normalized float handling allows users to specify how a driver handles non-normalized IEEE-754 floating point data. 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. 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.

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.

Property Groups	Identification	
General	Name	
Scan Mode	Description	
Auto-Demotion	Channel Assignment	
Redundancy	Driver	
	Model	
	ID Format	Decimal
	ID	2
	Operating Mode	
	Data Collection	Enable
	Simulated	No

Identification

Name: This property specifies 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: User-defined information about this device.

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

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

Driver: Selected protocol driver for this device. This property specifies the driver selected during channel creation. It is disabled in the channel properties.

Model: This property specifies the specific type of device that is associated with this ID. The contents of the drop-down menu depends 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 help documentation.

ID: This property specifies 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 ID format can be 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. For more information, refer to the driver's help documentation.

Operating Mode

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: This option places the device into 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 item's memory map is based on the group Update Rate. The data is not saved if the server removes the item (such as when the server is reinitialized). The default is No.

● Notes:

1. This 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.
2. 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.

● Simulation Mode is for test and simulation purposes only. It should never be used in a production environment.

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.

Property Groups	☐ Scan Mode	
General	Scan Mode	Respect Client-Specified Scan Rate ▼
Scan Mode	Initial Updates from Cache	Disable

Scan Mode: specifies how tags in the device are scanned for updates sent to subscribed 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 maximum scan rate to be used. 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 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.

Property Groups	[-] Communication Timeouts	
General	Connect Timeout (s)	3
Scan Mode	Request Timeout (ms)	5000
Timing	Retry Attempts	3
Auto-Demotion	[-] Timing	
	Inter-Request Delay (ms)	0

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: This property specifies 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 9,999,999 milliseconds (167.6667 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.

Retry Attempts: This property specifies how many times the driver retries 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 retries configured for an application depends largely on the communications environment.

Timing

Inter-Request Delay: This property specifies how long the driver waits before sending the next request to the target device. 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 turnaround 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.

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	Auto-Demotion	
General	Demote on Failure	Enable
Scan Mode	Timeouts to Demote	3
Timing	Demotion Period (ms)	10000
Auto-Demotion	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 - Tag Generation

The automatic tag database generation features make setting up an application a plug-and-play operation. Select communications drivers can be configured to automatically build a list of tags that correspond to device-specific data. These automatically generated tags (which depend on the nature of the supporting driver) can be browsed from the clients.

If the target device supports its own local tag database, the driver reads the device's tag information and uses the data to generate tags within the server. If the device does not natively support named tags, the driver creates a list of tags based on driver-specific information. An example of these two conditions is as follows:

1. If a data acquisition system supports its own local tag database, the communications driver uses the tag names found in the device to build the server's tags.
2. If an Ethernet I/O system supports detection of its own available I/O module types, the communications driver automatically generates tags in the server that are based on the types of I/O modules plugged into the Ethernet I/O rack.

Note: Automatic tag database generation's mode of operation is completely configurable. For more information, refer to the property descriptions below.

Property Groups	Tag Generation	
General	On Device Startup	Do Not Generate on Startup
Scan Mode	On Duplicate Tag	Delete on Create
Timing	Parent Group	
Auto-Demotion	Allow Automatically Generated Subgroups	Enable
Tag Generation	Create	Create tags
Redundancy		

On Device Startup

This property specifies when OPC tags are automatically generated. Descriptions of the options are as follows:

- **Do Not Generate on Startup:** This option prevents the driver from adding any OPC tags to the tag space of the server. This is the default setting.
- **Always Generate on Startup:** This option causes the driver to evaluate the device for tag information. It also adds tags to the tag space of the server every time the server is launched.
- **Generate on First Startup:** This option causes the driver to evaluate the target device for tag information the first time the project is run. It also adds any OPC tags to the server tag space as needed.

Note: When the option to automatically generate OPC tags is selected, any tags that are added to the server's tag space must be saved with the project. Users can configure the project to automatically save from the **Tools | Options** menu.

On Duplicate Tag

When automatic tag database generation is enabled, the server needs to know what to do with the tags that it may have previously added or with tags that have been added or modified after the communications driver since their original creation. This setting controls how the server handles OPC tags that were automatically generated and currently exist in the project. It also prevents automatically generated tags from accumulating in the server.

For example, if a user changes the I/O modules in the rack with the server configured to **Always Generate on Startup**, new tags would be added to the server every time the communications driver detected a new I/O module. If the old tags were not removed, many unused tags could accumulate in the server's tag space. The options are:

- **Delete on Create:** This option deletes any tags that were previously added to the tag space before any new tags are added. This is the default setting.
- **Overwrite as Necessary:** This option instructs the server to only remove the tags that the communications driver is replacing with new tags. Any tags that are not being overwritten remain in the server's tag space.
- **Do not Overwrite:** This option prevents the server from removing any tags that were previously generated or already existed in the server. The communications driver can only add tags that are completely new.
- **Do not Overwrite, Log Error:** This option has the same effect as the prior option, and also posts an error message to the server's Event Log when a tag overwrite would have occurred.

● **Note:** Removing OPC tags affects tags that have been automatically generated by the communications driver as well as any tags that have been added using names that match generated tags. Users should avoid adding tags to the server using names that may match tags that are automatically generated by the driver.

Parent Group: This property keeps automatically generated tags from mixing with tags that have been entered manually by specifying a group to be used for automatically generated tags. The name of the group can be up to 256 characters. This parent group provides a root branch to which all automatically generated tags are added.

Allow Automatically Generated Subgroups: This property controls whether the server automatically creates subgroups for the automatically generated tags. This is the default setting. If disabled, the server generates the device's tags in a flat list without any grouping. In the server project, the resulting tags are named with the address value. For example, the tag names are not retained during the generation process.

● **Note:** If, as the server is generating tags, a tag is assigned the same name as an existing tag, the system automatically increments to the next highest number so that the tag name is not duplicated. For example, if the generation process creates a tag named "AI22" that already exists, it creates the tag as "AI23" instead.

Create: Initiates the creation of automatically generated OPC tags. If the device's configuration has been modified, **Create tags** forces the driver to reevaluate the device for possible tag changes. Its ability to be accessed from the System tags allows a client application to initiate tag database creation.

● **Note:** **Create tags** is disabled if the Configuration edits a project offline.

Device Properties - Device Configuration

Property Groups	<input type="checkbox"/> General	
General	Port	Ethernet
Scan Mode	Data Handling	None
Timing	Start Math When Start	Disable
Auto-Demotion	Start Measuring When Start	Disable
Tag Generation	<input type="checkbox"/> Time Settings	
Device Configuration	Date and Time	Device Time
Redundancy	Date Format	MM/DD/YY
	Set Clock When Start	Disable
	<input type="checkbox"/> Tagnames	
	Generate Tag Database Using	Physical Channel Number
	<input type="checkbox"/> Login	
	Username	admin
	Password	*****

General

- **Port:** Specify the port that is supported by the driver. The default setting is Ethernet.
- **Data Handling:** This property allows the driver to be configured to return specific data values for the numerical out of range and error conditions returned from the device. Options include None, +INF, and -INF. The default setting is None.
 - **None:** When selected, special data values will be returned with the actual data value received from the device. For example, the data value of a measuring channel Over Range would be returned as 32,767 and the data value of a math channel Over Range would be returned as 2,147,450,879.
 - **+INF:** When selected, special data values will be returned as a numerical representation of positive infinity (#INF). The exception is an Under Range condition that is always returned as negative infinity.
 - **-INF:** When selected, special data values will be returned as a numerical representation of negative infinity (-#INF). The exception is an Over Range condition that is always returned as positive infinity.
- **Start Math When Start:** When enabled, this property will inform the driver to send a command to the device at communication startup that will start the math computation. The default setting is disabled.
- **Start Clock When Start:** When enabled, this property will inform the driver to send a command to the device at communication startup that will start the measuring option. The default setting is disabled.

Time Settings

- **Date and Time:** Specify the origin of the data value of the Date and Time data types (which represent the date and time of the latest data). Options include Device Time and System Time. The default setting is Device Time. Descriptions of the options are as follows:
 - **Device Time:** When selected, the Date and Time tags will return the date and time read from the device. This represents the date and time of the latest data that was measured or computed based on the internal device clock.
 - **System Time:** When selected, the Date and Time tags will return the date and time of the requested data that was returned from the device based on the internal system clock.

- **Date Format:** Specify the format of the return string for the Date data type. Options include MM/DD/YY (month/day/year), YY/MM/DD (year/month/day), or DD/MM/YY (day/month/year). The default setting is MM/DD/YY.
- **Set clock when Start:** When enabled, this option will inform the driver to send a command to the device at communication startup that will set the device clock to the date and time settings of the system clock. The default setting is disabled.

Tagnames

- **Generate Tag Database Using:** Specify the origin of the tag name that will be used when a tag database is automatically generated. Options include Physical Channel Number and Device Tagname. The default setting is Physical Channel Number. Descriptions are as follows:
 - **Physical Channel Number:** When selected, the driver will generate tag names based on the channel number of an item. For example, "CH01" or "CH01_alarm1".
 - **Device Tagname:** When selected, the driver will generate tag names using the tag name returned by the device for a channel. Special characters (such as slash and pound sign) are not allowed in the tag name. For example, "Flow" or "Flow_alarm1".

Login

- **Username:** Specify the registered username, which is required by Yokogawa MW devices when the Login function is enabled. This username may be up to 16 alphanumeric characters, and is case-sensitive.
 - **Note:** When the Login function is enabled, users must specify both a registered username and a password. When the device is disabled, users must specify the user level in order to communicate with the Yokogawa MW device. To indicate the user level, enter the username "admin" or "user". This does not require a password.
- **Password:** Specify the registered password, which may be up to 6 alphanumeric characters. Password entry will not be displayed on the Device Configuration screen.

Device Properties - Redundancy

Property Groups	☐ Redundancy	
General	Secondary Path	...
Scan Mode	Operating Mode	Switch On Failure
Timing	Monitor Item	
Redundancy	Monitor Interval (s)	300
	Return to Primary ASAP	Yes

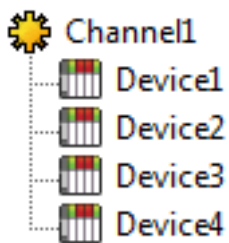
Redundancy is available with the Media-Level Redundancy Plug-In.

• Consult the website, a sales representative, or the user manual for more information.

Optimizing Communications

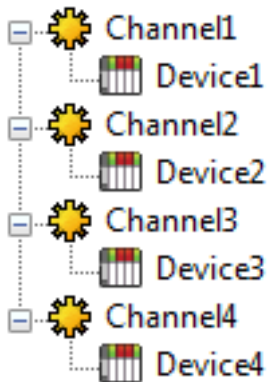
The Yokogawa MW Driver has been designed to provide the best performance with the least amount of impact on the system's overall performance. While the Yokogawa MW Driver is fast, there are a couple of guidelines that can be implemented to control and optimize the application and gain maximum performance.

This server refers to communications protocols like Yokogawa MW Driver 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 Yokogawa MW Ethernet Device 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 Yokogawa MW 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 Yokogawa MW 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 Yokogawa MW Driver could only define one single channel, then the example shown above would be the only option available; however, the Yokogawa MW Driver can define up to 16 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 16 or fewer devices, it can be optimized exactly how it is shown here.

The performance will improve even if the application has more than 16 devices. While 16 or fewer devices may be ideal, the application will still benefit from additional channels. Although spreading the device load across all channels will still cause the server to move from device to device, 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
Word	Unsigned 16-bit value
Short	Signed 16-bit value
Long	Signed 32-bit value
Float	32-bit floating point value
Double	64-bit floating point value
String	Null terminated ASCII string

MW100 Addressing

The driver supports the following addresses for this device. The default data type for each address type is shown in **bold**.

Measured Channels

Address Type	Format	Range	Data Types	Access
Process Value of Channel	CHxxxxx or CHxxxxx.PV	00001-00060	Double , Float	Read Only
Alarm Summary of Channel	CHxxxxx.Alarm	00001-00060	Short , Word, Byte	Read Only
Alarm Level1 Status of Channel	CHxxxxx.Alarm1	00001-00060	Short , Word, Byte	Read Only
Alarm Level2 Status of Channel	CHxxxxx.Alarm2	00001-00060	Short , Word, Byte	Read Only
Alarm Level3 Status of Channel	CHxxxxx.Alarm3	00001-00060	Short , Word, Byte	Read Only
Alarm Level4 Status of Channel	CHxxxxx.Alarm4	00001-00060	Short , Word, Byte	Read Only
Alarm Level1 Setpoint*	CHxxxxx.ASP1	00001-00060	Double , Float	Read/Write
Alarm Level2 Setpoint*	CHxxxxx.ASP2	00001-00060	Double , Float	Read/Write
Alarm Level3 Setpoint*	CHxxxxx.ASP3	00001-00060	Double , Float	Read/Write
Alarm Level4 Setpoint*	CHxxxxx.ASP4	00001-00060	Double , Float	Read/Write
Upper Scale Value of Channel*	CHxxxxx.scale_Hi	00001-00060	Double , Float	Read Only
Lower Scale Value of Channel*	CHxxxxx.scale_Lo	00001-00060	Double , Float	Read Only
Status of Channel	CHxxxxx.status	00001-00060	String	Read Only
Tag name of Channel*	CHxxxxx.tag	00001-00060	String	Read Only
Unit String of Channel*	CHxxxxx.unit	00001-00060	String	Read Only
Precision of Channel*	CHxxxxx.Precision	00001-00060	Short , Word	Read Only
Precision of Channel*	CHAxxxxx.Precision	001-300	Short , Word	Read Only
Digital Input	CHxxxxx.DI	00001-00060	Boolean	Read Only
Alarm Type 1 for Channel (Num)	CHxxxxx.AlarmType1.Num	00001-00060	Short , Word, Byte	Read Only
Alarm Type 2 for Channel (Num)	CHxxxxx.AlarmType2.Num	00001-00060	Short , Word, Byte	Read Only

Address Type	Format	Range	Data Types	Access
Alarm Type 3 for Channel (Num)	CHxxxxx.AlarmType3.Num	00001-00060	Short , Word, Byte	Read Only
Alarm Type 4 for Channel (Num)	CHxxxxx.AlarmType4.Num	00001-00060	Short , Word, Byte	Read Only
Alarm Type 1 for Channel (String)	CHxxxxx.AlarmType1.String	00001-00060	String	Read Only
Alarm Type 2 for Channel (String)	CHxxxxx.AlarmType2.String	00001-00060	String	Read Only
Alarm Type 3 for Channel (String)	CHxxxxx.AlarmType3.String	00001-00060	String	Read Only
Alarm Type 4 for Channel (String)	CHxxxxx.AlarmType4.String	00001-00060	String	Read Only
Process Value of Math	CHAxxxxx	001-300	Double , Float	Read Only
Process Value of Math	CHAxxxxx.PV	001-300	Double , Float	Read Only
Alarm Summary for Channel	CHAxxxxx.alarm	001-300	Short , Word, Byte	Read Only
Alarm 1 for Channel	CHAxxxxx.alarm1	001-300	Short , Word, Byte	Read Only
Alarm 2 for Channel	CHAxxxxx.alarm2	001-300	Short , Word, Byte	Read Only
Alarm 3 for Channel	CHAxxxxx.alarm3	001-300	Short , Word, Byte	Read Only
Alarm 4 for Channel	CHAxxxxx.alarm4	001-300	Short , Word, Byte	Read Only
Alarm Setpoint 1 for Channel	CHAxxxxx.ASP1	001-300	Double , Float	Read/Write
Alarm Setpoint 2 for Channel	CHAxxxxx.ASP2	001-300	Double , Float	Read/Write
Alarm Setpoint 3 for Channel	CHAxxxxx.ASP3	001-300	Double , Float	Read/Write
Alarm Setpoint 4 for Channel	CHAxxxxx.ASP4	001-300	Double , Float	Read/Write
Upper Scale Value for Channel	CHAxxxxx.scale_Hi	001-300	Double , Float	Read Only
Lower Scale Value for Channel	CHAxxxxx.scale_Lo	001-300	Double , Float	Read Only
Unit String of Channel	CHAxxxxx.unit	001-300	String	Read Only
Tagname of Channel	CHAxxxxx.tag	001-300	String	Read Only
Status of Channel	CHAxxxxx.status	001-300	String	Read Only
Last Math Channel	CHA.High	001-300	Short , Word	Read Only
First Math Channel	CHA.Low	001-300	Short , Word	Read Only
Alarm Type 1 for Channel (Numeric)	CHAxxxxx.AlarmType1.Num	001-300	Short	Read Only
Alarm Type 1 for Channel (String)	CHAxxxxx.AlarmType1.String	001-300	String	Read Only
Digital Output on Channel	CHxxxxx.DO	00001-00060	Boolean	Read/Write
Analog Output (Volt) on Channel**	CHxxxxx.AOVolt	00001-00060	Float	Read/Write

Address Type	Format	Range	Data Types	Access
Analog Output (mA) on Channel	CHxxxxx.AOmA	00001-00060	Float	Read/Write
Pulse Width Modulation on Channel	CHxxxxx.PWM	00001-00060	Float	Read/Write
Lowest Measuring Channel*	CH.Low		Short, Word	Read Only
Highest Measuring Channel*	CH.High		Short, Word	Read Only

*The data associated with these addresses will only be read from the device at the start of a communications session. Once read, the values will not be refreshed until the server has been restarted or the "Reset" tag has been invoked. To invoke a reset, a non zero value must be written to the Reset tag. Once the Reset tag has been invoked, the driver will reinitialize all startup data from the device. This will result in a pause of the update of process values and alarms until all initialized data has been read from the device.

*The Yokogawa MW Ethernet Device is arranged as a 6 slot (numbers 0-5) unit. Each slot may hold a module consisting of up to 10 channels (1-10). The first slot has possible channel numbers of CH00001-00010, the second slot CH000011-00020, the third slot CH00021-00030, the fourth slot CH00031-00040, the fifth slot CH00041-00050, and the last slot has possible channel numbers of 00051-00060. There is potential for gaps in channel numbering due to the fact that not all slots must contain a module, and not all modules are equipped with 10 channels (as in the case of a 4-channel module).

Tag Names

For channels that have unspecified tag names, the driver will construct an internal tag name based on the channel number. For example, the tag name of address 'CH00001' will be returned as 'CH00001'.

Digital Output

'CHxxxx.DO' is only valid for channel numbers in slots containing a Digital Output Module.

Analog Output (Volt)

Depending upon how fast multiple writes are written to this tag, the response time during multiple and frequent writes may be slow.

General Device Data

Address Type	Format	Range	Data Types	Access
Date of Last Data	Date		String	Read Only
Time of Last Data	Time		String	Read Only
SetTime	SetTime		Boolean	Write Only
Model String	Model		String	Read Only
Math Communication Data	CDxxx	001-300	Float	Write Only
MathControl	Math Control		Short	Write Only
OperationCtrl	Operation Control		Short	Write Only
Serial Number of Unit	SerialNumber		String	Read Only
IP Address of Device	IP		String	Read Only
Reset Alarms	AlarmReset		Boolean, Short, Word,	Write Only

Address Type	Format	Range	Data Types	Access
			Byte	
Direct Reloading of Configuration	Reset		Boolean , Short, Word, Byte	Write Only
ClearError	Clear Error		Boolean	Write Only
Control Command and Response*	Command		String	Read/Write

*The Control Command and Response address type allows users to send a string command and receive a string response to and from the device. As such, users can send commands to the device that are not directly supported by the driver. This tag is only available to users logged in at the Administrator level; otherwise, write operations will return an error. Binary data is not supported.

Caution: It is recommended that users be careful when performing write operations using the Command address.

Notes:

1. Addresses that have Write Only access are assigned a default access of Read/Write. However, data values are unreadable for these addresses and the associated tags are not included in the scan list. The current data value for these tags will always be 0 for numeric data types (with the exception of 'Disp.Interval,' which has a default value of 1000).
2. The actual number of addresses available for of each type depends on the configuration of the Yokogawa device. If the driver finds that an address is not present in the device at Runtime, it will post an error message and remove the tag from its scan list.

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 Read Only](#)

[Missing address](#)

Device Status Messages

[Device '<device>' login failed. Check username and password](#)

[Device '<device>' responded with error '<errnum>' \(Tag '<address>'\)](#)

[Device '<device>' responded with error '<error>'](#)

[Device '<device>' returned error '2 <Value exceeds setting range>'. \(Tag '<address>'\)](#)

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

[Device <device name> login failed. No more logins at this user level](#)

[Unable to set clock for device '<device>'](#)

[Unable to start math for device '<device>'](#)

[Unable to start measuring for device '<device>'](#)

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

Driver Error Messages

[Winsock initialization failed \(OS Error = n\)](#)

[Winsock V1.1 or higher must be installed to use the Yokogawa MW Ethernet Device Driver](#)

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 that 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>' 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.

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.

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 '<device name>' login failed. Check username and password

Error Type:

Warning

Possible Cause:

An invalid username has been specified.

Solution:

Retry with a valid username and password.

Device '<device>' responded with error '<errnum>' (Tag '<address>')

Error Type:

Warning

Possible Cause:

An error has been returned by the device that is not specified in the driver.

Solution:

Look up the error number in the device manual.

Device '<device>' responded with error '<error>'**Error Type:**

Warning

Possible Cause:

The device has failed to automatically generate a tag.

Solution:

Look up the error number in the device manual.

Device '<device>' returned error '2 <Value exceeds setting range>'. (Tag '<address>')**Error Type:**

Warning

Possible Cause:

The driver is attempting to write a value to a tag that exceeds its limit.

Solution:

Retry writes that are within the accepted range.

Device '<device name>' is not responding**Error Type:**

Serious

Possible Cause:

1. The connection between the device and the Host PC is broken.
2. The IP address assigned to the device is incorrect.
3. The device Ethernet port is already in use.
4. The connection cannot be established in the specified timeout period.
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 cabling between the PC and the PLC device.
2. Verify that the IP address given to the named device matches that configured in the actual device. If applicable, verify the subnet mask and default gateway properties configured in the actual device.
3. Check for another connected application (such as MW Standard software) and disconnect.
4. Increase the Connect Timeout value in the Timeout property group of Device Properties.
5. Increase the Request Timeout property value so that the entire response can be handled.

Note:

The MW device's TCP/IP port supports a single connection.

Device '<device name>' login failed. No more logins at this user level**Error Type:**

Warning

Possible Cause:

The device is already connected to the maximum number of clients that is allowed at a time.

Solution:

Wait until a connection becomes available for that device.

Unable to set clock for device '<device>'**Error Type:**

Warning

Possible Cause:

The driver has failed to set the clock in the device.

Solution:

1. Check connections to the device.
2. The device may have been busy performing other functions. Retry.

Unable to start math for device '<device>'**Error Type:**

Warning

Possible Cause:

1. The driver has failed to start math on the device.
2. The math option is missing from the device.

Solution:

1. Check connections to the device.
2. Math cannot be started when certain other features are already on. Check the device manual for details.
3. Use a device with the math option.

Unable to start measuring for device '<device>'

Error Type:

Warning

Possible Cause:

The driver has failed to start measuring on the device.

Solution:

1. Check connections to the device.
2. Measuring cannot be started when certain other features are already on. Check the device manual for details.

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

Error Type:

Serious

Possible Cause:

1. The connection between the device and the Host PC is broken.
2. The named device may have been assigned an incorrect IP address.
3. The address specified may be Read Only or may not exist in the current device.

Solution:

1. Verify the cabling between the PC and the PLC device.
2. Verify that the IP address given to the named device matches that of the actual device.
3. Check address availability for the device.

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.

OS Error	Indication	Possible Solution
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 Yokogawa MW 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.

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