WAGO Ethernet Driver

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WAGO Ethernet Driver

Help version 1.020

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Overview

The WAGO Ethernet Driver provides a reliable way to connect WAGO Ethernet devices to OPC client applications; including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for WAGO I/O System 750 series of devices. Communication is through the 750-342 Buscoupler for Ethernet TCP/IP, or the 750-842 Programmable Fieldbus Controller (PFC) for Ethernet TCP/IP. Up to 64 I/O modules per device can be addressed. The server's automated OPC tag database generation feature frees the user from tedious manual tag definition, which would include slot configuration dependent address calculations.

Notes :

1. The driver posts messages when a failure occurs during operation. *For more information, refer to **Error Descriptions**.*
2. TCP/IP must be properly installed to use this driver. *For more information on setting up TCP/IP, refer to Windows documentation.*

Setup

Supported Devices

WAGO I/O System 750-342 Buscoupler for Ethernet TCP/IP.
WAGO I/O System 750-842 Programmable Fieldbus Controller (PFC) for Ethernet TCP/IP.

Communication Protocol

Modbus Open Protocol over Ethernet using Winsock V1.1 or higher.

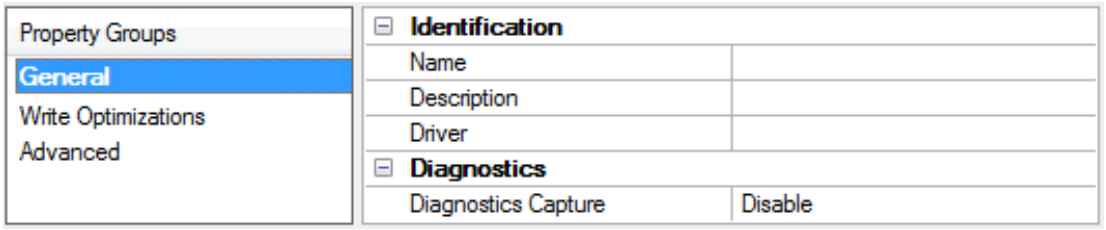
Device ID

WAGO I/O System devices are networked using standard IP addressing. The Device ID has the following format YYY.YYY.YYY.YYY designating the device IP address. Each YYY byte should be in the range of 0 to 255.

See Also: TCP/IP, Block Sizes, and Slot Configuration.

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.



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

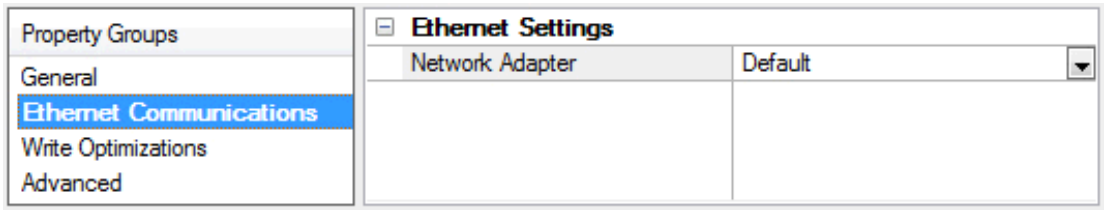
Diagnostics Capture: When enabled, this option makes the channel's diagnostic information available to OPC applications. Because the server's diagnostic features require a minimal amount of overhead processing, it is recommended that they be utilized when needed and disabled when not. The default is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

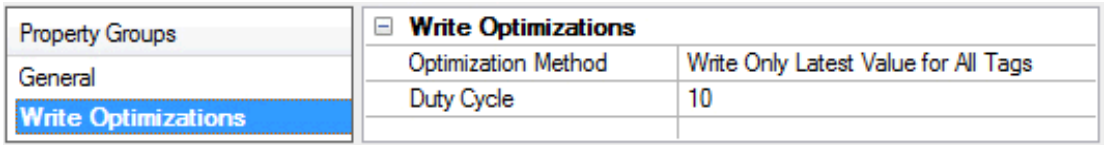


Ethernet Settings

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.

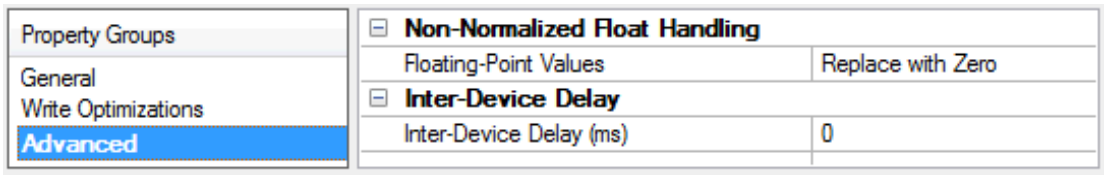
- **Write Only Latest Value for All Tags**: This option takes the theory behind the second optimization mode and applies it to all tags. It is especially useful if the application only needs to send the latest value to the device. This mode optimizes all writes by updating the tags currently in the write 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.



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.

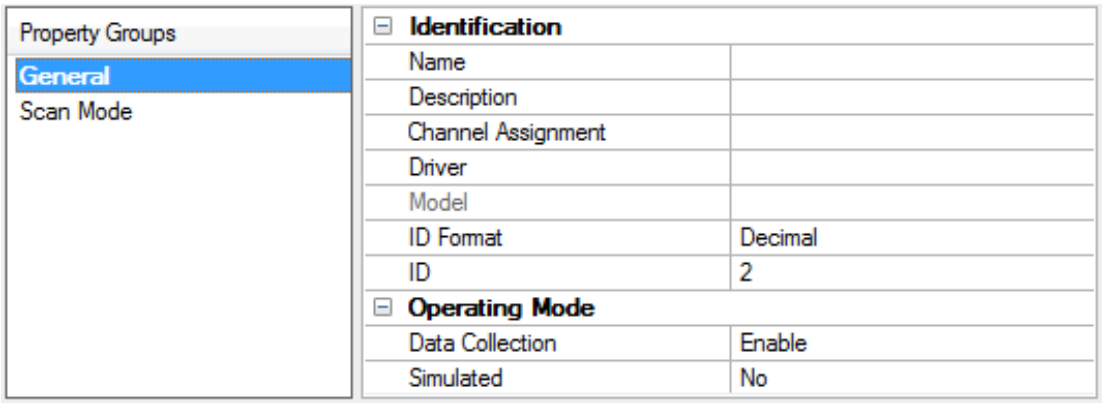
For more information on the floating point values, refer to "How To ... Work with Non-Normalized Floating Point Values" in the server help.

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.

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.



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 station / node / identity / address. The type of ID entered depends on the communications driver being used. For many 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. 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

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.

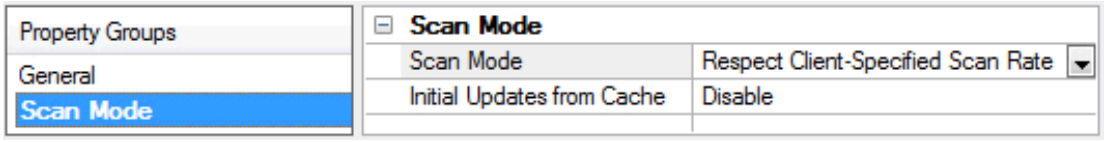
Notes:

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.



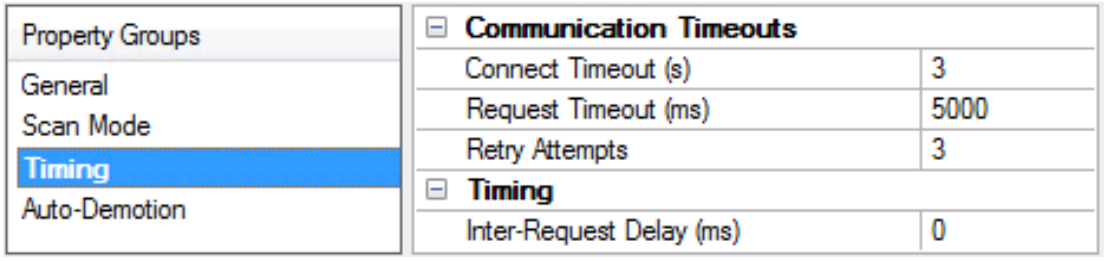
Scan Mode: specifies how tags in the device are scanned for updates sent to subscribed clients. Descriptions of the options are:

- **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.



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.

Attempts Before Timeout: This property specifies 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.

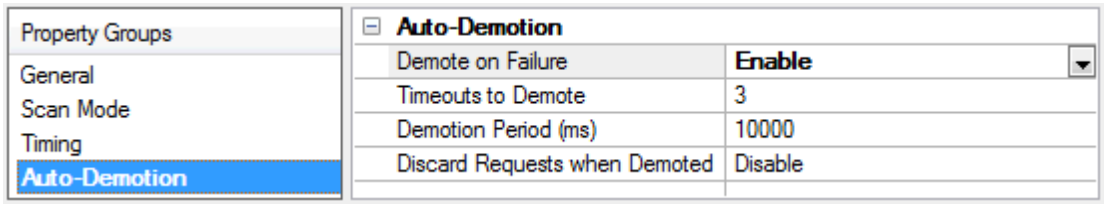
Timing

Inter-Request Delay: 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.



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

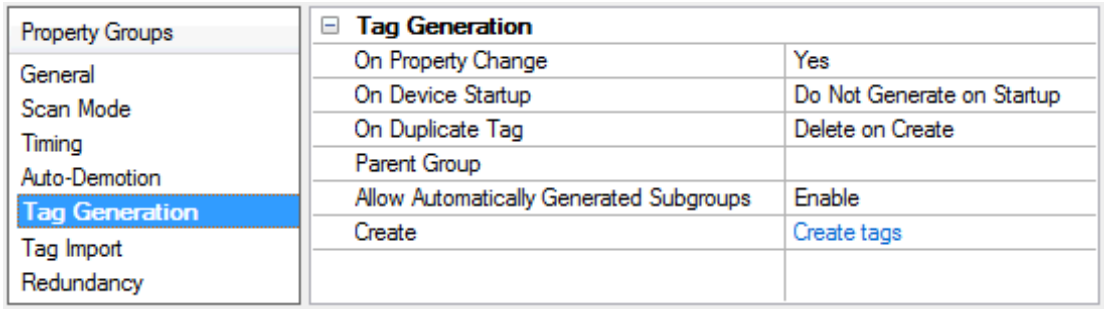
The automatic tag database generation features make setting up an application a plug-and-play operation. Select communications drivers can be configured to automatically build a list of tags that correspond to device-specific data. These automatically generated tags (which depend on the nature of the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

Not all devices and drivers support full automatic tag database generation and not all support the same data types. Consult the data types descriptions or the supported data type lists for each driver for specifics.

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.



On Property Change: If the device supports automatic tag generation when certain properties change, the **On Property Change** option is shown. It is set to **Yes** by default, but it can be set to **No** to control over when tag generation is performed. In this case, the **Create tags** action must be manually invoked to perform tag generation.

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.

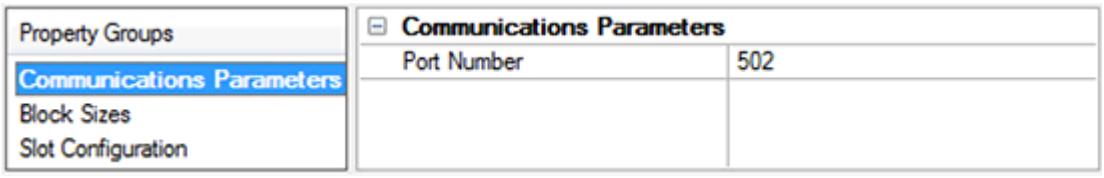
Allow Automatically Generated Subgroups: This property controls whether the server automatically creates subgroups for the automatically generated tags. This is the default setting. If disabled, the server generates the device's tags in a flat list without any grouping. In the server project, the resulting 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.

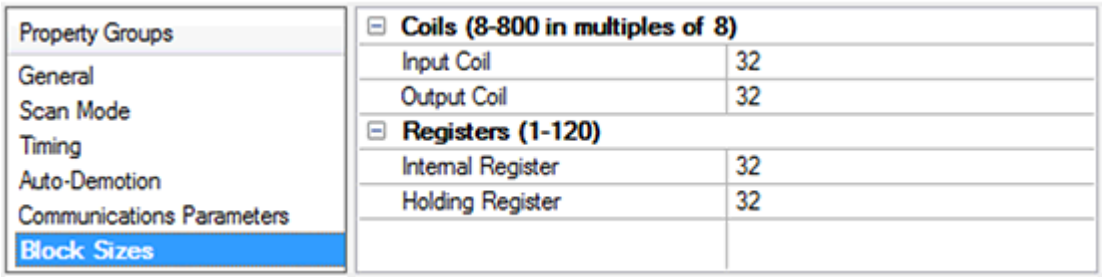
Note: **Create tags** is disabled if the Configuration edits a project offline.

Device Properties — Communications Parameters



Port Number: Specify the TCP/IP port number that the remote device is configured to use. The default port number is 502.

Device Properties — Block Sizes



Coils

Coils can be read from 8 to 800 points (bits) at a time.

Registers

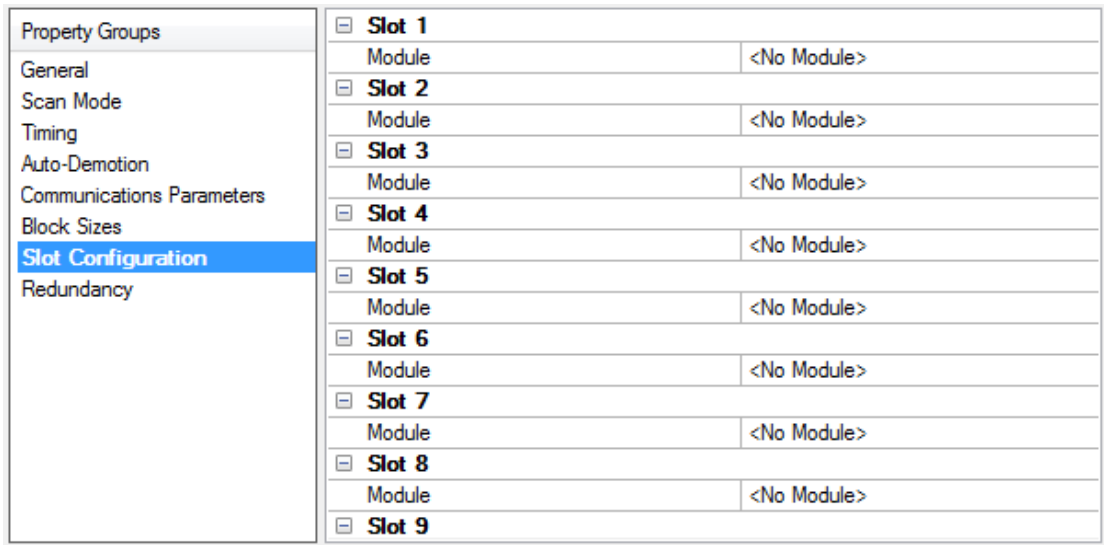
Registers can be read from 1 to 120 locations (words) at a time.

Note: The application may benefit by a change in block size. For example, future versions of the device may not support block Read/Write operations of the default size. Futhermore, if the device contains non-contiguous addresses (such as when a binary space module is used) the device will most likely reject a request to read a block of data that encompasses undefined memory.

Device Properties — Slot Configuration

Automated OPC tag database generation is a powerful labor saving feature of the server. However, before the server can create a tag database, the user must specify which modules are installed in the device. The slots may be configured during the last step of the Device Wizard. They may also be accessed by double-clicking on the device and then selecting the **Slot Configuration** property group.

Note: No modifications can be made to the slot configuration while client applications are connected to the device.



To configure the device, select a slot by clicking the module and then select the appropriate module type from the dropdown menu. If a slot was previously configured, the existing module type will be replaced by the new selection. To remove the module from the selected slot, select **<No Module>** as the module type.

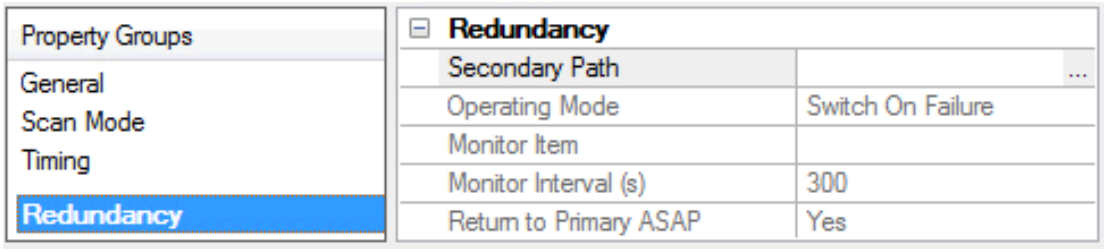
Up to 64 slots can be configured per device. Slots may be configured as having <No Module> when the physical module occupying that slot does not contribute to the process image. Examples of such modules are the power supply module 750-600 and separation module 750-616.

Some choices, such as the binary spacer module (750-622), some **special modules** (750-650, 750-651, 750-653, and 750-654), and the generic module require configuration. A configuration dialog box will be presented when one of these modules is added. Once added to the slot configuration, users may go back and edit the module's properties by double-clicking on its slot.

Tags will be created automatically as soon as the Device Wizard is finished (or after Apply or OK is selected in Device Properties).

See Also:
Digital Input Modules
Digital Output Modules
Analog Input Modules
Analog Output Modules
Power Supply and End Modules
Encoder and Resolver Modules
Binary Spacer Module
Special Modules
Generic Module

Device Properties — Redundancy



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

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

Analog Input Modules

Module	Description	IC	OC	IR	HR	Scaling	Format
750-452	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Unit Numerical
750-452/200	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Siemens
750-454	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Unit Numerical
750-454/200	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Siemens
750-456	2 Ch Analog Input (+/-10 V)	0	0	2	0	None	Unit Numerical
750-456/200	2 Ch Analog Input (+/- 10 V)	0	0	2	0	None	Siemens
750-461	2 Ch Analog Input (PT 100)	0	0	2	0	TC	Unit Numerical
750-461/002	2 Ch Analog Input (Resistance Test)	0	0	2	0	None	Unit Numerical
750-461/003	2 Ch Analog Input (PT 1000)	0	0	2	0	TC	Unit Numerical
750-461/004	2 Ch Analog Input (NI 100)	0	0	2	0	TC	Unit Numerical
750-461/005	2 Ch Analog Input (NI 1000)	0	0	2	0	TC	Unit Numerical
750-461/007	2 Ch Analog Input (Resistance Test)	0	0	2	0	None	Unit Numerical
750-461/200	2 Ch Analog Input (PT 100)	0	0	2	0	None	Siemens
750-462	2 Ch Analog Input (TC)	0	0	2	0	TC	Unit Numerical
750-462/001	2 Ch Analog Input (TC Type S)	0	0	2	0	TC	Unit Numerical
750-462/002	2 Ch Analog Input (TC Type T)	0	0	2	0	TC	Unit Numerical
750-462/003	2 Ch Analog Input (+/1120 mV))	0	0	2	0	None	Unit Numerical
750-462/006	2 Ch Analog Input (TC Type J)	0	0	2	0	TC	Unit Numerical
750-462/007	2 Ch Analog Input (TC Type B)	0	0	2	0	TC	Unit Numerical
750-462/008	2 Ch Analog Input (TC Type E)	0	0	2	0	TC	Unit Numerical
750-462/009	2 Ch Analog Input (TC Type N)	0	0	2	0	TC	Unit Numerical
750-462/010	2 Ch Analog Input (TC Type R)	0	0	2	0	TC	Unit Numerical
750-462/011	2 Ch Analog Input (TC Type U)	0	0	2	0	TC	Unit Numerical
750-462/050	2 Ch Analog Input (TC Type K)	0	0	2	0	TC	Unit Numerical
750-462/061	2 Ch Analog Input (TC Type U)	0	0	2	0	TC	Unit Numerical

Module	Description	IC	OC	IR	HR	Scaling	Format
750-465	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Unit Numerical
750-465/200	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Siemens
750-466	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Unit Numerical
750-466/200	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Siemens
750-467	2 Ch Analog Input (0-10 V)	0	0	2	0	None	Unit Numerical
750-467/200	2 Ch Analog Input (0-10 V)	0	0	2	0	None	Siemens
750-468	4 Ch Analog Input (0-10 V)	0	0	4	0	None	Unit Numerical
750-468/200	4 Ch Analog Input (0-10 V)	0	0	4	0	None	Siemens
750-469	2 Ch Analog Input (TC Type K)	0	0	2	0	TC	Unit Numerical
750-469/001	2 Ch Analog Input (TC Type S)	0	0	2	0	TC	Unit Numerical
750-469/002	2 Ch Analog Input (TC Type T)	0	0	2	0	TC	Unit Numerical
750-469/003	2 Ch Analog Input (+/- 120 mV)	0	0	2	0	None	Unit Numerical
750-469/006	2 Ch Analog Input (TC Type J)	0	0	2	0	TC	Unit Numerical
750-469/008	2 Ch Analog Input (TC Type E)	0	0	2	0	TC	Unit Numerical
750-469/012	2 Ch Analog Input (TC Type L)	0	0	2	0	TC	Unit Numerical
750-469/200	2 Ch Analog Input (TC)	0	0	2	0	None	Siemens
750-472	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Unit Numerical
750-472/200	2 Ch Analog Input (0-20 mA)	0	0	2	0	None	Siemens
750-474	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Unit Numerical
750-474/200	2 Ch Analog Input (4-20 mA)	0	0	2	0	None	Siemens
750-476	2 Ch Analog Input (+/-10 V)	0	0	2	0	None	Unit Numerical
750-476/200	2 Ch Analog Input (+/-10 V)	0	0	2	0	None	Siemens
750-478	2 Ch Analog Input (0-10 V)	0	0	2	0	None	Unit Numerical
750-478/200	2 Ch Analog Input (0-10 V)	0	0	2	0	None	Siemens

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.

Note: TC Scaling is used for thermocouple modules. Raw data is multiplied by 10 and returned as a float value.

Analog Output Modules

Module	Description	IC	OC	IR	HR	Scaling	Format
750-550	2 Ch Analog Output (0-10 V)	0	0	0	2	None	Unit Numerical
750-550/200	2 Ch Analog Output (0-10 V)	0	0	0	2	None	Siemens
750-552	2 Ch Analog Output (0-20 mA)	0	0	0	2	None	Unit Numerical
750-552/200	2 Ch Analog Output (0-20 mA)	0	0	0	2	None	Siemens
750-554	2 Ch Analog Output (4-20 mA)	0	0	0	2	None	Unit Numerical
750-554/200	2 Ch Analog Output (4-20 mA)	0	0	0	2	None	Siemens
750-556	2 Ch Analog Output (+/-10 V)	0	0	0	2	None	Unit Numerical
750-556/200	2 Ch Analog Output (+/-10 V)	0	0	0	2	None	Siemens

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.

Binary Spacer Module

When adding a Binary Spacer Module to the slot configuration, specify how many input and output coils will be used by the module. There can be 2, 4, 6 or 8 of each type of coil.

Digital Input Modules

Module	Description	IC	OC	IR	HR	CB	SB
750-400	2 Ch Digital Input (DC 24 V, 3 ms)	2	0	0	0	0	0
750-401	2 Ch Digital Input (DC 24 V, 0.2 ms)	2	0	0	0	0	0
750-402	4 Ch Digital Input (DC 24 V, 3 ms)	4	0	0	0	0	0
750-403	4 Ch Digital Input (DC 24 V, 0.2 ms)	4	0	0	0	0	0
750-404	Up/Down Counter (32-bit)	0	0	2	2	1*	1*
750-404/001	Counter w/ Enable Input (32-bit)	0	0	2	2	1*	1*
750-404/002	Peak Time Counter (32-bit)	0	0	2	2	1*	1*
750-404/003	Frequency Counter (0.1-10 kHz)	0	0	2	2	1*	1*
750-404/004	Up/Down Counter w/ Switching	0	0	2	2	1*	1*
750-404/005	2 Ch Up Counter (16-bit)	0	0	2	2	1*	1*

Module	Description	IC	OC	IR	HR	CB	SB
750-405	2 Ch Digital Input (AC 230 V)	2	0	0	0	0	0
750-406	2 Ch Digital Input (AC 120 V)	2	0	0	0	0	0
750-408	4 Ch Digital Input (DC 24 V, 3 ms)	4	0	0	0	0	0
750-409	4 Ch Digital Input (DC 24 V, 0.2 ms)	4	0	0	0	0	0
750-410	2 Ch Digital Input (DC 24, 3 ms)	2	0	0	0	0	0
750-411	2 Ch Digital Input (DC 24 V, 02. ms)	2	0	0	0	0	0
750-412	2 Ch Digital Input (DC 48 V, 3 ms)	2	0	0	0	0	0
750-412/001	2 Ch Digital Input (DC 48 V, 3 ms)	2	0	0	0	0	0
750-414	4 Ch Digital Input (DC 5V, 0.2 ms)	4	0	0	0	0	0
750-415	4 Ch Digital Input (AC/DC 5V, 0.2 ms)	4	0	0	0	0	0

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.
CB = Number of control bytes (holding register).
SB = Number of status bytes (internal register).

*For the 740-404 counter modules, the control byte is the low byte of a holding register, and the address of this register will precede the 2 data output registers. Likewise, the status byte is the low byte of an internal register and the address of this register will precede the 2 data input registers.

Digital Output Modules

Module	Description	IC	OC	IR	HR	CB	SB
750-501	2 Ch Digital Output (DC 24 V, 0.5 A)	0	2	0	0	0	0
750-502	2 Ch Digital Output (DC 24 V, 2 A)	0	2	0	0	0	0
750-504	4 Ch Digital Output (DC 24, 0.5 A)	0	4	0	0	0	0
750-506	2 Ch Digital Output (DC 24 V, 0.5 A)	4	4	0	0	0	0
750-507	2 Ch Digital Output (DC 24 V, 2 A)	2	2	0	0	0	0
750-509	2 Ch Digital Output (Solid State Relay)	0	2	0	0	0	0
750-511	2 Ch Pulsewidth (250 Hz-20 kHz)	0	0	2	2	2*	2*
750-511/002	2 Ch Pulsewidth (2 Hz-250 Hz)	0	0	2	2	2*	2*
750-512	2 Ch Output Output Relay (AC 250 V)	0	2	0	0	0	0
750-513	2 Ch Output Output Relay (AC 250 V)	0	2	0	0	0	0
750-514	2 Ch Digital Output Relay (AC 125 V)	0	2	0	0	0	0
750-516	4 Ch Digital Output (DC 24 V)	0	4	0	0	0	0
750-517	2 Ch Digital Output Relay (AC 250)	0	2	0	0	0	0

Module	Description	IC	OC	IR	HR	CB	SB
750-519	4 Ch Digital Output (DC 5 V, 20 mA)	0	4	0	0	0	0

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.
CB = Number of control bytes (holding register).
SB = Number of status bytes (internal register).

*For the 740-511 pulse width modules, the control byte is the low byte of a holding register, and the address of this register will precede the 2 data output registers. Likewise, the status byte is the low byte of an internal register and the address of this register will precede the 2 data input registers.

Encoder and Resolver Modules

Module	Description	IC	OC	IR	HR	CB	SB
750-630	SSI Transmitter Interface (Gray code)	0	0	2	0	0	0
750-630/001	SSI Transmitter Interface (Binary code)	0	0	2	0	0	0
750-630/006	SSI Transmitter Interface (Gray code)	0	0	2	0	0	0
750-631	Incremental Encoder Interface (4X)	0	0	3	3	1*	1*
750-631/001	Incremental Encoder Interface (1X)	0	0	3	3	1*	1*

*For the 740-631 family of incremental encoder interface modules, the control byte is the low byte of a holding register, and the address of this register will precede the 3 data output registers. Likewise, the status byte is the low byte of an internal register, and the address of this register will precede the 3 data input registers. The first input or output register contains counter data, the second contains period data, and the third contains latch data.

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.
CB = Number of control bytes (holding register).
SB = Number of status bytes (internal register).

Generic Module

A module that is not listed in the driver's Slot Configuration property group can use the driver's Generic Module to communicate. To invoke the Generic Module Configuration property group, select **Generic Module Type**.

Slot 1	
Module	000-000 Generic Module
Number of Digital Input Channels	2
Number of Digital Output Channels	0
Number of Analog Input Channels	0
Input Channel Data Type	Word
Number of Analog Output channels	0
Output Channel Data Type	Word
Analog Channels Use Siemens Format	No
Number of Cont/Stat Bytes	0

The generic module is extremely flexible. Up to 255 module channels may be configured: each of digital input, digital output, analog input and analog output. For analog channels, specify the data type of the input and output channel tags. The number of registers addressed by the generic module is determined from the number of channels and the data type. The number of internal registers used is equal to the number of input channels if the input channel data type is Short or Word, and two times the number of channels for Long, Float and DWord types. The number of holding registers used is calculated in a similar fashion from the number of output channels and output channel data type.

To generate circuit and overflow status tags, enable the **Analog channels use Siemens format** property (if the module uses this format option). If the module uses control/status bytes, set the total number used in the bottom box. This will affect how the module (and others in higher slot positions) will be addressed. It will also signal the automated tag generation feature to create control and status byte tags. The number of control bytes is equal to the number of status bytes.

Power Supply and End Modules

Module	Description	IC	OC	IR	HR
750-610	Power Supply (DC 24 V)	2*	0	0	0
750-611	Power Supply (AC 230 V)	2*	0	0	0
750-622	Binary Spacer	X**	X	0	0

*For the 750-610 and 750-611 power supply modules, digital inputs DI1 and DI2 report over/under voltage and blown fuse.

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.

DI1	DI2	Description
0	0	Under voltage
1	0	Blown fuse
0	1	Over voltage, fuse OK

**The binary spacer module 750-622 can be configured to used 2, 4, 6, or 8 digital inputs, or 2, 4, 6, or 8 digital outputs. Selecting this module in the slot configuration property group will invoke a "Binary Space Module configuration" property group, where the setting of the physical module can be matched.

See Also: Slot Configuration

Special Modules

Module	Description	IC	OC	IR	HR
750-650	RS232C Interface (3 byte)	0	0	2	2
750-650/001	RS232C Interface (5 byte)	0	0	3	3
750-651	TTY Interface (3 byte)	0	0	2	2
750-651/001	TTY Interface (5 byte)	0	0	3	3
750-653	RS485C Interface (3 byte)	0	0	2	2
750-653/001	RS485C Interface (5 byte)	0	0	3	3
750-654	Data Exchange Module (3 byte)	0	0	2	2
750-654/001	Data Exchange Module (5 byte)	0	0	3	3

IC = Number of Input Coils used.
OC = Number of Output Coils used.
IR = Number of Internal (input) Registers used.
HR = Number of Holding (output) Registers used.

Data is structured as (3 byte versions):
Analog Input 1 = [Data byte 0] [Status byte]
Analog Input 2 = [Data byte 2] [Data byte 1]

Analog Output 1 = [Data byte 0] [Control byte]
Analog Output 2 = [Data byte 2] [Data byte 1]

Data is structured as (5 byte versions):
Analog Input 1 = [Data byte 0] [Status byte]
Analog Input 2 = [Data byte 2] [Data byte 1]
Analog Input 3 = [Data byte 4] [Data byte 3]

Analog Ouput 1 = [Data byte 0] [Control byte]
Analog Output 2 = [Data byte 2] [Data byte 1]
Analog Output 3 = [Data byte 4] [Data byte 3]

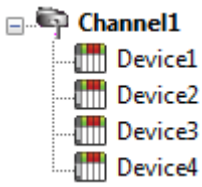
Note: When a special module is added to the slot configuration, tags specific to that module will be automatically generated. Before that occurs, however, users will have the following options:

- To have a Byte tag created for each data byte and a Bool tag created for each status/control bit.
- To have Word tags created with the packed data.

Optimizing Communications

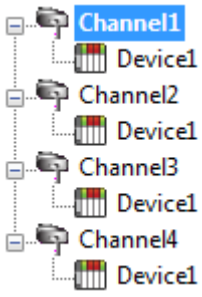
The WAGO Ethernet Driver is designed to provide the best performance with the least amount of impact on the system's overall performance. While the driver is fast, there are a couple of guidelines that can be used to control and optimize the application and gain maximum performance.

The server refers to communications protocols like WAGO Ethernet as a channel. Each channel defined in the application represents a separate path of execution in the server. Once a channel has been defined, a series of devices must then be defined under that channel. Each of these devices represents a single WAGO controller 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 WAGO Ethernet Driver or the network. An example of how the application may appear when configured using a single channel is shown below.



Each device appears under a single WAGO 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 WAGO Ethernet Driver could only define one single channel, then the example shown above would be the only option available; however, the 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 by spreading the device load across all 16 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.

Block Size, which is available on each defined device, can also affect performance. Block Size refers to the number of bytes that may be requested from a device at one time. To refine the performance of this driver, the block size may be configured to 1 to 120 registers and 8 to 800 bits.

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. When accessing data from a thermocouple or resistance sensor input module, the driver will use a single 16-bit register as a floating point value.
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.

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.

750-342 Buscoupler
750-842 Programmable Fieldbus Controller (PFC)

750-342 Buscoupler

The 750-342 Buscoupler maps all of the installed modules to a process image. The rules used for this mapping have been programmed into this driver, allowing for automated tag generation. For information on how to manually create tags to access module data (or on how this driver computes addresses during automated tag generation) refer to **Process Image**.

Only part of the 750-342 available memory is used for the process image. All memory, including that used by the process image, can be accessed with manually created tags. Conventional Modbus addressing is used.

See Also:
Input Coils
Output Coils
Internal Registers
Holding Registers

750-842 Programmable Fieldbus Controller (PFC)

The 750-842 Programmable Fieldbus Controller maps all of the installed modules to a process image. The rules used for this mapping have been programmed into this driver, allowing for automated tag generation. For information on how to manually create tags to access module data (or on how this driver computes addresses during automated tag generation) refer to **Process Image**.

Only part of the 750-842 available memory is used for the process image. All memory, including that used by the process image, can be accessed with manually created tags. Conventional Modbus addressing is used.

See Also:
Input Coils
Output Coils
Internal Registers
Holding Registers

Process Image

The server's automated OPC tag database generation takes care of all addressing issues for data associated with modules and is the preferred method of creating tags. In order to manually create tags to access module data, users must understand how the data is mapped by the Buscoupler or PFC. The WAGO I/O System uses the **Open Modbus protocol**, addressing digital inputs and outputs as Modbus coils and analog inputs and outputs as Modbus registers. When the buscoupler or PFC is powered up, it creates a process image of all of the data points associated with the installed modules.

Modbus addresses are assigned sequentially as the modules are arranged in the device (for all input coils, output coils, internal registers and holding registers). Addresses with a preceding "0" are interpreted by the driver as input coil addresses (digital input), "1" as output coil addresses (digital output), "3" as internal register addresses (Read Only analog), and "4" as holding register addresses (Read and Write analog).

WAGO Modbus and Modbus/TCP Buscoupler and PFC Memory Map

	Conventional Modbus Addressing	Alternative Modbus Addressing	PFC Addressing	Memory Stack		
0 255	Word addressing begins at 30001 Bit addressing begins at 10001	Word addressing begins at 40001 Bit addressing begins at 00001	Begins at %IX0.0, %IB0, %IW0, etc.	Real World Inputs (Buscoupler or PFC)	Analog In's Digital In's Available Memory	Addressing begins at: 30001 + numberOfAnalogOutputWords OR 40001 + numberOfAnalogOutputWords OR 00001 OR 10001
256 511	Word addressing begins at 30257 Bit addressing not available	Word addressing begins at 40257 Bit addressing not available	Begins at %QX256.0, %QB512, %QW256, etc.	Available Memory (PFC Only)		
512 767	Word addressing begins at 40001 Bit addressing begins at 00001 (These addresses are Write Only.)	Word addressing begins at 40513 Bit addressing begins at 00513	Begins at %QX0.0, %QB0, %QW0, etc.	Real World Outputs (Buscoupler or PFC)	Analog Out's Digital Out's Available Memory	Addressing begins at: 40001 + numberOfAnalogOutputWords * OR 40513 + numberOfAnalogOutputWords OR 00001 * OR 00513 * Write Only
768 1023	Word addressing begins at 40257 Bit addressing not available (These addresses are Write Only.)	Word addressing begins at 40769 Bit addressing not available	Begins at %IX256.0, %IB512, %IW256, etc.	Available Memory (PFC Only)		

Note: Various system properties are located beyond this range. For more information, refer to the hardware documentation.

Example of Module Mapping

Slot	WAGO Module	Modbus Addresses
1	4 Channel Digital Input - Input 1 - Input 2 - Input 3	(Input Coils 0-3) - 10000 - 10001 - 10002

Slot	WAGO Module	Modbus Addresses
	- Input 4	- 10003
2	1 Channel Analog Input (32-bit) - Input 1	(Internal Registers 0-1) - 30000
3	4 Channel Digital Output - Output 1 - Output 2 - Output 3 - Output 4	(Output Coils 0-3) - 00000 - 00001 - 00002 - 00003
4	2 Channel Analog Output (16-bit) - Output 1 - Output 2	(Holding Registers 0-1) - 40000 - 40001
5	4 Channel Digital Input - Input 1 - Input 2 - Input 3 - Input 4	(Input Coils 4-7) - 10004 - 10005 - 10006 - 10007
6	2 Channel Analog Input (16-bit) - Input 1 - Input 2	(Internal Registers 2-3) - 30002 - 30003
7	4 Channel Digital Output - Output 1 - Output 2 - Output 3 - Output 4	(Output Coils 4-7) - 00004 - 00005 - 00006 - 00007
8	2 Channel Analog Output (16-bit) - Output 1 - Output 2	(Holding Registers 2-3) - 40002 - 40003

Note: The WAGO I/O System Buscoupler and PFC handle reads to output channels differently. In these cases, 0x0200 must be added to the address. This is done by the driver: users do not have to be concerned with this offset when defining tags manually.

Input Coils

	Decimal Addressing	Hexadecimal Addressing
Type	**Boolean**	**Boolean**
Format	1xxxxx	H1yyyyy
Security	Read Only	Read Only
Range	1-65536	1-10000

Example
The 127th input coil would be addressed as '1127' using decimal addressing or 'H17F' using hexadecimal addressing.

Output Coils

	Decimal Addressing	Hexadecimal Addressing
Type	**Boolean**	**Boolean**
Format	0xxxxx	H0yyyyy
Security	Read/Write	Read/Write
Range	1-65536	1-10000

Example
The 255th output coil would be addressed as '0255' using decimal addressing or 'H0FF' using hexadecimal addressing.

Internal Registers

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

	Decimal Addressing	Hexadecimal Addressing
Type	**Word**, Short, BCD	**Word**, Short, BCD
Format	3xxxxx	H3yyyyy
Security	Read Only	Read Only
Range	1-65536	1-10000
Type	Byte	Byte
Format	3xxxxxL (Low Byte in Word) 3xxxxxH (High Byte in Word)	H3yyyyyL (Low Byte in Word) H3yyyyyH (High Byte in Word)

	Decimal Addressing	Hexadecimal Addressing
Security	Read Only	Read Only
Range	1-65536	1-10000
Type	**Boolean**	**Boolean**
Format	3xxxxx.bb	H3yyyyy.c
Security	Read Only	Read Only
Range	3xxxxx.0-3xxxxx.15	H3yyyyy.0-H3yyyyy.F
Type	Float, DWord, Long, LBCD	Float, DWord, Long, LBCD
Format	3xxxxx	H3yyyy
Security	Read Only	Read Only
Range	1-65535	1-FFFF

Arrays

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

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

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed the number of internal registers in the device configuration.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed one minus the number of internal registers in the device configuration.

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

Holding Registers

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

	Decimal Addressing	Hexadecimal Addressing
Type	**Word,** Short, BCD	**Word**, Short, BCD
Format	4xxxxx	H4yyyyy
Security	Read/Write	Read/Write
Range	1-65536	1-10000
Type	Byte	Byte
Format	4xxxxxL (Low Byte in Word) 4xxxxxH (High Byte in Word)	H4yyyyyL (Low Byte in Word) H4yyyyyL (High Byte in Word)
Security	Read/Write	Read/Write

	Decimal Addressing	Hexadecimal Addressing
Range	1-65536	1-10000
Type	**Boolean**	**Boolean**
Format	4xxxxx.bb	H4yyyyy.c
Security	Read/Write	Read/Write
Range	4xxxxx.0-4xxxxx.15	H4yyyyy.0-H4yyyyy.F
Type	Float, DWord, Long, LBCD	Float, DWord, Long, LBCD
Format	4xxxxx	H4yyyy
Security	Read/Write	Read/Write
Range	1-65535	1-FFFF

Arrays

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

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

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed the number of holding registers in the device configuration.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed one minus the number of holding registers in the device configuration.

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

Tag Naming Convention

Tags created by the automated tag database generator will be named according to the following convention:

Slot<slot number>_<module model number>_<I/O type><tag number>[_Bit<bit number>]

where

I/O Type	Meaning
DI	Digital Input
DO	Digital Output
AI	Analog Input
AO	Analog Output
ByteIn	Data Byte Input
ByteOut	Data Byte Output
CB	Control Byte*
SB	Status Byte*
Circuit	Circuit Short/Open Status**
Over	Numerical Overflow Status**

*All control and status tags will have the "_Bit<bit number>" attached.

**Siemens format only.

Note: All slot numbers and tag numbers are 1-based (1, 2, 3, ...8). All bit numbers are 0-based (0, 1, 2, ...7) by convention.

Examples

- Slot1_750_402_DI3 is the name given to the digital input 3 of a 750-402 module installed in slot 1.
- Slot2_750_404_CB1_Bit5 is the name given to a tag that reads and writes the value of bit 5 of the control byte of a 750-404 module installed in slot 2.

Error Descriptions

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

Address Validation

Device Status Messages

Device Specific Messages

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:

An invalid tag address has been specified in a dynamic request.

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

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

Error Type:
Warning

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

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

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

Error Type:
Warning

Possible Cause:
A tag address that has been specified 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.

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 communication properties for the connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device property .

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communication properties match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Increase the Request Timeout 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 named device may not be connected to the network.
2. The named device may have been assigned an incorrect Network ID.
3. The named device is not responding to write requests.
4. The address does not exist in the PLC.

Solution:

1. Check the PLC network connections.
2. Verify that the Network ID given to the named device matches that of the actual device.

Failure to initiate 'winsock.dll'

Error Type:
Fatal

Possible Cause:
Could not negotiate with the operating systems winsock 1.1 functionality.

Solution:
Verify that the winsock.dll is properly installed on the system.

Bad address in block [x to y] on device <device name>

Error Type:
Fatal for addresses falling in this block.

Possible Cause:
This error is reported when the driver attempts to read a location in a PLC that does not exist. For example in a PLC that only has holding registers 40001 to 41400, requesting address 41405 would generate this error. Once this error is generated, the driver will not request the specified block of data from the PLC again. Any other addresses being requested that are in this same block will also go invalid.

Solution:
The client application should be modified to ask for addresses within the range of the device.

Bad received length [x to y] on device <device name>

Error Type:
Fatal for addresses falling in this block.

Possible Cause:
The driver attempted to read a block of memory in the PLC. The PLC responded with no error, but did not provide the driver with the requested block size of data.

Solution:
Ensure that the range of memory exists for the PLC.

Resources

In addition to this user manual, there are a variety of resources available to assist customers, answer questions, provide more detail about specific implementations, or help with troubleshooting specific issues.

Knowledge Base
Whitepapers
Connectivity Guides
Technical Notes
Training Programs
Training Videos
Kepware Technical Support
PTC Technical Support

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