CODESYS Driver

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CODESYS Driver

Help version 1.053

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Overview

The CODESYS Driver provides a reliable way to connect CODESYS-compliant controllers to client applications, including HMI, SCADA, Historian, MES, ERP, and countless custom applications.

Setup

Communication Protocol

CODESYS V2.3 Ethernet over ARTI
CODESYS V3 Ethernet over ARTI
CODESYS Gateway for V2.3
CODESYS Gateway for V3
CODESYS Gateway for V3.5.18.0

Channel and Device Limits

The maximum number of channels supported by this driver is 1024. The maximum number of devices supported by this driver is 256 per channel.

Tag Database Creation

The Automatic Tag Database Generation feature of this driver has been designed to make setting up the OPC application less time consuming. This driver can be configured to automatically build a list of server tags within the server that correspond to device-specific data. The automatically generated OPC tags can then be browsed from the OPC client.

Device Timeouts

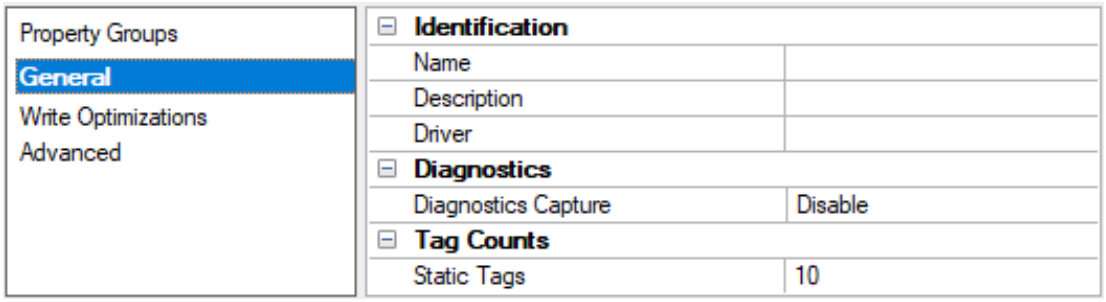
The driver does not support configurable timing parameters. These parameters are always set to the following values:

- **Connect Timeout**: 20 seconds
- **Request Timeout**: 10000 milliseconds
- **Retry Attempts**: 3 attempts

Note: This driver doesn't allow configuration of the request timeout. This can result in a device taking a long time to update the tag quality once connectivity is lost.

Channel Properties — General

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



Identification

Name: Specify the user-defined identity of this channel. In each server project, each channel name must be unique. Although names can be up to 256 characters, some client applications have a limited display window when browsing the OPC server's tag space. The channel name is part of the OPC browser information. The property is required for creating a channel.
For information on reserved characters, refer to "How To... Properly Name a Channel, Device, Tag, and Tag Group" in the server help.

Description: Specify user-defined information about this channel.
Many of these properties, including Description, have an associated system tag.

Driver: Specify the protocol / driver for this channel. Specify the device driver that was selected during channel creation. It is a disabled setting in the channel properties. The property is required for creating a channel.
Note: With the server's online full-time operation, these properties can be changed at any time. This includes changing the channel name to prevent clients from registering data with the server. If a client has already acquired an item from the server before the channel name is changed, the items are unaffected. If, after the channel name has been changed, the client application releases the item and attempts to re-acquire using the old channel name, the item is not accepted. Changes to the properties should not be made once a large client application has been developed. Utilize proper user role and privilege management to prevent operators from changing properties or accessing server features.

Diagnostics

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

Note: This property is not available if the driver does not support diagnostics.

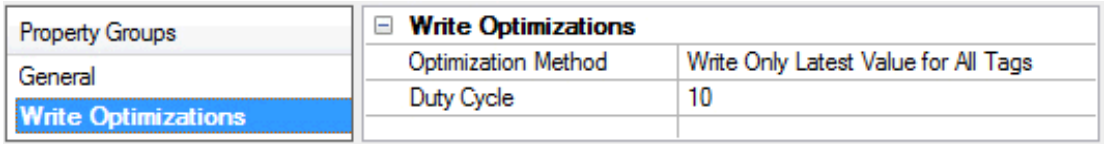
For more information, refer to Communication Diagnostics in the server help.

Tag Counts

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

Channel Properties — Write Optimizations

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



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.

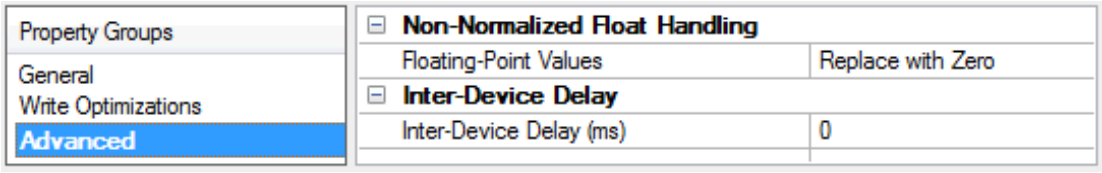
Duty Cycle: is used to control the ratio of write to read operations. The ratio is always based on one read for every one to ten writes. The duty cycle is set to ten by default, meaning that ten writes occur for each read

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.

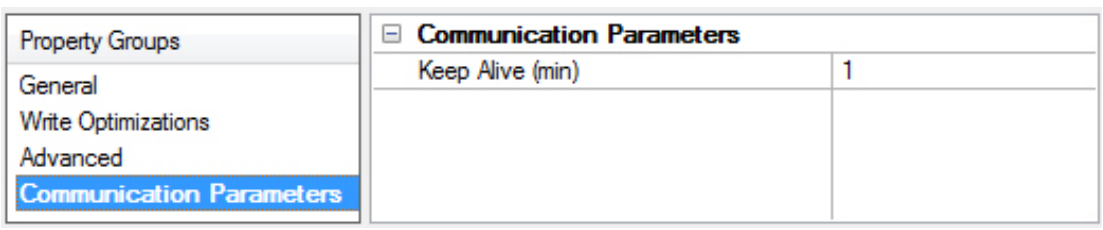
For more information on the floating-point values, refer to "How To ... Work with Non-Normalized Floating-Point Values" in the server help.

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.

Channel Properties — Communication Parameters

The Communication Parameters group is a collection of properties that configure communication parameters that apply to all devices within the channel.

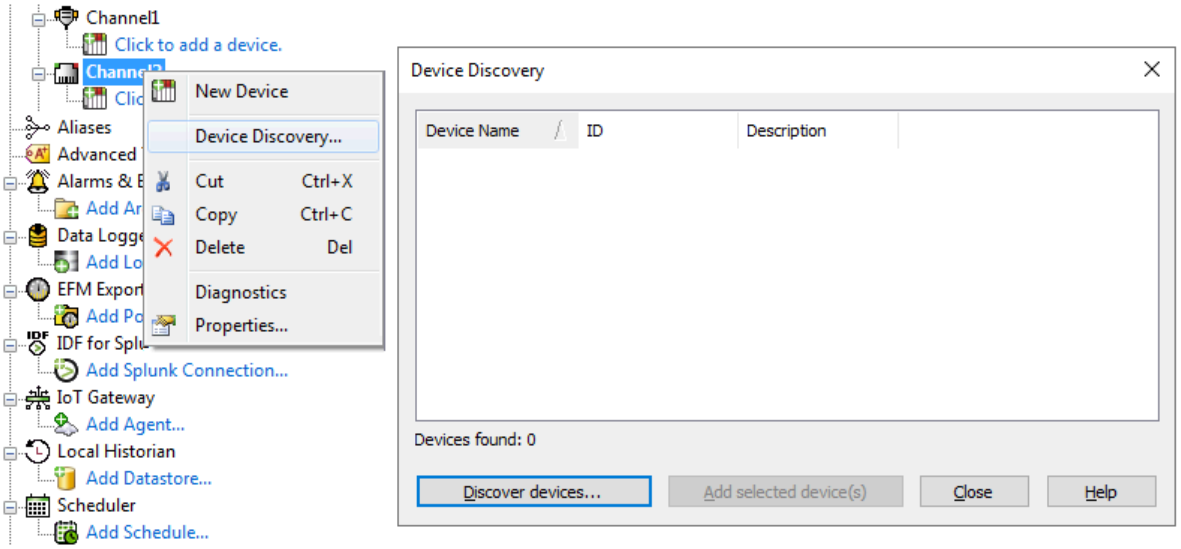


Communication Parameters

Keep Alive: Configure how many minutes the driver maintain an open connection with the device after all client references are removed. If no client references are added before the timeout expires, the connection is closed. If a client reference is added while the timer is active, the timeout is canceled, preventing the connection from being closed.

Device Discovery Procedure

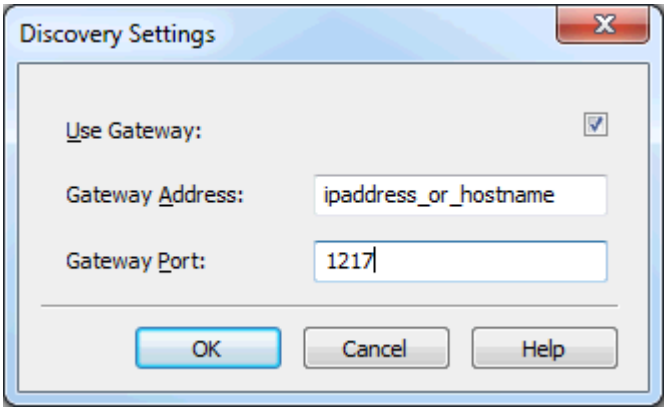
Device Discovery is available for drivers that support locating devices on the network. Once devices are found, they may be added to a channel. The maximum number of devices that can be discovered at once is 65535.



1. Select the channel in which devices should be discovered and added.
2. Right click on the channel node and select **Device Discovery...**
3. Specify the discovery properties, which are driver-specific, such as address range, timeout, discovery scope.
4. Click **OK**.
5. Devices discovered populate the dialog with the following information / headings **Device Name**, **ID**, **Description**.
6. If any discovered device is of interest, select the desired device(s) and click **Add selected device (s)...**.
7. Click **Close**.

Device Discovery Settings

To discover devices, it is necessary to communicate with the network where the devices are located.



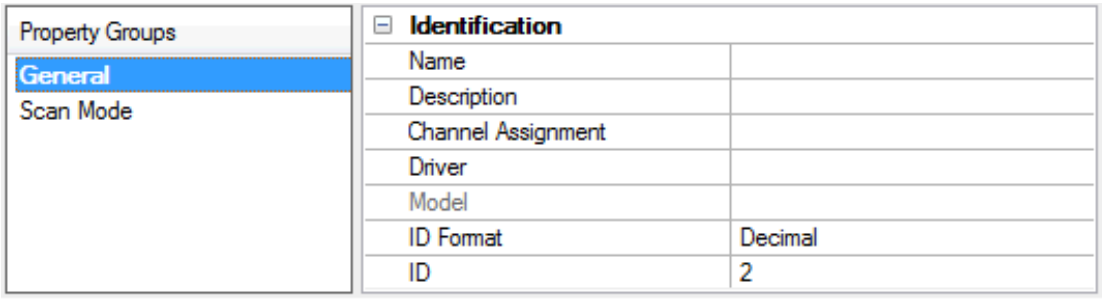
Use Gateway: Enable if discovery can occur through a network gateway.

Gateway Address: Specify the IP address or host name for the gateway server.

Gateway Port: Specify the port number through which to contact the gateway server

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

Note: Although descriptive names are generally a good idea, some OPC client applications may have a limited display window when browsing the OPC server's tag space. The device name and channel name become part of the browse tree information as well. Within an OPC client, the combination of channel name and device name would appear as "ChannelName.DeviceName".
For more information, refer to "How To... Properly Name a Channel, Device, Tag, and Tag Group" in server help.

Description: Specify the user-defined information about this device.
Many of these properties, including Description, have an associated system tag.

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

Driver: Selected protocol driver for this device.

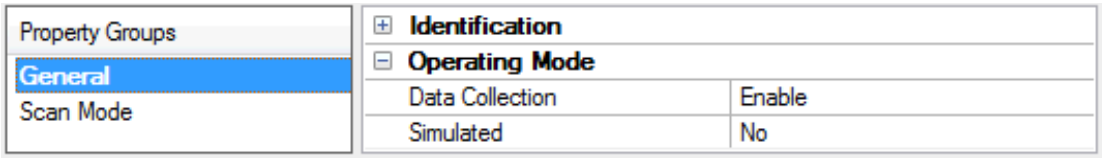
Model: Specify the type of device that is associated with this ID. The contents of the drop-down menu depend on the type of communications driver being used. Models that are not supported by a driver are disabled. If the communications driver supports multiple device models, the model selection can only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

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

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

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

Operating Mode



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

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

Notes:

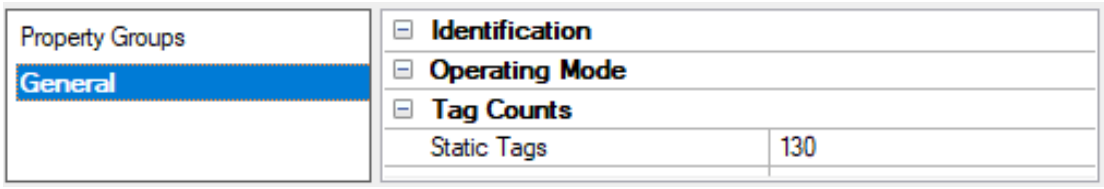
1. Updates are not applied until clients disconnect and reconnect.
2. The System tag (_Simulated) is read only and cannot be written to for runtime protection. The System tag allows this property to be monitored from the client.
3. In Simulation mode, the item's memory map is based on client update rate(s) (Group Update Rate for OPC clients or Scan Rate for native and DDE interfaces). This means that two clients that reference the same

item with different update rates return different data.

4. When a device is simulated, updates may not appear faster than one (1) second in the client.

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

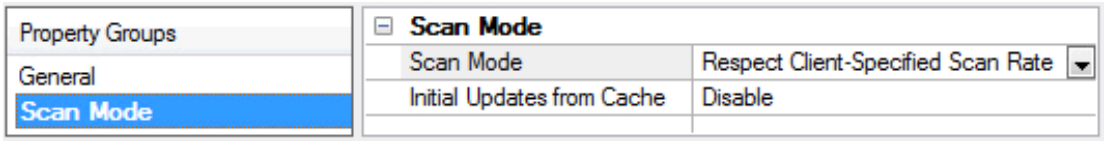
Tag Counts



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

Device Properties — Scan Mode

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



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

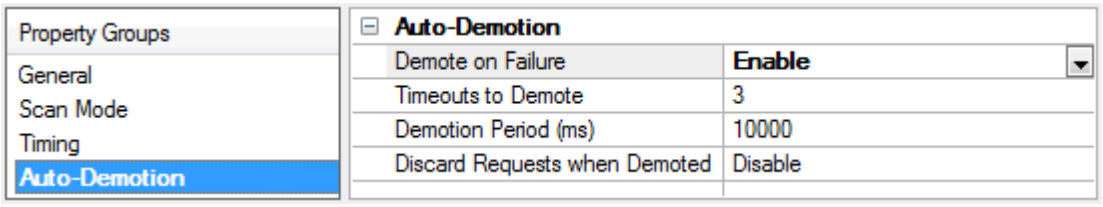
- **Respect Client-Specified Scan Rate**: This mode uses the scan rate requested by the client.
- **Request Data No Faster than Scan Rate**: This mode specifies the value set as the maximum scan rate. The valid range is 10 to 99999990 milliseconds. The default is 1000 milliseconds.
  Note: When the server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

Initial Updates from Cache: When enabled, this option allows the server to provide the first updates for newly activated tag references from stored (cached) data. Cache updates can only be provided when the new item reference shares the same address, scan rate, data type, client access, and scaling properties. A

device read is used for the initial update for the first client reference only. The default is disabled; any time a client activates a tag reference the server attempts to read the initial value from the device.

Device Properties — 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

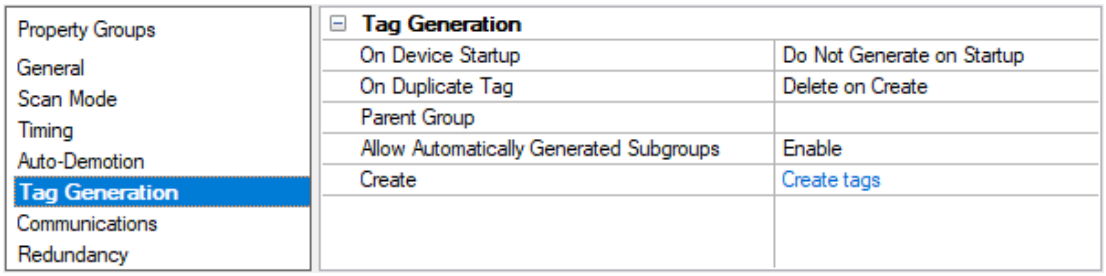
The automatic tag database generation features make setting up an application a plug-and-play operation. Select communications drivers can be configured to automatically build a list of tags that correspond to device-specific data. These automatically generated tags (which depend on the nature of the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

Automatic Tag Database Generation

- When tags are automatically generated, they are created with Client Access privileges matching the access privileges provided by the PLC wherever possible.
- Tags with Write Only privileges are generated with Read/Write Client Access privileges because there is no Write Only Client Access setting in the server.
- Tags that do not have Read or Write permissions are not generated as there is no corresponding access privilege in the server.
- According to the CODESYS V2.3 Protocol, addresses must be defined in a PLC Program variable list or a Global variable list. The first group is always the location of the variable (Global or the name of PLC Program where the tag is defined).
- Arrays are always expanded during tag generation, meaning that a tag is created for each element in the array. No tag is generated for the array itself.
- When **Allow Automatically Generated Subgroups** is enabled, subgroups are created for each segment of a tag address, with a maximum depth of eight groups. The tag name is the part of the address left over after subgroups have been created.
- When array elements are generated, provided the nested group limit has not been reached, the tags are placed in a group named after the array to which they belong.

CODESYS V2.3 Examples

Tag Address	Groups	Tag Name
.myTag	Global	myTag
PLC_PRG.myTag	PLC_PRG	myTag
.myStruct.myArray[0]	Global.myStruct.myArray[x]	myArray[0]
PLC_PRG.myStruct.myArray[0]	PLC_PRG.myStruct.myArray[x]	myArray[0]
.group1...group7.myTag	Global.group1...group7	Group7_myTag

CODESYS V3 Examples

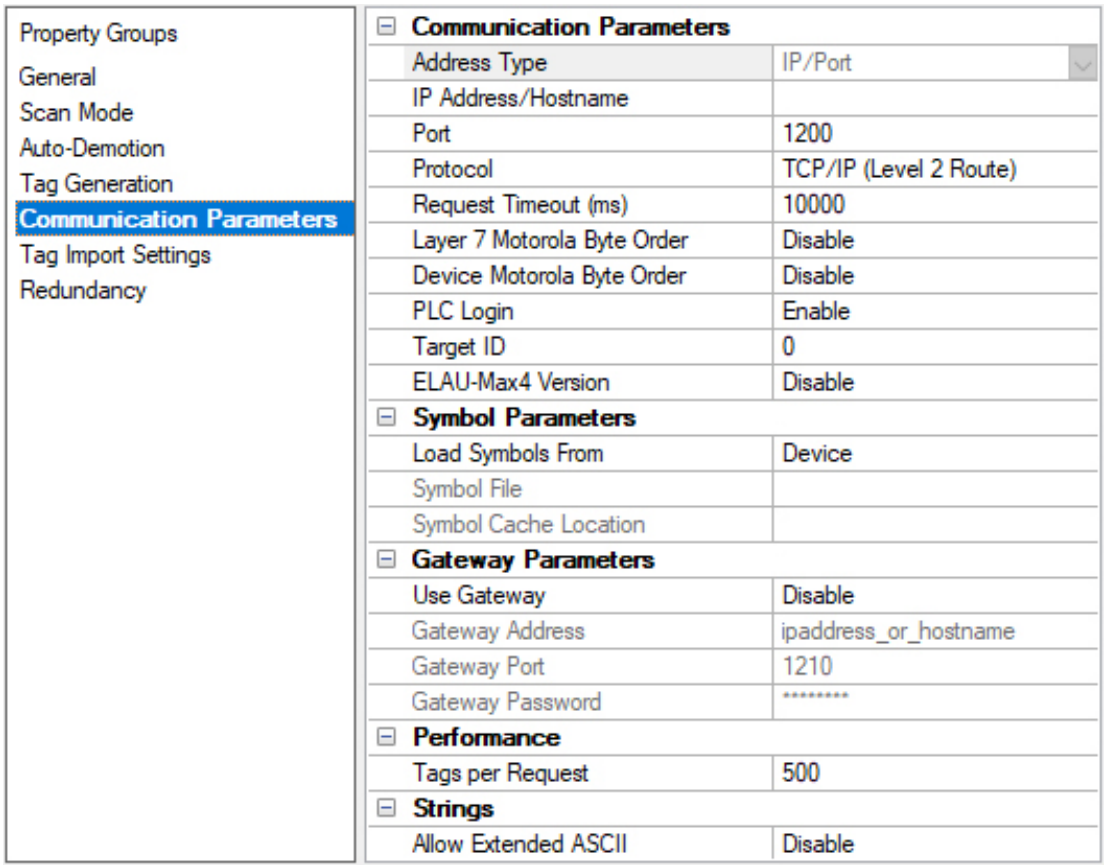
Tag Address	Groups	Tag Name
Application.GVL.myTag	Application.GVL	myTag
Application.PLC_PRG.myTag	Application.PLC_PRG	myTag
Application.GVL.myStruct.myArray[0]	Application.GVL.myStruct.myArray[x]	myArray[0]
Application.PLC_PRG.myStruct.myArray[0]	Application.PLC_PRG.myStruct.myArray[x]	myArray[0]
Application.GVL.group1...group6.myTag	Application.GVL.group1...group6	Group6_myTag

Tip: To make it easier to read, Groups have been concatenated together using periods (similar to how a user would access the tag via an OPC DA/UA client).

See Also: *Tag Import Settings*

Device Properties — Communication Parameters

Communication parameters are properties used for establishing a connection to the device.



Communication Parameters

Address Type: Specify the type of address to use to connect to the device (V3 Model only).

Address: Specify the logical address or the PLC name for the device (V3 Model only).

IP Address / Hostname: Specify the IP address or hostname for the target device. Only IP Addresses are valid for V3 devices.

Port: Specify the Ethernet / IP port number on the target device.

Protocol: Specify the protocol in use in this device.

Request Timeout: Specify how long the driver waits for a response from the target device to complete. The valid range is 4,000 to 9,999,999 milliseconds (167.6667 minutes). The default is 10,000 milliseconds. Valid for V2.3 Model only.

Layer 7 Motorola Byte Order: Specify if Layer 7 uses the Motorola byte order (Big Endian).

Device Motorola Byte Order: Specify if the target device uses the Motorola byte order (Big Endian). In most cases, this is set to the same value as Layer 7 Motorola Byte Order.

PLC Login: Specify if the driver should stay logged into the PLC after connecting. This setting should be disabled if the PLC only supports a single client connection, otherwise it should be enabled.

Target ID: Specify the identity if this is a sub-PLC device. PLCs that require communications to be routed through another PLC are called sub-PLCs. The target ID provides additional address information required to communicate with sub-PLCs. When not communicating with a sub-PLC, this setting should be 0.

ELAU-Max4 Version: Specify the hardware revision of the target PLC. This value should be disabled except when the device is an ELAU Max 4 1100 or 1200.

The IP address and port combination must be unique across all devices, even under different channels. Most CODESYS PLCs do not support parallel communication channels, so there is no performance gain by pointing multiple channels at the same CODESYS PLC. Currently, copying and pasting a channel in the server creates a device with the same IP address and port combination. All devices under the channel that have been copied should be changed to remove any IP address and port combination overlaps. Undefined behavior may occur if these collisions are not resolved.

Symbol Parameters (V2.3 Only)

Load Symbols From: Specify where the driver should look for device symbols.

- **File**: loads the symbols file as specified by the Symbol File property. When this option is selected, the Symbol File property must specify the full file name, including path and extension (.sdb) to the symbol file.
- **Device**: loads the symbols from the device on every connect or reconnect attempt. This is the default option.
- **Device and Cache**: loads the symbols from the local cache directory as specified by the Symbol Cache Location property. When this option is selected, the Symbol Cache Location property must specify the full directory path to the local cache location.

Symbol File: This property is required if the Load Symbols From property has the Fileoption selected. Specify the full file name, including path, to use if the symbol file cannot be stored on the device. This symbol file must match the symbols stored on the device. If the symbols do not match, communications with the device fails.

Symbol Cache Location: This property is required if the Load Symbols From property has the Device and Cache option selected. Specify the local directory location where the device symbols are cached. For use with devices that store symbols. If the symbol file size is large or the network has poor quality and / or bandwidth, use this property to avoid the overhead of a symbol copy over the network on every connect or reconnect attempt. The directory path, if specified, must end with a backslash (\).

Performance Tips:

- Enable Device and Cache to avoid potential network congestion due to symbols being copied over the network.
- When using the Device and Cache setting:
  - The Symbol Cache Location should be unique for each device.
  - Copying symbol files into place at project configuration avoids the symbol copy on the initial connect.

Gateway Parameters

Use Gateway: Specify if a gateway should be used when connecting to the device.

Gateway Address: Specify the IP address or hostname for the gateway.

Gateway Port: Specify the port for the gateway.

Gateway Password: Specify the password for the gateway (V2.3 Model only).

Device connection via a gateway requires that the CODESYS Gateway be installed on the same host as the server. If the CODESYS Gateway is not installed on the same server as the host, reading a tag results in a "Device is not responding" message in the event log. This only applies to configurations including the V2.3 Ethernet model.

Device connection via a gateway requires that initial communications be serialized. If devices are configured under different channels, they connect to the gateway one at a time. After the initial connection, communications stop being serialized. This only applies to configurations including the V2.3 Ethernet model.

Performance

Tags per Request: Maximum number of tags to include in a single request. For each single request, there is some service overhead. In general, it is better to handle several items in one request instead of request each item separately. However, requesting many items in one request causes the round-trip time (answer time) to rise. Depending on the application, it may be better to split up huge lists in several small requests.

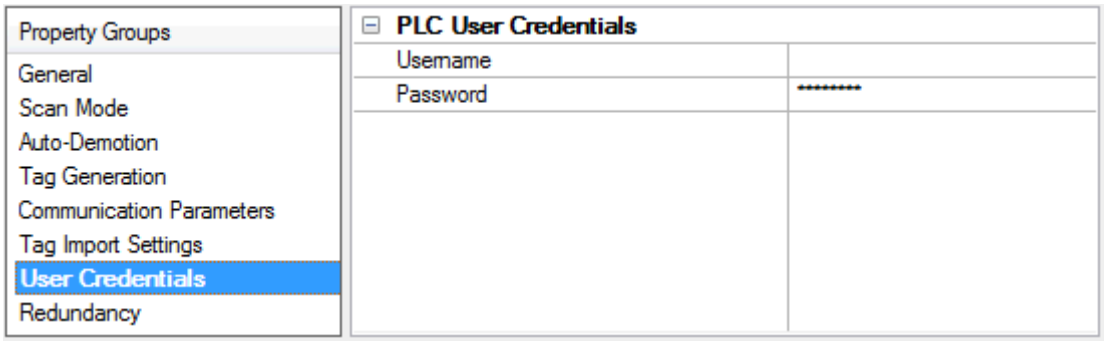
Note: The number of writes per request is limited based on the **Duty Cycle** specified in the channel settings.

Strings

Allow Extended ASCII: Specify whether to enable or disable strings with extended ASCII characters. The default is disabled (V2.3 Model only).

Device Properties — User Credentials

CODESYS V3 devices have the option to require authentication. If authentication is required, the Username and Password properties need to be configured with the correct settings to connect. These settings are not available for V2.3 devices.

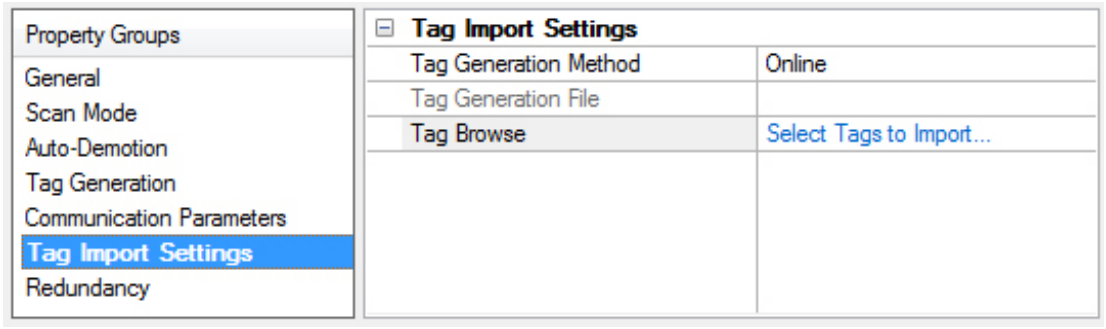


Username: Specify the name of the account to use for authentication. The maximum length supported for a user name is 254 characters.

Password: Specify the password associated with the specified user name. The maximum length supported for a password is 251 characters.

Device Properties — Tag Import Settings

Tag Import Settings are properties used for tag generation.



Tag Import Settings

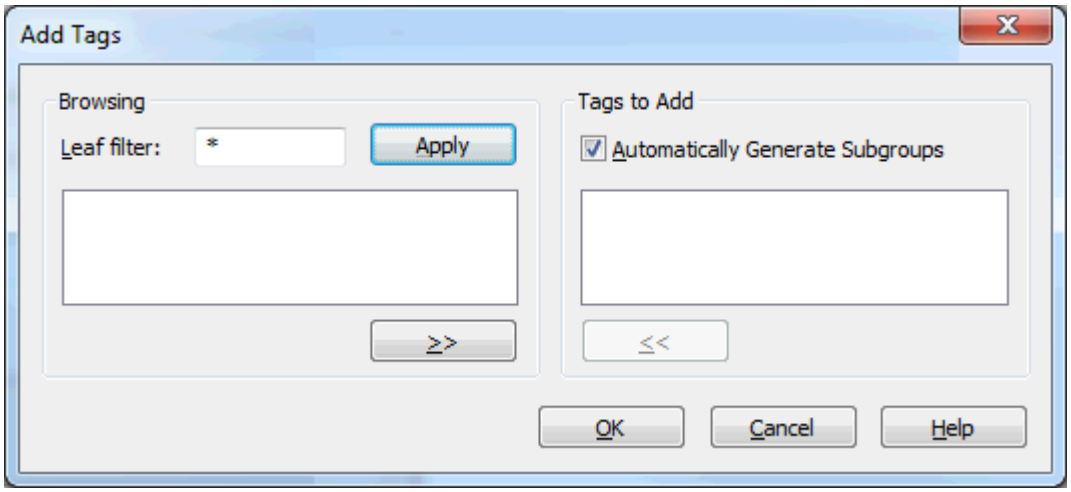
Tag Generation Method: Tags can be imported in one of two ways. Select **Online** to import tags from a device on a network visible to the driver at the time of import. Select **Offline** to import tags without a device connection by providing the server with the corresponding plain-text symbol (.SYM) file created when the CODESYS project is compiled.

Tag Generation File: Specify the path and file name of a symbol file to import. To locate and select the .SYM file, click on the **Browse** (**...**) button. This property is disabled if Online is chosen as the import method.
Tip: Once the file is selected, start tag generation using the Create Tags command in the **Tag Generation** group.

Tag Browse: Click **Select Tags to Import...** to invoke the Add Tags dialog to navigate to and select tags.

Tag Browser

The Tag Browser is used to navigate to and select the tags on the current device to be imported.
In addition to the graphical Tag Browser, a Tag Browser service is provided so users may search a device for tags using the Configuration API Service.
For more information on how to use the Configuration API Service, consult the server help.



Browsing: Provides a tree that represents the device tag hierarchy, including all tags and tag groups on the device. Multiple tags may be selected, but only one tag group may be selected at a time.

Tags to Add: A list of all the tags to be added under this device in the project.

Leaf Filter: Limits the items shown in the Browsing tree to only those that match the filter. Click Apply to refresh the tag list with the filter enabled.
For more information on syntax, see the table below.

Automatically Generate Subgroups: Controls whether the server automatically creates groups for the browsed tags.
***See Also**: Allow Automatically Generated Subgroups under **Tag Generation** for more information.*

>>: All selected tags in the browsing tree are added to the **Tags to Add** list. If a tag group is selected, all tags under that branch are added.
Note: Depending on the project size and complexity, it is possible that adding a tag group could take up to an hour. An example would be adding a group that contains many nested subgroups.

<<: Removes all selected tags from the **Tags to Add** list.
Note: The user must have permission to add tags, delete tags, and to add tag groups to use the Tag Browser.

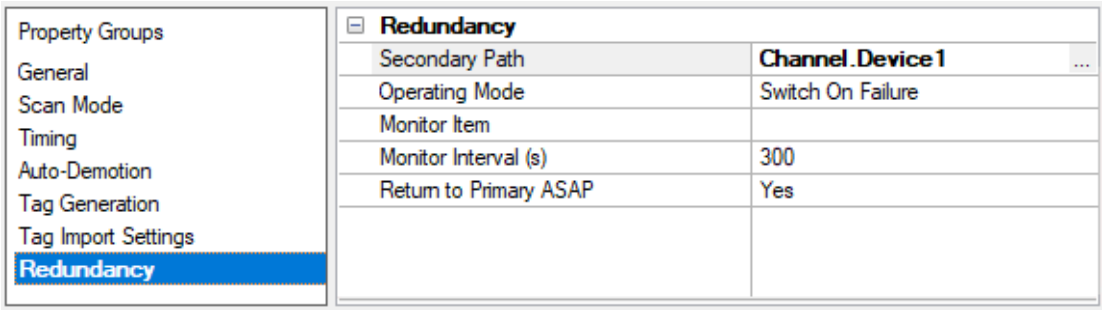
Filter Syntax

The filter allows the browser to reduce the items displayed to those which match a pattern. The filter only supports ASCII characters. The syntax supported is documented in the table below.

Characters in Pattern	Matches in String
?	Any single character

Characters in Pattern	Matches in String
	Example: ? matches “a”, “!”, “3”, etc. It does not match “aa” or “ok” as those strings have two characters versus one.
*	Zero or more characters Example: *server matches “server”, “cloud server”, and “OPC server” ...not “OPC Server” or “erver”.
#	Any single digit (0-9) Example: # matches “0”, “1”, “2”; not “a” or “z”.
[charlist]	Any single character in the list. Example: [a-c] matches “a”, “b”, or “c”; not any other characters including “A” “B” and “C”.
[!charlist]	Any single character not in the list. Example: [!a-c] matches “d”, “e”, “A”, and “B”; not “a”, “b”, or “c”.

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.*

Performance Optimization

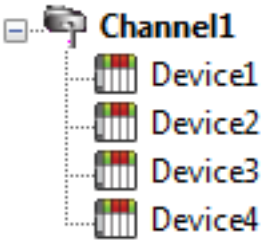
Optimizing Communications

With any programmable controller, there are unique ways for optimizing system throughput, and the CODESYS Driver is no different. The CODESYS Driver is designed to optimize reads and writes. For tags of all data types, requests are grouped into a single transaction. This provides drastic improvement in performance over single-tag transactions. The only limitation is on the number of tags that can fit in a single transaction.

Optimizing the Application

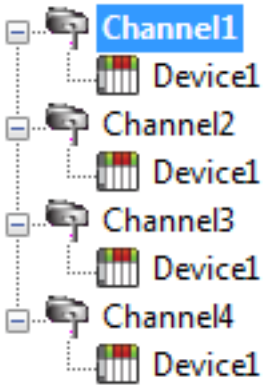
While the driver is fast, there are a couple of guidelines to optimizing the application for maximum performance. Communications protocols like CODESYS are referred to as channels. Each channel defined in the application represents a separate path of execution in the server. Once a channel has been defined, a series of devices may then be defined under that channel. Each of these devices represents a single CODESYS controller from which data can be collected. This approach to defining the application provides a high level of

performance, it doesn't take full advantage of the driver or the network. An example of how the application may appear when configured using a single channel is shown below.



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

If the CODESYS Driver could only define a single channel, the example above would be the only option. However, the driver can define up to 1024 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 is defined under its own channel. In this configuration, a single path of execution is dedicated to the task of gathering data from each device. If the application has 1024 or fewer devices, it can be optimized exactly as shown here.

The performance improves even if the application has more devices. While fewer devices may be ideal, the application still benefits from additional channels. Spreading the device load across all channels causes the server to move from device to device again with far fewer devices to process on a single channel.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8-bit value
Char	Signed 8-bit value
Word	Unsigned 16-bit value
Short	Signed 16-bit value
DWord	Unsigned 32-bit value
Long	Signed 32-bit value
QWord	Unsigned 64-bit value
Long Long	Signed 64-bit value
Float	32-bit IEEE floating point value
Double	64-bit IEEE floating point value
Date	64-bit IEEE date and time value
String	Null-terminated character array

*For a description of CODESYS-platform specific data types, refer to **CODESYS data types**.*

Unsupported Data Types

Unsupported data types include LBCD and BCD.

See Also**: **Address Descriptions**, **Atomic Data Types

Symbolic Tag-Based Addressing

The CODESYS Driver uses a symbolic addressing structure for tags. These tags (commonly referred to as Native Tags) differ from conventional PLC data items in that the tag name itself is the address, not a physical or logical address.

Client / Server Tag Address Rules

CODESYS variable names correspond to client / server tag addresses. CODESYS variable names (entered via CODESYS PLC) follow the IEC 61131-3 identifier rules. Client / server tag addresses follow these same rules and are listed below:

- Must begin with an alphabetic (A-Z, a-z) character or an underscore (_).
- Can only contain alphanumeric characters and underscores.
- Are not case sensitive.

Client / Server Tag Name Rules

The rules for tag name assignment in the server differs from address assignment because tag names cannot begin with an underscore.

Tag Scope

Global Tags

Global tags are CODESYS variables that have global scope in the controller. Any program or task can access the global tags, which use the following notation:

.<tag name>
.<struct name>.<tag name>

Note: Structures can be nested within other structures, so a tag name may be prefixed by multiple structure entries (<outer struct>.<inner struct>.<my tag>).

Program Tags

Program tags are identical to global tags, except that a program tag's scope is local to the program in which it is defined. Program tags have the same addressing rules and limitations as global tags. The only difference is that program tags are prefixed with the program name:
<program name>.<tag name>
OR
<program name>.<outer struct>.<inner struct>.<tag name>

Example:
“prog_1.tag_1”: Program “prog_1” containing a tag called “tag_1”

Tag Addressing

CODESYS V2.3

There are two categories of variables supported by CODESYS: global and private. Each of these categories has a slightly different format. The following tables provides examples of the different CODESYS variables and their corresponding server addressing syntax.

Address Type	Address Syntax
Global variable	.MyTag
Global variable within a struct*	.MyStruct.MyTag
Global bit within variable	.MyTag.[0]
Private variable	Program.MyTag
Private variable within a struct*	Program.MyStruct.MyTag
Private bit within a variable	Program.MyTag.[0]

* Multiple levels of structs are supported (up to eight levels deep).

CODESYS V3

There are two categories of variables supported by CODESYS: global and private. Each of these categories has a slightly different format. The following tables provides examples of the different CODESYS variables and their corresponding server addressing syntax.

Address Type	Address Syntax
Global variable	Application.GVL.MyTag
Global variable within a struct*	Application.GVL.MyStruct.MyTag
Global bit within variable	Application.GVL.MyTag.[0]
Private variable	Application Program.MyTag
Private variable within a struct*	Application Program.MyStruct.MyTag
Private bit within a variable	Application Program.MyTag.[0]

* Multiple levels of structs are supported (up to eight levels deep).

Nested Structures

Symbolic tags have the potential to be nested deep within any number of structures (i.e. .Struct1. Struct2.Struct3.Struct4.Struct5.Struct6.Struct7.Struct8.Struct9.tag). To keep the tag hierarchy from becoming overly complex due to nested structures, Automatic Tag Generation prevents the server from generating tags more than eight groups deep. If the tag's hierarchy on the device exceeds eight groups, the remaining groups are placed in the tag name. For automatically generated tags, the first group is either GLOBAL or the Program Organization Unit (POU) name.

Notes:

1. This only applies when the Allow Automatically Generated Subgroups property is set to Enabled.
2. The symbol file contains data points for structures as a whole represented as a byte array. The server does not support these tags.

Arrays

The CODESYS Driver supports arrays for all basic types, as well as user-defined structures. This driver has partial support for the arrays that can be defined in a PLC. Both one- and two-dimensional arrays are supported for all types, except Strings and Structures. Strings and Structures must be accessed using the **array element** syntax. Neither three-dimensional arrays nor nested arrays can be read as arrays. They must be accessed element by element using the array element syntax.

It is necessary to provide the size of each of the array dimensions. The array size in the server must match the array size in the PLC to read or write the array. *See the table below for several examples.*

Address Type	Address Syntax
Global 1D Array (10 elements)	.myArray{10}
Private 1D Array (100 elements)	PLC_PRG.myArray {100}
Global 2D Array (9 elements)	.myArray{3}{3}
Private 2D Array (25 elements)	PLC_PRG.myArray {5}{5}

Note: The maximum number of elements supported by an array is 65535.

Array Elements

If reading an entire array is not necessary or supported, it is possible to directly access a particular array element. Element access is available for one, two, and three-dimensional arrays as well as nested arrays. See the table below for example address syntax. It is important to note that while Structures must be accessed as array elements, they must be accessed using each of their member variables because reading an entire structure as a single tag is not supported by OPC.

Address Type	Address Syntax
One-Dimensional Array Element	.myArray[0]
Two-Dimensional Array Element	.myArray[1,7]
Three-Dimensional Array Element	.myArray[2,4,5]
Nested Array Element (5 Levels)	.myNestedArray[1][0][4][5][9]
Nested 3D Array (2 Levels)	.my3DNestedArray[4,8,1][3,2,0]

Note: Non-zero indexed arrays, arrays with a first element not beginning at zero, are supported. Example: To have the first element of a 1-indexed 1D array, use .myArray[1] as the address.

Bit Addressing

The CODESYS Driver supports bit addressing for the following controller data types: USINT, SINT, BYTE, UINT, INT, WORD, UDINT, DINT, and DWORD. Bit addressing provides access to a single bit within a 1, 2, or 4, byte data type in the controller.

When writing to a bit tag, the driver reads the contents of the data type in the controller, changes the value of the bit being written, and writes the entire contents of the data type back out to the controller. This is also known as read/modify/write (RMW) behavior.

Address Type	Address Syntax
Global bit variable	Application.GVL.MyTag.[0]
Global bit variable within a struct	Application.GVL.MyStruct.MyTag.[1]
Private bit variable	.Program.MyTag.[2]
Private bit variable within a struct	.Program.MyStruct.MyTag.[2]
Global bit variable in an array element	Application.GVL.MyArray[0].[5]

Note: The bit value inside the brackets for bit addresses can range from 0 to 31.

Unions

The CODESYS Driver supports the union data structure when communicating with a V3 device. All components defined in the union share the same memory.

A value change to one variable in the union affects all other variables in the union, regardless of data type.

Access Privileges

Each tag described by a program's symbol file has specific access privileges: None, Read, Write, or Both (Read + Write). These privileges tell the server how the PLC program intends for each tag with which a client interacts, but these privileges can be overridden by the server. This is supported through the Client Access property on each tag. If a tag in the server is configured as Read Only, regardless of the Access Privileges reported by the device, the server only allows clients to perform Read operations. If the tag is configured as Read/Write, regardless of the access privileges reported by the device, clients can Read and Write to the tag.

When a user performs automatic tag generation, the tags are configured with the correct client access based on the access privileges reported by the device. There are two cases where this does not occur.

Write Only: Tags that report as being Write Only are generated as Read/Write tags with both Read and Write permissions as there is no Write Only setting for client access.

None: Tags that report as having permissions None are not supported either through automatic tag generation or through manual tag creation because there is no client access setting that can correctly represent this access privilege.

Addressing Atomic Data Types

The table below shows the available CODESYS data types and the OPC equivalents.

Atomic Data Type (CODESYS Type)	OPC Data Type
BOOL	Boolean
USINT	Byte, Char
SINT	Byte, Char
BYTE	Byte, Char
UINT	Short, Word
INT	Short, Word
WORD	Short, Word
DWORD	DWord, Long
UDINT	DWord, Long
DINT	DWord, Long
ULINT	QWord, Long Long
LINT	QWord, Long Long
LWORD	QWord, Long Long
REAL	Float
LREAL	Double
TIME	DWord

Atomic Data Type (CODESYS Type)	OPC Data Type
TIME_OF_DAY	DWord
LTIME	QWord
DATE	DWord, Date
DATE_AND_TIME	DWord, Date
STRING	String
WSTRING	String
ENUM	Short, Word
BIT	Boolean

Unsupported CODESYS Data Types

The only unsupported data type is pointer.

***See Also**: Address Descriptions*

Event Log Messages

The following information concerns messages posted to the Event Log pane in the main user interface. Consult the OPC server help on filtering and sorting the Event Log detail view. Server help contains many common messages, so should also be searched. Generally, the type of message (informational, warning) and troubleshooting information is provided whenever possible.

Tag generation failed because the device symbols could not be loaded. | Device = '<ChannelName.DeviceName>'.

Error Type:
Error

Possible Cause:
The automatic tag generation operation failed because the server could not access the symbol information on the device.

Possible Solution:

1. Verify that the device is capable of storing its own symbol information. Some devices do not have this capability, requiring symbol information to be manually exported and accessed by the server.
2. Ensure that the device communication parameters are correctly configured in the server.

Tag generation failed because communications could not be established with the device. | Device = '<ChannelName.DeviceName>'.

Error Type:
Error

Possible Cause:
The automatic tag generation operation failed because the server was unable to connect to the device.

Possible Solution:

1. Ensure that the device communication parameters are correctly configured in the server.
2. Check the physical connection between the server and the device.
3. If connecting to the device via a gateway, verify that the CODESYS Gateway is installed on the same host as the server.

Tag generation failed because an unexpected failure occurred. | Device = '<ChannelName.DeviceName>'.

Error Type:
Error

Possible Cause:
The automatic tag generation operation failed due to an unknown reason.

Possible Solution:

1. Ensure that the device communication parameters are correctly configured in the server.
2. Check the physical connection between the server and the device.
3. Ensure the device is functioning properly.
4. Contact technical support.

Internal Error. An unexpected error occurred. Resetting the PLC connection. | Transaction info = '<Transaction Type and Details>'.

Error Type:
Error

Possible Cause:
An unknown error occurred.

Possible Solution:
Attempt the operation again or contact technical support.

Device discovery failed because an unexpected failure occurred.

Error Type:
Error

Possible Cause:
The device discovery operation failed due to an unknown reason.

Possible Solution:

1. Check the physical connection between the server, gateway if one is being used, and the devices.
2. Ensure the devices, and gateway if one is being used, are functioning properly.
3. Contact technical support.

Error occurred while attempting to write tag. Unable to connect to the device. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Error

Possible Cause:
The server failed to connect to the device.

Possible Solution:

1. Ensure that the device communication parameters are correctly configured in the server.
2. Check the physical connection between the server and the device.

3. If connecting to the device via a gateway, verify that the CODESYS Gateway is installed on the same host as the server.

Failed to browse tags.

Error Type:
Error

Error occurred while attempting to connect to device. Failed to retrieve symbol list from device or file.

Error Type:
Error

Possible Cause:

1. The server could not access the symbol information on the device.
2. The symbols do not match between the device and the specified symbol file in the device communication parameters.

Possible Solution:

1. Verify that the device is capable of storing its own symbol information. Some devices do not have this capability, and a symbol file must be specified in the device communication parameters.
2. Ensure that the device communication parameters are correctly configured in the server.

Internal error occurred while attempting to read tag. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Error

Possible Cause:
The read failed due to an unknown reason.

Possible Solution:
Contact technical support.

Internal error occurred while attempting to write tag. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Error

Possible Cause:

1. Non-ASCII characters were written to the string tag.
2. The write failed due to an unknown reason.

Possible Solution:

1. Only write ASCII characters to the string tag.
2. Contact technical support.

Error occurred while attempting to read tag. Unsupported data type or invalid address specified. | Tag address = '<.mystruct.innerstruct.tag>', data type = '<type>'.

Error Type:
Error

Possible Cause:

1. The specified data type is not supported.
2. The specified address is not valid.

Possible Solution:
Ensure that the correct data type and address are specified.

Error occurred while attempting to read tag. The specified tag address was not found on the device. | Tag address = '<.my-struct.innerstruct.tag>'.

Error Type:
Error

Possible Cause:
The tag address was not found on the device.

Possible Solution:

1. Verify that the correct address is specified.
2. Verify that the address exists on the device.

Error occurred while attempting to write tag. The specified tag address was not found on the device. | Tag address = '<.my-struct.innerstruct.tag>'.

Error Type:
Error

Possible Cause:
The tag address was not found on the device.

Possible Solution:

1. Verify that the correct address is specified.
2. Verify that the address exists on the device.

Error occurred while attempting to read tag. The specified server data type is not compatible with the device data type. | Tag address = '<.my-struct.innerstruct.tag>', server data type = '<type>', device data type = '<type>'.

Error Type:
Error

Possible Cause:
The specified server data type is not compatible with the device data type.

Possible Solution:
Change the server data type to one that is compatible with the device data type for this address.

Error occurred while attempting to write tag. The specified server data type is not compatible with the device data type. | Tag address = '<.my-struct.innerstruct.tag>', server data type = '<type>', device data type = '<type>'.

Error Type:
Error

Possible Cause:
The specified server data type is not compatible with the device data type.

Possible Solution:
Change the server data type to one that is compatible with the device data type for this address.

Internal error occurred while attempting to connect to device. The configuration provided is not valid.

Error Type:
Error

Possible Cause:
The configuration provided is not valid.

Possible Solution:
Contact technical support.

The browse path contains invalid characters.

Error Type:
Error

Possible Cause:
The path specified by the user contained non-ascii characters.

Possible Solution:
Remove all invalid characters.

Error occurred while attempting to read tag. The array size must match between the server and device. | Tag address = '<.my-struct.innerstruct.tag>', server array size = '<length>', device array size = '<length>'.

Error Type:
Error

Possible Cause:
The array size does not match between the server and device.

Possible Solution:
Specify the same array size for both the server and device.

Error occurred while attempting to write tag. The array size must match between the server and device. | Tag address = '<.my-struct.innerstruct.tag>', server array size = '<length>', device array size = '<length>'.

Error Type:
Error

Possible Cause:
The array size does not match between the server and device.

Possible Solution:
Specify the same array size for both the server and device.

Tag browsing failed because communications could not be established with the device.

Error Type:
Error

Possible Cause:
The tag browse operation failed because the server was unable to connect to the device.

Possible Solution:

1. Ensure that the device communication parameters are correctly configured in the server.
2. Check the physical connection between the server and the device.

3. If connecting to the device via a gateway, verify that the CODESYS Gateway is installed on the same host as the server.

Error occurred while attempting to read tag. The specified tag address has a string length that is larger than the maximum supported by the server. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<number>' characters.

Error Type:
Error

Possible Cause:
The corresponding tag on the device has a string length larger than the maximum supported by the server.

Possible Solution:
Shorten the string length of the tag on the device to a value that is supported by the server.

Error occurred while attempting to write tag. The specified tag address has a string length that is larger than the maximum supported by the server. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<number>' characters.

Error Type:
Error

Possible Cause:
The corresponding tag on the device has a string length larger than the maximum supported by the server.

Possible Solution:
Shorten the string length of the tag on the device to a value that is supported by the server.

The browse path does not exist.

Error Type:
Error

Possible Cause:
The user supplied an invalid path.

Possible Solution:

1. Verify the path is valid for the target device.
2. Verify the device is properly programmed.

Tag browse request aborted due to unknown error.

Error Type:
Error

Possible Cause:

1. The runtime is shutting down.
2. An unknown error was encountered.

Possible Solution:

1. Retry the tag browse operation.
2. Contact Tech Support if the issue persists.

The browse request was canceled because the driver has been stopped.

Error Type:
Error

Possible Cause:
The license or evaluation period for this driver has expired.

Possible Solution:
Verify the driver is properly licensed.

Data type for the given address is not supported. A tag is not generated for this data point. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Warning

Possible Cause:
This is caused by having an unsupported data type in the PLC program.

Possible Solution:
Verify that the tag is the correct data type in the programming software. Correct or use a different data type (supported by the server) or data the unsupported type contains is not accessible.

The tag could not be added to the server because the address exceeds the maximum length. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<1024>' characters.

Error Type:
Warning

Possible Cause:
This is caused by having a tag address in the PLC program that exceeds the maximum length supported by the server.

Possible Solution:
Restructure the PLC program so that the tag address is shorter than the maximum length.

The tag could not be added to the server because it failed address validation. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Warning

Possible Cause:
The tag address is malformed or is not supported by the server.

Possible Solution:

1. Verify the integrity of the symbol file or make a correction before trying again.
2. Verify or correct the tag address before trying again.

The value read from the string tag was truncated. | Tag address = '<.mystruct.innerstruct.tag>', maximum length = '<number>' characters.

Error Type:
Warning

Possible Cause:
The value read from the string tag was longer than the buffer size reported by the device.

Possible Solution:
Restart the server runtime.

The value written to the string tag was truncated. | Tag address = '<.mystruct.innerstruct.tag>', maximum length = '<number>' characters.

Error Type:
Warning

Possible Cause:
The value written to the string tag was longer than the buffer on the device.

Possible Solution:

1. Write a value that has a length less than or equal to the buffer on the device.
2. Make the buffer on the device large enough to fit the value being written.

Devices across channels must have unique address (IP address or hostname) and port combinations. | Address = '<number>', Port = '<number>', Overlapping device = '<device>'.

Error Type:
Warning

Possible Cause:

The address and port combination has already been used for another device.

Possible Solution:
Change the address and/or port for this device.

Failed to open the symbol file. | File = '<path to file>'.

Error Type:
Warning

The file path cannot be empty.

Error Type:
Warning

The symbol file was invalid or corrupt. | File = '<path to file>'.

Error Type:
Warning

Error opening file for tag database import. | OS Error = '<OS Supplied Message>'.

Error Type:
Warning

Error occurred while attempting to write tag. The bit value exceeds the size of the controller data type. | Tag address = '<.mystruct.innerstruct.tag>', bit value = '<bit location>', controller data type size (bytes) = '<size in bytes>'.

Error Type:
Warning

Error occurred while attempting to read tag. The bit value exceeds the size of the controller data type. | Tag address = '<.mystruct.innerstruct.tag>', bit value = '<bit location>', controller data type size (bytes) = '<size in bytes>'.

Error Type:
Warning

Invalid address. Please enter a valid Logical Address or PLC Name.

Error Type:
Warning

Devices across channels must have unique Logical Address/PLC Names. | Address = '<address>', Overlapping device = '<device>'.

Error Type:

Warning

Some of the imported tags replaced tags of the same name in your project.

Error Type:
Warning

Failed to open the symbol file. | File = '<path to file>', Reason = '<error message from operating system>'.

Error Type:
Warning

The tag could not be included in the browse because the address exceeds the maximum length. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<1024>' characters.

Error Type:
Warning

Possible Cause:
This is caused by having a tag address in the PLC program that exceeds the maximum length supported by the server.

Possible Solution:
Restructure the PLC program so that the tag address is shorter than the maximum length.

The tag could not be included in the browse because it failed address validation. | Tag address = '<.mystruct.innerstruct.tag>'.

Error Type:
Warning

Possible Cause:
The tag address is malformed or is not supported by the server.

Possible Solution:

1. Verify the integrity of the symbol file or make a correction before trying again.
2. Verify or correct the tag address before trying again.

Failure browsing tags. | Reason = '<string indicating why the tag browse failed>'.

Error Type:
Warning

Possible Cause:

1. The tag browse operation failed because the server was unable to connect to the device.
2. The supplied path is invalid.
3. The server could not access the symbol information on the device.
4. The symbols do not match between the device and the specified symbol file in the device communication parameters.

Possible Solution:

1. Ensure that the device communication parameters are correctly configured in the server.
2. Check the physical connection between the server and the device.
3. If connecting to the device via a gateway, verify that the CODESYS Gateway is installed on the same host as the server.
4. Verify the path is valid for the target device.
5. Verify the device is properly programmed.
6. Verify that the device is capable of storing its own symbol information. Some devices do not have this capability, and a symbol file must be specified in the device communication parameters.

Tags generated. | Tag count = <count>.

Error Type:

Informational

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Error occurred while attempting to write tag. The array size must match between the server and device. | Tag address = '<.mystruct.innerstruct.tag>', server array size = '<length>', device array size = '<length>'. 35

Error occurred while attempting to write tag. The bit value exceeds the size of the controller data type. | Tag address = '<.mystruct.innerstruct.tag>', bit value = '<bit location>', controller data type size (bytes) = '<size in bytes>'. 39

Error occurred while attempting to write tag. The specified server data type is not compatible with the device data type. | Tag address = '<.mystruct.innerstruct.tag>', server data type = '<type>', device data type = '<type>'. 34

Error occurred while attempting to write tag. The specified tag address has a string length that is larger than the maximum supported by the server. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<number>' characters. 36

Error occurred while attempting to write tag. The specified tag address was not found on the device. | Tag address = '<.mystruct.innerstruct.tag>'. 33

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The tag could not be included in the browse because it failed address validation. | Tag address = '<.mystruct.innerstruct.tag>'. 40

The tag could not be included in the browse because the address exceeds the maximum length. | Tag address = '<.mystruct.innerstruct.tag>', Max length = '<1024>' characters. 40

The value read from the string tag was truncated. | Tag address = '<.mystruct.innerstruct.tag>', maximum length = '<number>' characters. 38

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