# Yokogawa DXP Ethernet Driver Help

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## Yokogawa DXP Ethernet Driver Help

Help version 1.020

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## Overview

The Yokogawa DXP Ethernet Driver provides an easy and reliable way to connect Yokogawa DXP Ethernet devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with Yokogawa Data Acquisition and Data Recorder devices that support Ethernet TCP communications.

## Device Setup

### Supported Yokogawa Devices
DXP100
DXP200

### Connection Timeout
This parameter specifies the time that the driver will wait for a connection to be made with a device. Depending on network load, the connect time may vary with each connection attempt. The valid range is 1 to 30 seconds. The default setting is 3 seconds.

### Request Timeout
This parameter specifies the amount of time that the driver will wait for a response from the device before giving up and going on to the next request. Long timeouts will only affect performance if a device is not responding. The default setting is 1000 milliseconds. The valid range is 100 to 30000 milliseconds.

**Note:** If the default timing settings are being used while the initial client connection is being made, users may receive a "Device Not Responding" error message even though the tags are good. If the request timeout is adjusted (such as, increased from 1000 to 1500) users will not receive a "Device Not Responding" error message.

### Retry Attempts
This parameter specifies the number of times that the driver will retry a message before giving up and going on to the next message. The default setting is 3 retries. The valid range is 1 to 10.

**Note:** For more information on timeouts and retries, refer to the OPC server's help documentation.

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

**Port**
This parameter specifies the port number that the remote device is configured to use. This driver is currently set to use the Ethernet Exclusive port only. The port number is 34150.

**Note:** This driver requires Winsock V1.1 or higher.

**Polling Interval**
The setting allows a fixed time interval specified for all communications with a device. The Polling Interval can be used to prevent the driver from making excessive request to the device. In some cases, the OPC client may force the driver to run at its maximum update rate: the Polling Interval can be used to prevent this condition.

**Special Data Handling**
The setting allows the driver to be configured to return specific data values for numerical out of range and error conditions returned from the device.

Special Data Handling options are **NONE**, **+INF**, and **-INF**. If Special Data Handling is set to NONE, special data values will be returned with the actual data value received from the device. For example, the data value of a measuring channel Over Range would be returned as 32,767 and the data value of a math channel Over Range would be returned as 2,147,450,879.

If Special Data Handling is set to +INF, special data values will be returned as a numerical representation of positive infinity (#INF), with the exception of an Under Range condition that is always returned as negative infinity. When Special Data Handling is set to -INF, special data values will be returned as a numerical representation of negative infinity (-#INF), with the exception of an Over Range condition that is always returned as positive infinity.

**Start math when start**
When checked, this option will inform the driver to send a command to the device at communication startup that will start the math computation.

**Date & Time**
This parameter specifies the origin of the data value of the Date and Time data types which represent the date and time of the latest data.

Date & Time options are **Device Time** and **System Time**. If Device Time is selected, the Date and Time tags will return the date and time read from the device. This date and time represents the date and time that the latest data was measured or computed based on the internal device clock. If System Time is selected, the Date and Time tags will return the date and time that the requested data was returned from the device based on the internal system clock.

### Date Format
This parameter specifies the format of the return string for the Date data type. Date formats can be specified as **MM/DD/YY** (month/day/year), **YY/MM/DD** (year/month/day) or **DD/MM/YY** (day/month/year).

### Set clock when start
When checked, this option will inform the driver to send a command to the device at communication startup that will set the device clock to the date and time settings of the system clock.

### Generate tag database using:
This parameter specifies the origin of the tag name used when auto generating a tag database. The options are **Physical Channel Number** and **Device Tag name**. If Physical Channel Number is selected, the driver will generate tag names based on the channel number of an item. For example, CH01 or CH01_alarm1. If Device Tag name is selected, the driver will generate tag names using the tag name returned by the device for a channel. For example, Flow or Flow_alarm1.

### Username
The DXP devices require the user to login with a username. If the device is configured with the login function enabled, only users that are registered can login to the DXP. Enter the registered username, up to 16 alphanumeric characters. If the device is configured with the login function disabled, users must still specify a user level in order to communicate with the DXP. Enter the username user to indicate the user level. In this case, password is not required. Please note that username is case sensitive.

### Password
If the device is configured with the login function enabled, the user must specify both a registered username and password. Enter the registered password, up to 6 alphanumeric characters. Note that password entry will not be displayed on the Device Configuration screen.

### UserID
The DXP devices require the user to login with a userID in addition to **Username** and **Password**. Enter the registered userID.

### User Function
The DXP devices allow the user to login in either **Monitor** or **Setting** modes. The **Monitor** function allows the user to read all accessible data while allowing full operator access to the device through the front panel of the unit. The **Setting** function allows the user to read all accessible data and to write to Read/Write accessible tags, however, the front panel of the unit is locked while in Setting mode. Enter the desired user function.

**Note:** The User Function setting can be changed while the server is connected. It should only be selected if users want to write data to the device. Otherwise, users should select Monitor in order to maintain operability of the unit front panel.

## Device Settings
Regarding the DXP unit settings:

- The DXP unit should be configured with the Keep alive function enabled. This enables the DXP unit to drop the connection if there are no responses to periodic test packets at the TCP level. The Keep alive function is set on the Communication (Control –Login Time out-) screen in Setup Mode.
- The DXP unit should be in Key + Com mode in order for the OPC server to establish communications with the device if passwords, user ID and/or usernames are used.

**Note:** For more information, refer to the Yokogawa DXP instruction manual.

## Cable Diagrams

## Patch Cable (Straight Through)

| | | | | | |
|---|---|---|---|---|---|
| TD + | 1 | OR/WHT | OR/WHT | 1 | TD + |
| TD - | 2 | OR | OR | 2 | TD - |
| RD + | 3 | GRN/WHT | GRN/WHT | 3 | RD + |
| | 4 | BLU | BLU | 4 | |
| | 5 | BLU/WHT | BLU/WHT | 5 | |
| RD - | 6 | GRN | GRN | 6 | RD - |
| | 7 | BRN/WHT | BRN/WHT | 7 | |
| | 8 | BRN | BRN | 8 | |

RJ45                                                    RJ45

## 10 BaseT
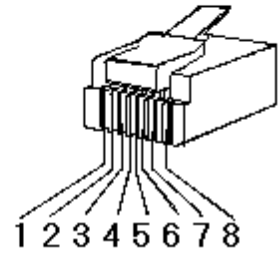
## Crossover Cable

| | | | | | |
|---|---|---|---|---|---|
| TD + | 1 | OR/WHT | GRN/WHT | 1 | TD + |
| TD - | 2 | OR | GRN | 2 | TD - |
| RD + | 3 | GRN/WHT | OR/WHT | 3 | RD + |
| | 4 | BLU | BLU | 4 | |
| | 5 | BLU/WHT | BLU/WHT | 5 | |
| RD - | 6 | GRN | OR | 6 | RD - |
| | 7 | BRN/WHT | BRN/WHT | 7 | |
| | 8 | BRN | BRN | 8 | |

RJ45                                                    RJ45

## 8-pin RJ45

1 2 3 4 5 6 7 8

## Optimizing Your Ethernet Communications

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

Our server refers to communications protocols like Yokogawa DXP Ethernet Device 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.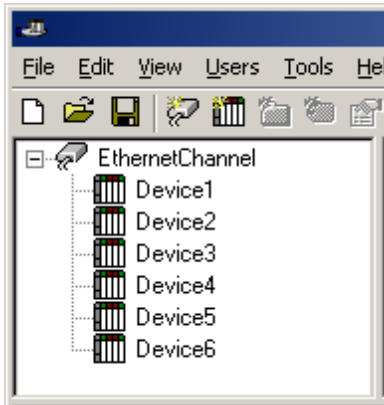 Each of these devices represents a single Ethernet device from which data will be collected. While this approach to defining the application will provide a high level of performance, it won't take full advantage of the Yokogawa DXP Ethernet Driver or the network. An example of how the application may appear when configured using a single channel is shown below.

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

If the Yokogawa DXP Ethernet Driver could only define one single channel, then the example shown above would be the only option available; however, the Yokogawa DXP Ethernet 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.
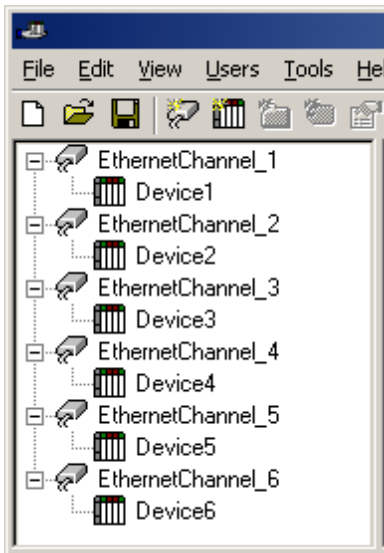
Each device has now been defined under its own channel. In this new configuration, a single path of execution is dedicated to the task of gathering data from each device. If the application has 16 or fewer devices, it can be optimized exactly how it is shown here.

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 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.

## Data Types Descriptions

| Data Type | Description |
| --- | --- |
| Boolean | Single bit |
| Byte | Unsigned 8 bit value |
| Word | Unsigned 16 bit value |
| Short | Signed 16 bit value |
| Float | 32 bit floating point value |
| Double | 64 bit floating point value |
| String | Null terminated ASCII string |

## Automatic Tag Database Generation

The Automatic OPC Tag Database Generation features of this driver have been designed to make setting up the OPC application a Plug and Play operation. This driver can be configured to automatically build a list of OPC tags within the OPC Server that correspond to device specific data. The automatically generated OPC tags can then be browsed from the OPC client. The OPC tags that are generated depend on the nature of the driver.

If the target device supports its own local tag database, the driver will read the device's tag information and use this data to generate OPC tags within the OPC Server. If the device does not natively support its own named tags, the driver will create a list of tags based on information specific to the driver. An example of these two conditions may be as follows:

1. A data acquisition system that supports its own local tag database. The driver will use the tags names found in the device to build the OPC Server's OPC tags.

2. An Ethernet I/O system that supports the detection of an I/O module type. The driver in this case will automatically generate OPC tags in the OPC Server that are based on the types of I/O modules plugged into the Ethernet I/O rack.

The mode of operation for Automatic Tag Database Generation is completely configurable. The following dialog is used to configure how the OPC Server and the associated communications driver will handle Automatic OPC Tag Database Generation.
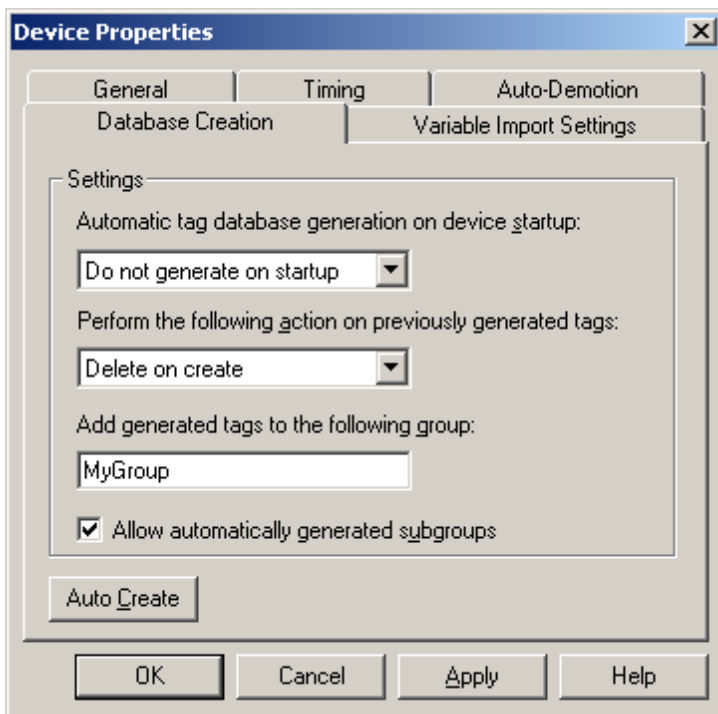
The **Automatic Tag Database Generation on device startup** selection is used to configure when OPC tags will be automatically generated. There are three possible selections:

- **Do not generate on startup**, the default condition, prevents the driver from adding any OPC tags to tag space of the OPC Server.
- **Always generate on startup** causes the driver to always evaluate the device for tag information and to add OPC tags to the tag space of the server each time the server is launched.
- **Generate on first startup** causes the driver to evaluate the target device for tag information the first time this OPC Server project is run and to add any OPC tags to the server tag space as needed.

When the automatic generation of OPC tags is selected, any tags that are added to the server's tag space must be saved with the project. The OPC Server project can be configured to auto save from the **Tools | Options** menu.

When automatic tag generation is enabled, the server needs to know what to do with OPC tags that it may have added from a previous run or with OPC tags that you may have added or modified after the communications driver added them. The selection **Perform the following action** is used to control how the server will handle OPC tags that were automatically generated and currently exist in the OPC Server project. This feature prevents

automatically generated tags from piling up in the server. This would occur if, using the Ethernet I/O example above, you continued to change the I/O modules in the rack with the OPC Server configured to always generate new OPC tags on startup. Under this condition every time the communications driver detected a new I/O module, the tags would be added to the server. If the old tags are not removed, a number of unused tags could accumulate in the server's tag space. The selection Perform the following action is used to tailor the server's operation to best fit the application's needs. Descriptions of the selections are as follows:

1. **Delete on create**, the default condition, allows the server to remove any tags that had previous been added to the tag space before the communications driver can add any new tags.

2. **Overwrite as necessary** allows the server to remove only tags the communications driver is replacing with new tags. Any tags that are not being overwritten will remain in the server's tag space.

3. **Do not overwrite** prevents the server from removing any tags that had been previous generated or may have already existed in the server. With this selection, the communications driver can only add tags that are completely new.

4. **Do not overwrite, log error**, has the same effect as the third with the addition of an error message posted to the OPC Server's event log when a tag overwrite would have occurred.

**Note:** The removal of OPC tags affects tags that have been automatically generated by the communications driver and any tags that have been added using names that match generated tags. It is recommended that users avoid adding tags to the server using names that match tags that may be automatically generated by the driver.

**Add generated tags to the following group** can be used to keep automatically generated tags from mixing with tags that have been entered manually. This parameter is used to specify a sub group that will be used when adding all automatically generated tags for this device. The name of the sub group can be up to 31 characters in length. The following displays demonstrate how this parameter effects where automatically generated tags are placed in the server's tag space. As shown below, this parameter provides a root branch to which all automatically generated tags will be added.
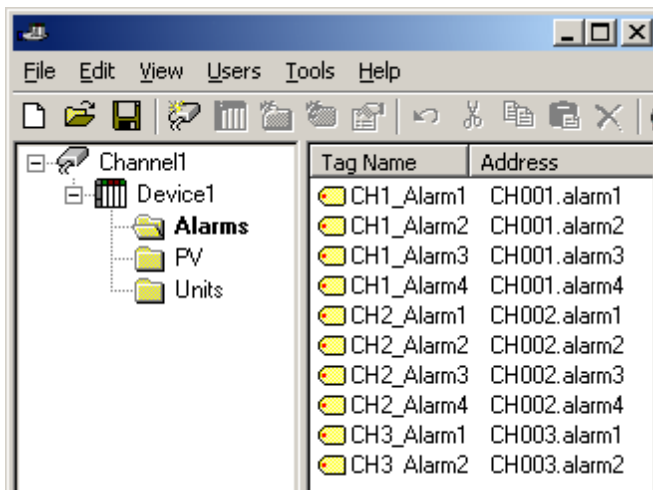


**No sub group specified.**
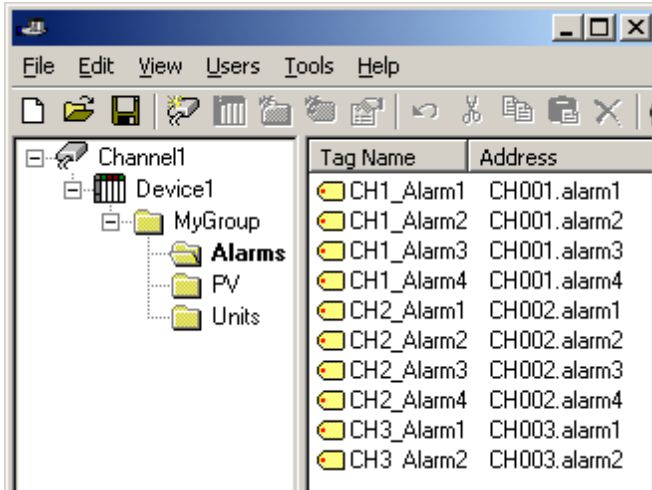
**Sub group namedMyGroup specified.**

**Auto Create** button is used to manually initiate the creation of automatically generated OPC tags. It can be used to make the communications driver reevaluate the device for possible tag changes. Auto Create can also be accessed from the System Tags for this device, allowing the OPC client application to initiate tag database creation.

## 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.

**DXP100 Addressing**
**DXP200 Addressing**

### DXP100 Addressing

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

**Measured Channels**

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Process Value of Channel | CHxx or CHxx.PV | 01-12 | **Double**, Float | Read Only |
| Alarm Summary of Channel | CHxx.Alarm | 01-12 | **Short**, Word, Byte | Read Only |
| Alarm Level1 Status of Channel | CHxx.Alarm1 | 01-12 | **Short**, Word, Byte | Read Only |
| Alarm Level2 Status of Channel | CHxx.Alarm2 | 01-12 | **Short**, Word, Byte | Read Only |
| Alarm Level3 Status of Channel | CHxx.Alarm3 | 01-12 | **Short**, Word, Byte | Read Only |
| Alarm Level4 Status of Channel | CHxx.Alarm4 | 01-12 | **Short**, Word, Byte | Read Only |
| Set and Read Level1 Alarm Setpoint | CHxx.ASP1 | 01-12 | **Double**, Float | Read/Write |
| Set and Read Level2 Alarm Setpoint | CHxx.ASP2 | 01-12 | **Double**, Float | Read/Write |
| Set and Read Level3 Alarm Setpoint | CHxx.ASP3 | 01-12 | **Double**, Float | Read/Write |
| Set and Read Level4 Alarm Setpoint | CHxx.ASP4 | 01-12 | **Double**, Float | Read/Write |
| Upper Scale Value of Channel* | CHxx.scale_Hi | 01-12 | **Double**, Float | Read Only |
| Lower Scale Value of Channel* | CHxx.scale_Lo | 01-12 | **Double**, Float | Read Only |
| Unit String of Channel* | CHxx.unit | 01-12 | **String** | Read Only |
| Tagname of Channel* | CHxx.tag | 01-12 | **String** | Read Only |
| Status of Channel* | CHxx.status | 01-12 | **String** | Read Only |
| Precision of Channel* | CHxx.Precision | 01-12 | **Short**, Word, Byte | Read Only |
| Lowest Measuring Channel* | CH.Low | | **Short**, Word, Byte | Read Only |
| Highest Measuring Channel* | CH.High | | **Short**, Word, Byte | Read Only |

**Math Channels**

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Process Value of Math Channel | CHxx or CHxx.PV | 31-42 | **Double**, Float | Read Only |
| Alarm Summary of Math Channel | CHxx.Alarm | 31-42 | **Short**, Word, Byte | Read Only |
| Alarm Level1 Status of Math Channel | CHxx.Alarm1 | 31-42 | **Short**, Word, Byte | Read Only |
| Alarm Level2 Status of Math Channel | CHxx.Alarm2 | 31-42 | **Short**, Word, Byte | Read Only |
| Alarm Level3 Status of Math Channel | CHxx.Alarm3 | 31-42 | **Short**, Word, Byte | Read Only |
| Alarm Level4 Status of Math Channel | CHxx.Alarm4 | 31-42 | **Short**, Word, Byte | Read Only |
| Set and Read Level1 Alarm Setpoint | CHxx.ASP1 | 31-42 | **Double**, Float | Read/Write |
| Set and Read Level2 Alarm Setpoint | CHxx.ASP2 | 31-42 | **Double**, Float | Read/Write |
| Set and Read Level3 Alarm Setpoint | CHxx.ASP3 | 31-42 | **Double**, Float | Read/Write |
| Set and Read Level4 Alarm Setpoint | CHxx.ASP4 | 31-42 | **Double**, Float | Read/Write |
| Upper Scale Value of Math Channel* | CHxx.scale_Hi | 31-42 | **Double**, Float | Read Only |
| Lower Scale Value of Math Channel* | CHxx.scale_Lo | 31-42 | **Double**, Float | Read Only |
| Unit String of Math Channel* | CHxx.unit | 31-42 | **String** | Read Only |
| Tagname of Math Channel* | CHxx.tag | 31-42 | **String** | Read Only |
| Status of Math Channel* | CHxx.status | 31-42 | **String** | Read Only |
| Precision of Math Channel* | CHxx.Precision | 31-42 | **Short**, Word, Byte | Read Only |
| Lowest Math Channel* | CHA.Low | | **Short**, Word, Byte | Read Only |
| Highest Math Channel* | CHA.High | | **Short**, Word, Byte | Read Only |

### *Initialized Data

Data associated with these addresses are read from the device only at the start of a communications session.
Once read, the values will not be refreshed until the server has been restarted or the "Reset" tag has been

invoked. To invoke a reset, a non-zero value must be written to the Reset tag. Once the Reset tag has been invoked, the driver will reinitialize all startup data from the device.

### Alarm Setpoints

Data values for Alarm Setpoints that are undefined in the device will be returned as +INF. Data values can only be written to Alarm Setpoints that are defined in the device. Write operations to undefined Alarm Setpoints will return an error. Write operations are available only for users logged in at the Administrator level; otherwise, they will return an error.

### Scales

Data values for Scale_Hi and Scale_Lo for channels that are skipped will be returned as +INF.

### Tag Names

For devices that do not support tag names and channels that have unspecified tag names, the driver will construct an internal tag name based on the channel number. For example, the tag name of address 'CH01' will be returned as 'CH01'.

### General Device Data

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Administrator Level | Admin | | **Boolean** | Read Only |
| Date of Last Data | Date | | **String** | Read Only |
| Time of Last Data | Time | | **String** | Read Only |
| Model Name of Device | Model | | **String** | Read Only |
| Host Name of Device | Hostname | | **String** | Read Only |
| Serial Number of Device | SerialNumber | | **String** | Read Only |
| IP Address of Device | IP | | **String** | Read Only |
| Math Communication Data | CDxx | 01-12 | **Float** | Read/Write |
| Control Math Execution | MathControl | | **Short**, Word, Byte | Write Only |
| Reset Alarms | AlarmReset | | **Boolean** | Write Only |
| Control Command and Response | Command | | **String** | Read/Write |
| Previous Screen | PreScreen | | **Boolean** | Write Only |
| Direct Reloading of Configuration | Reset | | **Boolean** | Write Only |

### Administrator Level

The Admin address type has a value of '1' or 'true' when the user has logged on at the Administrator level and a value of '0' or 'false' when the user has logged on at the User level.

**Note:** Administrative privileges are not allowed on DXP models.

### Math Communication Data

The CD address type is only valid for devices equipped with the math option. Write operations to CD addresses for non-math equipped devices will return an error. Write operations are available only for users logged in at the Administrator level; otherwise, they will return an error.

### Model Name of Device

The Model address type will have a string value of 'DXP100' or 'DXP200', indicating the model series returned by the device.

### Control Math Execution

The MathControl address type is only available for devices equipped with the math option. Write operations to the MathControl tag for non-math equipped devices will return an error.

### Control Command and Response

The Command address allows the user to send a string command and receive a string response to and from the device. This allows the user to send any command to the device, including commands not directly supported by the driver. This tag is only available to users logged in at the Administrator level; otherwise, write operations will return an error.

**Caution:** Perform Write operations using the Command address with caution.

**Note:** The actual number of addresses available for each type depends on the configuration of the Yokogawa device. If the driver finds that an address is not present in the device at Runtime, it will post an error message and remove the tag from its scan list.

Addresses that have Write Only access are assigned a default access of Read/Write. However, data values are unreadable for these addresses and the associated tags are not included in the scan list. The current data value for these tags will always be 0 for numeric data types and null string for string data types.

## DXP200 Addressing

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

### Measured Channels

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Process Value of Channel | CHxx or CHxx.PV | 01-30 | **Double**, Float | Read Only |
| Alarm Summary of Channel | CHxx.Alarm | 01-30 | **Short**, Word, Byte | Read Only |
| Alarm Level1 Status of Channel | CHxx.Alarm1 | 01-30 | **Short**, Word, Byte | Read Only |
| Alarm Level2 Status of Channel | CHxx.Alarm2 | 01-30 | **Short**, Word, Byte | Read Only |
| Alarm Level3 Status of Channel | CHxx.Alarm3 | 01-30 | **Short**, Word, Byte | Read Only |
| Alarm Level4 Status of Channel | CHxx.Alarm4 | 01-30 | **Short**, Word, Byte | Read Only |
| Set and Read Level1 Alarm Setpoint | CHxx.ASP1 | 01-30 | **Double**, Float | Read/Write |
| Set and Read Level2 Alarm Setpoint | CHxx.ASP2 | 01-30 | **Double**, Float | Read/Write |
| Set and Read Level3 Alarm Setpoint | CHxx.ASP3 | 01-30 | **Double**, Float | Read/Write |
| Set and Read Level4 Alarm Setpoint | CHxx.ASP4 | 01-30 | **Double**, Float | Read/Write |
| Upper Scale Value of Channel* | CHxx.scale_Hi | 01-30 | **Double**, Float | Read Only |
| Lower Scale Value of Channel* | CHxx.scale_Lo | 01-30 | **Double**, Float | Read Only |
| Unit String of Channel* | CHxx.unit | 01-30 | **String** | Read Only |
| Tagname of Channel* | CHxx.tag | 01-30 | **String** | Read Only |
| Status of Channel* | CHxx.status | 01-30 | **String** | Read Only |
| Precision of Channel* | CHxx.Precision | 01-30 | **Short**, Word, Byte | Read Only |
| Lowest Measuring Channel* | CH.Low | | **Short**, Word, Byte | Read Only |
| Highest Measuring Channel* | CH.High | | **Short**, Word, Byte | Read Only |

### Math Channels

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Process Value of Math Channel | CHxx or CHxx.PV | 31-60 | **Double**, Float | Read Only |
| Alarm Summary of Math Channel | CHxx.Alarm | 31-60 | **Short**, Word, Byte | Read Only |
| Alarm Level1 Status of Math Channel | CHxx.Alarm1 | 31-60 | **Short**, Word, Byte | Read Only |
| Alarm Level2 Status of Math Channel | CHxx.Alarm2 | 31-60 | **Short**, Word, Byte | Read Only |
| Alarm Level3 Status of Math Channel | CHxx.Alarm3 | 31-60 | **Short**, Word, Byte | Read Only |
| Alarm Level4 Status of Math Channel | CHxx.Alarm4 | 31-60 | **Short**, Word, Byte | Read Only |
| Set and Read Level1 Alarm Setpoint | CHxx.ASP1 | 31-60 | **Double**, Float | Read/Write |
| Set and Read Level2 Alarm Setpoint | CHxx.ASP2 | 31-60 | **Double**, Float | Read/Write |
| Set and Read Level3 Alarm Setpoint | CHxx.ASP3 | 31-60 | **Double**, Float | Read/Write |
| Set and Read Level4 Alarm Setpoint | CHxx.ASP4 | 31-60 | **Double**, Float | Read/Write |
| Upper Scale Value of Math Channel* | CHxx.scale_Hi | 31-60 | **Double**, Float | Read Only |
| Lower Scale Value of Math Channel* | CHxx.scale_Lo | 31-60 | **Double**, Float | Read Only |
| Unit String of Math Channel* | CHxx.unit | 31-60 | **String** | Read Only |
| Tagname of Math Channel* | CHxx.tag | 31-60 | **String** | Read Only |
| Status of Math Channel* | CHxx.status | 31-60 | **String** | Read Only |
| Precision of Math Channel* | CHxx.Precision | 31-60 | **Short**, Word, Byte | Read Only |
| Lowest Math Channel* | CHA.Low | | **Short**, Word, Byte | Read Only |
| Highest Math Channel* | CHA.High | | **Short**, Word, Byte | Read Only |

### *Initialized Data

Data associated with these addresses are read from the device only at the start of a communications session. Once read, the values will not be refreshed until the server has been restarted or the "Reset" tag has been invoked. To invoke a reset, a non-zero value must be written to the Reset tag. Once the Reset tag has been invoked, the driver will reinitialize all startup data from the device.

### Alarm Setpoints

Data values for Alarm Setpoints that are undefined in the device will be returned as +INF. Data values can only be written to Alarm Setpoints that are defined in the device. Write operations to undefined Alarm Setpoints will return an error. Write operations are available only for users logged in at the Administrator level; otherwise, they will return an error.

### Scales
Data values for Scale_Hi and Scale_Lo for channels that are skipped will be returned as +INF.

### Tag Names
For devices that do not support tag names and channels that have unspecified tag names, the driver will construct an internal tag name based on the channel number. For example, the tag name of address 'CH01' will be returned as 'CH01'.

### General Device Data

| Address Type | Format | Range | Data Types | Access |
|---|---|---|---|---|
| Administrator Level | Admin | | **Boolean** | Read Only |
| Date of Last Data | Date | | **String** | Read Only |
| Time of Last Data | Time | | **String** | Read Only |
| Model Name of Device | Model | | **String** | Read Only |
| Math Communication Data | CDxx | 01-30 | **Float** | Read/Write |
| Control Math Execution | MathControl | | **Short**, Word, Byte | Write Only |
| Reset Alarms | AlarmReset | | **Boolean** | Write Only |
| Control Command and Response | Command | | **String** | Read/Write |
| Previous Screen | PreScreen | | **Boolean** | Write Only |
| Direct Reloading of Configuration | Reset | | **Boolean** | Write Only |

### Administrator Level
The Admin address type has a value of '1' or 'true' when the user has logged on at the Administrator level and a value of '0' or 'false' when the user has logged on at the User level.

**Note:** Administrative privileges are not allowed on DXP models.

### Math Communication Data
The CD address type is only valid for devices equipped with the math option. Write operations to CD addresses for non-math equipped devices will return an error. Write operations are available only for users logged in at the Administrator level; otherwise, they will return an error.

### Model Name of Device
The Model address type will have a string value of 'DXP100' or 'DXP200', indicating the model series returned by the device.

### Control Math Execution
The MathControl address type is only available for devices equipped with the math option. Write operations to the MathControl tag for non-math equipped devices will return an error.

### Control Command and Response
The Command address allows the user to send a string command and receive a string response to and from the device. This allows the user to send any command to the device, including commands not directly supported by the driver. This tag is only available to users logged in at the Administrator level; otherwise, write operations will return an error.

**Caution:** Perform Write operations using the Command address with caution.

**Note:** The actual number of addresses available for of each type depends on the configuration of the Yokogawa device. If the driver finds that an address is not present in the device at Runtime, it will post an error message and remove the tag from its scan list.

Addresses that have Write Only access are assigned a default access of Read/Write. However, data values are unreadable for these addresses and the associated tags are not included in the scan list. The current data value for these tags will always be 0 for numeric data types and null string for string data types.

## Error Descriptions

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

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

**Device Status Messages**
**Device '<device name>' is not responding**
**Unable to write to '<address>' on device '<device name>**
**Write allowed for admin level only (Device '<device-name>', Tag '<address>'**
**Write allowed for devices with math option only (Device '<device-name>', Tag '<address>'**

**Driver Error Messages**
**Winsock initialization failed (OS Error = n)**
**Winsock V1.1 or higher must be installed to use the Yokogawa DXP Ethernet Device Driver**

**Automatic Tag Database Generation Messages**
**Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. Check username and password**
**Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' not accepted. Choose username of 'admin' or 'user'**
**Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. No more logins at this user level**
**Unable to generate a tag database-device responded with error code '<error code>'**

## Address Validation

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

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

## Missing address

**Error Type:**
Warning

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

**Solution:**
Re-enter the address in the client application.

## Device address '<address>' contains a syntax error

**Error Type:**
Warning

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

**Solution:**
Re-enter the address in the client application.

## Address '<address>' is out of range for the specified device or register

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically references a location that is beyond the range of supported locations for the device.

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

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

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically 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 statically has a requested access mode that is not compatible with what the device supports for that address.

**Solution:**
Change the access mode in the client application.

## Device Status Messages

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

**Device Status Messages**
**Device '<device name>' is not responding.**
**Unable to write to '<address>' on device '<device name>.**
**Write allowed for admin level only (Device '<device-name>', Tag '<address>'**
**Write allowed for devices with math option only (Device '<device-name>', Tag '<address>'**

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

**Error Type:**
Serious

**Possible Cause:**
1. The connection between the device and the Host PC is broken.
2. The IP address assigned to the device is incorrect.
3. The connection cannot be established in the specified timeout period.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

**Solution:**
1. Verify the cabling between the PC and the PLC device.
2. Verify the IP address given to the named device matches that of the actual device.
3. Increase the Connect Timeout value in the Timeout page of Device Properties.
4. Increase the Request Timeout setting so that the entire response can be handled.

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

**Error Type:**

Serious

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

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

## Write allowed for admin level only

**Error Type:**
Warning

**Possible Cause:**
The user is logged on to the named device at the user level and is attempting to write to a tag that is writeable at the administrator level only.

**Solution:**
Verify the user/admin level used for login.

**Note:**
Administrative privileges are not allowed on DXP models.

## Write allowed for devices with math option only

**Error Type:**
Warning

**Possible Cause:**
A write was attempted to a tag that is available for math operations only; however, the named device is not equipped with the math option.

**Solution:**
Verify that the tag address exists for the device.

## Driver Error Messages

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

**Driver Error Messages**
**Winsock initialization failed (OS Error = n)**
**Winsock V1.1 or higher must be installed to use the Yokogawa DXP Ethernet Device Driver**

## Winsock initialization failed (OS Error = n)

**Error Type:**
Fatal

| OS Error | Indication | Possible Solution |
|---|---|---|
| 10091 | Indicates that the underlying network subsystem is not ready for network communication. | Wait a few seconds and restart the driver. |
| 10067 | Limit on the number of tasks supported by the Windows Sockets implementation has been reached. | Close one or more applications that may be using Winsock and restart the driver. |

## Winsock V1.1 or higher must be installed to use the Yokogawa DXP Ethernet Device Driver

**Error Type:**
Fatal

**Possible Cause:**
The version number of the Winsock DLL found on the system is less than 1.1.

**Solution:**
Upgrade Winsock to version 1.1 or higher.

## Automatic Tag Database Generation Messages

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

**Automatic Tag Database Generation Messages**
Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. Check username and password.
Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' not accepted. Choose username of 'admin' or 'user'.
Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. No more logins at this user level.
Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' responded with error '<error code>'.

## Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. Check username and password

**Error Type:**
Serious

**Possible Cause:**
1. The username and password required for login to the device have not been specified in Device Configuration.
2. The username and password were entered incorrectly or entered in non-matching case.
3. The username and/or password specified in Device Configuration is not registered in the device.

**Solution:**
Re-enter the correct username and password in Device Configuration.

## Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login not accepted. Choose username of 'admin' or 'user'

**Error Type:**
Serious

**Possible Cause:**
1. The password protected login feature of the device is disabled and the username specified in Device Configuration does not contain the expected user level required for login to the device.
2.The user level was entered incorrectly or entered in non-matching case.

**Solution:**
Re-enter the correct user level 'user' in the username field in Device Configuration.

## Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' login failed. No more logins at this user level

**Error Type:**
Serious

**Possible Cause:**
There are no more users permitted to login at this user level. Other users may be connected to the device, or a connection may have been made and broken without logging off or disconnecting.

**Solution:**
1. Check for other user connections that are blocking connection.
2. Make sure that the Keep Alive feature for Ethernet communications is enabled in the device. This will cause the device to disconnect if there is a break in communications.

## Unable to generate a tag database for device '<device name>'. Reason: Device '<device name>' responded with error '<error code>'

**Error Type:**
Serious

**Possible Cause:**
Please see the instruction manual corresponding to the device model for an explanation of the error code.

**Solution:**
The solution depends on the error code. Please see the instruction manual corresponding to the device model for an explanation of the error code.

# Index