DNP Master Serial Driver Help

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DNP Master Serial Driver Help

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Overview

The DNP Master Serial Driver provides an easy and reliable way to connect DNP Master Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications.

Channel Setup

In the DNP3 protocol, a channel describes a communications path between two endpoints. DNP3 sessions describe specific communications between a DNP master node (server channel) and a DNP slave node (server device). For each channel (master node), DNP sessions are represented as server devices (slave nodes). Thus, the server channel describes the communications conduit over which the sessions will communicate. The other endpoint of the DNP channel may have one or more slave nodes available.

Communication Serialization

The DNP Master Serial Driver supports Communication Serialization, which specifies whether data transmissions should be limited to one channel at a time. For more information, refer to "Channel Properties - Advanced" in the server help file.

Timing

The Response Timeout specifies how long the device will wait for a response to a request before timing out. The valid range is 100 to 3600000 milliseconds. The default setting is 10000 milliseconds.
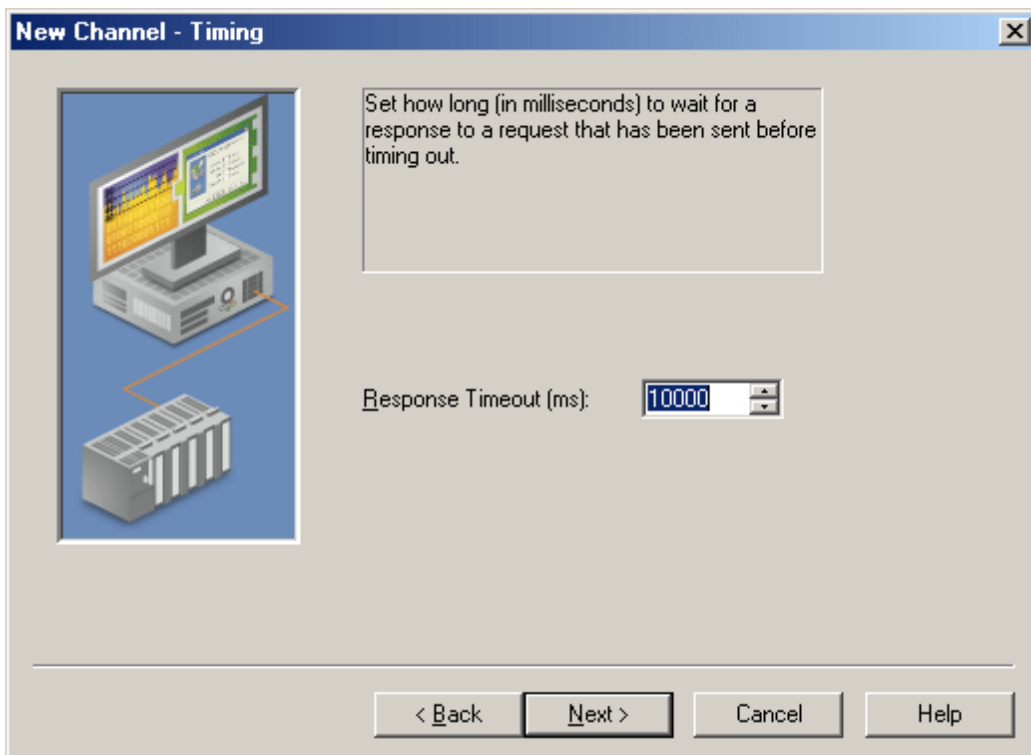
Note: For more information on performance, refer to **Timing and Other Considerations**.

Device Setup

Communication Protocol

Distributed Network Protocol 3.0 (DNP3).

Supported Devices

Any DNP3 slave device.

Maximum Channels and Devices

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

Note: When using Ethernet Encapsulation, this driver uses one socket per channel.

Flow Control and RS232/485 Converters

When using an RS232/RS485 converter, the type of flow control that is required depends on the needs of the converter. Some converters do not require any flow control whereas others require RTS flow. Consult the converter's documentation in order to determine its flow requirements. An RS485 converter that provides automatic flow control is recommended.

Note: When using the manufacturer's supplied communications cable, it is sometimes necessary to choose a flow control setting of **RTS** or **RTS Always** in the Communications tab in Channel Properties.

Device ID

The Device ID property is not available to this driver.

Cable Diagram
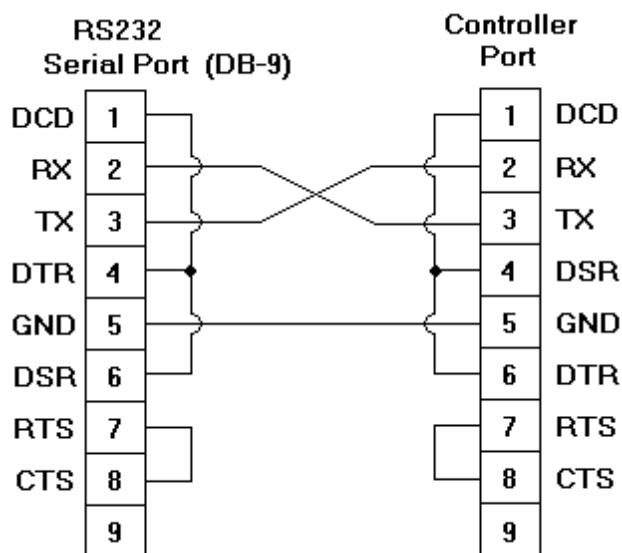
Communications

The Communications dialog is used to specify the DNP Master and Slave's 16 bit addresses.
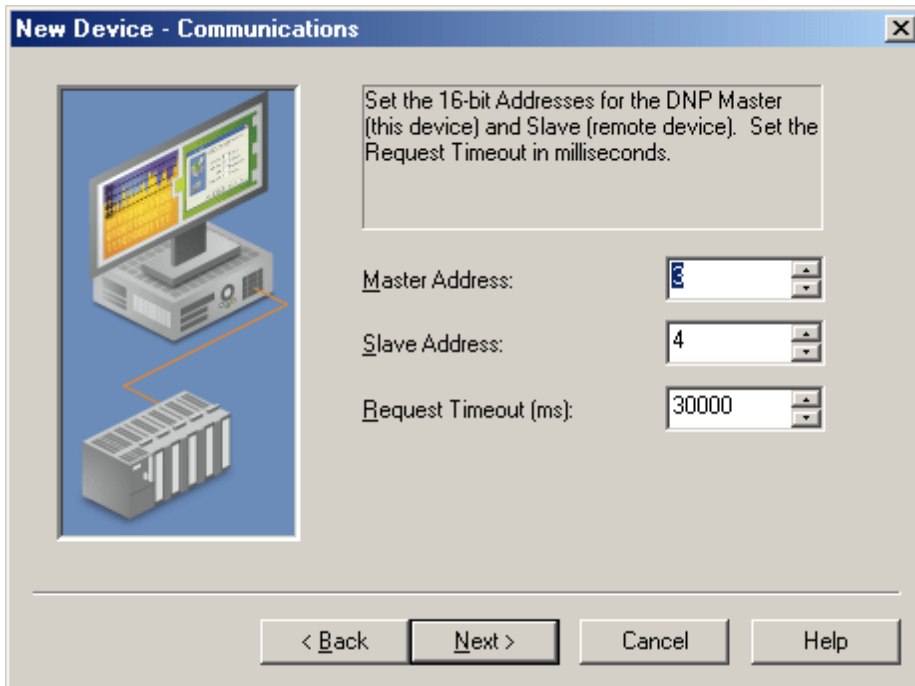
Descriptions of the parameters are as follows:

- **Master Address:** This parameter specifies the address to which the DNP slave devices will talk. The address must be unique and can range from 0 to 65519. Some addresses are reserved. The default setting is 3.
- **Slave Address:** This parameter specifies the slave address. The valid range is 0 to 65519. The default setting is 4.
- **Request Timeout (ms):** This parameter specifies the amount of time in which a command must be completed once it is transmitted. The valid range is 100 to 3600000 milliseconds. The default setting is 30000 milliseconds.

    Note: For more information on performance, refer to **Timing and Other Considerations**.

Time Sync Style
The Communications dialog is also used to specify the device's time synchronization style.
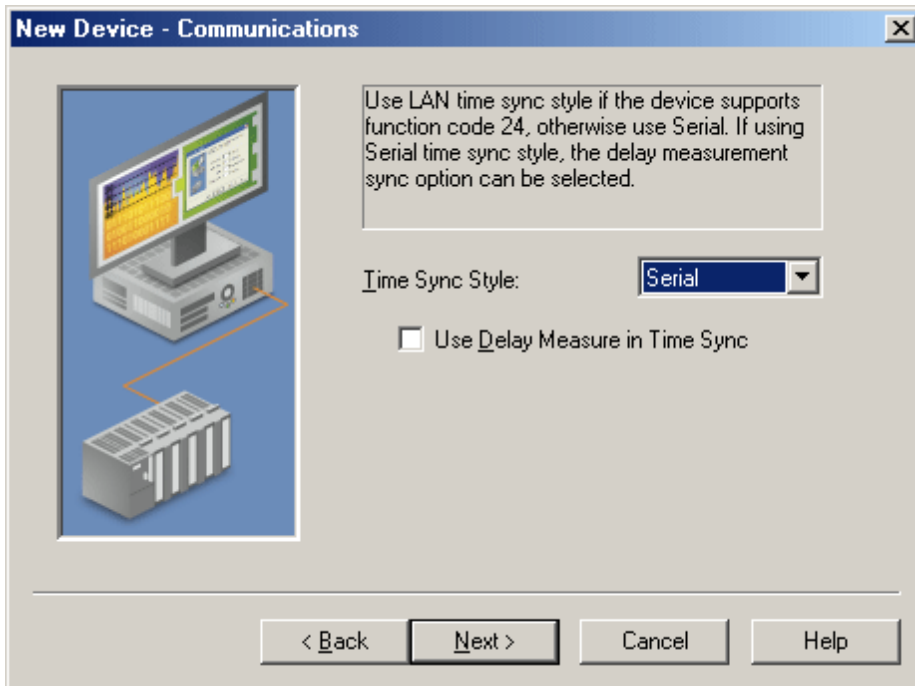
Descriptions of the parameters are as follows:

- **Time Sync Style:** This parameter specifies the DNP master's style of time synchronization, which will be used when a synchronization request is received from the slave. Options include Serial and LAN. In Serial, the DNP master makes a delay measurement using function code 23 over the link and then writes a lag-corrected value using Object Group 50 - Variation 1. In LAN, the DNP master first sends a request with function code 24 to tell the slave to record the current time. Then, the master writes the current time using Object Group 50 - Variation 3. The default setting is Serial.
- **Use Delay Measure in Time Sync:** When checked, this parameter specifies that the delay measure function code 23 will be used in time synchronization. This option is only available when the Serial Time Sync Style is selected. The default setting is unchecked.

Polling

Event Class Polling
The Event Class Polling dialog is used to specify the frequency with which each event class will be polled for data changes. The valid range is 0 to 86400 seconds (24 hours). To turn off the event poll for a given class, enter zero (0). The default setting is 5 seconds.
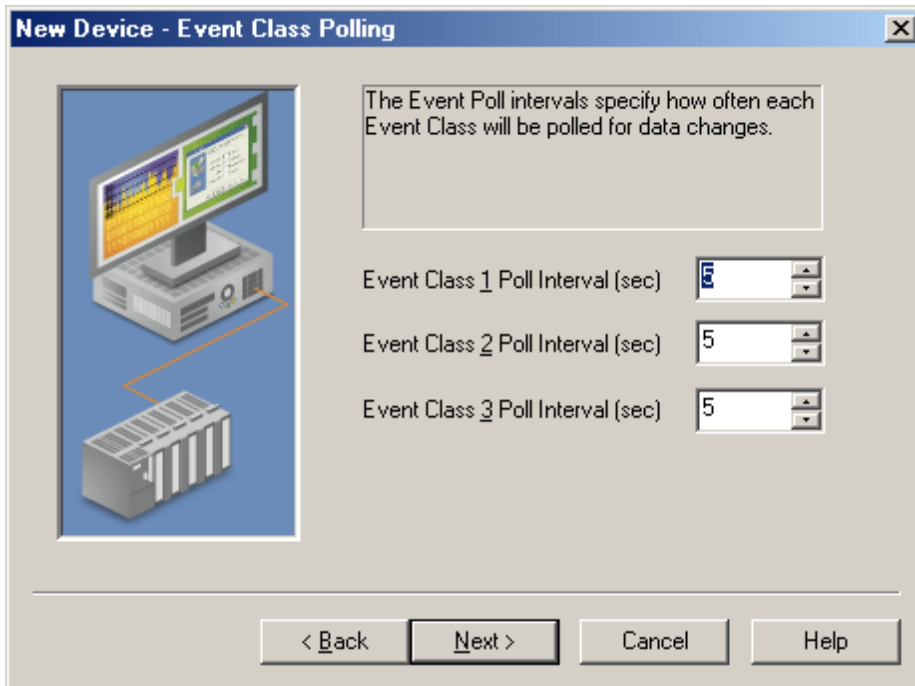
Integrity Polling

The Integrity Polling dialog is used to specify the frequency with which classes 0, 1, 2, and 3 will request data.
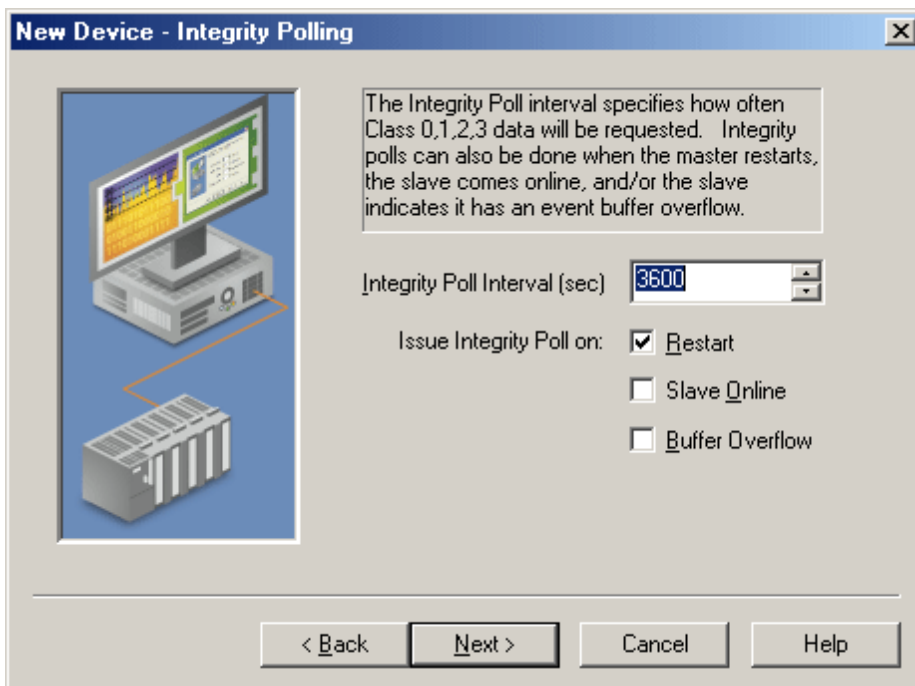
Descriptions of the parameters are as follows:

- **Integrity Poll Interval (sec):** This parameter specifies the frequency with which a complete data retrieval will be requested from the DNP slave device. To turn off integrity polling, enter zero (0). The valid range is 0 to 2,592,000 seconds (30 days). The default setting is 3600 seconds.
- **Issue Integrity Poll on:** This parameter specifies when integrity polls will occur. Options include Restart, Slave Online and Buffer Overflow. The default setting is Restart.

Unsolicited Messaging

The Unsolicited Messaging dialog is used to specify whether the DNP slave will send class 1, 2, and 3 unsolicited data updates.
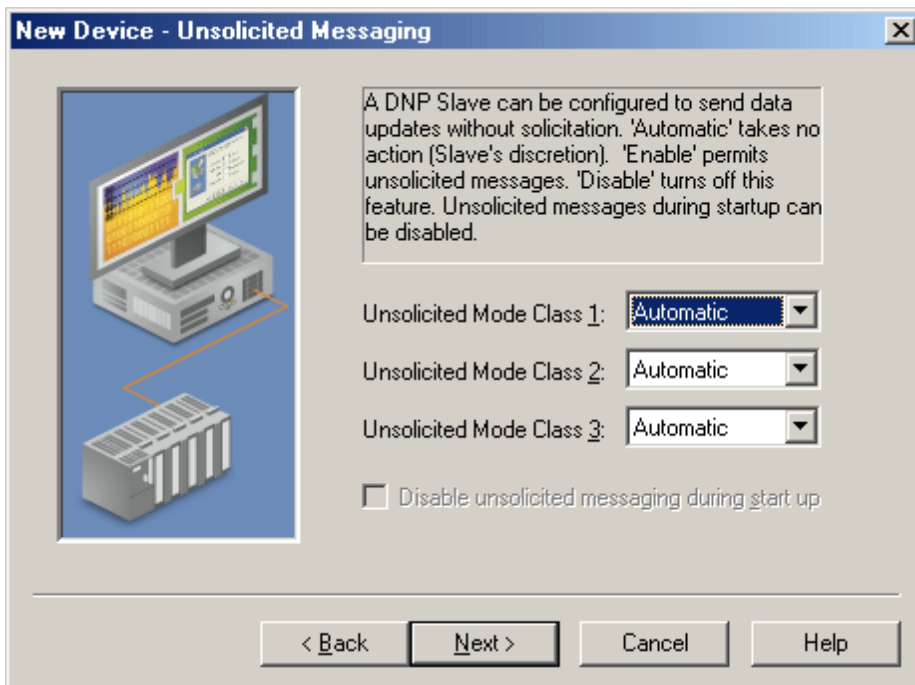
Descriptions of the parameters are as follows:

- **Unsolicited Mode Class 1, 2, and 3:** These parameters specify whether unsolicited messaging will be allowed. Options include **Automatic**, **Enable**, and **Disable**. Automatic takes no action and is at the slave's discretion. Enable permits the reporting of data updates for the selected classes. Disable turns off unsolicited messaging. The default setting is Automatic.
- **Disable unsolicited messaging during start up:** When checked, this option will disable unsolicited messaging during start up. This option is only available when one or more classes have Enable selected and no class has been set to Automatic. This setting applies to all Event classes. The default setting is unchecked.

Event Playback

The Event Playback dialog is used to specify when to retain a set number of updates and then deliver them to clients. DNP slave devices may be configured to retain event reports until contacted by a DNP master. The slave will typically deliver these event reports in bulk when responding to an integrity poll, event poll, or via unsolicited messages. The DNP Driver retains only the most recent update for a given I/O point and discards most or all of the historical stream by default.

Note: Event Playback will stop when the device goes into an error state. It will resume when the device comes back online.
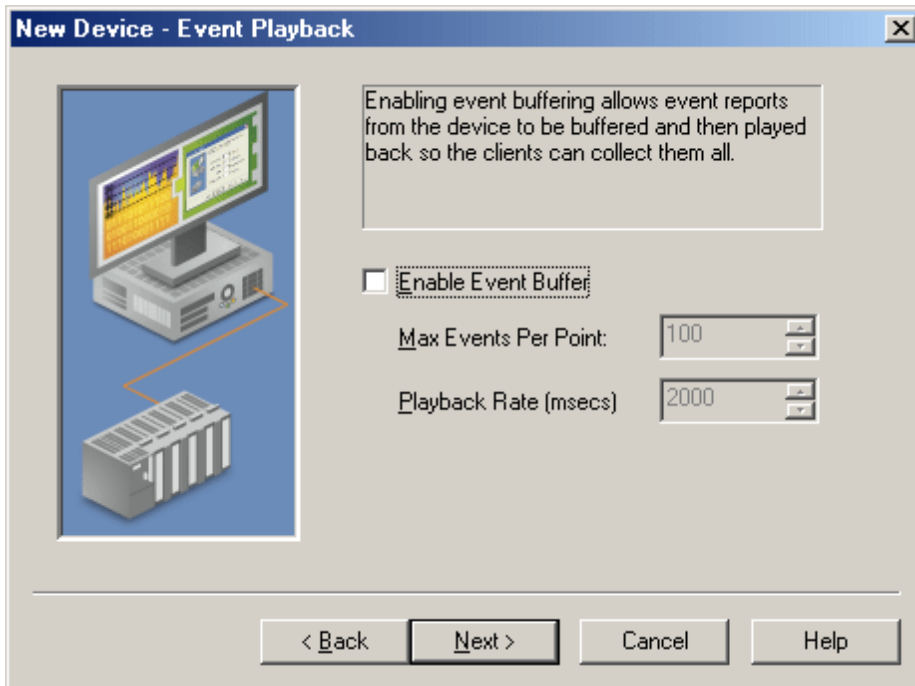
Descriptions of the parameters are as follows:

- **Enable Event Buffer:** When checked, this option allows event reports from the remote DNP device to be buffered and played back for OPC client collection. The default setting is unchecked.

  Note: The client may display intermittent buffered values if the slave sends buffered data while Event Playback is turned off.
- **Max Events Per Point:** This parameter specifies the maximum events to be collected per point. The valid range is 1 to 10000. The default setting is 100.

  Note: More than the specified Max Events Per Point could be played back if the DNP Master Serial Driver is in the middle of processing buffered data from the slave and more events arrive (or if Max Events Per Point is exceeded during the playback).
- **Playback Rate (msecs):** This parameter specifies the rate at which event reports will be played back. The valid range is 50 to 10000. The default setting is 2000 milliseconds.

Effects of Playback on Clients

1. To assure retrieval of all buffered events, the client must have an update rate that is at least twice as fast as the Playback Rate. If the client's update rate is slower, it will effectively override the Playback Rate.

2. Event Playback introduces latency to the tags for those affected objects. After the initial burst of events is played out of the buffer, incoming updates will only be reported at the Playback Rate. New updates may have a time period of 2000 milliseconds between arriving and reporting to clients (at the default settings).

   Note: Buffering should only be used when preservation of the event stream is more important than timely delivery of point updates. If a tag's event buffer fills up, new reports will displace the oldest reports in the queue.

Tag Import

The Tag Import dialog is used to specify options for importing tags from the DNP device.
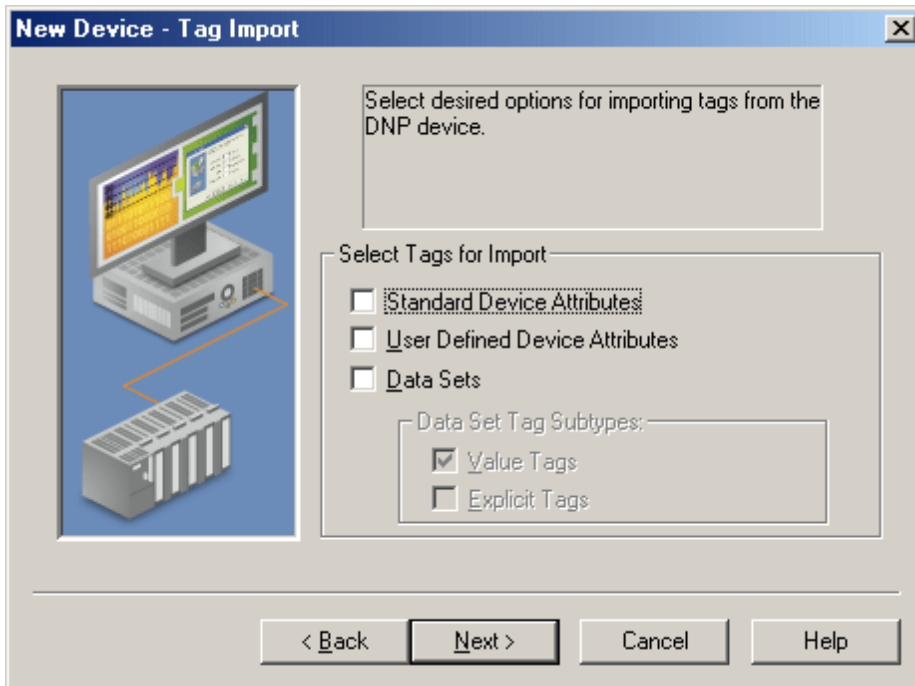
Descriptions of the parameters are as follows:

- **Standard Device Attributes:** When checked, the driver will create tags for standardized Object Group 0 Device Attributes defined by DNP3 at set index 0. The default setting is unchecked.
- **User Defined Device Attributes:** When checked, the driver will create tags for Object Group 0 Device Attributes indexes 1 and above. The default setting is unchecked.
- **Data Sets:** When checked, the driver will create tags for Object Group 87 - Data Sets. The default setting is unchecked.

     Note: The DNP Master Serial Driver will not create tags for data sets with more than 32 elements.
- **Data Set Subtypes:** This parameter specifies the sub-type of the Data Set Tags. It is only available when data sets are selected for import. The default setting is Value Tags. For more information on sub-types, refer to **Address Descriptions**.

Important: The driver will create all tag groups through communication with the device after it has been determined that tags are available in the target device. For accurate tag import, the communication settings must be correct.

Note: When the Tag Import settings are accessed through the Device Properties, an **Import Tags** button will be available. When clicked, this button will import the tag types specified in "Select Tags for Import". If the "Enable Authentication" device property is checked, authentication Statistics Tags will also be generated. When a tag import is in progress, the properties on this page will be disabled. For more information, refer to **Authentication**.
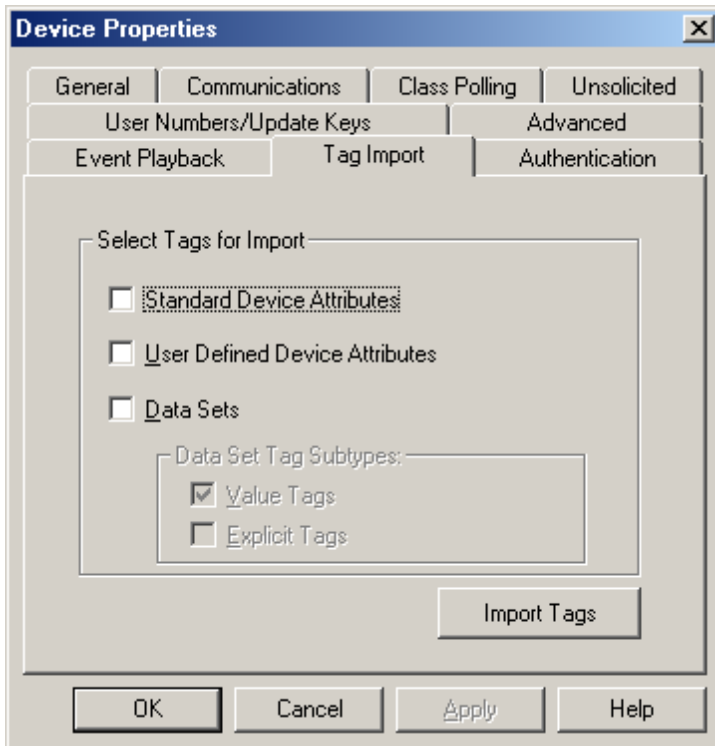
Authentication

The Authentication dialog is used to configure the device's Authentication settings.
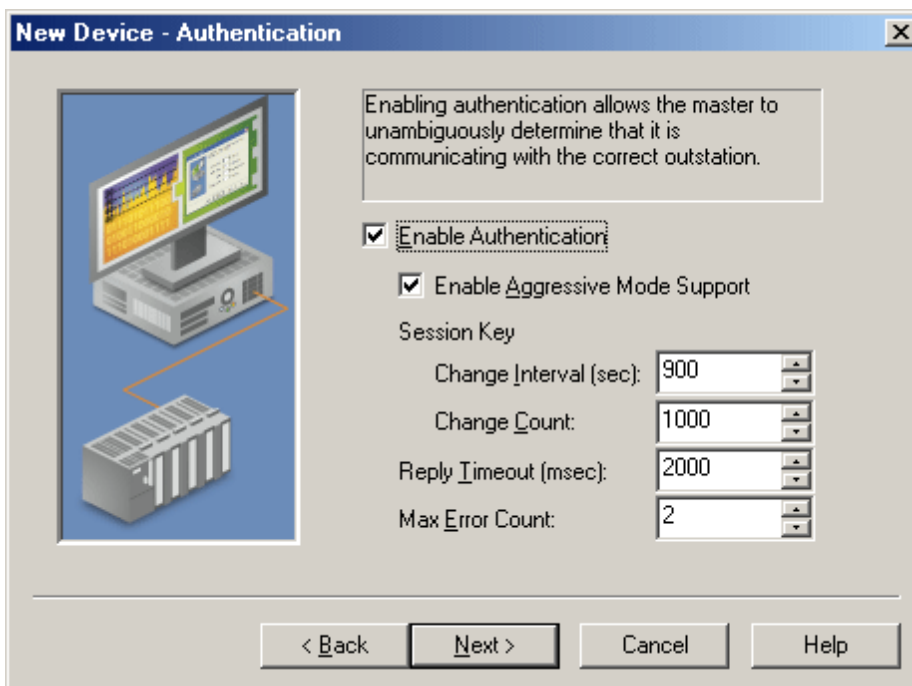
Descriptions of the parameters are as follows:

- **Enable Authentication:** When checked, this parameter enables Authentication. If the device requires Authentication, the master will need to configure it as well. The default setting is unchecked.

  Note: A tag import will be performed when this property changes. This ensures that the Authentication Object internal Statistics Tags will be automatically generated when Authentication is enabled. These tags

are pre-defined, and may be imported without communication with the device. When Authentication is disabled, a tag import will be performed in order to remove the Authentication Object internal Statistics Tags. When a tag import is in progress, the properties on this page will be disabled. For more information, refer to **Tag Import**.

- **Enable Aggressive Mode Support:** When checked, this parameter reduces traffic by not requiring a critical request "challenge and reply" after at least one "challenge and reply" was successful during the session key change interval. The default setting is checked.
- **Session Key Change Interval (sec):** This parameter specifies the session key change timeout that will be used by the master to determine when to change session keys. When a value of 0 is entered, Session Key Change Count will be used instead. The valid range is 0 to 7200 seconds. The default setting is 900 seconds.
- **Session Key Change Count:** This parameter specifies the number of transmitted authentication messages at which the master will change session keys. The messages may have been transmitted in either direction. The valid range is 0 to 65535. The default setting is 1000.
- **Reply Timeout (msec):** This parameter specifies how long the device will wait for an Authentication reply. The valid range is 0 to 300000 milliseconds. The default setting is 2000 milliseconds.
- **Max Error Count:** This parameter specifies the number of error messages that will be sent before error message transmission is disabled. It is also used to limit the number of Authentication attempts when there is no reply from the slave. With proper timeout settings, the maximum number of authentication retries per response timeout will be Max Error Count + 2. The valid range is 0 to 10. The default setting is 2.

Note: The DNP Master Serial Driver will automatically match the HMAC algorithm as configured in the slave.

Update Key Authentication
When "Enable Authentication" is checked, the New Device Wizard will present the following additional dialog. When it is not checked, this dialog will not be displayed.
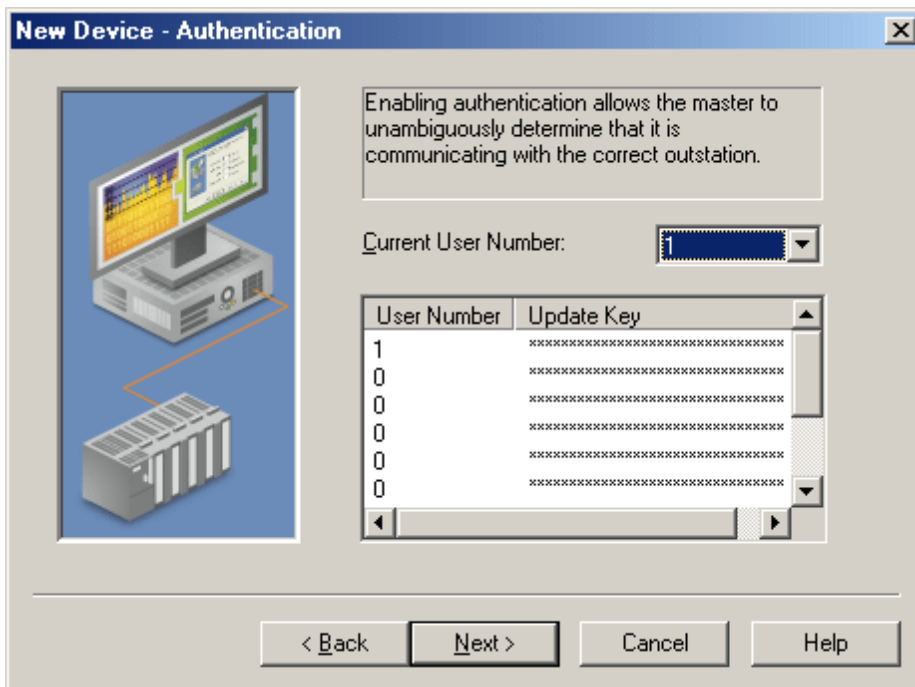
Descriptions of the parameters are as follows:

- **Current User Number:** This parameter specifies the User Number that will be used to retrieve the Update Key during Authentication. The valid range includes only those values in the User Number/Update Key table. The default setting is 1.
- **User Number/Update Key:** This parameter displays an array of 10 users, each with their own 16 hexadecimal byte Update Key. The same User Number/Update Key combination must be configured in the device. The valid range for User Number is 0 to 65535. The default setting for the first row of User Numbers is 1. All others are 0.

To edit a specific row's User Number and Update Key, double-click on it.
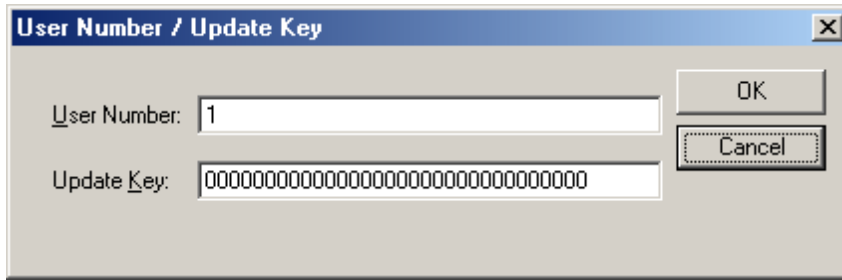
Descriptions of the parameters are as follows:

- **User Number:** This parameter modifies the current User Number.
- **Update Key:** This parameter modifies the existing Update Key. Update Keys can be entered either as 32 characters (such as "493B56AF89120C0429767DB301C63CA8") or as 16 sets of 2 characters that are separated by spaces (such as "49 3B 56 AF 89 12 0C 04 29 76 7D B3 01 C6 3C A8").

File Control

The File Control feature set is intended to be used as a mechanism for transferring log and configuration files between DNP masters and slaves. The DNP Master Serial Driver supports the transfer of files to and from a DNP slave. In the File Control tab of Device Properties, users can change a setting by clicking in the second column of the parameter. In most cases, this will invoke a drop-down menu that displays the available options. For the path properties, this will invoke a browse button instead.
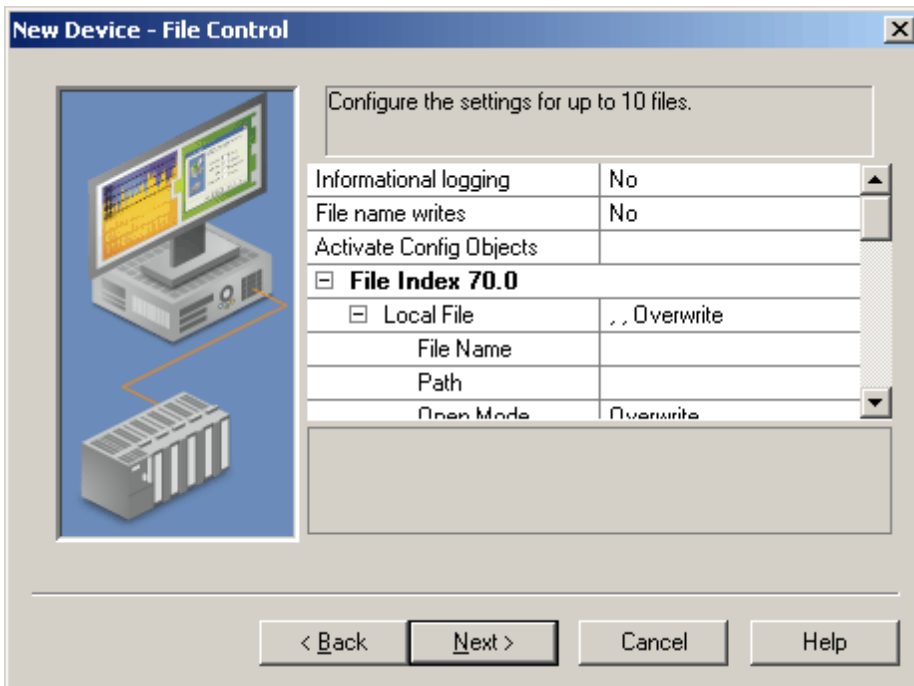
Descriptions of the parameters are as follows:

- **Informational logging:** When Yes is selected, this parameter will log informational messages to the Event Log during file transfers. When No is selected, informational logging will be turned off. In both cases, error messages will always be logged to the Event Log. The default setting is No.
- **File name writes:** When Yes is selected, the file name tags will be created with Read/Write access. When No is selected, the file name tags will be created with Read Only access. The default setting is No.

Note: When the applied setting changes from No to Yes, a message will be invoked warning the user that writes to the file name tags will change the device properties.

- **Activate Config Objects:** This parameter specifies a comma-delimited string that contains a list of the objects that will be used in the Activate Configuration Request. All 70.index objects listed in the string must have the remote file name and path defined in the File Index section for that index. All 110.index objects listed must have a tag defined for that data point. For example, the format of this list would be 70.0, 70.1, 110.5. The maximum number of characters allowed for this string is 256.

- **File Index 70.0:** The following local and remote path and file settings, file authentication, and maximum size are for the file index 0.

  - **Local File:** This is the definition of the DNP Master local file.

    - **File Name:** This parameter specifies the name of the file located on the master. It can include the entire path, part of the path, or only the file name. If a local path is defined, then the local file identifier will be defined by either *<local path>\<local file name>* or *<local path>/<local file name>*. The file name property will be exposed to the client in a tag. If the **File name writes** property is set to Yes, then the client can change the file name as needed by writing to the tag. The maximum number of characters for the file identifier is 256.

    - **Path:** This parameter specifies the local path of the file. When users click in the right column of this property, a browse button will be invoked. If the **Local File Name** property contains the entire file identifier, the path property should remain empty. For security, the path property will not be exposed to the client in a tag. A non-empty path will precede a backslash (or forward slash) and the local file name to identify the local file. The maximum number of characters for the file identifier is 256.

      Note: The Local File Path and Name must form a valid UNC path (which cannot contain the characters |?"*:<>). For security purposes, the parent directory (denoted by '..') is not permitted. Furthermore, the current user must have Read/Write privileges to the Local File Identifier.

    - **Open Mode:** When **Overwrite** is selected, the local file will be overwritten during file transfers. When **Append** is selected, the incoming file data will be appended to an existing file. The default setting is Overwrite.

  - **Remote File:** This is the definition of the DNP Slave remote file. The Remote File Identifier is restricted in length to 256 characters. Because the server cannot verify that the file name and path are valid, users must make sure to specify the path correctly in order to avoid unintended file transfers. For example, users that set the Remote File Identifier to a folder/directory on the DNP Slave may find that the transfer completes successfully, but that the file cannot be used by the DNP Master.

    - **File Name:** This parameter specifies the name of the file located on the slave. This entry can include the entire path, part of the path, or only the file name. If a remote path is defined, then the remote file identifier will be defined by either *<remote path>\<remote file name>* or *<remote path>/<remote file name>*. The file name property will be exposed to the client in a tag. If the **File name writes** property is set to Yes, then the client can change the file name as needed by writing to the tag. The maximum number of characters for the file identifier is 256.

    - **Path:** This parameter specifies the path of the file located on the slave. If the **Remote File Name** property contains the entire file identifier, the path property should remain empty. For security, the path property will not be exposed to the client in a tag. A non-empty path will precede a backslash (or forward slash) and the remote file name to identify the remote file. The maximum number of characters for the file identifier is 256.

  - **Authentication:** This determines the file authentication. The username and password should be as configured in the device.

    - **User Name:** This parameter specifies the username required by the device to authenticate the file. The maximum number of characters is 32.

    - **Password:** This parameter specifies the password required by the device to authenticate the file. The encrypted password is case-sensitive, and will not be displayed. The maximum number of characters is 32.

- **Retype Password:** This parameter verifies the password entered in the parameter above. The encrypted verification password is case-sensitive, and will not be displayed. The maximum number of characters is 32.
    - **Max file size:** This parameter specifies the maximum file size in kilobytes that are allowed in file transfers. The valid range is 100 to 65535 kilobytes. The default setting is 1000 kilobytes.
- **File Index 70.1** through **File Index 70.9:** Up to ten different files can be configured. The properties will be persisted to the project.

Note: When property changes are made and applied, a tag import will be performed. At that time, a tag group titled "File Control" will be created automatically. Four tags for each of the 0-9 file indexes that have non-empty file names or path names will also be created. The format of the tags will be *70.<index>.Upload*, *70.<index>.Download*, *70.<index>.LocalFileName*, and *70.<index>.RemoteFileName*. These tags are pre-defined, and may be imported without communication with the device. When a tag import is in progress, the properties on this page will be disabled. For more information, refer to **Tag Import**.

Advanced

The Advanced dialog is used to specify the operate mode, whether to perform a feedback poll after a write, how to display the DNP .Timestamp, whether to exchange data sets on restart, and whether to log informational messages to the Event Log when the device sets the Device Restart or Need Time IIN bits.

Note: In the Advanced tab of Device Properties, users can change a setting by clicking in the second column of the parameter. In most cases, this will invoke a drop-down menu that displays the available options.
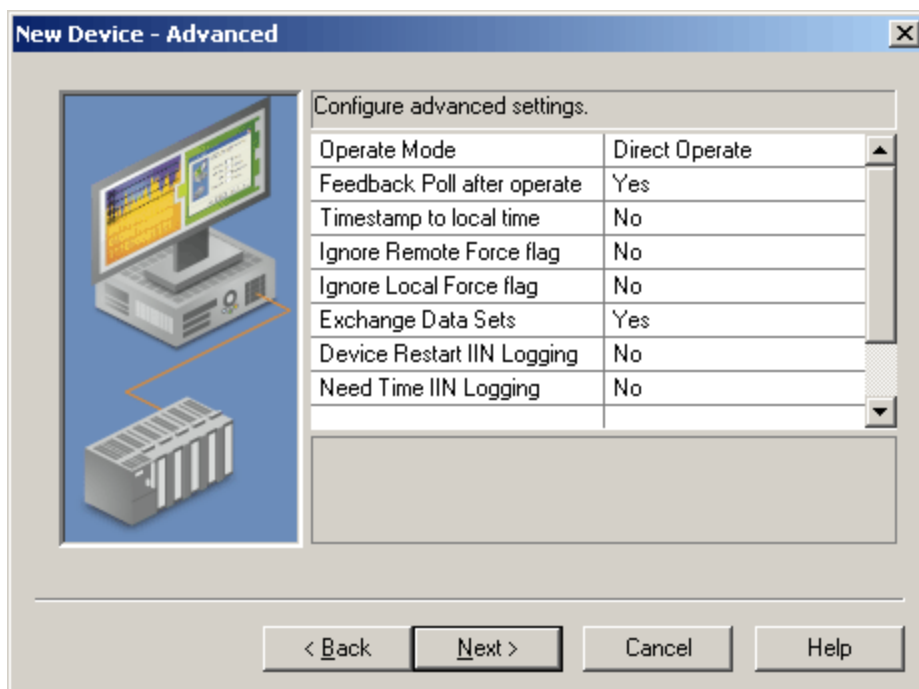
Descriptions of the parameters are as follows:

- **Operate Mode:** This parameter determines whether the writable I/O points (Object Group 10 - Binary Outputs and Object Group 40 - Analog Outputs) will use the Direct Operate or Select then Operate sequence. The default selection is Direct Operate.

    Note: Individual tags' write behavior can override this setting by writing a Boolean True to the output's corresponding .DO or .SO sub-type tags. For more information, refer to **DNP DO and SO sub-types**.
- **Feedback Poll after operate:** When Yes is selected, this parameter will enable a feedback poll to occur after an operate. The default setting is Yes.
- **Timestamp to local time:** When Yes is selected, this parameter will convert the UTC timestamp to local time. It will be displayed in .Timestamp tags. The default setting is No.
- **Ignore Remote Force flag:** If the DNP Remote Force flag is set and this parameter is set to No, the quality of the corresponding .Value and .Explicit Tags will be Bad. If the DNP Remote Force flag is set at

the slave end and this parameter is set to Yes, the quality of the corresponding .Value and .Explicit Tags will remain Good. The default setting is No.

- **Ignore Local Force flag:** If the DNP Local Force flag is set and this parameter is set to No, the quality of the corresponding .Value and .Explicit Tags will be Bad. If the DNP Local Force flag is set at the slave end and this parameter is set to Yes, the quality of the corresponding .Value and .Explicit Tags will remain Good. The default setting is No.

- **Exchange Data Sets:** When Yes is selected, this parameter ensures that the data set prototypes and descriptors will be exchanged with the slave whenever the master or slave restarts. When No is selected, the initial exchange of data sets will not take place. If a Data Set Tag needs to be updated, the data set prototype and descriptors must be exchanged before requesting the update. If the master restarts and does not exchange data sets, any data set events that occurred before the master restarted will be lost: the master will not have knowledge of the data sets. The default setting is Yes.

- **Device Restart IIN Logging:** When Yes is selected, this parameter will log informational messages to the Event Log when a response from the slave has the Device Restart IIN 1.7 bit set. When No is selected, informational logging will be turned off. The default setting is No.

- **Need Time IIN Logging:** When Yes is selected, this parameter will log informational messages to the Event Log when a response from the slave has the Need Time IIN 1.4 bit set. When No is selected, informational logging will be turned off. The default setting is No.

Note: For more information on DNP flag bytes, refer to "DNP Object Flag Definitions" located in Object Group 1, 3, 10, 20, 21, 30, and 40.

Timing and Other Considerations

Suggested Time Settings

Since the DNP3 protocol keeps communications at a minimum, the following suggested settings will help the OPC server and driver operate efficiently.

1. Only one transaction can be handled on the communications channel at a time. In situations where multiple devices share a single communications channel, 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 device), the overall update rate will begin to suffer.

   Note: An unresponsive device will block the other devices on that channel from receiving service while the Channel Response Timeout elapses. The explicit requests to the devices will slow down, and the event poll intervals will be affected once one or more devices fail to respond.

2. The entire send and receive transaction for a device must complete within the Device Request Timeout. If the send is successful, the response must be received within the Channel Response Timeout. The Device Request Timeout should be greater than or equal to the Channel Response Timeout.

3. Timeouts should be set to accommodate the responsiveness of a particular slave device: they should not be set too low. For example, if the Device Request Timeout and/or Channel Response Timeout were set to zero, the driver would be perpetually timed out and all effective communication would cease. Under these circumstances, users would likely receive Event Log error messages such as "Device '<device name>' is not responding". To determine the best settings for the Channel Response Timeout and the Device Request Timeout, consider the following example:

   There is one communications channel for 10 devices, and 9 of them are offline. Each device will wait the duration of the Channel Response Timeout (default setting 10 seconds), which will block the other devices. In order to keep the tenth device from failing due to the Device Request Timeout (default setting 30 seconds), the Device Request Timeout must be longer than it takes all of the offline devices to timeout one at a time. In this situation, a Device Request Timeout of 100 seconds should allow the tenth device to successfully complete its send and receive transaction after the nine devices timed out.

4. If the channel response timeout is longer than a device's poll interval, a delay may occur in event polling. For example, a device that shares a channel with other devices is not responding. If any device on that channel has a poll interval set at a shorter rate than the channel response timeout, the poll interval rate for that device will not be met. Event polling will occur as soon as the timeout has elapsed and the device is serviced. Once the device begins communicating again, the event poll interval will return to its defined rate.

5. Object Group 50 is the slave's clock. Since it cannot be received in event polls or through unsolicited messages, the DNP Master driver must explicitly request a read. Furthermore, because it is a time datum,

the driver will request a read every time the tag is pulled for an update. On a default instantiation, that is every 200 ms. To avoid congesting the communications link, create a separate OPC group for the object 50 time tag and then set that group's update rate to 1000 ms or slower. For more information on all objects, refer to **Object Definitions**.

Note: There are a variety of communication serialization tags that can be used to debug timing issues involving a serialization network. For more information, refer to "Communication Serialization Tags" in the server help documentation.

Effects of DNP Devices Going Offline

When a device goes offline, it may disrupt the DNP communications for all devices using the same channel. This is because DNP is a synchronous protocol; meaning, it requires an acknowledgement, timeout, or confirmed failure for the current command before the next command in the queue may be transmitted. The OPC driver will often queue multiple commands within a typical DNP timeout period. The DNP stack must dispose of these commands in the order they are received. Outstanding commands for still-responsive slave devices can be blocked until the command queue empties. For more examples of offline scenarios, refer to "Suggested Time Settings" above.

Note: Devices that have gone offline will cause a delay in the shutdown of the OPC server while the server waits for timeouts to expire.

Modem Setup

This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

Data Types Description

Data Type	Description
Boolean	Single bit
Word	Unsigned 16 bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16 bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
Float	32 bit floating-point value
Double	64 bit floating-point value
String	Null terminated ASCII string

Address Descriptions

Tag Addressing
Tag addressing is of the form *OBJ.VAR.IDX.SUB (ObjectGroup.Variation.Index.Sub-Type)*, where:

- **OBJ:** The data Object Group.
- **VAR:** The variation requested for the tag equates to data type. Strings do not have a variation component.

  Note: The variation is only applicable to .Value and .Explicit sub-types. For .Value tags, no request will be sent to the slave. All variations defined for .Value tags in the master will display the value in the slave's default event variation. For .Explicit tags, the variation will be used in the request to the slave. If the request is for variation 0, the slave will return the value in its default static variation. All other variations for .Explicit tags will be specifically requested from the slave.

- **IDX:** The specific data object in a given group. For example, IDX 4 is the 5th binary input. Indexes start with 0 for each Object Group with multiple points. Some objects, such as Objects 50 and 60, do not have an index component.
- **SUB:** The specific attribute of the point.

See Also: Other Object Groups

Sub-Types
Values reported to the server from the slave device will be in the slave device's default variation (which may differ from the server default variation) and will be obtained through report by exception. Certain Object Group variations in the DNP3 protocol will return multiple data items. For example, Object Group 20.1 asks for an analog input point's 32-bit Value as well as a Flag byte. Many event Object Groups' variations will also return the Time of Occurrence: because the OPC interface does not handle complex data types, the Value, Flags, and Timestamp data are not available in a single tag. The OPC server must retrieve the various parts of the combined report in separate tags.

- For the .SUB Value attribute, the data type is designated by the variation (.VAR). If the variation is .0, the .SUB Value attribute will have the same data type as the default variation.
- For the .SUB Flags attributes contained within the Flags attribute, the data type is always Boolean. They are unaffected by the variation.
- For the .SUB Flags attribute, the data type is always Byte. It is unaffected by the variation.
- The .SUB TimeStamp attribute is always Date. It is unaffected by the variation.

Sub-Type	Description
Value	The current value of the point. The data type returned from the slave depends on the default event variation and the default static variation configured in the slave for the point. The data type exposed to the client depends on the variation part of the tag address.
Explicit	The current value of the point. The data type varies as determined by the selected variation. Reading a tag with the Explicit sub-type will cause the driver to initiate a DNP Read transaction. DNP is usually used in a report-by-exception model, where the DNP slave device responds to an Event Poll with the point data that has changed since the last report. Some DNP slave devices may have I/O points that are not configured to answer to Event or Integrity polls. These points require special handling via the .Explicit sub-type. The .Explicit sub-type will trigger a DNP read transaction for every tag update, which may cause traffic on the DNP bus. Tags using the .Explicit sub-type must use a suitable update rate. Rates of 1000 ms or longer are recommended, as is limiting the use of .Explicit tags to only where required. It is the user's responsibility to configure .Explicit tags appropriately. **Note:** To reduce traffic, Explicit reads of the same object group and variation are blocked together to be read 64 at a time. If any tag in the block fails, then the whole block will fail.
TimeStamp	The date and time of the last update received from slave (if an event has occurred and the time of occurrence was returned). A successful write to a .Value or .Explicit tag will cause its corresponding .Timestamp tag quality to be Bad. The timestamp of the .Timestamp tag will then be the timestamp of the update from the write. The next time a DNP timestamp is received, the quality of the .Timestamp tag will change to Good and its timestamp will display the DNP timestamp. **Note:** The timestamp of the .Value item will only be updated if its value has changed since the

	last update. To find the current DNP timestamp value for the point, use the DNP .Timestamp Tag.
Online	Boolean: True if the slave is online.
Restart	Boolean: True if the slave has been restarted.
Lost	Boolean: True if communications with this point were lost.
RemoteForce	Boolean: True if the point value is forced to its current state at a device other than the end device.
LocalForce	Boolean: True if the point value is forced to its current state at the end device. **Note:** Local force is not yet implemented.
Chatter	Boolean: True if the slave's chatter filter is activated and applying correction.
Reference Check	Boolean: True if the reference signal used to digitize the analog input is not stable and the resulting digitized value may not be correct.
Over-range	Boolean: True if the digitized signal or calculation has exceeded its range. The actual value field can be ignored as its value is not defined.
DO*	Boolean: True if a writable point is set to Direct Operate mode. Writing to a tag of this sub-type will override the global Operate Mode setting. For more information, refer to **Operate Mode**.
SO*	Boolean: True if a writable point is set to Select then Operate mode. Writing to a tag of this sub-type will override the global Operate Mode setting. For more information, refer to **Operate Mode**.
Flags	The full set of transaction flags (0 through 7) for the specified DNP point.
Operate	This limited functionality is only retained to support older projects. New projects should use the enhanced Operate commands shown below.** The user specifies a crafted value to write. The .Operate sub-type is implemented as a DWord, but currently only the lowest 8 bits are significant. Bits 0-3 form a command number. Allowable values are currently 0-4. Values outside this range result in a failed write. The commands are as follows: 0 - No operation. 1 - Pulse on. 2 - Pulse off. 3 - Latch on (same as writing a 1 to 10.x.x.Value). 4 - Latch off (same as writing a 0 to 10.x.x.Value). Bit 4 is the Queue command modifier. Bit 5 is the Clear command modifier. Bits 6 & 7 form a Trip-Close command pair. Allowable values are currently 0-2. Values outside this range result in a failed write. Bit 6 is the Paired Close command modifier. Bit 7 is the Paired Trip command modifier. The allowable commands are as follows: 0 - Nul 1 - Close 2 - Trip
Enhanced Operate Controls	These expanded Operate sub-types allow a user to completely control commands sent to a Control Relay Output Block.**
Operate.OpType	This Byte contains the specific operation type to perform. The commands are as follows: 0 - No operation. 1 - Pulse on. 2 - Pulse off. 3 - Latch on (same as writing a 1 to 10.x.x.Value). 4 - Latch off (same as writing a 0 to 10.x.x.Value).
Operate.TripCloseCode	This Byte contains the Trip-Close code to apply to the operation. The commands are as follows: 0 - No operation. 1 - Close. 2 - Trip.
Operate.Clear	This Boolean adds the 'Clear' attribute to the command.

Operate.OnTime	This DWord specifies the on-time in milliseconds for the command.
Operate.OffTime	This DWord specifies the off-time in milliseconds for the command.
Operate.FeedbackDelay	This DWord specifies the time in milliseconds before a feedback poll is performed after the command completes.
Operate.Set	After all of the parameters above have been written, writing a True to this Boolean will initiate the command.

*Direct Operate (DO) and Select-then-Operate (SO) sub-types apply only to Object Groups 10 and 40. DO and SO are not allowed for other Object Groups.
See Also: **Object 10 - Binary Outputs.

Object Group 0 - Device Attributes

These tags are only read explicitly once after start up. If the device does not support Object Group 0 (or the specific variation), the tag quality will be Bad; as such, explicit reads of this tag will not resume until the Master or Slave restarts.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes*	.SUB Attribute	Data Type	Access
0.{1-253}.{0-65535}	Value	Byte, Char, Double, **DWord**, Float, Long, Short, String**, Word	Read/Write

*The IDX attribute indicates the particular set of device attributes that are defined in the device. The set of standardized device attributes defined by DNP3 are accessible at set index 0; indexes 1 and above are available for vendor-specific attributes.
**Device attribute strings have a maximum length of 210 characters.

Note: Flags do not apply.

Variations

Variations for Object Group 0 do not equate to a specific data type. A variation is a specific element for a set of device attributes. If the tag is configured by the user, the variation's data type must match the data type that is configured in the slave.

Examples

Tag Address	Definition	Description
0.211.0.Value	Displays the standard DNP Device Attribute Number of Analog Outputs.	If a value for this tag has not been received from the device, an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. If the response to the initial request indicates that the device does not support the variation 211 of set 0, then no other request will be issued and tag quality will be Bad. The user must configure the tag's data type to match the data type as configured by the slave.
0.250.0.Value	Displays the standard DNP Device Attribute Manufacturer's product name and model.	If a value for this tag has not been received from the device, an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. If the response to the initial request indicates that the device does not support variation 250 of set 0, then no other request will be issued and the tag quality will be Bad. The user must configure the tag's data type to match the data type as configured by the slave.
0.211.1.Value	Displays the custom Device Attribute set 1 variation 211 value.	If a value for this tag has not been received from the device, an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. If the response to the initial request indicates that the device does not support variation 211 of set 1, then no other request will be issued and tag quality will be Bad. The user must configure the tag's data type to match the data type as configured by the slave.

Object Group 1 - Binary Inputs

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 1 - Binary Input State is reflected in Object Group 2 - Binary Input Change Event. For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
1.{0,1,2}.{0-65535}	Chatter, LocalForce, Lost, Online, RemoteForce, Restart	Boolean	Read Only
1.{0,1,2}.{0-65535}	Flags	Byte	Read Only
1.{0,1,2}.{0-65535}	TimeStamp	Date	Read Only
1.0.{0-65535}	Value, Explicit	Boolean	Read Only

1.1.{0-65535}	Value, Explicit	**Boolean**	Read Only
			Table Row Outside Table:
			Table Cell Outside Table:
			  1.2.{0-65535}
			
			Table Cell Outside Table:
			  Value, Explicit
			
			Table Cell Outside Table:
			  Byte
			
			Table Cell Outside Table:
			  Read Only

Variations

Number	Description
0	Variation determined by slave device.
1	Packed format.
2	With Flags.

DNP Object Flag Definitions

If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online and State. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Chatter
- 6: Reserved
- 7: State - Status of input.

Examples

Tag Address	Definition	Description
1.0.0.Value	Value of point 0 as a Boolean.	This tag is updated from the data store that is populated via responses to integrity and event polls. An explicit request will not be sent to the device. Although the slave could return variation 1 or 2 (depending on its Object Group 2 default event variation), this tag will display the state of the binary input point 0 without the flags.
1.0.5.Explicit	Value of point 5 as a Boolean.	An explicit request will be sent to the device to get the value for this tag. Other object 1 variation 0 Explicit tags will be blocked with this one in one request. Although the slave could return variation 1 or 2 (depending on its default static variation), this tag will display the state of the binary input point 5 without the flags.

1.1.10.Explicit	Value of point 10 as a Boolean.	An explicit request will be sent to the device to get the value for this tag. Other object 1 variation 1 Explicit tags will be blocked with this one in one request. Although the slave may have returned the response with other points in a packed format, this tag will only display the 0 or 1 depending on the state of point 10.
1.1.10.Value	Value of point 10 as a Boolean.	This tag is updated from the data store that is populated via responses to integrity and event polls. An explicit request will not be sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the slave. The slave uses object 2 default event variation.
1.2.10.Explicit	Value of point 10 as a Byte.	An explicit request will be sent to the device to get the value for this tag. Other object 1 variation 2 Explicit tags will be blocked with this one in one request. This tag will display the status of the point as a byte where bits 0-6 are the flags and bit 7 is the state of the digital input point 10.
1.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. An explicit request will not be sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 2 default event variation on the device needs to be 2 or 3 in order for it to return the event time of occurrence.
1.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary input point 9. An explicit request will not be sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).
1.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary input point 3. An explicit request will not be sent to the device. The value of this tag will display the state of bit 2 from the flags byte received for point 3 (regardless of the variation in the tag address).

Object Group 3 - Double Bit Inputs

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 3 - Double Bit Input State is reflected in Object Group 4 - Double Bit Input Change Event. For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
3.{0,1,2}.{0-65535}	Chatter, LocalForce, Lost, Online, RemoteForce, Restart	Boolean	Read Only
3.{0,1,2}.{0-65535}	Flags	Byte	Read Only
3.{0,1,2}.{0-65535}	TimeStamp	Date	Read Only
3.0.{0-65535}	Value, Explicit	Byte	Read Only
3.1.{0-65535}	Value, Explicit	**Byte**	Read Only Table Row Outside Table: Table Cell Outside Table: 3.2.{0-65535} Table Cell Outside Table: Value, Explicit Table Cell Outside Table: Byte* Table Cell Outside Table: Read Only

*The extra bits are used to provide Flags.

Variations

Number	Description	Available Bits
0	Variation determined by slave device.	N/A.
1	Packed format.	Bits 0 and 1: 0 is Intermediate, 1 is OFF, 2 is ON, 3 is Indeterminate.
2	With Flags.	Bits 6 and 7: 0 is Intermediate, 1 is OFF, 2 is ON, 3 is Indeterminate.

DNP Object Flag Definitions

If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online and State. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Chatter
- 6: State - Status of input.
- 7: State - Status of input.

Examples

Tag Address	Definition	Description
3.0.0.Value	Value of point 0 as a Byte.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. Although the slave could return variation 1 or 2 (depending on its Object Group 4 default event variation), this tag will display the state of the double-bit binary input point 0 without the flags.
3.0.5.Explicit	Value of point 5 as a Byte.	An explicit request will be sent to the device to get the value for this tag. Other object 3 variation 0 Explicit tags will be blocked with this one in one request. Although the slave could return variation 1 or 2 (depending on its default static variation), this tag will display the state of the double-bit binary input point 5 without the flags.
3.1.10.Explicit	Value of point 10 as a Byte.	An explicit request will be sent to the device to get the value for this tag. Other object 3 variation 1 Explicit tags will be blocked with this one in one request. Although the slave returned the response in a packed format, possibly with other points, this tag will only show 0 (intermediate), 1 (Off), 2 (On), or 3 (indeterminate) depending on the state of point 10.
3.1.10.Value	Value of point 10 as a Byte.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the slave (which uses its object 4 default event variation).
3.2.10.Explicit	Value of point 10 as a Byte.	An explicit request will be sent to the device to get the value for this tag. Other object 3 variation 2 Explicit tags will be blocked with this one in one request. This tag will display the status of the point as a byte where bits 0-5 are the flags and bits 6 & 7 are the state of the digital input point 10.
3.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 4 default event variation on the device needs to be 2 or 3 in order for it to return the event time of occurrence.

3.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary input point 9. No explicit request is sent to the device. The value of this tag will display the latest flags' byte received for point 9 regardless of the variation in the tag address.
3.0.3.Lost	Latest state of the bit 2 of the Flag Byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary input point 3. No explicit request is sent to the device. The value of this tag tag will display the state of bit 2 from the flags byte received for point 3 regardless of the variation in the tag address.

Object Group 10 - Binary Outputs

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 10 - Binary Output State is reflected in Object Group 11 - Binary Output Change Event, Object Group 12 - Control Relay Output Block, and Object Group 13 - Binary Output Command Event. For more information, refer to **Other Object Groups**.

See Also: Object Group 12 - Binary Output Commands

Attributes
The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
10.{0,1,2}.{0-65535}	LocalForce, Lost, Online, RemoteForce, Restart	Boolean	Read Only
10.{0,1,2}.{0-65535}	DO, SO	Boolean	Read/Write
10.{0,1,2}.{0-65535}	Operate.Set, Operate.Clear	Boolean	Read/Write
10.{0,1,2}.{0-65535}	Operate.OpType, Operate. TripCloseCode	Byte	Read/Write
10.{0,1,2}.{0-65535}	Operate.OnTime, Operate. OffTime, Operate.FeedbackDelay	DWord	Read/Write
10.{0,1,2}.{0-65535}	Flags	Byte	Read Only
10.{0,1,2}.{0-65535}	TimeStamp	Date	Read Only
10.0.{0-65535}	Value, Explicit	Boolean	Read/Write
10.1.{0-65535}	Value, Explicit	**Boolean**	Read/Write
10.2.{0-65535}	Value, Explicit	Byte*	Read Only

*The extra bits are used to provide Flags.

Variations

Number	Description
0	Variation determined by slave device.
1	Packed format.
2	Status with Flags.

DNP Object Flag Definitions
If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online and State. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Reserved
- 6: Reserved
- 7: State - Status of input.

Binary Output Examples

Tag Address	Definition	Description
10.0.0.Value	Value of point 0 as a Boolean.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. Although the slave could return variation 1 or 2 (depending on its Object Group 11 default event variation), this tag will display the state of the binary output point 0 without the flags.
10.0.5.Explicit	Value of point 5 as a Boolean.	An explicit request will be sent to the device to get the value for this tag. Other object 10 variation 0 Explicit tags will be blocked with this one in one request. Although the slave could return variation 1 or 2 (depending on its default static variation), this tag will display the state of the binary output point 5 without the flags.
10.1.10.Explicit	Value of point 10 as a Boolean.	An explicit request will be sent to the device to get the value for this tag. Other object 10 variation 1 Explicit tags will be blocked with this one in one request. Although the slave may return the response with other points in a packed format, this tag will only show the 0 or 1 (depending on the state of point 10).
10.1.10.Value	Value of point 10 as a Boolean.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The variation of 1 in the tag address sets the data type of the tag. It does not define the data type returned by the slave, which uses its Object Group 11 default event variation.
10.2.10.Explicit	Value of point 10 as a Byte.	An explicit request will be sent to the device to get the value for this tag. Other object 10 variation 2 Explicit tags will be blocked with this one in one request. This tag will display the status of the point as a byte, where bits 0-6 are the flags and bit 7 is the state of the digital output point 10.
10.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 11 default event variation on the device needs to be 2 in order for it to return the event time of occurrence.
10.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary output point 9. No explicit request will be sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).
10.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for binary output point 3. No explicit request will be sent to the device. The value of this tag tag will display the state of bit 2 from the flags' byte received for point 3 (regardless of the variation in the tag address).
10.0.2.DO	Boolean value indicating if operations on binary output point 2 should be Direct Operate or Select then Operate.	Writing to this tag will not cause an explicit write to the device. It also will not change the overall device property for Operate Mode: it only changes it for Binary Output point 2. The variation of the tag does not matter.

		The value of this tag will be used when an operation is performed on binary output point 2 either using the Operate sub-type commands or a synchronous/asynchronous write to a 10.x.2.Value or 10.x.2.Explicit tag.
10.0.2.SO	Boolean value indicating if operations on binary output point 2 should be Direct Operate or Select then Operate.	Writing to this tag will not cause an explicit write to the device. It also will not change the overall device property for Operate Mode: it only changes it for Binary Output point 2. The variation of the tag does not matter. The value of this tag will be used when an operation is performed on binary output point 2 either using the Operate sub-type commands or a synchronous/asynchronous write to a 10.x.2.Value or 10.x.2.Explicit tag.

Object Group 12 - Binary Output Commands

Control Relay Output Block Operate Command Examples

To perform digital control operations (such as electro-mechanical relays) at binary output points using Object Group 12, variation 1, use tags addressed with Object Group 10. An operation on an Object Group 10 tag will issue the CROB command using Object Group 12, variation 1. Depending on the Feedback Poll after Operate device property, another request may be sent after the actual operate request in order to obtain the latest value of all binary output points. If the operate is successful but the feedback poll fails, the device will report status code 4. For more information, refer to **Advanced**.

See Also: Unable to write to address '<address>' on device '<device>'. Control-Related Status Code '<status code>'

The following example discusses how to issue a Select then Operate request for Binary Output point 10 that closes the point one time for 250 milliseconds.

1. To start, click **Device Properties | Advanced**. Then, set the **Operate Mode** to **Select Then Operate**.

    Note: If the device's Operate Mode is Direct Operate, create a tag with the address "10.0.10.SO". Then, write "1" to that tag.

2. Next, create a tag with the address "10.0.10.Operate.Optype". Then, write "1" to that tag. This sets the **Operation Type Field** of the **Control Code** to **Pulse On**.

3. Next, create a tag with the address "10.0.10.Operate.Tripclosecode". Then, write "1" to that tag. This sets the **Trip-Close Code Field** of the **Control Code** to **Close**.

4. Next, create a tag with the address "10.0.10.Operate.Ontime". Then, write "250" to that tag. This sets the duration (in milliseconds) in which the output drive will remain active.

5. Next, create a tag with the address "10.0.10.Operate.Set". Then, write "1" to that tag. This triggers the master to send the Object Group 12, variation 1 request that will perform the digital control operation.

See Also: Object Group 10 - Binary Outputs

Note: The Channel Diagnostics should display the three transactions. The master will send a request using function code 0x03 to select the output point. The slave will respond echoing the request if everything is okay. The master will then send the operate request using function code 0x04. The slave will respond echoing the request if everything is okay. The master will then send the feedback poll, and the slave will respond with the current static value for all binary outputs.

Tag Address	Definition	Description
10.0.2.Operate.Clear	Value of the CROB control code bit 5.	This Boolean tag will display a 0 or 1, depending on the last update from the client. The variation of the tag does not matter. Writing to this tag will not cause an explicit write to the device. It will be used in building the CROB control code that will be written to the object group 12 point 2 with the Operate.Set tag.

10.0.2.Operate.OpType	Value of the CROB control code bits 0-3.	This byte tag will display the operation type, depending on the last update from the client. Operation types are as follows: Nul (0) Pulse_On (1) Pulse_Off (2) Latch_On (3) Latch_Off (4) The variation of the tag does not matter. Writing to this tag will not cause an explicit write to the device. It will be used in building the CROB control code that will be written to the Object Group 12 point 2 with the Operate.Set tag.
10.0.2.Operate.TripCloseCode	Value of the CROB control code bits 6 & 7.	This byte tag will display the Trip-Close Field, depending on the last update from the client. Trip-close fields are as follows: Nul (0) Paired_Close (1) Paired_Trip (2) The variation of the tag does not matter. Writing to this tag will not cause an explicit write to the device. It will be used in building the CROB control code that will be written to the Object Group 12 point 2 with the Operate.Set tag.
10.0.2.Operate.OnTime	Value in milliseconds that the operation on the binary output point 2 will remain active.	This DWord tag will display the on time last updated from the client. The variation of the tag does not matter. Writing to this tag does not cause an explicit write to the device. It will be used in an Object Group 12 control operation on binary output point 2 when the Operate.Set tag is toggled to 1.
10.0.2.Operate.OffTime	Value in milliseconds that the operation on the binary output point 2 will remain non-active.	This DWord tag will display the off time last updated from the client. The variation of the tag does not matter. Writing to this tag does not cause an explicit write to the device. It will be used in an Object Group 12 control operation on binary output point 2 when the Operate.Set tag is toggled to 1.
10.0.2.Operate.FeedbackDelay	Value in milliseconds to delay after receiving the response before issuing feedback poll.	This DWord tag will display the feedback delay last updated from the client. The variation of the tag does not matter. Writing to this tag will not cause an explicit write to the device. It will be used to delay before issuing a feedback poll after receiving a response to an Object Group 12 control operation on binary output point 2.
10.0.2.Operate.Set	Always displays a Boolean value of 0 with Good quality.	The variation of the tag does not matter. Writing a 1 to this tag causes an Object Group 12 control operation on binary output point 2. The CROB control code is built from the values of the Operate.Clear, Operate.OpType, and Operate.TripCloseCode tags. The Values of the Operate.OnTime, Operate.OffTime, and Operate.FeedbackDelay tags are used in the operation as well.

Object Group 20 - Counters

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 20 - Counter Value is reflected in Object Group 22 - Counter Event Change. For more information, refer to **Other Object Groups**.

Attributes
The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
20.{0,1,2,5,6}.{0-65535}	LocalForce, Lost, Online, RemoteForce, Restart	Boolean	Read Only
20.{0,1,2,5,6}.{0-65535}	Flags	Byte	Read Only
20.{0,1,2,5,6}.{0-65535}	TimeStamp	Date	Read Only
20.0.{0-65535}	Value, Explicit	DWord	Read Only
20.1.{0-65535}	Value, Explicit	DWord	Read Only
20.2.{0-65535}	Value, Explicit	Word	Read Only
20.5.{0-65535}	Value, Explicit	**DWord**	Read Only
20.6.{0-65535}	Value, Explicit	Word	Read Only

Variations

Number	Description
0	Variation determined by slave device.
1	32-bit with Flag.
2	16-bit with Flag.
5	32-bit without Flag.
6	16-bit without Flag.

DNP Object Flag Definitions
If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Rollover
- 6: Discontinuity
- 7: Reserved

Examples

Tag Address	Definition	Description
20.0.0.Value	Value of point 0 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The slave could return variation 1, 2, 5, or 6 depending on its Object Group 22 default event variation. These all fit in a DWord.
20.0.5.Explicit	Value of point 5 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other Object Group 20 variation 0 Explicit tags will be blocked with this one in one request. The slave could return variation 1, 2, 5, or 6 depending on its default static variation. These all fit in a DWord.
20.1.10.Explicit	Value of point 10 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other Object Group 20 variation 1 Explicit tags will be blocked with this one in one request.
20.1.10.Value	Value of point 10 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the slave. The slave uses its Object Group 22 default event variation.

20.2.10.Explicit	Value of point 10 as a Word.	An explicit request will be sent to the device to get the value for this tag. Other Object Group 20 variation 2 Explicit tags will be blocked with this one in one request.
20.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. They will have Bad quality until the device sends an event with the time. The Object Group 22 default event variation on the device needs to be 5 or 6 in order for it to return the event time of occurrence.
20.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for counter point 9. No explicit request will be sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).
20.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for counter point 3. No explicit request will be sent to the device. The value of this tag tag will display the state of bit 2 from the flags byte received for point 3 (regardless of the variation in the tag address).

Object Group 21 - Frozen Counters

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 21 - Frozen Counter Value is reflected in Object Group 23 - Frozen Counter Event Change. For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
21.{0,1,2,5,6,9,10}.{0-65535}	LocalForce, Lost, Online, RemoteForce, Restart	Boolean	Read Only
21.{0,1,2,5,6,9,10}.{0-65535}	Flags	Byte	Read Only
21.{0,1,2,5,6,9,10}.{0-65535}	TimeStamp	Date	Read Only
21.0.{0-65535}	Value, Explicit	DWord	Read Only
21.1.{0-65535}	Value, Explicit	DWord	Read Only
21.2.{0-65535}	Value, Explicit	Word	Read Only
21.5.{0-65535}	Value, Explicit	DWord	Read Only
21.6.{0-65535}	Value, Explicit	Word	Read Only
21.9.{0-65535}	Value, Explicit	**DWord**	Read Only
21.10.{0-65535}	Value, Explicit	Word	Read Only

Variations

Number	Description
0	Variation determined by slave device.
1	32-bit with Flag.
2	16-bit with Flag.
5	32-bit with Flag and Time.
6	16-bit with Flag and Time.
9	32-bit without Flag.
10	16-bit without Flag.

DNP Object Flag Definitions
If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Rollover
- 6: Discontinuity
- 7: Reserved

Examples

Tag Address	Definition	Description
21.0.0.Value	Value of point 0 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The slave could return variation 1, 2, 5, 6, 9, or 10 depending on its Object Group 23 default event variation. These all fit in a DWord.
21.0.5.Explicit	Value of point 5 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other object 21 variation 0 Explicit tags will be blocked with this one in one request. The slave could return variation 1, 2, 5, 6, 9, or 10 depending on its default static variation. These all fit in a DWord.
21.1.10.Explicit	Value of point 10 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other object 21 variation 1 Explicit tags will be blocked with this one in one request.
21.1.10.Value	Value of point 10 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the slave. The slave uses its Object Group 23 default event variation.
21.2.10.Explicit	Value of point 10 as a Word	An explicit request will be sent to the device to get the value for this tag. Other object 21 variation 2 Explicit tags will be blocked with this one in one request.
21.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 23 default event variation on the device needs to be 5 or 6 in order for it to return the event time of occurrence.
21.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for frozen counter point 9. No explicit request will be sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).
21.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for frozen counter point 3. No explicit request will be sent to the device. The value of this tag tag will display the state of bit 2 from the flags byte received for point 3 (regardless of the variation in the tag address).

Object Group 30 - Analog Inputs

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 30 - Analog Input Value is reflected in Object Group 32 - Analog Input Change Event. For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
30.{0,1,2,3,4,5,6}.{0-65535}	LocalForce, Lost, Online, RemoteForce, Restart, OverRange, ReferenceCheck	Boolean	Read Only
30.{0,1,2,3,4,5,6}.{0-65535}	Flags	Byte	Read Only
30.{0,1,2,3,4,5,6}.{0-65535}	TimeStamp	Date	Read Only
30.0.{0-65535}	Value, Explicit	Double	Read Only
30.1.{0-65535}	Value, Explicit	Long	Read Only
30.2.{0-65535}	Value, Explicit	Short	Read Only
30.3.{0-65535}	Value, Explicit	Long	Read Only
30.4.{0-65535}	Value, Explicit	Short	Read Only
30.5.{0-65535}	Value, Explicit	Float	Read Only
30.6.{0-65535}	Value, Explicit	**Double**	Read Only

Variations

Number	Description
0	Variation determined by slave device.
1	32-bit with Flag.
2	16-bit with Flag.
3	32-bit without Flag.
4	16-bit without Flag.
5	32-bit floating-point with Flag.
6	64-bit floating-point with Flag.

DNP Object Flag Definitions

If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online. Descriptions of the available bits are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Overrange
- 6: Reference Check
- 7: Reserved

Examples

Tag Address	Definition	Description
30.0.0.Value	Value of point 0 as a Double.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. The slave could return variation 1, 2, 3, 4, 5, or 6 depending on its Object Group 32 default event variation. These will fit in a Double.
30.0.5.Explicit	Value of point 5 as a Double.	An explicit request will be sent to the device to get the value for this tag. Other object 30 variation 0 Explicit tags will be blocked with this one in one request. The slave could return variation 1, 2, 3, 4, 5, or 6 depending on its default static variation. These will fit in a Double.
30.1.10.Explicit	Value of point 10 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other object 30 variation 1 Explicit tags will be blocked with this one in one request.
30.1.10.Value	Value of point 10 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the

		slave. The slave uses its Object Group 32 default event variation. If the slave is returning a floating-point value using Object Group 32 variations 5, 6, 7, or 8, this tag will only display the integer part of the value of the point.
30.2.10.Explicit	Value of point 10 as a Word.	An explicit request will be sent to the device to get the value for this tag. Other object 30 variation 2 Explicit tags will be blocked with this one in one request.
30.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request is sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 32 default event variation on the device needs to be 3, 4, 7, or 8 in order for it to return the event time of occurrence.
30.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for analog input point 9. No explicit request is sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).
30.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for analog input point 3. No explicit request is sent to the device. The value of this tag tag will display the state of bit 2 from the flags byte received for point 3 (regardless of the variation in the tag address).

Object Group 34 - Analog Inputs Deadband

These tags are only read explicitly once after start up. Explicit reads of the same Object Group and Variation are blocked together: A block that contains a failed tag will continue to be read until the tag's quality changes to Good or is removed.

Attributes

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
34.0.{0-65535}	Value, Explicit	DWord	Read/Write
34.1.{0-65535}	Value, Explicit	Word	Read/Write
34.2.{0-65535}	Value, Explicit	**DWord**	Read/Write
34.3.{0-65535}	Value, Explicit	Float	Read/Write

Variations

Number	Description
0	Variation determined by slave device.*
1	16-bit.
2	32-bit.
3	32-bit floating-point.

*Variation 0 is used to request the default variation.

Examples

Tag Address	Definition	Description

34.0.0.Value	Deadband Value of analog input point 0 as a DWord.	If a value for this tag has not been received from the device, then an explicit request will be sent. The slave could return variation 1, 2, or 3 depending on its Object 34 default variation. These all fit in a DWord. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 34 variation 0 Explicit and Value tags will be blocked with this one in one request.
34.0.5.Explicit	Deadband Value of analog input point 5 as a DWord.	If a value for this tag has not been received from the device, then an explicit request will be sent. The slave could return variation 1, 2, or 3 depending on its Object 34 default variation. These all fit in a DWord. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 34 variation 0 Explicit and Value tags will be blocked with this one in one request.
34.1.10.Explicit	Deadband Value of analog input point 10 as a Word.	If a value for this tag has not been received from the device, then an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 34 variation 1 Explicit and Value tags will be blocked with this one in one request.
34.1.10.Value	Deadband Value of analog input point 10 as a Word.	If a value for this tag has not been received from the device, then an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 34 variation 2 Explicit and Value tags will be blocked with this one in one request.
34.2.10.Explicit	Deadband Value of analog input point 10 as a DWord.	If a value for this tag has not been received from the device, then an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 34 variation 2 Explicit and Value tags will be blocked with this one in one request.

Object Group 40 - Analog Outputs

The status for each point in an Object Group is retained on each transaction; all flags are reported in their sub-type tags. The corresponding event object may also return Time of Occurrence.

Note: Object Group 40 - Analog Output Value is reflected in Object Group 41 - Analog Output Write, Object Group 42 - Analog Output Change Event, and Object Group 43 - Analog Output Command Event. For more information, refer to **Other Object Groups**.

See Also: Object Group 41 - Analog Output Commands

Variations

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
40.{0,1,2,3,4}.{0-65535}	LocalForce, Lost, Online, RemoteForce, Restart, OverRange, ReferenceCheck	Boolean	Read Only
40.{0,1,2,3,4}.{0-65535}	DO, SO	Boolean	Read/Write
40.{0,1,2,3,4}.{0-65535}	Flags	Byte	Read Only
40.{0,1,2,3,4}.{0-65535}	TimeStamp	Date	Read Only
40.0.{0-65535}	Value, Explicit	Double	Read/Write
40.1.{0-65535}	Value, Explicit	Long	Read/Write
40.2.{0-65535}	Value, Explicit	Short	Read/Write
40.3.{0-65535}	Value, Explicit	Float	Read/Write
40.4.{0-65535}	Value, Explicit	**Double**	Read/Write

Variations

Number	Description
0	Status - Variation determined by slave device.*

1	Status 32-bit with Flag.
2	Status 16-bit with Flag.
3	Status 32-bit floating-point with Flag.
4	Status 64-bit floating-point with Flag.

*Variation 0 is used to request the default variation.

DNP Object Flag Definitions
If the device returns an exception bit set, the quality of the .Value or .Explicit tag will be Bad. The following available bits are exception bits, excluding Online. Descriptions are as follows:

- 0: Online
- 1: Restart
- 2: Communications Lost
- 3: Remote Force
- 4: Local Force
- 5: Overrange
- 6: Reference Check
- 7: Reserved

Examples

Tag Address	Definition	Description
40.0.0.Value	Value of point 0 as a Double.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The slave could return variation 1, 2, 3, 4, 5, 6, 7, or 8 depending on its Object Group 42 default event variation. These all fit in a Double.
40.0.5.Explicit	Value of point 5 as a Double.	An explicit request will be sent to the device to get the value for this tag. Other object 40 variation 0 Explicit tags will be blocked with this one in one request. The slave could return variation 1, 2, 3, or 4 depending on its default static variation. These all fit in a Double.
40.1.10.Explicit	Value of point 10 as a DWord.	An explicit request will be sent to the device to get the value for this tag. Other object 40 variation 1 Explicit tags will be blocked with this one in one request.
40.1.10.Value	Value of point 10 as a DWord.	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. The variation of 1 in the tag address sets the data type of the tag, but does not define the data type returned by the slave. The slave uses its Object Group 42 default event variation. If the slave is returning a floating-point value using Object Group 42 variations 5, 6, 7, or 8, this tag will only display the integer part of the value of the point.
40.2.10.Explicit	Value of point 10 as a Word.	An explicit request will be sent to the device to get the value for this tag. Other object 40 variation 2 Explicit tags will be blocked with this one in one request.
40.0.8.Timestamp	Event Time of Occurrence of point 8 (if an event has occurred and the time of occurrence was returned).	This tag is updated from the data store that is populated via responses to integrity and event polls. No explicit request will be sent to the device. This tag will show a timestamp of 1999-11-30T00:00:00 or 1899-12-30T00:00:00. It will have Bad quality until the device sends an event with the time. The Object Group 42 default event variation on the device needs to be 3, 4, 7, or 8 in order for it to return the event time of occurrence.
40.0.9.Flags	Latest Flag byte for point 9.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for analog output point 9. No explicit request will be sent to the device. The value of this tag will display the latest flags' byte received for point 9 (regardless of the variation in the tag address).

40.0.3.Lost	Latest state of bit 2 of the Flag byte for point 3.	This tag is updated from the data store that is populated via responses to integrity and event polls or an explicit request for analog output point 3. No explicit request will be sent to the device. The value of this tag tag will display the state of bit 2 from the flags byte received for point 3 (regardless of the variation in the tag address).
40.0.2.DO	Boolean value indicating if operations on analog output point 2 should be Direct Operate or Select then Operate.	Writing to this tag will not cause an explicit write to the device. It also will not change the overall device property for Operate Mode. It only changes it for Analog Output point 2. The variation of the tag does not matter. The value of this tag will be used when an operation is performed on analog output point 2 using a synchronous or asynchronous write to a 40.x.2.Value or 40.x.2.Explicit tag.
40.0.2.SO	Boolean value indicating if operations on analog output point 2 should be Direct Operate or Select then Operate.	Writing to this tag will not cause an explicit write to the device. It also will not change the overall device property for Operate Mode. It only changes it for Analog Output point 2. The variation of the tag does not matter. The value of this tag will be used when an operation is performed on analog output point 2 using a synchronous or asynchronous write to a 40.x.2.Value or 40.x.2.Explicit tag.

Object Group 41 - Analog Output Commands

Issuing an Analog Output Command

In order to issue an analog output command, execute a synchronous or an asynchronous write to a 40.x.x.Value or a 40.x.x.Explicit Tag. Depending on the Feedback Poll after Operate device property, another request may be sent after the actual operate request in order to obtain the latest value of all analog output points. If the operate is successful but the feedback poll fails, the device will report status code 4. For more information, refer to **Advanced**.

See Also: Unable to write to address '<address>' on device '<device>'. Control-Related Status Code '<status code>'

Function Codes

The function code used in the write request will depend on the setting of the overall device property for Operate Mode and/or any 40.x.x.DO or 40x.x.SO Tags. The Select then Operate option will send two requests - the first with the select function code (3) followed by a request with the operate function code (4). The Direct Operate option will send one request with the direct operate function code (5). For more information on the Operate Mode device property, refer to **Advanced**.

Note: For more information on the DO and SO sub-type, refer to **Object Group 40 - Analog Outputs**.

Object Group 50 - Time and Date

Object Group 50 is the slave's clock. Since it cannot be read through unsolicited replies, the DNP Master Serial Driver must explicitly request a read. The driver will request a read every time the tag is pulled for an update because it's a time datum. On a default instantiation, this will occur every 200 ms. To avoid congesting the communications link, create a separate OPC group for the Object Group 50 time tag. Then, set that group's update rate to 1000 ms or slower.

Note: Object Group 50 - Time and Date is reflected in Object Group 51 - Time and Date Common Time of Occurrence (CTO). For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.VAR Attributes	.SUB Attribute	Data Type	Access
50.0	Value, Explicit	Date	Read Only
50.1	Value, Explicit	**Date**	Read Only

Note: Flags do not apply.

Variations

Number	Description
0	Time and Data Absolute time.*
1	Time and Date Absolute time.

*Allowed, but same as 50.1.

Examples

Tag Address	Definition	Description
50.0.Value	Date and time saved in the slave.	An explicit request for object 50 variation 1 will be sent to the device to get the value for this tag. The update rate should not be set too often since it will cause traffic every time the tag needs to be updated.
50.1.Value	Date and time saved in the slave.	An explicit request for object 50 variation 1 will be sent to the device to get the value for this tag. The update rate should not be set too often since it will cause traffic every time the tag needs to be updated.
50.0.Explicit	Date and time saved in the slave.	An explicit request for object 50 variation 1 will be sent to the device to get the value for this tag. The update rate should not be too set often since it will cause traffic every time the tag needs to be updated.
50.1.Explicit	Date and time saved in the slave.	An explicit request for object 50 variation 1 will be sent to the device to get the value for this tag. The update rate should not be set too often since it will cause traffic every time the tag needs to be updated.

Object Group 60 - Class Poll Data Request

When a Boolean True is written to these tags, Object Group 60 variations 1-4 will initiate class 0-3 reads (respectively). Object Group 60 tags can be used to 'manually' poll when the recommended event and integrity class polling intervals cannot be used. This approach is not recommended, however, because care must be taken to keep the requests in proper order. An integrity poll polls class 1, 2, 3, and 0 in that order, in one request, and without time lapses in between.

When using the Object Group 60 tags to poll for events, users should poll the event classes (variations 2, 3, and 4) before polling for class 0 static data (variation 1). This ensures that event data is received in the correct order and that the latest value is received after preceding events. Although a class Object Group 60.1 request can be issued immediately after any of the event class Object Group 60.2, 3, or 4 requests, these are still separate requests. Users risk losing any events that occurred between the last class 1, 2, or 3 request and the class 0 request. A read of these tags will always return a Boolean False with good quality.

Attributes

These tags trigger commands on the DNP slave device when a True value is written. They read back as zero or False.

OBJ.VAR Attributes	.SUB Attribute	Data Type	Access
60.{1}	Value, Explicit	Boolean	Read/Write
60.{2}	Value, Explicit	Boolean	Read/Write
60.{3}	Value, Explicit	Boolean	Read/Write
60.{4}	Value, Explicit	Boolean	Read/Write

Note: Flags do not apply.

Variations

Number	Description

1	Initiates a poll of DNP Class 0 data.
2	Initiates a poll of DNP Class 1 data.
3	Initiates a poll of DNP Class 2 data.
4	Initiates a poll of DNP Class 3 data.

Examples

Tag Address	Definition	Description
60.1.Value	Always displays a Boolean value of 0 with Good quality.	Writing a 1 to this tag will initiate a request for Class 0 data. The sub-type can be Value or Explicit.
60.2.Value	Always displays a Boolean value of 0 with Good quality.	Writing a 1 to this tag will initiate a request for Class 1 data. The sub-type can be Value or Explicit.
60.3.Explicit	Always displays a Boolean value of 0 with Good quality.	Writing a 1 to this tag will initiate a request for Class 2 data. The sub-type can be Value or Explicit.
60.4.Explicit	Always displays a Boolean value of 0 with Good quality.	Writing a 1 to this tag will initiate a request for Class 3 data. The sub-type can be Value or Explicit.

Object Group 70 - File Identifiers

Attributes

OBJ.IDX Attributes	.SUB Attributes	Data Type	Access
70.0-9	Download, Upload	Boolean	Read/Write
70.0-9	LocalFileName, RemoteFileName	String	Read/Write

Note: Flags do not apply.

Examples

Tag Address	Definition	Description
70.0.Upload	Displays the current status of a file transfer upload for the file settings configured for index 0. 0: No file transfer upload in progress. 1: Upload in progress.	Writing a 1 to this tag causes a file transfer of the remote file on the slave to the local file on the master. The file identifiers are built from the path and the file name properties. If the path does not already end in a backslash or forward slash, one will be added before the file name. The tag will display a 1 until the transfer completes (at which time the tag will display a 0). If an upload is in progress, writing a 0 to this tag will cause the file transfer to be aborted.
70.5.Download	Displays the current status of a file transfer download for the file settings configured for index 5. 0: No file transfer download in progress. 1: Download in progress.	Writing a 1 to this tag causes a file transfer of the local file on the master to the remote file on the slave. The file identifiers are built from the path and the file name properties. If the path does not already end in a backslash or forward slash, one will be added before the file name. The tag will display a 1 until the transfer completes (at which time the tag will display a 0). If a download is in progress, writing a 0 to this tag will cause the file transfer to be aborted.

70.6.LocalFileName	Displays the currently configured local file name from the device property File Control tab for index 6.	This tag is Read Only unless the Device Property for File Name Writes is set to Yes. If the tag has Read/Write access, writing to this tag will update the corresponding File Control device property. The contents of the local file name property will be appended to the local path to build the file identifier. A backslash or forward slash will separate the path from the file name.
70.8.RemoteFileName	Displays the currently configured remote file name from the device property File Control tab for index 8.	This tag is Read Only unless the Device Property for File Name Writes is set to Yes. If the tag has Read/Write access, writing to this tag will update the corresponding File Control device property. The contents of the remote file name property will be appended to the remote path to build the file identifier. A backslash or forward slash will separate the path from the file name.

Object Group 80 - Internal

Attributes

The default data type is shown in **bold**.

OBJ.VAR Attributes	.SUB Attribute	Data Type	Access
80.{0}	Value, Explicit	Word	Read Only
80.{1}	Value, Explicit	**Word**	Read Only

Note: Flags do not apply.

Variations

Number	Description
0	Internal Indications Packed format.*
1	Internal Indications packed format.

*Allowed, but same as 80.1.

IIN Definitions

Object Group 80 returns the DNP Internal Indication bits (IIN) as an unsigned short integer. The data is refreshed with each response from the DNP slave, and therefore represents the latest IIN report.

Internal Indication	Bit Mask	Reason
DNPDEFS_IIN_RESTART	0x8000	Slave has been restarted.
DNPDEFS_IIN_TROUBLE	0x4000	Slave is reporting trouble.
DNPDEFS_IIN_LOCAL	0x2000	Slave is running in local mode.
DNPDEFS_IIN_NEED_TIME	0x1000	Slave requires time synchronization.
DNPDEFS_IIN_CLASS_3	0x0800	Slave has Class 3 data available.
DNPDEFS_IIN_CLASS_2	0x0400	Slave has Class 2 data available.
DNPDEFS_IIN_CLASS_1	0X0200	Slave has Class 1 data available.
DNPDEFS_IIN_ALL_STATIONS	0x0100	The message was directed to the DNP broadcast address.
DNPDEFS_IIN_BAD_CONFIG	0x0020	Slave is misconfigured.
DNPDEFS_IIN_ALREADY_EXECUTING	0x0010	Slave has received a duplicate request.
DNPDEFS_IIN_BUFFER_OVFL	0x0008	Slave has lost one or more event reports.
DNPDEFS_IIN_OUT_OF_RANGE	0x0004	Command received references a non-existent I/O point.
DNPDEFS_IIN_OBJECT_UNKNOWN	0x0002	Command received references an unkown object.
DNPDEFS_IIN_BAD_FUNCTION	0x0001	Command received is not supported.

Examples

Tag Address	Definition	Description

80.0.Value	Latest Value of the two IIN bytes as a Word.	The slave's response to every request includes two internal indication bytes. The bits of these bytes have special meanings as defined by the DNP spec. This tag displays the IIN bytes received in the last response from the device. This is read from the data store and will not send an explicit request. The sub-type can be Value or Explicit; the variation can be 0 or 1. It makes no difference.
80.1.Explicit	Latest Value of the two IIN bytes as a Word.	The slave's response to every request includes two internal indication bytes. The bits of these bytes have special meanings as defined by the DNP spec. This tag displays the IIN bytes received in the last response from the device. This is read from the data store and will not send an explicit request. The sub-type can be Value or Explicit; the variation can be 0 or 1. It makes no difference.

Object Group 87 - Data Sets

.Value tags will be populated by the data received from unsolicited events or integrity and event class polling. .Explicit tags will cause a device read: because tags for one set are blocked together, there will only be one device read for the entire data set.

Note 1: At this time, data sets can only be defined in the slave. Users that manually create tags must define the correct data types. The master will obtain the description of the data sets from the slave in order to automatically define tags.

Note 2: Object Group 88 - Data Set - Snapshot data is reflected in Object Group 87 - Data Set - Present Value tags. For more information, refer to **Other Object Groups**.

Attributes

Variations for Object Group 87 do not equate to specific data types. Users must configure the tag with the same data type that is configured in the slave for the specific data set element. Descriptions of the attributes are as follows:

- **VAR:** This attribute indicates the particular element of the data set.
- **IDX:** This attribute indicates the particular data set that is defined in the device.

The default data type is shown in **bold**.

OBJ.VAR.IDX Attributes	.SUB Attribute	Data Type	Access
87.{0-1}.{0-65535}	Value, Explicit	Byte, Char, Date, Double, **DWord**, Float, Long, Short, String, Word	Read Only
87.{2-32}.{0-65535}	Value, Explicit	Byte, Char, Date, Double, **DWord**, Float, Long, Short, String, Word	Read/Write
87.{0}.{0-65535}	Set	Boolean	Read/Write

Variations
DNP Object Flag Definitions
In order to get a data point's flags, the slave's definition of the data set must include an element specifically for DNP flags.

Examples

Tag Address	Definition	Description
87.5.1.Explicit	Displays the fifth element of data set 1.	The .Explicit sub-type indicates that a request to the device for all elements of data set 1 will occur every time the tag needs to be updated.
87.7.2.Value	Displays the seventh element of data set 2.	The .Value sub-type indicates the tags for data set 2 will only be updated from the data store that is populated through unsolicited messages or integrity and event polls.
87.0.2.Set	Always displays a Boolean value of 0 with Good quality.	Writing a 1 to this tag causes an Object Group 87 write operation on data set 2. The write will only take place if there is data pending to be written due to a previous write to other .Value or .Explicit tags of this data set.

Object Group 110 - Octet String Object

These tags are only read explicitly once after start up. Explicit reads of the same Object Group and Variation are blocked together: A block that contains a failed tag will continue to be read until the tag's quality changes to Good or is removed.

Note: Object Group 110 - Octet String Value is reflected in Object Group 111 - Octet String Event Change. For more information, refer to **Other Object Groups**.

Attributes

The default data type is shown in **bold**.

OBJ.IDX Attributes	.SUB Attribute	Data Type	Access
110.{0-65535}	Value, Explicit - will take up to 255 chars.	**String**	Read/Write

Note: Flags do not apply.

Variations

Number	Description
String Length	Octet String.

Examples

Tag Address	Definition	Description
110.0.Value	Value of point 0 as a String.	If a value for this tag has not been received from the device, then an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 110 Explicit and Value tags will be blocked with this one in one request. The sub-type can be Value or Explicit: it makes no difference.
110.5.Explicit	Value of point 5 as a String.	If a value for this tag has not been received from the device, then an explicit request will be sent. Once the point has been initialized, the tag will receive its updates from the data store. A second explicit request will only be issued if the slave or master restarts. Other Object 110 Explicit and Value tags will be blocked with this one in one request. The sub-type can be Value or Explicit: it makes no difference.

Object Group 120 - Authentication Object

The Authentication Object tags are internal statistics for DNP Authentication.

Attributes

The default data type is shown in **bold**.

OBJ.VAR Attributes	.SUB Attribute	Description	Data Type	Access
120.KeyStatRQTX	Value Reset	Key status requests sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.KeyStatRQRX	Value Reset	Key status responses received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.KeyStatRQRX_NoInit	Value Reset	Key status request responded with an uninitialized failure.	**DWord** **Bool**	Read Only Read/Write
120.KeyStatRQRX_CommFail	Value Reset	Key status request responded with a communications failure.	**DWord** **Bool**	Read Only Read/Write
120.KeyStatRQRX_AuthFail	Value Reset	Key status request responded with an authentication failure.	**DWord** **Bool**	Read Only Read/Write
120.KeyChangeTX	Value Reset	Key change requests sent to the outstation.	**DWord** **Bool**	Read Only Read/Write
120.AggrModeRQTX	Value Reset	Aggressive mode requests sent to the outstation.	**DWord** **Bool**	Read Only Read/Write
120.AggrModeResponseRX	Value Reset	Aggressive mode responses from the outstation.	**DWord** **Bool**	Read Only Read/Write
120.AggrModeResponseRX_Failed	Value Reset	Aggressive mode request responded with a failure.	**DWord** **Bool**	Read Only Read/Write
120.ChallRQTX	Value Reset	Challenge requests sent to the outstation.	**DWord** **Bool**	Read Only Read/Write
120.ChallRQRX	Value Reset	Challenge requests received from the outstation.	**DWord** **Bool**	Read Only Read/Write
120.CriticalChallRQTX	Value Reset	Critical challenge requests sent to the outstation.	**DWord** **Bool**	Read Only Read/Write

120.CriticalChallRQRX	Value Reset	Critical challenge requests received from the outstation.	**DWord** **Bool**	Read Only Read/Write
120.ChallReplyTX	Value Reset	Challenge responses sent to the outstation.	**DWord** **Bool**	Read Only Read/Write
120.ChallReplyRX	Value Reset	Challenge responses received from the outstation.	**DWord** **Bool**	Read Only Read/Write
120.ChallReplyRX_Failed	Value Reset	Challenge responses with a failure.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_Invalid	Value Reset	Invalid errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_UnexpectedReply	Value Reset	Unexpected reply errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_NoReply	Value Reset	No reply errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_ AggrModeNotSupported	Value Reset	Aggressive mode not supported errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_ HMACAlgNotSupported	Value Reset	HMAC algorithm not supported errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_ KeyWrapAlgNotSupported	Value Reset	Key wrap algorithm not supported errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_ UserAccessDenied	Value Reset	User access denied errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_ KeyChangeDenied	Value Reset	Key change denied errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_InvalidSign	Value Reset	Invalid signature errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_InvalidCert	Value Reset	Invalid certificate errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_UnknownUser	Value Reset	Unknown user errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorTX_VendorSpecific	Value Reset	Vendor specific errors sent to outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_Invalid	Value Reset	Invalid errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_UnexpectedReply	Value Reset	Unexpected reply errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_NoReply	Value Reset	No reply errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_ AggrModeNotSupported	Value Reset	Aggressive mode not supported errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_ HMACAlgNotSupported	Value Reset	HMAC algorithm not supported errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_ KeyWrapAlgNotSupported	Value Reset	Key wrap algorithm not supported errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_ UserAccessDenied	Value Reset	User access denied errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_ KeyChangeDenied	Value Reset	Key change denied errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_InvalidSign	Value Reset	Invalid signature errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_InvalidCert	Value Reset	Invalid certificate errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_UnknownUser	Value Reset	Unknown user errors received from outstation.	**DWord** **Bool**	Read Only Read/Write
120.ErrorRX_VendorSpecific	Value Reset	Vendor specific errors received from outstation.	**DWord** **Bool**	Read Only Read/Write

Examples

Tag Address	Definition	Description
120.KeyStatRQTX.Value	Value of the KeyStatRQTX	The number of key status requests sent to the outstation

	Authentication statistic.	since startup or last reset.
120.KeyStatRQTX.Reset	Reset the KeyStatRQTX Authentication statistic.	The KeyStatRQTX statistic will be cleared with a write value of 1.

Other Object Groups

Certain objects are not used in the driver due to the fact that their values are reflected in other objects.

Object	Name	Reflected in Object	Name
2	Binary Input Change Event	1	Binary Input State
4	Double Bit Input Change Event	3	Double Bit Input State
11	Binary Output Change Event	10	Binary Output State
12	Control Relay Output Block	10	Binary Output State
13	Binary Output Command Event	10	Binary Output State
22	Counter Event Change	20	Counter Value
23	Frozen Counter Event Change	21	Frozen Counter Value
32	Analog Input Change Event	30	Analog Input Value
41	Analog Output Write	40	Analog Output Value
42	Analog Output Change Event	40	Analog Output Value
43	Analog Output Command Event	40	Analog Output Value
51	Time and Date Common Time of Occurrence (CTO)	50	Time and Date
88	Data Set - Snapshot	87	Data Set - Present Value
111	Octet String Event Change	110	Octet String Value

Internal Tags

Tag	Description	Data Type	Access
_ChannelResponseTimeout	This tag allows the Request Timeout channel property to be changed from a client application. Valid values range from 100 to 3600000.	DWord	Read/Write
_EventClass1PollInterval	This tag allows the Event Class 1 Poll Interval device property to be changed from a client application. Valid values range from 0 to 86400.	DWord	Read/Write
_EventClass2PollInterval	This tag allows the Event Class 2 Poll Interval device property to be changed from a client application. Valid values range from 0 to 86400.	DWord	Read/Write
_EventClass3PollInterval	This tag allows the Event Class 3 Poll Interval device property to be changed from a client application. Valid values range from 0 to 86400.	DWord	Read/Write
_DeviceRequestQueueDepth	This tag indicates the current depth of the queue used for storing device requests. It is useful for diagnostic purposes for issues such as tag update delays. Although a zero or steady value is expected, a non-zero value is not a problem unless it continues to grow and causes a delay in tag updates. For example, if the project has a device defined with 100 blocks of .Explicit tags and the _DeviceRequestQueueDepth tag value is 100, then something is blocking the tags from being updated on time.	DWord	Read Only
_DeviceRequestTimeout	This tag allows the Request Timeout device property to be changed from a client application. Valid values range from 0 to 3600000.	DWord	Read/Write
_IntegrityPollInterval	This tag allows the Integrity Poll device property to be changed from a client application. Valid values range from 0 to 2592000.	DWord	Read/Write
_MasterAddress	This tag allows the Master Address device property to be changed from a client application. Valid values range from 0 to 65519.	DWord	Read/Write
_SlaveAddress	This tag allows the Slave Address device property to be changed from a client application. Valid values range from 0 to 65519.	DWord	Read/Write

Special Tags

Tag	Description
ActivateConfig	When a Boolean True is written to this tag, an Activate Configuration Request will be sent to the slave device. The tag will read back as zero or False, and will always have Good quality.*
Coldrestart	When a Boolean True is written to this tag, a cold restart will be sent to the slave device. The tag will read back as zero or False.
Unsolreceived	When written as a DWord True, the tag will increment by 1 every time an unsolicited message is received from the slave. **Note:** This tag is Read/Write, so it can be reset to any value by the operator.
Warmrestart	When a Boolean True is written to this tag, a warm restart will be sent to the slave device. The tag will read back as zero or False.

*The objects that will be included in the request are defined in the Activate Config Objects parameter located in **Device Properties** | **File Control**. For more information, refer to **File Control**.

Error Descriptions

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

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

Authentication Error Messages
Secure Authentication Failure on Device '<channel.device>'. Device does not support the function code (IIN2.0)
Secure Authentication Failure on Device '<channel.device>'. Key Status Request communications failure. Session Keys are not valid
Secure Authentication Failure on Device '<channel.device>'. Key Status Request non-authentic. Session Keys are not valid
Secure Authentication Failure on Device '<channel.device>'. Aggressive Mode Response indicates improper authentication
Secure Authentication Failure on Device '<channel.device>'. Challenge Reply indicates improper authentication
Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. RX Error Code= '<error code>'-'<error description>'
Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. TX Error Code= '<error code>'-'<error description>'
Secure Authentication failure on Device '<device>'. Key Status Request response status code: '<status code>'

Automatic Tag Database Generation Error Messages
Unable to add Data Set '<data set index>' on device '<device name>'. Data Set has '<number of elements>' elements. The maximum number of elements allowed is '<max elements>'
Unable to generate a tag database for device '<device>'. Channel is not open
Unable to generate a tag database for device '<device>'. Session is not open
Unable to generate a tag database for device '<device name>'. Unable to open communications port
Unable to generate a tag database for device '<driver>'. The device is not responding
Unable to read Device Attribute set '<set number>'. No tags added on device '<device>'

Device Status Messages
'<item description>' on device '<device>' has been auto-demoted
'<item description>' on device '<device>' has been auto-promoted to determine if it can be completed
Added '<tag count>' Data Set tag(s)
Data Set write of value '<value to be written>' pending on tag address '<address>' on device '<device>'
Device '<device>' does not support the LAN Time Sync Style Record Current Time Function Code 24
Device '<device>' does not support the LAN Time Sync Style write to object group 50, variation 3
Device '<device>' indicated an event buffer overflow (IIN 2.3)
Device '<device>' indicated it restarted (IIN 1.7)
Device '<device>' initialization completed
Device '<device>' requested time synchronization (IIN 1.4)
Device '<device>' Restarting
Device '<device name>' is not responding
Reached Max Events Per Point for Object Group '<Object Group>' Point '<data index>' on Device '<device>'
Request failed on device '<device>'. Device does not support the function code (IIN2.0)
Request to enable unsolicited messaging failed on device '<device>'
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred
Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid.
Unable to write to address '<address>' on device '<device>'. Failed to initialize communication stack
Unable to write to address '<address>' on device '<device>'. Internal Error occurred
Write complete to Data Set '<index>' on device '<device>'

DNP Specific Error Messages
Read Errors
The returned value for tag address '<tag address>' in device '<device name>' has a length of zero. The tag value cannot be set
The returned value of '<date returned value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is out of range for the '<data type>' tag data type
The returned value of '<returned string value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support the function code (IIN2.0)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Session shutting down or duplicate request
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unrecognized Object returned in Response
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support the function code (IIN2.0)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Session shutting down or duplicate request
Unable to read point(s) '<OBJ.VAR.IDX - OBJ.VAR.IDX>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Unrecognized Object returned in Response

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support the function code (IIN2.0)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Session shutting down or duplicate request

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Unrecognized Object returned in Response

Unable to read tag address '<address>' on device '<device>'. Element Index '<variation>' is not defined in Data Set '<index>'

Unable to read tag address '<address>' on device '<device>'. No definition for Data Set '<index>'

Unable to read tag address '<address>' on device '<device>'. Response missing data

Write Errors

Unable to write to address '<address>' on device '<device>'. Activate Configuration-Related Status Code '<status code>' - '<description>'

Unable to write to address '<address>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Unable to write to address '<address>' on device '<device>'. Channel Response Timeout must be between '<min channel response timeout>' and '<max channel response timeout>'

Unable to write to address '<address>' on device '<device>'. Control-Related Status Code '<status code>'

Unable to write to address '<address>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Unable to write to address '<address>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Unable to write to address '<address>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Unable to write to address '<address>' on device '<device>'. Device does not support the function code (IIN2.0)

Unable to write to address '<address>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Unable to write to address '<address>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Unable to write to address '<address>' on device '<device>'. Device Request Timeout must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. Element Index '<variation>' is not defined in Data Set '<index>'

Unable to write to address '<address>' on device '<device>'. Event Poll Interval must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. File name writes have been disabled

Unable to write to address '<address>' on device '<device>'. Integrity Poll Interval must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. Master Address '<master address>' already in use as Slave Address on Device '<device>'

Unable to write to address '<address>' on device '<device>'. Master Address must be between '<min master address>' and '<max master address>'

Unable to write to address '<address>' on device '<device>'. Master and Slave Address cannot be the same

Unable to write to address '<address>' on device '<device>'. No definition for Data Set '<index>'

Unable to write to address '<address>' on device '<device>'. Select Operate response invalid

Unable to write to address '<address>' on device '<device>'. Session shutting down or duplicate request

Unable to write to address '<address>' on device '<device>'. Slave Address '<slave address>' already in use on Device '<device>'

Unable to write to address '<address>' on device '<device>'. Slave Address must be between '<min slave address>' and '<max slave address>'

Unable to write to address '<address>' on device '<device>'. Tag '<data type>' Data type is incompatible with the Data Set element '<data type>' Data type

Unable to write to address '<address>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Unable to write to address '<address>' on device '<device>'. Unrecognized Object returned in Response

Unable to write to address '<address>' on device '<device>'. Unsupported Operation Type

Unable to write to address '<address>' on device '<device>'. Unsupported Trip-Close Code

Unable to write to address '<address>' on device '<device>'. Write value specified is invalid or incomplete

File Control Error Messages

File Transfer failure on Device '<device>' for file index '<index>'. Device returned File-Related Status Code '<status code>' - '<description>'

File Transfer failure on Device '<device>' for file index '<index>'. File size of '<size>' kilobytes is greater than maximum file size of '<maximum size>' kilobytes

File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted by user

File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted due to communications issue

File Transfer failure on Device '<device>' for file index '<index>'. Local file '<file name>' is empty

File Transfer failure on Device '<device>' for file index '<index>'. Local file open failure. <local file open failure>

File Transfer failure on Device '<device>' for file index '<index>'. Session shutting down or duplicate request

Invalid Local File for File Index 70.<file index>, general error

Invalid Local File for File Index 70.<file index>, verify the specified path is write-enabled

Invalid Local File path for File Index 70.<file index>

Invalid Local File syntax for File Index 70.<file index>

Address Validation

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

Address Validation

Address '<address>' is not valid on device '<channel>' '<device>'

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

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

Device address '<address>' contains a syntax error

Device address '<address>' is Read Only

Address '<address>' is not valid on device '<channel>' '<device>'

Error Type:
Warning

Possible Cause:
A scan tag with an invalid address was sent to the driver for initialization.

Solution:
Correct the address in the invalid tag.

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 the address 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>' 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.

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.

Authentication Error Messages

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

Authentication Error Messages
Secure Authentication Failure on Device '<channel.device>'. Device does not support the function code (IIN2.0)
Secure Authentication Failure on Device '<channel.device>'. Key Status Request communications failure. Session Keys are not valid
Secure Authentication Failure on Device '<channel.device>'. Key Status Request non-authentic. Session Keys are not valid
Secure Authentication Failure on Device '<channel.device>'. Aggressive Mode Response indicates improper authentication
Secure Authentication Failure on Device '<channel.device>'. Challenge Reply indicates improper authentication
Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. RX Error Code= '<error code>'-'<error description>'
Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. TX Error Code= '<error code>'-'<error description>'
Secure Authentication failure on Device '<device>'. Key Status Request response status code: '<status code>'

Secure Authentication Failure on Device '<channel.device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device is not configured to support Authentication.

Solution:
Either uncheck the "Enable Authentication" parameter in Device Properties or enable Authentication on the device.

Secure Authentication Failure on Device '<channel.device>'. Key Status Request communications failure. Session Keys are not valid

Error Type:
Warning

Possible Cause:
1. The master and slave are not configured to match.
2. Either the master or the slave restarted, and the other is expecting a different session key.

Solution:
1. Ensure that the User Number/Update Key pairs on the master match those in the device.
2. Correct any invalid settings (such as KeyWrap Algorithm). Then, wait for the master to issue the key change request.

Secure Authentication Failure on Device '<channel.device>'. Key Status Request non-authentic. Session Keys are not valid

Error Type:
Warning

Possible Cause:
The Update Keys do not match or there is another issue with encryption configuration.

Solution:
Correct the invalid Update Key for the current User Number.

Secure Authentication Failure on Device '<channel.device>'. Aggressive Mode Response indicates improper authentication

Error Type:
Warning

Possible Cause:
The Update Keys do not match or there is another issue with encryption configuration.

Solution:
Correct the invalid Update Key for the current User Number.

Secure Authentication Failure on Device '<channel.device>'. Challenge Reply indicates improper authentication

Error Type:
Warning

Possible Cause:
The Update Keys do not match or there is another issue with encryption configuration.

Solution:
Correct the invalid Update Key for the current User Number.

Note:
The slave rejected the critical request.

Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. RX Error Code= '<error code>'-'<error description>'

Error Type:
Warning

Possible Cause:
An error occurred when receiving a message.

Solution:
1. To determine the solution, refer to the code's error description.

Code Number	Description
1	Invalid Information
2	Unexpected Reply
3	No Reply
4	Aggressive Mode Not Supported
5	HMAC Algorithm Not Supported
6	Key Wrap Algorithm Not Supported
7	User Access Denied
8	Key Change Request Denied
9	Invalid Signature
10	Invalid Certification
11	Unknown User
128..255	Vendor Specific

2. When a User Number is provided, it can be used to confirm that the User Number and Update Key match in the master and slave.
3. When an Association ID is provided, it can be used to uniquely identify the association between the master and the slave on which the error occurred. This ID may correspond to different combinations of DNP addresses, IP addresses, and port numbers (or identifiers on the master and the slave).
4. When a Sequence Number is provided, it can be used to determine which request (such as a Challenge or Key Change) had the authentication failure.

Secure Authentication Failure on Device '<channel.device>'. User= '<User Number>', AssocID= '<Association ID>', Sequence= '<Sequence Number>'. TX Error Code= '<error code>'-'<error description>'

Error Type:
Warning

Possible Cause:
An error occurred when transmitting a message.

Solution:
1. To determine the solution, refer to the code's error description.

Code Number	Description
1	Invalid Information
2	Unexpected Reply
3	No Reply
4	Aggressive Mode Not Supported
5	HMAC Algorithm Not Supported
6	Key Wrap Algorithm Not Supported
7	User Access Denied

8	Key Change Request Denied
9	Invalid Signature
10	Invalid Certification
11	Unknown User
128..255	Vendor Specific

2. When a User Number is provided, it can be used to confirm that the User Number and Update Key match in the master and slave.
3. When an Association ID is provided, it can be used to uniquely identify the association between the master and the slave on which the error occurred. This ID may correspond to different combinations of DNP addresses, IP addresses, and port numbers (or identifiers on the master and the slave).
4. When a Sequence Number is provided, it can be used to determine which request (such as a Challenge or Key Change) had the authentication failure.

Secure Authentication failure on Device '<device>'. Key Status Request response status code: '<status code>'

Error Type:
Warning

Possible Cause:
An invalid status code was returned in the Key Status Request response from the slave.

Solution:
The status code returned in the error message describes the status of the two Session Keys as known by the slave. If the status code is 0 ("not used") or 5-255 ("reserved for future use"), determine why the slave is responding with an unsupported status code in the Object Group 120 variation 5 response.

Automatic Tag Database Generation Error Messages

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

Automatic Tag Database Generation Error Messages
Unable to add Data Set '<data set index>' on device '<device name>'. Data set has '<number of elements>' elements. The maximum number of elements allowed is '<max elements>'
Unable to generate a tag database for device '<device>'. Channel is not open
Unable to generate a tag database for device '<device>'. Session is not open
Unable to generate a tag database for device '<device name>'. Unable to open communications port
Unable to generate a tag database for device '<driver>'. The device is not responding
Unable to read Device Attribute set '<set number>'. No tags added on device '<device>'

Unable to add Data Set '<data set index>' on device '<device name>'. Data Set has '<number of elements>' elements. The maximum number of elements allowed is '<max elements>'

Error Type:
Informational

Possible Cause:
The data set at the specified index has more than the maximum number of elements allowed.

Solution:
Reduce the data set's number of elements.

Unable to generate a tag database for device '<device>'. Channel is not open

Error Type:
Warning

Possible Cause:
The driver was unable to initialize the communication stack.

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Solution:
Reinitialize the driver by right-clicking on the Administration menu and then selecting Reinitialize. If the problem persists, restart the master.

Unable to generate a tag database for device '<device>'. Session is not open

Error Type:
Warning

Possible Cause:
The driver was unable to initialize the communication stack.

Solution:
Reinitialize the driver by right-clicking on the Administration menu and then selecting Reinitialize. If the problem persists, restart the master.

Unable to generate a tag database for device '<device name>'. Unable to open communications port

Error Type:
Warning

Possible Cause:
The specified communications port is unavailable.

Solution:
Choose the correct communications port, and then ensure it is available to the OPC server.

Unable to generate a tag database for device '<driver>'. The device is not responding

Error Type:
Warning

Possible Cause:
1. The serial connection between the device and the Host PC is broken.
2. The communication parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. A device on the channel is unresponsive, due to improper timing settings or a broken communications link.
5. There are multiple channels using DNS host names that resolve to the same IP address.

Solution:
1. Verify the cabling between the DNP master and the DNP slave device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Locate the unresponsive device and then correct the timing settings or fix the broken communications link.
5. Ensure that all channels are using a unique Destination Host.

Unable to read Device Attribute set '<set number>'. No tags added on device '<device>'

Error Type:
Warning

Possible Cause:
The device attribute set specified does not exist in the device.

Solution:
Deselect "Standard Device Attributes" and/or "User-Defined Device Attributes" in the Tag Import dialog.

Device Status Messages

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

Device Status Messages

'<item description>' on device '<device>' has been auto-demoted
'<item description>' on device '<device>' has been auto-promoted to determine if it can be completed
Added '<tag count>' Data Set tag(s)
Data Set write of value '<value to be written>' pending on tag address '<address>' on device '<device>'
Device '<device>' does not support the LAN Time Sync Style Record Current Time Function Code 24
Device '<device>' does not support the LAN Time Sync Style write to object group 50, variation 3
Device '<device>' indicated an event buffer overflow (IIN 2.3)
Device '<device>' indicated it restarted (IIN 1.7)
Device '<device>' initialization completed
Device '<device>' requested time synchronization (IIN 1.4)
Device '<device>' Restarting
Device '<device name>' is not responding
Reached Max Events Per Point for Object Group '<Object Group>' Point '<data index>' on Device '<device>'
Request failed on device '<device>'. Device does not support the function code (IIN2.0)
Request to enable unsolicited messaging failed on device '<device>'
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred
Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid.
Unable to write to address '<address>' on device '<device>'. Failed to initialize communication stack
Unable to write to address '<address>' on device '<device>'. Internal Error occurred
Write complete to Data Set '<index>' on device '<device>'

'<item description>' on device '<device>' has been auto-demoted

Error Type:
Warning

Possible Cause:
The device continues to set an IIN bit, which requires the master to do something (such as time synchronization or clear the device restart bit); however, the device is rejecting the master's attempts to do so. This is possibly due to an issue with the authentication settings. When a number of successive cycles of request timeouts and retries have occurred, the master will stop trying for a period of time.

Solution:
Confirm that the authentication settings specified in the master match those specified in the slave.

'<item description>' on device '<device>' has been auto-promoted to determine if it can be completed

Error Type:
Warning

Possible Cause:
A request that was previously demoted has been promoted so that the master can try to resend the request.

Solution:
If the request is successful, nothing needs to be done. If the item continues to be demoted, ensure that the authentication settings are correct.

Added '<tag count>' Data Set tag(s)

Error Type:
Informational

Possible Cause:
If the added tag count for Data Set tags is 0, possible causes may be as follows:

1. There are no data sets defined in the slave.
2. The slave has a mismatched configuration; that is, it may be reporting that it has more prototypes or descriptors than actually have elements defined. When the master requests the prototype or descriptor definition, the slave then responds with a parameter error because it doesn't have definitions for all of them.

Solution:
1. Either define the data set descriptors in the slave or uncheck the Data Set parameter in Tag Import.
2. Correct the slave so that it reports the actual number of prototypes and descriptors that have elements defined.

Data Set write of value '<value to be written>' pending on tag address '<address>' on device '<device>'

Error Type:
Informational

Possible Cause:
A write occurred to a tag that references a data set element. The value is not displayed in the tag value, but is pending a write to the data set.

Solution:
The data set write will complete when a Data Set Tag with the subtype .Set has a Boolean True written to it.

Device '<device>' does not support the LAN Time Sync Style Record Current Time Function Code 24

Error Type:
Warning

Possible Cause:
The device does not support function code 24 - LAN (which is the specified time synchronization method).

Solution:
In **Device Properties** | **Communications**, change the time synchronization setting to Serial.

Note:
Time synchronization will be successful despite the error message. In order to prevent the error message from occurring, change the setting as described above.

Device '<device>' does not support the LAN Time Sync Style write to object group 50, variation 3

Error Type:
Warning

Possible Cause:
The device does not support a write to Object Group 50, variation 3, which is used in the second part of the LAN time synchronization method.

Solution:
To prevent the error message from occurring, open **Device Properties** and then select the **Communications** tab. In **Time Sync Style**, select **Serial**.

Note:
Time synchronization will be successful despite the error message.

Device '<device>' indicated an event buffer overflow (IIN 2.3)

Error Type:
Warning

Possible Cause:

A response from the device included IIN bytes along with the bit set, indicating that an event buffer overflow condition exists. At least one unconfirmed event was lost because the event buffers did not have enough room to store the information.

Solution:

1. If many events occur between event polls (and the bit is being set by the slave) decrease the event poll interval to keep the buffer size small.
2. To avoid logging unnecessary events, adjust the analog point deadband.

See Also:
Event Playback

Device '<device>' indicated it restarted (IIN 1.7)

Error Type:
Informational

Possible Cause:

A response from the device included IIN bytes along with the bit set. This indicates that the device restarted.

Solution:
N/A.

Device '<device>' initialization completed

Error Type:
Informational

Possible Cause:

1. The master has successfully communicated with the device, and the following requests have successfully completed (if configured):

- Integrity poll on restart.
- Data set change on startup.
- Enable unsolicited messages.
- Disable unsolicited messages.

2. When this message repeats frequently in the Event Log, it indicates that the master is repeatedly restarting. This may occur when channel serialization is in use, and the master receives a request from the slave when it does not have the channel token. If the connection was made using Ethernet Encapsulation, the slave may close the socket if it does not receive a response in the specified time.

Solution:
1. N/A.
2. Determine why the master is restarting, and then correct the setup. If it is because the TCP slave is sending a request (such as a Link Status request, a Keep Alive request, or an unsolicited message) via Ethernet Encapsulation while channel serialization is in use, then the slave should be reconfigured to disable the requests or to increase the timeout (so that it will not close the socket).

Device '<device>' requested time synchronization (IIN 1.4)

Error Type:
Informational

Possible Cause:

A response from the device included IIN bytes along with the bit set. This indicates that the device requires time synchronization from the master.

Solution:
N/A.

Device '<device>' Restarting

Error Type:
Information

Possible Cause:
The client wrote a "1" to a Warmrestart or Coldrestart tag.

Solution:
None.

Device '<device name>' is not responding

Error Type:
Serious

Possible Cause:
1. The serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. A device on the channel is unresponsive, due to improper timing settings or a broken communications link.
5. 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 DNP master and the DNP slave device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Locate the unresponsive device and then correct the timing settings or fix the broken communications link.
5. Increase the Request Timeout setting so that the entire response can be handled.

See Also:
Timing and Other Considerations

Reached Max Events Per Point for Object Group '<Object Group>' Point '<data index>' on Device '<device>'

Error Type:
Warning

Possible Cause:
At least one unconfirmed event was lost because the event buffers did not have enough room to store the information.

Reasons:
1. The value specified for the Max Events Per Point parameter is too small to receive all of the events without discarding data.
2. The event poll intervals are too large.
3. The slave is logging unnecessary events (such as changes in a floating value).

Solution:
1. Determine the buffer size allowed in the slave, and then set the Max Events Per Point parameter to the same value (or larger). This driver allows 10000 events per point. The default setting is 100.
2. If many events occur between event polls (and the Max Events Per Point is reached) decrease the event poll interval to keep the buffer size small.
3. To avoid logging unnecessary events, adjust the analog point deadband.

See Also:
Event Playback

Request failed on device '<device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device returned IIN bytes in the response with the "Function code not supported" bit set. This indicates that the device does not support the function code sent by the master in the request.

Solution:
In Channel Diagnostics, check the TX entry that has a similar timestamp as the error in the Event Log to determine which function code the device is not supporting. The solution depends on the function code.

Note:
For example, if the device should support the "Enable unsolicited responses" (0x14) function code or the "Disable unsolicited responses" (0x15) function code, correct the configuration in the device. If the device should not accept the function codes 0x14 or 0x15, change the Class 1, 2, and 3 Unsolicited Mode in Device Properties to Automatic. For more information on specific function code error messages, refer to **Error Descriptions**.

Request to enable unsolicited messaging failed on device '<device>'

Error Type:
Warning

Possible Cause:
The device rejected a request to enable unsolicited messages on startup. This is possibly due to an issue with the authentication settings.

Solution:
Confirm that the authentication settings specified in the master match those specified in the slave.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack

Error Type:
Fatal

Possible Cause:
The driver was unable to initialize the communication stack.

Solution:
Reinitialize the driver by right-clicking on the Administration menu and selecting **Reinitialize**. If the problem persists, restart the master.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred

Error Type:
Fatal

Possible Cause:
An internal error occurred within the driver.

Solution:
The driver may recover on its own. If the problem persists, restart the master.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Failed to initialize communication stack

Error Type:
Fatal

Possible Cause:
The driver was unable to initialize the communication stack.

Solution:
Reinitialize the driver by right-clicking on the Administration menu and selecting **Reinitialize**. If the problem persists, restart the master.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Internal Error occurred

Error Type:
Fatal

Possible Cause:
An internal error occurred within the driver.

Solution:
The driver may recover on its own. If the problem persists, restart the master.

Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Error Type:
Warning

Possible Cause:
1. The Response Timeout is too short to allow the slave's integrity or event poll response to complete in time. The slave may be returning a large number of points, but the timeout elapsed before the data could be received.
2. There is an issue with the Authentication settings.

Solution:
1. If the slave has been configured to return a large number of points (such as during a class 0 poll) change the channel's Response Timeout to a value that will allow the response to complete successfully.
2. Confirm that the Authentication settings in the master match those in the slave.

Notes:
1. The channel's Response Timeout should be as accurate as possible, because it is also the time that the driver will wait before reporting that the device is not responding.
2. The Device Request Timeout should be greater than the Channel Response Timeout.

See Also:
Timing and Other Considerations

Unable to write to address '<address>' on device '<device>'. Failed to initialize communication stack

Error Type:
Fatal

Possible Cause:
The driver was unable to initialize the communication stack.

Solution:
Reinitialize the driver by right-clicking on the Administration menu and selecting **Reinitialize**. If the problem persists, restart the master.

Unable to write to address '<address>' on device '<device>'. Internal Error occurred

Error Type:
Fatal

Possible Cause:
An internal error occurred within the driver.

Solution:
The driver may recover on its own. If the problem persists, restart the master.

Write complete to Data Set '<index>' on device '<device>'

Error Type:

Informational

Possible Cause:

A Data Set Tag with the subtype .Set had a Boolean True written to it while pending writes existed.

Solution:

The pending data set writes have been sent to the device, although they may not have been successful.

Note:

This message indicates that the write completed and the pending data has been cleared.

DNP Specific Error Messages

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

DNP Specific Error Messages
Read Errors
Write Errors

Read Errors

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

Read Errors
The returned value for tag address '<tag address>' in device '<device name>' has a length of zero. The tag value cannot be set
The returned value of '<date returned value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is out of range for the '<data type>' tag data type
The returned value of '<returned string value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support the function code (IIN2.0)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Session shutting down or duplicate request
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid
Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unrecognized Object returned in Response
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)
Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

The returned value for tag address '<tag address>' in device '<device name>' has a length of zero. The tag value cannot be set

Error Type:
Warning

Possible Cause:
The tag has addressed an element that has been defined in the slave with a data length of zero.

Solution:
Increase the data length to an appropriate value for the data type.

The returned value of '<date returned value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type

Error Type:
Warning

Possible Cause:
The device has configured the device attribute variation or data set element as a Date value, but the tag's data type is not Date.

Solution:
Change the tag's data type to Date.

The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type

Error Type:
Warning

Possible Cause:
The device has configured the device attribute variation or data set element as a numeric value, but the tag's data type is String.

Solution:
Change the tag's data type to the appropriate numeric type.

The returned value of '<returned numeric value>' for tag address '<address>' in device '<device>' is out of range for the '<data type>' tag data type

Error Type:
Warning

Possible Cause:
The device has configured the device attribute variation or data set element as a data type that is out of range for the data type of the tag.

Solution:
Change the tag's data type to match the data type configured in the slave.

The returned value of '<returned string value>' for tag address '<address>' in device '<device>' is invalid for the '<data type>' tag data type

Error Type:
Warning

Possible Cause:
The device has configured the device attribute variation or data set element as a String, but the tag's data type is numeric.

Solution:
Change the tag's data type to String.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Error Type:
Warning

Possible Cause:
An abnormal condition has occurred that is specific to the device.

Solution:
Resolve any hardware issues found in the slave.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Error Type:
Warning

Possible Cause:
The device has detected that its configuration is corrupt.

Solution:
Reconfigure the slave.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Error Type:
Warning

Possible Cause:
1. The device does not support a point in the specified range.
2. The device does not understand the parameters sent in the request.

Solution:
Change the point(s) to one supported by the slave.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Error Type:
Warning

Possible Cause:
The device does not support the requested operation for the objects in the request.

Solution:
Verify that the slave supports the requested operation.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device does not support the function code.

Solution:
None.

Note:
For more information, refer to the device's documentation.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Error Type:
Warning

Possible Cause:
Some output points are in local mode.

Solution:
Correct the mode in the slave's configuration.

Note:
For more information, refer to the device's documentation.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Error Type:
Warning

Possible Cause:
The specified point is being acted upon by another client.

Solution:
1. Stop the other client from acting upon the points.
2. Delay the operation of the points.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Session shutting down or duplicate request

Error Type:
Warning

Possible Cause:
The client disconnected while a transaction was in progress.

Solution:
Confirm that the connection between the master and the slave is okay.

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Error Type:
Warning

Possible Cause:
1. The Response Timeout is too short to allow the read to complete in time. The slave may have returned a large number of points in the response, but the timeout elapsed before the data was received.
2. There is an issue with the Authentication settings.

Solution:
1. If the slave is returning a large number of points in the response, change the channel's Response Timeout to a value that will allow the response to complete successfully.
2. Confirm that the Authentication settings in the master match those in the slave.

Notes:
1. The channel's Response Timeout should be as accurate as possible, because it is also the time that the driver will wait before reporting that the device is not responding.
2. The device's Request Timeout should be greater than the channel's Response Timeout.

See Also:
Timing and Other Considerations

Unable to read point(s) '<OBJ.VAR.IDX>' on device '<device>'. Unrecognized Object returned in Response

Error Type:
Warning

Possible Cause:
The response from the slave contains something that is unrecognized. This does not include function codes or objects, which have their own error messages. For more information, refer to the list below.

1. The qualifier may be incorrect or unsupported.
2. The length of the response may not match the length that was expected.
3. For Object Group 87 - Data Set reads, this error may mean that more elements are in the data set than are allowed.

Solution:
1. Review the Channel Diagnostics to find which qualifier is being used in the response from the slave. Then, check the object's implementation table to see if that qualifier is supported. If it is not, determine whether the slave can be configured to use a supported qualifier for the object or function code.
2. Review the Channel Diagnostics to find if the length reported in the response matches the number of bytes actually sent from the slave, or if the checksum was calculated correctly. Then, determine whether a faulty connection is causing the missing bytes and correct as necessary.

3. If the tag is a Data Set Tag of Object Group 87 and the data set has more than 32 elements, reduce the number of elements in the data set on the slave.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Error Type:
Warning

Possible Cause:
An abnormal condition has occurred that is specific to the device.

Solution:
Resolve any hardware issues found in the slave.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Error Type:
Warning

Possible Cause:
The device has detected that its configuration is corrupt.

Solution:
Reconfigure the slave.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Error Type:
Warning

Possible Cause:
1. The device does not support a point in the specified range.
2. The device does not understand the parameters sent in the request.

Solution:
Change the points to ones supported by the slave.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Error Type:
Warning

Possible Cause:
The device does not support the requested operation for the objects in the request.

Solution:
Verify that the slave supports the requested operation.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device does not support the function code.

Solution:
None.

Note:
For more information, refer to the device's documentation.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Error Type:
Warning

Possible Cause:
Some output points are in local mode.

Solution:
Correct the mode in the slave's configuration.

Note:
For more information, refer to the device's documentation.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Error Type:
Warning

Possible Cause:
The specified points are being acted upon by another client.

Solution:
1. Stop the other client from acting upon the points.
2. Delay the operation of the points.

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Session shutting down or duplicate request

Error Type:
Warning

Possible Cause:
The client disconnected while a transaction was in progress.

Solution:
Confirm that the connection between the master and the slave is okay.

Unable to read point(s) '<OBJ.VAR.IDX - OBJ.VAR.IDX>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Error Type:
Warning

Possible Cause:
1. The Response Timeout is too short to allow the read to complete in time. The slave may have returned a large number of points in the response, but the timeout elapsed before the data was received.
2. There is an issue with the Authentication settings.

Solution:
1. If the slave is returning a large number of points in the response, change the channel's Response Timeout to a value that will allow the response to complete successfully.
2. Confirm that the Authentication settings in the master match those in the slave.

Notes:
1. The channel's Response Timeout should be as accurate as possible, because it is also the time that the driver will wait before reporting that the device is not responding.
2. The device's Request Timeout should be greater than the channel's Response Timeout.

See Also:
Timing and Other Considerations

Unable to read point(s) '<OBJ.VAR.IDX – OBJ.VAR.IDX>' on device '<device>'. Unrecognized Object returned in Response

Error Type:
Warning

Possible Cause:
The slave does not support the Read request.

Solution:
Change the request to one supported by the slave.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Error Type:
Warning

Possible Cause:
An abnormal condition has occurred that is specific to the device.

Solution:
Resolve any hardware issues found in the slave.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Error Type:
Warning

Possible Cause:
The device has detected that its configuration is corrupt.

Solution:
Reconfigure the slave.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Error Type:
Warning

Possible Cause:
1. The device does not support a point in the specified range.
2. The device does not understand the parameters sent in the request.

Solution:
Change the points to one supported by the slave.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Error Type:
Warning

Possible Cause:
The device does not support the requested operation for the objects in the request.

Solution:
Verify that the slave supports the requested operation.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device does not support the function code.

Solution:
None.

Note:
For more information, refer to the device's documentation.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Error Type:
Warning

Possible Cause:
Some output points are in local mode.

Solution:
Correct the mode in the slave's configuration.

Note:
For more information, refer to the device's documentation.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Error Type:
Warning

Possible Cause:
The specified point is being acted upon by another client.

Solution:
1. Stop the other client from acting upon the points.
2. Delay the operation of the points.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Session shutting down or duplicate request

Error Type:
Warning

Possible Cause:
The client disconnected while a transaction was in progress.

Solution:
Confirm that the connection between the master and the slave is okay.

Unable to read set '<set index>' of object group '<object group>' on device '<device>'. Unrecognized Object returned in Response

Error Type:
Warning

Possible Cause:

The response from the slave contains something that is unrecognized. This does not include function codes or objects, which have their own error messages. For more information, refer to the list below.

1. The qualifier may be incorrect or unsupported.
2. The length of the response may not match the length that was expected.
3. For Object Group 87 - Data Set reads, this error may mean that more elements are in the data set than are allowed.

Solution:

1. Review the Channel Diagnostics to find which qualifier is being used in the response from the slave. Then, check the object's implementation table to see if that qualifier is supported. If it is not, determine whether the slave can be configured to use a supported qualifier for the object or function code.
2. Review the Channel Diagnostics to find if the length reported in the response matches the number of bytes actually sent from the slave, or if the checksum was calculated correctly. Then, determine whether a faulty connection is causing the missing bytes and correct as necessary.
3. If the tag is a Data Set Tag of Object Group 87 and the data set has more than 32 elements, reduce the number of elements in the data set on the slave.

Unable to read tag address '<address>' on device '<device>'. Element Index '<variation>' is not defined in Data Set '<index>'

Error Type:
Warning

Possible Cause:

The slave does not define this element index within the data set.

Solution:

1. If the element index should be defined, correct the data set in the slave.
2. If the element index is invalid, correct the tag address in the project.

Unable to read tag address '<address>' on device '<device>'. No definition for Data Set '<index>'

Error Type:
Warning

Possible Cause:

1. A data set definition does not exist for the data set index of the .Value tag being read.
2. A data set exchange took place between the master and the slave. A new data set was then added in the slave unknown to the master.

Solution:

1. Create the data set in the slave.
2. Initiate a data set exchange. To do so, click **Device Properties | Tag Import** and then select **Import Tags**. Alternatively, restart the master.

Unable to read tag address '<address>' on device '<device>'. Response missing data

Error Type:
Warning

Possible Cause:

Although the response from the slave indicated success, data for one or more points in the requested range was not included in the response.

Solution:

Confirm that the points are enabled in the slave.

Note:

For example, if the tag references Object Group 87 - Data Sets, confirm that all data set elements are configured in the slave with the correct data type and length and that the data set characteristics are correctly configured.

Write Errors

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

Write Errors

Unable to write to address '<address>' on device '<device>'. Activate Configuration-Related Status Code '<status code>' - '<description>'

Unable to write to address '<address>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Unable to write to address '<address>' on device '<device>'. Channel Response Timeout must be between '<min channel response timeout>' and '<max channel response timeout>'

Unable to write to address '<address>' on device '<device>'. Control-Related Status Code '<status code>'

Unable to write to address '<address>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Unable to write to address '<address>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Unable to write to address '<address>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Unable to write to address '<address>' on device '<device>'. Device does not support the function code (IIN2.0)

Unable to write to address '<address>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Unable to write to address '<address>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Unable to write to address '<address>' on device '<device>'. Device Request Timeout must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. Element Index '<variation>' is not defined in Data Set '<index>'

Unable to write to address '<address>' on device '<device>'. Event Poll Interval must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. File name writes have been disabled

Unable to write to address '<address>' on device '<device>'. Integrity Poll Interval must be between '<min value>' and '<max value>'

Unable to write to address '<address>' on device '<device>'. Master Address '<master address>' already in use as Slave Address on Device '<device>'

Unable to write to address '<address>' on device '<device>'. Master Address must be between '<min master address>' and '<max master address>'

Unable to write to address '<address>' on device '<device>'. Master and Slave Address cannot be the same

Unable to write to address '<address>' on device '<device>'. No definition for Data Set '<index>'

Unable to write to address '<address>' on device '<device>'. Select Operate response invalid

Unable to write to address '<address>' on device '<device>'. Session shutting down or duplicate request

Unable to write to address '<address>' on device '<device>'. Slave Address '<slave address>' already in use on Device '<device>'

Unable to write to address '<address>' on device '<device>'. Slave Address must be between '<min slave address>' and '<max slave address>'

Unable to write to address '<address>' on device '<device>'. Tag '<data type>' Data type is incompatible with the Data Set element '<data type>' Data type

Unable to write to address '<address>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Unable to write to address '<address>' on device '<device>'. Unrecognized Object returned in Response

Unable to write to address '<address>' on device '<device>'. Unsupported Operation Type

Unable to write to address '<address>' on device '<device>'. Unsupported Trip-Close Code

Unable to write to address '<address>' on device '<device>'. Write value specified is invalid or incomplete

Unable to write to address '<address>' on device '<device>'. Activate Configuration-Related Status Code '<status code>' - '<description>'

Error Type:
Warning

Possible Cause:
The Activate Configuration Request that was sent to the slave contained an invalid object or specification string.

Solution:
For information on a specific status code, refer to the table below.

Status Code	Description
0	No errors were detected in the corresponding request object. No errors were detected in the configuration data referenced by the corresponding request object.
1	An error was detected in the request object. For example, the slave was unable to locate a file referenced by a g70 file specification string, or the slave does not have a name referenced by a g110 octet string.
2	An error was detected in the configuration data referenced by the corresponding request data.
3	An error occurred that is not listed above.
4	The Activate Config Object was not checked for errors.

Unable to write to address '<address>' on device '<device>'. An abnormal condition exists in the device (IIN1.6)

Error Type:
Warning

Possible Cause:
An abnormal condition has occurred that is specific to the device.

Solution:
Resolve any hardware issues found in the slave.

Unable to write to address '<address>' on device '<device>'. Channel Response Timeout must be between '<min channel response timeout>' and '<max channel response timeout>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Channel Response Timeout range of 100 to 3600000 milliseconds.

Unable to write to address '<address>' on device '<device>'. Control-Related Status Code '<status code>'

Error Type:
Warning

Possible Cause:
1. The value written to the .Operate sub-type was not understood by the DNP slave.
2. If the operate was successful but the feedback poll failed, the device will report status code 4.

Solution:
For information on a specific code number, refer to the table below.

Code Number	Identifier Name	Description
0	Success	Request accepted, initiated, or queued.
1	Timeout	Request not accepted because the operate message was received after the arm timer timed out. The arm timer was started when the select operation for the same point was received.
2	No_Select	Request not accepted because no previous matching select request exists. An operate message was sent to activate an output that was not previously armed with a matching select message.
3	Format_Error	Request not accepted because there were formatting errors in the control request (either select, operate, or direct operate).
4	Not_Supported	1. Request not accepted because a control operation is not supported for this point. 2. The device does not understand the feedback poll request for the latest value of all objects of an object group.
5	Already_Active	Request not accepted because the control queue is full (or the point is already active).
6	Hardware_Error	Request not accepted because of control hardware problems.
7	Local	Request not accepted because the Local/Remote switch is in the Local position.
8	Too_Many_Objs	Request not accepted because too many objects appeared in the same request.
9	Not_Authorized	Request not accepted because of insufficient authorization.
10	Automation_ Inhibit	Request not accepted because it was prevented or inhibited by a local automation process.
11	Processing_ Limited	Request not accepted because the device cannot process any more activities than are presently in progress.
12	Out_Of_Range	Request not accepted because the value is outside the acceptable range permitted for this point.
13 to 125	Reserved	Reserved for future use.
126	Non_Participating	Sent in request messages indicating that the outstation will neither issue nor perform the control operation.
127	Undefined	Request not accepted due to an undefined reason.

Unable to write to address '<address>' on device '<device>'. Device detected corrupt configuration (IIN2.5)

Error Type:
Warning

Possible Cause:
The device has detected that its configuration is corrupt.

Solution:
Reconfigure the slave.

Unable to write to address '<address>' on device '<device>'. Device does not support a point in the range or other parameter error (IIN2.2)

Error Type:
Warning

Possible Cause:
1. The device does not support a point in the specified range.
2. The device does not understand the parameters sent in the request.

Solution:
Change the tag address to one supported by the slave.

Unable to write to address '<address>' on device '<device>'. Device does not support requested operation for objects in the request (IIN2.1)

Error Type:
Warning

Possible Cause:
The device does not support the requested operation for the objects in the request.

Solution:
Verify that the slave supports the requested operation.

Unable to write to address '<address>' on device '<device>'. Device does not support the function code (IIN2.0)

Error Type:
Warning

Possible Cause:
The device does not support the function code.

Solution:
None.

Note:
For more information, refer to the device's documentation.

Unable to write to address '<address>' on device '<device>'. Device reports that some output points are in local mode (IIN1.5)

Error Type:
Warning

Possible Cause:
Some output points are in local mode.

Solution:
Correct the mode in the slave's configuration.

Note:
For more information, refer to the device's documentation.

Unable to write to address '<address>' on device '<device>'. Device reports that the operation is already executing (IIN2.4)

Error Type:
Warning

Possible Cause:
The specified address is being acted upon by another client.

Solution:
1. Stop the other client from acting upon the address.
2. Delay the operation of the address.

Unable to write to address '<address>' on device '<device>'. Device Request Timeout must be between '<min value>' and '<max value>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Device Request Timeout range of 0 to 3600000 seconds.

Unable to write to address '<address>' on device '<device>'. Element Index '<variation>' is not defined in Data Set '<index>'

Error Type:
Warning

Possible Cause:
The slave does not define this element index within the data set.

Solution:
1. If the element index should be defined, correct the data set in the slave.
2. If the element index is invalid, correct the tag address in the project.

Unable to write to address '<address>' on device '<device>'. Event Poll Interval must be between '<min value>' and '<max value>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Event Poll Interval range of 0 to 86400 seconds.

Unable to write to address '<address>' on device '<device>'. File name writes have been disabled

Error Type:
Warning

Possible Cause:
An attempt to modify the value of a 70.<index>.LocalFileName Tag or 70.<index>.RemoteFileName Tag failed because the Enable File Name Writes parameter was disabled in File Control (located in Device Properties).

Solution:
Change the Enable File Name Writes parameter to "Yes".

See Also:
File Control

Unable to write to address '<address>' on device '<device>'. Integrity Poll Interval must be between '<min value>' and '<max value>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Integrity Poll Interval range of 0 to 2592000 seconds.

Unable to write to address '<address>' on device '<device>'. Master Address '<master address>' already in use as Slave Address on Device '<device>'

Error Type:
Warning

Possible Cause:
The Master Address is already in use as a Slave Address on another device.

Solution:
Specify a Master Address that is unique among all Slave Addresses in the channel.

Unable to write to address '<address>' on device '<device>'. Master Address must be between '<min master address>' and '<max master address>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Master Address range of 0 to 65519.

Unable to write to address '<address>' on device '<device>'. Master and Slave Address cannot be the same

Error Type:
Warning

Possible Cause:
The Master Address and Slave Address are the same.

Solution:
Specify unique values for the Master Address and the Slave Address.

Unable to write to address '<address>' on device '<device>'. No definition for Data Set '<index>'

Error Type:
Warning

Possible Cause:
1. A data set definition does not exist for the data set index of the write tag.
2. A data set exchange took place between the master and the slave. A new data set was then added in the slave unknown to the master.

Solution:
1. Create the data set in the slave.
2. Initiate a data set exchange. To do so, click **Device Properties** | **Tag Import** and then select **Import Tags**. Alternatively, restart the master.

Unable to write to address '<address>' on device '<device>'. Select Operate response invalid

Error Type:
Warning

Possible Cause:
The device did not return an acceptable response to a Select then Operate request.

Solution:
Verify that the slave is configured to operate on the point.

Unable to write to address '<address>' on device '<device>'. Session shutting down or duplicate request

Error Type:
Warning

Possible Cause:
The client disconnected while a transaction was in progress.

Solution:
Confirm that the connection between the master and the slave is okay.

Unable to write to address '<address>' on device '<device>'. Slave Address '<slave address>' already in use on Device '<device>'

Error Type:
Warning

Possible Cause:
The Slave Address is already in use as a Master Address or Slave Address on another device in the channel.

Solution:
Specify a Slave Address that is unique among all Master Addresses and Slave Addresses in the channel.

Unable to write to address '<address>' on device '<device>'. Slave Address must be between '<min slave address>' and '<max slave address>'

Error Type:
Warning

Possible Cause:
The value is out of range.

Solution:
Specify a value within the Slave Address range of 0 to 65519.

Unable to write to address '<address>' on device '<device>'. Tag '<data type>' Data type is incompatible with the Data Set element '<data type>' Data type

Error Type:
Warning

Possible Cause:
The value being written is incompatible with the definition of the data set for that element.

Solution:
Correct the tag's data type so that it matches the data type defined for the element in the data set.

Unable to write to address '<address>' on device '<device>'. Unable to receive response from device '<device>' within timeout. Either the request or response could not be completed or the response is invalid

Error Type:
Warning

Possible Cause:
1. The Response Timeout is too short to allow the write to complete in time. The slave may have returned a large number of points in the feedback poll, but the timeout elapsed before the data was received.
2. There is an issue with the Authentication settings.

Solution:
1. If the slave is returning a large number of points in the feedback poll, change the channel's Response Timeout to a value that will allow the response to complete successfully.
2. Confirm that the Authentication settings in the master match those in the slave.

Notes:
1. The channel's Response Timeout should be as accurate as possible, because it is also the time that the driver will wait before reporting that the device is not responding.
2. The device's Request Timeout should be greater than the channel's Response Timeout.

See Also:
Timing and Other Considerations

Unable to write to address '<address>' on device '<device>'. Unrecognized Object returned in Response

Error Type:
Warning

Possible Cause:
The slave does not support the value being written to the Object Group.

Solution:
Change the value to one supported by the slave.

Unable to write to address '<address>' on device '<device>'. Unsupported Operation Type

Error Type:
Fatal

Possible Cause:
An invalid DNP operation code was specified when writing to the .Operate.OpType tag.

Solution:
Correct the .Operate.OpType tag's value.

Unable to write to address '<address>' on device '<device>'. Unsupported Trip-Close Code

Error Type:
Fatal

Possible Cause:
An invalid DNP Trip-Close code was specified when writing to the .Operate.TripCloseCode tag.

Solution:
Correct the .Operate.TripCloseCode tag's value.

Unable to write to address '<address>' on device '<device>'. Write value specified is invalid or incomplete

Error Type:
Warning

Possible Cause:
1. An invalid value was written to the Operate.Set, Operate, Object Group 60, Warmrestart, Coldrestart, ActivateConfig, or data set .Set Tag.
2. An attempt to write a data set occurred when there was no pending data to be written.
3. An attempt to write a large data set caused the request message to surpass the maximum fragment size.
4. An attempt to send an Activate Configuration Request failed due to a syntax error.
5. An attempt to send an Activate Configuration Request failed due to a remote file identifier not defined at the 70.index.
6. An attempt to send an Activate Configuration Request failed due to a string not defined at 110.index.
7. An attempt to initiate a file transfer failed because a file transfer is already in progress on that device.

Solution:
1. Correct the value written to the Operate.Set, Operate, Object Group 60, Warmrestart, Coldrestart, or data set .Set Tag.
2. Before writing a True to the data set .Set Tag, write data to one or more elements of a data set.
3. Reduce the number of bytes being written to the data set.
4. Correct the Activate Config Objects string to a valid format: object.index, object.index, object.index, and so forth.
5. Fix the Activate Config Objects string file object 70.index if it is incorrect. If it is correct, then define the remote file and path at that index.
6. Fix the Activate Config Objects string object 110.index if it is incorrect. If it is correct, then create a tag with the address to that string index.
7. Wait for the file transfer in progress to complete before attempting another on the device.

Note:
The default maximum master transmit fragment size is 2048 bytes.

File Control Error Messages

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

File Control Error Messages
File Transfer failure on Device '<device>' for file index '<index>'. Device returned File-Related Status Code '<status code>' - '<description>'
File Transfer failure on Device '<device>' for file index '<index>'. File size of '<size>' kilobytes is greater than maximum file size of '<maximum size>' kilobytes
File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted by user
File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted due to communications issue
File Transfer failure on Device '<device>' for file index '<index>'. Local file '<file name>' is empty
File Transfer failure on Device '<device>' for file index '<index>'. Local file open failure. <local file open failure>
File Transfer failure on Device '<device>' for file index '<index>'. Session shutting down or duplicate request
Invalid Local File for File Index 70.<file index>, general error
Invalid Local File for File Index 70.<file index>, verify the specified path is write-enabled
Invalid Local File path for File Index 70.<file index>
Invalid Local File syntax for File Index 70.<file index>

File Transfer failure on Device '<device>' for file index '<index>'. Device returned File-Related Status Code '<status code>' - '<description>'

Error Type:
Warning

Possible Cause:
The slave is reporting that an error occurred during a file transfer request from the master.

Solution:
For information on a specific code number, refer to the table below.

Code Number	Identifier Name	Description
0	Success	The requested operation was successful.
1	Permission_Denied	Permission was denied due to improper authentication key, user name, or password.
2	Invalid_Mode	An unsupported or unknown operation mode was requested.
3	File_Not_Found	The requested file does not exist. The path may be incorrect.
4	File_Locked	The requested file is already in use by another user.
5	Too_Many_Open	File could not be opened because the number of simultaneously opened files would be exceeded.
6	Invalid_Handle	There is no file opened with the handle in the request.
7	Write_Block_Size	The outstation is unable to negotiate a suitable write block size.
8	Comm_Lost	Communications were lost or cannot be established with the end device where the file resides.
9	Cannot_Abort	An abort request was unsuccessful because the slave is unable or not programmed to abort, or the slave knows that aborting the file would make it unusable.
10-15	Reserved	Reserved for future use.
16	Not_Opened	File handle does not reference an opened file.
17	Handle_Expired	File closed due to inactivity timeout. This code is sent in a file transport status event object (g70v6) when the timeout occurs.
18	Buffer_Overrun	Too much file data was received for the slave to process.
19	Fatal	An error happened in the file processing that prevents any further activity with this file.

20	Block_Seq	The block number did not have the expected sequence number.
21-254	Reserved	Reserved for future use.
255	Undefined	Some other error not listed above occurred.

File Transfer failure on Device '<device>' for file index '<index>'. File size of '<size>' kilobytes is greater than maximum file size of '<maximum size>' kilobytes

Error Type:
Warning

Possible Cause:
The file to be copied has a file size that exceeds the configured maximum file size for this file index.

Solution:
If the file size is expected, increase the maximum file size configured for that file index. If the file should not reach that size, determine the reason for its growth.

File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted by user

Error Type:
Warning

Possible Cause:
During a file transfer, the user wrote a 0 to the Upload or Download Tag of the file index to stop the transfer.

Solution:
None.

File Transfer failure on Device '<device>' for file index '<index>'. File transfer aborted due to communications issue

Error Type:
Warning

Possible Cause:
The serial connection between the device and the Host PC disconnected during a file transfer.

Solution:
Verify the cabling between the DNP master and the DNP slave device.

File Transfer failure on Device '<device>' for file index '<index>'. Local file '<file name>' is empty

Error Type:
Warning

Possible Cause:
The file that is to be downloaded to the slave is empty.

Solution:
Determine why the file is empty. Then, correct it and re-attempt to download the file to the slave.

File Transfer failure on Device '<device>' for file index '<index>'. Local file open failure. <local file open failure>

Error Type:
Warning

Possible Cause:
1. File was not found.
2. Invalid or incorrect path.
3. Too many open files.

4. Access denied.
5. Disk is full.
6. An unspecified error occurred.

Solution:
1. If the Append option is desired, confirm that the file name and path are configured correctly. Otherwise, change the local file's Open Mode to Overwrite in order to create a new local file.
2. If the local path is invalid, correct it for the file index in File Control (located in Device Properties). If the path is incorrect (and the server_runtime is running as a service), then configure the server_runtime service with a non-system user account with the correct permissions.
3. The number of open files exceeds the maximum allowed. Determine what is causing the files to remain open.
4. The file could not be accessed. Correct the file's access rights.
5. The local disk is full. Free up some disk space.
6. Determine the problem with the file or path name.

File Transfer failure on Device '<device>' for file index '<index>'. Session shutting down or duplicate request

Error Type:
Warning

Possible Cause:
The device disconnected while a transaction was in progress.

Solution:
Confirm that the connection between the master and the slave is okay.

Invalid Local File for File Index 70.<file index>, general error

Error Type:
Warning

Possible Cause:
The specified Local File Identifier is invalid. The error is unspecified.

Solution:
1. Specify a new Local File Path and/or Name with Read/Write privileges.
2. If this is a network drive, verify that both the current user and the user associated with the service have Read/Write privileges.

Invalid Local File for File Index 70.<file index>, verify the specified path is write-enabled

Error Type:
Warning

Possible Cause:
The current user does not have Read/Write privileges to the specified Local File Identifier.

Solution:
Verify that the current user (or the user associated with the service) has Read/Write privileges to the specified file and folders.

Invalid Local File path for File Index 70.<file index>

Error Type:
Warning

Possible Cause:
The Local File Identifier (which consists of the Local File Path and Name) does not include a valid path to the file.

Solution:
Verify the file name's directory/folder hierarchy. The specified file will be created at Runtime (excluding its path) if it does not already exist.

Invalid Local File syntax for File Index 70.<file index>

Error Type:
Warning

Possible Cause:
1. The Local File Identifier (which consists of the Local File Path and Name) contains one or more invalid characters (such as |?"*:<>).
2. The Local File Identifier contains the parent directory (denoted by '..'), which is not permitted for security purposes.

Solution:
1. Verify that the specified Local File Identifier does not contain invalid characters.
2. Verify that the specified Local File Identifier does not contain the parent directory.

Device Profile

For more information on a specific section of the Device Profile, select a link from the list below.

Device Identification
Link Layer
Application Layer
Masters Only
Implementation Tables

Note: For a Device Profile template, refer to DNP.org.

Device Identification

Component	Description	Current Value	Methods
Device Function	Masters send DNP requests.	Master	N/A.
Device Name	This is the model and name of the device, which should distinguish it from any other device from the same organization.	DNP Master Serial	N/A.
Hardware Version	N/A.	- Windows 7 - Windows Server 2008 - Windows Vista Business/Ultimate - Windows Server 2003 SP2 - Windows XP SP2 - Windows 2000 SP4	N/A.
Software Version	N/A.	v.5	N/A.
Device Profile Document Version	The version of the Device Profile Document is indicated by a whole number incremented with each new release.	4	N/A.
Supported WITS Major Version	The major version of the WITS Standard implemented by the device.	1	N/A.
Supported WITS Minor Version	The minor version of the WITS Standard implemented by the device.	0	N/A.
DNP Levels Supported for Requests	The DNP3 level to which the device conforms fully. Requests can be indicated independently.	3	N/A.
DNP Levels Supported for Responses	The DNP3 level to which the device conforms fully. Responses can be indicated independently.	3	N/A.
Supported Function Blocks	N/A.	Object 0 - Attribute Objects, Data Sets, File Transfer, Secure Authentication, and Function Code 31 - Activate Configuration.	N/A.
Notable Additions	This brief description intends to identify the most obvious features that the device supports, in addition to the highest supported level of DNP. The complete list of features is described in the Implementation Table.	- Enabling and disabling unsolicited responses on an individual class basis. - Double-bit Input Objects. - Variations with time for Frozen Counters, Frozen Counter Events, and Analog Input Events. - Floating-point variations for	For more information, refer to **Address Descriptions**.

		both Analog Inputs and Analog Outputs. - Analog Input Reporting Deadband. - Event Objects for Binary and Analog Outputs. - Device Attribute Objects including the Standard DNP set 0 and User-defined sets. - Data Set Objects. - Authentication. - File Control. - Activate Configuration.	
Methods to Set Configurable Parameters	N/A.	N/A.	Methods include .opf and .xml project files.*

*In addition to custom Channel Properties and Device Properties dialogs.

Serial Connections

Component	Description	Current Value	Methods
Serial Port Name	This is the name used to reference the communication port defined in this section.	COM1	The property located on Channel Communications Property page. Ranges from COM1 to COM255.
Serial Connection Parameters	N/A.	Data Bits - 8. Stop Bits - 1. Parity - None.	Properties located on Channel Communications Property page. Supported parameters are as follows: Data Bits: 5, 6, 7, or 8. Stop Bits: 1 or 2. Parity: None, Even, Odd.
Serial Baud Rate	N/A.	9600	Property located on Channel Communications Property page.*
Serial Hardware Flow Control	This parameter describes the interface's hardware signaling requirements. If a transmitter or receiver is inhibited until a given control signal is asserted, it is considered to require that signal prior to sending or receiving characters. If a signal is asserted prior to transmitting, that signal will be maintained actively until after the end of transmission. If a signal is asserted to enable reception, any data sent to the device when the signal is not active could be discarded.	None.	Property located on Channel Communications Property page. Supported flow controls are as follows: - DTR - RTS - RTS-DTR - RTS Always

*Supported baud rates are as follows: 300, 600, 1200, 2400, 9600, 19200, 28800, 38400, 56000, 57600, 115200, 128000, and 256000.

**If no asynchronous serial interface is fitted, this parameter is not applicable. Furthermore, none of the options will be selected.

Link Layer

Component	Description	Current Value	Methods
Data Link Address	This indicates if the link address is configurable over the entire valid range of 0 to 65519.	Ranges from 0 to 65519.	Slave Address property located on Device Communications Property page.

Sends Confirmed User Data Frames	This is a list of conditions under which the device transmits the following confirmed link layer services:
	
	    TEST_LINK_STATES
	    RESET_LINK_STATES
	    CONFIRMED_USER_DATA
		Never.	N/A.

Data Link Layer Confirmation Timeout	This timeout applies to any secondary data link message that requires a confirmation or response (such as link reset, link status, user data, and so forth).	2 seconds.	N/A.
Maximum Data Link Retries	This is the number of times that the device will retransmit a frame that requests Link Layer confirmation.	3 retries.	N/A.
Maximum Number of Octets Transmitted in a Data Link Frame	This number includes the checksum. With a length field of 255, the maximum size would be 292.	292	N/A.
Maximum Number of Octets that can be Received in a Data Link Frame	This number includes the checksum. With a length field of 255, the maximum size would be 292. The device must be able to receive 292 octets to be compliant.	292	N/A.

*Data link addresses 0xFFF0 through 0xFFFF are reserved for broadcast or other special purposes.

Application Layer

Component	Description	Current Value	Methods
Maximum Number of Octets Transmitted in an Application Layer Fragment other than File Transfer	This size does not include any transport or frame octets. Masters must provide a setting less than or equal to 249.	249	N/A.
Maximum Number of Octets Transmitted in an Application Layer Fragment Containing File Transfer	N/A.	N/A.	N/A.
Maximum Number of Octets that can be Received in an Application Layer Fragment	This size does not include any transport or frame octets. Masters must provide a setting greater than or equal to 2048.	2048	N/A.

Timeout waiting for Complete Application Layer Fragment	Timeout if all frames of a message fragment are not received in the specified time. It is measured from the time that the first frame of a fragment is received until the last frame is received.	N/A.	N/A.
Maximum Number of Objects Allowed in a Single Control Request for CROB (g12)	N/A.	N/A.	N/A.
Maximum Number of Objects Allowed in a Single Control Request for Analog Outputs (g41)	N/A.	N/A.	N/A.
Maximum Number of Objects Allowed in a Single Control Request for Data Sets (g85, 86, 87)	N/A.	N/A.	N/A.
Supports Mixing Object Groups* in the Same Control Request	N/A.	N/A.	N/A.

*AOBs, cROBs, and Data Sets.

Masters Only

Component	Description	Current Value	Methods
Timeout Waiting for Complete Application Layer Response	Timeout on Master if all fragments of a response message are not received in the specified time.	10000 ms.	Property located on the Channel Communications Property page. Supported response timeouts are 100 to 3600000.
Maximum Application Layer Retries for Request Messages	This is the number of times a Master will retransmit an application layer request message if a response is not received. This parameter must never cause a Master to retransmit control or time sync messages.	None.	N/A.
Incremental Timeout Waiting for First or Next Fragment of an Application Layer Response	N/A.	None.	N/A.

Implementation Tables

The following implementation tables identify which Object Groups and variations, function codes, and qualifiers are supported by the Master in both requests and responses. The Request columns identify all requests that may be sent by the Master, or all requests that must be parsed by a Slave. The Response columns identify all responses that must be parsed by the Master, or all responses that may be sent by a Slave.

Note 1: Both the Request Function Code and the Response Function Code are in decimal.

Code	Description
1	Read.
2	Write.

3	Select.
4	Operate.
5	Direct operate.
6	Direct operate, no acknowledgement.
20	Enable unsolicited responses.
21	Disable unsolicited responses.
25	Open file.
26	Close file.
27	Delete file.
28	Get file information.
29	Authenticate file.
30	Abort file transfer.
31	Activate configuration.
32	Authentication request.
129	Response.
130	Unsolicited response.
131	Authentication response.

Note 2: Both the Request Qualifier Code and the Response Qualifier Code are in hexadecimal.

Code	Description
00	8 bit start-stop.
01	16 bit start-stop.
06	No range, or all.
07	8 bit limited quantity.
08	16 bit limited quantity.
17	8 bit index.
18	16 bit index.
5B	Free format.

Object Group 0 - Device Attributes

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1-253	Standard Set 0 and User Defined Sets.	1 2	00, 06 00	129 N/A.	00, 17 N/A.
254	Non-specific all attributes request.	1	00, 06	129	00, 17
255	List of attribute variations.	1	00, 06	129	00, 5B

Object Group 1 - Binary Inputs

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	Packed format.	1	00, 01, 06	129	00, 01
2	With flags.	1	00, 01, 06	129	00, 01

Object Group 2 - Binary Input Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	Without time.	N/A.	N/A.	129, 130	17, 28
2	With absolute time.	N/A.	N/A.	129, 130	17, 28
3	With relative time.	N/A.	N/A.	129, 130	17, 28

Object Group 3 - Double Bit Inputs

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	Packed format.	1	00, 01, 06	129	00, 01
2	With flags.	1	00, 01, 06	129	00, 01

Object Group 4 - Double-bit Binary Input Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	Without time.	N/A.	N/A.	129, 130	17, 28
2	With absolute time.	N/A.	N/A.	129, 130	17, 28
3	With relative time.	N/A.	N/A.	129, 130	17, 28

Object Group 10 - Binary Outputs

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	Packed format.	1	00, 01, 06	129	00, 01
2	Output status with flags.	1	00, 01, 06	129	00, 01

Object Group 11 - Binary Output Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	Status without time.	N/A.	N/A.	129, 130	17, 28
2	Status with time.	N/A.	N/A.	129, 130	17, 28

Object Group 12 - Binary Command

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Control relay output block (CROB).	3, 4, 5, 6	17, 28	129	Echo of request.

Object Group 20 - Counters

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	32-bit with flag.	1	00, 01, 06	129	00, 01
2	16-bit with flag.	1	00, 01 06	129	00, 01
5	32-bit without flag.	1	00, 01 06	129	00, 01
6	16-bit without flag.	1	00, 01 06	129	00, 01

Object Group 21 - Frozen Counters

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation	1	00, 01, 06	N/A.	N/A.
1	32-bit with flag.	1	00, 01, 06	129	00, 01
2	16-bit with flag.	1	00, 01, 06	129	00, 01
5	32-bit with flag and time.	1	00, 01, 06	129	00, 01
6	16-bit with flag and time.	1	00, 01, 06	129	00, 01
9	32-bit without flag.	1	00, 01 06	129	00, 01
10	16-bit without flag.	1	00, 01 06	129	00, 01

Object Group 22 - Counter Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	32-bit with flag.	N/A.	N/A.	129, 130	17, 28
2	16-bit with flag.	N/A.	N/A.	129, 130	17, 28
5	32-bit with flag and time.	N/A.	N/A.	129, 130	17, 28
6	16-bit with flag and time.	N/A.	N/A.	129, 130	17, 28

Object Group 23 - Frozen Counter Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	32-bit with flag.	N/A.	N/A.	129, 130	17, 28
2	16-bit with flag.	N/A.	N/A.	129, 130	17, 28
5	32-bit with flag and time.	N/A.	N/A.	129, 130	17, 28
6	16-bit with flag and time.	N/A.	N/A.	129, 130	17, 28

Object Group 30 - Analog Inputs

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	32-bit with flag.	1	00, 01, 06	129	00, 01
2	16-bit with flag.	1	00, 01, 06	129	00, 01
3	32-bit without flag.	1	00, 01, 06	129	00, 01
4	16-bit without flag.	1	00, 01, 06	129	00, 01
5	Single-precision floating- point with flag.	1	00, 01, 06	129	00, 01
6	Double-precision floating- point with flag.	1	00, 01, 06	129	00, 01

Object Group 32 - Analog Input Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	32-bit without time.	N/A.	N/A.	129, 130	17, 28
2	16-bit without time.	N/A.	N/A.	129, 130	17, 28
3	32-bit with time.	N/A.	N/A.	129, 130	17, 28
4	16-bit with time.	N/A.	N/A.	129, 130	17, 28
5	Single-precision floating- point without time.	N/A.	N/A.	129, 130	17, 28
6	Double-precision floating- point without time.	N/A.	N/A.	129, 130	17, 28
7	Single-precision floating- point with time.	N/A.	N/A.	129, 130	17, 28
8	Double-precision floating- point with time.	N/A.	N/A.	129, 130	17, 28

Object Group 34 - Analog Inputs Deadband

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes

0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	16-bit.	1 2	00, 01, 06 00, 01	129 N/A.	00, 01 N/A.
2	32-bit.	1 2	00, 01, 06 00, 01	129 N/A.	00, 01 N/A.
3	Single-precision floating- point.	1 2	00, 01, 06 00, 01	129 N/A.	00, 01 N/A.

Object Group 40 - Analog Outputs

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	1	00, 01, 06	N/A.	N/A.
1	32-bit with flag.	1	00, 01, 06	129	00, 01
2	16-bit with flag.	1	00, 01, 06	129	00, 01
3	Single-precision floating point with flag.	1	00, 01, 06	129	00, 01
4	Double-precision floating point with flag.	1	00, 01, 06	129	00, 01

Object Group 41 - Analog Output Status

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	32-bit.	3, 4, 5, 6	17, 28	129	Echo of request.
2	16-bit.	3, 4, 5, 6	17, 28	129	Echo of request.
3	Single-precision floating- point.	3, 4, 5, 6	17, 28	129	Echo of request.
4	Double-precision floating- point.	3, 4, 5, 6	17, 28	129	Echo of request.

Object Group 42 - Analog Output Event

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
0	Any variation.	N/A.	N/A.	N/A.	N/A.
1	32-bit without time.	N/A.	N/A.	129, 130	17, 28
2	16-bit without time.	N/A.	N/A.	129, 130	17, 28
3	32-bit with time.	N/A.	N/A.	129, 130	17, 28
4	16-bit with time.	N/A.	N/A.	129, 130	17, 28
5	Single-precision floating- point without time.	N/A.	N/A.	129, 130	17, 28
6	Double-precision floating- point without time.	N/A.	N/A.	129, 130	17, 28
7	Single-precision floating- point with time.	N/A.	N/A.	129, 130	17, 28
8	Double-precision floating- point with time.	N/A.	N/A.	129, 130	17, 28

Object Group 50 - Time and Date

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Absolute time.	1 2	07 07	129 N/A.	07 N/A.
3	Absolute time at last recorded time.	2	07	N/A.	N/A.

Object Group 51 - Time and Date CTO

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Absolute time, synchronized.	N/A.	N/A.	129, 130	07
2	Absolute time, unsynchronized.	N/A.	N/A.	129, 130	07

Object Group 52 - Time Delay

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Coarse.	N/A.	N/A.	129	07
2	Fine.	N/A.	N/A.	129	07

Object Group 60 - Class Poll Data Request

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Code	Response Qualifier Codes
1	Class 0 data.	1	06	N/A.	N/A.
2	Class 1 data.	1 20 21	06, 07, 08 06 06	N/A. N/A. N/A.	N/A. N/A. N/A.
3	Class 2 data.	1 20 21	06, 07, 08 06 06	N/A. N/A. N/A.	N/A. N/A. N/A.
4	Class 3 data.	1 20 21	06, 07, 08 06 06	N/A. N/A. N/A.	N/A. N/A. N/A.

Object Group 70 - File Identifiers

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
2	Authentication.	29	5B	129	5B
3	File command.	25, 27	5B	N/A.	N/A.
4	File command status.	26, 30 N/A.	5B N/A.	129 130	5B 5B
5	File transport.	1, 2 N/A.	5B N/A.	129 130	5B 5B
6	File transport status.	1 N/A.	5B N/A.	129 130	5B 5B
7	File descriptor.	28 N/A.	5B N/A.	129 130	5B 5B
8	File specification string.	31	5B	N/A.	N/A.

Object Group 80 - Internal Indications

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Packed format.	1	00, 01	129	00, 01

Object Group 85 - Data Set Prototype

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	With UUID.	1	06	129	5B

Object Group 86 - Data Set Descriptor

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Data set contents.	1	06	129	5B

Object Group 87 - Data Set Present Value

Variation	Description	Request	Request	Response	Response

		Function Code	Qualifier Codes	Function Codes	Qualifier Codes
1	Present Value.	1	00, 01, 06	129	5B
		2	00, 01	N/A.	N/A.

Object Group 88 - Data Set Snapshot

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Data Set Snapshot.	N/A.	N/A.	129, 130	5B

Object Group 110 - Octet String Object

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	String	1	00, 01, 06	129	00, 01

Object Group 120 - Authentication Object

Variation	Description	Request Function Code	Request Qualifier Codes	Response Function Codes	Response Qualifier Codes
1	Challenge.	32	5B	131	5B
2	Reply.	32	5B	131	5B
3	Aggressive Mode Request.	1, 2, 3, 4, 5, 6, 20, 21	07	N/A.	N/A.
4	Session Key Status Request.	32	07	N/A.	N/A.
5	Session Key Status.	N/A.	N/A.	131	5B
6	Session Key Change.	32	5B	N/A.	N/A.
7	Error.	32	5B	131	5B
9	HMAC.	32	5B	N/A.	N/A.

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