

DNP3 Device Profile

Based on DNP XML Schema version 2.08.00

Document Name: PLX51-DNPM Device Profile

Document Description: PLX51-DNPM DNP3 Device Profile Document

Revision History

Date	Time	Version	Reason for change	Edited by
2021-04-17	09:31:00	1002	v1.001 - Initial Version v1.002 - Updated PLX51-DNPM firmware to 1.003.017 which included: - Support for Freeze Commands - Support for configurable DNP TCP and UDP ports - Support for variation 0 requests - Support for Octet Strings	ProSoft Technology

REFERENCE DEVICE:

1 Device Properties

This document is intended to be used for several purposes, including:

- Identifying the capabilities of a DNP3 device (Master Station or Outstation)
- Recording the settings of a specific instance of a device (parameter settings for a specific instance of the device in the user's total DNP3 estate)
- Matching user requirements to product capabilities when procuring a DNP3 device

The document is therefore structured to show, for each technical feature, the capabilities of the device (or capabilities required by the device when procuring).

It is also structured to show the current value (or setting) of each of the parameters that describe a specific instance of the device. This "current value" may also show a functional limitation of the device. For example when implementing secure authentication it is not required that all DNP3 devices accept aggressive mode requests during critical exchanges (see Device Profile 1.12.4), in which case a vendor would mark this current value as "No - does not accept aggressive mode requests".

Additionally, the current value may sometimes be used to show a value that a device can achieve because of hardware or software dependencies. An example of this is in section 1.6.8 of the Device Profile (Maximum error in the time that the Master issues freeze requests) where the value may well depend upon tolerances of hardware components and interactions between software tasks. When the Device Profile current value is used in this way the corresponding entry in the capabilities column is grayed-out. Users should note that if an entry in the capabilities column of the Device Profile is grayed-out then there may be information in the current value column that is pertinent to the device's capabilities.

Unless otherwise noted, multiple boxes in the second column below are selected for each parameter to indicate all capabilities supported or required. Parameters without checkboxes in the second column do not have capabilities and are included so that the current value may be shown in the third column.

The items listed in the capabilities column below may be configurable to any of the options selected, or set to a fixed value when the device was designed. Item 1.1.10 contains a list of abbreviations for the possible ways in which the configurable parameters may be set. Since some parameters may not be accessible by each of these methods supported, an abbreviation for the configuration method supported by each parameter is shown in the fourth column of the tables below.

If this document is used to show the current values, the third column should be filled in even if a fixed parameter is selected in the capabilities section ("NA" may be entered for parameters that are Not Applicable).

If the document is used to show the current values of parameters, then column 3 applies to a single connection between a master and an outstation.

1.1 DEVICE IDENTIFICATION	Capabilities	Current Value	If configurable list methods
1.1.1 Device Function: <i>Masters send DNP requests, while Outstations send DNP responses. If a single physical device can perform both functions a separate Device Profile Document must be provided for each function.</i>	<input checked="" type="radio"/> Master <input type="radio"/> Outstation	<input checked="" type="radio"/> Master <input type="radio"/> Outstation	
1.1.2 Vendor Name: <i>The name of the organization producing the device.</i> <i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 252.</i>		ProSoft Technology	
1.1.3 Device Name: <i>The model and name of the device, sufficient to distinguish it from any other device from the same organization.</i> <i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 250.</i>		PLX51-DNPM	
1.1.4 Device manufacturer's hardware version string: <i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 243.</i>		N/A	
1.1.5 Device manufacturer's software version string: <i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 242.</i>		1.003.017	
1.1.6 Device Profile Document Version Number: <i>Version of the Device Profile Document is indicated by a whole number incremented with each new release. This should match the latest version shown in the Revision History at the beginning of this document.</i>		1	
1.1.7 DNP Levels Supported for: <i>Indicate each DNP3 Level to which the device conforms fully. For Masters, requests and responses can be indicated independently.</i>	Masters Only Requests Responses <input type="checkbox"/> <input type="checkbox"/> None <input type="checkbox"/> <input checked="" type="checkbox"/> Level 1 <input type="checkbox"/> <input checked="" type="checkbox"/> Level 2 <input type="checkbox"/> <input checked="" type="checkbox"/> Level 3 <input type="checkbox"/> <input type="checkbox"/> Level 4	For requests: For responses: Level 1 Level 2 Level 3	Proprietary File via Other Mechanism ----- ---

1.1.8 Supported Function Blocks:	<div><input type="checkbox"/> Self Address Support</div> <div><input type="checkbox"/> Data Sets</div> <div><input type="checkbox"/> File Transfer</div> <div><input type="checkbox"/> Virtual Terminal</div> <div><input type="checkbox"/> Mapping to IEC 61850 Object Models defined in a DNP3 XML file</div> <div><input type="checkbox"/> Function code 31, activate configuration</div> <div><input checked="" type="checkbox"/> Secure Authentication (if checked then see 1.12)</div>	Secure Authentication	Proprietary File via Other Mechanism ----- ---																												
1.1.9 Notable Additions: <i>A brief description intended to quickly identify (for the reader) the most obvious features the device supports in addition to the Highest DNP Level Supported. The complete list of features is described in the Implementation Table.</i>																															
1.1.10 Methods to set Configurable Parameters:	<div><input type="checkbox"/> XML - Loaded via DNP3 File Transfer</div> <div><input type="checkbox"/> XML - Loaded via other transport mechanism</div> <div><input type="checkbox"/> Terminal - ASCII Terminal Command Line</div> <div><input type="checkbox"/> Software - Vendor software named</div> <div><input type="checkbox"/> Proprietary file loaded via DNP3 File Transfer</div> <div><input checked="" type="checkbox"/> Proprietary file loaded via other transport mechanism</div> <div><input type="checkbox"/> Direct - Keypad on device front panel</div> <div><input type="checkbox"/> Factory - Specified when device is ordered</div> <div><input type="checkbox"/> Protocol - Set via DNP3 (e.g. assign class)</div> <div><input type="checkbox"/> Other - explain:</div>																														
1.1.11 DNP3 XML files available On-line: <i>XML configuration file names that can be read or written through DNP3 File Transfer to a device.</i> <i>A device's currently running configuration is returned by DNP3 on-line XML file read from the device.</i> <i>DNP3 on-line XML file write to a device will update the device's configuration when the Activate Configuration (function code 31) is received.</i>	<table><thead><tr><th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th><th><u>Description of Contents</u></th></tr></thead><tbody><tr><td><input type="checkbox"/></td><td></td><td>dnpDP.xml</td><td>Complete Device Profile</td></tr><tr><td><input type="checkbox"/></td><td></td><td>dnpDPCap.xml</td><td>Device Profile Capabilities</td></tr><tr><td><input type="checkbox"/></td><td></td><td>dnpDPCfg.xml</td><td>Device Profile config values</td></tr></tbody></table>	<u>Rd</u>	<u>Wr</u>	<u>Filename</u>	<u>Description of Contents</u>	<input type="checkbox"/>		dnpDP.xml	Complete Device Profile	<input type="checkbox"/>		dnpDPCap.xml	Device Profile Capabilities	<input type="checkbox"/>		dnpDPCfg.xml	Device Profile config values	<table><thead><tr><th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th></tr></thead><tbody><tr><td><input type="checkbox"/></td><td></td><td>dnpDP.xml</td></tr><tr><td><input type="checkbox"/></td><td></td><td>dnpDPCap.xml</td></tr><tr><td><input type="checkbox"/></td><td></td><td>dnpDPCfg.xml</td></tr></tbody></table>	<u>Rd</u>	<u>Wr</u>	<u>Filename</u>	<input type="checkbox"/>		dnpDP.xml	<input type="checkbox"/>		dnpDPCap.xml	<input type="checkbox"/>		dnpDPCfg.xml	
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1.1.12 External DNP3 XML files available Off-line: <i>XML configuration file names that can be read or written from an external system, typically from a system that maintains the outstation configuration.</i> <i>External off-line XML file read permits an XML definition of a new configuration to be supplied from off-line configuration tools.</i> <i>External off-line XML file write permits an XML definition of a new configuration to be supplied to off-line configuration tools.</i>	<table><thead><tr><th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th><th><u>Description of Contents</u></th></tr></thead><tbody><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDP.xml</td><td>Complete Device Profile</td></tr><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDPCap.xml</td><td>Device Profile Capabilities</td></tr><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDPCfg.xml</td><td>Device Profile config values</td></tr></tbody></table>	<u>Rd</u>	<u>Wr</u>	<u>Filename</u>	<u>Description of Contents</u>	<input type="checkbox"/>	<input type="checkbox"/>	dnpDP.xml	Complete Device Profile	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCap.xml	Device Profile Capabilities	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCfg.xml	Device Profile config values	<table><thead><tr><th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th></tr></thead><tbody><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDP.xml</td></tr><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDPCap.xml</td></tr><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDPCfg.xml</td></tr></tbody></table>	<u>Rd</u>	<u>Wr</u>	<u>Filename</u>	<input type="checkbox"/>	<input type="checkbox"/>	dnpDP.xml	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCap.xml	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCfg.xml	
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<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCfg.xml																													

1.1.13 Connections Supported:	<input checked="" type="checkbox"/> Serial (complete section 1.2) <input checked="" type="checkbox"/> IP Networking (complete section 1.3) <input type="checkbox"/> Other, explain	Serial IP Networking	Proprietary File via Other Mechanism ----- ---
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1.2 SERIAL CONNECTIONS	Capabilities	Current Value	If configurable list methods
1.2.1 Port Name: <i>Name used to reference the communications port defined in this section.</i>			
1.2.2 Serial Connection Parameters:	<input checked="" type="checkbox"/> Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bit, No Parity <input type="checkbox"/> Other, explain <div>Note: Implemented in Target Layer</div>	Asynchronous	
1.2.3 Baud Rate:	<input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input checked="" type="checkbox"/> Configurable, selectable from 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 <input type="checkbox"/> Configurable, other, describe <div>Note: Implemented in Target Layer</div>		

<p>1.2.4 Hardware Flow Control (Handshaking):</p> <p><i>Describe hardware signaling requirements of the interface.</i></p> <p><i>Where 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.</i></p> <p><i>Where a signal is asserted prior to transmitting, that signal will be maintained active until after the end of transmission.</i></p> <p><i>Where a signal is asserted to enable reception, any data sent to the device when the signal is not active could be discarded.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p>RS-232 / V.24 / V.28 Options:</p> <p><u>Asserts:</u></p> <p><input type="checkbox"/> RTS Before Tx</p> <p><input type="checkbox"/> DTR Before Tx</p> <p><input type="checkbox"/> RTS Before Rx</p> <p><input type="checkbox"/> DTR Before Rx</p> <p><input type="checkbox"/> Always RTS</p> <p><input type="checkbox"/> Always DTR</p> <p><u>Requires Before Tx:</u></p> <p>CTS <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>DCD <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>DSR <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>RI <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p><input type="checkbox"/> Requires Rx Inactive before Tx</p> <p><u>Requires Before Rx:</u></p> <p>CTS <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>DCD <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>DSR <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p>RI <input type="checkbox"/> Asserted <input type="checkbox"/> Deasserted</p> <p><u>Always Ignores:</u></p> <p><input type="checkbox"/> CTS</p> <p><input type="checkbox"/> DCD</p> <p><input type="checkbox"/> DSR</p> <p><input type="checkbox"/> RI</p> <p><input type="checkbox"/> Other, explain</p> <p>RS-422 / V.11 Options:</p> <p><input type="checkbox"/> Requires Indication before Rx</p> <p><input type="checkbox"/> Asserts Control before Tx</p> <p><input type="checkbox"/> Other, explain</p> <p>RS-485 Options:</p> <p><input type="checkbox"/> Requires Rx inactive before Tx</p> <p><input type="checkbox"/> Other, explain</p> <p><input checked="" type="checkbox"/> Other, explain Software</p>	<p>None RS-232 / V.24 / V.28 Options:</p> <p>Other,</p> <p>RS-422 / V.11 Options:</p> <p>RS-485 Options: Other,</p>
<p>1.2.5 Interval to Request Link Status:</p> <p><i>Indicates how often to send Data Link Layer status requests on a serial connection. This parameter is separate from the TCP Keep-alive timer.</i></p>	<p><input checked="" type="checkbox"/> Not Supported</p> <p><input type="checkbox"/> Fixed at seconds</p> <p><input type="checkbox"/> Configurable, range to seconds</p> <p><input type="checkbox"/> Configurable, selectable from seconds</p> <p><input type="checkbox"/> Configurable, other, describe</p>	<p>Proprietary File via Other Mechanism</p> <p>-----</p> <p>---</p>

<p>1.2.6 Supports DNP3 Collision Avoidance:</p> <p><i>Indicates whether an Outstation uses a collision avoidance algorithm.</i></p> <p><i>Collision avoidance may be implemented by a back-off timer with two parameters that define the back-off time range or by some other vendor-specific mechanism.</i></p> <p><i>The recommended back-off time is specified as being a fixed minimum delay plus a random delay, where the random delay has a maximum value specified. This defines a range of delay times that are randomly distributed between the minimum value and the minimum plus the maximum of the random value.</i></p> <p><i>If a back-off timer is implemented with only a fixed or only a random value, select the Back-off time method and set the parameter that is not supported to "Fixed at 0 ms".</i></p>	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, using Back-off time = (Min + Random) method <input type="checkbox"/> Other, explain	No	
<p>1.2.7 Receiver Inter-character Timeout:</p> <p><i>When serial interfaces with asynchronous character framing are used, this parameter indicates if the receiver makes a check for gaps between characters. (i.e. extensions of the stop bit time of one character prior to the start bit of the following character within a message). If the receiver performs this check and the timeout is exceeded then the receiver discards the current data link frame. A receiver that does not discard data link frames on the basis of inter-character gaps is considered not to perform this check.</i></p> <p><i>Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.</i></p>	<input checked="" type="checkbox"/> Not Checked <input type="checkbox"/> No gap permitted <input type="checkbox"/> Fixed at bit times <input type="checkbox"/> Fixed at ms <input type="checkbox"/> Configurable, range to bit times <input type="checkbox"/> Configurable, range to ms <input type="checkbox"/> Configurable, selectable from bit times <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain	Not Checked	
<p>1.2.8 Inter-character gaps in transmission:</p> <p><i>When serial interfaces with asynchronous character framing are used, this parameter indicates whether extra delay is ever introduced between characters in the message, and if so, the maximum width of the gap.</i></p> <p><i>Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.</i></p>	<input checked="" type="checkbox"/> None (always transmits with no inter-character gap) <input type="checkbox"/> Maximum bit times <input type="checkbox"/> Maximum ms	None	

1.3 IP NETWORKING	Capabilities	Current Value	If configurable list methods
<p>1.3.1 Port Name:</p> <p><i>Name used to reference the communications port defined in this section.</i></p>			
<p>1.3.2 Type of End Point:</p>	<input checked="" type="checkbox"/> TCP Initiating (Master Only) <input checked="" type="checkbox"/> TCP Listening (Outstation Only) <input checked="" type="checkbox"/> TCP Dual (required for Masters) <input checked="" type="checkbox"/> UDP Datagram (required)	TCP Initiating	Proprietary File via Other Mechanism ----- ---

1.3.3 IP Address of this Device:		*,*,*,*	Proprietary File via Other Mechanism ----- ---
1.3.4 Subnet Mask:			Proprietary File via Other Mechanism ----- ---
1.3.5 Gateway IP Address:			Proprietary File via Other Mechanism ----- ---
1.3.6 Accepts TCP Connections or UDP Datagrams from:	<input checked="" type="checkbox"/> Allows all (show as *,*,*,* in 1.3.7) <input checked="" type="checkbox"/> Limits based on IP address <input checked="" type="checkbox"/> Limits based on list of IP addresses <input type="checkbox"/> Limits based on a wildcard IP address <input type="checkbox"/> Limits based on list of wildcard IP addresses <input type="checkbox"/> Other, explain	Allows all	Proprietary File via Other Mechanism ----- ---
1.3.7 IP Address(es) from which TCP Connections or UDP Datagrams are accepted:		*,*,*,*	Proprietary File via Other Mechanism ----- ---
1.3.8 TCP Listen Port Number: <i>If Outstation or dual end point Master, port number on which to listen for incoming TCP connect requests. Required to be configurable for Masters and recommended to be configurable for Outstations.</i>	<input type="checkbox"/> Not Applicable (Master w/o dual end point) <input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	20000	Proprietary File via Other Mechanism ----- ---
1.3.9 TCP Listen Port Number of remote device: <i>If Master or dual end point Outstation, port number on remote device with which to initiate connection. Required to be configurable for Masters and recommended to be configurable for Outstations.</i>	<input type="checkbox"/> Not Applicable (Outstation w/o dual end point) <input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	20000	Proprietary File via Other Mechanism ----- ---
1.3.10 TCP Keep-alive timer: <i>The time period for the keep-alive timer on active TCP connections.</i>	<input type="checkbox"/> Fixed at ms <input checked="" type="checkbox"/> Configurable, range 0 to 2147483647 ms <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe	0 ms	Proprietary File via Other Mechanism ----- ---
1.3.11 Local UDP port: <i>Local UDP port for sending and/or receiving UDP datagrams. Masters may let system choose an available port. Outstations must use one that is known by the Master.</i>	<input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input checked="" type="checkbox"/> Let system choose (Master only)	20000	Proprietary File via Other Mechanism ----- ---
1.3.12 Destination UDP port for DNP3 Requests (Masters Only):	<input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		Proprietary File via Other Mechanism ----- ---

1.3.13 Destination UDP port for initial unsolicited null responses (UDP only Outstations): <i>The destination UDP port for sending initial unsolicited Null response.</i>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		Proprietary File via Other Mechanism ----- ---
1.3.14 Destination UDP port for responses (UDP only Outstations): <i>The destination UDP port for sending all responses other than the initial unsolicited Null response.</i>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Use source port number		Proprietary File via Other Mechanism ----- ---
1.3.15 Multiple outstation connections (Masters only): <i>Indicates whether multiple outstation connections are supported.</i>	<input checked="" type="checkbox"/> Supports multiple outstations (Masters only)	True	
1.3.16 Multiple master connections (Outstations only): <i>Indicates whether multiple master connections are supported and the method that can be used to establish connections.</i>	<input type="checkbox"/> Supports multiple masters (Outstations only) If supported, the following methods may be used: <input type="checkbox"/> Method 1 (based on IP address) - required <input type="checkbox"/> Method 2 (based on IP port number) - recommended <input type="checkbox"/> Method 3 (browsing for static data) - optional	Not supported	Proprietary File via Other Mechanism ----- ---
1.3.17 Time synchronization support:	<input type="checkbox"/> DNP3 LAN procedure (function code 24) <input checked="" type="checkbox"/> DNP3 Write Time (not recommended over LAN) <input type="checkbox"/> Other, explain <input type="checkbox"/> Not Supported		Proprietary File via Other Mechanism ----- ---

1.4 LINK LAYER	Capabilities	Current Value	If configurable list methods
1.4.1 Data Link Address: <i>Indicates if the link address is configurable over the entire valid range of 0 to 65,519. Data link addresses 0xFFFF0 through 0xFFFF are reserved for broadcast or other special purposes.</i>	<input type="checkbox"/> Fixed at <input checked="" type="checkbox"/> Configurable, range 0 to 65519 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	1	Proprietary File via Other Mechanism ----- ---
1.4.2 DNP3 Source Address Validation: <i>Indicates whether the Outstation will filter out requests not from a specific source address.</i>	<input type="checkbox"/> Never <input checked="" type="checkbox"/> Always, one address allowed (shown in 1.4.3) <input type="checkbox"/> Always, any one of multiple addresses allowed (each selectable as shown in 1.4.3) <input type="checkbox"/> Sometimes, explain		Proprietary File via Other Mechanism ----- ---
1.4.3 DNP3 Source Address(es) expected when Validation is Enabled: <i>Selects the allowed source address(es)</i>	<input type="checkbox"/> Configurable to any 16 bit DNP Data Link Address value <input checked="" type="checkbox"/> Configurable, range 0 to 65519 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	3	Proprietary File via Other Mechanism ----- ---
1.4.4 Self Address Support using address 0xFFFFC: <i>If an Outstation receives a message with a destination address of 0xFFFFC it shall respond normally with its own source address. It must be possible to diasble this feature if supported.</i>	<input type="checkbox"/> Yes (only allowed if configurable) <input checked="" type="checkbox"/> No	No	Proprietary File via Other Mechanism ----- ---

1.4.5 Sends Confirmed User Data Frames: <i>A list of conditions under which the device transmits confirmed link layer services (TEST_LINK_STATES, RESET_LINK_STATES, CONFIRMED_USER_DATA).</i>	<input checked="" type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes, explain	Never	Proprietary File via Other Mechanism ----- ---
1.4.6 Data Link Layer Confirmation Timeout: <i>This timeout applies to any secondary data link message that requires a confirm or response (link reset, link status, user data, etc).</i>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at ms <input type="checkbox"/> Configurable, range to ms <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		Proprietary File via Other Mechanism ----- ---
1.4.7 Maximum Data Link Retries: <i>The number of times the device will retransmit a frame that requests Link Layer confirmation.</i>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		Proprietary File via Other Mechanism ----- ---
1.4.8 Maximum number of octets Transmitted in a Data Link Frame: <i>This number includes the CRCs. With a length field of 255, the maximum size would be 292.</i>	<input checked="" type="checkbox"/> Fixed at 292 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	292	Proprietary File via Other Mechanism ----- ---
1.4.9 Maximum number of octets that can be Received in a Data Link Frame: <i>This number includes the CRCs. With a field length of 255, the maximum size would be 292. The device must be able to receive 292 octets to be compliant.</i>	<input checked="" type="checkbox"/> Fixed at 292 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		Proprietary File via Other Mechanism ----- ---

1.5 APPLICATION LAYER	Capabilities	Current Value	If configurable list methods
1.5.1 Maximum number of octets Transmitted in an Application Layer Fragment other than File Transfer: <i>This size does not include any transport or frame octets.</i> - Masters must provide a setting less than or equal to 249 to be compliant. - Outstations must provide a setting less than or equal to 2048 to be compliant. <i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 240.</i>	<input checked="" type="checkbox"/> Fixed at 256 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	2048	Proprietary File via Other Mechanism ----- ---
1.5.2 Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer:	<input checked="" type="checkbox"/> Fixed at 256 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		Proprietary File via Other Mechanism ----- ---

<p>1.5.3 Maximum number of octets that can be received in an Application Layer Fragment:</p> <p><i>This size does not include any transport or frame octets.</i></p> <p>- Masters must provide a setting greater than or equal to 2048 to be compliant.</p> <p>- Outstations must provide a setting greater than or equal to 249 to be compliant.</p> <p><i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 241.</i></p>	<input checked="" type="checkbox"/> Fixed at 1000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	2048	Proprietary File via Other Mechanism ----- ---
<p>1.5.4 Timeout waiting for Complete Application Layer Fragment:</p> <p><i>Timeout if all frames of a message fragment are not received in the specified time. Measured from time first frame of a fragment is received until the last frame is received.</i></p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at ms <input checked="" type="checkbox"/> Configurable, range 100 to 65000ms <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		
<p>1.5.5 Maximum number of objects allowed in a single control request for CROB (Group 12):</p> <p><i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 216.</i></p>	<input checked="" type="checkbox"/> Fixed at 256 (enter 0 if controls are not supported for CROB) <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain	10	Proprietary File via Other Mechanism ----- ---
<p>1.5.6 Maximum number of objects allowed in a single control request for Analog Outputs (Group 41):</p>	<input checked="" type="checkbox"/> Fixed at 256 (enter 0 if controls are not supported for Analog Outputs) <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		Proprietary File via Other Mechanism ----- ---
<p>1.5.7 Maximum number of objects allowed in a single control request for Data Sets (Groups 85, 86, 87):</p>	<input type="checkbox"/> Fixed at (enter 0 if controls are not supported for Data Sets) <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		Proprietary File via Other Mechanism ----- ---
<p>1.5.8 Supports mixed object groups (AOBs, CROBs and Data Sets) in the same control request:</p>	<input type="checkbox"/> Not applicable - controls are not supported <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Yes	Proprietary File via Other Mechanism ----- ---

1.6 FILL OUT THE FOLLOWING ITEMS FOR MASTERS ONLY	Capabilities	Current Value	If configurable list methods
<p>1.6.1 Timeout waiting for Complete Application Layer Responses (ms):</p> <p><i>Timeout on Master if all fragments of a response message are not received in the specified time.</i></p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at ms <input checked="" type="checkbox"/> Configurable, range 100 to 65000ms <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		

<p>1.6.2 Maximum Application Layer Retries for Request Messages:</p> <p><i>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 time sync messages.</i></p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at <input checked="" type="checkbox"/> Configurable, range 0 to 10 <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		
<p>1.6.3 Incremental Timeout waiting for First or Next Fragment of an Application Layer Response:</p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at ms <input type="checkbox"/> Configurable, range to ms <input type="checkbox"/> Configurable, selectable from ms <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		
<p>1.6.4 Issuing controls to off-line devices:</p> <p><i>Indicates if the Master issues control requests to devices that are thought to be off-line (i.e. the Master has not seen responses to previous Master requests).</i></p>	<input checked="" type="checkbox"/> Not applicable - controls are not supported <input type="checkbox"/> Yes <input type="checkbox"/> No		
<p>1.6.5 Issuing controls to off-scan devices:</p> <p><i>Indicates if the Master issues control requests to devices that are currently off-scan (i.e. the Master has been configured not to issue poll requests to the device).</i></p>	<input checked="" type="checkbox"/> Not applicable - controls are not supported <input type="checkbox"/> Yes <input type="checkbox"/> No		
<p>1.6.6 Maximum Application Layer Retries for Control Select Messages (same sequence number):</p> <p><i>Indicates the number of times a Master will retransmit an application layer control select request message if a response is not received - using the same message sequence number.</i></p>	<input checked="" type="checkbox"/> None (required) <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		
<p>1.6.7 Maximum Application Layer Retries for Control Select Messages (new sequence number):</p> <p><i>Indicates the number of times a Master will retransmit an application layer control select request message if a response is not received - using a new message sequence number.</i></p>	<input checked="" type="checkbox"/> None (required) <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain		
<p>1.6.8 Maximum error in the time that the Master issues freeze requests:</p> <p><i>If the Master is scheduled to issue freeze requests at a specific time, what is the maximum error in the time that the Master may actually issue a request?</i></p>		ms	
<p>1.6.9 Maximum error in the time that the Master schedules repetitive freeze requests:</p> <p><i>If the Master is scheduled to issue freeze requests at a regular interval, what is the maximum error in the time interval that the Master may actually issue a request? (i.e. how early / late could the request actually be issued)?</i></p>		ms	
<p>1.6.10 Scheduled actions that may affect the accuracy of freeze requests:</p> <p><i>Indicates if the Master's accuracy of issuing freeze requests may be affected by other scheduled operations such as poll requests or control requests.</i></p>	<input type="checkbox"/> Freeze time may be affected by Poll requests <input type="checkbox"/> Freeze time may be affected by Control requests		

<p>1.6.11 Master's algorithm for scheduling request operations:</p> <p><i>Describe the Master's algorithm for determination of which activity is performed when more than one is due at the same moment. Discuss precedence and priorities for activities such as time synchronization, poll requests, control requests and freeze requests.</i></p>			
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1.12 SECURITY PARAMETERS	Capabilities	Current Value	If configurable list methods
<p>1.12.1 DNP3 device support for secure authentication:</p> <p><i>The support for secure authentication is optional in DNP3 devices. Indicate here if the device supports secure authentication.</i></p> <p><i>If the device does not support secure authentication then ignore the rest of this section.</i></p> <p><i>If the device does support secure authentication then specify the version(s) that are supported in the device. The version number is an integer value defined in the DNP3 Specification. The Secure Authentication procedure defined in IEEE 1815-2010 is version 2. The Secure Authentication procedure defined in IEEE 1815-2012 is version 5.</i></p>	<p><input type="checkbox"/> Secure Authentication not supported</p> <p>If Secure Authentication is supported, what Version(s) are supported:</p> <p><input type="checkbox"/> Fixed at</p> <p><input checked="" type="checkbox"/> Configurable, selectable from 2, 5</p>	<p>Supports security Version: 5</p>	<p>Proprietary File via Other Mechanism ----- ---</p>
<p>1.12.2 Maximum number of users:</p> <p><i>The secure authentication algorithm provides support for multiple users. The device must support details for each user (update keys, session keys, etc). A user is identified by a 16-bit user number, allowing a maximum of 65535 users. Devices are not mandated to support this number of potential users. Indicate here the actual limit to the number of simultaneous users that can be supported.</i></p>	<p>Maximum number of users supported: 1</p>	<p>Maximum number of users supported: 1</p>	<p>Proprietary File via Other Mechanism ----- ---</p>
<p>1.12.3 Security message response timeout:</p> <p><i>Authentication of critical messages may involve additional message exchanges (challenges and responses) which can require an extension to the normal DNP3 message response timeout. This timeout specifies an additional time to be used when the extra security transactions are involved. The maximum allowable timeout extension should not exceed 120 seconds.</i></p>	<p><input type="checkbox"/> Fixed at ms</p> <p><input checked="" type="checkbox"/> Configurable, range 1 to 65ms</p> <p><input type="checkbox"/> Configurable, selectable from ms</p> <p><input type="checkbox"/> Configurable, other, describe</p>	<p>2 ms</p>	<p>Proprietary File via Other Mechanism ----- ---</p>
<p>1.12.4 Aggressive mode of operation (receive):</p> <p><i>DNP3 devices may (optionally) accept "aggressive" mode requests, where challenge data used for authentication is appended to a critical message rather than needing to be solicited via a separate message exchange.</i></p>		<p><input checked="" type="radio"/> Yes, accepts aggressive mode requests</p> <p><input type="radio"/> No, does not accept aggressive mode requests</p>	<p>Proprietary File via Other Mechanism ----- ---</p>

<p>1.12.5 Aggressive mode of operation (issuing):</p> <p><i>DNP3 devices must support the issuing of "aggressive" mode of operation, where challenge data used for authentication is appended to a critical message rather than needing to be solicited via a separate message exchange. Specific instances of devices may have the use of aggressive mode switched off.</i></p>		<p><input checked="" type="radio"/> Yes, issues aggressive mode requests</p> <p><input type="radio"/> No, does not issue aggressive mode requests</p>	<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>
<p>1.12.6 Session key change interval:</p> <p><i>To counter an attack that compromises the session key, the session key is changed at regular intervals. The maximum interval is 2 hours. Outstation devices invalidate the current set of session keys if they have not been changed by the master station after a period of twice this configured value.</i></p> <p><i>To accommodate systems with infrequent communications, this change interval can be disabled and just the session key change message count used (see 1.12.7)</i></p>	<p><input checked="" type="checkbox"/> Can be disabled</p> <p>When enabled</p> <p><input type="checkbox"/> Configurable, range to seconds</p>	<p>Disabled</p>	<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>
<p>1.12.7 Session key change message count:</p> <p><i>In addition to changing the session key at regular intervals, the key shall also be changed after a specified number of messages have been exchanged. The maximum allowable value for this message count is 10,000</i></p>	<p><input type="checkbox"/> Configurable, range to</p>		<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>
<p>1.12.8 Maximum error count:</p> <p><i>To assist in countering denial of service attacks, a DNP3 device shall stop replying with error codes after a number of successive authentication failures. This error count has a maximum value of 10. Setting the error count to zero inhibits all error messages.</i></p>	<p><input checked="" type="checkbox"/> Configurable, range 1 to 1</p>	<p>1</p>	<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>
<p>1.12.9 MAC algorithm requested in a challenge exchange:</p> <p><i>Part of the authentication message is hashed using an MAC algorithm. Secure Authentication version 2 specifies that DNP3 devices must support SHA-1 and may optionally support SHA-256 for this hashing process. Secure Authentication version 5 specifies that SHA-256 is the default. The output of the MAC algorithm is truncated (the resulting length dependant on the media being used).</i></p>	<p><input checked="" type="checkbox"/> SHA-1 (truncated to the leftmost 4 octets)</p> <p><input checked="" type="checkbox"/> SHA-1 (truncated to the leftmost 8 octets)</p> <p><input checked="" type="checkbox"/> SHA-1 (truncated to the leftmost 10 octets)</p> <p><input checked="" type="checkbox"/> SHA-256 (truncated to the leftmost 8 octets)</p> <p><input checked="" type="checkbox"/> SHA-256 (truncated to the leftmost 16 octets)</p> <p><input checked="" type="checkbox"/> AES-GMAC</p> <p><input type="checkbox"/> Other, explain:</p>	<p>SHA-256 (16)</p>	<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>
<p>1.12.10 Key-wrap algorithm to encrypt session keys:</p> <p><i>During the update of a session key, the key is encrypted using AES-128 or optionally using other algorithms.</i></p>	<p><input checked="" type="checkbox"/> AES-128</p> <p><input checked="" type="checkbox"/> AES-256</p> <p><input type="checkbox"/> RSAES-OAEP-1024 / SHA-1</p> <p><input type="checkbox"/> RSAES-OAEP-2048 / SHA-256</p> <p><input type="checkbox"/> RSAES-OAEP-3072 / SHA-256</p> <p><input type="checkbox"/> Other, explain:</p>	<p>AES-128</p>	<p>Proprietary</p> <p>File via Other Mechanism</p> <p>-----</p> <p>---</p>

<p>1.12.11 Cipher Suites used with DNP implementations using TLS:</p> <p><i>When TLS is supported, DNP3 Secure Authentication mandates the support of TLS_RSA_WITH_AES_128_SHA. The specification has a number of recommended cipher suite combinations. Indicate the supported Cipher Suites for implementations using TLS.</i></p>	<input checked="" type="checkbox"/> Not relevant - TLS is not used <input type="checkbox"/> TLS_RSA encrypted with AES128 <input type="checkbox"/> TLS_RSA encrypted with RC4_128 <input type="checkbox"/> TLS_RSA encrypted with 3DES_EDE_CBC <input type="checkbox"/> TLS_DH, signed with DSS, encrypted with 3DES_EDE_CBC <input type="checkbox"/> TLS_DH, signed with RSA, encrypted with 3DES_EDE_CBC <input type="checkbox"/> TLS_DHE, signed with DSS, encrypted with 3DES_EDE_CBC <input type="checkbox"/> TLS_DHE, signed with RSA, encrypted with 3DES_EDE_CBC <input type="checkbox"/> TLS_DH, signed with DSS, encrypted with AES128 <input type="checkbox"/> TLS_DH, signed with DSS, encrypted with AES256 <input type="checkbox"/> TLS_DH encrypted with AES128 <input type="checkbox"/> TLS_DH encrypted with AES256 <input type="checkbox"/> Other, explain:	Not relevant	
<p>1.12.12 Change cipher request timeout:</p> <p><i>Implementations using TLS shall terminate the connection if a response to a change cipher request is not seen within this timeout period.</i></p>	<input checked="" type="checkbox"/> Not relevant - TLS is not used <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	Not relevant	
<p>1.12.13 Number of Certificate Authorities supported:</p> <p><i>Implementations using TLS shall support at least 4 Certificate Authorities. Indicate the number supported.</i></p>		0	
<p>1.12.14 Certificate Revocation check time:</p> <p><i>Implementations using TLS shall evaluate Certificate Revocation Lists on a periodic basis, terminating a connection if a certificate is revoked.</i></p>	<input checked="" type="checkbox"/> Not relevant - TLS is not used <input type="checkbox"/> Fixed at hours <input type="checkbox"/> Configurable, range to hours <input type="checkbox"/> Configurable, selectable from hours <input type="checkbox"/> Configurable, other, describe	Not relevant	
<p>1.12.15 Additional critical function codes:</p> <p><i>The DNP3 specification defines those messages with specific function codes that are critical and must be used as part of a secure authentication message exchange. Messages with other function codes are optional and changes to this list should be noted here.</i></p> <p><i>Note: Secure Authentication version 5 defines additional functions as critical that were not considered critical in version 2. These are shown in the next column annotated with "V2 only".</i></p>	<p>Additional function codes that are to be considered as "critical":</p> <input checked="" type="checkbox"/> 0 (Confirm) <input checked="" type="checkbox"/> 1 (Read) <input checked="" type="checkbox"/> 7 (Immediate freeze) <input checked="" type="checkbox"/> 8 (Immediate freeze - no ack) <input checked="" type="checkbox"/> 9 (Freeze-and-clear) <input checked="" type="checkbox"/> 10 (Freeze-and-clear - no ack) <input checked="" type="checkbox"/> 11 (Freeze-at-time) <input checked="" type="checkbox"/> 12 (Freeze-at-time - no ack) <input type="checkbox"/> 22 (Assign Class) <input checked="" type="checkbox"/> 23 (Delay Measurement) <input type="checkbox"/> 25 (Open File) - V2 only <input type="checkbox"/> 26 (Close File) - V2 only <input type="checkbox"/> 27 (Delete File) - V2 only <input type="checkbox"/> 28 (Get File Info) - V2 only <input type="checkbox"/> 30 (Abort File) - V2 only <input type="checkbox"/> 129 (Response) <input type="checkbox"/> 130 (Unsolicited Response)		Proprietary File via Other Mechanism ----- ---

1.12.16 Other critical fragments: <i>Other critical transactions can be defined and should be detailed here. Examples could be based on time (for example: the first transaction after a communications session is established). Other examples could be based on specific data objects (for example: the reading of specific data points).</i>			
1.12.17 Support for remote update key changes: <i>Devices implementing secure authentication version 5 of later have the option to support remote update key changes. If remote update key change is supported then the procedure using symmetric cryptography is mandatory. Additional support for the procedure using asymmetric (public key) cryptography is optional.</i>	<input type="checkbox"/> Remote update key change by symmetric cryptography <input type="checkbox"/> Remote update key change by asymmetric cryptography		

2 Mapping between DNP3 and IEC 61850 Objects

This optional section allows each configuration parameter or point in the DNP Data map to be tied to an attribute in the IEC 61850 object models (and vice-versa).

Earlier versions of this section (up to version 2.07) used mappings based on an "access point" (section 2.1.1 and then a series of XPath references (section 2.1.2). Section 2.1.2 has been superseded in version 2.08 onwards with mappings defined using either predefined rules (section 2.1.3) or specified as an equation (section 2.1.4). The list of pre-defined rules is found in the IEEE 1815-1 document.

The following display has been selected to be in a tabular form.

MAPPING BETWEEN DNP3 AND IEC 61850 OBJECTS

3 Capabilities and Current Settings for Device Database (Outstation only)

The following tables identify the capabilities and current settings for each DNP3 data type. Details defining the data points available in the device are shown in part 5 of this Device Profile.

3.1 SINGLE-BIT BINARY INPUT POINTS Static (Steady-State) Object Number: 1 Event Object Number: 2			
	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.1.1 Static Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - Single-bit packed format <input checked="" type="checkbox"/> Variation 2 - Single-bit with flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.1.2 Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for binary input events can be determined remotely using protocol object Group 0 Variation 237.</i>	<input checked="" type="checkbox"/> Variation 1 - without time <input checked="" type="checkbox"/> Variation 2 - with absolute time <input checked="" type="checkbox"/> Variation 3 - with relative time <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---

3.1.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. "All events" must be checked to be compliant.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---
3.1.4 Binary Inputs included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---

3.2 DOUBLE-BIT INPUT POINTS

Static (Steady-State) Object Number: 3

Event Object Number: 4

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.2.1 Static Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for double-bit inputs can be determined remotely using protocol object Group 0 Variation 234.</i>	<input checked="" type="checkbox"/> Variation 1 - Double-bit packed format <input checked="" type="checkbox"/> Variation 2 - Double-bit with flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.2.2 Event Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - without time <input checked="" type="checkbox"/> Variation 2 - with absolute time <input checked="" type="checkbox"/> Variation 3 - with relative time <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.2.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. "All events" must be checked to be compliant.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---
3.2.4 Double Bit Inputs included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---

3.3 BINARY OUTPUT STATUS AND CONTROL RELAY OUTPUT BLOCK

Binary Output Status Object Number: 10

Binary Output Event Object Number: 11

CROB Object Number: 12

Binary Output Command Event Object Number: 13

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.3.1 Minimum pulse time allowed with Trip, Close and Pulse On commands:	<input type="checkbox"/> Fixed at ms (hardware may limit this further) <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---

3.3.2 Maximum pulse time allowed with Trip, Close and Pulse On commands:	<input type="checkbox"/> Fixed at ms (hardware may limit this further) <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---
3.3.3 Binary Output Status included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---
3.3.4 Reports Output Command Event Objects:	<input type="checkbox"/> Never <input checked="" type="checkbox"/> Only upon a successful Control <input type="checkbox"/> Upon all control attempts	On success	Proprietary File via Other Mechanism ----- ---
3.3.5 Static Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - Continuous control <input type="checkbox"/> Variation 2 - Continuous control, binary output status <input type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.3.6 Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for binary output events can be determined remotely using protocol object Group 0 Variation 222.</i>	<input checked="" type="checkbox"/> Variation 1 - without time <input type="checkbox"/> Variation 2 - with absolute time <input type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.3.7 Command Event Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - without time <input type="checkbox"/> Variation 2 - with absolute time <input type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.3.8 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events		Proprietary File via Other Mechanism ----- ---
3.3.9 Command Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events	All events	Proprietary File via Other Mechanism ----- ---
3.3.10 Maximum Time between Select and Operate:	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Fixed at seconds <input type="checkbox"/> Configurable, range to seconds <input type="checkbox"/> Configurable, selectable from seconds <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---

3.4 COUNTERS / FROZEN COUNTERS

Static Counter Object Number: 20

Static Frozen Counter Object Number: 21

Counter Event Object Number: 22

Frozen Counter Event Object Number: 23

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.4.1 Static Counter Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 5 - 32-bit without flag <input checked="" type="checkbox"/> Variation 6 - 16-bit without flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.4.2 Counter Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for counter events can be determined remotely using protocol object Group 0 Variation 227.</i>	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 5 - 32-bit with flag and time <input checked="" type="checkbox"/> Variation 6 - 16-bit with flag and time <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.4.3 Counters included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---
3.4.4 Counter Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. Only the most recent event is typically reported for Counters. When reporting only the most recent event the counter value returned in the response may be either the value at the time that the event is queued or it may be the value at the time of the response.</i>	<input type="checkbox"/> A: Only most recent (value at time of event) <input type="checkbox"/> B: Only most recent (value at time of response) <input checked="" type="checkbox"/> C: All events <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.4.5 Static Frozen Counter Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 5 - 32-bit with flag and time <input checked="" type="checkbox"/> Variation 6 - 16-bit with flag and time <input checked="" type="checkbox"/> Variation 9 - 32-bit without flag <input checked="" type="checkbox"/> Variation 10 - 16-bit without flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.4.6 Frozen Counter Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for frozen counter events can be determined remotely using protocol object Group 0 Variation 225.</i>	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 5 - 32-bit without flag <input checked="" type="checkbox"/> Variation 6 - 16-bit without flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.4.7 Frozen Counters included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---
3.4.8 Frozen Counter Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Frozen Counters</i>	<input type="checkbox"/> Only most recent frozen value <input checked="" type="checkbox"/> All frozen values <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---

3.4.9 Counters Roll Over at:	<input checked="" type="checkbox"/> 16 Bits (65,535) <input checked="" type="checkbox"/> 32 Bits (4,294,967,295) <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	Based on point index	
3.4.10 Counters frozen by means of:	<input checked="" type="checkbox"/> Master Request <input type="checkbox"/> Freezes itself without concern for time of day <input type="checkbox"/> Freezes itself and requires time of day <input type="checkbox"/> Other, explain:	Master Request	

3.5 ANALOG INPUT POINTS Static (Steady-State) Object Number: 30 Event Object Number: 32 Deadband Object Number: 34			
	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.5.1 Static Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 3 - 32-bit without flag <input checked="" type="checkbox"/> Variation 4 - 16-bit without flag <input checked="" type="checkbox"/> Variation 5 - single-precision floating point with flag <input checked="" type="checkbox"/> Variation 6 - double-precision floating point with flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	Three	Proprietary File via Other Mechanism ----- ---
3.5.2 Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for analog input events can be determined remotely using protocol object Group 0 Variation 231.</i>	<input checked="" type="checkbox"/> Variation 1 - 32-bit without time <input checked="" type="checkbox"/> Variation 2 - 16-bit without time <input checked="" type="checkbox"/> Variation 3 - 32-bit with time <input checked="" type="checkbox"/> Variation 4 - 16-bit with time <input checked="" type="checkbox"/> Variation 5 - single-precision floating point w/o time <input checked="" type="checkbox"/> Variation 6 - double-precision floating point w/o time <input checked="" type="checkbox"/> Variation 7 - single-precision floating point with time <input checked="" type="checkbox"/> Variation 8 - double-precision floating point with time <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	One	Proprietary File via Other Mechanism ----- ---
3.5.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. Only the most recent event is typically reported for Analog Inputs. When reporting only the most recent event the analog value returned in the response may be either the value at the time that the event is queued or it may be the value at the time of the response.</i>	<input type="checkbox"/> A: Only most recent (value at time of event) <input type="checkbox"/> B: Only most recent (value at time of response) <input checked="" type="checkbox"/> C: All events <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---

3.5.4 Analog Inputs included in Class 0 response:	<input checked="" type="checkbox"/> Always <input checked="" type="checkbox"/> Never <input checked="" type="checkbox"/> Only if point is assigned to a class <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---
3.5.5 How Deadbands are set:	<input type="checkbox"/> A. Global Fixed <input type="checkbox"/> B. Configurable through DNP <input checked="" type="checkbox"/> C. Configurable via other means <input type="checkbox"/> D. Other, explain: <input type="checkbox"/> Based on point index - column in part 5 specifies which of the options applies, B, C, or D		Proprietary File via Other Mechanism ----- ---
3.5.6 Analog Deadband Algorithm: simple- just compares the difference from the previous reported value integrating- keeps track of the accumulated change other- indicating another algorithm	<input checked="" type="checkbox"/> Simple <input type="checkbox"/> Integrating <input type="checkbox"/> Other, explain: <input type="checkbox"/> Based on point index (add column to table in part 5)	Simple	Proprietary File via Other Mechanism ----- ---
3.5.7 Static Frozen Analog Input Variation reported when variation 0 requested or in response to Class polls:	<input type="checkbox"/> Variation 1 - 32-bit with flag <input type="checkbox"/> Variation 2 - 16-bit with flag <input type="checkbox"/> Variation 3 - 32-bit with time-of-freeze <input type="checkbox"/> Variation 4 - 16-bit with time-of-freeze <input type="checkbox"/> Variation 5 - 32-bit without flag <input type="checkbox"/> Variation 6 - 16-bit without flag <input type="checkbox"/> Variation 7 - single-precision floating point with flag <input type="checkbox"/> Variation 8 - double-precision floating point with flag <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.5.8 Frozen Analog Input Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for frozen analog input events can be determined remotely using protocol object Group 0 Variation 230.</i>	<input type="checkbox"/> Variation 1 - 32-bit without time <input type="checkbox"/> Variation 2 - 16-bit without time <input type="checkbox"/> Variation 3 - 32-bit with time <input type="checkbox"/> Variation 4 - 16-bit with time <input type="checkbox"/> Variation 5 - single-precision floating point w/o time <input type="checkbox"/> Variation 6 - double-precision floating point w/o time <input type="checkbox"/> Variation 7 - single-precision floating point with time <input type="checkbox"/> Variation 8 - double-precision floating point with time <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.5.9 Frozen Analog Inputs included in Class 0 response:	<input type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.5.10 Frozen Analog Input Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Frozen Analog Inputs.</i>	<input type="checkbox"/> Only most recent frozen value <input type="checkbox"/> All frozen values <input type="checkbox"/> Based on point index (add column to table in part 5)		

3.6 ANALOG OUTPUT STATUS AND ANALOG OUTPUT CONTROL BLOCK

Analog Output Status Object Number: 40

Analog Output Control Block Object Number: 41

Analog Output Event Object Number: 42

Analog Output Command Event Object Number: 43

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
3.6.1 Static Analog Output Status Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - 32-bit with flag <input checked="" type="checkbox"/> Variation 2 - 16-bit with flag <input checked="" type="checkbox"/> Variation 3 - single-precision floating point with flag <input checked="" type="checkbox"/> Variation 4 - double-precision floating point with flag <input checked="" type="checkbox"/> Based on point index (add column to table in part 5)	Two	Proprietary File via Other Mechanism ----- ---
3.6.2 Analog Output Status included in Class 0 response:	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to a class <input type="checkbox"/> Based on point index (add column to table in part 5)	Always	Proprietary File via Other Mechanism ----- ---
3.6.3 Reports Output Command Event Objects:	<input type="checkbox"/> Never <input checked="" type="checkbox"/> Only upon a successful Control <input type="checkbox"/> Upon all control attempts		Proprietary File via Other Mechanism ----- ---
3.6.4 Event Variation reported when variation 0 requested or in response to Class polls: <i>Note: The support for analog output events can be determined remotely using protocol object Group 0 Variation 219.</i>	<input checked="" type="checkbox"/> Variation 1 - 32-bit without time <input checked="" type="checkbox"/> Variation 2 - 16-bit without time <input checked="" type="checkbox"/> Variation 3 - 32-bit with time <input checked="" type="checkbox"/> Variation 4 - 16-bit with time <input checked="" type="checkbox"/> Variation 5 - single-precision floating point w/o time <input checked="" type="checkbox"/> Variation 6 - double-precision floating point w/o time <input checked="" type="checkbox"/> Variation 7 - single-precision floating point with time <input checked="" type="checkbox"/> Variation 8 - double-precision floating point with time <input type="checkbox"/> Based on point index (add column to table in part 5)	Two	Proprietary File via Other Mechanism ----- ---
3.6.5 Command Event Variation reported when variation 0 requested or in response to Class polls:	<input checked="" type="checkbox"/> Variation 1 - 32-bit without time <input checked="" type="checkbox"/> Variation 2 - 16-bit without time <input checked="" type="checkbox"/> Variation 3 - 32-bit with time <input checked="" type="checkbox"/> Variation 4 - 16-bit with time <input checked="" type="checkbox"/> Variation 5 - single-precision floating point w/o time <input checked="" type="checkbox"/> Variation 6 - double-precision floating point w/o time <input checked="" type="checkbox"/> Variation 7 - single-precision floating point with time <input checked="" type="checkbox"/> Variation 8 - double-precision floating point with time <input type="checkbox"/> Based on point index (add column to table in part 5)	Two	Proprietary File via Other Mechanism ----- ---

3.6.6 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events	All events	Proprietary File via Other Mechanism ----- ---
3.6.7 Command Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events	All events	Proprietary File via Other Mechanism ----- ---
3.6.8 Maximum Time between Select and Operate:	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Fixed at seconds <input type="checkbox"/> Configurable, range to seconds <input type="checkbox"/> Configurable, selectable from seconds <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Variable, explain <input type="checkbox"/> Based on point index (add column to table in part 5)		Proprietary File via Other Mechanism ----- ---

3.7 SEQUENTIAL FILE TRANSFER

Object Number: 70

	Capabilities	Current Value	If configurable list methods
3.7.1 File Transfer Supported:	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No (set 3.7.6 to "Fixed at 0" and do not complete other entries in section 3.7)	Yes	Proprietary File via Other Mechanism ----- ---
3.7.2 File Authentication: <i>Indicates whether a valid authentication key must be obtained prior to open and delete requests.</i>	<input checked="" type="checkbox"/> Always <input checked="" type="checkbox"/> Sometimes, explain <input checked="" type="checkbox"/> Never	Sometimes	Proprietary File via Other Mechanism ----- ---
3.7.3 File Append Mode: <i>Indicates if a file can be opened and appended to versus just overwritten.</i>	<input checked="" type="checkbox"/> Always <input checked="" type="checkbox"/> Sometimes, explain <input checked="" type="checkbox"/> Never	Always	Proprietary File via Other Mechanism ----- ---
3.7.4 Permissions Support: <i>Indicates the device is capable of using the indicated permissions.</i>	<input checked="" type="checkbox"/> Owner Read Allowed: 0x0100 <input checked="" type="checkbox"/> Owner Write Allowed: 0x0080 <input checked="" type="checkbox"/> Owner Execute Allowed: 0x0040 <input checked="" type="checkbox"/> Group Read Allowed: 0x0020 <input checked="" type="checkbox"/> Group Write Allowed: 0x0010 <input checked="" type="checkbox"/> Group Execute Allowed: 0x0008 <input checked="" type="checkbox"/> World Read Allowed: 0x0004 <input checked="" type="checkbox"/> World Write Allowed: 0x0002 <input checked="" type="checkbox"/> World Execute Allowed: 0x0001	Owner Read Owner Write Owner Execute Group Read Group Write Group Execute World Read World Write World Execute	Proprietary File via Other Mechanism ----- ---
3.7.5 Multiple Blocks in a Fragment: <i>File data is transferred in a series of blocks of a maximum specified size. This indicates whether only a single block or multiple blocks will be sent in fragment.</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No	

3.7.6 Max number of Files Open at one time:	<input checked="" type="checkbox"/> Fixed at 1 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	1	
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3.10 DATA SET PROTOTYPE

Object Number: 85

Variation Number: 1

	Capabilities	Current Value	If configurable list methods
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This version of the Device Profile has no requirement for describing Data Set Prototype capabilities and current settings. This page is intentionally left blank, existing as placeholder for future use.

3.11 DATA SET DESCRIPTOR CONTENTS AND CHARACTERISTICS

Object Number: 86

Variation Numbers: 1 and 2

This version of the Device Profile has no requirement for describing Data Set Descriptor capabilities and current settings. This page is intentionally left blank, existing as placeholder for future use.

4 Implementation Table

The following implementation table identifies which object groups and variations, function codes and qualifiers the device supports in both requests and responses. The *Request* columns identify all requests that may be sent by a Master, or all requests that must be parsed by an Outstation. The *Response* columns identify all responses that must be parsed by a Master, or all responses that may be sent by an Outstation.

DNP OBJECT GROUP & VARIATION			REQUEST Master may issue Outstation must parse		RESPONSE Master must parse Outstation may issue	
Object Group Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
1	0	Binary Input – Any Variation	1 (read)	06 (no range, or all)		
1	1	Binary Input – Packed format	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
1	2	Binary Input – With Flags format	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
2	0	Binary Input Event – Any Variation	1 (read)	06 (no range, or all), 07, 08 (limited qty)		
2	1	Binary Input Event – Without time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
2	1	Binary Input Event – Without time			130 (Unsol. Resp.)	17, 28 (index)
2	2	Binary Input Event – With absolute time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
2	2	Binary Input Event – With absolute time			130 (Unsol. Resp.)	17, 28 (index)

3	0	Double-bit Binary Input – Any Variation	1(<i>read</i>)	00, 01 (<i>start-stop</i>), 06 (<i>no range, or all</i>)		
3	1	Double-bit Binary Input – Packed format	1(<i>read</i>)	00, 01 (<i>start-stop</i>), 06 (<i>no range, or all</i>)	129 (<i>Response</i>)	00, 01 (<i>start-stop</i>)
3	2	Double-bit Binary Input – With flags	1(<i>read</i>)	00, 01 (<i>start-stop</i>), 06 (<i>no range, or all</i>)	129 (<i>Response</i>)	00, 01 (<i>start-stop</i>)
4	0	Double-bit Binary Input Event – Any Variation	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)		
4	1	Double-bit Binary Input Event – Without time	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)	129 (<i>Response</i>)	17, 28 (<i>index</i>)
4	1	Double-bit Binary Input Event – Without time			130 (<i>Unsol. Resp.</i>)	17, 28 (<i>index</i>)
4	2	Double-bit Binary Input Event – With absolute time	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)	129 (<i>Response</i>)	17, 28 (<i>index</i>)
4	2	Double-bit Binary Input Event – With absolute time			130 (<i>Unsol. Resp.</i>)	17, 28 (<i>index</i>)
10	0	Binary Output – Any Variation	1(<i>read</i>)	00, 01 (<i>start-stop</i>), 06 (<i>no range, or all</i>)		
10	2	Binary Output – Output status with flags	1(<i>read</i>)	00, 01 (<i>start-stop</i>), 06 (<i>no range, or all</i>)	129 (<i>Response</i>)	00, 01 (<i>start-stop</i>)
11	0	Binary Output Event – Any Variation	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)		
11	1	Binary Output Event – Status without time	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)	129 (<i>Response</i>)	17, 18
11	1	Binary Output Event – Status without time			130 (<i>Unsol. Resp.</i>)	17, 18
11	2	Binary Output Event – Status with time	1(<i>read</i>)	06 (<i>no range, or all</i>), 07, 08 (<i>limited qty</i>)	129 (<i>Response</i>)	17, 18
11	2	Binary Output Event – Status with time			130 (<i>Unsol. Resp.</i>)	17, 18
12	1	Binary Command – Control relay output block (CROB)	3(<i>select</i>)	17, 28 (<i>index</i>)	129 (<i>Response</i>)	echo of request
12	1	Binary Command – Control relay output block (CROB)	4(<i>operate</i>)	17, 28 (<i>index</i>)		
12	1	Binary Command – Control relay output block (CROB)	5(<i>direct op.</i>)	17, 28 (<i>index</i>)		
12	1	Binary Command – Control relay output block (CROB)	6(<i>direct op, no ack</i>)	17, 28 (<i>index</i>)		

13	0	Binary Output Command Event – Any Variation	1 (read)	06 (no range, or all), 07, 08 (limited qty)		
13	1	Binary Output Command Event – Command status without time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
13	1	Binary Output Command Event – Command status without time			130 (Unsol. Resp.)	17, 28 (index)
13	2	Binary Output Command Event – Command status with time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
13	2	Binary Output Command Event – Command status with time			130 (Unsol. Resp.)	17, 28 (index)
20	0	Counter – Any Variation	1 (read)	00, 01 (start-stop), 06 (no range, or all)		
20	0	Counter – Any Variation	7 (freeze)	00, 01 (start-stop), 06 (no range, or all)		
20	0	Counter – Any Variation	8 (freeze, no ack)	00, 01 (start-stop), 06 (no range, or all)		
20	0	Counter – Any Variation	9 (freeze & clear)	00, 01 (start-stop), 06 (no range, or all)		
20	0	Counter – Any Variation	10 (frz & clr, no ack)	00, 01 (start-stop), 06 (no range, or all)		
20	1	Counter – 32-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
20	2	Counter – 16-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
20	5	Counter – 32-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
20	6	Counter – 16-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
21	0	Counter – Any Variation	1 (read)	00, 01 (start-stop), 06 (no range, or all)		
21	1	Frozen Counter – 32-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)

21	2	Frozen Counter – 16-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
21	5	Frozen Counter – 32-bit with flag and time	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
21	6	Frozen Counter – 16-bit with flag and time	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
21	9	Frozen Counter – 32-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
21	10	Frozen Counter – 16-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
22	0	Counter Event – Any Variation	1 (read)	06 (no range, or all), 07, 08 (limited qty)		
22	1	Counter Event – 32-bit with flag	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
22	1	Counter Event – 32-bit with flag			130 (Unsol. Resp.)	17, 28 (index)
22	2	Counter Event – 16-bit with flag	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
22	2	Counter Event – 16-bit with flag			130 (Unsol. Resp.)	17, 28 (index)
23	0	Frozen Counter Event – Any Variation	1 (read)	06 (no range, or all), 07, 08 (limited qty)		
23	1	Frozen Counter Event – 32-bit with flag	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
23	1	Frozen Counter Event – 32-bit with flag			130 (Unsol. Resp.)	17, 28 (index)
23	2	Frozen Counter Event – 16-bit with flag	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
23	2	Frozen Counter Event – 16-bit with flag			130 (Unsol. Resp.)	17, 28 (index)
23	5	Frozen Counter Event – 32-bit with flag and time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
23	5	Frozen Counter Event – 32-bit with flag and time			130 (Unsol. Resp.)	17, 28 (index)
23	6	Frozen Counter Event – 16-bit with flag and time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
23	6	Frozen Counter Event – 16-bit with flag and time			130 (Unsol. Resp.)	17, 28 (index)

30	0	Analog Input – Any Variation	1 (read)	00, 01 (start-stop), 06 (no range, or all)		
30	1	Analog Input – Analog Input – 32-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
30	2	Analog Input – Analog Input – 16-bit with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
30	3	Analog Input – 32-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
30	4	Analog Input – 16-bit without flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
30	5	Analog Input – Single-prec flt-pt with flag	1 (read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
32	0	Analog Input Event – Any Variation	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	1	Analog Input Event – 32-bit without time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	1	Analog Input Event – 32-bit without time			130 (Unsol. Resp.)	17, 28 (index)
32	2	Analog Input Event – 16-bit without time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	2	Analog Input Event – 16-bit without time			130 (Unsol. Resp.)	17, 28 (index)
32	3	Analog Input Event – 32-bit with time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	3	Analog Input Event – 32-bit with time			130 (Unsol. Resp.)	17, 28 (index)
32	4	Analog Input Event – 16-bit with time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	4	Analog Input Event – 16-bit with time			130 (Unsol. Resp.)	17, 28 (index)
32	5	Analog Input Event – Single-prec flt-pt without time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	5	Analog Input Event – Single-prec flt-pt without time			130 (Unsol. Resp.)	17, 28 (index)
32	7	Analog Input Event – Single-prec flt-pt with time	1 (read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
32	7	Analog Input Event – Single-prec flt-pt with time			130 (Unsol. Resp.)	17, 28 (index)
40	0	Analog Output Status – Any Variation	1 (read)	00, 01 (start-stop)		

40	1	Analog Output Status – 32-bit with flag	1(read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
40	2	Analog Output Status – 16-bit with flag	1(read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
40	3	Analog Output Status – Single-prec flt-pt with flag	1(read)	00, 01 (start-stop), 06 (no range, or all)	129 (Response)	00, 01 (start-stop)
41	1	Analog Output – 32-bit with flag	3(select)	17, 28 (index)	129 (Response)	echo of request
41	1	Analog Output – 32-bit with flag	4(operate)	17, 28 (index)		
41	1	Analog Output – 32-bit with flag	5(direct op.)	17, 28 (index)		
41	1	Analog Output – 32-bit with flag	6(direct op, no ack)	17, 28 (index)		
41	2	Analog Output – 16-bit with flag	3(select)	17, 28 (index)	129 (Response)	echo of request
41	2	Analog Output – 16-bit with flag	4(operate)	17, 28 (index)		
41	2	Analog Output – 16-bit with flag	5(direct op.)	17, 28 (index)		
41	2	Analog Output – 16-bit with flag	6(direct op, no ack)	17, 28 (index)		
41	3	Analog Output – Single-prec flt-pt with flag	3(select)	17, 28 (index)	129 (Response)	echo of request
41	3	Analog Output – Single-prec flt-pt with flag	4(operate)	17, 28 (index)		
41	3	Analog Output – Single-prec flt-pt with flag	5(direct op.)	17, 28 (index)		
41	3	Analog Output – Single-prec flt-pt with flag	6(direct op, no ack)	17, 28 (index)		
42	0	Analog Output Event – Any Variation	1(read)	06 (no range, or all), 07, 08 (limited qty)		
42	1	Analog Output Event – 32-bit without time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	1	Analog Output Event – 32-bit without time			130 (Unsol. Resp.)	17, 28 (index)
42	2	Analog Output Event – 16-bit without time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	2	Analog Output Event – 16-bit without time			130 (Unsol. Resp.)	17, 28 (index)
42	3	Analog Output Event – 32-bit with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	3	Analog Output Event – 32-bit with time			130 (Unsol. Resp.)	17, 28 (index)
42	4	Analog Output Event – 16-bit with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	4	Analog Output Event – 16-bit with time			130 (Unsol. Resp.)	17, 28 (index)
42	5	Analog Output Event – Single-prec flt-pt without time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	5	Analog Output Event – Single-prec flt-pt without time			130 (Unsol. Resp.)	17, 28 (index)

42	7	Analog Output Event – Single-prec flt-pt with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
42	7	Analog Output Event – Single-prec flt-pt with time			130 (Unsol. Resp.)	17, 28 (index)
43	0	Analog Output Command Event – Any Variation	1(read)	06 (no range, or all), 07, 08 (limited qty)		
43	1	Analog Output Command Event – 32-bit without time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
43	1	Analog Output Command Event – 32-bit without time			130 (Unsol. Resp.)	17, 28 (index)
43	3	Analog Output Command Event – 32-bit with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
43	3	Analog Output Command Event – 32-bit with time			130 (Unsol. Resp.)	17, 28 (index)
43	4	Analog Output Command Event – 16-bit with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
43	4	Analog Output Command Event – 16-bit with time			130 (Unsol. Resp.)	17, 28 (index)
43	5	Analog Output Command Event – Single-prec flt-pt without time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
43	5	Analog Output Command Event – Single-prec flt-pt without time			130 (Unsol. Resp.)	17, 28 (index)
43	7	Analog Output Command Event – Single-prec flt-pt with time	1(read)	06 (no range, or all), 07, 08 (limited qty)	129 (Response)	17, 28 (index)
43	7	Analog Output Command Event – Single-prec flt-pt with time			130 (Unsol. Resp.)	17, 28 (index)
50	1	Time and Date – Absolute time	1(read)	07 (limited qty = 1)	129 (Response)	07 (limited qty = 1)
50	1	Time and Date – Absolute time	2(write)	07 (limited qty = 1)		
60	2	Class Objects – Class 1 data	1(read)	06 (no range, or all), 07, 08 (limited qty)		
60	2	Class Objects – Class 1 data	20(enable unsol.)	06 (no range, or all)		
60	2	Class Objects – Class 1 data	21(disable unsol.)	06 (no range, or all)		
60	3	Class Objects – Class 2 data	1(read)	06 (no range, or all), 07, 08 (limited qty)		
60	3	Class Objects – Class 2 data	20(enable unsol.)	06 (no range, or all)		
60	3	Class Objects – Class 2 data	21(disable unsol.)	06 (no range, or all)		

60	4	Class Objects – Class 3 data	1(read)	06 (no range, or all), 07, 08 (limited qty)		
60	4	Class Objects – Class 3 data	20(enable unsol.)	06 (no range, or all)		
60	4	Class Objects – Class 3 data	21(disable unsol.)	06 (no range, or all)		
80	1	Internal Indications – Packed format	1(read)	00, 01 (start-stop)	129 (Response)	00, 01 (start-stop)
80	1	Internal Indications – Packed format	2(write)	00 (start-stop)		

5 Data Points List (outstation only)

This part of the Device Profile shows, for each data type, a table defining the data points available in the device or a description of how this information can be obtained if the database is configurable.

5.1 Definition of Binary Input Point List: <i>List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.</i> <i>Note: the number of binary inputs present in the device, and the maximum binary input index, are available remotely using object Group 0 Variations 239 and 238.</i>	<input type="checkbox"/> Fixed, list shown in table below <input checked="" type="checkbox"/> Configurable (current list may be shown in table below) <input type="checkbox"/> Other, explain:
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Binary Input points list:

Point Index	Name	Event Class Assigned (1, 2, 3 or none)	Name for State when value is 0	Name for State when value is 1	Description
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5.2 Definition of Double Bit Input Point List: <i>List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.</i> <i>Note: the number of double-bit inputs present in the device, and the maximum double-bit input index, are available remotely using object Group 0 Variations 236 and 235.</i>	<input type="checkbox"/> Fixed, list shown in table below <input checked="" type="checkbox"/> Configurable (current list may be shown in table below) <input type="checkbox"/> Other, explain:
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Double-bit Input points list:

Point Index	Name	Event Class Assigned (1, 2, 3 or none)	Name for State when value is 0 (intermediate)	Name for State when value is 1 (off)	Name for State when value is 2 (on)	Name for State when value is 3 (indeterminate)	Description
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5.3 Definition of Binary Output Status / Control Relay Output Block Points List: <i>List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.</i> <i>Note: the number of binary outputs present in the device, and the maximum binary output index, are available remotely using object Group 0 Variations 224 and 223.</i>	<input type="checkbox"/> Fixed, list shown in table below <input checked="" type="checkbox"/> Configurable (current list may be shown in table below) <input type="checkbox"/> Other, explain:
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Binary Output Status and CROB points list:

		Supported Control Operations													Event Class Assigned (1,2,3 or none)		
Point Index	Name	Select/Operate	Direct Operate	Direct Operate - No Ack	Pulse On	Pulse Off	Latch On	Latch Off	Trip	Close	Count > 1	Cancel Currently Running Operation	Name for State when value is 0	Name for State when value is 1	Change	Command	Description

5.4 Definition of Counter / Frozen Counter Point List:

List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.

Note: the number of counters present in the device, and the maximum counter index, are available remotely using object Group 0 Variations 229 and 228.

- ☐ Fixed, list shown in table below
☒ Configurable (current list may be shown in table below)
☐ Other, explain:

Counter / Frozen Counter points list:

Point Index	Name	Event Class Assigned to Counter Events (1, 2, 3 or none)	Frozen Counter Exists (Yes or No)	Event Class Assigned to Frozen Counter Events (1, 2, 3 or none)	Description
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5.5 Definition of Analog Input Point List:

List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.

Note: the number of analog inputs present in the device, and the maximum analog input index, are available remotely using object Group 0 Variations 233 and 232.

- ☐ Fixed, list shown in table below
☒ Configurable (current list may be shown in table below)
☐ Other, explain:

Analog Input points list:

			Transmitted Value		Scaling				
Point Index	Name	Event Class Assigned (1, 2, 3 or none)	Min int / ft	Max int / ft	Multiplier	Offset	Units	Resolution	Description

5.6 Definition of Analog Output Status / Analog Output Block Point List:

List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.

Note: the number of analog outputs present in the device, and the maximum analog output index, are available remotely using object Group 0 Variations 221 and 220.

- ☐ Fixed, list shown in table below
☒ Configurable (current list may be shown in table below)
☐ Other, explain:

Analog Output points list:

Supported Control Operations					Transmitted Value		Scaling				Event Class Assigned (1, 2, 3 or none)			
Point Index	Name	Select/Operate	Direct Operate	Direct Operate - No Ack	Min	Max	Min	Max	Units	Resolution	Change	Command	Description	

5.7 Definition of File Names that may be read or written:

- ☒ Fixed, list shown in table below
☒ Configurable (current list may be shown in table below)
☐ Other, explain:

Sequential Files list:

		Authentication Required for:			
File Name	Event Class Assigned (1, 2, 3 or none)	Read	Write	Delete	Description

5.8 Definition of Octet String Point List:

List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.

- ☐ Fixed, list shown in table below
☐ Configurable (current list may be shown in table below)
☐ Other, explain:

Octet String points list:

Point Index	Name	Event Class Assigned (1, 2, 3 or none)	Description
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5.9 Definition of Virtual Terminal Port Numbers:

List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.

- ☒ Fixed, list shown in table below
☒ Configurable (current list may be shown in table below)
☐ Other, explain:

Ports list:

Virtual Port Number (Point Index)	Name	Event Class Assigned (1, 2, 3 or none)	Description
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5.10 Definition of Data Set Prototypes:

List of all data set prototypes. The following table is repeated for each Data Set Prototype defined.

Note: the number of data set prototypes known to the device are available remotely using object Group 0 Variations 212 and 213.

- ☐ Fixed, list shown in table below
☐ Configurable (current list may be shown in table below)
☐ Other, explain:

5.11 Definition of Data Set Descriptors:

List of all data set descriptors. The following table is repeated for each Data Set Descriptor defined.

Note: the number of data sets known to the device are available remotely using object Group 0 Variations 214 and 215.

- ☐ Fixed, list shown in table below
☐ Configurable (current list may be shown in table below)
☐ Other, explain:

5.12 Data Set Descriptors - Point Index Attributes

The following table is optional and correlates data set elements to point indexes of standard DNP3 Data Objects. The element number below refers to the position in the present value object (object 87) or event (object 88) data set and will not match the element number in the data set descriptor or data set prototype tables above.

----- End of Device Profile for Reference Device -----

----- End of Complete Device Profile -----