



DNP3 Device Profile

Based on DNP XML Schema version 2.11.00

Document Name: OPT100 Device Profile

Document Description: Device Profile for OPT100

Showing both the Device's Capabilities and its Current Configuration

Revision History

Date	Time	Version	Reason for change	Edited by
2020-10-20		5	Add binary inputs for Total Gas Pressure cautions and alarms. The inputs 30 and 31 are TGP minimum and maximum limit cautions respectively, while 230 and 231 are TGP minimum and maximum limit alerts respectively. Add analog inputs for Total Gas Pressure present (analog input 11) and averaged (analog input 29) values.	Vaisala Oyj
2020-08-05		4	Removed analog input 29 that was described as Oil temperature 24h average but which has actually been always offline. Removed capability for binary input packed variation. Add note about LOCAL_FORCED flag usage.	Vaisala Oyj
2019-10-21		3	Removed reserved inputs. Added Device Stopped binary input. Added unsolicited response and time synchronization support. Changed default variations of binary and analog inputs. Conformance level set to "none" instead of "Level 1" because of missing configuration options related to unsolicited messages.	Vaisala Oyj
2018-05-22		2	Added caution and alarm binary inputs.	Vaisala Oyj
2018-02-08		1		Vaisala Oyj

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. 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 ("N/A" 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 type="radio"/> Master <input checked="" type="radio"/> Outstation	<input type="radio"/> Master <input checked="" type="radio"/> Outstation	
1.1.2 Vendor Name:		Vaisala Oyj	

<p>The name of the organization producing the device.</p> <p>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 252.</p>			
<p>1.1.3 Device Name:</p> <p>The model and name of the device, sufficient to distinguish it from any other device from the same organization.</p> <p>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 250.</p>		OPT100	
<p>1.1.4 Device manufacturer's hardware version string:</p> <p>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 243.</p>		1.0	
<p>1.1.5 Device manufacturer's software version string:</p> <p>Note: The current value of this</p>		3.0	

<p>outstation parameter is available remotely using protocol object Group 0 Variation 242.</p>			
<p>1.1.6 Device Profile Document Version Number:</p> <p><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></p>		2	
<p>1.1.7 DNP Levels Supported for:</p> <p><i>Indicate each DNP3 Level to which the device conforms fully. For Masters, requests and responses can be indicated independently.</i></p>	<p>Outstations Only Requests and Responses</p> <p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Level 1</p> <p><input type="checkbox"/> Level 2</p> <p><input type="checkbox"/> Level 3</p> <p><input type="checkbox"/> Level 4</p>	None	
<p>1.1.8 Supported Function Blocks:</p>	<p><input type="checkbox"/> Self Address Support</p> <p><input type="checkbox"/> Data Sets</p> <p><input type="checkbox"/> File Transfer</p> <p><input type="checkbox"/> Virtual Terminal</p> <p><input type="checkbox"/> Mapping to IEC 61850 Object Models defined in a DNP3 XML file</p> <p><input type="checkbox"/> Function code 31, activate configuration</p> <p><input type="checkbox"/> Secure Authentication (if checked then see 1.12)</p>		
<p>1.1.9 Notable Additions:</p> <p><i>A brief description intended to quickly identify (for the reader) the most obvious</i></p>			

features the device supports in addition to the Highest DNP Level Supported. The complete list of features is described in the Implementation Table.																							
1.1.10 Methods to set Configurable Parameters:	<input type="checkbox"/> XML - Loaded via DNP3 File Transfer <input type="checkbox"/> XML - Loaded via other transport mechanism <input type="checkbox"/> Terminal - ASCII Terminal Command Line <input type="checkbox"/> Proprietary file loaded via DNP3 File Transfer <input type="checkbox"/> Proprietary file loaded via other transport mechanism <input type="checkbox"/> Direct - Keypad on device front panel <input checked="" type="checkbox"/> Factory - Specified when device is ordered <input type="checkbox"/> Protocol - Set via DNP3 (e.g. assign class) <input checked="" type="checkbox"/> Other - explain: via WEB-UI																						
1.1.11 DNP3 XML files available On-line: XML configuration file names that can be read or written through DNP3 File Transfer to a device. A device's currently running configuration is returned by DNP3 on-line XML file read from the device. DNP3 on-line XML file write to a device will update the device's configuration when the Activate Configuration (function code 31) is received.	<table> <tr> <th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th><th><u>Description of Contents</u></th></tr> <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> </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						
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1.1.12 External DNP3 XML	<table> <tr> <th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th><th><u>Description of Contents</u></th></tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDP.xml</td><td>Complete Device</td></tr> </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	<table> <tr> <th><u>Rd</u></th><th><u>Wr</u></th><th><u>Filename</u></th><th><u>Description of Contents</u></th></tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDP.xml</td><td></td></tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>dnpDPCap.xml</td><td></td></tr> </table>	<u>Rd</u>	<u>Wr</u>	<u>Filename</u>	<u>Description of Contents</u>	<input type="checkbox"/>	<input type="checkbox"/>	dnpDP.xml		<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCap.xml		
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<input type="checkbox"/>	<input type="checkbox"/>	dnpDP.xml																					
<input type="checkbox"/>	<input type="checkbox"/>	dnpDPCap.xml																					

<div>files available Off-line:</div> <div><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></div> <div><i>External off-line XML file read permits an XML definition of a new configuration to be supplied from off-line configuration tools.</i></div> <div><i>External off-line XML file write permits an XML definition of a new configuration to be supplied to off-line configuration tools.</i></div>	<div><input type="checkbox"/> <input type="checkbox"/> dnpDPCap.xml</div> <div><input type="checkbox"/> <input type="checkbox"/> dnpDPCfg.xml</div> <div><input checked="" type="checkbox"/> <input type="checkbox"/> OPT100_DNP3_Device_profile.xml</div>	<div>Profile</div> <div>Device</div> <div>Profile</div> <div>Capabilities</div> <div>Device</div> <div>Profile</div> <div>config</div> <div>values</div> <div>Complete</div> <div>Device</div> <div>Profile</div> <div>Document</div>	<div><input type="checkbox"/> <input type="checkbox"/> dnpDPCfg.xml</div> <div><input checked="" type="checkbox"/> <input type="checkbox"/> OPT100_DNP3_Device_profile.xml</div>
<div>1.1.13</div> <div>Connections Supported:</div>	<div><input checked="" type="checkbox"/> Serial (complete section 1.2)</div> <div><input checked="" type="checkbox"/> IP Networking (complete section 1.3)</div> <div><input type="checkbox"/> Other, explain</div>	<div>Serial</div> <div>IP Networking</div>	
<div>1.1.14</div> <div>Conformance Testing:</div> <div><i>Where conformance testing has been completed for the outstation or master station, specify the version of the published DNP3 test procedures that was successfully passed. If independently</i></div>	<div><input checked="" type="checkbox"/> Self-tested, version version Ver 2.6 rev</div> <div><input type="checkbox"/> Independently tested, version</div>		

tested, identify the organization that performed the test.

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>		Not Relevant	
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	Asynchronous	
1.2.3 Baud Rate:	<input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input checked="" type="checkbox"/> Configurable, selectable from 4800, 9600, 19200, 38400, 57600, 115200 <input type="checkbox"/> Configurable, other, describe	115200	other (via WEB-UI)
1.2.4 Hardware Flow Control (Handshaking): <i>Describe hardware signaling requirements of the interface.</i> <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> <i>Where a signal is asserted prior to transmitting, that signal will be maintained active until after the end of transmission.</i> <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>	<input checked="" type="checkbox"/> None	None	
1.2.5 Interval to Request Link Status: <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>	<input checked="" type="checkbox"/> Not Supported <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	Not Supported	
1.2.6 Supports DNP3 Collision Avoidance: <i>Indicates whether an Outstation uses a collision avoidance algorithm.</i> <i>Collision avoidance may be implemented by a back-off timer with two parameters that define the back-off</i>	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, using Back-off time = (Min + Random) method <input type="checkbox"/> Other, explain	No	

<p>time range or by some other vendor-specific mechanism.</p> <p>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.</p> <p>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".</p>			
<p>1.2.7 Receiver Inter-character Timeout:</p> <p>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.</p> <p>Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.</p>	<p><input checked="" type="checkbox"/> Not Checked</p> <p><input type="checkbox"/> No gap permitted</p> <p><input type="checkbox"/> Fixed at bit times</p> <p><input type="checkbox"/> Fixed at ms</p> <p><input type="checkbox"/> Configurable, range to bit times</p> <p><input type="checkbox"/> Configurable, range to ms</p> <p><input type="checkbox"/> Configurable, selectable from bit times</p> <p><input type="checkbox"/> Configurable, selectable from ms</p> <p><input type="checkbox"/> Configurable, other, describe</p> <p><input type="checkbox"/> Variable, explain</p>	Not Checked	
<p>1.2.8 Inter-character gaps in transmission:</p> <p>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.</p> <p>Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.</p>	<p><input checked="" type="checkbox"/> None (always transmits with no inter-character gap)</p> <p><input type="checkbox"/> Maximumbit times</p> <p><input type="checkbox"/> Maximumms</p>	None	

1.3 IP NETWORKING	Capabilities	Current Value	If configurable list methods
1.3.1 Port Name:		eth0	

Name used to reference the communications port defined in this section.			
1.3.2 Type of End Point:	<input type="checkbox"/> TCP Initiating <input checked="" type="checkbox"/> TCP Listening <input type="checkbox"/> TCP Dual <input type="checkbox"/> UDP Datagram	TCP Listening	
1.3.3 IP Address of this Device:			other (via WEB-UI)
1.3.4 Subnet Mask:			other (via WEB-UI)
1.3.5 Gateway IP Address:			other (via WEB-UI)
1.3.6 Accepts TCP Connections or UDP Datagrams from:	<input checked="" type="checkbox"/> Allows all (show as *.*.*.* in 1.3.7) <input type="checkbox"/> Limits based on IP address <input 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		
1.3.7 IP Address(es) from which TCP Connections or UDP Datagrams are accepted:			
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 checked="" type="checkbox"/> Fixed at 20,000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	20000	
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 checked="" type="checkbox"/> Not Applicable (Outstation w/o dual end point) <input type="checkbox"/> Fixed at 20,000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		
1.3.10 TCP Keep-alive timer: <i>The time period for the keep-alive timer on active TCP connections.</i>	<input checked="" type="checkbox"/> Timer Disabled <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		
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 checked="" type="checkbox"/> Fixed at 20,000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Let system choose (Master only)	20000	
1.3.12 Destination UDP port for	<input type="checkbox"/> Fixed at 20,000		

DNP3 Requests (Masters Only):	<input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		
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 checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at 20,000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	None	
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 checked="" type="checkbox"/> Fixed at 20,000 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe <input type="checkbox"/> Use local port number (as specified in 1.3.11)	20000	
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		
1.3.17 Time synchronization support:	<input checked="" type="checkbox"/> DNP3 LAN procedure (function code 24) <input checked="" type="checkbox"/> DNP3 Write Time (not recommended over LAN) <input checked="" type="checkbox"/> Other, explain NTP <input type="checkbox"/> Not Supported		other (Web-UI)

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 0xFFFFF 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	4	other (Web-UI)
1.4.2 DNP3 Source Address Validation: <i>Indicates whether the Outstation will filter out requests not from a specific source address.</i>	<input checked="" type="checkbox"/> Never <input 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	Never	
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 type="checkbox"/> Configurable, range to		

	<input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		
1.4.4 Self Address Support using address 0xFFFC: <i>If an Outstation receives a message with a destination address of 0xFFFC it shall respond normally with its own source address. It must be possible to disable this feature if supported.</i>	<input type="checkbox"/> Yes (only allowed if configurable) <input checked="" type="checkbox"/> No	No	
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 type="checkbox"/> Always <input type="checkbox"/> Sometimes, explain	Never	
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	None	
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	None	
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	
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	292	

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> <i>- Masters must provide a setting less than or equal to 249 to be compliant.</i> <i>- Outstations must provide a setting less than or equal to 2048 to be compliant.</i>	<input checked="" type="checkbox"/> Fixed at 2048 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe	2048	

<p><i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 240.</i></p>			
<p>1.5.2 Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer:</p>	<p> <input type="checkbox"/> Same as 1.5.1 <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe </p> <p>Note: Not relevant - DNP3 file transfer not supported.</p>		
<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><i>- Masters must provide a setting greater than or equal to 2048 to be compliant.</i></p> <p><i>- Outstations must provide a setting greater than or equal to 249 to be compliant.</i></p> <p><i>Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 241.</i></p>	<p> <input checked="" type="checkbox"/> Fixed at 2048 <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe </p>	2048	
<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>	<p> <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 </p>	None	
<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>	<p> <input checked="" type="checkbox"/> Fixed at 0(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 <input type="checkbox"/> The number of objects that can be contained in a fragment (as specified in 1.5.3) </p>	0	
<p>1.5.6 Maximum number of objects allowed in a single control request for Analog Outputs (Group 41):</p>	<p> <input checked="" type="checkbox"/> Fixed at 0(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 <input type="checkbox"/> The number of objects that can be contained in a fragment (as specified in 1.5.3) </p> <p>Note: Set at zero because Analog Outputs are not supported.</p>	0	

1.5.7 Maximum number of objects allowed in a single control request for Data Sets (Groups 85, 86, 87):	<input checked="" type="checkbox"/> Fixed at 0 (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 <input type="checkbox"/> The number of objects that can be contained in a fragment (as specified in 1.5.3) <div>Note: Set at zero because DNP3 Data Sets are not supported.</div>	0	
1.5.8 Supports mixed object groups (AOBs, CROBs and Data Sets) in the same control request:	<input type="checkbox"/> Not applicable - controls are not supported <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No	
1.5.9 Control Status Codes Supported: <i>Indicates which control status codes are supported by the device:</i> <i>- Masters must indicate which control status codes they accept in outstation responses.</i> <i>- Outstations must indicate which control status codes they generate in responses.</i> <i>Control status code 0 (success) must be supported by Masters and Outstations.</i>	<input type="checkbox"/> 1 - TIMEOUT <input type="checkbox"/> 2 - NO_SELECT <input type="checkbox"/> 3 - FORMAT_ERROR <input type="checkbox"/> 4 - NOT_SUPPORTED <input type="checkbox"/> 5 - ALREADY_ACTIVE <input type="checkbox"/> 6 - HARDWARE_ERROR <input type="checkbox"/> 7 - LOCAL <input type="checkbox"/> 8 - TOO_MANY_OBJS <input type="checkbox"/> 9 - NOT_AUTHORIZED <input type="checkbox"/> 10 - AUTOMATION_INHIBIT <input type="checkbox"/> 11 - PROCESSING_LIMITED <input type="checkbox"/> 12 - OUT_OF_RANGE <input type="checkbox"/> 13 - DOWNSTREAM_LOCAL <input type="checkbox"/> 14 - ALREADY_COMPLETE <input type="checkbox"/> 15 - BLOCKED <input type="checkbox"/> 16 - CANCELLED <input type="checkbox"/> 17 - BLOCKED_OTHER_MASTER <input type="checkbox"/> 18 - DOWNSTREAM_FAIL <input type="checkbox"/> 126 - RESERVED <input type="checkbox"/> 127 - UNDEFINED		

1.6 FILL OUT THE FOLLOWING ITEMS FOR MASTERS ONLY	Capabilities	Current Value	If configurable list methods
This section is not included in this Profile.			

1.7 FILL OUT THE FOLLOWING ITEMS FOR OUTSTATIONS ONLY	Capabilities	Current Value	If configurable list methods
1.7.1 Timeout waiting for Application Confirm of solicited response message:	<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	None	
1.7.2 How often is time synchronization required from the master:	<input checked="" type="checkbox"/> Never needs time <input type="checkbox"/> Within seconds after IIN1.4 is set <input type="checkbox"/> Periodically, fixed at seconds	Never	

<p>Details of when the master needs to perform a time synchronization to ensure that the outstation clock does not drift outside of an acceptable tolerance. If the option to relate this to IIN1.4 is used then details of when IIN1.4 is asserted are in section 1.10.2.</p>	<input type="checkbox"/> Periodically, between and seconds <div>Note: OPT100 requests Time Sync at device startup if DNP3 Time sync is enabled in Web-UI</div>		
<p>1.7.3 Device Trouble Bit IIN1.6:</p> <p>If IIN1.6 device trouble bit is set under certain conditions, explain the possible causes.</p>	<input checked="" type="checkbox"/> Never used <input type="checkbox"/> Reason for setting	Never used	
<p>1.7.4 File Handle Timeout:</p> <p>If there is no activity referencing a file handle for a configurable length of time, the outstation must do an automatic close on the file. The timeout value must be configurable up to 1 hour. When this condition occurs the outstation will send a File Transport Status Object (obj grp 70 var 6) using a status code value of handle expired (0x02).</p>	<input checked="" type="checkbox"/> Not applicable, files not supported <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	Not applicable	
<p>1.7.7 Sends Multi-Fragment Responses:</p> <p>Indicates whether an Outstation sends multi-fragment responses (Masters do not send multi-fragment requests).</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No	
<p>1.7.8 Last Fragment Confirmation:</p> <p>Indicates whether the Outstation requests confirmation of the last fragment of a multi-fragment response.</p>	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes, explain <input type="checkbox"/> Never		
<p>1.7.9 DNP Command Settings preserved through a device restart:</p> <p>If any of these settings are written through the DNP protocol and they are not preserved through a restart of the Outstation, the Master will have to write them again after it receives a response in which the Restart IIN bit is set.</p>	<input type="checkbox"/> Assign Class <input type="checkbox"/> Analog Deadbands <input type="checkbox"/> Data Set Prototypes <input type="checkbox"/> Data Set Descriptors <input type="checkbox"/> Function Code 31 Activate Configuration		
<p>1.7.10 Supports configuration signature:</p> <p>Indicates whether an Outstation supports the Group 0 device attribute "Configuration signature" (variation 200). If yes, list the vendor-defined name(s) of the algorithm(s) available to calculate the signature.</p> <p>Note: The algorithm used for calculating the signature is identified by name in a string that can be determined remotely using protocol object Group 0 Variation 201. If only a single algorithm is available,</p>	<input type="checkbox"/> Configuration signature supported If configuration signature is supported, then the following algorithm(s) are available for calculating the signature:		

identifying that algorithm in this object is optional.			
<p>1.7.11 Requests Application Confirmation:</p> <p><i>Indicate if application confirmation is requested:</i></p> <ul style="list-style-type: none"> - when responding with events - when sending non-final fragments of multi-fragment responses <p><i>Note: to be compliant both must be selected as "yes".</i></p>	<p>For event responses:</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Configurable</p> <p>For non-final fragments:</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Configurable</p>		
<p>1.7.12 Supports DNP3 Clock Management:</p> <p><i>Indicates whether the Outstation supports the DNP3 clock management functionality:</i></p> <ul style="list-style-type: none"> - supports timestamped object variations required for its subset level with a time accuracy that is consistent with section 10 of this Device Profile - if the outstation asserts IIN1.4 [NEED_TIME], it shall support DNP3 time synchronization functionality 	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>		

1.8 OUTSTATION UNSOLICITED RESPONSE SUPPORT	Capabilities	Current Value	If configurable list methods
<p>1.8.1 Supports Unsolicited Reporting:</p> <p><i>When the unsolicited response mode is configured "off", the device is to behave exactly like an equivalent device that has no support for unsolicited responses. If set to "on", the Outstation will send a null Unsolicited Response after it restarts, then wait for an Enable Unsolicited Response command from the master before sending additional Unsolicited Responses containing event data.</i></p>	<p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Configurable, selectable from On and Off</p>	On	
<p>1.8.2 Master Data Link Address:</p> <p><i>The destination address of the master device where the unsolicited responses will be sent.</i></p>	<p><input type="checkbox"/> Fixed at</p> <p><input checked="" type="checkbox"/> Configurable, range 0 to 65519</p> <p><input type="checkbox"/> Configurable, selectable from</p> <p><input type="checkbox"/> Configurable, other, describe</p>	3	other (via WEB-UI)
<p>1.8.3 Unsolicited Response Confirmation Timeout:</p> <p><i>This is the amount of time that the outstation will wait for an Application Layer confirmation back from the master indicating that the master received the unsolicited response message. As a minimum, the range of</i></p>	<p><input type="checkbox"/> Fixed at ms</p> <p><input type="checkbox"/> Configurable, range to ms</p> <p><input type="checkbox"/> Configurable, selectable from ms</p> <p><input type="checkbox"/> Configurable, other, describe</p> <p><input type="checkbox"/> Variable, explain</p>		

configurable values must include times from one second to one minute. This parameter may be the same one that is used for normal, solicited, application confirmation timeouts, or it may be a separate parameter.			
1.8.4 Number of Unsolicited Retries: <i>This is the number of retries that an outstation transmits in each unsolicited response series if it does not receive confirmation back from the master. The configured value includes identical and regenerated retry messages. One of the choices must provide for an indefinite (and potentially infinite) number of transmissions.</i>	<input 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 <input type="checkbox"/> Unlimited		

1.9 OUTSTATION UNSOLICITED RESPONSE TRIGGER CONDITIONS	Capabilities	Current Value	If configurable list methods
1.9.1 Number of class 1 events:	<input type="checkbox"/> Class 1 not used to trigger Unsolicited Responses <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	
1.9.2 Number of class 2 events:	<input type="checkbox"/> Class 2 not used to trigger Unsolicited Responses <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	
1.9.3 Number of class 3 events:	<input type="checkbox"/> Class 3 not used to trigger Unsolicited Responses <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	
1.9.4 Total number of events from any class:	<input checked="" type="checkbox"/> Total Number of Events not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		

1.10 OUTSTATION PERFORMANCE	Capabilities	Current Value	If configurable list methods
1.10.1 Maximum Time Base Drift (milliseconds per minute): <i>If the device is synchronized by DNP, what is the clock drift rate over the full operating temperature range.</i>	<input checked="" type="checkbox"/> Fixed at 0ms <input type="checkbox"/> Range to ms <input type="checkbox"/> Selectable from ms <input type="checkbox"/> Other, describe	0 ms	
1.10.2 When does outstation set IIN1.4:	<input checked="" type="checkbox"/> Never <input checked="" type="checkbox"/> Asserted at startup until first Time	Never	other (WEB-UI)

When does the outstation set the internal indication IIN1.4 NEED_TIME	Synchronization request received <input type="checkbox"/> Periodically every seconds <input type="checkbox"/> Periodically, range to seconds <input type="checkbox"/> Periodically, selectable from seconds <input type="checkbox"/> seconds after last time sync <input type="checkbox"/> Range to seconds after last time sync <input type="checkbox"/> Selectable from seconds after last time sync <input type="checkbox"/> When time error may have drifted by ms <input type="checkbox"/> When time error may have drifted by range to ms <input type="checkbox"/> When time error may have drifted by selectable from ms		
1.10.3 Maximum Internal Time Reference Error when set via DNP (ms): <i>The difference between the time set in DNP Write Time message, and the time actually set in the outstation.</i>	<input checked="" type="checkbox"/> Fixed at 0ms <input type="checkbox"/> Range to ms <input type="checkbox"/> Selectable from ms <input type="checkbox"/> Other, describe	0 ms	
1.10.4 Maximum Delay Measurement Error (ms): <i>The difference between the time reported in the delay measurement response and the actual time between receipt of the delay measurement request and issuing the delay measurement reply.</i>	<input type="checkbox"/> Fixed at ms <input type="checkbox"/> Range to ms <input type="checkbox"/> Selectable from ms <input type="checkbox"/> Other, describe		
1.10.5 Maximum Response Time (ms): <i>The amount of time an outstation will take to respond upon receipt of a valid request. This does not include the message transmission time.</i>	<input checked="" type="checkbox"/> Fixed at 200ms <input type="checkbox"/> Range to ms <input type="checkbox"/> Selectable from ms <input type="checkbox"/> Other, describe Note: Typically 30ms to 70ms, maximum 200ms	200 ms	
1.10.6 Maximum time from start-up to IIN 1.4 assertion (ms):	<input checked="" type="checkbox"/> Fixed at 0ms <input type="checkbox"/> Range to ms <input type="checkbox"/> Selectable from ms <input type="checkbox"/> Other, describe	0 ms	

1.11 INDIVIDUAL FIELD OUTSTATION PARAMETERS	Value of Current Setting	If configurable list methods
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1.12 SECURITY PARAMETERS	Capabilities	Current Value	If configurable list methods
This section is not included in this Profile.			

1.13 BROADCAST FUNCTIONALITY	Capabilities	Current Value	If configurable list methods
This section indicates which functions are supported by the device when using broadcast addresses.			

Note that this section shows only entries that may have a meaningful purpose when used with broadcast requests.

1.13.1 Support for broadcast functionality:	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled <input type="radio"/> Configurable		
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2 Mapping to IEC 61850 Object Models

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.

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.

This section is not included in this Profile.

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 BINARY INPUTS Static (Steady-State) Group Number: 1 Event Group 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 type="checkbox"/> Variation 1 - packed format <input checked="" type="checkbox"/> Variation 2 - with flag <input type="checkbox"/> Based on point index (add column to table in part 5)	Two	
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 type="checkbox"/> Variation 1 - without time <input type="checkbox"/> Variation 2 - with absolute time <input type="checkbox"/> Variation 3 - with relative time <input type="checkbox"/> Based on point index (add column to table in part 5)		
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 type="checkbox"/> All events <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.1.4 Binary Inputs included in Class	<input type="checkbox"/> Always		

0 response:	<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)		
3.1.5 Binary Inputs Event Buffer Organization: <i>When event buffers are allocated per object group (see part 1.7.6), indicate the number of events that can be buffered for Binary Inputs. If event buffers are not allocated per object group then set "Fixed at 0".</i>	<input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		

3.2 DOUBLE-BIT BINARY INPUTS

Static (Steady-State) Group Number: 3
Event Group Number: 4

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
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This section is not included in this Profile.

3.3 BINARY OUTPUT STATUS AND CONTROL RELAY OUTPUT BLOCK

Binary Output Status Group Number: 10
Binary Output Event Group Number: 11
CROB Group Number: 12
Binary Output Command Event Group Number: 13

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
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This section is not included in this Profile.

3.4 COUNTERS / FROZEN COUNTERS

Counter Group Number: 20
Frozen Counter Group Number: 21
Counter Event Group Number: 22
Frozen Counter Event Group Number: 23

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
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This section is not included in this Profile.

3.5 ANALOG INPUTS / FROZEN ANALOG INPUTS

Static (Steady-State) Group Number: 30
Static Frozen Group Number: 31
Event Group Number: 32
Frozen Analog Input Event Group Number: 31
Deadband Group 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	Four	

	floating point with flag <input checked="" type="checkbox"/> Variation 6 - double-precision floating point with flag <input type="checkbox"/> Based on point index (add column to table in part 5)		
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 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)		
3.5.3 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 type="checkbox"/> C: All events <input type="checkbox"/> Based on point index (add column to table in part 5)		
3.5.4 Analog 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	
3.5.5 How Deadbands are set:	<input type="checkbox"/> A. Global Fixed <input type="checkbox"/> B. Configurable through DNP <input 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		
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 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)		
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)		
3.5.11 Analog Inputs Event Buffer Organization: <i>When event buffers are allocated per object group (see part 1.7.6), indicate the number of events that can be buffered for Analog Inputs. If event buffers are not allocated per object group then set "Fixed at 0".</i>	<input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		
3.5.12 Frozen Analog Inputs Event Buffer Organization: <i>When event buffers are allocated per object group (see part 1.7.6), indicate the number of events that can be buffered for Frozen Analog Inputs. If event buffers are not allocated per object group then set "Fixed at 0".</i>	<input type="checkbox"/> Fixed at <input type="checkbox"/> Configurable, range to <input type="checkbox"/> Configurable, selectable from <input type="checkbox"/> Configurable, other, describe		



3.6 ANALOG OUTPUTS / ANALOG OUTPUT COMMANDS

Analog Output Status Group Number: 40

Analog Outputs Group Number: 41

Analog Output Events Group Number: 42

Analog Output Command Events Group Number: 43

	Capabilities (leave tick-boxes blank if this data type is not supported)	Current Value	If configurable list methods
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This section is not included in this Profile.

3.7 FILE CONTROL

Group Number: 70

	Capabilities	Current Value	If configurable list methods
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This section is not included in this Profile.

3.8 OCTET STRING AND EXTENDED OCTET STRING POINTS

Static (Steady-State) Group Number: 110, 114

Event Group Number: 111, 115

	Capabilities	Current Value	If configurable list methods
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This section is not included in this Profile.

3.9 VIRTUAL TERMINAL PORT NUMBERS (POINTS)

Static (Steady-State) Group Number: 112

Event Group Number: 113

	Capabilities	Current Value	If configurable list methods
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This section is not included in this Profile.

3.10 DATA SET PROTOTYPE

Group 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

Group 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.

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)
0	242	Device Attributes - Device manufacturer's software version	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
0	243	Device Attributes - Device manufacturer's hardware version	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
0	250	Device Attributes - Device manufacturer's product name and model	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
0	252	Device Attributes - Device manufacturer's name	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
30	0	Analog Input - any variation	1(read)	00, 01 (start-stop), 06 (no range, or all)		
30	0	Analog Input - any variation	22(assign class)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)		
30	1	Analog Input - 32-bit with flag	1(read)	00, 01 (start-stop), 06 (no range, or all),	(Response)	00, 01 (start-stop), 17, 28 (index)

				07, 08 (limited qty), 17, 27, 28 (index)		
30	2	Analog Input - 16-bit with flag	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
30	3	Analog Input - 32-bit without flag	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
30	4	Analog Input - 16-bit without flag	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
30	5	Analog Input - single-precision, floating-point with flag	1(read)	00, 01 (start-stop), 06 (no range, or all), 07, 08 (limited qty), 17, 27, 28 (index)	(Response)	00, 01 (start-stop), 17, 28 (index)
60	1	Class Objects - class 0 data	1(read)	06 (no range, or all)		
80	1	Internal Indications - packed format	2(write)			

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:

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 binary inputs present in the device, and the maximum binary input index, are available remotely using object Group 0 Variations 239 and 238.

- ☒ Fixed, list shown in table below
- ☐ Configurable (current list may be shown in table below)
- ☒ Other, explain: **Alert levels and change event classes are configurable through the Web-UI. If alerts are muted in the Web-UI, LOCAL_FORCED flag is set for those alerts that are active.**

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
0	Cautions present	two	No	Yes	
1	Alarms present	one	No	Yes	
2	Device Stopped	one	No	Yes	
20	Caution Present Methane	two	No	Yes	
21	Caution Present Acetylene	two	No	Yes	
22	Caution Present Ethylene	two	No	Yes	
23	Caution Present Ethane	two	No	Yes	
24	Caution Present Carbon Monoxide	two	No	Yes	
25	Caution Present Carbon Dioxide	two	No	Yes	
26	Caution Present Total Dissolved Combustible Gases	two	No	Yes	
27	Caution Present Hydrogen	two	No	Yes	
28	Caution Present Moisture In Oil	two	No	Yes	
29	Caution Present Relative Moisture In Oil	two	No	Yes	
30	Caution Present Total Gas Pressure Maximum limit	two	No	Yes	
31	Caution Present Total Gas Pressure	two	No	Yes	

	Minimum limit				
60	Caution ROC1D Methane	two	No	Yes	
61	Caution ROC1D Acetylene	two	No	Yes	
62	Caution ROC1D Ethylene	two	No	Yes	
63	Caution ROC1D Ethane	two	No	Yes	
64	Caution ROC1D Carbon Monoxide	two	No	Yes	
65	Caution ROC1D Carbon Dioxide	two	No	Yes	
66	Caution ROC1D Total Dissolved Combustible Gases	two	No	Yes	
67	Caution ROC1D Hydrogen	two	No	Yes	
80	Caution ROC7D Methane	two	No	Yes	
81	Caution ROC7D Acetylene	two	No	Yes	
82	Caution ROC7D Ethylene	two	No	Yes	
83	Caution ROC7D Ethane	two	No	Yes	
84	Caution ROC7D Carbon Monoxide	two	No	Yes	
85	Caution ROC7D Carbon Dioxide	two	No	Yes	
86	Caution ROC7D Total Dissolved Combustible Gases	two	No	Yes	
87	Caution	two	No	Yes	

	ROC7D Hydrogen				
100	Caution ROC30D Methane	two	No	Yes	
101	Caution ROC30D Acetylene	two	No	Yes	
102	Caution ROC30D Ethylene	two	No	Yes	
103	Caution ROC30D Ethane	two	No	Yes	
104	Caution ROC30D Carbon Monoxide	two	No	Yes	
105	Caution ROC30D Carbon Dioxide	two	No	Yes	
106	Caution ROC30D Total Dissolved Combustible Gases	two	No	Yes	
107	Caution ROC30D Hydrogen	two	No	Yes	
220	Alarm Present Methane	one	No	Yes	
221	Alarm Present Acetylene	one	No	Yes	
222	Alarm Present Ethylene	one	No	Yes	
223	Alarm Present Ethane	one	No	Yes	
224	Alarm Present Carbon Monoxide	one	No	Yes	
225	Alarm Present Carbon Dioxide	one	No	Yes	
226	Alarm Present Total Dissolved Combustible Gases	one	No	Yes	

227	Alarm Present Hydrogen	one	No	Yes	
228	Alarm Present Moisture In Oil	one	No	Yes	
229	Alarm Present Relative Moisture In Oil	one	No	Yes	
230	Alarm Present Total Gas Pressure Maximum limit	one	No	Yes	
231	Alarm Present Total Gas Pressure Minimum limit	one	No	Yes	
260	Alarm ROC1D Methane	one	No	Yes	
261	Alarm ROC1D Acetylene	one	No	Yes	
262	Alarm ROC1D Ethylene	one	No	Yes	
263	Alarm ROC1D Ethane	one	No	Yes	
264	Alarm ROC1D Carbon Monoxide	one	No	Yes	
265	Alarm ROC1D Carbon Dioxide	one	No	Yes	
266	Alarm ROC1D Total Dissolved Combustible Gases	one	No	Yes	
267	Alarm ROC1D Hydrogen	one	No	Yes	
280	Alarm ROC7D Methane	one	No	Yes	
281	Alarm ROC7D Acetylene	one	No	Yes	

282	Alarm ROC7D Ethylene	one	No	Yes	
283	Alarm ROC7D Ethane	one	No	Yes	
284	Alarm ROC7D Carbon Monoxide	one	No	Yes	
285	Alarm ROC7D Carbon Dioxide	one	No	Yes	
286	Alarm ROC7D Total Dissolved Combustible Gases	one	No	Yes	
287	Alarm ROC7D Hydrogen	one	No	Yes	
300	Alarm ROC30D Methane	one	No	Yes	
301	Alarm ROC30D Acetylene	one	No	Yes	
302	Alarm ROC30D Ethylene	one	No	Yes	
303	Alarm ROC30D Ethane	one	No	Yes	
304	Alarm ROC30D Carbon Monoxide	one	No	Yes	
305	Alarm ROC30D Carbon Dioxide	one	No	Yes	
306	Alarm ROC30D Total Dissolved Combustible Gases	one	No	Yes	
307	Alarm ROC30D Hydrogen	one	No	Yes	

5.2 Definition of Double-bit 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.

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

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.

This section is not included in this Profile.

5.3 Definition of Binary Output Status / Control Relay Output Block Points 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 binary outputs present in the device, and the maximum binary output index, are available remotely using object Group 0 Variations 224 and 223.

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

This section is not included in this Profile.

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:

This section is not included in this Profile.

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)	Frozen Analog Exists (Yes or No)	Event Class Assigned to Frozen Analog Events (1, 2, 3 or none)	Min int / flt	Max int / flt	Multiplier	Offset	Units	Resolution	Description
0	Methane	none			0	999999			ppm	1	
1	Acetylene	none			0	999999			ppm	1	
2	Ethylene	none			0	999999			ppm	1	
3	Ethane	none			0	999999			ppm	1	

4	Carbon Monoxide	none			0	999999			ppm	1	
5	Carbon Dioxide	none			0	999999			ppm	1	
6	Total Dissolved combustible gases	none			0	999999			ppm	1	
7	Hydrogen	none			0	999999			ppm	1	
8	Moisture in oil	none			0	999999			ppm	1	
9	Oil Temperature in MHT chamber	none			-50	200			C	1	
10	Relative Moisture in oil	none			0	100			%RS	1	
11	Total Gas Pressure	none			0	10000			hPa	1	
20	Methane, 24h average	none			0	999999			ppm	1	
21	Acetylene, 24h average	none			0	999999			ppm	1	
22	Ethylene, 24h average	none			0	999999			ppm	1	
23	Ethane, 24h average	none			0	999999			ppm	1	
24	Carbon Monoxide, 24h average	none			0	999999			ppm	1	
25	Carbon Dioxide, 24h average	none			0	999999			ppm	1	
26	Total Dissolved combustible gases, 24h average	none			0	999999			ppm	1	
27	Hydrogen, 24h average	none			0	999999			ppm	1	
28	Moisture in oil, 24h average	none			0	999999			ppm	1	
29	Total Gas Pressure, 24h average	none			0	10000			hPa	1	
40	Methane, 24h ROC	none			-999999	999999			ppm	1	
41	Acetylene, 24h ROC	none			-999999	999999			ppm	1	
42	Ethylene, 24h ROC	none			-999999	999999			ppm	1	
43	Ethane, 24h	none			-999999	999999			ppm	1	

[illegible]

87	Hydrogen, month ROC	none				-999999	999999			ppm	1	
100	CH4/H2	none										CH4/H2 ratio multiplied by 100.
101	C2H2/C2H4	none										C2H2/C2H4 ratio multiplied by 100.
102	C2H2/CH4	none										C2H2/CH4 ratio multiplied by 100.
103	C2H6/C2H2	none										C2H6/C2H2 ratio multiplied by 100.
104	C2H4/C2H6	none										C2H4/C2H6 ratio multiplied by 100.
105	CO2/CO	none										CO2/CO ratio multiplied by 100.

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:

This section is not included in this Profile.

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:

This section is not included in this Profile.

5.8 Definition of Octet String and Extended 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:

This section is not included in this Profile.

5.9 Definition of Virtual Terminal Port Numbers:

- ☐ Fixed, list shown in table below

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

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

This section is not included in this Profile.

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:

This section is not included in this Profile.

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:

This section is not included in this Profile.

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.

This section is not included in this Profile.

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

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