DNP 3.0 Device Profile

Based on DNP XML Schema version 2.07.00

Device Profile for the QuickServer, ProtoCessor and FS-B35 Series FieldServer

Revision History			
Date	**Version**	**Reason for change**	**Editor**
2010-06-18	1	First Release.	Sukhwant Singh Samra
2010-07-08	2	Now this is FS capability document for schema version 2.07.00.	Sukhwant Singh Samra
2010-07-16	3	Updated for UDP port numbers and notes.	Sukhwant Singh Samra
2010-07-27	4	Matching baud rate options with driver manual and DFS.	Sukhwant Singh Samra
2010-08-04	5	Supporting on more models and using receiving inter-character timeout in section 1.2.7.	Sukhwant Singh Samra
2010-08-17	5	Supporting on ProtoCessor.	Sukhwant Singh Samra
2010-11-10	6	Updating as per discussion with Steve.	Sukhwant Singh Samra
2017-08-11	7	Take out x20, x25 & x40 info. General update for format/look and accuracy.	Scott Horbaly

Document Revision: 7.A

Technical Support

Please call us for any technical support needs related to the FieldServer product.

Sierra Monitor Corporation
1991 Tarob Court
Milpitas, CA 95035

Website: www.sierramonitor.com

U.S. Support Information:

+1 408 964-4443
+1 800 727-4377

Email: support@sierramonitor.com

EMEA Support Information:

+44 2033 1813 41

Email: support.emea@sierramonitor.com

TABLE OF CONTENTS

1 DEVICE PROPERTIES

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

- Identifying the capabilities of a DNP 3.0 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 DNP 3.0 estate)
- Matching user requirements to product capabilities when procuring a DNP 3.0 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 DNP 3.0 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

1.1. Device Identification	Capabilities	Configuration Method[1]
1.1.1. Device Function: *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.*	- Master- Outstation	Proprietary File via Other Mechanism
1.1.2. Vendor Name: *The name of the organization producing the device.*	**Note: Current value = FieldServer Technologies.** Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 252.	
1.1.3. Device Name: *The model and name of the device, sufficient to distinguish it from any other device from the same organization.*	**Note: Current Value = FS-B35 Series, ProtoCessor, or QuickServer.** Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 250.	
1.1.4. Device manufacturer's hardware version string:	Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 243.	
1.1.5. Device manufacturer's software version string:	Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 242.	
1.1.6. Device Profile Document Version Number: *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 start of this document.*		
1.1.7. DNP Levels Supported for: *Indicate each DNP3 Level to which the device conforms fully. For Masters, requests and responses can be indicated independently.*	Outstations Only Requests and Responses ☒ None ☒ Level 1 ☒ Level 2 ☐ Level 3 ☐ Level 4 Note: Similar levels are supported as a Master. **Note: Current value = Level 2**	Proprietary File via Other Mechanism
1.1.8. Supported Function Blocks:	☒ Self Address Reservation ☐ Data Sets ☐ File Transfer ☐ Virtual Terminal	Proprietary File via Other Mechanism

[1] Only listed if configurable.

	☐ Mapping to IEC 61850 Object Models defined in a DNP3 XML file ☐ Function code 31 activate config. ☐ Secure Authentication (see 1.12)	
1.1.9. Notable Additions: *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.*		
1.1.10. Methods to set Configurable Parameters:	☐ XML - Loaded via DNP3 File Transfer ☐ XML - Loaded via other transport mechanism ☐ Terminal - ASCII Terminal Command Line ☐ Software - Vendor software named ☐ Proprietary file loaded via DNP3 File Transfer ☒ Proprietary file loaded via other transport mechanism ☐ Direct - Keypad on device front panel ☐ Factory - Specified on device order ☐ Protocol - Set via DNP3 (assign class) ☐ Other - explain:	
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.*	RdWrFilename — Description of Contents ☐ dnpDP.xml — Complete Device Profile ☐ dnpDPCap.xml — Device Profile Capabilities ☐ dnpDPCfg.xml — Device Profile config values	
1.1.12. External DNP3 XML files available Off-line: *XML configuration file names that can be read or written from an external system, typically from a system that maintains the outstation configuration.* *External off-line XML file read permits an XML definition of a new configuration to be supplied from off-line configuration tools.* *External off-line XML file write permits an XML definition of a new configuration to be supplied to off-line configuration tools.*	RdWrFilename — Description of Contents ☐ ☐ dnpDP.xml — Complete Device Profile ☐ ☐ dnpDPCap.xml — Device Profile Capabilities ☐ ☐ dnpDPCfg.xml — Device Profile config values ☒ ☐ fs_dnp3.xml — Complete Device Profile Document	
1.1.13. Connections Supported:	☒ Serial (complete section 1.2) ☒ IP Networking (complete section 1.3) ☐ Other, explain:	Proprietary File via Other Mechanism

1.2 Serial Connections

1.2. SERIAL CONNECTIONS	Capabilities	Configuration Method[2]
1.2.1. Port Name: *Name used to reference the communications port defined in this section.*	Note: 1-8 (RS-232) and 2 (RS-485) channels are available, referenced as P1 to P8 and R1 and R2.	
1.2.2. Serial Connection Parameters:	☒ Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bit, No Parity ☒ Other, explain: Configurable Data Bits (7, 8), Parity Bits (NONE, EVEN, ODD) and Stop Bits (1, 2)	Proprietary File via Other Mechanism
1.2.3. Baud Rate:	☐ Fixed at ☐ Configurable, range to ☒ Configurable, selectable from 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 ☐ Other, explain:	Proprietary File via Other Mechanism
1.2.4. Hardware Flow Control (Handshaking): *Describe hardware signaling requirements of the interface.* *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.* *Where a signal is asserted prior to transmitting, that signal will be maintained active until after the end of transmission.* *Where a signal is asserted to enable reception, any data sent to the device when the signal is not active could be discarded.*	☒ None **RS-232 / V.24 / V.28 Options** Asserts ☐ RTS Before Tx ☐ DTR Before Tx ☐ RTS Before Rx ☐ DTR Before Rx ☐ Always RTS ☐ Always DTR Requires Before Tx CTS ☐ Asserted ☐ Deasserted DCD ☐ Asserted ☐ Deasserted DSR ☐ Asserted ☐ Deasserted RI ☐ Asserted ☐ Deasserted ☐ Requires Rx Inactive before Tx Requires Before Rx CTS ☐ Asserted ☐ Deasserted DCD ☐ Asserted ☐ Deasserted DSR ☐ Asserted ☐ Deasserted RI ☐ Asserted ☐ Deasserted Always Ignores ☐ CTS ☐ DCD ☐ DSR ☐ RI ☐ Other, explain:	Proprietary File via Other Mechanism

[2] Only listed if configurable.

	RS-422 / V.11 Options ☐ Requires Indication before Rx ☐ Asserts Control before Tx ☐ Other, explain: **RS-485 Options** ☐ Requires Rx inactive before Tx ☐ Other, explain: Note: Not all ports are available on all models	
1.2.5. Interval to Request Link Status: *Indicates how often to send Data Link Layer status requests on a serial connection. This parameter is separate from the TCP Keep-alive timer.*	☒ Not Supported ☐ Fixed at seconds ☐ Configurable, range to seconds ☐ Configurable, selectable from seconds ☐ Other, explain:	
1.2.6. Supports DNP3 Collision Avoidance: *Indicates whether an Outstation uses a collision avoidance algorithm.* *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.* *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.* *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".*	☒ No ☐ Yes, using Back-off time = (Min + Random) method ☐ Other, explain:	Proprietary File via Other Mechanism
1.2.7. Receiver Inter-character Timeout: *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. Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.*	☐ Not Checked ☐ No gap permitted ☐ Fixed at bit times ☐ Fixed at ms ☐ Configurable, range to bit times ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from bit times ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	Proprietary File via Other Mechanism

1.2.8. Inter-character gaps in transmission: *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. Where no asynchronous serial interface is fitted this parameter is not applicable. In this case none of the options shall be selected.*	☒ None (transmits with no inter-character gap) ☐ Maximum bit times ☐ Maximum ms	

1.3 IP Networking

1.3. IP NETWORKING	Capabilities	Configuration Method[3]
1.3.1. Port Name: *Name used to reference the communications port defined in this section.*	Note: Configurable 1-2 channels are available, referenced as N1 and N2.	
1.3.2. Type of End Point:	☒ TCP Initiating (Master Only) ☒ TCP Listening (Outstation Only) ☒ TCP Dual (required for Masters) ☒ UDP Datagram (required)	Proprietary File via Other Mechanism
1.3.3. IP Address of this Device:		software **FS-GUI**
1.3.4. Subnet Mask:		software **FS-GUI**
1.3.5. Gateway IP Address:		software **FS-GUI**
1.3.6. Accepts TCP Connections or UDP Datagrams from:	☐ Allows all (show as *.*.*.* in 1.3.7) ☒ Limits based on IP address ☐ Limits based on list of IP addresses ☐ Limits based on a wildcard IP address ☐ Limits based on list of wildcard IP addresses ☒ Other validation, explain: As an outstation, If IP Address is not specified, it can accept connection from any single IP Address	Proprietary File via Other Mechanism
1.3.7. IP Address(es) from which TCP Connections or UDP Datagrams are accepted:		
1.3.8. TCP Listen Port Number: *If Outstation or dual end point Master, port number on*	☐ Not Applicable (Master w/o dual end point) ☐ Fixed at 20,000	Proprietary File via Other

[3] Only listed if configurable.

which to listen for incoming TCP connect requests. Required to be configurable for Masters and recommended to be configurable for Outstations.	☒ Configurable, range **0** to **65535** ☐ Configurable, selectable from ☐ Other, explain: Note: By default or configured 0 mean 20000	Mechanism
1.3.9. TCP Listen Port Number of remote device: *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.*	☐ Not Applicable (Outstation w/o dual end point) ☐ Fixed at 20,000 ☒ Configurable, range **0** to **65535** ☐ Configurable, selectable from ☐ Other, explain: Note: By default or configured 0 mean 20000	Proprietary File via Other Mechanism
1.3.10. TCP Keep-alive timer: *The time period for the keep-alive timer on active TCP connections.*	☐ Fixed at ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☒ Other, explain: Not used	Proprietary File via Other Mechanism
1.3.11. Local UDP port: *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.*	☐ Fixed at 20,000 ☒ Configurable, range **0** to **65535** ☐ Configurable, selectable from ☐ Other, explain: ☒ Let system choose (Master only) Note: (As Outstation) By default or configured 0 mean 20000. (As Master) By default or configured 0 mean 'Let system choose'	Proprietary File via Other Mechanism
1.3.12. Destination UDP port for DNP3 Requests (Master Only):	☐ Fixed at 20,000 ☒ Configurable, range **0** to **65535** ☐ Configurable, selectable from ☐ Other, explain: Note: By default or configured 0 mean 20000	
1.3.13. Destination UDP port for initial unsolicited null responses (UDP only Outstations): *For a UDP only Outstation, the destination UDP port for sending initial unsolicited Null response.*	☐ None ☐ Fixed at 20,000 ☒ Configurable, range **0** to **65535** ☐ Configurable, selectable from ☐ Other, explain: Note: By default or configured 0 mean 20000, But it will be updated dynamically to the port number being used by Master	
1.3.14. Destination UDP port for responses: *For a UDP only Outstation, the destination UDP port for sending all responses other than the initial unsolicited Null response.*	☐ None ☐ Fixed at 20,000 ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☒ Use source port number	
1.3.15. Multiple outstation connections (Masters only): *Indicates whether multiple outstation connections are supported.*	☒ Supports multiple outstations (Masters only)	Proprietary File via Other Mechanism

1.3.16. Multiple master connections (Outstations only): *Outstations only. Indicates whether multiple master connections are supported and the method that can be used to establish connections.*	☐ Supports multiple masters (Outstations only) If supported, the following methods may be used: ☐ Method 1 (based on IP address) - required ☐ Method 2 (based on IP port number) - recommended ☐ Method 3 (browsing for static data) - optional	
1.3.17. Time synchronization support:	☒ DNP3 LAN procedure (function code 24) ☒ DNP3 Write Time (not recommended over LAN) ☐ Other, explain: ☐ Not Supported	

1.4 Link Layer

1.4. LINK LAYER	Capabilities	Configuration Method[4]
1.4.1. Data Link Address: *Indicates if the link address is configurable over the entire valid range of 0 to 65,519. Data link addresses 0xFFF0 through 0xFFFF are reserved for broadcast or other special purposes.*	☐ Fixed at ☒ Configurable, range **0** to **65519** ☐ Configurable, selectable from ☐ Other, explain:	Proprietary File via Other Mechanism
1.4.2. DNP3 Source Address Validation: *Indicates whether the Outstation will filter out requests not from a specific source address.*	☐ Never ☒ Always, one address allowed (shown in 1.4.3) ☐ Always, any one of multiple addresses allowed (each selectable as shown in 1.4.3) ☒ Sometimes, explain: (As an outstation) If master address is configured, it will be validated, otherwise master address will be configured dynamically and then will be validated	Proprietary File via Other Mechanism
1.4.3. DNP3 Source Address(es) expected when Validation is Enabled: *Selects the allowed source address(es)*	☐ Configurable to any 16 bit DNP Data Link Address value ☒ Configurable, range **0** to **65519** ☐ Configurable, selectable from ☐ Other, explain:	Proprietary File via Other Mechanism
1.4.4. Self Address Support using address 0xFFFC: *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.*	☒ Yes (only allowed if configurable) ☒ No	Proprietary File via Other Mechanism
1.4.5. Sends Confirmed User Data Frames: *A list of conditions under which the device transmits confirmed link layer services (TEST_LINK_STATES, RESET_LINK_STATES, CONFIRMED_USER_DATA).*	☐ Never ☐ Always ☒ Sometimes, explain: Configurable or when requested.	Proprietary File via Other Mechanism

[4] Only listed if configurable.

1.4.6. Data Link Layer Confirmation Timeout: *This timeout applies to any secondary data link message that requires a confirm or response (link reset, link status, user data, etc.).*	☐ None ☐ Fixed at ms ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain:	Proprietary File via Other Mechanism
1.4.7. Maximum Data Link Retries: *The number of times the device will retransmit a frame that requests Link Layer confirmation.*	☒ None ☐ Fixed at ☒ Configurable, range **1** to **255** ☐ Configurable, selectable from ☐ Other, explain: Note: None is the default or selected by configuring a zero value for the retries.	Proprietary File via Other Mechanism
1.4.8. Maximum number of octets Transmitted in a Data Link Frame: *This number includes the CRCs. With a length field of 255, the maximum size would be 292.*	☒ Fixed at **292** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:	
1.4.9. Maximum number of octets that can be Received in a Data Link Frame: *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.*	☒ Fixed at **292** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:	

1.5 Application Layer

1.5. APPLICATION LAYER	Capabilities	Configuration Method[5]
1.5.1. Maximum number of octets Transmitted in an Application Layer Fragment other than File Transfer: *This size does not include any transport or frame octets.* *- Masters must provide a setting ≤ 249.* *- Outstations must provide a setting ≤ 2048.*	☐ Fixed at ☒ Configurable, range **2** to **2048** ☐ Configurable, selectable from ☐ Other, explain: Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 240.	Proprietary File via Other Mechanism
1.5.2. Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer:	☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☒ Other, explain: **File Transfer not supported**	
1.5.3. Maximum number of octets that can be received in an Application Layer Fragment: *This size does not include any transport or frame*	☒ Fixed at **2048** ☐ Configurable, range to	

[5] Only listed if configurable.

octets. *- Masters must provide a setting ≥ 2048.* *- Outstations must provide a setting ≥ 249.*	☐ Configurable, selectable from ☐ Other, explain: Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 241.	
1.5.4. Timeout waiting for Complete Application Layer Fragment: *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.*	☒ None ☐ Fixed at ms ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain: Note: 'None' as an outstation and 'range' is for master.	
1.5.5. Maximum number of objects allowed in a single control request for CROB (Group 12): *Note: The current value of this outstation parameter is available remotely using protocol object Group 0 Variation 216.*	☒ Fixed at **50** (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain:	
1.5.6. Maximum number of objects allowed in a single control request for Analog Outputs (Group 41):	☒ Fixed at **50** (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain:	
1.5.7. Maximum number of objects allowed in a single control request for Data Sets (Groups 85, 86, 87):	☒ Fixed at **0** (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain: Note: Data Sets are not supported.	
1.5.8. Supports mixed object groups (AOBs, CROBs and Data Sets) in the same control request:	☐ Not applicable - controls are not supported ☐ Yes ☒ No	

1.6 For Masters Only

1.6. Fill Out The Following Items For Masters Only	**Capabilities**	**Configuration Method[6]**
1.6.1. Timeout waiting for Complete Application Layer Responses (ms): *Timeout on Master if all fragments of a response message are not received in the specified time.*	☐ None ☐ Fixed at ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms	Proprietary File via Other Mechanism

[6] Only listed if configurable.

	☐ Other, explain: ☒ Variable, explain: Configurable timeout (0-65534s), resets on every fragment receive	
1.6.2. Maximum Application Layer Retries for Request Messages: *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.*	☐ None ☒ Fixed at **3** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain:	
1.6.3. Incremental Timeout waiting for First or Next Fragment of an Application Layer Response:	☐ None ☐ Fixed at ms ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain: Note: These values are in seconds	
1.6.4 Issuing controls to off-line devices: *Indicates if the Master issues control requests to devices that are thought to be off-line (no seen responses to requests).*	☐ Not applicable - controls are not supported ☐ Yes ☒ No	
1.6.5 Issuing controls to off-scan devices: *Indicates if the Master issues control requests to devices that are currently off-scan (the Master is configured not to issue poll requests to the device).*	☐ Not applicable - controls are not supported ☐ Yes ☒ No	
1.6.6 Maximum Application Layer Retries for Control Select Messages (same sequence number): *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.*	☒ None (required) ☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain:	
1.6.7 Maximum Application Layer Retries for Control Select Messages (new sequence number): *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.*	☒ None (required) ☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Variable, explain:	
1.6.8 Maximum error in the time that the Master issues freeze requests: *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 issue a request?*		
1.6.9 Maximum error in the time that the Master schedules repetitive freeze requests: *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 issue a request? (how early/late can a request be issued)?		
1.6.10 Scheduled actions that may affect the accuracy of freeze requests: *Indicates if the Master's accuracy of issuing freeze requests may be affected by other scheduled operations (poll requests/control requests).*	☒ Poll requests may affect Freeze time ☒ Control requests may affect Freeze time	
1.6.11 Master's algorithm for scheduling request operations: *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.*	Send clear restart bit immediately when restart detected. Send time sync immediately when detected Control or freeze requests. Poll requests.	

1.7 For Outstations Only

1.7. Fill Out The Following Items For Outstations Only	Capabilities	Configuration Method[7]
1.7.1. Timeout waiting for Application Confirm of solicited response message:	☐ None ☐ Fixed at ms ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain:	Proprietary File via Other Mechanism
1.7.2. How often is time synchronization required from the master: *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.*	☐ Never needs time ☒ Within **300** seconds after IIN1.4 is set ☐ Periodically, fixed at seconds ☐ Periodically, between and seconds	
1.7.3. Device Trouble Bit IIN1.6: *If IIN1.6 device trouble bit is set under certain conditions, explain the possible causes.*	☒ Never used ☐ Reason for setting:	
1.7.4. File Handle Timeout: *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).*	☒ Not applicable, files not supported ☐ Fixed at ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain:	
1.7.5. Event Buffer Overflow Behavior:	☐ Discard the oldest event ☒ Discard the newest event ☐ Other, explain:	

[7] Only listed if configurable.

1.7.6. Event Buffer Organization: *Explain how event buffers are arranged (per Object Group, per Class, single buffer etc.) and provide their sizes.*	Maximum number of total events are configurable. Event logging is independent of the class or data type.	Proprietary File via Other Mechanism
1.7.7. Sends Multi-Fragment Responses: *Indicates whether an Outstation sends multi-fragment responses (Masters do not send multi-fragment requests).*	☐ Yes ☒ No	
1.7.8. Last Fragment Confirmation: *Indicates whether the Outstation requests confirmation of the last fragment of a multi-fragment response.*	☐ Always ☐ Sometimes, explain: ☐ Never	
1.7.9. DNP Command Settings preserved through a device reset: *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 anytime the Restart IIN bit is set.*	☐ Assign Class ☐ Analog Deadbands ☐ Data Set Prototypes ☐ Data Set Descriptors ☐ Function Code 31 Activate Configuration	

1.8 Outstation Unsolicited Response Support

1.8. OUTSTATION UNSOLICITED RESPONSE SUPPORT	Capabilities	Configuration Method[8]
1.8.1. Supports Unsolicited Reporting: *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.*	☐ Not Supported ☒ Configurable, selectable from On and Off	Proprietary File via Other Mechanism
1.8.2. Master Data Link Address: *The destination address of the master device where the unsolicited responses will be sent.*	☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☒ Other, explain: Configurable from 0 to 65519. If not configured, outstation will send unsolicited responses to master address 0, but it will also update master address dynamically on receive of first message from master	Proprietary File via Other Mechanism
1.8.3. Unsolicited Response Confirmation Timeout: *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 configurable values must include times from one second to one minute. This*	☐ Fixed at ms ☒ Configurable, range **0** to **65534** ms ☐ Configurable, selectable from ms ☐ Other, explain: ☐ Variable, explain:	Proprietary File via Other Mechanism

[8] Only listed if configurable.

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: *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.*	☒ None ☐ Fixed at ☒ Configurable, range **1** to **2147483647** ☐ Configurable, selectable from ☐ Other, explain: ☐ Always infinite, never gives up Note: To select 'None', leave it unconfigured or if configured as 0.2147483647 is read as "infinite".	Proprietary File via Other Mechanism

1.9 Outstation Unsolicited Response Trigger Conditions

1.9. OUTSTATION UNSOLICITED RESPONSE TRIGGER CONDITIONS[9]	**Capabilities**
1.9.1. Number of class 1 events:	☐ Class 1 not used to trigger Unsolicited Responses ☒ Fixed at **1** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:
1.9.2. Number of class 2 events:	☐ Class 2 not used to trigger Unsolicited Responses ☒ Fixed at **1** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:
1.9.3. Number of class 3 events:	☐ Class 3 not used to trigger Unsolicited Responses ☒ Fixed at **1** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:
1.9.4. Total number of events from any class:	☐ Total Number of Events not used to trigger Unsolicited Responses ☒ Fixed at **1** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:
1.9.5. Hold time after class 1 event: *A configurable value of 0 indicates that responses are not delayed by this parameter.*	☐ Class 1 not used to trigger Unsolicited Responses ☒ Fixed at **0** ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Other, explain:

[9] None in Section 1.9 are configurable

1.9.6. Hold time after class 2 event: *A configurable value of 0 indicates that responses are not delayed due to this parameter.*	☐ Class 2 not used to trigger Unsolicited Responses ☒ Fixed at **0** ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Other, explain:
1.9.7. Hold time after class 3 event: *A configurable value of 0 indicates that responses are not delayed due to this parameter.*	☐ Class 3 not used to trigger Unsolicited Responses ☒ Fixed at **0** ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Other, explain:
1.9.8. Hold time after event assigned to any class: *A configurable value of 0 indicates that responses are not delayed due to this parameter.*	☐ Class events not used to trigger Unsolicited Responses ☒ Fixed at **0** ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Other, explain:
1.9.9. Retrigger Hold Time: *The hold-time timer may be retriggered for each new event detected (increased possibility of capturing all the changes in a single response) or not retriggered (giving the master a guaranteed update time).*	☐ Hold-time timer will be retriggered for each new event detected (may get more changes in next response) ☐ Hold-time timer will not be retriggered for each new event detected (guaranteed update time)
1.9.10. Other Unsolicited Response Trigger Conditions:	☐

1.10 Outstation Performance

1.10. OUTSTATION PERFORMANCE	Capabilities	Configuration Method[10]
1.10.1. Maximum Time Base Drift (milliseconds per minute): *If the device is synchronized by DNP, what is the clock drift rate over the full operating temperature range.*	☐ Fixed at ms ☒ Range **0** to **15** ms ☐ Selectable from ms ☐ Other, describe:	
1.10.2. When does outstation set IIN1.4? *When does the outstation set the internal indication NEED_TIME*	☐ Never ☒ Asserted at startup until first Time Synchronization request received ☐ Periodically, range to seconds ☐ Periodically, selectable from seconds ☒ Range **120** to **28800** seconds after last time sync ☐ Selectable from seconds after last time sync ☐ When time error may have drifted by range to ms ☐ When time error may have drifted by selectable from ms	Proprietary File via Other Mechanism
1.10.3. Maximum Internal Time Reference Error when set via DNP (ms): *The difference between*	☐ Fixed at ms ☒ Range **10** to **35** ms	

[10] Only listed if configurable.

the time set in DNP Write Time message, and the time actually set in the outstation.	☐ Selectable from ms ☐ Other, describe:	
1.10.4. Maximum Delay Measurement Error (ms): *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.*	☐ Fixed at ms ☒ Range **20** to **50** ms ☐ Selectable from ms ☐ Other, describe:	
1.10.5. Maximum Response Time (ms): *The amount of time an outstation will take to respond upon receipt of a valid request. This does not include the message transmission time.*	☐ Fixed at ms ☒ Range **10** to **40** ms ☐ Selectable from ms ☐ Other, describe:	
1.10.6. Maximum time from start-up to IIN 1.4 assertion (ms):	☐ Fixed at ms ☐ Range to ms ☐ Selectable from ms ☒ Other, describe: On startup vary first message from outstation will have IIN1.4 set. Startup time may vary from 30 seconds to 120 seconds.	
1.10.7. Maximum Event Time-tag error for local Binary and Double Bit I/O (ms): *The error between the time-tag reported and the absolute time of the physical event. This error includes the Internal Time Reference Error.*	☒ Fixed at **10** ms ☐ Range to ms ☐ Selectable from ms ☐ Other, describe: Note: The current value of the parameter is available remotely via protocol object Group 0 Variation 217.	
1.10.8. Maximum Event Time-tag error for local I/O other than Binary and Double Bit data types (ms):	☒ Fixed at **10** ms ☐ Range to ms ☐ Selectable from ms ☐ Other, describe:	

1.11 Individual Field Outstation Parameters

1.11. INDIVIDUAL FIELD OUTSTATION PARAMETERS	Value of Current Setting	Configuration Method[11]
1.11.1. User-assigned location name or code string (same as g0v245):	Not Supported	
1.11.2. User-assigned ID code/number string (same as g0v246):		Proprietary File via Other Mechanism; protocol Note: String length limited to 199 bytes.
1.11.3 User-assigned name string for the outstation (same as g0v247):	Not Supported	
1.11.4 Device Serial Number string (same as g0v248):		

[11] Only listed if configurable.

1.12 Security Parameters

1.12. SECURITY PARAMETERS[12]	Capabilities	Current Value
1.12.1 DNP3 device support for secure authentication: *The support for secure authentication is optional in DNP3 devices. Indicate here if the device supports secure authentication.* *If the device does not support secure authentication then ignore the rest of this section.* *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 protocol document "DNP3Spec-V2-Sup1-SecureAuthentication". The volume 2 supplement shows version numbers of all associated documents that comprise that version of Secure Authentication.*	☒ Secure Authentication not supported If Secure Authentication is supported, what Version(s) are supported: ☐ Fixed at version ☐ Configurable, selectable from versions	Not Supported

[12] Not configurable.

3 CAPABILITIES AND CURRENT SETTINGS FOR DEVICE DATABASE (OUTSTATION ONLY)

The following tables identify the capabilities and current settings for each DNP 3.0 data type. Details defining the data points available in the device are shown in part 5 of this Device Profile.

3.1 Binary Input Points

3.1. BINARY INPUT POINTS Static (Steady-State) Object Number: 1 Event Object Number: 2		
	Capabilities	**Configuration Method[13]**
3.1.1. Static Variation reported when variation 0 requested	☒ Variation 1 - Single-bit packed format ☒ Variation 2 - Single-bit with flag ☐ Based on point index (part 5 tables) Note: Default is 1; configurable per point index.	Proprietary File via Other Mechanism
3.1.2. Event Variation reported when variation 0 requested: *Note: The support for binary input events can be determined remotely using protocol object Group 0 Variation 237.*	☒ Variation 1 - without time ☒ Variation 2 - with absolute time ☒ Variation 3 - with relative time ☐ Based on point index (part 5 tables) Note: Default is 1; configurable per point index.	Proprietary File via Other Mechanism
3.1.3. Event reporting mode: *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 Binary Inputs*	☐ Only most recent ☒ All events	
3.1.4. Binary Inputs included in Class 0 response: *If Binary Inputs are not included in the Class 0 response, Binary Input Events (group 2) may not be reported.*	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	

3.3 Binary Output Status and Control Relay Output Block

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	**Configuration Method[13]**
3.3.1. Minimum pulse time allowed with Trip, Close and Pulse On commands.	☒ Fixed at **0** ms (hardware may limit this further) ☐ Based on point index (part 5 tables)	

[13] Only listed if configurable.

3.3.2. Maximum pulse time allowed with Trip, Close and Pulse On commands.	☒ Fixed at **4294967295** ms (hardware may limit this further) ☐ Based on point index (part 5 tables)	
3.3.3. Binary Output Status included in Class 0 response: *If Binary Output Status points are not included in the Class 0 response, Binary Output Status Events (group 11) may not be reported.*	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.3.4. Reports Output Command Event Objects:	☒ Never ☐ Only upon a successful Control ☐ Upon all control attempts	
3.3.5. Static Variation reported when variation 0 requested.	☐ Variation 1 - Continuous control ☒ Variation 2 - Continuous control, binary output status ☐ Based on point index (part 5 tables)	
3.3.6. Event Variation reported when variation 0 requested. *Note: The support for binary output events can be determined remotely using protocol object Group 0 Variation 222.*	☐ Variation 1 - without time ☐ Variation 2 - with absolute time ☐ Based on point index (part 5 tables) Note: Not relevant - output events not supported.	
3.3.7. Command Event Variation reported when variation 0 requested.	☐ Variation 1 - without time ☐ Variation 2 - with absolute time ☐ Based on point index (part 5 tables) Note: Not relevant - output events not supported.	
3.3.8. Change Event reporting mode: *When responding with event data and more than one event occurs for a data point, an Outstation may include all events or only the most recent event.*	☐ Only most recent ☐ All events Note: Not relevant - output events not supported.	
3.3.9. Command Event reporting mode: *When responding with event data and more than one event occurs for a data point, an Outstation may include all events or only the most recent event.*	☐ Only most recent ☐ All events Note: Not relevant - output events not supported.	
3.3.10. Maximum Time between Select and Operate:	☐ Not Applicable ☐ Fixed at seconds ☒ Configurable, range **0** to **65.534** seconds ☐ Configurable, selectable from seconds ☐ Other, explain: ☐ Variable, explain: ☐ Based on point index (part 5 tables) Note: The device's 'timeout' parameter is being used for various timeouts	Proprietary File via Other Mechanism

3.4 Counters / Frozen Counters

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	**Configuration Method[14]**
3.4.1. Static Counter Variation reported when variation 0 requested.	☒ Variation 1 - 32-bit with flag ☒ Variation 2 - 16-bit with flag ☒ Variation 5 - 32-bit without flag ☒ Variation 6 - 16-bit without flag ☐ Based on point index (part 5 tables) Note: Default is 5; configurable per point index	Proprietary File via Other Mechanism
3.4.2. Counter Event Variation reported when variation 0 requested. *Note: The support for counter events can be determined remotely using protocol object Group 0 Variation 227.*	☒ Variation 1 - 32-bit with flag ☒ Variation 2 - 16-bit with flag ☐ Variation 5 - 32-bit with flag and time ☐ Variation 6 - 16-bit with flag and time ☐ Based on point index (part 5 tables) Note: Default is as per Counter variation (section 3.4.1): 1 for 32-bit counters, 2 for 16-bit counters; configurable per point index.	Proprietary File via Other Mechanism
3.4.3. Counters included in Class 0 response: *If counters are not included in the Class 0 response, Counter Events (group 22) may not be reported.*	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.4.4. Counter Event reporting mode: *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.*	☐ A: Only most recent (value at time of event) ☐ B: Only most recent (value at time of response) ☒ C: All events ☐ Based on point index (part 5 tables)	
3.4.5. Static Frozen Counter Variation reported when variation 0 requested.	☒ Variation 1 - 32-bit with flag ☒ Variation 2 - 16-bit with flag ☐ Variation 5 - 32-bit with flag and time ☐ Variation 6 - 16-bit with flag and time ☒ Variation 9 - 32-bit without flag ☒ Variation 10 - 16-bit without flag ☐ Based on point index (part 5 tables)	

[14] Only listed if configurable.

	Note: (section 3.4.1) 1 if Counter's variation is 1; 2 if counter's variation is 2, 9 if counter's variation is 5; 10 if counter's variation is 6.	
3.4.6. Frozen Counter Event Variation reported when variation 0 requested: *Note: The support for frozen counter events can be determined remotely using protocol object Group 0 Variation 225.*	☐ Variation 1 - 32-bit with flag ☐ Variation 2 - 16-bit with flag ☐ Variation 5 - 32-bit without flag ☐ Variation 6 - 16-bit without flag ☐ Based on point index (part 5 tables) Note: Frozen Counter events not supported	
3.4.7. Frozen Counters included in Class 0 response: *If Frozen Counters are not included in the Class 0 response, Frozen Counter Events (group 23) may not be reported.*	☐ Always ☒ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.4.8. Frozen Counter Event reporting mode: *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*	☐ Only most recent frozen value ☐ All frozen values Note: Frozen Counter events not supported	
3.4.9. Counters Roll Over at:	☒ 16 Bits (65,535) ☒ 32 Bits (4,294,967,295) ☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain: ☐ Based on point index (part 5 tables)	
3.4.10. Counters frozen by means of:	☒ Master Request ☐ Freezes itself without concern for time of day ☐ Freezes itself and requires time of day ☐ Other, explain:	

3.5 Analog Input Points

3.5. ANALOG INPUT POINTS Static (Steady-State) Object Number: 30 Event Object Number: 32 Deadband Object Number: 34		
	Capabilities	**Configuration Method[15]**
3.5.1. Static Variation reported when variation 0 requested	☒ Variation 1 - 32-bit with flag ☒ Variation 2 - 16-bit with flag ☒ Variation 3 - 32-bit without flag	Proprietary File via Other

[15] Only listed if configurable.

	☒ Variation 4 - 16-bit without flag ☐ Variation 5 - single-precision floating point with flag ☐ Variation 6 - double-precision floating point with flag ☐ Based on point index (part 5 tables) Note: Default is 3 but also configurable per point index	Mechanism
3.5.2. Event Variation reported when variation 0 requested: *Note: The support for analog input events can be determined remotely using protocol object Group 0 Variation 231.*	☒ Variation 1 - 32-bit without time ☒ Variation 2 - 16-bit without time ☐ Variation 3 - 32-bit with time ☐ Variation 4 - 16-bit with time ☐ Variation 5 - single-precision floating point w/o time ☐ Variation 6 - double-precision floating point w/o time ☐ Variation 7 - single-precision floating point with time ☐ Variation 8 - double-precision floating point with time ☐ Based on point index (part 5 tables) Note: See Analog variation (section 3.5.1) for default; 1 for 32bit AI, 2 for 16bit AI, but also configurable per point index	Proprietary File via Other Mechanism
3.5.3. Event reporting mode: *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.*	☐ A: Only most recent (value at time of event) ☐ B: Only most recent (value at time of response) ☒ C: All events ☐ Based on point index (part 5 tables)	
3.5.4. Analog Inputs included in Class 0 response: *If Analog Inputs are not included in the Class 0 response, Analog Input Events (group 32) may not be reported.*	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.5.5. How Deadbands are set:	☐ A. Global Fixed ☐ B. Configurable through DNP ☒ C. Configurable via other means ☐ D. Other, explain: ☐ Based on point index (part 5 tables) Note: Default is deadband is 0 and also configurable per point index	Proprietary File via Other Mechanism
3.5.6. Analog Deadband Algorithm: *simple- compares the difference from the previous reported value* *integrating- keeps track of the accumulated change* *other- indicating another algorithm*	☒ Simple ☐ Integrating ☐ Other, explain: ☐ Based on point index (part 5 tables)	Proprietary File via Other Mechanism

3.5.7. Static Frozen Analog Input Variation reported when variation 0 requested	☐ Variation 1 - 32-bit with flag ☐ Variation 2 - 16-bit with flag ☐ Variation 3 - 32-bit with time-of-freeze ☐ Variation 4 - 16-bit with time-of-freeze ☐ Variation 5 - 32-bit without flag ☐ Variation 6 - 16-bit without flag ☐ Variation 7 - single-precision floating point with flag ☐ Variation 8 - double-precision floating point with flag ☐ Based on point index (part 5 tables)	
3.5.8. Frozen Analog Input Event Variation reported when variation 0 requested: *Note: The support for frozen analog input events can be determined remotely using protocol object Group 0 Variation 230.*	☐ Variation 1 - 32-bit without time ☐ Variation 2 - 16-bit without time ☐ Variation 3 - 32-bit with time ☐ Variation 4 - 16-bit with time ☐ Variation 5 - single-precision floating point w/o time ☐ Variation 6 - double-precision floating point w/o time ☐ Variation 7 - single-precision floating point with time ☐ Variation 8 - double-precision floating point with time ☐ Based on point index (part 5 tables)	
3.5.9. Frozen Analog Inputs included in Class 0 response: *If Frozen Analog Inputs are not included in the Class 0 response, Frozen Analog Input Events (group 33) may not be reported.*	☐ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.5.10. Frozen Analog Input Event reporting mode: *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.*	☐ Only most recent frozen value ☐ All frozen values	

3.6 Analog Output Status and Analog Output Control Block

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	**Configuration Method[16]**
3.6.1. Static Analog Output Status Variation reported when variation 0 requested	☐ Variation 1 - 32-bit with flag ☒ Variation 2 - 16-bit with flag ☐ Variation 3 - single-precision floating point with flag	

[16] Only listed if configurable.

	☐ Variation 4 - double-precision floating point with flag ☐ Based on point index (part 5 tables)	
3.6.2. Analog Output Status included in Class 0 response: *If Analog Output Status points are not included in the Class 0 response, Analog Output Events (group 42) may not be reported.*	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index (part 5 tables)	
3.6.3. Reports Output Command Event Objects:	☒ Never ☐ Only upon a successful Control ☐ Upon all control attempts	
3.6.4. Event Variation reported when variation 0 requested *Note: The support for analog output events can be determined remotely using protocol object Group 0 Variation 219.*	☐ Variation 1 - 32-bit without time ☐ Variation 2 - 16-bit without time ☐ Variation 3 - 32-bit with time ☐ Variation 4 - 16-bit with time ☐ Variation 5 - single-precision floating point w/o time ☐ Variation 6 - double-precision floating point w/o time ☐ Variation 7 - single-precision floating point with time ☐ Variation 8 - double-precision floating point with time ☐ Based on point index (part 5 tables) Note: Not relevant - output events not supported.	
3.6.5. Command Event Variation reported when variation 0 requested	☐ Variation 1 - 32-bit without time ☐ Variation 2 - 16-bit without time ☐ Variation 3 - 32-bit with time ☐ Variation 4 - 16-bit with time ☐ Variation 5 - single-precision floating point w/o time ☐ Variation 6 - double-precision floating point w/o time ☐ Variation 7 - single-precision floating point with time ☐ Variation 8 - double-precision floating point with time ☐ Based on point index (part 5 tables) Note: Not relevant - output events not supported.	
3.6.6. Change Event reporting mode: *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 most recent ☐ All events Note: Not relevant - output events not supported.	
3.6.7. Command Event reporting mode: *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 most recent ☐ All events Note: Not relevant - output events not supported.	
3.6.8. Maximum Time between Select and Operate:	☐ Not Applicable ☐ Fixed at seconds ☒ Configurable, range **0** to **65.534** seconds ☐ Configurable, selectable from seconds ☐ Other, explain:	Proprietary File via Other Mechanism

	☐ Variable, explain: ☐ Based on point index (part 5 tables) Note: The device's 'timeout' parameter is being used for various timeouts.	

3.7 Sequential File Transfer

3.7. SEQUENTIAL FILE TRANSFER[17] Object Number: 70	
	Capabilities
3.7.1. File Transfer Supported:	☐ Yes ☐ No (do not complete any further entries in section 3.7)
3.7.2. File Authentication: *Indicates whether a valid authentication key must be obtained prior to open and delete requests.*	☐ Always ☐ Sometimes, explain: ☐ Never
3.7.3. File Append Mode: *Indicates if a file can be opened and appended to versus just overwritten.*	☐ Always ☐ Sometimes, explain ☐ Never
3.7.4. Permissions Support: *Indicates the device is capable of using the indicated permissions.*	☐ Owner Read Allowed: 0x0100 ☐ Owner Write Allowed: 0x0080 ☐ Owner Execute Allowed: 0x0040 ☐ Group Read Allowed: 0x0020 ☐ Group Write Allowed: 0x0010 ☐ Group Execute Allowed: 0x0008 ☐ World Read Allowed: 0x0004 ☐ World Write Allowed: 0x0002 ☐ World Execute Allowed: 0x0001
3.7.5. Multiple Blocks in a Fragment: *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.*	☐ Yes ☐ No
3.7.6. Max number of Files Open at one time:	☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☐ Other, explain:

[17] None of the below are configurable.

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)**
0	242	Device Attributes - Device manufacturer's software version	1 *(read)*	00 *(start-stop)*	129 *(Response)*	00 *(start-stop)*
0	243	Device Attributes - Device manufacturer's hardware version	1 *(read)*	00 *(start-stop)*	129 *(Response)*	00 *(start-stop)*
0	246	Device Attributes - User assigned ID code/number	1 *(read)*	00 *(start-stop)*	129 *(Response)*	00 *(start-stop)*
0	246	Device Attributes - User assigned ID code/number	2 *(write)*	00 *(start-stop)*		
0	248	Device Attributes - Device serial number	1 *(read)*	00 *(start-stop)*	129 *(Response)*	00 *(start-stop)*
0	250	Device Attributes - Device manufacturer's product name and model	1 *(read)*	00 *(start-stop)*	129 *(Response)*	00 *(start-stop)*
0	254	Device Attributes - Non-specific all attributes request	1 *(read)*	00 *(start-stop)*, 06 *(no range, or all)*		
0	255	Device Attributes - List of attribute variations	1 *(read)*	00 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00 *(start-stop)*
1	0	Binary Input - any variation	1 *(read)*	06 *(no range, or all)*		
1	1	Binary Input - Single-bit packed			129 *(Response)*	00, 01 *(start-stop)*
1	2	Binary Input - Single-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
2	0	Binary Input Change Event - any variation	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*		
2	1	Binary Input Change Event - without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
2	1	Binary Input Change Event - without time			130 *(Unsol. Resp.)*	17, 28 *(index)*
2	2	Binary Input Change Event - with absolute time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*

2	2	Binary Input Change Event - with absolute time			130 *(Unsol. Resp.)*	17, 28 *(index)*
2	3	Binary Input Change Event - with relative time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
2	3	Binary Input Change Event - with relative time			130 *(Unsol. Resp.)*	17, 28 *(index)*
10	0	Continuous Control - any variation	1 *(read)*	06 *(no range, or all)*		
10	2	Continuous Control - binary output status			129 *(Response)*	00, 01 *(start-stop)*
12	1	Pulsed Control - control relay output block	3 *(select)*	17, 28 *(index)*	129 *(Response)*	echo of request
12	1	Pulsed Control - control relay output block	4 *(operate)*	17, 28 *(index)*	129 *(Response)*	echo of request
12	1	Pulsed Control - control relay output block	5 *(direct op.)*	17, 28 *(index)*	129 *(Response)*	echo of request
12	1	Pulsed Control - control relay output block	6 *(direct op, no ack)*	17, 28 *(index)*	129 *(Response)*	echo of request
20	0	Counter - any variation	1 *(read)*	06 *(no range, or all)*		
20	0	Counter - any variation	7 *(freeze)*	06 *(no range, or all)*		
20	0	Counter - any variation	8 *(freeze, no ack)*	06 *(no range, or all)*		
20	0	Counter - any variation	9 *(freeze & clear)*	06 *(no range, or all)*		
20	0	Counter - any variation	10 *(frz & clr, no ack)*	06 *(no range, or all)*		
20	1	Counter - 32-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
20	2	Counter - 16-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
20	5	Counter - 32-bit without flag			129 *(Response)*	00, 01 *(start-stop)*
20	6	Counter - 16-bit without flag			129 *(Response)*	00, 01 *(start-stop)*
21	0	Frozen Counter - any variation	1 *(read)*	06 *(no range, or all)*		
21	1	Frozen Counter - 32-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
21	2	Frozen Counter - 16-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
21	9	Frozen Counter - 32-bit without flag			129 *(Response)*	00, 01 *(start-stop)*

21	10	Frozen Counter - 16-bit without flag			129 *(Response)*	00, 01 *(start-stop)*
22	0	Counter Change Event - any variation	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*		
22	1	Counter Change Event - 32-bit with flag			129 *(Response)*	17, 28 *(index)*
22	1	Counter Change Event - 32-bit with flag			130 *(Unsol. Resp.)*	17, 28 *(index)*
22	2	Counter Change Event - 16-bit with flag			129 *(Response)*	17, 28 *(index)*
22	2	Counter Change Event - 16-bit with flag			130 *(Unsol. Resp.)*	17, 28 *(index)*
30	0	Analog Input - any variation	1 *(read)*	06 *(no range, or all)*		
30	1	Analog Input - 32-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
30	2	Analog Input - 16-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
30	3	Analog Input - 32-bit without flag			129 *(Response)*	00, 01 *(start-stop)*
30	4	Analog Input - 16-bit without flag			129 *(Response)*	00, 01 *(start-stop)*
32	0	Analog Input Change Event - any variation	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*		
32	1	Analog Input Change Event - 32-bit without time			129 *(Response)*	17, 28 *(index)*
32	1	Analog Input Change Event - 32-bit without time			130 *(Unsol. Resp.)*	17, 28 *(index)*
32	2	Analog Input Change Event - 16-bit without time			129 *(Response)*	17, 28 *(index)*
32	2	Analog Input Change Event - 16-bit without time			130 *(Unsol. Resp.)*	17, 28 *(index)*
40	0	Analog Output Status - any variation	1 *(read)*	06 *(no range, or all)*		
40	2	Analog Output Status - 16-bit with flag			129 *(Response)*	00, 01 *(start-stop)*
41	2	Analog Output Block - 16-bit	3 *(select)*	17, 28 *(index)*	129 *(Response)*	echo of request
41	2	Analog Output Block - 16-bit	4 *(operate)*	17, 28 *(index)*	129 *(Response)*	echo of request
41	2	Analog Output Block - 16-bit	5 *(direct op.)*	17, 28 *(index)*	129 *(Response)*	echo of request

41	2	Analog Output Block - 16-bit	6 *(direct op, no ack)*	17, 28 *(index)*	129 *(Response)*	echo of request
50	1	Time and Date - absolute time	2 *(write)*	07 *(limited qty = 1)*		
51	1	Time and Date CTO - absolute time, synchronized			129 *(Response)*	07 *(limited qty = 1)*
51	1	Time and Date CTO - absolute time, synchronized			130 *(Unsol. Resp.)*	07 *(limited qty = 1)*
51	2	Time and Date CTO - absolute time, un-synchronized			129 *(Response)*	07 *(limited qty = 1)*
51	2	Time and Date CTO - absolute time, un-synchronized			130 *(Unsol. Resp.)*	07 *(limited qty = 1)*
52	1	Time Delay - coarse			129 *(Response)*	07 *(limited qty = 1)*
52	2	Time Delay - fine			129 *(Response)*	07 *(limited qty = 1)*
60	1	Class Objects - class 0 data	1 *(read)*	06 *(no range, or all)*		
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	2 *(write)*	00 *(start-stop)*		
No object (function code only)			13 *(cold restart)*			
No object (function code only)			23 *(delay meas.)*			

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:

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		none	off	on	Binary Input index 0

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:

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
0		Y	Y	Y	Y	Y	Y		Y	Y	Y		Off	On	none	none	Binary Output 0

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:

Note: All Counter indexes are configurable as 16-bit or 32-bit.

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
0		none	Y	none	16-bit or 32-bit counter

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:

Note: All Analog Inputs indexes are configurable as 16-bit or 32-bit.

Analog Input points list									
			Transmitted Value		Scaling				
Point Index	Name	Event Class Assigned (1, 2, 3 or none)	Min int	Max int	Multiplier	Offset	Units	Resolution	Description
0		none	-32768	+32767					16-bit Analog Input
1		none	-2147483648	+2147483647					32-bit Analog Input

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
0		Y	Y	Y	-32768	+32767					none		16-bit Analog Output