PROTECTION MADE SIMPLE.

SEG electronics

HighPROTEC

DNP3 Field Device Profile

Distributed Network Protocol

HIGHPROTEC DNP3 FIELD DEVICE PROFILE

HighPROTEC Version: 3.10

Original document

English

REFERENCE MANUAL HPT-3.10-EN-DNP-Profile

Build 60823

Revision A

SEG Electronics GmbH

Krefelder Weg 47 • D–47906 Kempen (Germany)

Telephone: +49 (0) 21 52 145 0

Internet: www.SEGelectronics.de

Sales

Telephone: +49 (0) 21 52 145 331

Fax: +49 (0) 21 52 145 354

E-mail: sales@SEGelectronics.de

Service

Telephone: +49 (0) 21 52 145 600

Fax: +49 (0) 21 52 145 354

E-mail: support@SEGelectronics.de

Complete address / phone / fax / email information for all locations is available on our website.

Revision History

Date	Time	Version	Reason for change	Edited by
2012-01-11		1	Initial Version	Joerg Katzer
2015-04-16	15:00:00	2	First updates	Joerg Katzer Claus Kronenberger
2017-09-22	11:00:00	3	Review of current implementation	Joerg Katzer Claus Kronenberger Krzysztof Urgacz
2020-08-26	07:30:00	4	Renamed vendor from *Woodward* to *SEG Electronics*	Sebastian Daniels
2023-01-20	11:30:00	5	Layout reworked. (No technical changes.)	Ralf Gawlista

Table of Contents

1 Device Properties . . . 6

1.1 Device Identification . . . 6

1.2 Serial Connections . . . 8

1.3 IP Networking . . . 10

1.4 Link Layer . . . 14

1.5 Application Layer . . . 16

1.6 Items for Masters Only – Not Applicable . . . 18

1.7 Items For Outstations Only . . . 18

1.8 Outstation Unsolicited Response Support . . . 20

1.9 Outstation Unsolicited Response Trigger Conditions . . . 21

1.10 Outstation Performance . . . 23

1.11 Individual Field Outstation Parameters . . . 24

2 Mapping to IEC 61850 Object Models . . . 26

3 Capabilities and Current Settings for Device Database . . . 27

3.1 Binary Input Points . . . 27

3.2 Double-bit Input Points . . . 29

3.3 Binary Output Status and Control Relay Output Block . . . 30

3.4 Counters / Frozen Counters . . . 33

3.5 Analog Input Points . . . 37

3.6 Analog Output Status and Analog Output Control Block 40
3.7 Sequential File Transfer 43
3.8 Octet String Points 45
3.9 Virtual Terminal Port Numbers (Points) 46
3.10 Data Set Prototype 46
3.11 Data Set Descriptor Contents and Characteristics 47

4 Implementation Table 49

1 Device Properties

1.1 Device Identification

1.1. Device Identification	Capabilities	Current Value	If configurable list methods
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.*	- Outstation	- Outstation	
1.1.2. Vendor Name: *The name of the organization producing the device.*	-	SEG SEG	
1.1.3. Device Name: *The model and name of the device, sufficient to distinguish it from any other device from the same organization.*	-	HighPROTEC	
1.1.4. Device manufacturer's hardware version string:	-		
1.1.5. Device manufacturer's software version string:	-	3.10	
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.*	-	5	
1.1.7. DNP Levels Supported for: *Indicate each DNP3 Level to which the device conforms fully. For Nasters, requests and responses can be indicated independently.*	Outstations Only Requests and Responses ☒ None ☒ Level 1 ☒ Level 2 ☐ Level 3	Level 2	

1.1. Device Identification	Capabilities	Current Value	If configurable list methods
1.1.8. Supported Function Blocks:	☒ Self Address Reservation ☐ Object 0 - attribute objects ☐ Data Sets ☐ File Transfer ☐ Virtual Terminal ☐ Mapping to IEC 61850 Object Models defined in a DNP3 XML file	Self Address	
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.*	This is a notable addition	This is a notable addition	
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 PowerPort-E ☐ Proprietary file loaded via DNP3 File Transfer ☐ Proprietary file loaded via other transport mechanism ☒ Direct - Keypad on device front panel ☐ Factory - Specified when device is ordered ☐ Protocol - Set via DNP3 (e.g. assign class) ☐ Other - explain:	Software Direct	
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.*	Rd Filename (Description of Contents) ☐ dnpDP.xml (Complete Device Profile) ☐ dnpDPCap.xml (Device Profile Capabilities)	Rd Filename (Description of Contents) ☐ dnpDP.xml ☐ dnpDPCap.xml	

1.1. Device Identification	Capabilities	Current Value	If configurable list methods
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.*	☐ dnpDPCfg.xml (Device Profile config values)	☐ dnpDPCfg.xml	
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.*	Rd/Wr Filename (Description of Contents) ☒/☐ dnpDP.xml (Complete Device Profile) ☐/☐ dnpDPCap.xml (Device Profile Capabilities) ☐/☐ dnpDPCfg.xml (Device Profile config values)	Rd/Wr Filename (Description of Contents) ☒/☐ dnpDP.xml ☐/☐ dnpDPCap.xml ☐/☐ dnpDPCfg.xml	
1.1.13. Connections Supported :*If IP Networking is supported, both TCP and UDP are required to meet the requirements of DNP3 Specification Volume 7, IP Networking Specification.*	☒Serial (complete section 1.2) ☒ IP Networking (complete section 1.3) ☐ Other, explain:		software Smart view ---------- direct ----------

1.2 Serial Connections

1.2. Serial Connections	Capabilities	Current Value	If configurable list methods
1.2.1. Port Name: *The name associated with this serial port.*	-	X103	
1.2.2. Serial Connection Parameters:	☒ Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bit, No Parity	Asynchronous	software Smart view

1.2. Serial Connections	Capabilities	Current Value	If configurable list methods
	☒ Other, explain: **Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bits, Even Parity** **Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bits, Odd Parity** **Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bits, No Parity** **Asynchronous - 8 Data Bits, 1 Start Bit, 2 Stop Bits, NO Parity**		---------- direct ----------
1.2.3. Baud Rate:	☐ Fixed at ☐ Configurable, rangeto ☒ Configurable, selectable from **1200**, **2400**,**4800**, **9600**, **19200**, **38400**, **57600**, **115200** ☐ Configurable, other, describe:	19200	software Smart view ---------- direct ----------
1.2.4. Hardware Flow Control (Handshaking):	☒ None **RS-485 Options:** ☒ Requires Rx inactive before Tx ☐ Other, explain:	**RS-485Options:** Requires Rx inactive before Tx	
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 **0** to **120** seconds ☐ Configurable, selectable from seconds ☐ Configurable, other, describe:	0 seconds	
1.2.6. Supports DNP3 Collision Avoidance:	☒ No ☐ Yes, explain:	No	

1.2. Serial Connections	Capabilities	Current Value	If configurable list methods
Indicates whether an Outstation uses a collision avoidance algorithm. Documentation provided by the vendor will provide information on collision avoidance schemes.			
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 are selected.*	☒ Not Checked ☐ No gap permitted ☐ Fixed atbit times ☐ Fixed atms ☐ Configurable, rangetobit times ☐ Configurable, rangetoms ☐ Configurable, selectable from bit times ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	Not Checked	
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 are selected.*	☒ None (always transmits with no inter-character gap) ☐ Maximum bit times ☐ Maximum ms	None	

1.3 IP Networking

1.3. IP Networking	Capabilities	Current Value	If configurable list methods
1.3.1. Port Name:	-	X100	software Smart view

1.3. IP Networking	Capabilities	Current Value	If configurable list methods
The name associated with this network port.			---------- direct ----------
1.3.2. Type of End Point:	☐ TCP Initiating (Master Only) ☒ TCP Listening (Outstation Only) ☐ TCP Dual (required for Masters) ☒ UDP Datagram (required)		software Smart view ---------- direct ----------
1.3.3. IP Address of this Device:	-	see [Device Para / TCP/IP config]	software Smart view ---------- direct ----------
1.3.4. Subnet Mask:	-	see [Device Para / TCP/IP config]	software Smart view ---------- direct ----------
1.3.5. Gateway IP Address:	-	see [Device Para / TCP/IP config]	software Smart view ---------- direct ----------
1.3.6. Accepts TCP Connections or UDP Datagrams from:	☒ Allows all (show as *.*.*.* in 1.3.7) ☐ Limits based on IP address	Allows all	

1.3. IP Networking	Capabilities	Current Value	If configurable list methods
	☐ 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:		
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 Mater, port number on which to listen for incoming TCP connect requests. Required to be configureable for Masters and recommended to be configurable for Outstations.*	☐ Not Applicable (Master w/o dual end point) ☐ Fixed at 20,000 ☐ Configurable, rangeto ☒ Configurable, selectable from **1 to 65535** ☒ Configurable, other, describe: **Not recommended to use ports in private area 0 to 49152, and not possible to use private ports 52151 to 52162.**	20000	software Smart view ---------- direct ----------
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, rangeto ☐ Configurable, selectable from ☐ Configurable, other, describe:	Not Applicable	
1.3.10. TCP Keep-alive timer: *The time period for the keep-alive timer on active TCP connections.*	☐ Fixed atms ☒ Configurable, range **1** to **7200** ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe:	720 ms	software Smart view ---------- direct ----------
1.3.11. Local UDP port:	☐ Fixed at 20,000 ☐ Configurable, range to	20000	software Smart view ----------

1.3. IP Networking	Capabilities	Current Value	If configurable list methods
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.	☒ Configurable, selectable from **1 to 65535** ☒ Configurable, other, describe: **Not recommended to use ports in private area 0 to 49152, and not possible to use private ports 52151 to 52162.** ☐ Let system choose (Master only)		direct ----------
1.3.12. Destination UDP port for DNP3 Requests (Master Only):	-		
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, rangeto ☒ Configurable, selectable from **1 to 65535** ☒ Configurable, other, describe: **Not recommended to use ports in private area 0 to 49152, and not possible to use private ports 52151 to 52162.**	same value as Local UDP Port (1.3.11)	software Smart view ---------- direct ----------
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, rangeto ☒ Configurable, selectable from **1 to 65535** ☒ Configurable, other, describe: **Not recommanded to use ports in private area 0 to 49152, and not possible to use private ports 52151 to 52162.** ☐ Use source port number	same value as Local UDP Port (1.3.11)	software Smart view ---------- direct ----------
1.3.15. Multiple outstation connections (Masters only): *Master only. Indicates whether multiple outstation connections are supported.*	☐ Supports multiple outstations (Masters only)		
1.3.16. Multiple master connections (Outstations only):	☐ Supports multiple masters (Outstations only) If supported, the following methods may be used:	Not supported	

1.3. IP Networking	Capabilities	Current Value	If configurable list methods
Outstations only. Indicates whether multiple master connections are supported and the method that can be used to establish connections.	☐ 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 synchonization support:	☒ DNP3 Network method ☒ Other, explain: **None, IRIG-B, SNTP** ☐ Not Supported	Other	software Smart view ---------- direct ----------

1.4 Link Layer

1.4. Link Layer	Capabilities	Current Value	If configurable list methods
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 ☐ Configurable, other, describe:	65500	software Smart view ---------- direct ----------
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:	Always - single address	
1.4.3. DNP3 Source Address(es) expected when Validation is Enabled:	☐ Configurable to any 16 bit DNP Data LInk Address value ☒ Configurable, range **0** to **65519**	1	software Smart view

1.4. Link Layer	**Capabilities**	**Current Value**	**If configurable list methods**
Selects the allowed source address(es)	☐ Configurable, selectable from ☐ Configurable, other, describe:		---------- direct ----------
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 diasble this feature if supported.*	☒ Yes (only allowed if configurable) ☒ No	No	software Smart view ---------- direct ----------
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: **Depends on DataLinkConfirm setting**	Sometimes	software Smart view ---------- direct ----------
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 atms ☒ Configurable, range **100** to **10000** ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	1000 ms	software Smart view ---------- direct ----------
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**0**to**255** ☐ Configurable, selectable from ☐ Configurable, other, describe:	1	software Smart view ---------- direct ----------

1.4. Link Layer	Capabilities	Current Value	If configurable list methods
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 ☐ Configurable, other, describe:		
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, rangeto ☐ Configurable, selectable from ☐ Configurable, other, describe:		

1.5 Application Layer

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: *This size does not include any transport or frame octets.* *- Masters must provide a setting less than or equal to 249.* *- Outstations must provide a setting less than or equal to 2048.*	☒ Fixed at **2048** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe:	2048	
1.5.2. Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer:	☒ Fixed at **2048** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe:	2048	

1.5. Application Layer	Capabilities	Current Value	If configurable list methods
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 octets.* *- Masters must provide a setting greater than or equal to 2048.* *- Outstations must provide a setting greater than or equal to 249.*	☒ Fixed at **2048** ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe:	2048	
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 to ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	ms	
1.5.5. Maximum number of objects allowed in a single control request for CROB (Group 12):	☐ Fixed at (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☒ Configurable, other, describe: **The maximum Number of objects allowed in a single Control Request for CROB is only limited by the maximum length of a data link frame.** ☐ Variable, explain:		
1.5.6. Maximum number of objects allowed in a single control request for Analog Outputs (Group 41):	☐ Fixed at (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe: ☐ Variable, explain:		

1.5. Application Layer	Capabilities	Current Value	If configurable list methods
1.5.7. Maximum number of objects allowed in a single control request for Data Sets (Groups 85, 86, 87):	☐ Fixed at (enter 0 if controls are not supported) ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe: ☐ Variable, explain:		
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	No	

1.6 Items for Masters Only – Not Applicable

1.7 Items For Outstations Only

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:	☐ None ☐ Fixed atms ☒ Configurable, range **100** to **10000** ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	5000 ms	software Smart view ---------- direct ----------
1.7.2. How often is time synchronization required from the master:	☐ Never needs time ☐ Withinseconds after IIN1.4 is set		

1.7. Fill Out The Following Items For Outstations Only	Capabilities	Current Value	If configurable list methods
	☒ Periodically every **60** 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 staus code value of handle expired (0x02).*	☒ Not applicable, files not supported ☐ Fixed atms ☐ Configurable, rangetoms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:		
1.7.5. Event Buffer Overflow Behaviour:	☐ Discard the oldest event ☒ Discard the newest event ☐ Other, explain:	Discard newest	
1.7.6. Event Buffer Organization: *Explain how event buffers are arranged (per Object Group, per Class, single buffer etc) and provide their sizes.*	Events with timestamp and without timestamp are stored in different buffers. Events without timestamp are reported first.	Events with timestamp and without timestamp are stored in different buffers. Events without timestamp are reported first.	
1.7.7. Sends Multi-Fragment Responses: *Indicates whether an Outstation sends multi-fragment responses (Masters do not send multi-fragment requests).*	☒ Yes ☐ No	Yes	
1.7.8. 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 is set.*	☒ Assign Class ☐ Analog Deadbands ☐ Data Set Prototypes ☐ Data Set Descriptors	Assign Class	
1.7.9 Function Code 31, Activate Configuration:	☐ Supports Function Code 31		

1.7. Fill Out The Following Items For Outstations Only	Capabilities	Current Value	If configurable list methods
Indicate whether FC31 is supported. If it is supported, does the outstation save configuration or code to non-volatile memory when command is received?	☐ Saves to non-volatile storage		

1.8 Outstation Unsolicited Response Support

1.8. Outstation Unsolicited Response Support	Capabilities	Current Value	If configurable list methods
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	Off	software Smart view ---------- direct ----------
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 **0** to **65519** ☐ Configurable, selectable from ☐ Configurable, other, describe:	65500	software Smart view ---------- direct ----------
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 parameter may be the same one that is used for normal, solicited, application confirmation timeouts, or it may be a separate parameter.*	☐ Fixed at ms ☒ Configurable, range **1000** to **60000** ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Variable, explain:	10000 ms	software Smart view ---------- direct ----------
1.8.4. Number of Unsolicited Retries:	☐ None	2	software Smart view

1.8. Outstation Unsolicited Response Support	Capabilities	Current Value	If configurable list methods
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 trasmissions.	☐ Fixed at ms ☒ Configurable, range **0** to **255** ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe: ☐ Always infinite, never gives up		---------- direct ----------

1.9 Outstation Unsolicited Response Trigger Conditions

1.9. Outstation Unsolicited Response Trigger Conditions	Capabilities	Current Value	If configurable list methods
1.9.1. Number of class 1 events:	☐ Class 1 not used to trigger Unsolicited Responses ☐ Fixed at ☐ Configurable, range to ☒ Configurable, selectable from **1, Off** ☐ Configurable, other, describe:	Off	software Smart view ---------- direct ----------
1.9.2. Number of class 2 events:	☐ Class 2 not used to trigger Unsolicited Responses ☐ Fixed at ☐ Configurable, range to ☒ Configurable, selectable from **1, Off** ☐ Configurable, other, describe:	Off	software Smart view ---------- direct ----------
1.9.3. Number of class 3 events:	☐ Class 3 not used to trigger Unsolicited Responses ☐ Fixed at ☐ Configurable, range to	Off	software Smart view ---------- direct

1.9. Outstation Unsolicited Response Trigger Conditions	Capabilities	Current Value	If configurable list methods
	☒ Configurable, selectable from **1, Off** ☐ Configurable, other, describe:		----------
1.9.4. Total number of events from any class:	☒ Total Number of Events not used to trigger Unsolicited Responses ☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☐ Configurable, other, describe:		
1.9.5. Hold time after class 1 event: *A configurable value of 0 indicates that responses are not delayed due to this parameter.*	☐ Class 1 not used to trigger Unsolicited Responses ☒ Fixed at ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe:	0 ms	
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 ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe:	0 ms	
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 ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe:	0 ms	
1.9.8. Hold time after event assigned to any class:	☐ Class events not used to trigger Unsolicited Responses	0 ms	

1.9. Outstation Unsolicited Response Trigger Conditions	Capabilities	Current Value	If configurable list methods
A configurable value of 0 indicates that responses are not delayed due to this parameter.	☒ Fixed at ms ☐ Configurable, range to ms ☐ Configurable, selectable from ms ☐ Configurable, other, describe:		
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)	Not retriggered	
1.9.10. Other Unsolicited Response Trigger Conditions:	☐		

1.10 Outstation Performance

1.10. Outstation Performance	Capabilities	Current Value	If configurable list methods
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.*	-	1 ms	
1.10.2. When does outstation set IIN1.4?	☒ Never ☒ Asserted at startup until first Time Synchronization request received ☒ Periodically, range **60s** to **60s** seconds ☐ Periodically, selectable from seconds ☐ Rangetoseconds after last time sync ☐ Selectable from seconds after last time sync ☐ When time error may have drifted by range to ms	Never	

1.10. Outstation Performance	Capabilities	Current Value	If configurable list methods
	☐ When time error may have drifted by selectable from ms		
1.10.3. Maximum Internal Time Reference Error when set via DNP (ms): *The difference between the time set in DNP Write Time message, and the time actually set in the outstation.*	-	1 ms	
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.*	-	1 ms	
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.*	-	50 ms	
1.10.6. Maximum time from start-up to IIN 1.4 assertion (ms):	-	15 ms	
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.*	-	100 ms	
1.10.8. Maximum Event Time-tag error for local I/O other than Binary and Double Bit data types (ms):	-	100 ms	

1.11 Individual Field Outstation Parameters

1.11. Individual Field Outstation Parameters	Value of Current Setting	If configurable list methods
1.11.1. User-assigned location name or code string (same as g0v245):		

1.11. Individual Field Outstation Parameters	Value of Current Setting	If configurable list methods
1.11.2. User-assigned ID code/number string (same as g0v246):		
1.11.3 User-assigned name string for the outstation (same as g0v247):		
1.11.4 Device Serial Number string (same as g0v248):		

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. The IEC 61850 mappings are stored in the XML version of the Device Profile Document as a list of XPath references to the tags representing real-time data from DNP under each point (for example value, timestamp, and quality for Analog inputs) paired with an IEC 61850 Object Reference in the form of a flattened ACSI (Abstract Communications Service Interface) name of the object and attributes as specified in IEC 61850 parts 7-4 and 7-3. The Xpath reference into the DNP XML file may also contain a reference to a constant value, a formula or conditional expression involving one or more XML tags, or a reference to a configuration parameter that is not associated with a particular data point.

A graphical or table representation may be generated from the XML and shown here in the Device Profile Document. The following is an example table format.

Mapping to IEC 61850 Object Models

3 Capabilities and Current Settings for Device Database

The following tables identify the capabilities and current settings for each DNP3 data type. Each data type also provides 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.

3.1 Binary Input Points

3.1. Binary Input Points **Static (Steady-State) Object Number: 1** **Event Object Number: 2**			
	Capabilities	**Current Value**	**If configurable list methods**
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	One	
3.1.2. Event Variation reported when variation 0 requested	☒ Variation 1 - without time ☒ Variation 2 - with absolute time ☒ Variation 3 - with relative time ☐ Based on point index	Two	
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	All events	
3.1.4. Binary Inputs included in Class 0 response:	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3	Always	

3.1. Binary Input Points **Static (Steady-State) Object Number: 1** **Event Object Number: 2**			
	Capabilities	**Current Value**	**If configurable list methods**
	☐ Based on point index		
3.1.5. 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.*	☐ Fixed, list shown in table below ☒ Configurable (current list may be shown in table below) ☐ Other, explain:	Configurable	software Smart view ---------- direct ----------

Binary Input points list:

Point Index	Name	Default class Assigned to Events (1, 2, 3 or none)	Name for State when value is 0	Name for State when value is 1	Description
0	Binary Input Point 0	one	Depends on the selected status bit	Depends on the selected status bit	User configurable binary Input (select value from a list of status bits)
. . .					
63	Binary Input Point 63	one	Depends on the selected status bit	Depends on the selected status bit	User configurable binary Input (select value from a list of status bits)

3.2 Double-bit Input Points

3.2. Double-bit Input Points **Static (Steady-State) Object Number: 3** **Event Object Number: 4**			
	Capabilities	**Current Value**	**If configurable list methods**
3.2.1. Static Variation reported when variation 0 requested	☒ Variation 1 - Double-bit packed format ☒ Variation 2 - Double-bit with flag ☐ Based on point index	One	
3.2.2. Event Variation reported when variation 0 requested	☒ Variation 1 - without time ☒ Variation 2 - with absolute time ☒ Variation 3 - with relative time ☐ Based on point index	One	
3.2.3. 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 Double Bit Inputs*	☐ Only most recent ☒ All events	All events	
3.2.4. Double Bit Inputs included in Class 0 response:	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index	Always	
3.2.5. 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:	Configurable	software Smart view ----------

3.2. Double-bit Input Points **Static (Steady-State) Object Number: 3** **Event Object Number: 4**			
	Capabilities	**Current Value**	**If configurable list methods**
			direct ----------

Double-bit Input points list:

Point Index	Name	Default class Assigned to Events (1, 2, 3 or none)	Name for State when value is 0 (intermediate)	Name for State when value is 1 (off)	Name for State when value is 2 (on)	Name for State when value is 3 (indeterminate)	Description
0	Double Bit Input Point 0	one	In transit	Open	Closed	Faulty	User configurable double bit Input (select breaker from a list).
. . .							
6	Double Bit Input Point 6	one	In transit	Open	Closed	Faulty	User configurable double bit Input (select breaker from a list).

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	**Current Value**	**If configurable list methods**
3.3.1. Minimum pulse time allowed with Trip, Close and Pulse On commands.	☒ Fixed atms (hardware may limit this further		

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	**Current Value**	**If configurable list methods**
	☐ Based on point index		
3.3.2. Maximum pulse time allowed with Trip, Close and Pulse On commands.	☒ Fixed atms (hardware may limit this further ☐ Based on point index		
3.3.3. Binary Output Status included in Class 0 response:	☒ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index	Always	
3.3.4. Reports Output Command Event Objects:	☒ Never ☐ Only upon a successful Control ☐ Upon all control attempts	Never	
3.3.5. Event Variation reported when variation 0 requested	☒ Variation 1 - without time ☒ Variation 2 - with absolute time ☐ Based on point index	One	
3.3.6. Command Event Variation reported when variation 0 requested	☐ Variation 1 - without time ☐ Variation 2 - with absolute time ☐ Based on point index		
3.3.7. Change Event reporting mode:	☐ Only most recent ☐ All events		

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	**Current Value**	**If configurable list methods**
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.			
3.3.8. 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		
3.3.9. Maximum Time between Select and Operate:	☐ Not Applicable ☐ Fixed atseconds ☒ Configurable, range toseconds ☐ Configurable, selectable from seconds ☐ Configurable, other, describe: ☐ Variable, explain: ☐ Based on point index	1 to 60 seconds	
3.3.10. 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.*	☐ Fixed, list shown in table below ☒ Configurable (current list may be shown in table below) ☐ Other, explain:	Configurable	software Smart view ---------- direct ----------

Binary Output Status and CROB points list:

		Supported Control Operations												Default Class Assigned to Events (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 Cur-rently Running Opera-tion**	**Name for State when value is 0**	**Name for State when value is 1**	**Change**	**Command**	**Descript-ion**
0	Binary Output Point 0	Y	Y	Y	Y	–	–	–	–	–	–	inactive	active	none	none	Single bit state set by DNP Binary Output Point 0
. . .																
31	Binary Output Point 31	Y	Y	Y	Y	–	–	–	–	–	–	inactive	active	none	none	Single bit state set by DNP Binary Output Point 31

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	Current Value	If configurable list methods
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	One	

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	**Current Value**	**If configurable list methods**
	☐ Based on point index		
3.4.2. Counter Event 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 ☐ Based on point index	One	
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	Always	
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.* *All events are typically reported for Counters*	☒ Only most recent ☐ All events	Most recent	
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		

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	**Current Value**	**If configurable list methods**
	☐ Variation 9 - 32-bit without flag ☐ Variation 10 - 16-bit without flag ☐ Based on point index		
3.4.6. Frozen Counter Event 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		
3.4.7. Frozen Counters included in Class 0 response:	☐ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index		
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 ounters*	☐ Only most recent ☐ All events		
3.4.9. Counters Roll Over at:	☐ 16 Bits (65,535) ☐ 32 Bits (4,294,967,295)	Other	

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	**Current Value**	**If configurable list methods**
	☐ Fixed at ☐ Configurable, range to ☐ Configurable, selectable from ☒ Configurable, other, describe: **Based on selected counter** ☐ Based on point index		
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:		
3.4.11. 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.*	☐ Fixed, list shown in table below ☒ Configurable (current list may be shown in table below) ☐ Other, explain:	Configurable	software Smart view ---------- direct ----------

Counter / Frozen Counter points list:

Point Index	Name	Default class Assigned to Events (1, 2, 3 or none)	Frozen Counter Exists (Yes or No)	Default class Assigned to Frozen Counter Events (1, 2, 3 or none)	Description
0	Binary Counter Point 0	three	–		User configurable binary cuonter (select value from a list of counters)

Point Index	Name	Default class Assigned to Events (1, 2, 3 or none)	Frozen Counter Exists (Yes or No)	Default class Assigned to Frozen Counter Events (1, 2, 3 or none)	Description
. . .					
8	Binary Counter Point 8	three	–		User configurable binary cuonter (select value from a list of counters)

3.5 Analog Input Points

3.5. Analog Input Points

Static (Steady-State) Object Number: 30

Event Object Number: 32

	Capabilities	Current Value	If configurable list methods
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 ☒ 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	One	
3.5.2. 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	One	

3.5. Analog Input Points **Static (Steady-State) Object Number: 30** **Event Object Number: 32**			
	Capabilities	**Current Value**	**If configurable list methods**
	☐ Variation 8 - double-precision floating point with time ☐ Based on point index		
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*	☒ Only most recent ☐ All events	Most recent	
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	Always	
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 - column specifies which of the options applies B, C or D	C	software Smart view ---------- direct ----------
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	☒ Simple ☒ Integrating ☐ Other, explain:	Integrating	software Smart view ---------- direct

3.5. Analog Input Points **Static (Steady-State) Object Number: 30** **Event Object Number: 32**			
	Capabilities	**Current Value**	**If configurable list methods**

3.5.7. 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.*	☐ Fixed, list shown in table below ☒ Configurable (current list may be shown in table below) ☐ Other, explain:	Configurable	software Smart view ---------- direct ----------

Analog Input points list:

			Transmitted Value		**Scaling**				
Point Index	**Name**	**Default Class Assigned to Events (1, 2, 3 or none)**	**Min**	**Max**	**Multiplier**	**Offset**	**Units**	**Resolution**	**Description**
0	Analog Input Point 0	two	–	–	Configurable between 0.001 and 1000000	0.0	Based on selected value	1	User configurable analog input (select value from a list of measured values)
. . .									
31	Analog Input Point 31	two	–	–	Configurable between 0.001 and 1000000	0.0	Based on selected value	1	User configurable analog input (select value from a list of measured 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	**Current Value**	**If configurable list methods**
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 ☐ Variation 4 - double-precision floating point with flag ☐ Based on point index		
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		
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	☐ Variation 1 - 32-bit without time ☐ Variation 2 - 16-bit without time ☐ Variation 3 - 32-bit with time ☐ Variation 4 - 16-bit with time		

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	**Current Value**	**If configurable list methods**
	☐ 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		
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		
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		
3.6.7. Command Event reporting mode:	☐ Only most recent		

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	**Current Value**	**If configurable list methods**
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		
3.6.8. Maximum Time between Select and Operate:	☐ Not Applicable ☐ Fixed at seconds ☐ Configurable, range to seconds ☐ Configurable, selectable from seconds ☐ Configurable, other, describe: ☐ Variable, explain: ☐ Based on point index		
3.6.9. 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.*	☐ 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				Default Class Assigned to Events (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**
–													

3.7 Sequential File Transfer

3.7. Sequential File Transfer **Object Number: 70**			
	Capabilities	**Current Value**	**If configurable list methods**
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		

3.7. Sequential File Transfer **Object Number: 70**			
	Capabilities	**Current Value**	**If configurable list methods**
	☐ 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 ☐ Configurable, other, describe:		
3.7.7. Definition of File Names that may be read or written:	☐ Fixed, list shown in table below ☐ Configurable (current list may be shown in table below) ☐ Other, explain:		

Sequential Files list:

		Authentication Required for:			
File Name	**Default Class Assigned to Events (1, 2, 3 or none)**	**Read**	**Write**	**Delete**	**Description**
–					

3.8 Octet String Points

3.8. Octet String Points **Static (Steady-State) Object Number: 110** **Event Object Number: 111**			
	Capabilities	**Current Value**	**If configurable list methods**
3.8.1. 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		
3.8.2. Octet Strings included in Class 0 response: *If Octet Strings are not included in the Class 0 response, Octet String Events (group 111) may not be reported.*	☐ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index		
3.8.3. Definition of Octet String Point List: *List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.*	☐ Fixed, list shown in table below ☐ Configurable (current list may be shown in table below) ☐ Other, explain:		

Sequential Files list:

Point Index	Name	Default Class Assigned to Events (1, 2, 3 or none)	Description
–			

3.9 Virtual Terminal Port Numbers (Points)

3.9. Virtual Terminal Port Numbers (Points) **Static (Steady-State) Object Number: 112** **Event Object Number: 113**			
	Capabilities	**Current Value**	**If configurable list methods**
3.9.1. Definition of Virtual Terminal Port Numbers: *List of addressable points. Points that do not exist (for example, because an option is not installed) are omitted from the table.*	☐ Fixed, list shown in table below ☐ Configurable (current list may be shown in table below) ☐ Other, explain:		

Ports list:

Virtual Port Number (Point Index)	Name	Default Class Assigned to Events (1, 2, 3 or none)	Description
–			

3.10 Data Set Prototype

3.10. Data Set Prototype **Object Number: 85** **Variation Number: 1**			
	Capabilities	**Current Value**	**If configurable list methods**
3.10.1. Definition of Data Set Prototypes:	☐ Fixed, a Data Set Descriptor is shown in table below ☐ Configurable (a currently defined Data Set Prototype may be shown in table below) ☐ Other, explain:		

3.10. Data Set Prototype **Object Number: 85** **Variation Number: 1**			
	Capabilities	**Current Value**	**If configurable list methods**
3.10.2. Description:		This is a dataset prototype	

Element Number	Descriptor Code	Element Description	Data Type Code	Max Data Length	Ancillary Value
0	ID (identifier)	Mandatory DS identifier	None	0	
1	UUID	UUID assigned to prototype	None	0	
2	NSPC	Prototype namespace	None	0	
3	Name	Prototype name	None	0	
4	DAEL	Data Element			

3.11 Data Set Descriptor Contents and Characteristics

3.11. Data Set Descriptor Contents and Characteristics **Object Number: 86** **Variation Numbers: 1 and 2**			
	Capabilities	**Current Value**	**If configurable list methods**
3.11.1. Definition of Data Set Descriptors:	☐ Fixed, a Data Set Descriptor is shown in table below ☐ Configurable (current list may be shown in table below) ☐ Other, explain:		
3.11.2. Description:			
3.11.3. Data Set Properties:	☐ Readable		

3.11. Data Set Descriptor Contents and Characteristics

Object Number: 86

Variation Numbers: 1 and 2

	Capabilities	Current Value	If configurable list methods
	☐ Writable ☐ Outstation maintains a static data set ☐ Outstation generates a data set event ☐ Data set defined by master		
3.11.4. Default Event Assigned Class:	☐ One ☐ Two ☐ Three		
3.11.5. Static Data Set included in Class 0 response:	☐ Always ☐ Never ☐ Only if point is assigned to Class 1, 2, or 3 ☐ Based on point index		

Element Number	Descriptor Code	Element Description	Data Type Code	Max Data Length	Ancillary Value
0	ID (identifier)	Mandatory DS identifier	None	0	

Data set Points		
Element Number	**DNP Group Number**	**Point Index**

4 Implementation Table

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

DNP OBJECT GROUP & VARIATION			**REQUEST** **Master may issue** **Outstation must parse**		**RESPONSE** **Master must parse** **Outstation may issue**	
Object Group Number	**Variation Number**	**Description**	**Function Codes (dec)**	**Qualifier Codes (hex)**	**Function Codes (dec)**	**Qualifier Codes (hex)**
1	0	Binary Input - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
1	0	Binary Input - any variation	22 *(assign class)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
1	1	Binary Input - Single-bit packed	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
1	2	Binary Input - Single-bit with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
2	0	Binary Input Change Event - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
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	1 *(read)*	06 *(no range, or all)*,	130 *(Unsol. Resp.)*	17, 28 *(index)*

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)**
				07, 08 *(limited qty)*		
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	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	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	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
3	0	Double-bit Input - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
3	0	Double-bit Input - any variation	22 *(assign class)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
3	1	Double-bit Input - Double-bit packed	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
3	2	Double-bit Input - with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*

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)**
4	0	Double-bit Input Change Event - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
4	1	Double-bit Input Change Event - without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
4	1	Double-bit Input Change Event - without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
4	2	Double-bit Input Change Event - with absolute time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
4	2	Double-bit Input Change Event - with absolute time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
4	3	Double-bit Input Change Event - with relative time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
4	3	Double-bit Input Change Event - with relative time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
10	0	Continuous Control - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
10	0	Continuous Control - any variation	22 *(assign class)*	00, 01 *(start-stop)*,		

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)**
				06 *(no range, or all)*		
10	2	Continuous Control - binary output status	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
11	0	Binary Output Change Event - any variation				
11	1	Binary Output Change Event - status without time				
11	1	Binary Output Change Event - status without time				
11	2	Binary Output Change Event - status with time				
11	2	Binary Output Change Event - status with time				
12	0	Pulsed Control - any variation	22 *(assign class)*	00, 01 *(start-stop)*		
12	1	Pulsed Control - control relay output block	3 *(select)*	17, 28 *(index)*	129 *(Response)*	17, 28 *(index)*
12	1	Pulsed Control - control relay output block	4 *(operate)*	17, 28 *(index)*	129 *(Response)*	17, 28 *(index)*
12	1	Pulsed Control - control relay output block	5 *(direct op.)*	17, 28 *(index)*	129 *(Response)*	17, 28 *(index)*
12	1	Pulsed Control - control relay output block	6 *(direct op, no ack)*	17, 28 *(index)*	129 *(Response)*	17, 28 *(index)*
12	2	Pulsed Control - pattern control block	5 *(direct op.)*	07 *(limited qty = 1)*	129 *(Response)*	07 *(limited qty = 1)*
12	2	Pulsed Control - pattern control block	6 *(direct op, no ack)*	07 *(limited qty = 1)*	129 *(Response)*	07 *(limited qty = 1)*
12	3	Pulsed Control - pattern mask	5 *(direct op.)*	00, 01 *(start-stop)*	129 *(Response)*	00, 01 *(start-stop)*
12	3	Pulsed Control - pattern mask	6 *(direct op, no ack)*	00, 01 *(start-stop)*	129 *(Response)*	00, 01 *(start-stop)*

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)**
13	0	Binary Output Command Event - any variation				
13	1	Binary Output Command Event - without time				
13	1	Binary Output Command Event - without time				
13	2	Binary Output Command Event - with time				
13	2	Binary Output Command Event - with time				
20	0	Counter - any variation	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
20	0	Counter - any variation	22 *(assign class)*	00, 01 *(start-stop)*, 06 *(no range, or all)*		
20	1	Counter - 32-bit with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
20	2	Counter - 16-bit with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
20	5	Counter - 32-bit without flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
20	6	Counter - 16-bit without flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*

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)**
21	0	Frozen Counter - any variation				
21	0	Frozen Counter - any variation				
21	1	Frozen Counter - 32-bit with flag				
21	2	Frozen Counter - 16-bit with flag				
21	5	Frozen Counter - 32-bit with flag and time				
21	6	Frozen Counter - 16-bit with flag and time				
21	9	Frozen Counter - 32-bit without flag				
21	10	Frozen Counter - 16-bit without flag				
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	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
22	1	Counter Change Event - 32-bit with flag	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
22	2	Counter Change Event - 16-bit with flag	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
22	2	Counter Change Event - 16-bit with flag	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*

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)**
22	5	Counter Change Event - 32-bit with flag and time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
22	5	Counter Change Event - 32-bit with flag and time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
22	6	Counter Change Event - 16-bit with flag and time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
22	6	Counter Change Event - 16-bit with flag and time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
23	0	Frozen Counter Change Event - any variation				
23	1	Frozen Counter Change Event - 32-bit with flag				
23	1	Frozen Counter Change Event - 32-bit with flag				
23	2	Frozen Counter Change Event - 16-bit with flag				
23	2	Frozen Counter Change Event - 16-bit with flag				
23	5	Frozen Counter Change Event - 32-bit with flag and time				
23	5	Frozen Counter Change Event - 32-bit with flag and time				

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)**
23	6	Frozen Counter Change Event - 16-bit with flag and time				
23	6	Frozen Counter Change Event - 16-bit with flag and time				
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)*		
30	1	Analog Input - 32-bit with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
30	2	Analog Input - 16-bit with flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
30	3	Analog Input - 32-bit without flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
30	4	Analog Input - 16-bit without flag	1 *(read)*	00, 01 *(start-stop)*, 06 *(no range, or all)*	129 *(Response)*	00, 01 *(start-stop)*
30	5	Analog Input - single-precision, floating-point with flag				
30	6	Analog Input - double-precision, floating-point with flag				

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)**
31	0	Frozen Analog Input - any variation				
31	0	Frozen Analog Input - any variation				
31	1	Frozen Analog Input - 32-bit with flag				
31	2	Frozen Analog Input - 16-bit with flag				
31	3	Frozen Analog Input - 32-bit with time of freeze				
31	4	Frozen Analog Input - 16-bit with time of freeze				
31	5	Frozen Analog Input - 32-bit without flag				
31	6	Frozen Analog Input - 16-bit without flag				
31	7	Frozen Analog Input - single-precision, floating point with flag				
31	8	Frozen Analog Input - double-precision, floating point with flag				
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	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
32	1	Analog Input Change Event - 32-bit without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*

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)**
32	2	Analog Input Change Event - 16-bit without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
32	2	Analog Input Change Event - 16-bit without time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
32	3	Analog Input Change Event - 32-bit with time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
32	3	Analog Input Change Event - 32-bit with time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
32	4	Analog Input Change Event - 16-bit with time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	129 *(Response)*	17, 28 *(index)*
32	4	Analog Input Change Event - 16-bit with time	1 *(read)*	06 *(no range, or all)*, 07, 08 *(limited qty)*	130 *(Unsol. Resp.)*	17, 28 *(index)*
32	5	Analog Input Change Event - single-precision, floating-point without time				
32	5	Analog Input Change Event - single-precision, floating-point without time				
32	6	Analog Input Change Event - double-precision, floating-point without time				
32	6	Analog Input Change Event - double-precision, floating-point without time				

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)**
32	7	Analog Input Change Event - single-precision, floating-point with time				
32	7	Analog Input Change Event - single-precision, floating-point with time				
32	8	Analog Input Change Event - double-precision, floating-point with time				
32	8	Analog Input Change Event - double-precision, floating-point with time				
33	0	Frozen Analog Input Change Event - any variation				
33	1	Frozen Analog Input Change Event - 32-bit without time				
33	1	Frozen Analog Input Change Event - 32-bit without time				
33	2	Frozen Analog Input Change Event - 16-bit without time				
33	2	Frozen Analog Input Change Event - 16-bit without time				
33	3	Frozen Analog Input Change Event - 32-bit with time				
33	3	Frozen Analog Input Change Event - 32-bit with time				
33	4	Frozen Analog Input Change Event - 16-bit with time				
33	4	Frozen Analog Input Change Event - 16-bit with time				

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)**
33	5	Frozen Analog Input Change Event - single-precision, floating-point without time				
33	5	Frozen Analog Input Change Event - single-precision, floating-point without time				
33	6	Frozen Analog Input Change Event - double-precision, floating-point without time				
33	6	Frozen Analog Input Change Event - double-precision, floating-point without time				
33	7	Frozen Analog Input Change Event - single-precision, floating-point with time				
33	7	Frozen Analog Input Change Event - single-precision, floating-point with time				
33	8	Frozen Analog Input Change Event - double-precision, floating-point with time				
33	8	Frozen Analog Input Change Event - double-precision, floating-point with time				
34	0	Analog Input Deadband - any variation				
34	1	Analog Input Deadband - 16-bit				
34	1	Analog Input Deadband - 16-bit				
34	2	Analog Input Deadband - 32-bit				
34	2	Analog Input Deadband - 32-bit				

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)**
34	3	Analog Input Deadband - single-precision, floating-point				
34	3	Analog Input Deadband - single-precision, floating-point				
40	0	Analog Output Status - any variation				
40	0	Analog Output Status - any variation				
40	1	Analog Output Status - 32-bit with flag				
40	2	Analog Output Status - 16-bit with flag				
40	3	Analog Output Status - single-precision, floating-point with flag				
40	4	Analog Output Status - double-precision, floating-point with flag				
41	0	Analog Output Block - any variation				
41	1	Analog Output Block - 32-bit				
41	1	Analog Output Block - 32-bit				
41	1	Analog Output Block - 32-bit				
41	1	Analog Output Block - 32-bit				
41	2	Analog Output Block - 16-bit				
41	2	Analog Output Block - 16-bit				
41	2	Analog Output Block - 16-bit				
41	2	Analog Output Block - 16-bit				

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)**
41	3	Analog Output Block - single-precision, floating-pointt				
41	3	Analog Output Block - single-precision, floating-pointt				
41	3	Analog Output Block - single-precision, floating-pointt				
41	3	Analog Output Block - single-precision, floating-pointt				
41	4	Analog Output Block - double-precision, floating-point				
41	4	Analog Output Block - double-precision, floating-point				
41	4	Analog Output Block - double-precision, floating-point				
41	4	Analog Output Block - double-precision, floating-point				
42	0	Analog Output Change Event - any variation				
42	1	Analog Output Change Event - 32-bit without time				
42	1	Analog Output Change Event - 32-bit without time				
42	2	Analog Output Change Event - 16-bit without time				
42	2	Analog Output Change Event - 16-bit without time				

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)**
42	3	Analog Output Change Event - 32-bit with time				
42	3	Analog Output Change Event - 32-bit with time				
42	4	Analog Output Change Event - 16-bit with time				
42	4	Analog Output Change Event - 16-bit with time				
42	5	Analog Output Change Event - single-precision, floating-point without time				
42	5	Analog Output Change Event - single-precision, floating-point without time				
42	6	Analog Output Change Event - double-precision, floating-point without time				
42	6	Analog Output Change Event - double-precision, floating-point without time				
42	7	Analog Output Change Event - single-precision, floating-point with time				
42	7	Analog Output Change Event - single-precision, floating-point with time				
42	8	Analog Output Change Event - double-precision, floating-point with time				
42	8	Analog Output Change Event - double-precision, floating-point with time				
43	0	Analog Output Command Event - any variation				

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)**
43	1	Analog Output Command Event - 32-bit without time				
43	1	Analog Output Command Event - 32-bit without time				
43	2	Analog Output Command Event - 16-bit without time				
43	2	Analog Output Command Event - 16-bit without time				
43	3	Analog Output Command Event - 32-bit with time				
43	3	Analog Output Command Event - 32-bit with time				
43	4	Analog Output Command Event - 16-bit with time				
43	4	Analog Output Command Event - 16-bit with time				
43	5	Analog Output Command Event - single-precision, floating-point without time				
43	5	Analog Output Command Event - single-precision, floating-point without time				
43	6	Analog Output Command Event - double-precision, floating-point without time				
43	6	Analog Output Command Event - double-precision, floating-point without time				
43	7	Analog Output Command Event - single-precision, floating-point with time				

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)**
43	7	Analog Output Command Event - single-precision, floating-point with time				
43	8	Analog Output Command Event - double-precision, floating-point with time				
43	8	Analog Output Command Event - double-precision, floating-point with time				
50	1	Time and Date - absolute time	1 *(read)*	07 *(limited qty = 1)*	129 *(Response)*	07 *(limited qty = 1)*
50	1	Time and Date - absolute time	2 *(write)*	07 *(limited qty = 1)*		
50	2	Time and Date - absolute time and interval	11 *(frz at time)*	07 *(limited qty = 1)*		
50	2	Time and Date - absolute time and interval	12 *(frz at time, no ack)*	07 *(limited qty = 1)*		
50	3	Time and Date - absolute time at last recorded time	2 *(write)*	07 *(limited qty = 1)*		
51	1	Time and Date CTO - absolute time, synchronised			129 *(Response)*	07 *(limited qty = 1)*
51	1	Time and Date CTO - absolute time, synchronised			130 *(Unsol. Resp.)*	07 *(limited qty = 1)*
51	2	Time and Date CTO - absolute time, un-synchronised			129 *(Response)*	07 *(limited qty = 1)*
51	2	Time and Date CTO - absolute time, un-synchronised			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)*,		

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)**
				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	2	Class Objects - class 1 data	22 *(assign class)*	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	3	Class Objects - class 2 data	22 *(assign class)*	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)*		
60	4	Class Objects - class 3 data	22 *(assign class)*	06 *(no range, or all)*		
70	0	File Control - any variation				
70	0	File Control - any variation				
70	2	File Control - authentication				
70	3	File Control - file command				
70	3	File Control - file command				

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)**
70	4	File Control - file command status				
70	4	File Control - file command status				
70	4	File Control - file command status				
70	4	File Control - file command status				
70	5	File Control - file transport				
70	5	File Control - file transport				
70	5	File Control - file transport				
70	5	File Control - file transport				
70	6	File Control - file transport status				
70	6	File Control - file transport status				
70	7	File Control - file descriptor				
70	7	File Control - file descriptor				
70	8	File Control - file specification string				
80	1	Internal Indications - packed format	1 *(read)*	00, 01 *(start-stop)*	129 *(Response)*	00, 01 *(start-stop)*
80	1	Internal Indications - packed format	2 *(write)*	00 *(start-stop)*		
85	0	Data Set Prototype - any variation				
85	1	Data Set Prototype - with UUID				
85	1	Data Set Prototype - with UUID				
86	0	Data Set Descriptor - any variation				
86	0	Data Set Descriptor - any variation				

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)**
86	1	Data Set Descriptor - Data Set contents				
86	1	Data Set Descriptor - Data Set contents				
86	2	Data Set Descriptor - characteristics				
86	3	Data Set Descriptor - point index attributes				
86	3	Data Set Descriptor - point index attributes				
87	1	Data Set - present value				
87	1	Data Set - present value				
88	0	Data Set Event - any variation				
88	1	Data Set Event - snapshot				
88	1	Data Set Event - snapshot				
91	1	Status of Requested Operation				
101	1	Binary Coded Decimal Integers - small				
101	2	Binary Coded Decimal Integers - medium				
101	3	Binary Coded Decimal Integers - large				
110	255	Octet String				
110	255	Octet String				
111	255	Octet String Change Event				
111	255	Octet String Change Event				
112	255	Virtual Terminal Output Block				

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)**
113	255	Virtual Terminal Event Data				
113	255	Virtual Terminal Event Data				

PROTECTION MADE SIMPLE.

HighPROTEC

DNP3 Field Device Profile

SEG Electronics GmbH
Krefelder Weg 47 • D–47906 Kempen (Germany)
Telephone: +49 (0) 21 52 145 0

Internet: www.SEGelectronics.de

Sales
Telephone: +49 (0) 21 52 145 331
Fax: +49 (0) 21 52 145 354
E-mail: sales@SEGelectronics.de

Service
Telephone: +49 (0) 21 52 145 600
Fax: +49 (0) 21 52 145 354
E-mail: support@SEGelectronics.de

docs.SEGelectronics.de/HighPROTEC

Complete address / phone / fax / email information for all locations is available on our website.