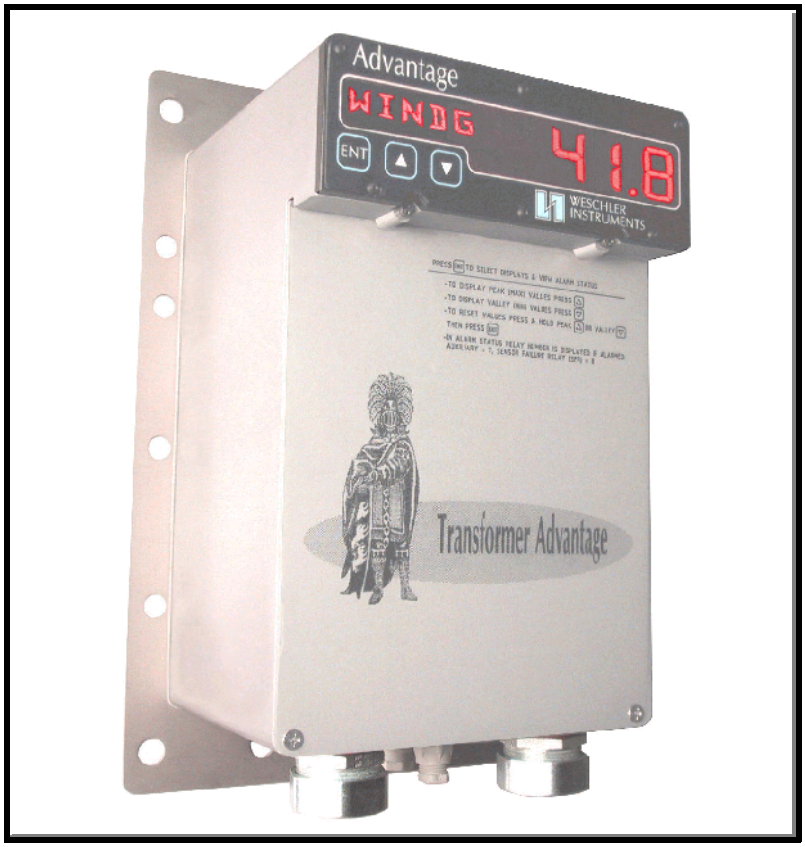
WESCHLER INSTRUMENTS
DIVISION OF HUGHES CORP.

Advantage SC, DC & TC

Protocol Manual



Manual Part Number PMGVT200

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Table of Contents

Firmware Covered by this Manual

G3TSYS0201
G7TSYS0201
G9TSYS0201

1.0 Introduction

The Advantage VC (variant channel) is a dual protocol device. When equipped with digital communications, it can communicate using two different protocols simultaneously. The Simple ASCII Protocol (SAP), which is a Weschler proprietary communications specification is used by the Weschler configuration and monitoring programs, and may be incorporated into simple substation monitoring schemes where the more complex international protocols are not implemented.

The term "variant" in the VC model designator is derived from the fact that the number of channels may be varied through software, without requiring hardware change. Thus a three channel (TC) VC may be configured as a one, two or three channel device. The dual channel (DC) VC may be configured as a one or two channel device. The single channel (SC) will always be a single channel device. All three Variant versions share the same interface feel and owner's manuals.

The second protocol type must be specified at the time of ordering. Currently the DNP-3 Level 1 Slave implementation is provided. The protocol translator used in the Advantage is capable of having other protocols installed. A licensing fee may be required to provide the protocol depending upon the quantity of devices ordered. Consult Weschler Marketing at 440-238-2550 for further details. The protocol is installed by a simple firmware upgrade process, performed through digital communications. No hardware changes are required.

2.0 Simple ASCII Protocol (SAP)

All characters except the checksum are transmitted as 8-bit ACSII, with 1 start bit and 1 stop bit. All frames open with the start-of-command (SOC) character and close with the end-of-command (EOC) character, and the frame elements are comma delimited. Numeric data items are represented as ASCII encoded decimal numbers. Where a byte is used bitwise, the bit pattern will be converted to a decimal equivalent value from 0 to 255 prior to transmission.

Host Query Commands comprise three fields, the header field, Op Code field and trailer field. The header contains the SOC character, Unit ID and Command prefix. The Op Code field defines the type of query and which data group information is being requested from. The trailer field contains the checksum and EOC character.

Command and Reply frames are also arranged into three fields; the header field, data item field and trailer field. The header field contains the SOC, command or reply prefixes and Group ID Code. The data item field returns measurement and status information in response to host queries, or carries configuration settings from the host to the Advantage. The trailer field contains the checksum and EOC character.

The unit ID is used to identify individual Advantage units on a common communications path with other units. The unit ID can have values of 00 to 99 which allows for up to 100 units on a common path. Note that the RS-485 specification only allows up to 32 units on one buffered pair of conductors. As a consequence several buffered branches will be needed in order to use all available unit ID's.

When a radix is used, it will generally be assumed to occupy the position immediately to the left of the least significant digit (LSD), even though the actual radix is not transmitted. For example; the temperature 41.2 degrees will be transmitted as 412. The host software will need to replace the radix in its correct position when it receives the raw number. In some cases the radix will occupy 2 positions to the left of the LSD. These exceptions are shown in the "Range and Significance" columns of the tables.

Negative signs will be represented by ASCII code 2D hex, and will take the frame position immediately preceding the most significant digit. The maximum range of most numeric values will thus be -99.9 to 999.9. In practice this full range cannot be used due to limitations of transformer operating ranges. For load current indication, since the radix is not used, the value may range up to 99999 amps. Leading zeroes will only be used in the unit ID, and the frame length will therefore vary as a function of variable magnitude.

In all frames the checksum is the full (hex) sum of all character's ASCII codes from the SOC, up to and including the separator immediately preceding the checksum. The checksum is not converted to ASCII; it is transmitted as a hex value.

2.1 Host Query Commands

The query command consists of 5 parts; the SOC character, the unit ID, the command prefix, the Op Code and the EOC character.

In this specification, there are seven Op Codes, QDDA through QDDG. Op Code QDDA is reserved for future implementations. Op Codes QDDB through QDDI cause the Advantage to send digital data corresponding to the 7 defined information groups which are detailed in section 2.2. The following is an example of the host query command for Op Code QDDB, which requests measurement data :

Frame Representation>	:	0	0	Q	D	D	B	,	01	E1	,	CR
	SOC Character	Unit ID Char 1	Unit ID Char. 2	Command Prefix	Op Code Char 1	Op Code Char 2	Op Code Char 3	Separator Char	Checksum Hi Byte	Checksum Lo Byte	Separator Char	EOC Character
ASCII String (hex) >	3A	30	30	51	44	44	42	2C	01	E1	2C	0D

The checksum of the characters in the example above can have values which range between 01E1 and 01EF hex.

2.2 Advantage Reply - to - Host Frame

The reply frame consists of 7 components; the SOC character, the unit ID, the reply prefix, the group ID code, the data item fields, the checksum and the EOC character. When replying to a QDDB through QDDG query command, the Advantage sends all information contained within the group to which the command corresponds. The Query Command, Reply Frame Header and the Data Groups have the following correspondence:

Query Header & Op Code	Reply Header	Data Group Number	Data Group Description	Query Header & Op Code	Reply Header	Data Group Number	Data Group Description
:00QDDB	:00AB	1	Measurements	:00QDDG	:00AG	5	System Parameters
:00QDDC	:00AC	2	Alarms 1-6	:00QDDI	:00AI	6	Miscellaneous Parameters
:00QDDD	:00AD	3	Alarms 7-12				
:00QDDE	:00AE	4	Analog Retransmit				

The following is a shortened example of the Advantage Reply Frame for Op Code QDDB, showing only the channel 2 temperature response of 123.4 °C. Note that the actual reply frame will contain all data items shown in section 2.4.

Frame Representation>	:	0	0	A	B	,	1	2	3	4	,	01	E1	,	CR
	SOC Character	Unit ID Char 1	Unit ID Char. 2	Reply Prefix	Group 1 ID Code	Separator Char	Data Item	Data Item	Data Item	Data Item	Separator Char	Checksum Hi Byte	Checksum Lo Byte	Separator Char	EOC Character
ASCII String (hex) >	3A	30	30	41	42	2C	31	32	33	34	2C	01	E1	2C	0D

Note that the reply prefix serves the same purpose as the command prefix in the query command, and the group ID code corresponds to character 3 of the query command's Op Code.

A full example of the general form of the reply frame corresponding to a QDDE (group 4, ID code "E") query command is illustrated below. The group 4 reply details the analog retransmit channel settings for up to 3 channels. The complete frame string for 3 channels of retransmit, would look like the following:

:00AE,1,4000,20000,0,1600,2,4000,20000,0,2000,3,0,10000,0,1000,CS,CR

Assuming the following configurations:

Channel Number	Source	Low Output (µa)	High Output (µa)	Zero Scale	Full Scale
1	Channel 1	4000	20000	0 °C	160.0 °C
2	Channel 2	4000	20000	0 °C	200.0 °C
3	Channel 3	0	10000	0 °C	100.0 °C

See section 2.7 for details of data item assignments

Note that CS = checksum and CR = Carriage return, which is the EOC character. Note also that the full scale temperatures in the example string have had the radix removed in accordance with the general rules in section 2.0. The total byte count for the string is 88 and the checksum is 0BDD hex.

2.3 Frame Component Table Conventions

In the frame component tables below the following conventions are used:

Label	Description
B	One byte used to encode an ASCII alpha or numeric character.
b	One Byte Used to Represent One of Three Decimal Numbers which in turn describe a Byte used Bitwise. For example, if a relay status byte has the bit pattern 1101 1110, this corresponds to a binary number whose decimal equivalent is 222. Thus the label in the table would appear as " **bbb** ".
:	Start of Command Character. Hex value 3A. Requires One Byte.
,	Frame component Separator. Hex Value 2C. Requires One Byte.

Abbreviated Sample Table

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Reply or Command Code	**B**						Single Hex Value 41 = Reply 42 = Command
Header 5	Reply Group ID	**B**						Single value for groups 1 - 6 Group 1 = 42 Hex Group 2 = 43 Hex Group 3 = 44 Hex Group 4 = 45 Hex Group 5 = 47 Hex Group 6 = 49 Hex
First Data Item	Item name	**,**	**B**					Range's Minimum and Maximum Values
Last Data Item	Item Name	**,**	**B**	**B**	**B**	**B**	**B**	Note that Some values have 1 or 2-place radix positioning. Host software must re-position the radix properly.
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

Note that if a single unit is being communicated with, only header items 4 and 5, and trailer items 2 and 3 change for any communication function. If, for example, you read the configuration of the alarm relays 1-6 (group 2) and wanted to send the same data back as a configuration command, you would only need to change header item 4 from 41 to 42 hex and add 01 hex to the checksum before transmitting the string back as a command.

2.4 Group 1 “Measurements” Reply - to - Host Frame Expansion

The numbers shown in the Frame component column tabulate the maximum number of bytes which can be present in the frame build. In practice the maximum values will never occur for all frame components simultaneously, and since the frame component layouts are not padded for leading zeroes, total frame length will vary with changes in the magnitudes of measured values. The maximum frame length for the group 1 frame is 238 bytes.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Reply Code	**B**						Single Value 41 hex
Header 5	Reply Group ID	**B**						Single value for group 1, 42 hex
Data Item 1-5	Channel 1 Temperature	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 6-10	Channel 2 Temperature	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 11-15	Channel 3 Temperature	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 16-20	Channel 1 Peak Temp	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 21-23	Channel 1 Peak Time Month	,	**B**	**B**				Range 1 to 12
Data Item 24-26	Channel 1 Peak Time Day	,	**B**	**B**				Range 1 to 31
Data Item 27-31	Channel 1 Peak Time Year	,	**B**	**B**	**B**	**B**		Range 2003 to 2099
Data Item 32-34	Channel 1 Peak Time Hour	,	**B**	**B**				Range 0 to 23
Data Item 35-37	Channel 1 Peak Time Min.	,	**B**	**B**				Range 0 to 59
Data Item 38-40	Channel 1 Peak Time Sec.	,	**B**	**B**				Range 0 to 59
Data Item 41-45	Channel 2 Peak Temp	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 46-48	Channel 2 Peak Time Month	,	**B**	**B**				Range 1 to 12
Data Item 49-51	Channel 2 Peak Time Day	,	**B**	**B**				Range 1 to 31
Data Item 52-56	Channel 2 Peak Time Year	,	**B**	**B**	**B**	**B**		Range 2003 to 2099
Data Item 57-59	Channel 2 Peak Time Hour	,	**B**	**B**				Range 0 to 23
Data Item 60-62	Channel 2 Peak Time Min.	,	**B**	**B**				Range 0 to 59
Data Item 63-65	Channel 2 Peak Time Sec.	,	**B**	**B**				Range 0 to 59
Data Item 66-70	Channel 3 Peak Temp	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 71-73	Channel 3 Peak Time Month	,	**B**	**B**				Range 1 to 12
Data Item 74-76	Channel 3 Peak Time Day	,	**B**	**B**				Range 1 to 31
Data Item 77-81	Channel 3 Peak Time Year	,	**B**	**B**	**B**	**B**		Range 2003 to 2099
Data Item 82-84	Channel 3 Peak Time Hour	,	**B**	**B**				Range 0 to 23
Data Item 85-87	Channel 3 Peak Time Min.	,	**B**	**B**				Range 0 to 59
Data Item 88-90	Channel 3 Peak Time Sec.	,	**B**	**B**				Range 0 to 59
Data Item 91-95	Channel 1 Valley Temp	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 96-98	Channel 1 Valley Time Mon.	,	**B**	**B**				Range 1 to 12
Data Item 99-101	Channel 1 Valley Time Day	,	**B**	**B**				Range 1 to 31
Data Item 102-106	Channel 1 Valley Time Year	,	**B**	**B**	**B**	**B**		Range 2003 to 2099
Data Item 107-109	Channel 1 Valley Time Hour	,	**B**	**B**				Range 0 to 23
Data Item 110-112	Channel 1 Valley Time Min.	,	**B**	**B**				Range 0 to 59
Data Item 113-115	Channel 1 Valley Time Sec.	,	**B**	**B**				Range 0 to 59
Data Item 116-120	Channel 2 Valley Temp	,	**B**	**B**	**B**	**B**		Range -999 to 9999 (-99.9 to 999.9)
Data Item 121-123	Channel 2 Valley Time Mon.	,	**B**	**B**				Range 1 to 12
Data Item 124-126	Channel 2 Valley Time Day	,	**B**	**B**				Range 1 to 31
Data Item 127-131	Channel 2 Valley Time Year	,	**B**	**B**	**B**	**B**		Range 2003 to 2099
Data Item 132-134	Channel 2 Valley Time Hour	,	**B**	**B**				Range 0 to 23
Data Item 135-137	Channel 2 Valley Time Min.	,	**B**	**B**				Range 0 to 59

Data Item 138-140	Channel 2 Valley Time Sec.	,	B	B				Range 0 to 59
Data Item 141-145	Channel 3 Valley Temp.	,	B	B	B	B		Range -99.9 to 9999 (-99.9 to 999.9)
Data Item 146-148	Channel 3 Valley Time Mon.	,	B	B				Range 1 to 12
Data Item 149-151	Channel 3 Valley Time Day	,	B	B				Range 1 to 31
Data Item 152-156	Channel 3 Valley Time Year	,	B	B	B	B		Range 2003 to 2099
Data Item 157-159	Channel 3 Valley Time Hour	,	B	B				Range 0 to 23
Data Item 160-162	Channel 3 Valley Time Min.	,	B	B				Range 0 to 59
Data Item 163-165	Channel 3 Valley Time Sec.	,	B	B				Range 0 to 59
Data Item 166-169	Relay 1 to 8 Status	,	b	b	b			Range 0 - 255 Used Bitwise Bits 0 to 7 Correspond to Relays 1 to 8 0 = De-energized, 1 = Energized Bit 7 = Relay 5 Bit 6 = Relay 6 Bit 5 = Relay 7,Aux SFR Bit 4 = Relay 8 Bit 3 = Relay 1 Bit 2 = Relay 2 Bit 1 = Relay 3 Bit 0 = Relay 4
Data Item 170-173	Relay 9 to 12 Status	,	b	b	b			Range 0 - 255 (0 - 16 valid) Used Bitwise Bits 0 to 3 Correspond to Relays 9 to 12 0 = De-energized, 1 = Energized Bit 7 = Future Bit 6 = Future Bit 5 = Future Bit 4 = Future Bit 3 = Relay 9 Bit 2 = Relay 10 Bit 1 = Relay 11 Bit 0 = Relay 12
Trailer 1-3	Checksum	,	B	B				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	B					Single value 0D hex (Carriage Return)

2.5 Group 2 "Alarm Relay 1 to 6 Setup" Reply - to - Host Frame Expansion

The alarm relay setup frame build for reply to host and configuration commands is identical. Only the directional code (reply or command) of header item 4 and the group code of header item 5 is changed. Changing these codes reflects whether the string contains a report from Advantage detailing what its current configuration is (reply), or a command from the host detailing what the Advantage's new configuration will be (command). The maximum frame length is 124 bytes.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	B	B					Range 00 to 99
Header 4	Reply Code	B						Single Value 41 hex
Header 5	Reply Group ID	B						Single value for group 2, 43 hex
Data Item 1-4	Alarm 1 Setup A	,	b	b	b			Range 0-255 Used Bitwise Bit 7 Relay Sequencing 0 = Disabled, 1 = Enabled Bit 6 Relay Check 0 = Disabled, 1 = Enabled Bits 5, 4, 3, 2 Trip Source 0000 = Remote, 0001 = Channel 1 0010 = Channel 2, 0011 = Channel 3 Bit 1 Sensor Failure Function 0 = Off, 1 = On Bit 0 Un-Alarmed (Normal) State 0 = De-Energized, 1 = Energized

Frame Component	Description	Layout						Range and Significance
Data Item 5-8	Alarm 1 Setup B	,	b	b	b			Range 0-255 Used Bitwise Bit 7 Seasonal Setback 0 = Disabled, 1 = Enabled Bits 6, 5 Trigger 00 = None, 01 = Daily, 10 = Calendar, 11 = Both Bits 4, 3, 2 Future Use Bits 1, 0 Sensor Fail Effect 00 = De-Energize Relay Coil 01 = Energize Relay Coil 10 = Toggle Relay Coil State
Data Item 9-13	Alarm 1 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 14-17	Alarm 1 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 18-21	Alarm 2 Setup A	,	b	b	b			Same as Relay 1 Setup A
Data Item 22-25	Alarm 2 Setup B	,	b	b	b			Same as Relay 1 Setup B
Data Item 26-30	Alarm 2 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 31-34	Alarm 2 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 35-38	Alarm 3 Setup A	,	b	b	b			Same as Relay 1 Setup A
Data Item 39-42	Alarm 3 Setup B	,	b	b	b			Same as Relay 1 Setup B
Data Item 43-47	Alarm 3 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 48-51	Alarm 3 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 52-55	Alarm 4 Setup A	,	b	b	b			Same as Relay 1 Setup A
Data Item 56-59	Alarm 4 Setup B	,	b	b	b			Same as Relay 1 Setup B
Data Item 60-64	Alarm 4 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 65-68	Alarm 4 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 69-72	Alarm 5 Setup A	,	b	b	b			Same as Relay 1 Setup A
Data Item 73-76	Alarm 5 Setup B	,	b	b	b			Same as Relay 1B Setup B
Data Item 77-81	Alarm 5 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 82-85	Alarm 5 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 86-89	Alarm 6 Setup A	,	b	b	b			Same as Relay 1 Setup A
Data Item 90-93	Alarm 6 Setup B	,	b	b	b			Same as Relay 1 Setup B
Data Item 94-98	Alarm 6 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 99-102	Alarm 6 Hysteresis	,	B	B	B			Range 0 to 200
Trailer 1-3	Checksum	,	B	B				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	B					Single value 0D hex (Carriage Return)

2.6 Group 3 “Alarm Relay 7 to 12 Setup” Reply - to - Host Frame Expansion

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	B	B					Range 00 to 99
Header 4	Reply Code	B						Single Value 41 hex
Header 5	Reply Group ID	B						Single value for group 3, 44 hex
Data Item 1	Alarm 8 (SFR) Normal Coil State	B						Range 0 - 1 0 = De Energized, 1 = Energized

Frame Component	Description	Layout						Range and Significance
Data Item 2-5	Alarm 7 (Aux) Setup A	,	b	b	b			Range 0-255 Used Bitwise Bit 7 Relay Sequencing 0 = Disabled, 1 = Enabled Bit 6 Relay Check 0 = Disabled, 1 = Enabled Bits 5, 4, 3, 2 Trip Source 0000 = Remote, 0001 = Channel 1 0010 = Channel 2, 0011 = Channel 3 Bit 1 Sensor Failure Function 0 = Off, 1 = On Bit 0 Un-Alarmed (Normal) State 0 = De-Energized, 1 = Energized
Data Item 6-9	Alarm 7 (Aux) Setup B	,	b	b	b			Range 0-255 Used Bitwise Bit 7 Seasonal Setback 0 = Disabled, 1 = Enabled Bits 6, 5 Trigger 00 = None, 01 = Daily, 10 = Calendar, 11 = Both Bits 4, 3, 2 Connected Cooling Equip. 000 = Alarm, 001 = Fan, 010 = Pump 011 = Spray, 100 = None 101 = Change Bits 1, 0 Sensor Fail Effect 00 = De-Energize Relay Coil 01 = Energize Relay Coil 10 = Toggle Relay Coil State
Data Item 10-14	Alarm 7 (Aux) Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 15-18	Alarm 7 (Aux) Hysteresis	,	B	B	B			Range 0 to 200
Data Item 19-22	Alarm 9 Setup A	,	b	b	b			Same as Relay 7 Setup A
Data Item 23-26	Alarm 9 Setup B	,	b	b	b			Same as Relay 7 Setup B
Data Item 27-31	Alarm 9 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 32-35	Alarm 9 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 36-39	Alarm 10 Setup A	,	b	b	b			Same as Relay 7 Setup A
Data Item 40-43	Alarm 10 Setup B	,	b	b	b			Same as Relay 7 Setup B
Data Item 44-48	Alarm 10 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 49-52	Alarm 10 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 53-56	Alarm 11 Setup A	,	b	b	b			Same as Relay 7 Setup A
Data Item 67-60	Alarm 11 Setup B	,	b	b	b			Same as Relay 7 Setup B
Data Item 61-65	Alarm 11 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 66-69	Alarm 11 Hysteresis	,	B	B	B			Range 0 to 200
Data Item 70-73	Alarm 12 Setup A	,	b	b	b			Same as Relay 7 Setup A
Data Item 74-77	Alarm 12 Setup B	,	b	b	b			Same as Relay 7 Setup B
Data Item 78-82	Alarm 12 Set Point Value	,	B	B	B	B		Range -999 to 9999
Data Item 83-86	Alarm 12 Hysteresis	,	B	B	B	B		Range 0 to 200
Trailer 1-3	Checksum	,	B	B				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	B					Single value 0D hex (Carriage Return)

2.7 Group 4 “Analog Retransmit Setup” Reply - to - Host Frame Expansion

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Reply Code	**B**						Single Value 41 hex
Header 5	Reply Group ID	**B**						Single value for group 4, 45 hex
Data Item 1-2	Channel 1 Source	,	**B**					Range 1 - 255 (1 - 9 valid) 1 = Channel 1, 2 = Channel 2 3 = Channel 3
Data Item 3 - 8	Channel 1 Zero Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 9 - 14	Channel 1 Full Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 15-19	Channel 1 Zero Scale Temp	,	**B**	**B**	**B**	**B**		Range -400 to 2500
Data Item 20-24	Channel 1 Full Scale Temp.	,	**B**	**B**	**B**	**B**		Range -400 to 2000
Data Item 25, 26	Channel 2 Source	,	**B**					Range 1 - 255 (1 - 9 valid) 1 = Channel 1, 2 = Channel 2 3 = Channel 3
Data Item 27 - 32	Channel 2 Zero Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 33 - 38	Channel 2 Full Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 39 - 43	Channel 2 Zero Scale Temp	,	**B**	**B**	**B**	**B**		Range -400 to 2500
Data Item 44 - 48	Channel 2 Full Scale Temp.	,	**B**	**B**	**B**	**B**		Range -400 to 2500
Data Item 49, 50	Channel 3 Source	,	**B**					Range 1 - 255 (1 - 9 valid) 1 = Channel 1, 2 = Channel 2 3 = Channel 3
Data Item 51 - 56	Channel 3 Zero Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 57 - 62	Channel 3 Full Scale	,	**B**	**B**	**B**	**B**	**B**	Range 0 - 24000 (µa)
Data Item 63 - 67	Channel 3 Zero Scale Temp	,	**B**	**B**	**B**	**B**		Range -400 to 2500
Data Item 68 - 72	Channel 3 Full Scale Temp.	,	**B**	**B**	**B**	**B**		Range -400 to 2500
Trailer 1-3	Checksum	,	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	**B**					Single value 0D hex (Carriage Return)

2.8 Group 5 “System Parameters” Reply - to - Host Frame Expansion

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 63 hex
Header 4	Reply Code	**B**						Single Value 41 hex
Header 5	Reply Group ID	**B**						Single value for group 5, 47 hex
Data Item 1-2	Channel 1Title	,	**B**					1 = Top Oil, 2 = Winding, 3 = XWinding 4 = YWinding, 5 = Hwinding, 6 = Bottom Oil, 7 = Ambient, 8 = Fluid
Data Item 3 - 4	Channel 2 Title	,	**B**					0 = Off, 1 = Top Oil, 2 = Winding, 3 = XWinding, 4 = YWinding, 5 = HWinding, 6 = Bottom Oil, 7 = Ambient, 8 = Fluid

Data Item 5 - 6	Channel 3 Title	,	B					0 = Off, 1 = Top Oil, 2 = Winding, 3 = XWinding, 4 = YWinding, 5 = HWinding, 6 = Bottom Oil, 7 = Ambient, 8 = Fluid
Data Item 7 - 8	Operator Mode	,	B					Range 0 - 1, 0 = Disabled, 1 = Enabled
Data Item 9 - 10	Display Flash	,	B					Range 0 - 1, 0 = Disabled, 1 = Enabled
Data Item 11 - 15	RTD 1 Offset	,	B	B	B	B		Range -250 to 250 (-25.0 to +25.0 °C)
Data Item 16 - 20	RTD 2 Offset	,	B	B	B	B		Range -250 to 250 (-25.0 to +25.0 °C)
Data Item 21 - 25	RTD 3 Offset	,	B	B	B	B		Range -250 to 250 (-25.0 to +25.0 °C)
Data Item 26 - 27	Display Conserver	,	B					Range 0 - 1, 0 = Disabled, 1 = Enabled
Trailer 1-3	Checksum	,	B	B				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	B					Single value 0D hex (Carriage Return)

2.9 Group 6 “Miscellaneous Parameter” Reply - to - Host Frame Expansion

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	:						Single value 3A hex
Header 2, 3	Unit ID	B	B					Range 00 to 99
Header 4	Command Code	B						Single Value 41 hex
Header 5	Group ID	B						Single value for group 6, 49 hex
Data Item 1, 2	Peak or Valley Event Recording Mode	,	B					Peak and Valley Recording Mode 0 = Continuous (Manual Reset) 1 = Hourly (Auto Reset Each Hour)
Data Item 3 - 4	Upper End Scale Value	,	B					0 = 200 °C , 1 = 250 °C
Data Item 5 - 6	Daylight Savings	,	B					0 = Disabled, 1 = Enabled
Data Item 7 - 11	Seasonal Setback	,	B	B	B	B		-500 to 500 (-50.0 to 50.0 °C Offset)
Data Item 12 - 14	Season Start Month	,	B	B				01 to 12 = January to December
Data Item 15 - 17	Season Start Day	,	B	B				01 to 31
Data Item 18 - 20	Season Start Hour	,	B	B				00 to 23
Data Item 21 - 23	Season Start minute	,	B	B				00 to 59
Data Item 24 - 26	Season End Month	,	B	B				01 To 12
Data Item 27 - 29	Season End Day	,	B	B				01 to 31
Data Item 30 - 32	Season End Hour	,	B	B				00 to 23
Data Item 33 - 35	Season End Minute	,	B	B				00 to 59
Data Item 36 - 38	Daily Alarm Start Hour	,	B	B				00 to 23
Data Item 39 - 41	Daily Alarm Start Minute	,	B	B				00 to 59
Data Item 42 - 44	Daily Alarm Length Hours	,	B	B				00 to 23
Data Item 45 - 47	Daily Alarm Length Minute	,	B	B				00 to 59
Data Item 48 - 50	Calendar Alarm Start Mon	,	B	B				01 to 12
Data Item 51 - 53	Calendar Alarm Start Day	,	B	B				01 to 31
Data Item 54 - 56	Calendar Alarm Start Hour	,	B	B				00 to 23
Data Item 57 - 59	Calendar Alarm Start Min	,	B	B				00 to 59
Data Item 60 - 62	Calendar Alarm Stop Month	,	B	B				01 to 12
Data Item 63 - 65	Calendar Alarm Stop Day	,	B	B				01 to 31
Data Item 66 - 68	Calendar Alarm Stop Hour	,	B	B				00 to 23
Data Item 69 - 71	Calendar Alarm Stop Min	,	B	B				00 to 59
Trailer 1-3	Checksum	,	B	B				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	,	B					Single value 0D hex (Carriage Return)

2.10 Group 2 “Alarms 1 to 6 Set up” Command Frame Expansion

The frames for the group 2 configuration commands are built identically to the group 2 reply - to - host frames with the single exception that header item 4 is changed from the reply code “A” (41 hex) to the command code “C” (43 hex). Thus a single, or multiple data items in a setup group can be easily changed by requesting a reply string, selecting and changing the item, changing the reply code to the command code and sending it out as a command. Note that the data groups covered by the command codes are 2 - 6, codes C - G. Please see the frame table of section 2.5 for descriptions of data items 1-114.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Command Code	**B**						Single Value 43 hex
Header 5	Command Group ID	**B**						Single value for group 2, 43 hex
Data Items 1-102	See Group 2 Reply Table							
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

2.11 Group 3 “Alarm Relays 7 - 12 Set up” Command Frame Expansion

The frames for the group 3 configuration commands are built identically to the group 3 reply - to - host frames with the single exception that header item 4 is changed from the reply code “A” (41 hex) to the command code “C” (43 hex). Please see the frame table of section 2.6 for descriptions of data items 1-114.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Command Code	**B**						Single Value 43 hex
Header 5	Group ID	**B**						Single value for group 3, 44 hex
Data Items 1 - 86	See Group 3 Reply Table							
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

2.12 Group 4 “Analog Retransmit Set up” Command Frame Expansion

The frames for the group 4 configuration commands are built identically to the group 4 reply - to - host frames with the single exception that header item 4 is changed from the reply code “A” (41 hex) to the command code “C” (43 hex). Please see the frame table of section 2.7 for descriptions of data items 1-78.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 99
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 63 hex
Header 4	Command Code	**B**						Single Value 43 hex
Header 5	Group ID	**B**						Single value for group 4, 45 hex
Data Items 1 - 72	See Group 4 Reply Table							
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

2.13 Group 5 “System Parameter Set up” Command Frame Expansion

The frames for the group 5 configuration commands are built identically to the group 5 reply - to - host frames with the single exception that header item 4 is changed from the reply code “A” (41 hex) to the command code “C” (43 hex). Please see the frame table of section 2.8 for descriptions of data items 1-34.

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Command Code	**B**						Single Value 43 hex
Header 5	Group ID	**B**						Single value for group 5, 47 hex
Data Items 1 - 27	See Group 5 Reply Table							
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

2.14 Group 6 “Miscellaneous Parameter Set up” Command Frame Expansion

The frames for the group 6 configuration commands are built identically to the group 6 reply - to - host frames with the single exception that header item 4 is changed from the reply code “A” (41 hex) to the command code “C” (43 hex).

Frame Component	Description	Layout						Range and Significance
Header 1	SOC Character	**:**						Single value 3A hex
Header 2, 3	Unit ID	**B**	**B**					Range 00 to 99
Header 4	Command Code	**B**						Single Value 43 hex
Header 5	Group ID	**B**						Single value for group 6, 49 hex
Data Item 1 - 71	See Group 6 Reply Table							
Trailer 1-3	Checksum	**,**	**B**	**B**				Range 0000 - FFFF Hex
Trailer 4, 5	EOC Character	**,**	**B**					Single value 0D hex (Carriage Return)

DNP V3.00

DEVICE PROFILE DOCUMENT

This table must be accompanied by a table having the following headings:

Object Group	Request Function Codes	Response Function Codes
Object Variation	Request Qualifiers	Response Qualifiers
	Object Name (optional)	

Vendor Name: Weschler Instruments

Device Name: Advantage VC (Variant Channel)

Highest DNP Level Supported:	Device Function:
For Requests: Level 1 For Responses: Level 1	**G** Master **O** Slave

Notable objects, functions and/or qualifiers supported in addition to the highest DNP levels Supported (the complete list is described in the attached table):

Maximum Data Link Frame Size (octets):	Maximum Application Fragment Size (octets):
Transmitted: 292 Received: 292	Transmitted: 249 Received: 249

Maximum Data Link Re-tries:	Maximum Application Layer Re-tries:
O None **G** Fixed at _____ **G** Configurable, range ____ to ____	**O** None **G** Configurable, range _____ to _____ (fixed is not permitted)

Requires Data Link Layer Confirmation:

O Never
G Always
G Sometimes If 'Sometimes', when? _____
G Configurable If 'Configurable', how? _____

Requires Application Layer Confirmation:

G Never
G Always (not recommended)
O When reporting event data (Slave devices only)
G When sending multi-fragment responses (slave devices only)
G Sometimes If 'Sometimes', when? _____
G Configurable If 'Configurable', how? _____

Timeouts While Waiting For:

Data link confirm	**O** None	**G** Fixed at ___	**G** Variable	**G** Configurable*
Complete application fragment	**O** None	**G** Fixed at ___	**G** Variable	**G** Configurable*
Application confirm	**O** None	**G** Fixed at ___	**G** Variable	**G** Configurable*
Complete application response	**O** None	**G** Fixed at ___	**G** Variable	**G** Configurable*

Others _____

Attach an explanation if 'Variable' or 'Configurable' was checked for any timeout

Send / Executes Control Operations:

WRITE Binary Outputs	**O** Never	**G** Always	**G** Sometimes	**G** Configurable*
SELECT / OPERATE	**G** Never	**O** Always	**G** Sometimes	**G** Configurable*
DIRECT OPERATE	**G** Never	**O** Always	**G** Sometimes	**G** Configurable*
DIRECT OPERATE - NO ACK	**G** Never	**O** Always	**G** Sometimes	**G** Configurable*

Count > 1	**O** Never	**G** Always	**G** Sometimes	**G** Configurable*
Pulse On	**G** Never	**G** Always	**O** Sometimes	**G** Configurable*
Pulse Off	**G** Never	**G** Always	**O** Sometimes	**G** Configurable*
Latch On	**G** Never	**G** Always	**O** Sometimes	**G** Configurable*
Latch Off	**G** Never	**G** Always	**O** Sometimes	**G** Configurable*
Queue	**O** Never	**G** Always	**G** Sometimes	**G** Configurable*
Clear Queue	**O** Never	**G** Always	**G** Sometimes	**G** Configurable*

* See attached point table for control operations checked as 'Sometimes'

FILL OUT THE FOLLOWING ITEMS FOR MASTER DEVICES ONLY

Expects Binary Input Change Events:

G Either time-tagged or non-time-tagged for a single event.
G Both time-tagged and non-time-tagged for a single event.
G Configurable (attach explanation).

FILL OUT THE FOLLOWING ITEM FOR SLAVE DEVICES ONLY

Reports binary input change events when no specific variation requested;

G Never
O Only time-tagged
G Only non-time-tagged
G Configurable to send both, one, or the other (attach explanation)

Reports time-tagged binary input change events when no specific variation requested:

G Never
O Binary input change with time
G Binary input change with relative time
G Configurable (attach explanation)

Sends Unsolicited Responses:

O Never
G Configurable (attach explanation)
G Only certain objects
G Sometimes (attach explanation)
G ENABLE / DISABLE UNSOLICITED Function Codes Supported

Sends Static Data in Unsolicited Responses

O Never
G When device restarts
G When status flags change

No Other Options Are Permitted

Default Counter Object / Variation:	Counters Roll Over At:
G No counters reported **G** Configurable (attach explanation) **O** Default object 20 Default Variation 1 **G** Point-by-point list attached	**G** No counters reported **G** Configurable (attach explanation) **G** 16 Bits **O** 32 Bits **G** Other value _____ **G** point-by-point list attached
Sends Multi-Fragment Responses: **G** Yes **O** No	

Advantage VC Implementation Table

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
GROUP	VARIATION	DESCRIPTION	Function Codes (decimal)	Qualifier Codes (hex)	Function Codes (decimal)	Qualifier Codes (hex)
1	2	Binary Input with Status			129	00,01
2	2	Binary Input Change with Time			129	17, 28
10	2	Binary Output Status			129	00, 01
12	1	Control Relay Output Block	3, 4, 5, 6	17, 28	129	echo of request
20	1	32 Bit Binary Counter			129	00, 01
30	1	32 Bit Analog Input			129	00, 01
40	2	16 Bit Analog Output status			129	00, 01
41	2	16 Bi8t Analog Output Block	3, 4, 5, 6	17, 28	129	echo of request
50	1	Time and Date	1, 2	07 quantity=1		
60	0	Class Zero Data Read		06		

Advantage VC Point Table

Object	Variation	Type	Point	Description
1	2	Binary Input with Status (Static, Read) Status Octet: Bit 7 = State (0, 1) Bit 6 = N/A Bit 5 = N/A Bit 4 = N/A Bit 3 = N/A Bit 2 = N/A Bit 1 = N/A Bit 0 = On / Off Line Bit 0: 0 = True (Off Line) 1 = False (On Line)	0 1 2 3 4 5	Channel 1 Peak Value Channel 2 Peak Value Channel 3 Peak Value Channel 1 Valley Value Channel 2 Valley Value Channel 3 Valley Value
2	2	Binary Input Change with Time (Read, Event) Status Octet: Bit 7 = State (0, 1) Bit 6 = N/A Bit 5 = N/A Bit 4 = N/A Bit 3 = N/A Bit 2 = N/A Bit 1 = N/A Bit 0 = On / Off Line Bit 0: 0 = True (Off Line) 1 = False (On Line)	0 1 2 3 4 5	Channel 1 Peak Time. Channel 2 Peak Time. Channel 3 Peak Time. Channel 1 Valley Time. Channel 2 Valley Time. Channel 3 Valley Time. Bit 7 is set, and the time is updated whenever a new peak or valley is recorded. The bit is cleared for a point immediately after the point's previous peak or valley is reset. Use this function in combination with object 30, variation 1 to time-stamp peak and valley values.

Object	Variation	Type	Point	Description
10	2	Binary Output With Status. (Static, Read) Status Octet: Bit 7 = State (0, 1) Bit 6 = N/A Bit 5 = N/A Bit 4 = N/A Bit 3 = N/A Bit 2 = N/A Bit 1 = N/A Bit 0 = On / Off Line Bit 0: 0 = Off Line 1 = On Line	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34	Relay 1 Remote Control. Enabled = 1, Disabled = 0 Relay 2 Remote Control. Enabled = 1, Disabled = 0 Relay 3 Remote Control. Enabled = 1, Disabled = 0 Relay 4 Remote Control. Enabled = 1, Disabled = 0 Relay 5 Remote Control. Enabled = 1, Disabled = 0 Relay 6 Remote Control. Enabled = 1, Disabled = 0 Relay 7 Remote Control. Enabled = 1, Disabled = 0 Relay 9 Remote Control. Enabled = 1, Disabled = 0 Relay 10 Remote Control. Enabled = 1, Disabled = 0 Relay 11 Remote Control. Enabled = 1, Disabled = 0 Relay 12 Remote Control. Enabled = 1, Disabled = 0 Relay 1 coil state. Energized = 1, De-energized = 0 Relay 2 coil state. Energized = 1, De-energized = 0 Relay 3 coil state. Energized = 1, De-energized = 0 Relay 4 coil state. Energized = 1, De-energized = 0 Relay 5 coil state. Energized = 1, De-energized = 0 Relay 6 coil state. Energized = 1, De-energized = 0 Relay 7 coil state. Energized = 1, De-energized = 0 Relay 8 coil state. Energized = 1, De-energized = 0 Relay 9 coil state. Energized = 1, De-energized = 0 Relay 10 coil state. Energized = 1, De-energized = 0 Relay 11 coil state. Energized = 1, De-energized = 0 Relay 12 coil state. Energized = 1, De-energized = 0 Relay 1 Normal Coil State. Energized = 1, De-energized = 0 Relay 2 Normal Coil State. Energized = 1, De-energized = 0 Relay 3 Normal Coil State. Energized = 1, De-energized = 0 Relay 4 Normal Coil State. Energized = 1, De-energized = 0 Relay 5 Normal Coil State. Energized = 1, De-energized = 0 Relay 6 Normal Coil State. Energized = 1, De-energized = 0 Relay 7 Normal Coil State. Energized = 1, De-energized = 0 Relay 8 Normal Coil State. Energized = 1, De-energized = 0 Relay 9 Normal Coil State. Energized = 1, De-energized = 0 Relay 10 Normal Coil State. Energized = 1, De-energized = 0 Relay 11 Normal Coil State. Energized = 1, De-energized = 0 Relay 12 Normal Coil State. Energized = 1, De-energized = 0

Object	Variation	Type	Point	Description
12	1	Control Relay Output Block. (Static, Write) Notes: In order to set or change the values of points 11 through 21, the corresponding relay's remote control function must be enabled. In order for local control to be restored to points 11 through 21, the relay's remote control function must be disabled.	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Relay 1 Remote Control. See supported control codes. Relay 2 Remote Control. See supported control codes. Relay 3 Remote Control. See supported control codes Relay 4 Remote Control. See supported control codes Relay 5 Remote Control. See supported control codes Relay 6 Remote Control. See supported control codes Relay 7 Remote Control. See supported control codes Relay 9 Remote Control. See supported control codes Relay 10 Remote Control. See supported control codes Relay 11 Remote Control. See supported control codes Relay 12 Remote Control. See supported control codes Relay 1 Coil State. See supported control codes. Relay 2 Coil State. See supported control codes. Relay 3 Coil State. See supported control codes. Relay 4 Coil State. See supported control codes. Relay 5 Coil State. See supported control codes. Relay 6 Coil State. See supported control codes. Relay 7 Coil State. See supported control codes. Relay 9 Coil State. See supported control codes. Relay 10 Coil State. See supported control codes. Relay 11 Coil State. See supported control codes. Relay 12 Coil State. See supported control codes. Control Codes Supported: 0 = NUL 1 = Pulse on. Relay energized until timer times out. 2 = Pulse off. Relay de-energized until timer times out. 3 = Latch on. Local Control will not supercede if set point exceeded. 4 = Latch off. 5 through 15 are undefined. Queue, Clear and Trip/Close bits set to 0.
20	1	Binary Counter (Static, Read)	0 1 2	Advantage Model (3 to 9 = G3T to G9T) Firmware Version Number. (0-3E7 Hex) Firmware Revision Number (0-63 Hex)
30	1	32 Bit Analog Input with Status. (Static, Read) Status Octet: Bit 7 = N/A Bit 6 = Ref Check Bit 5 = N/A Bit 4 = N/A Bit 3 = N/A Bit 2 = N/A Bit 1 = N/A Bit 0 = Flag Bit 6: 0 = Normal 1 = Error Bit 0: 0 = True (Off Line) 1 = False (On Line)	0 1 2 3 4 5 6 7 8	Channel 1 Present Temperature. Bit 0, 6 = Sensor, Internal Failure? Channel 2 Present Temperature. Bit 0, 6 = Sensor, Internal Failure? Channel 3 Present Temperature. Bit 0, 6 = Sensor, Internal Failure? Channel 1 Temperature Peak. Channel 2 Temperature Peak. Channel 3 Temperature Peak. Channel 1 Temperature Valley. Channel 2 Temperature Valley. Channel 3 Temperature Valley. See object 2, variation 2 for peak and valley time-stamp capability.

Object	Variation	Type	Point	Description
40	2	16 Bit Analog Output Status (Static, Read) Status Byte: Bit 7 = N/A Bit 6 = N/A Bit 5 = N/A Bit 4 = N/A Bit 3 = N/A Bit 2 = N/A Bit 1 = N/A Bit 0 = N/A See note 1 at the bottom of the table.	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Alarm 1 Set Point Alarm 2 Set Point Alarm 3 Set Point Alarm 4 Set Point Alarm 5 Set Point Alarm 6 Set Point Alarm 7 Set Point Alarm 9 Set Point Alarm 10 Set Point Alarm11 Set Point Alarm 12 Set Point Alarm 1 Hysteresis Alarm 2 Hysteresis Alarm 3 Hysteresis Alarm 4 Hysteresis Alarm 5 Hysteresis Alarm 6 Hysteresis Alarm 7 Hysteresis Alarm 9 Hysteresis Alarm 10 Hysteresis Alarm 11 Hysteresis Alarm 12 Hysteresis
41	2	16 Bit Analog Output Block (Static, Write) Control Codes Supported: 0 = 0 (NUL) 1 = 0 2 = 0 3 = 0 4 = 0 5 through 15 are undefined. Queue = 0 Clear = 0 Trip/Close bit = 0 See note 2 at the bottom of the table.	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Alarm 1 Set Point Alarm 2 Set Point Alarm 3 Set Point Alarm 4 Set Point Alarm 5 Set Point Alarm 6 Set Point Alarm 7 Set Point Alarm 9 Set Point Alarm 10 Set Point Alarm11 Set Point Alarm 12 Set Point Alarm 1 Hysteresis Alarm 2 Hysteresis Alarm 3 Hysteresis Alarm 4 Hysteresis Alarm 5 Hysteresis Alarm 6 Hysteresis Alarm 7 Hysteresis Alarm 9 Hysteresis Alarm 10 Hysteresis Alarm 11 Hysteresis Alarm 12 Hysteresis
50	1	Time & Date (Read & Write)	0	Time and Date
60	0	Class 0 Data (Read)	All	Using qualification code 06 returns all static data.