Stratos Evo

A402 Cond

Transmitter Specific HART Command Specification

Device Type 0xD3 (A402 Cond)

Device Revision: 4

Document Revision 1.2

Knick Elektronische Messgeräte GmbH & Co. KG

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1 Reference Documents

Document Title	Revision	Document Number
HART® - FSK Physical Layer Specification	8.1	HCF_SPEC-54
HART® - Data Link Layer Specification	8.0	HCF_SPEC-81
HART® - Command Summary Specification	8.1	HCF_SPEC-99
HART® - Universal Command Specification	6.0	HCF_SPEC-127
HART® - Common Practice Command Specification	8.0	HCF_SPEC-151
HART® - Common Tables	16.0	HCF_SPEC-183
Appendix 1 - Command Specific Response Code Definitions	5.0	HCF_SPEC-307
Application Layer Guideline on HART Status Information	1.0	HCF_LIT-5

Version history

00-01	Abgeleitet aus “StratosPro A211-A411 Cond SWRev 2 HART CMD Spec 01-02.doc”, alle Änderungen angenommen.	mes
	Cmd 0: Device Revision von 2 auf 3	
	Cmd 137: Sizes korrigiert	
	Cmd 147: Erweitert um Feld „Face 22mA“	
	Cmd 148: Länge an Cmd 147 angepasst	
	Cmd 14 and 54: SensorSerialNumber only for ISM sensors	rth

Bug Liste in den Geräten

Cmd 37	Response Code 14 fehlt (A201: V1.0.2, A401: 1.0.2)	mes
Cmd 147 + 148	Im Gerät war eine Länge von 20 hinterlegt, obwohl die Cmds 24 Byte umfassen und diese auch im Gerät so zusammengestellt werden. Offenbar funktionierte es aber trotzdem: Test ergibt, dass auch bei kürzeren Längen alles geliefert wird. Vermutung: Die Zahl gibt an, wieviele Bytes mindestens geschrieben werden müssen. Später in das CMD aufgenommene, hinten angefügte Zusatz-Items sind quasi optional.	mes

Umwandlung dieses Dokuments von Knick zu Mettler

1	Kopieren von Knick Cond 00-21	
	Alle Änderungen im Dokument annehmen	
	Änderungsmarkierung anschalten	
	Suchen nach “Knick”	
	Suchen nach A201	
	Suchen nach A401	
3		

Content

2 Common Tables Related to A402 Cond

2.1 Device Variable Code Tables

Device Variable Code	Measurement Value	Units Code	Lower Limit	Upper Limit	Mininum Span	Damping
0	Cond (This can be any of Device Variables 2 to 6 depending on the setting of the Channel parameter.)					
1	Temperature	32 – °C 33 – °F	-20 -4	250 482	0,05 0,09	0 0
2	Conductivity	66 – mS/cm	0	999.9	0.0005	0
3	Specific Resistance	245 – MOhm * cm	0	99.99	0,005	0
4	Concentration	57 – %	0	99.99	0.005	0
5	USP	67 – uS/cm	0	99.99	0,005	0
6	Salinity	246 – ‰	0	45	0,005	0

Device Variable Code	Device Variable	Device Variable Class	Device Variable Family
0	Cond	81 – Analytical	250 – not used
1	Temperature	64 – Temperature	4 – Temperature
2	Conductivity	81 – Analytical	250 – not used
3	Specific Resistance	81 – Analytical	250 – not used
4	Concentration	81 – Analytical	250 – not used
5	USP	81 – Analytical	250 – not used
6	Salinity	81 – Analytical	250 – not used

2.2 Analog Channel Code Table

Analog Channel Code	Current Loop of Device
0	Primary Current Loop (OUT1)
1	Secondary Current Loop (OUT2)

2.3 Device Specific Unit Codes Table

Unit Code	Unit
244	1/cm
245	MOhm * cm
246	‰

2.4 Device Specific Transfer Function Codes Table

Transfer Function Code	Transfer Function
0	linear
240	logarithmic
241	bilinear

3 Universal Commands

3.1 Command 0 Read Unique Identifier

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	(=254)
1	Enum	Manufacturer Identification Code (=97 for Knick)
2	Enum	Device Type (=0xD3 for A402 Cond)
3	Unsigned-8	Minimum Number of Preambles (=5)
4	Unsigned-8	Universal Command Major Revision Number (=6)
5	Unsigned-8	Device Revision Level (=4)
6	Unsigned-8	Software Revision Level (=1)
7	Enum	Hardware Revision Level (=1)
8	Bits	Flags (=0)
9-11	Unsigned-24	Device Identification Number
12	Unsigned-8	Number of Preambles
13	Unsigned-8	Maximum Number of Device Variables (=6, Index of last device variable)
14-15	Unsigned-16	Configuration Change Counter
16	Bits	Extended Field Device Status

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.2 Command 1 Read Primary Variable

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Primary Variable Units Code (Coding see 2.1)
1-4	Float	Primary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.3 Command 2 Read Loop Current and Percent of Range

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Primary Variable Loop Current [mA]
4-7	Float	Primary Variable Percent of Range [%]

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.4 Command 3 Read Dynamic Variables and Loop Current

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Primary Variable Loop Current [mA]
4	Enum	Primary Variable Units Code (Coding see 2.1)
5-8	Float	Primary Variable
9	Enum	Secondary Variable Units Code (Coding see 2.1)
10-13	Float	Secondary Variable
14	Enum	Tertiary Variable Units Code (Coding see 2.1)
15-18	Float	Tertiary Variable
19	Enum	Quaternary Variable Units Code (Coding see 2.1)
20-23	Float	Quaternary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.5 Command 6 Write Polling Address

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode 0 – Disabled (= Multidrop Mode) 1 – Enabled (= Current Signaling Mode)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Polling Address Selection (>63)
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

3.6 Command 7 Read Loop Configuration

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode (Coding see Command 6)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.7 Command 8 Read Dynamic Variable Classifications

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Enum	Primary Variable Classification (Coding see 2.1)
1	Enum	Secondary Variable Classification (Coding see 2.1)
2	Enum	Tertiary Variable Classification (Coding see 2.1)
3	Enum	Quaternary Variable Classification (Coding see 2.1)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.8 Command 9 Read Device Variables with Status

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Slot 0: Device Variable Code (Coding see 2.1)
1	Unsigned-8	Slot 1: Device Variable Code (Coding see 2.1)
2	Unsigned-8	Slot 2: Device Variable Code (Coding see 2.1)
3	Unsigned-8	Slot 3: Device Variable Code (Coding see 2.1)

Response Data Bytes

Byte	Format	Description
0	Enum	Extended Field Device Status
1	Unsigned-8	Slot 0: Device Variable Code (Coding see 2.1)
2	Enum	Slot 0: Device Variable Classification
3	Enum	Slot 0: Units Code
4-7	Float	Slot 0: Device Variable Value
8	Bits	Slot 0: Device Variable Status 0x80 – 0x40: 00 – Bad 01 – Poor 11 – Good 0x20 – 0x10: 00 - ok 01 - Low Limited 10 - High Limited 11 - Constant
9	Unsigned-8	Slot 1: Device Variable Code
10	Enum	Slot 1: Device Variable Classification
11	Enum	Slot 1: Units Code
12-15	Float	Slot 1: Device Variable Value
16	Bits	Slot 1: Device Variable Status (Coding see Byte 8)
17	Unsigned-8	Slot 2: Device Variable Code
18	Enum	Slot 2: Device Variable Classification
19	Enum	Slot 2: Units Code
20-23	Float	Slot 2: Device Variable Value
24	Bits	Slot 2: Device Variable Status (Coding see Byte 8)
25	Unsigned-8	Slot 3: Device Variable Code
26	Enum	Slot 3: Device Variable Classification
27	Enum	Slot 3: Units Code
28-31	Float	Slot 3: Device Variable Value
32	Bits	Slot 3: Device Variable Status (Coding see Byte 8)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
8	Warning	Update Failure

3.9 Command 11 Read Unique Identifier Associated with Tag

Request Data Bytes

Byte	Format	Description
0-5	Packed	Tag

Response Data Bytes

Byte	Format	Description
0-16		Same as Command 0 (Read Unique Identifier) No response is made unless the Tag matches that of the device.

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.10 Command 12 Read Message

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-23	Packed	Message

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.11 Command 13 Read Tag, Descriptor, Date

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-5	Packed	Tag
6-17	Packed	Descriptor
18-20	Date	Date Code

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.12 Command 14 Read Primary Variable Transducer Information

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-2	Unsigned-24	Numerical Sensor Serialnumber - ISM sensors only (reads 0 if there is no ISM sensor)
3	Enum	Transducer Limits and Minimum Span Units Code (Coding see 2.1)
4-7	Float	Upper Transducer Limit
8-11	Float	Lower Transducer Limit
12-15	Float	Minimum Span

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.13 Command 15 Read Device Information

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Enum	PV Alarm Selection Code 0 – High 239 – Last Val
1	Enum	PV Transfer Function Code (Coding see 2.4)
2	Enum	PV Upper and Lower Range Values Units Code (Coding see 2.1)
3-6	Float	PV Upper Range Value
7-10	Float	PV Lower Range Value
11-14	Float	PV Damping Value [s]
15	Enum	Write Protect Code (=251, None)
16	Enum	Private Label Distributor Code (=97, Knick)
17	Bits	PV Analog Channel Flags (=0)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.14 Command 16 Read Final Assembly Number

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-2	Unsigned-24	Final Assembly Number

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.15 Command 17 Write Message

Request Data Bytes

Byte	Format	Description
0-23	Packed	Message String Used by the Master for Record Keeping

Response Data Bytes

Byte	Format	Description
0-23	Packed	Message String

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

3.16 Command 18 Write Tag, Descriptor, Date

Request Data Bytes

Byte	Format	Description
0-5	Packed	Tag
6-17	Packed	Descriptor Used by the Master for Record Keeping
18-20	Unsigned-24	A Date Code Used by the Master for Record Keeping (e.g. Last Or Next Calibration Date)

Response Data Bytes

Byte	Format	Description
0-5	Packed	Tag
6-17	Packed	Descriptor
18-20	Date	Date Code

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
9	Error	Invalid Date Code Detected
16	Error	Access Restricted

3.17 Command 19 Write Final Assembly Number

Request Data Bytes

Byte	Format	Description
0-2	Unsigned-24	Final Assembly Number

Response Data Bytes

Byte	Format	Description
0-2	Unsigned-24	Final Assembly Number

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

3.18 Command 20 Read Long Tag

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.19 Command 21 Read Unique Identifier Associated With Long Tag

Request Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Response Data Bytes

Byte	Format	Description
0-16		Same as Command 0 (Read Unique Identifier) No response is made unless the Long Tag matches that of the device.

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

3.20 Command 22 Write Long Tag

Request Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Response Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

4 Common Practice Commands

4.1 Command 33 Read Device Variables

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Slot 0: Device Variable Code (Coding see 2.1)
1	Unsigned-8	Slot 1: Device Variable Code (Coding see 2.1)
2	Unsigned-8	Slot 2: Device Variable Code (Coding see 2.1)
3	Unsigned-8	Slot 3: Device Variable Code (Coding see 2.1)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Slot 0: Device Variable Code
1	Enum	Slot 0: Units Code (Coding see 2.1)
2-5	Float	Slot 0: Device Variable Value
6	Unsigned-8	Slot 1: Device Variable Code
7	Enum	Slot 1: Units Code (Coding see 2.1)
8-11	Float	Slot 1: Device Variable Value
12	Unsigned-8	Slot 2: Device Variable Code
13	Enum	Slot 2: Units Code (Coding see 2.1)
14-17	Float	Slot 2: Device Variable Value
18	Unsigned-8	Slot 3: Device Variable Code
19	Enum	Slot 3: Units Code (Coding see 2.1)
20-23	Float	Slot 3: Device Variable Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
8	Warning	Update Failure

4.2 Command 35 Write Primary Variable Range Values

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Upper and Lower Range Values Units Code (must be the same as the actually used unit) (Coding see 2.1)
1-4	Float	Upper Range Value
5-8	Float	Lower Range Value

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Upper and Lower Range Values Units Code
1-4	Float	Upper Range Value
5-8	Float	Lower Range Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
9	Error	Lower Range Value Too High
10	Error	Lower Range Value Too Low
11	Error	Upper Range Value Too High
12	Error	Upper Range Value Too Low
16	Error	Access Restricted
29	Error	Invalid Span

4.3 Command 36 Set Primary Variable Upper Range Value

This Command sets the actual value of the Primary Variable as the Upper Range Value.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
9	Error	Applied Process Too High
10	Error	Applied ProcessToo Low
16	Error	Access Restricted
29	Error	Invalid Span

4.4 Command 37 Set Primary Variable Lower Range Value

This Command sets the actual value of the Primary Variable as the Lower Range Value.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
9	Error	Applied Process Too High
10	Error	Applied ProcessToo Low
14	Warning	New Lower Range Value Pushed
16	Error	Access Restricted
29	Error	Invalid Span

4.5 Command 38 Reset Configuration Changed Flag

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
16	Error	Access Restricted

4.6 Command 41 Perform Self Test

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
16	Error	Access Restricted

4.7 Command 42 Perform Device Reset

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
16	Error	Access Restricted

4.8 Command 44 Write Primary Variable Units

Request Data Bytes

Byte	Format	Description
0	Enum	Primary Variable Units Code (switching between °C and °F is allowed, all other units must not be changed) (Coding see 2.1)

Response Data Bytes

Byte	Format	Description
0	Enum	Primary Variable Units Code

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

4.9 Command 47 Write Primary Variable Transfer Function

Request Data Bytes

Byte	Format	Description
0	Enum	Transfer Function Code (Coding see 2.4)

Response Data Bytes

Byte	Format	Description
0	Enum	Transfer Function Code (Coding see 2.4)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

4.10 Command 48 Read Additional Device Status

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Error number
1	Unsigned-8	Reserved
2	Enum	Device Specific Status: 0 – MEAS 1 – DIAG 2 – CAL 3 – CONF 4 – SERVICE
3	Enum	Sensoface: 0 – Good 1 – Poor 2 – Bad 3 – Unknown
4	Enum	Active Parameter Set: 0 – PARSET A 1 – PARSET B
5	Bits	State: 0x10 – Alarm 0x08 – Sensor Connected 0x02 – Product Calibration Step 2 Pending 0x01 – Hold
6	Bits	Extended Device Status: 0x01 – Maintenance required
7-9	Bits	Reserved
10	Bits	Analog Channel Saturation: 0x02 – Channel 2 saturated 0x01 – Channel 1 saturated
11-12	Bits	Reserved
13	Bits	Analog Channel Fixed: 0x02 – Channel 2 fixed 0x01 – Channel 1 fixed

14-22	Bits	Device specific status 0x00000000 - No error 0x00000001 - Wrong sensor channel 2 0x00000002 - No sensor channel 2 0x00000004 - Sensocheck error channel 1 0x00000008 - USP too high 0x00000010 - Salinity range channel 1 0x00000020 - Concentration range channel 1 0x00000040 - Conductivity range channel 1 0x00000080 - Temperature range channel 1 0x00000100 - Salinity range channnel 2 0x00000200 - Concentration range channel 2 0x00000400 - Conductivity range channel 2 0x00000800 - Temperature range channel 2 0x00001000 - Conductance rance channel 2 0x00002000 - Calibration data error channel 2 0x00004000 - Sensor error channel 2 0x00008000 - Sensor canceled channel 2 0x00010000 - Output 1 too low 0x00020000 - Invalid parameter Output 2 0x00040000 - Invalid parameter Output 1 0x00080000 - Invalid corner Output 2 0x00100000 - Invalid corner Output 1 0x00200000 - Load error Output 1 or 2 0x00400000 - Sensocheck error channel 2 0x00800000 - USP too high channel 2 0x01000000 - Configuration error Hart/IrDA 0x02000000 - Invalid parameter controller 0x04000000 - Configuration error relay 1 or 2 0x08000000 - Flow too low 0x10000000 - Flow too high 0x20000000 - Output 2 current too high 0x40000000 - Output 2 current too low 0x80000000 - Output 1 too high 0x00010000 - No module 0x00020000 - System error 0x00040000 - Configuration data defect 0x00080000 - Error in factory settings 0x01000000 - Conductance range 0x02000000 - Calibration data error 0x04000000 - Sensor error channel 1 0x08000000 - Sensor canceled channel 1 0x10000000 - Wrong sensor channel 1 0x20000000 - No sensor channel 1 0x40000000 - Invalid span I-input 0x80000000 - Wrong module

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

4.11 Command 50 Read Dynamic Variable Assignment

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Primary Variable (Coding see 2.1)
1	Unsigned-8	Device Variable assigned to the Secondary Variable (Coding see 2.1)
2	Unsigned-8	Device Variable assigned to the Tertiary Variable (=250, not used)
3	Unsigned-8	Device Variable assigned to the Quaternary Variable (=250, not used)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

4.12 Command 53 Write Device Variable Units

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code (Coding see 2.1)
1	Enum	Device Variable Units Code (switching between °C and °F is allowed, all other units must not be changed) (Coding see 2.1)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code
1	Enum	Device Variable Units Code

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
11	Error	Unvalid Device Variable Code
12	Error	Invalid Units Code
16	Error	Access Restricted

4.13 Command 54 Read Device Variable Information

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code
1-3	Unsigned-24	Device Variable Transducer Serialnumber (ISM sensors only)
4	Enum	Device Variable Limits/Minimum Span Units Code (Coding see 2.1)
5-8	Float	Device Variable Upper Transducer Limit
9-12	Float	Device Variable Lower Transducer Limit
13-16	Float	Device Variable Damping Value (=0)
17-20	Float	Device Variable Minimum Span
21	Enum	Device Variable Classification (Coding see 2.1)
22	Enum	Device Variable Family (Coding see 2.1)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

4.14 Command 59 Write Number of Response Preambles

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Number of preambles to be sent with the response message from Slave to the Master

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Number of preambles to be sent with the response message from Slave to the Master

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
8	Warning	Set to Nearest Possible Value
16	Error	Access Restricted

4.15 Command 60 Read Analog Channel and Percent of Range

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code
1	Enum	Analog Channel Units Code (=39, mA)
2-5	Float	Analog Channel Level
6-9	Float	Analog Channel Percent of Range

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

4.16 Command 62 Read Analog Channels

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code assigned to Slot 0 (Coding see 2.2)
1	Unsigned-8	Analog Channel Number Code assigned to Slot 1 (Coding see 2.2)
2	Unsigned-8	Analog Channel Number Code assigned to Slot 2 (Coding see 2.2)
3	Unsigned-8	Analog Channel Number Code assigned to Slot 3 (Coding see 2.2)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code in Slot 0
1	Enum	Slot 0 Units Code (=39, mA)
2-5	Float	Slot 0 Level of selected Analog Channel
6	Unsigned-8	Analog Channel Number Code in Slot 1
7	Enum	Slot 1 Units Code (=39, mA)
8-11	Float	Slot 1 Level of selected Analog Channel
12	Unsigned-8	Analog Channel Number Code in Slot 2
13	Enum	Slot 2 Units Code (=39, mA)
14-17	Float	Slot 2 Level of selected Analog Channel
18	Unsigned-8	Analog Channel Number Code in Slot 3
19	Enum	Slot 3 Units Code (=39, mA)
20-23	Float	Slot 3 Level of selected Analog Channel

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

4.17 Command 63 Read Analog Channel Information

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code
1	Enum	Analog Channel Alarm Selection Code 0 – High 239– Last Val
2	Enum	Analog Channel Transfer Function Code (Coding see 2.4)
3	Enum	Analog Channel Upper and Lower Range Values Units Code (Coding see 2.1)
4-7	Float	Analog Channel Upper Range Value
8-11	Float	Analog Channel Lower Range Value
12-15	Float	Analog Channel Damping Value [s]
16	Bits	Analog Channel Flags (=0)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

4.18 Command 64 Write Analog Channel Additional Damping Value

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)
1-4	Float	Analog Channel Additional Damping Value [s]

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code
6-9	Float	Analog Channel Additional Damping Value [s]

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

4.19 Command 65 Write Analog Channel Range Values

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)
1	Enum	Analog Channel Upper and Lower Range Values Units Codes (the actually used unit must not be changed) (Coding see 2.1)
2-5	Float	Analog Channel Upper Range Value
6-9	Float	Analog Channel Lower Range Value

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code
1	Enum	Analog Channel Upper and Lower Range Values Units Codes
2-5	Float	Analog Channel Upper Range Value
6-9	Float	Analog Channel Lower Range Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Error Code
9	Error	Lower Range Value Too High
10	Error	Lower Range Value Too Low
11	Error	Upper Range Value Too High
12	Error	Upper Range Value Too Low
15	Error	Invalid Analog Channel Code Number
16	Error	Access Restricted
29	Error	Invalid Span

4.20 Command 69 Write Analog Channel Transfer Function

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)
1	Enum	Analog Channel Transfer Function Code (Coding see 2.4)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Analog Channel Number Code (Coding see 2.2)
1	Enum	Analog Channel Transfer Function Code (Coding see 2.4)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
13	Error	Invalid Transfer Function Code
15	Error	Invalid Analog Channel Code Number
16	Error	Access Restricted

4.21 Command 71 Lock Device

Request Data Bytes

Byte	Format	Description
0	Enum	Lock Code: 0 – Unlocked 1 – Lock – Temporary 2 – Lock – Permanent

Response Data Bytes

Byte	Format	Description
0	Enum	Lock Code

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
10	Error	Invalid Lock Code
16	Error	Access Restricted

4.22 Command 72 Squawk

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

4.23 Command 73 Find Device

The 201Cond / 401Cond must be set to Diag mode manually before using this command. In all other modes the device will not answer this command.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-16	Bits	Same as Command 0 (Read Unique Identifier)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

4.24 Command 76 Read Lock Device State

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Bits	Lock Status: 0x01 – Device Locked 0x02 – Lock is Permanent 0x04 – Locked by Primary Master

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5 Device Specific Commands

5.1 Command 128 Read Device Configuration

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Bits	Device type and options 1: 0x01 – 1= A402 Cond 0x02 – reserved 0x04 – 0 = non Ex, 1= Ex 0x08 – 1= Option Secondary Loop Current activated 0x10 – reserved 0x20 – 1= Option Logbook activated 0x40 – 1= Option Current Input activated 0x80 – reserved
1	Bits	Device type and options 2: 0x01 – 1= Option Audit Trail activated
2	Unsigned-8	Reserved
3	Unsigned-8	Reserved

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.2 Command 135 Read Sensor Information

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	(=0)	
1	Enum	Sensor Type: 0 – 2-ELECTRODE 1 – 4-ELECTRODE 4 – MEMOSENS	SNS:
2-5	Float	Cellfactor [1/cm]	SNS: CELLFACTOR
6	Enum	Meas Mode: 0 – Cond 1 – Conc [%] 2 – SAL [°/oo] 3 – USP [µS/cm]	SNS: MEAS MODE
7	Enum	Meas Range (Meas Mode Cond only): 0 – o.ooo µS/cm 1 – oo.oo µS/cm 2 – ooo.o µS/cm 3 – oooo µS/cm 4 – o.ooo mS/cm 5 – oo.oo mS/cm 6 – ooo.o mS/cm 7 – o.ooo S/m 8 – oo.oo S/m 9 – oo.oo MΩ*cm	SNS: MEAS RANGE
8	Enum	Solution (Meas Mode Conc only): 0 – NaCl 1 – HCl 2 – NaOH 3 – H2SO4 4 – HNO3	SNS: SOLUTION
9	Enum	Temperature Unit: 32 – °C 33 – °F	SNS: TEMP UNIT
10	Enum	Temperature Meas Mode: 0 – AUTO 1 – MAN 2 – EXT	SNS:TEMPERATURE
11	Enum	RTD Type (not with Memosens): 0 – PT100 1 – PT1000 3 – NTC855B 5 – NTC30K 7 – NI100	SNS: RTD TYPE
12-15	Float	Manual Temperature Value	SNS: TEMP MAN
16	Enum	CIP Count: 0 – OFF 1 – ON	SNS: CIP COUNT
17	Enum	SIP Count: 0 – OFF 1 – ON	SNS: SIP COUNT

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.3 Command 136 Write Sensor Information

Request Data Bytes

Byte	Format	Description
0-17		Same as Response of Command 135

Response Data Bytes

Byte	Format	Description
0-17		Same as Response of Command 135

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.4 Command 139 Read Dynamic Variable Assignments

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description
0	Enum	Parset selection (Coding see Request)
1	Unsigned-8	Device Variable assigned to the primary variable (Coding see 2.1)
2	Unsigned-8	Device Variable assigned to the secondary variable (Coding see 2.1)
3	Unsigned-8	Device Variable assigned to the tertiary variable (=250, not used)
4	Unsigned-8	Device variable assigned to the quaternary variable (=250, not used)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.5 Command 147 Read OUT1/OUT2

Request Data Bytes

Byte	Format	Description
0	Enum	Parset and analog channel selection: 0 – OUT1, Parset A 1 – OUT1, Parset B 2 – OUT2, Parset A 3 – OUT2, Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset and analog channel selection (Coding see Request)	
1	Enum	Channel: 0 – Conductivity (COND) 1 – Temperature (TMP)	OT1/2: CHANNEL
2	Enum	Output Range: 0 – 0-20mA 1 – 4-20mA	OT1/2: RANGE
3	Enum	Output: 0 – linear (LIN) 1 – logarithmic (LOG) (Channel = COND only) 2 – bilinear (BI LIN)	OT1/2: OUTPUT
4-7	Float	BEGIN Value for Output = LIN and BI LIN The Unit depends on the setting of Meas Mode and Meas Range (see 5.2): mS/cm – Meas Mode = Cond and Meas Range = uS/cm, mS/cm or S/m MΩ*cm – Meas Mode = Cond and Meas Range = MΩ*cm % – Meas Mode = Conc ‰ – Meas Mode = Sal uS/cm – Meas Mode = USP	OT1/2: BEGIN
8-11	Float	END Value for Output = LIN and BI LIN Unit see BEGIN	OT1/2: END
12	Enum	BEGIN Value for Output = LOG For mS/cm: 0 – 1.0 µS/c 1 – 10.0 µS/c 2 – 100.0 µS/c 3 – 1.0 mS/c 4 – 10.0 mS/c 5 – 100.0 mS/c 6 – 1000 mS/c For S/m: 7 – 0.001 S/m 8 – 0.01 S/m 9 – 0.1 S/m 10 – 1.0 S/m 11 – 10.0 S/m 12 – 100 S/m	OT1/2: BEGIN
13	Enum	END Value for Output = LOG Coding see BEGIN Value for Output = LOG	OT1/2: END
14-17	Float	Filtertime [s]	OT1/2: FILTERTIME
18	Enum	22mA-Fail: 0 – OFF 1 – ON	OT1/2: 22mA-FAIL
19	Enum	Hold Mode: 1 – FIX 2 – LAST	OT1/2: HOLD MODE
20-23	Float	Hold Fix	OT1/2: HOLD FIX
24-27	Float	Corner X for Output = BI LIN	OT1/2: CORNER X
28-31	Float	Corner Y for Output = BI LIN	OT1/2: CORNER Y
32	Enum	22mA on Sensoface Message: 0 – OFF	OT1/2: FACE 22mA

1 – ON

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.6 Command 148 Write OUT1/OUT2

Request Data Bytes

Byte	Format	Description
0-32		Same as Response of Command 147

Response Data Bytes

Byte	Format	Description
0-32		Same as Response of Command 147

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.7 Command 157 Read Correction

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset selection (Coding see Request)	
1	Enum	TC Type: 0 – OFF 1 – LIN 2 – NLF 3 – nACL 4 – HCL 5 – nH3 6 – NAOH	COR: TC SELECT
2-5	Float	TC Liquid [%/K] for TC Type = LIN	COR: TC LIQUID
6	Enum	Input Type: 0 – 0-20mA 1 – 4-20mA	COR: I-INPUT
7-10	Float	Input Begin Temperature Value (in the active temperature unit)	COR: BEGIN
11-14	Float	Input End Temperature Value (in the active temperature unit)	COR: END
15-18	Float	Reference Temperature Value for TC Type = LIN (in the active temperature unit)	COR: REF TEMP

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.8 Command 158 Write Correction

Request Data Bytes

Byte	Format	Description
0-18		Same as Response of Command 157

Response Data Bytes

Byte	Format	Description
0-18		Same as Response of Command 157

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.9 Command 159 Read Control Input

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Control Mode 0 – PARSET 1 – FLOW	IN: CONTROL
1-4	Float	Adjust Flow for Control Mode = Flow	IN: ADJUST FLOW

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.10 Command 160 Write Control Input

Request Data Bytes

Byte	Format	Description
0-4		Same as Response of Command 159

Response Data Bytes

Byte	Format	Description
0-4		Same as Response of Command 159

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.11 Command 161 Read Alarm

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset selection (Coding see Request)	
1-4	Float	Delay Time [s]	ALA: DELAYTIME
5	Enum	Sensocheck: 0 – OFF	ALA: SENSOCHECK

		1 – ON	
6	Enum	Flow Control: 0 – OFF 1 – ON	ALA: FLOW CONTR
7-10	Float	Flow Min [l/h]	ALA: FLOW MIN
11-14	Float	Flow Max [l/h]	ALA: FLOW MAX

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.12 Command 162 Write Alarm

Request Data Bytes

Byte	Format	Description
0-14		Same as Response of Command 161

Response Data Bytes

Byte	Format	Description
0-14		Same as Response of Command 161

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.13 Command 163 Read Relais

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset selection (Coding see Request)	
1	Enum	Relais Mode: 0 – Limits 1 – Controller 2 – USP Function	REL:

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.14 Command 164 Write Relais

Request Data Bytes

Byte	Format	Description
0-1		Same as Response of Command 163

Response Data Bytes

Byte	Format	Description
0-1		Same as Response of Command 163

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.15 Command 165 Read Limits

Request Data Bytes

Byte	Format	Description
0	Enum	Relais and parset selection: 0 – Rel1, Parset A 1 – Rel1, Parset B 2 – Rel2, Parset A 3 – Rel2, Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Relais and parset selection (Coding see Request)	
1	Enum	Channel: 0 – Conductivity (Cond, Conc, Sal or USP) 1 – Temperature 2 – Flow	RL1/2: CHANNEL
2	Enum	Function: 0 – Low Level 1 – High Level	RL1/2: FUNCTION
3	Enum	Contact Type: 0 – N/O 1 – N/C	RL1/2: CONTACT
4-7	Float	Level	RL1/2: LEVEL
8-11	Float	Hysteresis	RL1/2: HYSTERESIS
12-15	Float	Delay Time [s]	RL1/2: DELAYTIME

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.16 Command 166 Write Limits

Request Data Bytes

Byte	Format	Description
0-15		Same as Response of Command 165

Response Data Bytes

Byte	Format	Description
0-15		Same as Response of Command 165

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.17 Command 167 Read Controller

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset selection (Coding see Request)	
1	Enum	Channel: 0 – Conductivity (Cond, Conc, Sal or USP) 1 – Temperature (TMP)	CTR: CHANNEL
2	Enum	Controller Type: 0 – Pulse Length (PLC) 1 – Pulse Frequency (PFC)	CTR: TYPE
3-6	Float	Pulse Length [s] (PLC only)	CTR: PULSE LEN
7-10	Float	Pulse Frequency [1/min] (PFC only)	CTR: PULSE FREQ
11-14	Float	Set Point	CTR: SETPOINT
15-18	Float	Dead Band	CTR: DEAD BAND
19-22	Float	P Gain [%]	CTR: P-GAIN
23-26	Float	I Time [s]	CTR: I-TIME
27-30	Float	D Time [s]	CTR: D-TIME
31	Enum	Hold Mode: 0 – Y OFF 2 – Y LAST	CTR: HOLD MODE

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.18 Command 168 Write Controller

Request Data Bytes

Byte	Format	Description
0-31		Same as Response of Command 167

Response Data Bytes

Byte	Format	Description
0-31		Same as Response of Command 167

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.19 Command 169 Read USP

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset selection: 0 – Parset A 1 – Parset B	
1-4	Float	USP Factor [%]	USP: FACTOR
5	Enum	Contact Rel1: 0 – N/O 1 –N/C	USP: CONTACT
6-9	Float	Delay Time Rel1 [s]:	USP: DELAYTIME
10	Enum	Contact Rel2: 0 – N/O 1 – N/C	USP: CONTACT
11-14	Float	Delay Time Rel2 [s]:	USP: DELAYTIME

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.20 Command 170 Write USP

Request Data Bytes

Byte	Format	Description
0-14		Same as Response of Command 169

Response Data Bytes

Byte	Format	Description
0-14		Same as Response of Command 169

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.21 Command 171 Read Wash

Request Data Bytes

Byte	Format	Description
		None

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Mode: 0 – Wash 1 – Parset A/B	WSH:
1-4	Float	Wash Cycle [h]	WSH: WASH CYCLE
5-8	Float	Wash Time [s]	WSH: WASH TIME
9	Enum	Contact Type: 0 – N/O 1 – N/C	WSH: CONTACT

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.22 Command 172 Write Wash

Request Data Bytes

Byte	Format	Description
0-9		Same as Response of Command 171

Response Data Bytes

Byte	Format	Description
0-9		Same as Response of Command 171

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.23 Command 173 Read Clock

Request Data Bytes

Byte	Format	Description
		None

Response Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Milliseconds
2	Unsigned-8	Minute
3	Unsigned-8	Hour
4	Unsigned-8	Day
5	Unsigned-8	Month
6	Unsigned-8	Year

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.24 Command 174 Write Clock

Request Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Milliseconds (0-59999)
2	Unsigned-8	Minute (0-59)
3	Unsigned-8	Hour (0-23)
4	Unsigned-8	Day (1-31)
5	Unsigned-8	Month (1-12)
6	Unsigned-8	Year (1-255)

Response Data Bytes

Byte	Format	Description
0-6		Same as Response of Command 173

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
9	Error	Invalid Date Code Detected
16	Error	Access Restricted

5.25 Command 175 Read Logbook Entry

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Group index: Value range depends on setting of Logbook options No Logbook option activated: 0 Logbook activated: 0-49 Logbook + Audit Trail activated: 0-99

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Group Index
1	Unsigned-8	Index of latest entry
2	Unsigned-8	Index of the first entry of the requested group index
3-27		Logbook entry
28	Unsigned-8	Index of the second entry of the requested group index
29-53		Logbook entry

Logbook Entry

Byte	Format	Description
0	Unsigned-8	Message ID
1	Unsigned-8	Day
2	Unsigned-8	Month
3	Unsigned-8	Year
4-9	Packed	Time (Format: “hh:mm:ss“)
10	Bits	Info Flags: 0x01 - 0x02: Sensoface 0 – Good 1 – Medium 2 – Bad 3 – Unknown 0x04: Parset 0 – ParsetA 1 – ParsetB 0x08 - 0x10: Reserved 0x20 - 0x80: Kind of Message 0 – Static 1 – Begin of event 2 – End of event 3 – Float (Bytes 11-14 are valid, 15-18 are reserved) 4 – Unsigned-32 (Bytes 15-18 are valid, 11-14 and 19-24 are reserved) 5 – Packed (Bytes 19-24 are valid, 11-18 are reserved)
11-14	Float	Float Value
15-18	Unsigned-32	Integer Value
19-24	Packed	String Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.26 Command 176 Store Actual Process Value

Command 176 takes a sample of the actual process value and stores it for later correction. This is step 1 of the product calibration.

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)

Response Data Bytes

Byte	Format	Description
0	Enum	(=0)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

5.27 Command 177 Read Stored Process Value

Reads the process value stored with Command 176. It returns NaN (not a number) if no value has been stored.

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)

Response Data Bytes

Byte	Format	Description
0	Enum	(=0)
1	Enum	Unit Code: 66 – mS/cm
2-5	Float	Stored value or NaN

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.28 Command 178 Write Calibration Reference Value

This is step 2 of the product calibration.

For the pass/fail result of the product calibration see Command 192.

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)
1	Enum	(=0)
2-5	Float	Reference value [mS/cm]

Response Data Bytes

Byte	Format	Description
0	Enum	(=0)
1	Enum	(=0)
2-5	Float	Reference value [mS/cm]

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.29 Command 179 Read Cell Factor

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)

Response Data Bytes

Byte	Format	Description
0	Enum	(=0)
1	Unsigned-8	Result of the last calibration (manual or via HART), Sensoface: 0 – Good 1 – Medium 2 – Bad 3 – Unknown
2	Unsigned-8	Cell Factor Units Code (=244, 1/cm)
3-6	Float	Cell Factor Value
7	Unsigned-8	reserved

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.30 Command 180 Write Active Parset

The parameter set can only be switched in Parset Mode MAN (see Command 181).

Request Data Bytes

Byte	Format	Description
0	Enum	Parset selection: 0 – Parset A 1 – Parset B

Response Data Bytes

Byte	Format	Description
0	Enum	Parset selection (Coding see Request)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
16	Error	Access Restricted

5.31 Command 181 Read Parset Mode

Request Data Bytes

Byte	Format	Description
		none

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0	Enum	Parset Mode: 0 – CNTR Input A/B 1 – MAN A/B 2 – FIX A	PAR:

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.32 Command 182 Write Parset Mode

Request Data Bytes

Byte	Format	Description
0		Same as Response of Command 181

Response Data Bytes

Byte	Format	Description
0		Same as Response of Command 181

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.33 Command 183 Read Device Tag

Request Data Bytes

Byte	Format	Description
		None

Response Data Bytes

Byte	Format	Description	Parameter Name on Display
0-31	Latin-1	Device Tag	TAG:

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.34 Command 184 Write Device Tag

Request Data Bytes

Byte	Format	Description
0-31		Same as Response of Command 183

Response Data Bytes

Byte	Format	Description
0-31		Same as Response of Command 183

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
16	Error	Access Restricted

5.35 Command 185 Read Sensor Identification

Request Data Bytes

Byte	Format	Description
0	Enum	Info Request Selector: 0 – Sensortype 1 – Manufacturer 2 – Sensorname 3 – Serialnumber 4 – Date of latest calibration

Response Data Bytes

Byte	Format	Description
0	Enum	Info Request Selector (Coding see Request)
1	Enum	Sensor Connection State: 0 – disconnected 1 – connected
2..17	Latin-1	Requested Information

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.36 Command 186 Read Unit Code

Request Data Bytes

Byte	Format	Description
0	Enum	Parset and analog channel selection: 0 – OUT1, Parset A 1 – OUT1, Parset B 2 – OUT2, Parset A 3 – OUT2, Parset B

Response Data Bytes

Byte	Format	Description
0	Enum	Parset and analog channel selection (Coding see Request)
1	Unsigned-8	Units Code (Coding see 2.1)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.37 Command 187 Read Version Info

Request Data Bytes

Byte	Format	Description
0	Enum	Info Request Selector: 0 – Device: Software Version 1 – Device: Hardware Version 2 – Device: Serialnumber 4 – HART IF: Software Version 7 – Meas Unit: Software Version 8 – Meas Unit: Hardware Version 9 – Meas Unit: Serialnumber 15 – Device: Type

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Info Request Selector (Coding see Request)
1-24	Latin-1	Requested Information

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.38 Command 188 Read Calibration Values

Request Data Bytes

Byte	Format	Description
0	Enum	Info Request Selector: 0 – Cell Factor [1/cm]

Response Data Bytes

Byte	Format	Description
0	Enum	Info Request Selector (Coding see Request)
1	Enum	Unit Codes: 244 – 1/cm
2-5	Float	Calibration Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.39 Command 189 Read Process Values

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Info Request Selector: 0 – Resistance of Temperature Sensor [Ohm] 1 – Temperature [°C] or [°F] 2 – Resistance of Conductivity Sensor [Ohm] 3 – Conductance [uS] 4 – Conductivity temp. comp. [mS/cm] 5 – Current Input [mA] 6 – Flow [l/h]

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Info Request Selector (Coding see Request)
1	Enum	Unit Codes: 32 – °C 33 – °F 37 – Ohm 39 – mA 56 – uS 66 – mS/cm 138– l/h
2-5	Float	Process Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.40 Command 190 Read Digital Sensor Information

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Value Request Selector: 0 – Operation time 1 – CIP counter 2 – SIP counter

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Value Request Selector (Coding see Request)
1	Enum	Unit Codes: 53 – d 52 – h 57 – % 251– none
2-5	Float	Requested value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.41 Command 191 Read Last Calibration Date

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0..7	Latin-1	Date of latest calibration (Format „dd.mm.yy“)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.42 Command 192 Read Product Calibration Success

Request Data Bytes

Byte	Format	Description
0	Enum	(=0)

Response Data Bytes

Byte	Format	Description
0	Enum	(=0)
1	Unsigned-8	Result of Latest Product Calibration done via HART 0 – Success 1 – Fail 2 – Busy (result not yet available)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

5.43 Command 193 Write TV and QV Assignment

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Tertiary Variable
1	Unsigned-8	Device Variable assigned to the Quaternary Variable

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Tertiary Variable
1	Unsigned-8	Device Variable assigned to the Quaternary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

16	Error	Access Restricted