

# **HART® 7.x Field Device Specification for Honeywell SLG 700 SmartLine Level Transmitter**

**34-SL-00-03**

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# 1 Introduction

## **1.1 *Scope***

The Honeywell SmartLine Level Transmitter (SLG 700), device complies with 7.x version of the HART protocol Revision 7.x. This document specifies all the device specific features and provides HART protocol implementation details. The functionality of this field device is described sufficiently to allow its proper application in a process and to demonstrate its complete support in HART capable host applications.

## **1.2 *Purpose***

This specification is designed to complement other documentation by providing a complete, unambiguous description of this field device from a HART communication perspective.

## **1.3 *Who should use this document?***

The specification is designed to be a technical reference for HART capable host application developers, system integrators and knowledgeable end users. It also provides functional specifications (e.g., commands, enumerations and performance requirements) used during field device development, maintenance and testing. This document assumes the reader is familiar with HART protocol requirements and terminology.

## 1.4 Abbreviations and definitions

ADC	Analog to Digital Converter
DAC	Digital to Analog Converter
EEPROM	Electrically-Erasable Programmable Read-Only Memory
Enum	Enumerated Type (1 byte)
Float	An IEEE 754 single precision floating point value (4 bytes)
Latin-1	A string using the 8-bit ISO Latin-1 character set. Latin-1 strings are padded out with zeroes.
MSG	Model Selection Guide
Packed	A string consisting of 6-bit alpha-numeric characters that are a subset of the ASCII character set. This allows four characters to be packed into three bytes.
PV	Primary Variable
ROM	Read-Only Memory
SV	Secondary Variable
TV	Tertiary Variable
QV	Quaternary Variable
SLG700	SmartLine Guided Wave Radar Level Transmitter
Signed-nn	A signed integer where nn indicates the number of bits in this integer. Multi-byte integers are transmitted MSB-LSB.
Unsigned-nn	An unsigned integer where nn indicates the number of bits in this integer. Multi-byte integers are transmitted MSB-LSB.

**Table 1: Abbreviation and Definitions**

## 1.5 References

HART Field Communications Protocol Specification. HCF\_SPEC-12, Rev 7.4, dated 29 June 2012

## 2 Device Identification

<b>Manufacturer Name:</b>	Honeywell	<b>Model Name(s):</b>	SLG720, SLG722
<b>Manufacture ID Code:</b>	23 (17 Hex)	<b>Device Type Code:</b>	38 (26 Hex)
<b>HART Protocol Revision</b>	7.x	<b>Device Revision:</b>	4
<b>Number of Device Variables</b>	15		
<b>Physical Layers Supported</b>	FSK		
<b>Physical Device Category</b>	Transmitter, Non-DC-isolated Bus Device		

**Table 2: Device Identification**

The Honeywell SLG 700 is designed to meet hazardous area approvals. Refer to the user manual on the available methods of protections for use in hazardous locations.

## 3 Product Overview

### 3.1 Transmitter

The SLG 700 SmartLine Level Transmitter measures the process level and transmits an output signal proportional to the measured variable over a 4 to 20 milliampere, two-wire loop. A diagrammatic representation of the SLG 700 is shown in Figure 1.

The SLG 700 SmartLine Level Transmitter can transmit its output in an analog 4 to 20 milliampere format. Besides the process variable (PV) output, the transmitter also provides different types of device variables, as mentioned in Table 5.

The handheld device communicates with the transmitter via the HART interface.

Note that multiple mounting configurations are possible and are fully described in the SLG 700 Installation and User Manuals.



Figure 1: Typical Communication Interface

### 3.2 Communicator Purpose

The communicator allows the user to adjust transmitter values, or diagnose potential problems from a remote location such as the control room. The communicator can be used to:

Configure: Define and enter the transmitter's operating parameters.

Monitor: Read the input Level in engineering units and the transmitter's output in mA or percent.

Display: Retrieve and display data from the transmitter or the communicator's memory.

Change Mode of Operation: Select configuration for multi-drop mode (digital) or loop current enabled (analog) operation.

Check current output: Use the transmitter to supply the output current desired for verifying analog loop operation, troubleshooting, or calibrating other components in the analog loop.

Troubleshoot: Check status of transmitter operation and display diagnostic messages to identify transmitter, communication, or operator error problems.

## 4 Product Interfaces

### 4.1 Process Interface

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range.

### 4.2 Host Interface

Analog Output 1: Process Level

The transmitter is powered via the 2 wire, 4-20 mA signal connected to the + and - terminals on the output side of the module.

This is the only output from this transmitter, representing the process measurement (Level/Distance/Volume, etc). The data is Linearized across lower and upper range values held in the non-volatile memory.

HART communication is supported on this loop. A guaranteed linear over-range is provided. Downscale or upscale current can indicate device malfunction. The direction is selectable by the user through the hardware jumper. User can also select the analog output saturation range using HART commands (i.e. software selectable).

Refer to Section 4.3.

Current values are shown in the following table.

**Table 3: Analog Output Values**

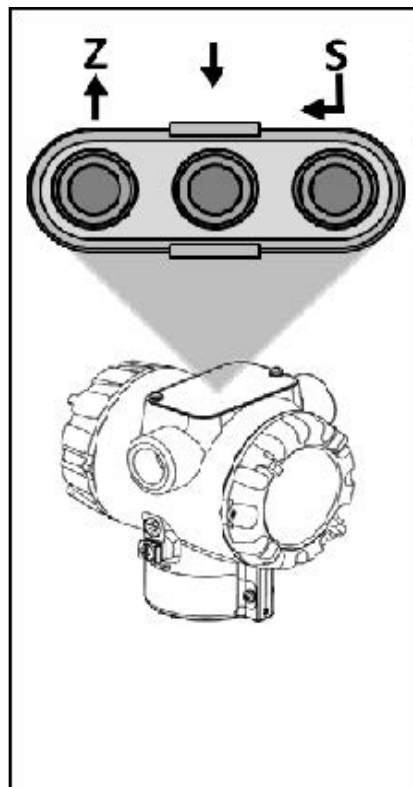
	Direction		Values (% of range)	Values (mA or V)
Linear over-range*	Classic	Down	-1.25 % $\pm$ 0.1 %	3.8 to 4.0 mA 0.95 to 1.0 V
		Up	105.0 % $\pm$ 0.1 %	20.0 to 20.8 mA 5.0 to 5.2 V
	NAMUR	Down	-1.25 % to $\pm$ 0.1 %	3.8 to 4.0 mA 0.95 to 1.0 V
		Up	103.125 % $\pm$ 0.1 %	20.0 to 20.5 mA 5.0 to 5.125 V
Device malfunction indication	Down: less than		- 1.25 %	3.58 mA
	Up: greater than		+ 105 %	21 mA
Maximum current			+111.25%	21.8 mA
Multi-Drop current draw **				4.0 mA
Lift-off voltage **				14.0 V

\* Honeywell will offer the SLG 700 SmartLine Level Transmitter with NAMUR compliant analog outputs, in addition to the "Classic" levels traditionally featured in the product.

\*\* When configured for multi-drop, the SLG700 requires a minimum startup current of 17mA and a minimum terminal voltage of 11V during startup. After this initial startup period (approximately 0.5 seconds), the loop current will be fixed at 4mA, and the minimum terminal voltage is 14V.

### 4.3 *Local Interfaces, Jumpers and Switches*

The SLG 700 SmartLine Level Transmitter three-button option provides a user interface and operation without the use of the MC Toolkit. Figure 2 shows the location of the three-button option and the labels for each button.

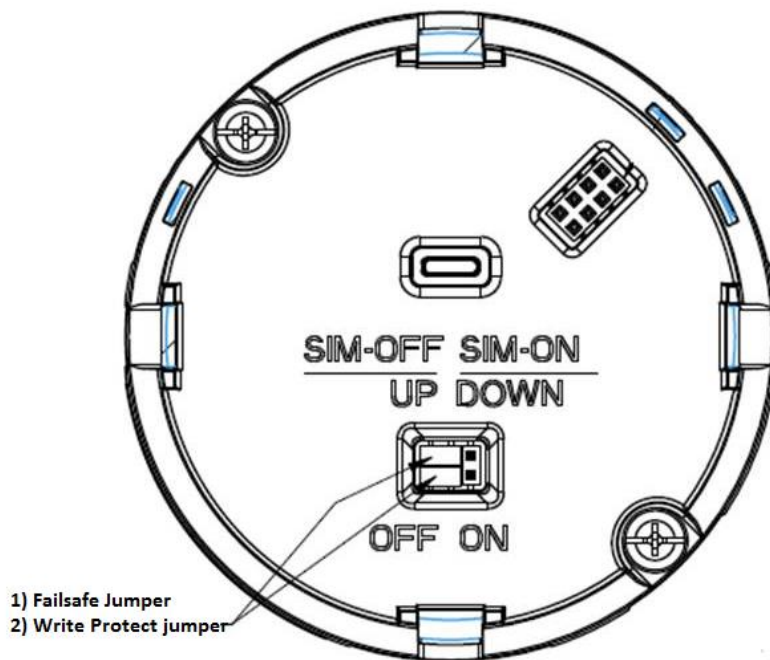


**Figure 2: Three-Button Option**

The functions of the three buttons are:

- Enter (S←)
  - Enter the top level main menu from the normal PV display mode
  - Select a target to go down to the next menu level, up to the previous level or exit back to the PV display mode
  - Accept the current value of an entered parameter

- Down (↓)
  - Advance to the next configured screen when in the normal PV display mode
  - Scroll down to the next item in a menu
  - Advance through a list of parameters for configuration
  - Advance through numerical values or alpha characters for data entry
- Up (↑)
  - Go back to the previous configured screen when in the normal PV display mode
  - Scroll up to the previous item in a menu
  - Go back through a list of parameters for configuration
  - Go back through numerical values or alpha characters for data entry



**Figure 3: Locating the Failsafe Jumper**



### 4.3.1 Device Malfunction

The direction of indication of a detected malfunction by the analog current output is user-selectable to up or down, by means of a two-position jumper inside the instrument. SLG 700 SmartLine Level Transmitters are shipped with a default failsafe direction of upscale. This means that the transmitter's output will be driven upscale (maximum output) when the transmitter detects a critical status.

### 4.3.2 Write Protection

The SLG 700 transmitters have a transmitter security option, also known as a "write protect option," which is jumper-selectable. The jumper, located on the transmitter's printed wiring assembly (PWA), can be positioned to allow read and write access or read only access to the transmitter's configuration database. When the jumper is in the read only position, the transmitter's configuration and calibration data can only be read / viewed. The factory-default jumper positions are for read and write access. The figure above shows the location of the write protect jumper on the PWA. The Write Protect hardware Jumper is placed behind the Display PWA. For accessing the hardware write protect jumper, the Display PWA needs to be removed. Software write protection is also available. Refer to the Common Practice command 175 and command 176. When the Device is in Hardware write protect (Jumper) then the software write protect functionality is inoperative.

#### 4.4 *Meter Display Options*

The SLG 700 Level Transmitter offers an Advanced Display. See Table 44 for additional details.

<b>Advanced Display</b>	<p>360° rotation in 90° increments</p> <p>Three (3) configurable screen formats with configurable rotation timing:</p> <ul style="list-style-type: none"><li>• Large process variable (PV)</li><li>• Small PV with bar graph</li><li>• Small PV with trend (1-999 hours, configurable)</li></ul> <p>Eight (8) screens 3-30 seconds rotation timing</p> <p>Standard and custom engineering units</p> <p>Diagnostic alerts and diagnostic messaging</p> <p>Multiple language support:</p> <ul style="list-style-type: none"><li>• English</li><li>• French</li><li>• German</li><li>• Spanish</li><li>• Russian</li><li>• Chinese</li><li>• Japanese</li><li>• Turkish</li><li>• Italian</li></ul> <p>Out-of-range indication</p> <p>Supports 3-button configuration, transmitter messaging, and maintenance mode indications</p>
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**Table 4: Available Display Characteristics**

## 5 Device Variables

The SLG 700 Device supports 15 device variables, based on measured product types, which are listed below in Table 5.

**Table 5: List of Device Variables**

<b>Table Serial Number</b>	<b>Device Variables</b>	<b>Device Variable code</b>	<b>Supported Units</b>
1	Product Level	0	ft, in, m, cm, mm
2	Product Level %	1	%
3	Distance to Product	2	ft, in, m, cm, mm
4	Product Level rate	3	ft/s, m/s, in/min, m/h, ft/min, in/sec
5	Product Volume	4	ft3, in3, US gal, Imp gal, barrels, yd3, m3, liters, bbl liq
6	Vapor Thickness	5	ft, in, m, cm, mm
7	Vapor Thickness %	6	%
8	Vapor Volume	7	ft3, in3, US gal, Imp gal, barrels, yd3, m3, liters, bbl liq
9	Interface Level	8	ft, in, m, cm, mm
10	Interface Level %	9	%
11	Distance To Interface	10	ft, in, m, cm, mm
12	Interface Level Rate	11	ft/s, m/s, in/min, m/h, ft/min, in/sec
13	Upper Product Thickness	12	ft, in, m, cm, mm
14	Lower Product Volume	13	ft3, in3, US gal, Imp gal, barrels, yd3, m3, liters, bbl liq
15	Upper Product Volume	14	ft3, in3, US gal, Imp gal, barrels, yd3, m3, liters, bbl liq

## 6 Dynamic Variables

The four (4) Dynamic Variables are implemented and any one of the device variables can be assigned to any of the dynamic variables.

**Table 6: List of Dynamic Variables**

<b>Process Variable</b>	<b>Meaning</b>	<b>Units</b>
<b>PV</b>	Any one from table 5	Refer to Table 5
<b>SV</b>	Any one from table 5	Refer to Table 5
<b>TV</b>	Any one from table 5	Refer to Table 5
<b>QV</b>	Any one from table 5	Refer to Table 5

## 7 Status Information

### 7.1 Field Device Status

Many of the flags in the device status are further described by critical, non-critical, and informative flags in the additional status bytes described in section 0.

**Table 7: Field Device Status**

Bit	Name	Use
7	Device Malfunction	This flag is set to "1" when any critical failure is detected. When a "Device Malfunction" is indicated, the "More Status Available" status flag is always asserted and further information is available in the manufacturer specific status bytes. The designation for critical status, and Honeywell's unique status bytes are described in Section 0.
6	Configuration Changed	Set when any parameter in the device configuration is changed. The flag is reset only if the Configuration Changed Counter in the Command 38 request matches the transmitter's current value.
5	Cold Start	Set when power is first applied. The flag will also be set when the device is reset.
4	More Status Available	Set whenever any failure is detected. Command #48 gives further detail (see Section 0).
3	Loop Current Fixed	Set when the device is placed in fixed current mode (command 40).
2	Loop Current Saturated	Set if the primary variable is out of range. The measurement limits differ between the "classic" and "NAMUR" output options. This event does <i>not</i> set bit 7 ("Field Device Malfunction").
1	Non-Primary Variable Out Of Limits	Set if the device variables other than the one selected or mapped as PV are out of Limits. When this status is asserted, the "More Status Available" flag is also set.
0	Primary Variable Out of Limits	Set if the PV is greater than the Upper Range Limit (UTL) or Lower Range Limit (LTL) of the device. When this status is asserted, the "More Status Available" flag is also set, and the specific failure is indicated as PV Out of Range (see Section 0)

## 7.2 *Extended Device Status*

The Extended Device Status byte has the following flags:

**Table 8: Extended Device Status**

Bit	Description	Use in Device
0	Maintenance Required	Not Used
1	Device Variable Alert	Set when a critical or non-critical error (except “In Fixed Output Current Mode”) associated with the PV has been detected (see Section 0)
2-7	Undefined	

### 7.3 **Command #48 – Additional Field Device Status**

Command #48 returns 9 bytes of data. The first 6 bytes contain device specific status as shown below. The Extended Device Status byte (byte 6) will be returned as defined in section 7.2. All other bytes are unused, and will be returned as 0.

The 6 detailed status bytes are divided by category of the status: critical error and non-critical error.

**Table 9: Additional Field Device Status**

Status Type	Bit	Command 48 Status
Critical status (Byte 0)	7	Unused
	6	Reset Required
	5	Measurement Failure
	4	Sensor Communication Timeout
	3	Sensor Critical Failure
	2	Comm Module Critical Failure 2
	1	Device Configuration Failure
	0	Comm Module Critical Failure 1
Non-critical status 1 (Byte 1)	7	No DAC Compensation
	6	Unreliable sensor communication
	5	PV Out of Range
	4	Fixed Current Mode
	3	Low Supply Voltage (DAC)
	2	Sensor Failure
	1	Electronic Module Comm Failure
	0	Display Failure

Non-critical status 2 (Byte 2)	7	Transmitter in Startup Mode
	6	Device Variable Out of Range
	5	Tamper Alarm
	4	Sensor in Sleep Mode due to Configuration Change
	3	Loop current noise (DAC Not able to regulate loop current)
	2	AO Out of Range
	1	URV Set Error - Span Config Button
	0	LRV Set Error - Zero Config Button
Non-critical status 3 (Byte 3)	7	Unused
	6	Interface Rate of Change Exceeded
	5	Surface Rate of Change Exceeded
	4	Field Background Load error
	3	Sensor Not Calibrated
	2	Sensor Not Characterized
	1	Field Background Not Compatible
	0	Field Background Not Set
Non-critical status 4 (Byte 4)	7	Unused
	6	Unused
	5	Unused
	4	Unused
	3	Interface in Blocking Distance Low Zone
	2	Interface in Blocking Distance High Zone
	1	Surface in Blocking Distance Low Zone
	0	Surface in Blocking Distance High Zone



Non-Critical status 5 (Byte 5)	7	Invalid reference plane offset
	6	Unused
	5	Unused
	4	Unused
	3	Unused
	2	Low DC application is not licensed
	1	Saturated Steam application is not licensed
	0	Interface measurement is not licensed

All critical faults will be indicated to the user with bits 4 and 7 set in the Field Device Status byte of the response.

Some faults are cleared when the error condition is resolved, while all Critical Status faults require the device be power cycled.

## 8 Universal Commands

The transmitter supports version 7.x of the HART protocol, thus each universal command is as specified in that standard. The following universal commands are provided by the device:

**Table 10: Universal Commands**

Number	Name	Notes
0	Read Unique Identifier	Returns unique identification for the device
1	Read Primary Variable	Returns PV value and its unit
2	Read Loop Current and Percent of Range	Returns AO value and % range
3	Read Dynamic Variables and Loop Current	Returns PV and SV, TV, QV values and corresponding unit values along with AO value
6	Write Polling Address	Changes device's polling address and loop current mode.
7	Read Loop Configuration	Returns polling address and loop current mode status.
8	Read Dynamic Variable Classifications	Returns dynamic variable classification.
9	Read Device Variables with Status	Returns dynamic variables PV, SV, TV & QV with status.
11	Read Unique Identifier Associated With Tag	Same response as command 0
12	Read Message	Returns 24 bytes of packed ASCII data
13	Read Tag, Descriptor, Date	Returns tag, descriptor (packed ASCII format) and date from the device
14	Read Primary Variable Transducer Information	Returns transducer limits and span
15	Read Device Information	Returns burnout settings, PV unit value, LRV, URV, damping value and write protect code
16	Read Final Assembly Number	Returns final assembly number
17	Write Message	Write 24 bytes of packed ASCII data.
18	Write Tag, Descriptor, Date	Writes tag, descriptor (packed ASCII format) and date to the device
19	Write Final Assembly Number	Writes final assembly number to the device
20	Read Long Tag	Returns 32-byte Long Tag.
21	Read Unique Identifier	Returns unique identifier associated with the Long Tag.
22	Write Long Tag	Writes the Long Tag
38	Reset Configuration Changed Flag	Resets the configuration change flag
48	Read Additional Device Status	Returns Critical and Non critical fault status

## 9 Common-Practice Commands

The following common-practice commands are implemented:

**Table 11: Common Practice Commands**

Number	Name	Notes
33	Read Device Variables	Will return Device Variable 0 = PV (Media Level), Device Variable 1 = SV (?), Device Variable 2 = TV (?) and Device Variable 3 = QV (?) when requested. The response is similar to command 9.
34	Write PV Damping Value	Accepts damping values between 0 and 60 seconds.
35	Write PV Range Values	Write PV LRV/URV values
36	Set PV Upper Range Value	Set current PV as URV. Adjusts the span accordingly.
37	Set PV Lower Range Value	Set current PV as LRV. Adjusts the span accordingly.
40	Enter/Exit Fixed Current Mode	Sets loop current to a fixed value or return to the normal mode (follows PV value)
42	Perform Device Reset	Resets the device
45	Trim Loop Current Zero	Trims loop current to 4mA
46	Trim Loop Current Gain	Trims loop current to 20mA
50	Read dynamic device variable assignment	Read device variable assignment
51	Write dynamic device variable assignment	Write device variable assignment
71	Lock Device	This command locks a device preventing any changes being made from a local panel or from another master.
76	Read Lock Device status	This command reads the current state of lock device.
106	Flush delayed Responses	This command clears all pending delayed responses for all the master that issues the command.

## 10 Device-Specific Commands

The following device-specific commands are implemented:

Number	Name	Notes
134	Read Transmitter Device Type Code and Display Information	This command reads the transmitter device type code and the local display module information.
135	Reset NVRAM alarm	This command resets the NVRAM corrupt alarms
136	Probe Length Calibration	Automatically measure length of the probe and update configuration.
138	Write License Key	Program license key to sensor non-volatile memory for enabling licensed options.
139	Read Licensed Options	Read currently licensed options programmed to the transmitter.
140	Calibrate Steam Reference Probe	Start, check status or cancel steam reference probe calibration operation.
141	Capture Field Background	This command supports starting, checking the status and cancelling the field background operation.
142	Read Sensor and Communication modules software/firmware details.	This command reads the Sensor and Communication modules software/firmware revision details.
143	Initialize Echo Curve Capture	This command configures the Start and End distance with resolution for the Echo curve capture.
144	Apply the configuration changes	This command enables sensor to use recently configured parameters for level measurement.
145	Read Product Characteristics	This command reads Product (Upper Product), Vapor and Lower Product Dielectric Constants and Attenuation parameters respectively.

146	Write Dielectric Constants	This command writes Product (Upper), Lower product and Vapor Dielectric Constants.  Range is 1 – 100 for all.
147	Write Mounting Settings	This command writes mounting type, height, diameter and mounting angle.
148	Write Probe Settings	This command is used to write Probe type, Probe End Type, Probe Grounded, Probe Material, Probe Diameter, Centering Disk Type, Centering Disk Diameter, Probe Propagation Factor and Steam Reference Probe Type.
149	Reads Mounting Settings	This command reads Mounting Type, Connection type, Length unit Code, Mounting Height, Mounting Diameter, and Mounting Angle.
150	Reads MCU Supply Voltage, MCU_ASIC Sensor Temperature.	This command reads MCU Supply Voltage and temperature of sensor module.
151	Write transmitter install date to sensor	This command writes the transmitter install date to the sensor.
152	Writes Ideal Tank Dimensions and Shape	This command writes ideal tank dimensions and ideal tank shape.  Ideal tank dimension has four fields. Each field is of type float with size of 4 bytes.
153	Reads Interface Level values	This command reads the Interface Length unit code, Measured Media Interface level and Interface Level (Linearized).
154	Writes Application Type (Measured Product)	This command writes Application Type (Measured Products type).
155	Read Amplitude Tracking Selection	This command read the amplitude tracking option
156	Write Amplitude Tracking Selection	This command select the amplitude tracking option
157	Read cyclic time statistics	This command reads sensor update rate statistics

158	Reset cyclic time statistics	This command resets the cyclic time statistics
159	Read Application Type (Measured Product)	This command reads currently configured Application Type (Measured Product).
160	Read Volume strapping table data	<p>This command reads strapping table data for Volume.</p> <p>The user can read maximum of 7 entries at one time. The response data contains two float values (Level &amp; Volume) associated with one entry.</p> <p>Range for Start Point Index/ Entry is 0 to 49.</p>
161	Read Echo Init parameters	This command reads Start distance, End distance, resolution, unit code and number of valid echo data samples
162	Read Power Fail Information	This command reads Power fail count & its timestamp. Timestamp is in seconds.
163	Read Echo Data	This command reads the Echo data captured in the range configured in command 143
164	Write Volume Calculation Type	<p>This Command Writes volume calculation type. Volume calculation:</p> <p>0 = None</p> <p>1 = Ideal Tank shape Calculation</p> <p>2 = Strapping table calculation</p>
165	Restore to Factory Defaults	This command restores the device configuration to the factory default configuration
166	Read Status Bar Information	This command reads the device variable values and status.
167	Read Dashboard Information	This command reads the additional device variables and status.

168	Read Process Connector and steam reference Correlation Algorithm Reflection Model Parameters	This command reads the correlation algorithm reflection model parameter corresponding to the process connector and steam reference.
169	Reads Correlation Algorithm Reflection Model Parameters	This command reads correlation algorithm reflection model parameters corresponding to Reference, Surface, Interface, Process Connector and End of Probe.
170	Writes Correlation Algorithm Reflection Model Parameters	This command writes the correlation algorithm reflection model parameters corresponding to Reference, Surface, Interface, Process Connector End of Probe and Steam Reference.
171	Read Volume Strapping table size	This command reads the maximum volume strapping table size used to derive volume
172	Calibrate Volume Strapping Table Entry	This command calibrates volume strapping table based on current measurement.
173	Write Dry Calibration Strapping table Data	This command writes volume strapping table data (Dry Calibration). The user has to enter 7 entries at one time. The response data contains two float values (Level & Volume) associated with one entry. Range for the Start index is 0-49
174	Write Volume Strapping table size	This command writes Volume Strapping table size.  The range is 2 to 50
175	Read/Lock Write Protect Configuration	This command is used to read software Write Protect Status and also lock the device to prevent configuration change.
176	Write/Change Write Protect Password	This command is used to Change the software write Protect mode (prevent configuration change) and also set (or change) write protect password.

177	Reads Volume Settings	<p>This command reads the Volume calculation type, Volume unit code and volume offset.</p> <p>The range for Volume calculation type is:</p> <p>0 = None 1 = Ideal 2 = Strapping Table</p>
178	Writes Volume Offset	<p>This command writes the Volume Offset.</p> <p>Limits for writing volume offset are -2000 to +2000</p>
179	Select Model Number	<p>This command write Model Number to the device</p>
180	Writes Echo lost timeout	<p>This command sets the relative timeout to be considered by the device to consider a lost echo as a fault.</p>
181	Writes blocking distance operation mode	<p>This command writes the PV alarm code when the distance is in the blocking zones.</p>
182	Reads blocking distance modes	<p>This command reads PV alarm code selected when distance is in blocking zones.</p>
183	Read Defaults Units	<p>This command reads the unit code of the device variables</p>
184	Write Defaults Units	<p>This command writes the units of device variables.(Level, Temperature, Level Rate,Volume)</p>
185	Write level calibration time stamp	<p>This command writes the Time &amp; date of level calibration.</p>
186	Write Volume calibration time stamp	<p>This command write the Time stamp (Date &amp; Time) for Volume calibration.</p>
187	Read Tank shape	<p>Reads the ideal tank shape.</p>
188	Read Transmitters configuration mode & validation	<p>Command Reads Transmitter Configuration Mode and Transmitter Configuration Validation, applicable only to the DTM.</p>
189	Read Transmitter Diagnostics	<p>This command reads time in service, percent time in stress and service life remaining for the transmitter.</p>



190	Read Comm. Board ET Upper Tracking Parameters.	This command reads ET value, ET max limit, ET max value, Max time counter and max time stamp(In seconds).
191	Read Comm. Board ET Lower Tracking Parameters	This command reads ET min limit, min value, min time counter, min time stamp (In seconds).
192	Read Loop Voltage Data	This command reads Loop Voltage Current value, Loop Voltage min value, Loop Voltage min time stamp and MSP VCC Voltage.
193	Reset min terminal voltage and its time stamp	This command Resets min terminal voltage and its time stamp.
194	Read Database ID	This command provides a Database ID for the requested configuration history code.
195	Read Configuration history	This command provides a history of the last 5 Configuration changes.
196	Read error log part1	This command reads the information for 5 latest errors.
197	Reset error log	This command initializes the error log data to zeros.
198	Read error logging status	This command reads the error logging status.
199	Write error logging status	This command configures the error logging status.
200	Read Tank Settings	<p>This command reads the following tank configurations:</p> <ul style="list-style-type: none"> <li>• Tank Shape</li> <li>• Length unit code</li> <li>• Tank Diameter</li> <li>• Tank Length</li> <li>• Tank Width</li> <li>• Tank Height.</li> </ul>

201	Read Probe Settings	<p>This command reads the following:</p> <ul style="list-style-type: none"> <li>• Probe Type</li> <li>• Probe End Type</li> <li>• Probe Grounded</li> <li>• Probe Material</li> <li>• Probe Diameter</li> <li>• Centering Disk Type</li> <li>• Centering Disk Diameter</li> <li>• Probe Propagation Factor</li> <li>• Steam Reference Probe Type</li> </ul>
202	Read Comm board model key	Read Communication Board Model Key
203	Read Comm board model number I	Read Communication Board Model Number - Table I
204	Read Comm board model number II	Read Communication Board Model Number - Table II
205	Write AVT Validation	Writes AVT configuration validation
206	Read Model Number - Table I	This command reads the 7 byte key number and 20 byte Table I information
207	Read Model Number – Table II	This command reads Model number Table II information
208	Read Model Number –Table III	This command reads Model number Table III information
209	Read Transmitter install & Char. date	This command reads the transmitter install date & characterization date
210	Write Display General configuration	<p>This command displays common features such as:</p> <ul style="list-style-type: none"> <li>• Language</li> <li>• Rotation time</li> <li>• Password</li> <li>• Contrast</li> </ul>

211	Read Display General configuration	<p>This command reads the following:</p> <ul style="list-style-type: none"> <li>• Language</li> <li>• Rotation time</li> <li>• Password</li> <li>• Contrast</li> </ul>
212	Read Display Firmware Version	This command reads the Display Firmware Version.
213	Reads ASIC Calibration info	This command reads the ASIC Calibration Slope and Offset
214	Read Additional Stem Plot Data	Read reference plane distance and stem plot data for saturated steam application.
215	Reset PV tracking values	This command initializes the PV tracking values.
216	Write PV high and low alarm limits	This command configures the PV high and low alarm limits.
217	Read PV tracking values	This command reads the Primary Variable tracking values.
220	Read additional status	This command reads the additional status.
221	Write NAMUR Selection	This command is used to write NAMUR enable or disable.
222	Read NAMUR Selection	This command is used to read the NAMUR selection.
223	Read error log part 2	This command reads the information for the last 5 errors.
224	Write/Configure Basic Level Calibration	This command configures the sensor height, maximum product height and Level offset.
225	Reads Basic Level Calibration	This command reads sensor height, Measured Product height and Level Offset.
226	Reads Echo stem plot data	This command reads the Echo stem plot data.
227	Writes Attenuation parameters	<p>This command configures the Media Attenuation, Interface Attenuation, and Vapor Attenuation.</p> <p>Range is 0.0 to 1.0.</p>

228	Read maintenance flag	Reads the status of the “Available for Maintenance” flag.
229	Write maintenance flag	This command writes the maintenance flag.
230	Read tamper alarm settings	This command reads tamper alarm settings. It reads Tamper mode, Tamper latency in seconds, Maximum allowable Tamper Attempts and Tamper attempts recorded so far.
231	Write Tamper alarm settings	This command writes Tamper mode, Tamper latency in seconds and Maximum allowable Tamper Attempts.
232	Reset executed attempts counter	This command resets the tamper attempt count.
64768	Write Display View configuration I	This command writes part 1 of display screen configuration.
64769	Write Display View configuration II	This command writes part 2 of display screen configuration.
64770	Write Display View configuration III	This command writes part 3 of display screen configuration.
64771	Read Display View configuration I	This command reads display screen configuration part 1.
64772	Read Display View configuration II	This command reads display screen configuration part 2.
64773	Read Display View configuration III	This command reads display screen configuration part 3.
64775	Reads Sensor Device Information	This command reads device information which includes the sensor technology, process connection and MOC of Seal and Probe.
64779	Reads Level family internal variable values	This function reads Length unit Code, Measured Level value, Distance to Level value, Distance to Interface value.
64780	Write Calibration offset	This command writes Calibration offset parameter.

64781	Read Sensor Offsets	This command read calibration offset, reference plane offset, process connector offset and steam reference plane offset.
64783	Reads Distance settings values	This command reads the Probe Length and blocking distance settings in Length units. Blocking distance settings include blocking distance High & Low limits.
64784	Read Device Variable Limits	This command reads device Variable Limits.
64787	Write Tank Material	This command writes the Tank Material parameter.
64788	Read Tank Material	This command reads the Tank Material parameter.
64789	Writes blocking distance settings	This function writes the distance settings blocking. Range of Blocking distance value is 0.0 to 1.0.Default Blocking distance value: 0.3.
64790	Writes probe length	This command is used to write the probe length.
64792	Calibrate Level Linearization Table	<p>This command is used to calibrate level linearization table based on current measurement. The user has to enter the index of the calibration points and the device adjustable level to perform wet calibration.</p> <p>If the calibration points in use are less than the user entered calibration index, it will be an invalid selection.</p>
64794	Writes Level Linearization Table	This command is used for writing linearization table (Dry calibration). User will enter both Device measured level and Device Adjustable level to update the table. User has to enter seven entries in one attempt.
64796	Writes Level Linearization Table Size	This command is used for writing linearization table size. The user can write a maximum of 32 calibration points.
64797	Reads Level Calibration points in use	This command is used for reading calibration points in use.

64798	Reads Level Calibration points	This command is used for reading calibration points. User has to enter calibration index in order to read calibration points from that index. User can read maximum 7 entries in one attempt. Valid calibration index is 0 – 31.
64799	Writes Level Calibration Enable/Disable	This command is used for writing calibration enable/disable.
64800	Reads Level Calibration Enable/Disable	This command is used for reading calibration points in use.
64803	Reset SV tracking values	This command initializes the SV tracking values.
64804	Write SV high and low alarm limits	This command configures the SV high and low alarm limits.
64805	Read SV tracking values	This command reads Secondary Variable tracking values.
64806	Read Level current calibration time stamp records	This command reads the current time stamp of Level calibration. Data format is same as used in the write command (Command 185).
64807	Read Level Previous calibration time stamp records	This command Reads the Level Previous calibration time stamp records.
64808	Read Level Last calibration time stamp records	This command Read Level Last calibration time stamp records
64809	Read Volume Current calibration time stamp records	This command Read Volume Current calibration time stamp records.
64810	Read Volume Previous calibration time stamp records	This command Read Volume Previous calibration time stamp records.

64811	Read Volume Last calibration time stamp records	This command Read Volume Last calibration time stamp records.
64812	Read Signal Strength and Quality	This command is used to read as Signal strength & signal quality.
64813	Read interface Signal strength & surface noise margin	This command is used to read the value of the interface Signal strength & surface noise margin.
64818	Write maximum filling emptying speed	This command writes the maximum filling emptying speed.
64819	Read maximum filling emptying speed	This command reads the maximum filling emptying speed.

Each device specific command is detailed below. Only the supported response codes are listed for a command.

## 10.1 Command #134: Read Transmitter Device Type Code and Display Information

The command reads the device type code and display module information like languages supported.

The Device type code for SLG 700 SmartLine Level Transmitter is 0x26

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Transmitter Device type code(SLG 700 = 0x26)
1	Enum	Meter/Display connected flag 00: Not Connected 01: Connected
2	Enum	Meter/Display type 00: Local display is not connected 01: Advanced display 02: Basic display
3	Enum	Language pack 00 : English (only for basic display type) 01 : Western languages ( for advanced display type , ) 02 : Eastern languages ( for advanced display type , )

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors



## 10.2 Command #135: Sensor and Comm NVRAM reset

The command resets the sensor or comm NVRAM corrupt alarm only if corresponding alarm is set.

Request Data Bytes:

Byte	Format	Description
0	Bits-8	Bit0: Reset Comm module Database corrupt Alarm Bit1: Reset Sensor Database corrupt Alarm

Response Data Bytes:

Byte	Format	Description
0	Bits-8	Bit0: Reset Comm module Database corrupt Alarm Bit1: Reset Sensor Database corrupt Alarm

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
32	Error	Busy
65	Error	Communication module NVM is not corrupted
66	Error	Sensor module NVM is not corrupted
75	Error	Error with sensor communication

### 10.3 Command #136: Probe length calibration

This Command support starting, checking the status and cancelling of probe length calibration operation.

Request Data Bytes:

Byte	Format	Description
0	Enum	Requested operation (Cancel = 0, Get Status = 1, Calibrate = 2 )

Response Data Bytes:

Byte	Format	Description
0	Enum	Calibration Status (0: Not Available (Calibrate command was not received by the sensor yet). 1: In Progress 2: Cancelled 3: Failed 4: Successful)
1	Unsigned 8	Calibration Progress 0: Set when calibration status is Not Available, Failed or Cancelled. 1-99: % completion when Calibration Status is In Progress. 100: Set when Calibration Status is Successful.
2	Unsigned 8	0x00: Calibration completed successfully without any error or warning. 0x01: Calibration cancelled by the user. 0x02: Calibration aborted because vapor compensation application is not configured. 0x04: Calibration aborted since reference reflection is not found. 0x08: Calibration aborted after multiple failed attempts. 0x10: Calibration failed due to non-volatile RAM write error.
3	Unsigned 8	Device variable unit
4-7	Float 4	Probe length calibrated.

#### 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 (Sensor is in low power mode or sensor communication timeout)
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Incompatible Device revision
66	Error	Reset required bit is set
67	Error	Invalid calibration command
75	Error	Error with sensor communication

## 10.4 Command #138: Write License Key

Program license key to sensor non-volatile RAM for enabling licensed options. This is a delayed response command that hosts need to poll to until completion.

Request Data Bytes:

Byte	Format	Description
0-3	Unsigned 32	Encrypted license key (8 digit number)

Response Data Bytes:

Byte	Format	Description
0-2	Bits-16	Decrypted licensed options bitmap. See command 139 for the definition of licensed options bitmap.

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 (Sensor is in low power mode or sensor communication timeout)
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
33	Error	DR Initiated
34	Error	DR Running
35	Error	DR Dead
65	Error	Incompatible Device revision
66	Error	Invalid License Key
67	Error	Licensed key write failed
68	Error	Write complete but error in reading updated licensed options
75	Error	Error with sensor communication

## 10.5 Command #139: Read Licensed Options

Read licensed options supported by the sensor.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-2	Bits-16	Licensed Option Bitmap Bit 0: Interface Measurement Bit 1: Saturated Steam Application Bit 2: Single Liquid Low DC

Command-Specific Response Codes:

Code	Class	Description
0	Success	No command specific errors
6	Error	Device specific command error (Sensor is in low power mode or sensor communication timeout)
65	Error	Incompatible Device revision

## 10.6 Command #140: Calibrate Steam Reference Probe

This Command support starting, checking the status and cancelling of Steam reference probe calibration operation.

Request Data Bytes:

Byte	Format	Description
0	Enum	Requested operation (Cancel = 0, Get Status = 1, Calibrate = 2 )

Response Data Bytes:

Byte	Format	Description
0	Enum	Calibration Status (0: Not Available (Calibrate command was not received by the sensor yet). 1: In Progress 2: Cancelled 3: Failed 4: Successful)
1	Unsigned 8	Calibration Progress 0: Set when calibration status is Not Available, Failed or Cancelled. 1-99: % completion when Calibration Status is In Progress. 100: Set when Calibration Status is Successful.
2	Unsigned 8	0x00: Calibration completed successfully without any error or warning. 0x01: Calibration cancelled by the user. 0x02: Calibration aborted because Saturated Steam application is not configured. 0x04: Calibration aborted since reference reflection is not found. 0x08: Calibration aborted after multiple failed attempts. 0x10: Calibration failed due to non-volatile RAM write error.
3	Unsigned 8	Device variable unit
4-7	Float 4	Steam Reference plane offset calibrated.

#### Command-Specific Response Codes:

Code	Class	Description
0	Success	No command specific errors
2	Error	Invalid selection (Invalid capture command)
5	Error	Too few data bytes received
6	Error	Device specific command error (Sensor is in low power mode or sensor communication timeout)
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Incompatible Device revision
66	Error	Reset required bit is set
67	Error	Invalid calibration command
75	Error	Error with sensor communication

## 10.7 Command #141: Capture Field Background

This command supports starting, status checks and cancelling the field background operation.

Request Data Bytes:

Byte	Format	Description
0	Enum	Requested operation (Cancel = 0, Get Status = 1, Capture = 2 )
1-4	Float 4	User specified Background length
5	Enum	User input type (Distance to surface = 0, Level = 1)
6	Enum	Background type (Field =1, Obstacle =2)

Response Data Bytes:

Byte	Format	Description
0	Enum	Capture Status (0: Not Available (Capture command was not received by the sensor yet). 1: In Progress 2: Cancelled 3: Failed 4: Successful)
1	Unsigned 8	Capture Progress 0: Set when capture status is Failed or Cancelled 1-99: % completion when capture status is In Progress. 100: Set when capture status is Successful.
2	Unsigned 8	0x00: Capture completed successfully without any error or warning. 0x01: Capture completed successfully but length had to be trimmed due to short probe length. 0x02: Capture completed successfully but length had to be trimmed due to background buffer size. 0x04: Capture completed successfully but a level peak was included in the background. 0x08: Capture cancelled by the user. 0x10: Capture aborted due to invalid configuration. 0x20: Capture aborted after multiple failed attempts. 0x40: Capture aborted since reference reflection is not found. 0x80: Capture failed due to non-volatile RAM write error.
3	Unsigned 8	Device variable unit
4-7	Float 4	Background length captured in meter.



Command-Specific Response Codes:

Code	Class	Description
0	Success	No command specific errors
2	Error	Invalid selection (Invalid capture command)
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 (Sensor is in low power mode or sensor communication timeout)
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Reset required bit is set
66	Error	Incorrect Capture Type
67	Error	Incorrect background type
68	Error	Background Length is out of limit
69	Error	Invalid input type
70	Error	No field background capture for steam reference application
75	Error	Error with sensor communication

## 10.8 Command #142: Read Firmware revision details

This command reads the Sensor and Communication module firmware revisions along with device database details.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-7	ASCII (Packed)	Sensor Module Firmware Revision
8-15	ASCII (Packed)	Communication Module Firmware Revision
16	Unsigned 8	Database version
17 – 24	ASCII (Packed)	Sensor Module Hardware Revision

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.9 Command#143: Initialize Echo Curve Capture

This command configures the Start and End distance with resolution for Echo curve capture.

Valid enumerations for Echo capture type are

0: Windowed

1: Full scan

2: Filtered (Processed)

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	Start Distance
4-7	Float 4	End Distance
8-11	Float 4	Resolution
12	Enum	Length unit code for start and end distances
13	Enum	Length unit code for Resolution
14	Enum	Echo capture type

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Start Distance
4-7	Float 4	End Distance
8-11	Float 4	Resolution
12	Enum	Length unit code for start and end distances
13	Enum	Length unit code for Resolution
14	Enum	Echo capture type
15	Unsigned 8	Number of Valid windows
16-19	Float 4	Start distance of window 1
20-21	Unsigned 16	Number of Data points in window 1
22-25	Float 4	Start distance of window 2
26-27	Unsigned 16	Number of Data points in window 2
28-31	Float 4	Start distance of window 3

32-33	Unsigned 16	Number of Data points in window 3
34-37	Float 4	Start distance of window 4
38-39	Unsigned 16	Number of Data points in window 4
40-43	Float 4	Start distance of window 5
44-45	Unsigned 16	Number of Data points in window 5

#### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes received
6	Error	Transmitter specific command error
2	Error	Invalid selection
32	Error	Busy
33	Error	DR Initiated
34	Error	DR Running
35	Error	DR Dead
65	Error	User terminated the echo curve reading
66	Error	Start distance is greater than end distance
67	Error	Echo init read failed
75	Error	Error with sensor communication

## 10.10 Command#144: Apply the configuration changes

This command drives the device to use new set of parameters configured for level measurement.

Whenever sensor specific configuration is changed like Probe length, DC value and algorithm parameters this command shall be used to enable sensor to use new parameters for level measurement.

Valid Enum is 3.

Request Data Bytes:

Byte	Format	Description
0	Enum	Apply configuration changes

Response Data Bytes:

Byte	Format	Description
0	Enum	Applied configuration changes

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes received
6	Error	Transmitter specific command error
2	Error	Invalid selection
32	Error	Busy
75	Error	Error with sensor communication

### 10.11 Command #145: Read Product Characteristics

This command reads Product DC, Vapor DC, lower product DC, Product Attenuation, Lower product Attenuation and Vapor Attenuation.

If saturated steam application is configured, vapor DC field will contain dynamic vapor DC calculated by the transmitter.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Product ( Upper ) DC
4-7	Float 4	Vapor DC
8-11	Float 4	Lower product DC
12-15	Float 4	Product Attenuation ( Upper product )
16-19	Float 4	Lower product Attenuation
20-23	Float 4	Vapor Attenuation

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.12 Command #146: Write Dielectric Constants

This command writes Dielectric constants of Product (Upper), Lower product and Vapor.

The range is 1 - 100.

If saturated steam application is configured, write vapor DC will be accepted by the transmitter but will not be used in level calculation.

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	Product DC ( Upper product )
4-7	Float 4	DC of Lower Product
8-11	Float 4	DC of Vapor

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Product DC ( Upper product )
4-7	Float 4	DC of Lower Product
8-11	Float 4	DC of Vapor

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameter too large
4	Error	Passed parameter too small
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	DC of upper product outside applicable range
66	Error	DC of lower product outside applicable range
67	Error	DC of vapor outside applicable range

### **10.13 Command #147: Write Mounting Settings**

This command writes mounting type, height, diameter, mounting angle and connection type. The following list outlines the enums for mounting location:

- Tank (0)
- Bracket (1)
- Nozzle = (2)
- Bypass (3)
- Stillwell (4)

Valid enumerations for the sensor connection-type are:

- Direct = 0
- Remote =1

If the user writes mounting type as Nozzle then height and diameter entered are considered for Nozzle.

If user writes mounting type as Stillwell then height and diameter entered are for Stillwell.

Range for Nozzle height is 0.0 to 75.0 in meters

Range for Nozzle diameter is 0.0 to 1.0 in meters

Range for Stillwell height is 0.0 to 75.0 in meters

Range for Stillwell diameter is 0.0 to 1.0 in meters

Range for Mounting angle is 0.0 to 90.0 deg.

Height and Diameter values entered are considered in length units.

If length unit is feet (length unit code 44) then value entered is considered in feet.



Request Data Bytes:

Byte	Format	Description
0	Enum	Mounting Location
1	Enum	Sensor Connection Type
2-5	Float 4	Height
6-9	Float 4	Diameter
10-13	Float 4	Mounting Angle
14	Enum	Transmitter Type SLG720 (0) SLG726 (3) This field must be match with the model key programmed to the transmitter for the write to succeed.
15	Enum	Background Type Built-in (0) Field (1)
16	Enum	Full Tank detection Disable (0) Enable (1)
17	Enum	Process Connection Type
18	Enum	Dynamic Background Update (OFF (0), ON (1))

### Response Data Bytes:

Byte	Format	Description
0	Enum	Mounting Type
1	Enum	Connection Type
2-5	Float 4	Height
6-9	Float 4	Diameter
10-13	Float 4	Mounting Angle
14	Enum	Transmitter Type SLG720 (0) SLG726 (3)
15	Enum	Background Type Built-in (0) Field (1)
16	Enum	Full Tank detection Disable (0) Enable (1)
17	Enum	Process Connection Type
18	Enum	Dynamic Background Update (OFF (0), ON (1))

### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameter too large
2	Error	Invalid Selection
4	Error	Passed parameter too small
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Field background not available
66	Error	Process connector not supported

67	Error	Field background configuration mismatch
68	Error	Field background capture in progress
69	Error	Field background enabled
70	Error	Dynamic background not valid
71	Error	Invalid background type for saturated steam application

### **10.14 Command #148: Write Probe Settings**

This command is used to write Probe type, Probe End Type, and Probe Grounded, Probe Material, Probe Diameter, Centering Disk Type, Centering Disk Diameter, Probe Propagation Factor and Steam Reference Probe Type.

The valid values for the probe Type enumerations are:

- 0 = Custom
- 1 = Rod
- 2 = Wire
- 3 = Coax
- 4 = Twin Rod
- 5 = Twin Wire
- 6 = Multi\_Twist\_Wire
- 7 = PTFE Rod
- 8 = PTFE Wire

The valid values for the Probe End Type enumerations are:

- 00 = NONE
- 01 = CLAMP
- 02 = WEIGHT
- 03 = LOOP

The valid values for the Probe grounded enumerations are:

- 00 = No
- 01 = Yes

The valid values for the Probe Material enumerations are:

- 00 = CUSTOM
- 01 = 316\_316L\_STAINLESS\_STEEL
- 02 = PFA\_COATED\_STAINLESS\_STEEL
- 03 = C\_276\_NICKEL\_ALLOY

Valid enumerations for Probe Diameter are

00 = CUSTOM

01 = 4mm,

02 = 6mm,

03 = 7mm,

04 = 8mm,

05 = 12mm,

06 = 16mm,

07 = 22mm,

08 = 42mm

Valid enumerations for Centering Disk Type are

00 = CENTRIC\_DISK\_TYPE\_NONE

01 = 316\_316L\_STAINLESS\_STEEL

02 = PTFE

03 = C\_276\_NICKEL\_ALLOY

Valid enumerations for Disk Diameter are

00 = 2INCHES

01 = 3INCHES,

02 = 4INCHES,

03 = 6INCHES,

04 = 8INCHES

Valid enumeration for Steam Reference Probe Type are

00 = None

01 = 33 cm

02 = 50 cm

#### Request Data Bytes:

Byte	Format	Description
0	Enum	Probe Type
1	Enum	Probe End Type
2	Enum	Probe Grounded
3	Enum	Probe Material
4	Enum	Probe Diameter
5	Enum	Centering Disk Type
6	Enum	Centering Disk Diameter
7 – 10	Float 4	Probe Propagation Factor (0.9 - 1.1)
11	Enum	Steam Reference Probe Type

#### Response Data Bytes:

Byte	Format	Description
0	Enum	Probe Type
1	Enum	Probe End Type
2	Enum	Probe Grounded
3	Enum	Probe Material
4	Enum	Probe Diameter
5	Enum	Centering Disk Type
6	Enum	Centering Disk Diameter
7 – 10	Float 4	Probe Propagation Factor (0.9 - 1.1)
11	Enum	Steam Reference Probe Type

#### 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	Passed too few data bytes.

6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Probe type cannot be changed with field background enabled.
66	Error	Probe type selection does not match the process connector configuration.
66	Error	Invalid Probe Type selection
67	Error	Invalid Probe End Type selection
68	Error	Invalid Probe Grounded selection
69	Error	Invalid Probe Material selection
70	Error	Invalid Probe Diameter selection
71	Error	Invalid Centering Disk Type selection
72	Error	Invalid Centering Disk Diameter selection
73	Error	Propagation Factor out of range
74	Error	Invalid Steam Reference Probe Type selection

### 10.15 Command #149: Reads Mounting Settings.

This command reads Mounting Type, Connection Type, Length unit Code, Mounting Height, Mounting Diameter, and Mounting Angle.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Mounting Type
1	Enum	Connection Type
2	Enum	Length unit code
3-6	Float 4	Mounting Height
7-10	Float 4	Mounting Diameter
11-14	Float 4	Mounting Angle
15	Enum	Transmitter Type SLG720 (0), SLG726 (3)
16	Enum	Background Type Factory (0), Field (1), Obstacle (2)
17	Enum	Full Tank detection Disable (0), Enable (1)
18	Enum	Process Connection Type
19	Enum	Dynamic Background Update (OFF (0), ON (1))

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error



### ***10.16 Command #150: Reads Sensor MCU Supply Voltage temperature.***

This command reads Sensor MCU Supply Voltage (in volts) and Temperature (in default temperature units as configured by the user).

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Sensor MCUSupply Voltage
4-7	Float 4	Sensor MCU Temperature ( In default temperature units )

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.17 Command #151: Write transmitter install date to sensor

This command writes transmitter install date to sensor.

Note: The **Year** field is the number of years since 1900.

Install date is a onetime configurable parameter.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Day
1	Unsigned 8	Month
2	Unsigned 8	Year

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Day
1	Unsigned 8	Month
2	Unsigned 8	Year

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes received
6	Error	Transmitter specific command error
7	Error	In write protect mode
16	Error	Access Restricted
32	Error	Busy
65	Error	Install Date is Already Present in Device
66	Error	Invalid Day, month or year
67	Error	Day or month is zero
75	Error	Error with sensor communication

### 10.18 Command #152: Writes Ideal Tank Dimensions and Shape

This command writes ideal tank dimensions and ideal tank shape.

For Ideal tank dimension four fields are there, each field of type float and size 4 byte.

Enums for Ideal tank Shapes are:

SPHERE = 0	HORIZONTAL_CYLINDER = 4
CUBIC = 1	RECTANGLE = 5
HORIZONTAL_BULLET = 2	VERTICAL_BULLET = 6
VERTICAL_CYLINDER = 3	

Request Data Bytes:

Byte	Format	Description
0	Enum	Tank Shape
1-4	Float 4	Ideal Tank Diameter
5-8	Float 4	Ideal Tank Length
9-12	Float 4	Ideal Tank width
13-16	Float 4	Ideal Tank height

Response Data Bytes:

Byte	Format	Description
0	Enum	Tank Shape
1	Enum	Length unit code
2-5	Float 4	Ideal Tank Diameter
6-9	Float 4	Ideal Tank Length
10-13	Float 4	Ideal Tank width
14-17	Float 4	Ideal Tank height

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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Invalid Tank shape
66	Error	Tank Diameter is less than lower Limit
67	Error	Tank Length is less than lower Limit
68	Error	Tank Width is less than lower Limit
69	Error	Tank Height is less than lower Limit

### 10.19 Command #153: Reads Interface Level Values.

This command reads Interface Length unit code, Measured Media Interface level and Interface Level (Linearized) only when Measure product type is selected as Two liquids flooded or Two liquids non flooded. If Measure product is selected other than Two liquids flooded or Two liquids non flooded then is command gives response code as 65.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code
1-4	Float 4	Measured Media Interface level
5-8	Float 4	Interface Level

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error
65	Error	Variable not supported

## 10.20 Command #154: Writes Application Type (Measured product)

Enums for Application Type (Measured Product) are:

SINGLE\_LIQUID = 1

TWO\_LIQUIDS\_FLOODED = 2

TWO\_LIQUIDS\_NON\_FLOODED = 3

SATURATED\_STEAM = 4

SINGLE LIQUID, LOW\_DC\_APPLICATION = 5

Request Data Bytes:

Byte	Format	Description
0	Enum	Application Type (Measured Product)

Response Data Bytes:

Byte	Format	Description
0	Enum	Application Type (Measured Product)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Invalid License for Application type
66	Error	Incorrect process connection type for current application type

## 10.21 Command #155: Read Amplitude Tracking Selection

### Request Data Bytes:

Byte	Format	Description
None		

### Response Data Bytes:

Byte	Format	Description
0	Enum	Amplitude Tracking

### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command

## 10.22 Command #156: Write Amplitude Tracking Selection

Enums for Amplitude Tracing are as below

Disable = 0

Enable = 1

### Request Data Bytes:

Byte	Format	Description
0	Enum	Amplitude Tracking

### Response Data Bytes:

Byte	Format	Description
0	Enum	Amplitude Tracking

### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection

6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
75	Error	Error with sensor communication



## 10.23 Command #157: Read cyclic time statistics

This command reads sensor update rates

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Read Request Type (0x01 )

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Read Request Type
1-4	Float 4	Current Value
5-8	Float 4	Mean Value
9-12	Float 4	Sigma
13-16	Float 4	Minimum Value
17-20	Float 4	Maximum Value

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes received
6	Error	Transmitter specific command error
2	Error	Invalid selection
32	Error	Busy
33	Error	DR Initiated
34	Error	DR Running
35	Error	DR Dead
75	Error	Error with sensor communication

## 10.24 Command #158: Reset cyclic time statistics

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Reset Time statistics (0x01)

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Reset Time statistics

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	Transmitter specific command error
32	Error	Busy
75	Error	Error with sensor communication

### ***10.25 Command #159: Reads Application Type (Measured product).***

This command reads Measured Product.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Application Type(Measured Product)

Command-Specific Response Codes:

0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.26 Command #160: Read Volume strapping table data.

This command reads strapping table data for Volume.

User can read maximum 7 entries at one time. The response data contains two float value (Level & Volume) associated with one entry.

Range for Start Point Index is 0 to 49.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Start Point Index

Response Data Bytes:

Byte	Format	Description
0	unsigned 8	Start Index n
1-4	Float 4	Level n
5-8	Float 4	Volume n
9-12	Float 4	Level n+1
13-16	Float 4	Volume n+1
17-20	Float 4	Level n+2
21- 24	Float 4	Volume n+2
25-28	Float 4	Level n+3
29-32	Float 4	Volume n+3
33-36	Float 4	Level n+4
37-40	Float 4	Volume n+4
41-44	Float 4	Level n+5
45-48	Float 4	Volume n+5
49-52	Float 4	Level n+6
53-56	Float 4	Volume n+6

Command-Specific Response Codes:

0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too few Data bytes received

### 10.27 Command #161: Read Echo Init parameters.

This command reads Start distance, End distance, resolution, echo curve type, unit code and windows used by sensor.

0: Windowed

1: Full scan

2: Filtered (Processed)

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Start Distance
4-7	Float 4	End Distance
8-11	Float 4	Resolution
12	Enum	Length unit code for start and end distances
13	Enum	Length unit code for Resolution
14	Enum	Echo capture type
15	Unsigned 8	Number of Valid windows
16-19	Float 4	Start distance of window 1
20-21	Unsigned 16	Number of Data points in window 1
22-25	Float 4	Start distance of window 2
26-27	Unsigned 16	Number of Data points in window 2
28-31	Float 4	Start distance of window 3
32-33	Unsigned 16	Number of Data points in window 3
34-37	Float 4	Start distance of window 4
38-39	Unsigned 16	Number of Data points in window 4
40-43	Float 4	Start distance of window 5
44-45	Unsigned 16	Number of Data points in window 5

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.28 Command #162: Read Power Fail Information

This command reads Power fail count & its time stamp. Timestamp is in seconds.

Note: The **Power Fail Count** value is in seconds and provides the time for which device is on before power cycle or reset.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-1	Unsigned 16	Power Fail Count
2-5	Unsigned 32	Power Fail Stamp (in Seconds)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.29 Command #163: Read Echo Data

This command reads the Echo data captured in the range configured in command 143.

Each time this command returns 32 data points (bytes 3-66) and byte 2 contains the valid number of points out of 32 data points returned.

Request Data Bytes:

Byte	Format	Description
0-1	Unsigned 16	Data sample index

Response Data Bytes:

Byte	Format	Description
0-1	Unsigned 16	Data sample index
2	Unsigned 8	Valid echo data points
3 - 66	Signed Array	Echo data points as an array of signed data type

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few Data bytes received
6	Error	Transmitter specific command error
65	Error	Echo Read Data Buffer fault
66	Error	Echo Data process in progress ( used like busy)
67	Error	Invalid Data Index
68	Error	Reading Echo Data is in progress
75	Error	Error with sensor communication



### 10.30 Command #164: Write Volume Calculation Type

This command writes the volume calculation type.

The following are the enums for Volume calculation:

0 = None

1 = Ideal Tank shape Calculation

2 = Strapping table calculation

Request Data Bytes:

Byte	Format	Description
0	Enum	Calculation Type

Response Data Bytes:

Byte	Format	Description
0	Enum	Calculation Type

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy

### ***10.31 Command #165: Restore the Parameter values to Factory Default values***

This command default the device configuration to factory default values.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
None		None

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
65	Error	Factory Data Absent

### 10.32 Command #166: Read Status Bar Information

This command reads the device variable values and status.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum-8	Length Unit (same as Command #183)
1	Enum-8	Temperature Unit (same as Command #183)
2	Enum-8	Velocity Unit (same as Command #183)
3	Enum-8	Volume Unit (same as Command #183)
4	Bits-8	Extended Device Status (same as Command #48)
5 – 10	Bits-8	Device Specific Status (same as Command #28)
11 – 21	Bits-8	Critical Device Status Bytes (same as Command #220)
22	Enum-8	Write Protect Code (Disabled, Hardware Enabled, Software Enabled)
23	Bits-8	Lock Device State (see Common Table 25)
24	Enum-8	Loop Current Mode (same as Command #7)
25 – 28	Float-32	Loop Current (mA) (same as Command #2)
29 – 32	Float-32	Percent of Range (%) (same as Command 2)
33	Enum-8	Measured Products (same as Command #59)
34	Unsigned-8	PV Device Variable Number
35 – 38	Float-32	PV Device Variable Value
39	Bits-8	PV Device Variable Status
40	Unsigned-8	SV Device Variable Number
41 – 44	Float-32	SV Device Variable Value
45	Bits-8	SV Device Variable Status
46 – 49	Float-32	Distance to Level (same as Command #64779)

50	Bits-8	Distance to Level Device Variable Status
51 – 54	Float-32	Distance to Interface (same as Command #64779)
55	Bits-8	Distance to Interface Device Variable Status
56 – 59	Float-32	Measured Level (same as Command #64779)
60 – 63	Float-32	Product Level Value
64	Bits-8	Product Level Device Variable Status
65 – 68	Float-32	Interface Level Value
69	Bits-8	Interface Level Device Variable Status

#### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.33 Command #167: Read Dashboard Information

This command reads the additional device variable and status information.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum-8	Length Unit
1	Enum-8	Temperature Unit
2	Enum-8	Velocity Unit
3	Enum-8	Volume Unit
4	Enum-8	Measurement Mode
5	Unsigned-8	TV Device Variable Number
6 – 9	Float-32	TV Device Variable Value
10	Bits-8	TV Device Variable Status
11	Unsigned-8	QV Device Variable Number
12 – 15	Float-32	QV Device Variable Value
16	Bits-8	QV Device Variable Status
17 – 20	Float-32	Vapor Thickness Device Variable Value
21	Bits-8	Vapor Thickness Device Variable Status
22 – 25	Float-32	Product Volume Device Variable Value
26	Bits-8	Product Volume Device Variable Status
27 – 30	Float-32	Vapor Volume Device Variable Value
31	Bits-8	Vapor Volume Device Variable Status
32 – 35	Float-32	Upper Product Volume Device Variable Value
36	Bits-8	Upper Product Volume Device Variable Status
37 – 40	Float-32	Lower Product Volume Device Variable Value

41	Bits-8	Lower Product Volume Device Variable Status
42 – 45	Float-32	Surface Signal Strength
46 – 49	Float-32	Surface Signal Quality
50 – 53	Float-32	Interface Signal Strength
54 – 57	Float-32	Interface Signal Quality
58 – 61	Float-32	Sensor MCU Supply Voltage
62 - 65	Float-32	Sensor MCU Temperature

Command Specific Response Codes:

Code	Class	Description
0	Success	No Command Specific Errors
6	Error	Transmitter Specific Command Error

### **10.34 Command #168: Read Process Connector and Steam Reference Model Parameters**

This command reads correlation algorithm reflection model parameters corresponding to the process connector and steam reference.

Request Data Bytes:

Byte	Format	Description
None		None

Response Data Bytes:

Byte	Format	Description
0 – 1	Signed 16	Process Connector Reflection Model Gain
2 – 5	Float 4	Process Connector Reflection Model Attenuation
6 – 9	Float 4	Process Connector Reflection Threshold
10 – 11	Unsigned 16	Process Connector Reflection Start Distance
12 – 13	Unsigned 16	Process Connector Reflection End Distance
14 – 15	Unsigned 16	Process Connector Reflection Model Width (mm)
16	Unsigned 8	Process Connector Reflection Decimation
17-18	Signed 16	Steam Reference Reflection Model Amplitude/Gain
19-22	Float 4	Steam Reference Reflection Model Attenuation
23-26	Float 4	Steam Reference Reflection Threshold
27-28	Unsigned 16	Reserved
29-30	Unsigned 16	Reserved
31-32	Unsigned 16	Steam Reference Model Width in millimeter
33	Unsigned 8	Reserved

Command Specific Response Codes:

Code	Format	Description
0	Success	No Command Specific Errors
6	Error	Device Specific Command Error



### 10.35 Command #169: Reads Correlation Algorithm Reflection Model

#### Parameters

This command reads Reflection Response Model parameters of the correlation algorithm. There are four reflection response models which are **Reference**, **Surface**, **Interface** and **End of Probe**.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-1	Signed 16	Reference Reflection Model Gain
2-5	Float 4	Reference Reflection Model Attenuation
6-9	Float 4	Reference Reflection Threshold
10-11	Unsigned 16	Reference Reflection Start Distance
12-13	Unsigned 16	Reference Reflection End Distance
14-15	Unsigned 16	Reference Reflection Model Width in millimeter
16	Unsigned 8	Reference Reflection Decimation
17- 18	Signed 16	Surface Reflection Model Gain
19-22	Float 4	Surface Reflection Model Attenuation
23-26	Float 4	Surface Reflection Threshold
27-28	Unsigned 16	Surface Reflection Start Distance
29-30	Unsigned 16	Surface Reflection End Distance
31-32	Unsigned 16	Surface Reflection Model Width in millimeter
33	Unsigned 8	Surface Reflection Decimation
34-35	Signed 16	Interface Reflection Model Gain
36-39	Float 4	Interface Reflection Model Attenuation
40-43	Float 4	Interface Reflection Threshold
44-45	Unsigned 16	Interface Reflection Start Distance
46-47	Unsigned 16	Interface Reflection End Distance
48-49	Unsigned 16	Interface Reflection Model Width in millimeter

Byte	Format	Description
50	Unsigned 8	Interface Reflection Decimation
51-52	Signed 16	End of Probe Reflection Model Gain
53-56	Float 4	End of Probe Reflection Model Attenuation
57-60	Float 4	End of Probe Reflection Threshold
61-62	Unsigned 16	End of Probe Reflection Start Distance
63-64	Unsigned 16	End of Probe Reflection End Distance
65-66	Unsigned 16	End of Probe Reflection Model Width in millimeter
67	Unsigned 8	End of Probe Reflection Decimation

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Device specific command error

### **10.36 Command #170: Writes Correlation Algorithm Reflection Model Parameters.**

This command writes Reflection Model parameters of correlation algorithm. There are four reflection models that can be configured. Index determines which response model parameters are written

Index has the following possible enumerations:

- 0 = Reference
- 1 = Surface
- 2 = Interface
- 3 = End of Probe
- 4 = Process Connector
- 5 = Steam Reference

Limit for Model Width is: 1 - 1000 in millimeters

Limit for Model Gain is: -32768 to 32767

Limit for Model Attenuation is: 0 -10

Limit for Threshold is: 0 - 1

Start Distance, End Distance and Decimation are deprecated parameters retained only for backward compatibility. Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Reflection Response Model index
1-2	Signed 16	Reflection Model Gain
3-6	Float 4	Reflection Model Attenuation
7-10	Float 4	Reflection Threshold
11-12	Unsigned 16	Reflection Start Distance
13-14	Unsigned 16	Reflection End Distance
15-16	Unsigned 16	Reflection Model Width in millimeter
17	Unsigned 8	Reflection Decimation

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Reflection Model index
1-2	Signed 16	Reflection Model Gain
3-6	Float 4	Reflection Model Attenuation
7-10	Float 4	Reflection Threshold
11-12	Unsigned 16	Reflection Start Distance
13-14	Unsigned 16	Reflection End Distance
15-16	Unsigned 16	Reflection Model Width in millimeter
17	Unsigned 8	Reflection Decimation

#### Command Specific Response Codes:

Byte	Format	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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Invalid reflection model type
66	Error	Invalid reflection model gain
67	Error	Invalid reflection model attenuation
68	Error	Invalid reflection model threshold
69	Error	Invalid reflection model width
75	Error	Error with sensor communication

### **10.37 Command #171: Read Volume Strapping table size.**

This command reads maximum volume strapping index (user configurable) value.

Range for size is from 2 to 50.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Volume strapping table size

Command Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors

### 10.38 Command #172: Calibrate Volume Strapping Table Entry

This command writes volume strapping table data in wet calibration (Single entry updated based on current measurement made by device).

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Strapping Table Index
1-4	Float 4	Volume Value

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Strapping Table Index
1-4	Float 4	Volume Value
5-8	Float 4	Actual Level Value

Command Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Data Increment order fault
66	Error	Data Decrement order fault
75	Error	Error with sensor communication

### 10.39 Command #173: Write Dry Calibration Strapping table Data

This command writes volume strapping table data (Dry Calibration).

User has to enter 7 entries in one time in increasing/decreasing order only. The response data contains two float value (Level & Volume) associated with one entry. Range for Start index is 0-49.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Start Index n
1-4	Float 4	Level n
5-8	Float 4	Volume n
9-12	Float 4	Level n+1
13-16	Float 4	Volume n+1
17-20	Float 4	Level n+2
21- 24	Float 4	Volume n+2
25-28	Float 4	Level n+3
29-32	Float 4	Volume n+3
33-36	Float 4	Level n+4
37-40	Float 4	Volume n+4
41-44	Float 4	Level n+5
45-48	Float 4	Volume n+5
49-52	Float 4	Level n+6
53-56	Float 4	Volume n+6

Response Data Bytes:

Byte	Format	Description
0	unsigned 8	Start Index (Range: 0-49)
1-4	Float 4	Level n
5-8	Float 4	Volume n
9-12	Float 4	Level n+1
13-16	Float 4	Volume n+1
17-20	Float 4	Level n+2
21- 24	Float 4	Volume n+2
25-28	Float 4	Level n+3
29-32	Float 4	Volume n+3
33-36	Float 4	Level n+4
37-40	Float 4	Volume n+4
41-44	Float 4	Level n+5
45-48	Float 4	Volume n+5
49-52	Float 4	Level n+6
53-56	Float 4	Volume n+6
57	Unsigned 8	Accepted Entry

#### Command Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Data Increment order fault
66	Error	Data Decrement order fault



### 10.40 Command #174: Write Volume Strapping table size

This command writes maximum volume strapping table size used to derive volume.

Range is 2 to 50.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Volume strapping table size

Response Data Bytes:

Byte	Format	Description
0	unsigned 8	Volume strapping table size

Command Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3	Error	Pass parameter too large
4	Error	Pass parameter too small
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy

### 10.41 Command #175: Read/Lock Write Protect Configuration

This command reads or Locks Write Protect Configuration based on selection.

Request Data Bytes:

Byte	Format	Description
0	Enum	0x01 – Enable WP OR 0x02 – Read WP status

Response Data Bytes:

Byte	Format	Description
0	Enum	0x00 – Disabled OR 0x01 – Enabled

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy

## 10.42 Command #176: Write/Change Write Protect Password

This command is used to Write/Change Write Protect Password.

Request Data Bytes:

Byte	Format	Description
0	Enum	Disable WP(0x00) / Change(0x03)
1-4	ASCII	“Current Password” for Disable WP command (Or) “New Password” for Change command
5-8	ASCII	Current password (field valid only for password change command)

Response Data Bytes:

Byte	Format	Description
0	Enum	Unlock(0x00) / Change(0x03)

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	Transmitter specific command error
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy
65	Error	Wrong Password
66	Error	Invalid Mode

### 10.43 Command #177: Reads Volume Settings

This command reads Volume calculation type, Volume unit code and volume offset.

The enum for Volume calculation type is (0 = None, 1= Ideal Tank, 2 = Strapping Table)

Request Data Bytes:

Byte	Format	Description
0	None	

Response Data Bytes:

Byte	Format	Description
0	Enum	Volume Calculation Type
1	Enum	Volume Unit Code
2-5	Float 4	Volume Offset

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.44 Command #178: Writes Volume Offset

This command writes Volume Offset. Limit for writing volume offset is -2000 to +2000.

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	Volume Offset

Response Data Bytes:

Byte	Format	Description
0	Enum	Volume unit code
1-4	Float 4	Volume Offset

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameters too small
4	Error	Passed parameters too large
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy

## 10.45 Command #179: Select Model Number

Valid enumerations of Transmitter Model Number selection are:

0x00: Sensor Model Number

0x01: Communication Board Model Number

### Request Data Bytes:

Byte	Format	Description
0	Enum	Transmitter Model Number selection (Sensor model number = 0, Comm model number = 1 )

### Response Data Bytes:

Byte	Format	Description
0	Enum	Transmitter Model Number selection (Sensor model number = 0, Comm model number = 1 )

### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Sensor model number absent
66	Error	Comm model number absent
67	Error	Incompatible Comm Model Number

### **10.46 Command #180: Write Echo lost timeout and Fault Latching mode configuration**

This command can be used to set the timeout for Echo lost where alarm is triggered based on user selection.

Time mentioned is relative to the measurement scan rate.

Latch configuration has the following enumerations.

0: Latching

1: Non-Latching

Request Data Bytes:

Byte	Format	Description
0-1	Unsigned 16	Timeout in seconds for Echo lost
2	Enum	Latch mode

Response Data Bytes:

Byte	Format	Description
0-1	Unsigned 16	Timeout in seconds for Echo lost
2	Enum	Latch mode

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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted

32	Error	Busy
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### ***10.47 Command #181: Selection of loop current behavior in blocking distance zones***

Valid enumerations of loop current behavior selection are:

0x00: Set loop current to high saturation

0x01: Set loop current to low saturation

239: Set loop current to last known good value

240: Set loop current to default behavior

Request Data Bytes:

Byte	Format	Description
0	Enum	Transmitter loop current behavior selection

Response Data Bytes:

Byte	Format	Description
0	Enum	Transmitter loop current behavior selection

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy



### ***10.48 Command #182: Reads blocking zone behavior selection, lost Echo timeout value and latch mode configuration***

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Transmitter loop current behavior selection in blocking zones
1-2	Unsigned 16	Transmitter Echo lost timeout value
3	Enum	Latch mode selected

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.49 Command #183: Read Defaults Units

This command reads unit code of the device variables.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit
1	Enum	Temperature Unit
2	Enum	Level Rate Unit
3	Enum	Volume Unit

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.50 Command #184: Write Defaults Units

This command writes units of device variables.

Note: Unit codes will be available in device variable sheet.

Request Data Bytes:

Byte	Format	Description
0	Enum	Length unit Code
1	Enum	Temperature Unit Code
2	Enum	Level Rate Unit Code
3	Enum	Volume Unit Code

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit Code
1	Enum	Temperature Unit Code
2	Enum	Level Rate Unit Code
3	Enum	Volume Unit Code

Command-Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
18	Error	Invalid Unit Code
32	Error	Busy
65	Error	Incorrect Length unit
66	Error	Incorrect Temperature unit
67	Error	Incorrect Level Rate unit
68	Error	Incorrect Volume unit

### 10.51 Command #185: Write level Linearization time stamp

This command writes Time & date of level calibration.

The DD is sending the install date in below format. [MM/DD/YYYY]

Year is one byte from 1900 as a base.

If user has to write 01/02/2014 (2 Jan 2014) date then data received in HART command is 01 02 114

(Year is calculated as  $2014 - 1900 = 114$ )

In hex it will be 0x01, 0x02, and 0x72

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Month
1	Unsigned 8	Day
1	Unsigned 8	Year
1	Unsigned 8	Hour
1	Unsigned 8	Minute

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Month
1	Unsigned 8	Day
1	Unsigned 8	Year
1	Unsigned 8	Hour
1	Unsigned 8	Minute

#### Command-Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Invalid Date
66	Error	Invalid Time
67	Error	Day, Month is zero

## 10.52 Command #186: Write Volume calibration time stamp

This command writes Time & date of Volume calibration.

The DD is sending the install date in below format. [MM/DD/YYYY]

Year is one byte from 1900 as a base.

If user has to write 01/02/2014 (2 Jan 2014) date then data received in HART command is 01 02 114

(Year is calculated as below  $2014 - 1900 = 114$ )

In hex it will be 0x01, 0x02, and 0x72

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Month
1	Unsigned 8	Day
1	Unsigned 8	Year
1	Unsigned 8	Hour
1	Unsigned 8	Minute

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Month
1	Unsigned 8	Day
1	Unsigned 8	Year
1	Unsigned 8	Hour
1	Unsigned 8	Minute

Command-Specific Response Codes:

Byte	Format	Description
0	Success	No Command-Specific Errors
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Invalid Date
66	Error	Invalid Time
67	Error	Day, Month is zero

### 10.53 Command#187: Read Tank shape

Possible values are:

SPHERE = 0

CUBIC = 1

HORIZONTAL\_BULLET = 2

VERTICAL\_CYLINDER = 3

HORIZONTAL\_CYLINDER = 4

RECTANGLE = 5

VERTICAL\_BULLET = 6

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Ideal tank shape

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors



### 10.54 Command #188: Read Transmitter Configuration Mode & Validation

This Command Reads Transmitter Configuration Mode and Transmitter Configuration Validation

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Transmitter Configuration Mode
1	Unsigned 8	Transmitter Configuration Validation

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.55 Command #189: Read Diagnostics

This command reads time in service, percent time in stress, service life remaining for the transmitter.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Unsigned -32	Time in Service (in seconds)
4-7	Float 4	Percent Time in stress
8-11	Float 4	Service Life remaining

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### **10.56 Command #190: Read Comm. Board ET Upper Tracking Parameters.**

This command reads ET value, ET max limit, ET max value, Max time counter, max time stamp(In seconds) .

Note: ET stands for Electronics Temperature.

Value of temperature is provided in default temperature units as configured by user.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	ET value ( In default temperature units )
4-7	Float 4	max limit ( In default temperature units )
8-11	Float 4	max value ( In default temperature units )
12-15	Unsigned -32	max time counter
16-19	Unsigned -32	max time stamp

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.57 Command #191: Read Comm. Board ET Lower Tracking Parameters

This command reads ET min limit, min value, min time counter, min time stamp (In seconds).

Note: ET stands for Electronics Temperature.

Value of temperature is provided in default temperature units as configured by user.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	ET min limit ( In default temperature units )
4-7	Float 4	min value ( In default temperature units )
8-11	Unsigned -32	Min time counter
12-15	Unsigned -32	min time stamp (In seconds)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.58 Command #192: Read Loop Voltage Data

This command reads Loop Voltage Current value, Loop Voltage min value, Loop Voltage min time stamp, MSP VCC Voltage

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Vloop current value
4-7	Float 4	VLOOP min value
8-11	Unsigned -32	VLOOP min time stamp
12-15	Float 4	MSP VCC Voltage

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### ***10.59 Command #193: Reset min terminal voltage and its time stamp***

This command Resets min terminal voltage and its time stamp.

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
32	Error	Busy

## 10.60 Command #194: Read Database ID

This command provides a Database ID for the requested configuration history code.

Request Data Bytes:

Byte	Format	Description
0	Enum	01 This is request byte to read latest parameter) 02:- (This is request byte to read second last parameter written) 03:- (This is request byte to read third last parameter written) 04:- (This is request byte to read forth last parameter written) 05:- (This is request byte to read fifth last parameter written)

Response Data Bytes:

Byte	Format	Description
0	Enum	Database ID of the parameter for which we have made request When no record is present, database ID returned will be 0xFF.

Command-Specific Response Codes:

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

Database Id's:

enum_nvm_db_version	= 0
enum_hart_denum_select	= 1
enum_crc_common,	= 2
enum_cal_current_4mA,	= 3
enum_cal_current_20mA,	= 4
enum_damping,	= 5
enum_polling_address_loop_current_mode	= 6
enum_namur,	= 7
enum_devicenum_identifier,	= 8
enum_ConfLockDevice,	= 9
enum_final_assembly_no,	= 10
enum_soft_write_protect,	= 11
enum_user_password,	= 12
enum_master_password,	= 13
enum_tag_desc_date,	= 14
enum_tag,	= 15
enum_message,	= 16
enum_long_tag,	= 17
enum_TamperModeConf,	= 18
enum_ErrorLogStatus,	= 19
enum_PvUrvLrv,	= 20
enum_loop_current_mode,	= 21
enum_polling_address,	= 22
enum_date,	= 23
enum_PvHighAndLowAlarmLimits,	= 24



enum_DeviceVariableCode,	= 25
enum_DeviceVariableUnits,	= 26
enum_PV_AlarmCode_Selection_InBlockingZone	= 27
enum_FaultLatch,	= 28
enum_sensor_scratch_pad,	= 29
enum_VolumeOffset,	= 30
enum_ProbeLength,	= 31
enum_BlockingDistanceLimit,	= 32
enum_TankDimensionAndShape,	= 33
enum_DC_Configuration,	= 34
enum_Probe_Configuration,	= 35
enum_ProbeMounting_Configuration,	= 36
enum_LevelMeasurement_Configuration,	= 37
enum_CalculationModes,	= 38
enum_SensorHeightMeasuredProductHeight,	= 39
enum_Calibration,	= 40
enum_Algo_Atten_Configuration,	= 41
enum_CorrelationAlgo_ReferenceModel,	= 42
enum_CorrelationAlgo_LevelModel,	= 43
enum_CorrelationAlgo_InterfaceModel,	= 44
enum_CorrelationAlgo_ProbeEndModel,	= 45
enum_CalibrationPoint1,	= 46
enum_MaxStrappingEntryForLevel,	= 47
enum_CalibrationPoint2,	= 48
enum_VolumeStrappingTable1,	= 49
enum_MaxStrappingEntryForVolume,	= 50

enum_VolumeStrappingTable2,	= 51
enum_CalibrationTimeDateRecords,	= 52
enum_VolumeTimeDateRecords,	= 53
enum_SvHighAndLowAlarmLimits,	= 54
enum_MaximumFillingEmptyingSpeed,	= 55
enum_SensorCalibrationOffset,	= 56
enum_TransmitterConfiguration,	= 57
enum_TankMaterial,	= 58
enum_ProcessConnectorReflecModel	= 59
enum_PowerUpRecalculationStatus,	= 60
enum_AmplitudeTracking,	= 61

### 10.61 Command #195: Read Configuration history

This command provides a history of the last 5 Configuration changes.

Request Data Bytes:

Byte	Format	Description
0	Enum	01:-(This is request byte to read latest parameter) 02:- (This is request byte to read second last parameter written) 03:- (This is request byte to read third last parameter written) 04:- (This is request byte to read forth last parameter written) 05:- (This is request byte to read fifth last parameter written)

Response Data Bytes:

Byte	Format	Description
0	Enum	Database ID of the parameter for which we have made request When no record is present, database ID returned will be 0xFF.
1-33	Enum	Value of the parameter for which we have made request We will get number of byte= size of parameter Eg, If PV unit is of size 2 byte so we will get 2 byte rest 3-33 bytes will be garbage. Rest bytes will be garbage data When no record is present, it will return 32 garbage bytes.

Command-Specific Response Codes:

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

## 10.62 Command #196\_223: Read error log part1

This command reads the 5 latest errors information.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Error code1
1	Enum	Error code2
2	Enum	Error code3
3	Enum	Error code4
4	Enum	Error code5
5-8	Unsigned -32	Error 1 time stamp
9-12	Unsigned -32	Error 2 time stamp
13-16	Unsigned -32	Error 3 time stamp
17-20	Unsigned -32	Error 4 time stamp
21-24	Unsigned -32	Error 5 time stamp
25-28	Unsigned -32	Transmitter time in service

Error Log codes:

- a) No error
- b) DAC failure
- c) Configuration corrupt
- d) Advance SIL diags failure
- e) Sensing section failure
- f) Sensor comm. timeout
- g) Measurement Failure
- h) Configuration RAM Failure
- i) Meter failure
- j) Watch dog reset
- k) Cold start
- l) Comm. section non critical failure
- m) Sensing section non critical failure
- n) Unused
- o) Unused

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.63 Command #197: Reset error log

This command initializes the error log data to zeros.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Command execution status (always 0x00 indicating success)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
7	Error	In Write Protect Mode
16	Error	Access restricted

## 10.64 Command #198: Read error logging status

This command reads the error logging status.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Error logging status (0x00: Disabled 0x01: Enabled)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.65 Command #199: Write error logging status

This command configures the error logging status.

Request Data Bytes:

Byte	Format	Description
0	Enum	Error logging status (0x00: Disable 0x01: Enable)

Response Data Bytes:

Byte	Format	Description
0	Enum	Error logging status (0x00: Disabled 0x01: Enabled)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy



## 10.66 Command#200: Read Tank Settings

This command reads Length unit code, Tank Diameter, Tank Length, Tank Width, and Tank Height.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code
1-4	Float 4	Diameter
5-8	Float 4	Length
9-12	Float 4	Width
13-16	Float 4	Height

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.67 Command#201: Read Probe Settings

This command reads Probe Type, Probe End Type, Probe Grounded, Probe Material, Probe Diameter, Centering Disk Type, Centering Disk Diameter, Probe Propagation Factor and Steam Reference Probe Type.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Probe Type
1	Enum	Probe End Type
2	Enum	Probe Grounded
3	Enum	Probe Material
4	Enum	Probe Diameter
5	Enum	Centering Disk Type
6	Enum	Centering Disk Diameter
7 – 10	Float 4	Probe Propagation Factor
11	Enum	Steam Reference Probe Type

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### ***10.68 Command #202: Read Communication Board Model Key Number***

This command reads the 7 byte Model key number.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-6	<b>Latin-1</b>	Model Key Number

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

## **10.69 Command #203: Read Communication Board Model Number - Table I**

This command reads 44 byte Model Part Table I.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-43	Latin-1	Table 1 information

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

## **10.70 Command #204: Read Communication Board Model Number - Table II**

This command reads 46 bytes Model number Table II information.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-45	Latin-1	Table II information

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### **10.71 Command #205: Write Transmitter Configuration validation**

This Command Writes Transmitter Configuration validation (Not Validated & Validated)

Request Data Bytes:

Byte	Format	Description
0	Enum	Transmitter Configuration validation (Not Validated = 0, Validated = 1)

Response Data Bytes:

Byte	Format	Description
0	Enum	Transmitter Configuration validation (Not Validated = 0, Validated = 1)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy

### **10.72 Command #206: Read Model Number - Table I**

This command reads 44 byte Model Part Table I.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-43	Latin-1	Table 1 information

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### **10.73 Command #207: Read Model Number – Table II**

This command reads 46 bytes Model number Table II information.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-45	Latin-1	Table II information

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors



### ***10.74 Command #208: Read Model Key Number***

This command reads the 7 byte Model key number.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-6	<b>Latin-1</b>	Model Key Number

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### **10.75 Command #209: Read Transmitter install & Char. date**

This command reads the transmitter install date & characterization date.

If Date is not configured by user the default installation date would be read as Jan - 01-1972.

Note: YY is number of years since 1900.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0 - 2	Unsigned 8	Transmitter install date (DDMMYY)
3-5	Unsigned 8	Characterization date (DDMMYY)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### **10.76 Command #210: Write Display General Configuration**

This command writes the following General Local Display Configuration parameters.

Language, Sequence Time, Screen Rotation Selection, display password and LCD contrast.

Valid enumerations for language are:

If the advanced display loaded is of western version package then below list is valid.

Language:

English-0,

French-1,

German-2,

Spanish-3,

Russian-4,

Turkish-7,

Italian-8

If the advanced display loaded is of Eastern version package then below list is valid.

English-0,

Chinese-5,

Japanese-6

Sequence time data entered is in seconds and range is from 3 to 30 seconds.

Screen Rotation has following valid enumerations:

0x00: Disable

0x01: Enable

Display contrast range is from 1 to 9 (1 is least contrast level)

Request Data Bytes:

Byte	Format	Description
0	Enum	Language
1	Unsigned 8	Sequence Time in seconds
2	Enum	Screen Rotation
3-6	ASCII	Password
7	Unsigned 8	Display Contrast

Response Data Bytes:

Byte	Format	Description
0	Enum	Language
1	Unsigned 8	Sequence Time in seconds
2	Enum	Screen Rotation
3-6	ASCII	Password
7	Unsigned 8	Display Contrast

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	Transmitter specific command error
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy
65	Error	Invalid contrast
66	Error	Display write failure
67	Error	Display is in Menu Mode (Exit Menu mode & retry)

### **10.77 Command #211: Read Display General Configuration**

This command reads the Display General Configuration.

Valid enumerations for language are:

If the advanced display loaded is of western version package then below list is valid.

Language:

English-0,

French-1,

German-2,

Spanish-3,

Russian-4,

Turkish-7,

Italian-8

If the advanced display loaded is of Eastern version package then below list is valid.

English-0,

Chinese-5,

Japanese-6

Sequence time data entered is in seconds and range is from 3 to 30 seconds.

Screen Rotation has following valid enumerations:

0x00: Disable

0x01: Enable

Display contrast range is from 1 to 9 (1 is minimum contrast level)

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Language
1	Unsigned 8	Sequence Time in seconds
2	Unsigned 8	Screen Rotation Selection
3-6	ASCII	Password
7	Unsigned 8	Display Contrast(0-9)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.78 Command #212: Read Display Firmware Version

This command reads the Display Firmware Version.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-7	Enum	Display Firmware revision

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.79 Command#213: Reads Sensor ASIC Calibration Slope and Offset

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Sensor ASIC Slope
4-7	Float 4	Sensor ASIC Offset

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error



## ***10.80 Command #214: Reads Additional Echo stem plot data for Saturated Steam application***

This command reads Observed Echo stem plot data for vapor compensation.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code for Echo start and End distances
1-4	Float 4	Steam Reference position ( distance )
5-8	Float 4	Steam Reference amplitude
9-12	Float 4	Steam Reference reflection position( True distance )
13-16	Float 4	Steam Reference Multiplier
17-20	Float 4	Observed Reference plane distance

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### ***10.81 Command #215: Reset PV tracking values***

This command initializes the PV tracking values.

Request Data Bytes:

Byte	Format	Description
0	Enum	Reset data type (0x01: Reset all 0x02: Reset Highest value 0x03: Reset Lowest value 0x04: Reset high alarm count 0x05: Reset low alarm count)

Response Data Bytes:

Byte	Format	Description
0	Enum	Reset data type

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted

## 10.82 Command #216: Write PV high and low alarm limits

This command configures the PV high and low alarm limits.

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	PV high alarm limit
4-7	Float 4	PV low alarm limit

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	PV high alarm limit
4-7	Float 4	PV low alarm limit

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	High Limit is less than Low Limit

### 10.83 Command #217: Read PV tracking values

This command reads Primary Variable tracking values.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Highest PV recorded
4-7	Unsigned-32	Highest PV Timestamp
8-11	Float 4	Lowest PV recorded
12-15	Unsigned-32	Lowest PV Timestamp
16-19	Float 4	High alarm limit
20-23	Float 4	Low alarm limit
24-25	Unsigned-16	No of times PV recorded above High alarm limit
26-27	Unsigned-16	No of times PV recorded below low alarm limit

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.84 Command #220: Read additional status

This command reads the additional Status.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0-10	Enum	Refer <b>Error! Reference source not found.</b>

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.85 Command #221: Write NAMUR Selection

This command is used to write NAMUR enable or disable.

Request Data Bytes:

Byte	Format	Description
0	Enum	0x00 to disable 0x01 to enable

Response Data Bytes:

Byte	Format	Description
0	Enum	Accepted value

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameter too large
5	Error	Too few data bytes received
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy

### **10.86 Command #222: Read NAMUR Selection**

This command is used to read NAMUR selection.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	NAMUR selection 0x00 – Disabled 0x01 – Enabled

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.87 Command #223: Read error log part2

This command reads the 5 oldest errors information.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Error code6
1	Enum	Error code7
2	Enum	Error code8
3	Enum	Error code9
4	Enum	Error code10
5-8	Unsigned -32	Error 6 time stamp
9-12	Unsigned -32	Error 7 time stamp
13-16	Unsigned -32	Error 8 time stamp
17-20	Unsigned -32	Error 9 time stamp
21-24	Unsigned -32	Error 10 time stamp

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors



### 10.88 Command #224: Write/Configure Basic Level Calibration

This command configures the sensor height, maximum product height & Level offset.

Range for Level Offset is: -100.0 to 100.0 in meters

Range for Sensor Height is: 0.0 to 100.0 in meters

Measured Product Height is: 0.0 to 100.0 in meters

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	Sensor height
4-7	Float 4	Maximum product height
8-11	Float 4	Level Offset

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code
1-4	Float 4	Sensor height (meters)
5-8	Float 4	Maximum product height (meters)
9-12	Float 4	Maximum product height (meters)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameter too large
4	Error	Passed parameter too small
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Sensor height is greater than high limit

66	Error	Sensor height is less the lower limit
67	Error	Level offset is greater than high limit
68	Error	Level offset is less than lower limit
69	Error	Measured Product is greater than high limit
70	Error	Measured Product is less than lower limit

### **10.89 Command #225: Reads Basic Level Calibration**

This command reads sensor height, Measured Product height, and Level Offset.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code
1-4	Float 4	Sensor height
5-8	Float 4	Measured product height
9-12	Float 4	Level Offset

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

## 10.90 Command #226: Reads Echo stem plot data

This command reads Observed Echo stem plot data.

Status byte details are:

Status positions in byte 1 are:

- Reference status: bit1bit0
- Level Status: bit3bit2
- Interface status: bit5bit4
- Probe End: bit7bit6

Status in byte 34 are:

Process connector reflection status: bit1bit0

Steam reference reflection status: bit3bit2

2 bit Status for each position	Description
00	Good
01	Unknown
10	Unused
11	Bad

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Length unit code for Echo start and End distances
1	Unsigned 8	Status of Reference ,Level, Interface and Probe End
2-5	Float 4	Reference position ( distance )
6-9	Float 4	Reference amplitude
10-13	Float 4	Level Position ( distance )

14-17	Float 4	Level amplitude
18-21	Float 4	Interface position ( distance )
22-25	Float 4	Interface amplitude
26-29	Float 4	Probe End position ( distance )
30-33	Float 4	Probe End Amplitude
34	Unsigned 8	Status of Process Connector reflection (bit1bit0) and Steam Reference reflection (bit3bit2)
35-38	Float 4	Process Connector reflection position (Observed distance )
39-42	Float 4	Process Connector reflection amplitude
43-46	Float 4	Surface reflection position (True distance )
47-50	Float 4	Interface reflection position (True distance )
51-54	Float 4	Probe end reflection position (True distance )
55-58	Float 4	Probe length (Observed distance)
59-62	Float 4	Blocking distance high (Observed distance)
63-66	Float 4	Blocking distance low (Observed distance)
67-70	Float 4	Process Connector Offset (Observed distance)

#### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific command error

### 10.91 Command #227: Writes Attenuation parameters

This command configures the Product (upper) Attenuation, Lower product Attenuation, Vapor Attenuation Limits are from: 0.0 to 10.0 for these parameters

Request Data Bytes:

Byte	Format	Description
0-3	Float 4	Product (Upper) Attenuation
4-7	Float 4	Lower Product Attenuation
8-11	Float 4	Vapor Attenuation

Response Data Bytes:

Byte	Format	Description
0-3	Float 4	Product ( Upper ) Attenuation
4-7	Float4	Lower Product Attenuation
8-11	Float 4	Vapor Attenuation

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
3	Error	Passed parameter too large
4	Error	Passed parameter too small
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Surface attenuation is greater than high limit
66	Error	Surface attenuation is less than lower limit
67	Error	Interface attenuation is greater than high limit
68	Error	Interface attenuation is less than lower limit
69	Error	Steam Reference attenuation is greater than high limit
70	Error	Steam reference attenuation is less than lower limit
75	Error	Error with sensor communication

## 10.92 Command #228: Read maintenance flag

This command reads the maintenance flag.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	0x00 – “Check with operator” 0x01 – “Available for maintenance”

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.93 Command #229: Write maintenance flag

This command writes Maintenance Flag.

Request Data Bytes:

Byte	Format	Description
0	Enum	0x00 – “Check with operator” 0x01 – “Available for maintenance”

Response Data Bytes:

Byte	Format	Description
0	Enum	0x00 – “Check with operator” 0x01 – “Available for maintenance”

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
32	Error	Busy

### 10.94 Command #230: Read tamper alarm settings

This command reads tamper alarm settings. It reads Tamper mode, Tamper latency in seconds, Maximum allowable Tamper Attempts, Tamper attempts recorded so far.

Request Data Bytes:

Byte	Format	Description
None		

Response Data Bytes:

Byte	Format	Description
0	Enum	Tamper mode(0x00 – Disable/ 0x01 – Enable),
1	Enum	Tamper latency in seconds(range 0 - 60 seconds),
2	Enum	Maximum allowable Tamper Attempts (Min 1 / Max 10),
3	Enum	Tamper attempts recorded so far

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors



### 10.95 Command #231: Write Tamper alarm settings

This command writes Tamper mode, Tamper latency in seconds, Maximum allowable Tamper Attempts

Request Data Bytes:

Byte	Format	Description
0	Enum	Tamper mode(0x00 – Disable/ 0x01 – Enable),
1	Enum	Tamper latency in seconds(range 0 - 60 seconds),
2	Enum	Maximum allowable Tamper Attempts (Min 1 / Max 10),

Response Data Bytes:

Byte	Format	Description
0	Enum	Tamper mode(0x00 – Disable/ 0x01 – Enable),
1	Enum	Tamper latency in seconds(range 0 - 60 seconds),
2	Enum	Maximum allowable Tamper Attempts (Min 1 / Max 10),
3	Enum	Tamper attempts recorded so far

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy

### ***10.96 Command #232: Reset executed attempts counter***

This command resets the tamper attempt count.

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
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied

### 10.97 Command #64768: Write Display Screen configuration I

This command writes part 1 of screen configuration.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x00)
2	Enum	Screen Selection screen 1:-Hex 3E screen 2:-Hex 3F screen 3:-Hex 40 screen 4:-Hex 41 screen 5:-Hex 42 screen 6:-Hex 43 screen 7:-Hex 44 screen 8:-Hex 45
3	Enum	Screen Format None- 00 PV - 01 PV & Bar Graph - 02 PV & Trend – 03
4	Enum	Identifies which of the process variables in the publish message is displayed in the view – parameter index
5-6	Enum	Unit Codes(meter= 45, feet = 44, inches = 47, centimeters = 48, millimeters = 49)
7	Enum	Number of digits to display after the decimal point. None - 00 .x - 01 .xx - 02 .xxx - 03
8-9	Enum	Trend duration, Duration of a trend screen in hours. Valid range 1 – 999

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x00)

2	Enum	Screen Selection screen 1:-Hex 3E screen 2:-Hex 3F screen 3:-Hex 40 screen 4:-Hex 41 screen 5:-Hex 42 screen 6:-Hex 43 screen 7:-Hex 44 screen 8:-Hex 45
3	Enum	Screen Format None- 00 PV - 01 PV & Bar Graph - 02 PV & Trend – 03
4	Enum	Identifies which of the process variables in the publish message is displayed in the view – parameter index
5-6	Enum	Unit Code (Refer Table 11.1)
7	Enum	Number of digits to display after the decimal point. None - 00 .x - 01 .xx - 02 .xxx - 03
8-9	Enum	Trend duration, Duration of a trend screen in hours. Valid range 1 – 999

#### 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	Transmitter specific command error
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy
65	Error	Display response failed
66	Error	Incorrect value
67	Error	Display is in Menu Mode (Exit Menu mode & retry)
68	Error	Display write failure

## 10.98 Command #64769: Write Display View configuration II

This command writes part 2 of screen configuration.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x01)
2	Enum	Screen selection
3-6	Float 4	Low Limit (Trend, Bar chart)
7-10	Float 4	High Limit (Trend, Bar chart)

**Note:** High Limit and Low Limit values should not be same.

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x01)
2	Enum	Screen selection
3-6	Float 4	Low Limit (Trend, Bar chart)
7-10	Float 4	High Limit (Trend, Bar chart)

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	Transmitter specific command error
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy
65	Error	Display response failed
66	Error	Incorrect value
67	Error	Display is in Menu Mode (Exit Menu mode & retry)
68	Error	Display write failure

### 10.99 Command #64770: Write View configuration III

This command writes part 3 of screen configuration.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x02)
2	Enum	Screen selection
3-32	ASCII	Custom Tag

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x02)
2	Enum	Screen selection
3-32	ASCII	Custom Tag

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	Transmitter specific command error
7	Error	Transmitter In Write Protect Mode
16	Error	Access Denied
32	Error	Busy
65	Error	Display response failed
66	Error	Incorrect value
67	Error	Display is in Menu Mode (Exit Menu mode & retry)
68	Error	Display write failure

### 10.100      **Command #64771: Read Display View configuration I**

This command reads view configuration I.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x03)
2	Enum	Screen Selection screen 1:-Hex 3E screen 2:-Hex 3F screen 3:-Hex 40 screen 4:-Hex 41 screen 5:-Hex 42 screen 6:-Hex 43 screen 7:-Hex 44 screen 8:-Hex 45

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x03)
2	Enum	Screen Selection screen 1:-Hex 3E screen 2:-Hex 3F screen 3:-Hex 40 screen 4:-Hex 41 screen 5:-Hex 42 screen 6:-Hex 43 screen 7:-Hex 44 screen 8:-Hex 45
3	Enum	Screen Format None- 00 PV - 01 PV & Bar Graph - 02 PV & Trend – 03
4	Enum	Identifies which of the process variables in the publish message is displayed in the view – parameter index

5-6	Enum	Unit Code (Refer Table 11.1)
7	Enum	Number of digits to display after the decimal point.
8-9	Enum	Trend duration, Duration of a trend screen in hours. Valid range 1 – 999

Command-Specific Response Codes:

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



### **10.101      *Command #64772: Read Display View configuration II***

This command reads the View configuration II

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x04)
2	Enum	Screen selection

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number (0xFD)
1	Unsigned 8	Extended command number (0x04)
0	Enum	Screen selection
10-13	Float 4	Low Limit (Trend, Bar chart)
14-17	Float 4	High Limit (Trend, Bar chart)

Command-Specific Response Codes:

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

### 10.102      ***Command #64773: Read Display View configuration III***

This command reads the View configuration III.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number 0xFD (0xFD05)
1	Unsigned 8	0x05
2	Enum	Screen selection

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	Extended command number 0xFD (0xFD05)
1	Unsigned 8	0x05
2	Enum	Screen selection
3-32	ASCII	Custom Tag

Command-Specific Response Codes:

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

### **10.103      *Command #64775: Reads Sensor Device Information***

This command reads device information which includes the sensor technology, process connection & MOC of Seal and Probe.

Below are the possible enums for Process Connection:

Std Temp / Std Pressure = 0

Std Temp / Std Pressure / High Strength= 1

Std Temp / High Pressure = 2

High Temp / High Pressure = 3

Cryogenic = 4

Below are the possible enums for MOC of Probe:

316 = 0

C276 = 1

PFA/316 = 3

Below are the possible enums for MOC of Seal:

Viton = 0

Kalrez = 1

BUNA-N = 2

EPDM = 3

Below are the possible enums for Sensor Technology Code:

Sensor Technology	Code
Free Wave	0
Guided Wave	1
Capacitive	2
Hydrostatic	3
Radiometric	4
Magnetostrictive	5
Buoyancy	6
Undefined	7-251
Unknown	252
Special	253

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64775)
1	Unsigned 8	0x07

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64775)
1	Unsigned 8	0x07
2	Unsigned 8	Sensor Technology Code.
3	Enum	MOC of Seal
4	Enum	MOC of Probe
5	Enum	Process Connection

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Transmitter specific command error

### 10.104      ***Command #64779: Reads Level family internal variable values***

This function reads Length unit Code, Measured Level value, Distance to Level value, Distance to Interface value.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64779)
1	Unsigned 8	0x0B

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64779)
1	Unsigned 8	0x0B
2	Enum	Length unit Code
3-6	Float 4	Measured Level value
7-10	Float 4	Distance To Level value
11-14	Float 4	Distance To Interface value

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Transmitter specific command error

### 10.105      **Command #64780: Write Calibration offset**

This function writes calibration offset value. The range is -1 meter to 1 meter.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x0C
2-5	Float 4	Calibration offset

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x0C
2	Enum	Length unit Code
3-6	Float 4	Calibration offset

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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
75	Error	Error with sensor communication

### 10.106      *Command #64781: Read Sensor Offsets*

This function read calibration offset, reference plane offset, process connector offset and steam reference offset.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x0D

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x0D
2	Enum	Length unit Code
3 - 6	Float 4	Calibration offset
7 - 10	Float 4	Reference Plane Offset
11 – 14	Float 4	Process Connector Offset
15-18	Float 4	Steam Reference offset

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Transmitter specific command error

### 10.107      **Command #64783: Reads Probe Length Blocking Distance values.**

This command reads Probe length and blocking distance settings .Blocking distance setting includes configuration of blocking distance High limit & Low limit.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64783)
1	Unsigned 8	0x0F

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command Number 64783)
1	Unsigned 8	0x0F
2	Enum	Length unit code.
3-6	Float 4	Probe Length
7-10	Float 4	Blocking Distance Low
11-14	Float 4	Blocking Distance High
15-18	Float 4	Minimum BDL value
19-22	Float 4	Minimum BDH value

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Transmitter specific command error



## 10.108      **Command #64784: Read Device Variable Limits**

This command reads Device variable limits.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x10

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x10
2	Unsigned 8	PV Code
3-6	Float 4	PV LTL
7-10	Float 4	PV UTL
11	Unsigned 8	SV Code
12-15	Float 4	SV LTL
16-19	Float 4	SV UTL
20	Unsigned 8	TV Code
21-24	Float 4	TV LTL
25-28	Float 4	TV UTL
29	Unsigned 8	QV Code
30-33	Float 4	QV LTL
34-37	Float 4	QV UTL

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### 10.109      **Command #64787: Write Tank Material**

This function writes tank material.

Tank Material =

00 = Metallic

01 = Non Metallic

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x13
2	Enum	Tank Material

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x13
2	Enum	Tank Material

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
75	Error	Error with sensor communication

### 10.110      ***Command #64788: Read tank material***

This function read tank material.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x14

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x14
2	Enum	Tank Material

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes Received
6	Error	Transmitter specific command error

### 10.111 **Command #64789: Writes blocking distance settings**

This function writes the distance settings blocking.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64789)
1	Unsigned 8	0x15
2-5	Float 4	Blocking distance Low value
6-9	Float 4	Blocking distance High value

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64788)
1	Unsigned 8	0x15
2	Enum	Length unit Code.
3-6	Float 4	Blocking distance Low value
7-10	Float 4	Blocking distance High value

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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	Blocking Distance low value is less than minimum blocking distance limit
66	Error	Blocking Distance high value is less than minimum blocking distance high limit
67	Error	Blocking distance value is greater than probe length
75	Error	Error with sensor communication

### 10.112 **Command #64790: Write Probe Length.**

This command is used to write the probe length in length units.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64790)
1	Unsigned 8	0x16
2-5	Float 4	Probe Length ( in length units)

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64790)
1	Unsigned 8	0x16
2	Enum	Length unit Code.
3-6	Float 4	Probe Length

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	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
75	Error	Error with sensor communication

### 10.113 **Command #64792: Calibrate Level Linearization Table.**

This command is used for writing Level Linearization Table. User has to enter index of the calibration points and device adjustable level to update calibration table. If Linearization table size is less than user entered calibration index then it will be an invalid selection.

User has to enter the calibration points in either increasing or decreasing order.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64792)
1	Unsigned 8	0x18
2	Unsigned 8	Index of calibration points(Max 32)
3-6	Float 4	Device Adjustable Level

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64792)
1	Unsigned 8	0x18
2	Unsigned 8	Index of calibration points(Max 32)
3-6	Float 4	Device Adjustable Level
7-10	Float 4	Device Measured Level

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
32	Error	Busy
65	Error	Data Increment order fault
66	Error	Data Decrement order fault
75	Error	Error with sensor communication

### 10.114      **Command #64794: Writes Level Linearization Table**

This command is used for writing Level Linearization table. User has to enter both Device measured level and Device Adjustable level to update table. User has to enter seven entries in one attempt.

User has to enter the calibration points in either increasing or decreasing order.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64794)
1	Unsigned 8	0x1A
2	Unsigned 8	Start Index of calibration points
3-6	Float 4	Device Measured Level <sup>n</sup>
7-10	Float 4	Device Adjustable Level <sup>n</sup>
11-14	Float 4	Device Measured Level <sup>n+1</sup>
15-18	Float 4	Device Adjustable Level <sup>n+1</sup>
19-22	Float 4	Device Measured Level <sup>n+2</sup>
23-26	Float 4	Device Adjustable Level <sup>n+2</sup>
27-30	Float 4	Device Measured Level <sup>n+3</sup>
31-34	Float 4	Device Adjustable Level <sup>n+3</sup>
35-38	Float 4	Device Measured Level <sup>n+4</sup>
39-42	Float 4	Device Adjustable Level <sup>n+4</sup>
43-46	Float 4	Device Measured Level <sup>n+5</sup>
47-50	Float 4	Device Adjustable Level <sup>n+5</sup>
51-54	Float 4	Device Measured Level <sup>n+6</sup>
55-58	Float 4	Device Adjustable Level <sup>n+6</sup>

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64794)
1	Unsigned 8	0x1A
2	Unsigned 8	Start Index of calibration points
3-6	Float 4	Device Measured Level <sup>n</sup>

7-10	Float 4	Device Adjustable Level <sup>n</sup>
11-14	Float 4	Device Measured Level <sup>n+1</sup>
15-18	Float 4	Device Adjustable Level <sup>n+1</sup>
19-22	Float 4	Device Measured Level <sup>n+2</sup>
23-26	Float 4	Device Adjustable Level <sup>n+2</sup>
27-30	Float 4	Device Measured Level <sup>n+3</sup>
31-34	Float 4	Device Adjustable Level <sup>n+3</sup>
35-38	Float 4	Device Measured Level <sup>n+4</sup>
39-42	Float 4	Device Adjustable Level <sup>n+4</sup>
43-46	Float 4	Device Measured Level <sup>n+5</sup>
47-50	Float 4	Device Adjustable Level <sup>n+5</sup>
51-54	Float 4	Device Measured Level <sup>n+6</sup>
55-58	Float 4	Device Adjustable Level <sup>n+6</sup>
59	Unsigned 8	Calibration points in use

#### Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode
32	Error	Busy
65	Error	Data Increment order fault
66	Error	Data Decrement order fault



### 10.115      ***Command #64796: Writes Level Linearization Table size.***

This command is used for writing Level Linearization table size. The user can configure the calibration table size between 2 - 32.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64796)
1	Unsigned 8	0x1C
2	Unsigned 8	Level linearization table size

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64796)
1	Unsigned 8	0x1C
2	Unsigned 8	Level linearization table size

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode

### 10.116      ***Command #64797: Reads Level Linearization table size***

This command is used for reading Level linearization table size in use.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64797)
1	Unsigned 8	0x1D

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64797)
1	Unsigned 8	0x1D
2	Unsigned 8	Level linearization table size

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
6	Error	Transmitter specific command error

### 10.117 **Command #64798: Reads Level Linearization Table.**

This command is used for reading the Level Linearization Table. User has to enter calibration index in order to read calibration points from that index. User can read maximum 7 entries in one attempt. Valid calibration index is 0 – 31.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64798)
1	Unsigned 8	0x1E
2	Unsigned 8	Start Index of calibration points

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64798)
1	Unsigned 8	0x1E
2	Unsigned 8	Start Index of calibration points $n$
3-6	Float 4	Device Measured Level $n$
7-10	Float 4	Device Adjustable Level $n$
11-14	Float 4	Device Measured Level $n+1$
15-18	Float 4	Device Adjustable Level $n+1$
19-22	Float 4	Device Measured Level $n+2$
23-26	Float 4	Device Adjustable Level $n+2$
27-30	Float 4	Device Measured Level $n+3$
31-34	Float 4	Device Adjustable Level $n+3$
35-38	Float 4	Device Measured Level $n+4$
39-42	Float 4	Device Adjustable Level $n+4$
43-46	Float 4	Device Measured Level $n+5$
47-50	Float 4	Device Adjustable Level $n+5$
51-54	Float 4	Device Measured Level $n+6$
55-58	Float 4	Device Adjustable Level $n+6$

Command-Specific Response Codes:

Code	Class	Description
------	-------	-------------

0	Success	No Command-Specific Errors
2	Error	Invalid Selection
6	Error	Transmitter specific command error

### 10.118      **Command #64799: Select Level Linearization.**

This write command is used for selecting Linearization for level.

Valid enumerations for selection are:

00: Disable

01: Enable

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64799)
1	Unsigned 8	0x1F
2	Enum	Level Linearization Selection Enable : 01 Disable : 00

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64799)
1	Unsigned 8	0x1F
2	Enum	Level Linearization Selection Enable : 01 Disable : 00

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Passed too few data bytes.
6	Error	Transmitter specific command error
7	Error	In Write Protect Mode

### **10.119      *Command #64800: Reads Selection of Level Linearization***

This command is used for reading selection of Level Linearization.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64800)
1	Unsigned 8	0x20

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD(Command number 64800)
1	Unsigned 8	0x20
2	Enum	Level Linearization Selection Enable : 01 Disable : 00

## 10.120      **Command #64803: Reset SV tracking values**

This command initializes the SV tracking values.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x23
2	Enum	Reset data type (0x01: Reset all 0x02: Reset Highest value 0x03: Reset Lowest value 0x04: Reset high alarm count 0x05: Reset low alarm count)

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x23
2	Enum	Reset data type (0x01: Reset all 0x02: Reset Highest value 0x03: Reset Lowest value 0x04: Reset high alarm count 0x05: Reset low alarm count)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted

### 10.121      **Command #64804: Write SV high and low alarm limits**

This command configures the SV high and low alarm limits.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x24
2-5	Float 4	SV high alarm limit
6-9	Float 4	SV low alarm limit

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x24
2-5	Float 4	SV high alarm limit
6-9	Float 4	SV low alarm limit

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
5	Error	Too few data bytes
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
65	Error	SV high limit is less than lower limit value



### 10.122      **Command #64805: Read SV tracking values**

This command reads Secondary Variable tracking values.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x25

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x25
2-5	Float 4	Highest SV recorded
6-9	Unsigned-32	Highest SV Timestamp
10-13	Float 4	Lowest SV recorded
14-17	Unsigned-32	Lowest SV Timestamp
18-21	Float 4	High alarm limit
22-25	Float 4	Low alarm limit
26-27	Unsigned-16	No of times SV recorded above High alarm limit
28-29	Unsigned-16	No of times SV recorded below low alarm limit

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors

### 10.123      **Command #64806: Read Level current Linearization time stamp records**

This command read current time stamp of Level linearization.

Data format is same as used in write command (Command 185)

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x26

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x26
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### **10.124      *Command #64807: Read Level Previous Linearization time stamp records***

This command Read Level Previous linearization time stamp records

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x27

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x27
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### 10.125      ***Command #64808: Read Level Last Linearization time stamp records***

This command Read Level Last linearization time stamp records

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x28

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x28
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

## 10.126      ***Command #64809: Read Volume Current calibration time stamp records***

This command Read Volume Current calibration time stamp records

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x29

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x29
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### **10.127      *Command #64810: Read Volume Previous calibration time stamp records***

This command Read Volume Previous calibration time stamp records

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2A

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2A
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### **10.128      *Command #64811: Read Volume Last calibration time stamp records***

This command Read Volume Last calibration time stamp records.

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2B

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2B
2	Unsigned 8	Month
3	Unsigned 8	Day
4	Unsigned 8	Year
5	Unsigned 8	Hour
6	Unsigned 8	Minute

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### 10.129      **Command #64812: Read Signal Strength and Quality of Media**

This command Read Signal strength & signal quality

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2C

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2C
2-5	Float 4	Media Signal strength
6-9	Float 4	Media signal quality

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error



### 10.130      ***Command #64813: Read interface Signal strength & quality***

This command Read interface Signal strength & surface noise margin

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2D

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x2D
2-5	Float 4	Interface Signal strength
6-9	Float 4	Interface signal quality

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

### 10.131 **Command #64818: Write maximum filling emptying speed**

This command writes maximum filling emptying speed.

Limit for maximum filling emptying speed is: 0.04 - 0.9 m/s

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x32
2-5	Float 4	Maximum Filling/Emptying Speed (m/s)

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x32
2-5	Float 4	Maximum Filling/Emptying Speed (m/s)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid selection
3	Error	Pass parameter too high
4	Error	Pass parameter too low
5	Error	Too few data bytes
6	Error	Transmitter specific error
7	Error	In Write Protect Mode
16	Error	Access restricted
32	Error	Busy
75	Error	Error with sensor communication

### 10.132      ***Command #64819: Read maximum filling emptying speed***

This command Read maximum filling emptying speed

Request Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x33

Response Data Bytes:

Byte	Format	Description
0	Unsigned 8	0xFD
1	Unsigned 8	0x33
2-5	Float 4	Maximum Filling/Emptying Speed (m/s)

Command-Specific Response Codes:

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Transmitter specific error

## 11 Command 220 details

Details of detailed device status provided in command 220 are mentioned in below table.

**Table 12: Additional Status Bytes**

Type	Bit	Command 220 bit status
DAC Failure (BYTE0)	7	DAC SPI Interface Failure
	6	Packet Error
	5	Over Current Status
	4	Under Current Status
	3	Temp Above 140C
	2	Temp Above 100C
	1	Control Word Write Fault
	0	Unused
Communication (BYTE1)	7	Communication board Vcc ( 3.3 ) Failure
	6	Device variables calculation Failure
	5	Volume calculation Failure
	4	RAM CRC Failure
	3	Brownout Status
	2	Program Flow Failure
	1	ROM Failure
	0	RAM Failure ( Walk Test )
Sensor (BYTE2)	7	Surface distance in blocking lower zone
	6	Surface distance in blocking higher zone
	5	Media signal quality bad
	4	Media signal strength bad
	3	Sensor ET over temperature
	2	Primary variable bad
	1	Interface signal quality bad
	0	Interface signal strength bad

Comm-Sensor (BYTE3)	7	Communication board database version mismatch with Sensor
	6	Inconsistent database parameters in Com and Sensor
	5	Sensor Parameter write failure
	4	Calibration/Linearization Table Error
	3	Calibration/Linearization Table Absent
	2	Display NVM Corrupt
	1	Sensor Characterization failure
	0	Meter (Display) Timeout
Sensor (BYTE4)	7	Power Accumulator Status
	6	Sensor Probe missing
	5	Sensor Power Supply 3.3V
	4	Sensor Power Supply 2.5V
	3	Sensor Power Supply 2.5V OSC
	2	Sensor Flash CRC check
	1	Sensor External Ram Status
	0	Sensor Internal Ram Status failure
Sensor (BYTE5)	7	Interface is in lower blocking zone
	6	Interface is in higher blocking zone
	5	Sensor NVRAM corrupt
	4	Error In Locating Echo Reference
	3	Sensor Low Power Mode
	2	Test Mode (sensor in factory mode)
	1	Sensor Board Oscillator Failure
	0	Sensor Code Flow Fault

Database (BYTE6)	7	Sensor DB config corrupt
	6	Display Common Config DB corrupt
	5	Display View Config DB corrupt
	4	Adv Diag DB corrupt
	3	Config Change DB corrupt
	2	General Config DB corrupt
	1	Vital Config DB corrupt
	0	Common DB corrupt
Database (BYTE7)	7	Comm Model key DB corrupt
	6	Calibration Record DB corrupt
	5	Volume strappingTable2 config DB corrupt.
	4	Volume strappingTable1 config DB corrupt.
	3	Level calibration Table2 config DB corrupt
	2	Level calibration Table1 config DB corrupt
	1	Sensor Algorithm config DB corrupt
	0	Model Number Mismatch
RAM (BYTE8)	7	Sensor DB config RAM corrupt
	6	Display Common Config DB RAM corrupt
	5	Display View Config DBRAM corrupt
	4	Adv Diag DB RAM corrupt
	3	Config Change DB RAM corrupt
	2	General Config DB RAM corrupt
	1	Vital Config DB RAM corrupt
	0	Common DB RAM corrupt

RAM (BYTE9)	7	Unused
	6	Steam Reference config DB RAM corrupt
	5	Volume strappingTable2 config DB RAM corrupt.
	4	Volume strappingTable1 config DBRAM corrupt.
	3	Level calibration Table2 confide RAM corrupt
	2	Level calibration Table1 confide RAM corrupt
	1	Sensor Algorithm config DB RAM corrupt
	0	Unused
Display (BYTE10)	7	Display screen 8 corrupt
	6	Display screen 7 corrupt
	5	Display screen 6 corrupt
	4	Display screen 5 corrupt
	3	Display screen 4 corrupt
	2	Display screen 3 corrupt
	1	Display screen 2 corrupt
	0	Display screen 1 corrupt

## 12 Performance

### 12.1 *Sampling Rates*

Typical sampling rates are shown in the following table.

**Table 13: Sampling Rates**

Primary Distance sensor sample	1 per second
Internal sensor sample	1 per second
PV digital value calculation	1 per second
SV digital value calculation	1 per second
TV digital value calculation	1 per second
QV digital value calculation	1 per second
Analog output update	1 per second

### 12.2 *Power-Up*

On power up, the transmitter initializes the data in RAM and the HART communication links and starts the task scheduler to sample the input.

The device will not respond to HART commands during the Power Up sequence.

Fixed-current mode is cancelled by power loss or software reset (command 42, for instance).

Typical Startup Time = 45 sec

HART communication start time = 50 sec

In very short succession after power is applied to the transmitter, the device will set its output to 50% (12 mA nominal), and then begin publishing the primary variable.



### 12.3 Device Reset

Command 42 "Perform Device Reset" causes the device to reset its microprocessor. The resulting restart is similar to the normal power up sequence. (See section 12.2).

The only difference is if the primary variable is valid at the start of the reset sequence. If so, it will be maintained until initialization is performed, and then a new calculation will be placed on the analog output channel.

### 12.4 Self Test

The transmitter keeps performing continuous self tests in the background. The device does support Command 237 "Self Test" through internal command.

### 12.5 Command Response Times

**Table 14: Response Times**

Minimum	18.236ms
Typical	64ms
Maximum	210.643ms

### 12.6 Busy and Delayed-Response

BUSY (32) response code implementation:

BUSY Response code is implemented for the commands, where NVM writing is involved. Each time when the NVM write command comes, first it is checked if the device is busy in writing NVM in background, when some configuration is done from display OR long string parameters like tag/date/descriptor, Long tag, Message from previous HART command, in the background task.

If device is busy in writing long string parameters then the device issues RC-32 to the HART command and completes the NVM write activity in hand in the command itself using its response time of 250ms. As device sends RC-32 to the HART command, the host is expected to send the same command again until it gets a success response code or till the limited number of retries as decided by host in case of BUSY RC.

If the NVM write background task is in progress for the parameters configured from display, the device sends BUSY RC to the host, and keeps on sending BUSY RC's to the next coming HART commands until it finishes this background task of NVM write.

For any IPC command if the Comm PWA is unable to respond in 240mSec as it may have not received response from sensor/display, for the first time it sends BUSY response so that host can retry, then if again the Comm PWA is unable to respond in 240mSec then it sends a Device specific error (RC=0x06) to HART host.

Delayed-response is used when configuring start, End distance to read the Echo curve.

## ***12.7 Long Messages***

The largest data field used is in the response to Commands 20 and 22: 32 bytes of long tag and Command 17: 24 bytes containing the packed ASCII message data.

## ***12.8 Non-Volatile Memory***

EEPROM is used to hold the device's configuration parameters. New data is written to this memory 20 seconds after the execution of a write command. When data is downloaded to the device, power to the transmitter should not be interrupted until the data is copied to the non volatile memory.

## ***12.9 Modes***

Fixed current mode is implemented, using Command 40. This mode is cleared by power loss or reset. When the device is in fixed current mode, the analog output will not track the input.

## ***12.10 Write Protection***

Write-protection is provided, selected by an external jumper as well as a software write protect (command 175 and 176). When the jumper is present, all commands are available.

## ***12.11 Damping***

The damping is available from 0 to 60 seconds in HART.

## Annex A. Capability Checklist

**Table 15: Capability checklist**

Manufacturer, model and revision	Honeywell Intl (23)., SLG 700, Rev.4
Device type	1 (Transmitter)
HART revision	7.x
Device Description available?	Yes
Number and type of sensors	1 (Internal)
Number and type of actuators	0
Number and type of host side signals	1:4 – 20mA analog
Number of Device Variables	15
Number of Dynamic Variables	4
Map able Dynamic Variables?	Yes
Number of common-practice commands	14
Number of device-specific commands	132
Bits of additional device status	85 (11 bytes are used)
Alternative operating modes?	No
Burst mode?	No
Capture Device Variables?	No
Write-protection?	Yes

## Annex B. Default Configuration

Table 16: Default Configuration

Parameter	Default value
Lower Range Value	0
Upper Range Value	10
PV Units	Meters
SV Units	%
TV Units	Meters
QV Units	Meters/second
Damping time constant	2 seconds
Fault-indication jumper	Up-scale
Write-protect jumper	Installed (write disabled)
Number of response preambles	7
Polling Address	0
Loop Current	Enable
Output mode	Analog

## Annex C. Revision History

Document Revision	Date	Device Revision	DD Revision	Description
1.0	5 Feb 2015			<p>1. Removed Below Commands: 138,139,141,155,156,157,158,166,167,168,179,202,203,204,218,219,64816,64817,64820,64821</p> <p>2. Added below commands: 64780,64781,64787,64788</p> <p>3. Modified below commands:142,147,148,149,154,159,165,169,170,201,210,64768,64769,64770,64771,195</p> <p>4.Updated command 48 &amp; 220 status bits</p>
2.0	25 Feb 2015			<p>Added range for decimal points in Command-64768</p> <p>Corrected Table number for Command 220 details</p>
3.0	12 May 2016			<p>Updated command 147, 148, 169, 170, 226, 64781, 48.</p> <p>Added new command 141, 166,167,168</p> <p>Updated command 141, 201 &amp; 148</p>
0.4	9 Sep 2016			<p>Added command 179, 202-204 for spare rook support</p>
0.5	18 Oct 2016			<p>Updated command 48, 220 and 179.</p> <p>Added command 135 for NVRAM corrupt alarm reset interface support</p>

0.6	25 Oct 2016			Added RC 67 (incompatible comm model number) in command 179  Added command 155 and 156
0.7	22 Nov 2016			Added command 157 and 158 for sensor update rate  Added two new status bits in command 48 byte 4.
0.8	5 June 2017			Added command 138, 139 and 140
0.9	11 July 2017			Added command 214 for additional Stem plot data and updated command 48 for licensed status  Added user friendly Response codes for all commands
1.0	18 October 2017			Added 1 status bit in command 48 and command 136 and updated VC as saturated steam
1.1	13 December	4	1	Corrected command 48 last byte name and updated capability checklist



## Sales and Service

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The Honeywell logo, consisting of the word "Honeywell" in a bold, red, sans-serif font.

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