MDE 232

HRT_IMVS2000v2 User Manual

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1 INTRODUCTION

The HRT_IMVS2000v2 is an electronic module that allows connecting the Biffi actuator IMVS2000v2 to an HART serial communication line. The module complies with HART Protocol Revision 7.5. The HRT_IMVS2000v2 has its microprocessor, it's controlled by a program stored internally, it works as a pure bus interface and does not affect the actuator control integrity. It is installed inside the actuator housing and the communication interface is powered from the actuator power supply module. The HART hardware modem is located on the module board. The data lines are fully isolated from the actuator electronics.

2 Reference Documents

[1] MAN720 IMVS2000v2 Instruction and Operating Manual

3 Operation and storage

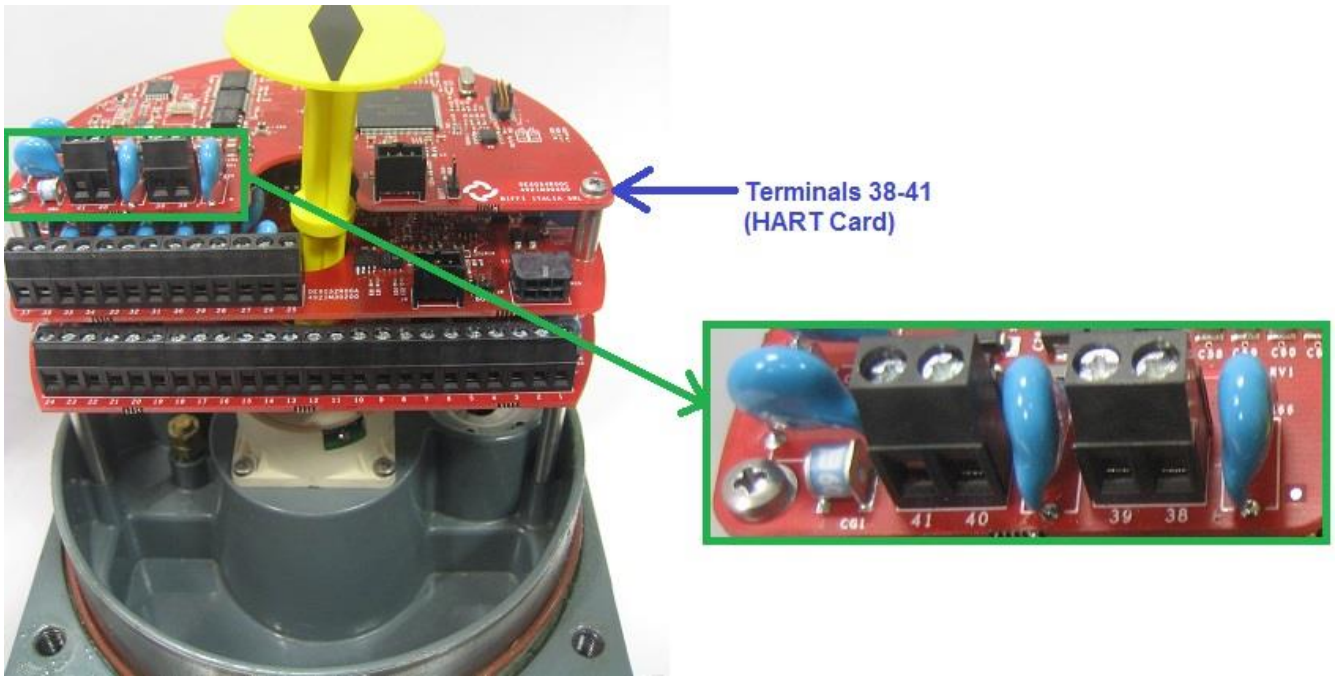
The module is designed to work and to be stored in the same environment of the actuator.

4 COMMUNICATION FEATURES

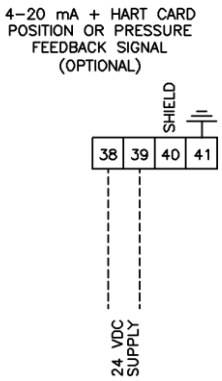
Communication Protocol:	HART Protocol Revision 7.5
Electrical Interface:	4-20mA analog loop, 2 wire communication
HART Signal:	Digital FSK Frequency Shift Keying (Bell 202 Standard)
Logical "0" frequency:	2200Hz
Logical "1" frequency:	1200Hz
Data rate:	Request/Response mode – 2/3 updates per seconds Optional Burst mode – 3/4 updates per seconds
Data transmission:	Master / Slave and Burst communication modes
Data byte structure:	1 start bit, 8 data bits, 1 odd parity bit, 1 stop bit
Command Structure:	**Type of command** — **Structure** UNIVERSAL — Common to all devices COMMON PRACTICE — Optional, used by many devices DEVICE SPECIFIC — For unique product features
HART Topology:	Point to point, Multidrop, Series Connection
Electrical power:	Bus powered Max Voltage 26.4V Min Voltage 19.2V
Max Load (cable + resistor) :	300 Ω
Device Type:	Transmitter
Device Impedance:	High impedance
Temperature:	-40°C, +75°C
Reversed polarity protection:	Present
EMC protections:	According to generic standard for industrial environments EN61000-6-2 and EN61000-6-4
Manufacturer ID Code:	183 (B7 Hex)
Device Type Code:	124 (7C Hex)

5 HART MODULE

The module consists in a single PCB that is installed inside the actuator housing. It is connected to the IMVS2000v2 base card via strip connector.



41: Protection Earth
40: Available connection for the cable Shield.
It is connected to the Protection Earth through a 2.2nF 4KV capacitor
39-38: HART + 4-20mA. Used to connect the HRT_IMVS2000v2 to the HART network.



5.1 Analog feedback signal

Maximum Current 20.3 mA
Minimum Current 3.8 mA
Multidrop Current 4.0 mA

The following values are measured according to the HCF_TEST-2 rev2.2.
Input Impedance 73.6 KΩ
Input Capacitance 5000pF

5.2 Process Variables

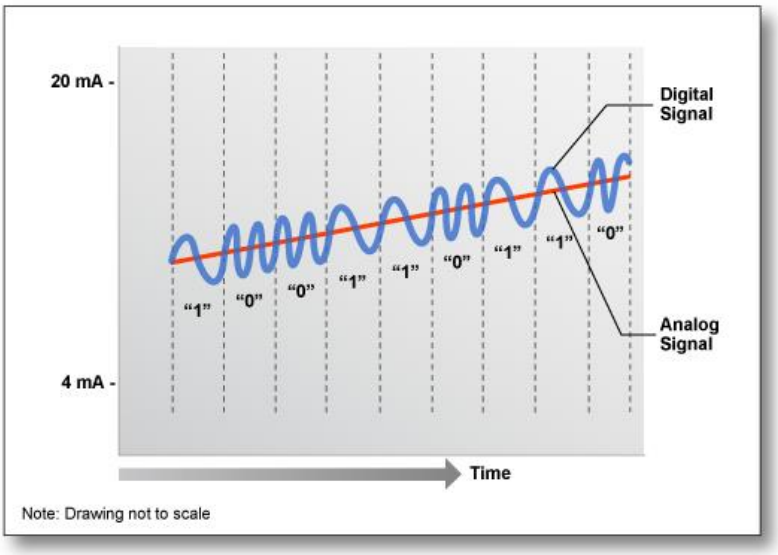
Default Process Variables are:

PV	Actuator Position
PV loop current	analogue 4-20mA output signal in mA
SV	Pressure1
TV	Pressure2
QV	Process Pressure

Process variables can be changed by Command #51 (see Section 8.2.3 for details).

6 HART PROTOCOL PREVIEWS

The HART bus combines the familiarity of using the 4-20mA signals with the benefits of the bus technology. In fact, by means of the simultaneous analogue and digital signals, additional information can be carried out on the same pair of wires together with the analogue 4-20mA signal. The digital communication signal has a response time of approximately 2-3 data updates per second without interrupting the analog signal.
HART is typically a request-response communication protocol, which means that during normal operation (2-3 data updates per second), each field device communication is initiated by a host communication device. Two hosts can connect to each HART loop. The primary host is generally a distributed control system (DCS), programmable logic controller (PLC), or a personal computer (PC). Our actuator interface is a transmitter field device.
The HRT_IMVS2000v2 Module supports the optional burst communication mode. Burst mode enables faster communication (3-4 data updates per second). In burst mode, the host instructs the field device to continuously broadcast a standard HART reply message (e.g., the value of the process variable). The host receives the message at the higher rate until it instructs the device to stop bursting.
The HART Communication Protocol is based on the Bell 202 telephone communication standard and operates using the frequency shift keying (FSK) principle. The digital signal is made up of two frequencies 1200 Hz and 2200 Hz representing bits 1 and 0, respectively. Sine waves of these two frequencies are superimposed on the direct current analog signal cables to provide simultaneous analog and digital communications. Because the average value of the FSK signal is always zero, the 4-20mA analog signal is not affected.



Digital over Analog

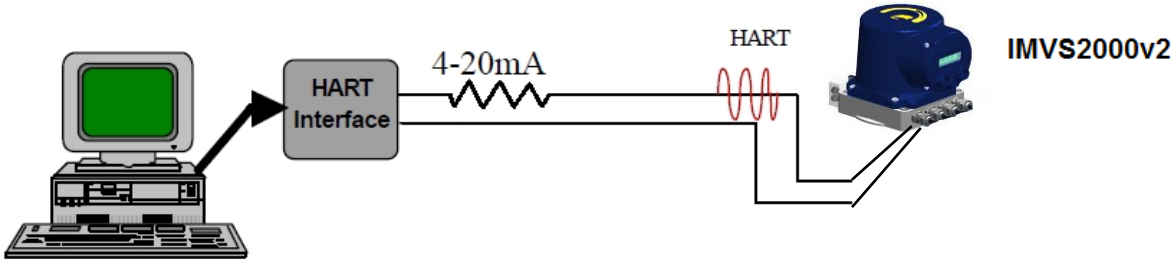
More information about HART is available in the official website http://www.hartcomm.org .

6.1 HART wirings

According to HART specification the following working modes are available: point to point and multidrop.
The factory configuration is POINT to POINT.

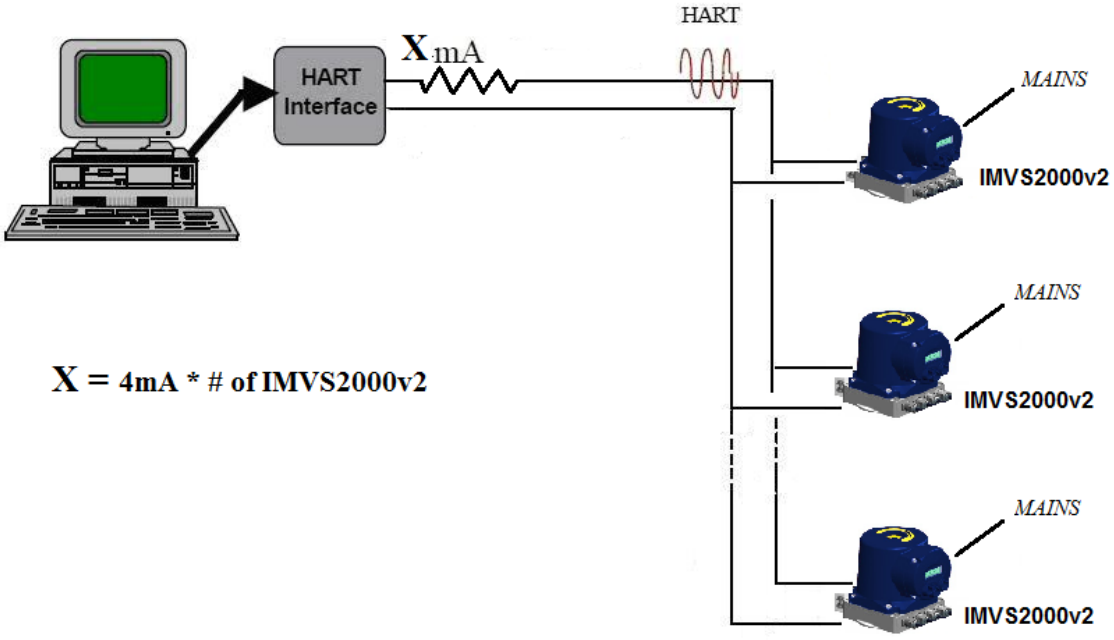
- **POINT TO POINT**

In point to point mode, the 4-20mA signal is used to communicate one process variable, while additional process variables, configuration parameters, and other device data are transferred digitally using the HART Protocol. The 4-20mA analog signal is not affected by the HART signal and can be used for control. The HART communication digital signal gives access to secondary variables and other data that can be used for operations, commissioning, maintenance and diagnostic purposes.



- **MULTIDROP**

The Multidrop Mode requires only a single pair of wires and can control up to 16 devices connected in parallel. All process values are transmitted digitally. In Multidrop mode, each field device must have a unique polling address, different from each other in the range 0-15. The current of the loop is fixed to a minimum value (typically 4mA for each device).



7 HART COMMANDS

The HART Command Set provides uniform and consistent communication for all field devices. The command set includes three classes: Universal, Common Practice, and Device Specific.
Host applications may implement any of the necessary commands for a particular application.

- **UNIVERSAL**

All devices using the HART Protocol must recognize and support the universal commands. Universal commands provide access to information useful in normal operations (e.g., read primary variable and units).

Universal Commands	
0	Read Unique Identifier
1	Read Primary Variable
2	Read Loop Current and Percent of Range
3	Read Dynamic Variables and Loop Current
6	Write Polling Address
7	Read Loop Configuration
8	Read Dynamic Variable Classifications
9	Read Device Variables with Status
11	Read Unique Identifier Associated With Tag
12	Read Message
13	Read Tag, Descriptor, Date
14	Read Primary Variable Transducer Information
15	Read Device Information
16	Read Final Assembly Number
17	Write Message
18	Write Tag, Descriptor, Date
19	Write Final Assembly Number
20	Read Long Tag
21	Read Unique Identifier Associated With Long Tag
22	Write Long Tag
38	Reset Configuration Changed Flag
48	Read Additional Device Status

- **COMMON PRACTICE**

Common Practice commands provide functions implemented by many, but not necessarily all, HART communication devices.

Common Practice Commands	
40	Enter/Exit Fixed Current Mode
42	Perform Device Reset
50	Read Dynamic Variable Assignment
51	Write Dynamic Variable Assignment
54	Read Device Variable Information
59	Write Number of Response Preamble
79	Write Device Variable
95	Read Device Communication Statistics
103	Write Burst Period
104	Write Burst Trigger
105	Read Burst Mode Configuration
107	Write Burst Device Variables
108	Write Burst Mode Command Number
109	Burst Mode Control

- **DEVICE SPECIFIC**

Device Specific commands represent functions that are unique to each field device. These commands access setup and calibration information, as well as information about the construction of the device. Information on Device Specific commands is available from device manufacturers.

Device Specific Commands	
128	Read Parameters1
129	Write Parameters1
130	Read Parameters2
131	Write Parameters2
132	Read Parameters4
133	Write Parameters4
134	Read ParametersE
135	Write ParametersE
136	Read ParametersF
137	Write ParametersF
138	Read Dates
139	Write Dates
140	Read Times
141	Write Times
142	Read Alarms Log
143	Read Strings20
144	Write Strings20
145	Read Strings16
146	Write Strings16
	Continue…

Device Specific Commands
…Continue
147 Read Strings12
148 Write Strings12
149 Read Strings10
150 Write Strings10
151 Read Curve ID and Type
152 Write Curve ID and Type
153 Read Curve Data Header
154 Read Curve Samples Pressure1 - Part 1
155 Read Curve Samples Pressure1 - Part 2
156 Read Curve Samples Pressure1 - Part 3
157 Read Curve Samples Pressure1 - Part 4
158 Read Curve Samples Pressure1 - Part 5
159 Read Curve Samples Pressure1 - Part 6
160 Read Curve Samples Pressure1 - Part 7
161 Read Curve Samples Pressure2 - Part 1
162 Read Curve Samples Pressure2 - Part 2
163 Read Curve Samples Pressure2 - Part 3
164 Read Curve Samples Pressure2 - Part 4
165 Read Curve Samples Pressure2 - Part 5
166 Read Curve Samples Pressure2 - Part 6
167 Read Curve Samples Pressure2 - Part 7
168 Read Curve Samples Process Pressure - Part 1
169 Read Curve Samples Process Pressure - Part 2
170 Read Curve Samples Process Pressure - Part 3
171 Read Curve Samples Process Pressure - Part 4
172 Read Curve Samples Process Pressure - Part 5
173 Read Curve Samples Process Pressure - Part 6
174 Read Curve Samples Process Pressure - Part 7
175 Read Curve Samples Position - Part 1
176 Read Curve Samples Position - Part 2
177 Read Curve Samples Position - Part 3
178 Read Curve Samples Position - Part 4
179 Read Curve Samples Position - Part 5
180 Read Curve Samples Position - Part 6
181 Read Curve Samples Position - Part 7
182 Read Curve Samples P1-P2 - Part 1
183 Read Curve Samples P1-P2 - Part 2
184 Read Curve Samples P1-P2 - Part 3
185 Read Curve Samples P1-P2 - Part 4
186 Read Curve Samples P1-P2 - Part 5
187 Read Curve Samples P1-P2 - Part 6
188 Read Curve Samples P1-P2 - Part 7
189 Read Logic Card Firmware Revision

All slave response messages return two Command Status bytes in the first two bytes of the Data field. The first byte is multiplexed and contains either the Communication Status (most significant bit is set) or the Response Code (most significant bit is reset). The second byte of a slave response message always contains Field Device Status.
The Response Data Bytes are not returned if a communications or command error is reported in the Command Status Bytes.

The **Communication Status** is returned if a communication error is detected by the field device.

Bit Mask	Communication Status Definition
0x80	**1** – this bit is always set to indicate a communication error
0x40	**Vertical Parity Error** – the parity of one or more of the bytes received by the device was not odd.
0x20	**Overrun Error** – At least one byte of data in the receive buffer of the UART was overwritten before it was read.
0x10	**Framing Error** – the Stop Bit of one or more bytes received by the device was not detected by the UART.
0x08	**Longitudinal Parity Error** – the Longitudinal Parity calculated by the device did not match the Check Byte at the end of the message.
0x04	**Reserved** – always 0
0x02	**Buffer Overflow** – the message was too long for the receive buffer of the device.
0x01	**Reserved** – always 0

If no communication errors are detected the first byte in the Data Field contains the **Response Code.** The Response Code describes the result of the executed command.
The Response Code is encoded as a 7-bit enumeration (between 0 and 127).

There are 3 Classification Response Codes:

- **Notification:** the command sent by the Master is executed properly by the Slave.
- **Warning:** the command sent by the Master is executed with the deviation as described in the response.
- **Error:** the command sent by the Master was not properly completed and the Response Code indicates the reason.

See the appropriate Response Code Table for each command.

The second data byte in a Slave-to-Master frame is a bit field table that represent the current operating status of the slave.

Bit Mask	Communication Status Definition
0x80	**Device Malfunction** – The device detected a serious error or failure that compromises device operation.
0x40	**Configuration Changed** – An operation was performed that changed the device's configuration.
0x20	**Cold Start –** A power failure or Device Reset has occurred.
0x10	**More Status Available** – More status information is available via command 48, Read Additional Device Status
0x08	**Loop Current Fixed** – The Loop Current is being held at a fixed value and is not responding to process variations.
0x04	**Loop Current Saturated –** The Loop Current has reached its upper (or lower) endpoint limit and cannot increase (or decrease) any further.
0x02	**Non-Primary Variable Out of Limits** – A Device Variable not mapped to PV is beyond its operating limits.
0x01	**Primary Variable Out of Limits** – The PV is beyond its operating limit.

Device Malfunction bit is set if a generic alarm or warning is active, maintenance operation is required, one or more device variables are not loaded by the logic card or Main Voltage alarm is active.

Configuration Changed bit is set if one or more parameters are modified.

Cold Start bit is set after a power on or reset operation has occurred.

More Status Available bit is set if additional device status data bytes are changed.

Loop Current Fixed bit is set if Loop Current Mode is disabled.

Loop Current Saturated bit is set if Loop Current value reached 20mA.

"Non-Primary Variable Out of Limits" and "Primary variable Out of Limits" bits are not used. These bits are always set to 0.

8 HART COMMAND SET

8.1 Universal Commands

N°	Command Description
0	Read Unique Identifier
1	Read Primary Variable
2	Read Loop Current and Percent of Range
3	Read Dynamic Variables and Loop Current
6	Write Polling Address
7	Read Loop Configuration
8	Read Dynamic Variable Classifications
9	Read Device Variables with Status
11	Read Unique Identifier Associated with Tag
12	Read Message
13	Read Tag, Descriptor, Date
14	Read Primary Variable Transducer Information
15	Read Device Information
16	Read Final Assembly Number
17	Write Message
18	Write Tag, Descriptor, Date
19	Write Final Assembly Number
20	Read Long Tag
21	Read Unique Identifier Associated with long Tag
22	Write Long Tag
38	Reset Configuration Changed Flag
48	Read Additional Device Status

8.1.1 Command #0: Read Unique Identifier

This command returns identity information about the field device including: Device Type, revision levels, and Device ID.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	"254" – Fixed Value
1-2	Enum	Expanded Device Type Code (see Section 8.4, Table 1)
3	Unsigned-8	5 = Minimum number of preambles required for the request message from the Master to the Slave
4	Unsigned-8	7 = HART Protocol Major Revision
5	Unsigned-8	Device Revision
6	Unsigned-8	Software Revision
7	Unsigned-5	MSB (5 bits) – Hardware Revision
7	Enum	LSB (3 bits) – Physical Signalling Code (see Section 8.4, Table 10)
8	Bits	Flag Assignement (see Section 8.4, Table 11)
9-11	Unsigned-24	Device ID
12	Unsigned-8	Minimum Number of preambles to be sent with the response message from the Slave to the Master.
13	Unsigned-8	Maximum Number of Device Variables.
14-15	Unsigned-16	Configuration Change Counter
16	Bits	Extended Field Device Status (see Section 8.4, Table 17)
17-18	Enum	Manufacturer Identification Code (see Section 8.4, Table 8)
19-20	Enum	Private Label Distributor Code (see Section 8.4, Table 8)
21	Enum	Device Profile (see Section 8.4, Table 57)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-127		Undefined

8.1.2 Command #1: Read Primary Variable

This command returns the Primary Variable value whit its Unit Code.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Enum	Primary Variable Units Code (see Section 8.4, Table 2)
1-4	Float	Primary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7		Undefined
8	Warning	Update Failure
9-15		Undefined
16	Error	Access Restricted
1-127		Undefined

8.1.3 Command #2: Read Loop Current and Percent of Range

This command reads the Loop Current and its associated Percent of Range.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Primary Variable Loop Current (units of mA)
4-7	Float	Primary Variable Percent of Range (units of percent)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7		Undefined
8	Warning	Update Failure
9-15		Undefined
16	Error	Access Restricted
17-127		Undefined

8.1.4 Command #3: Read Dynamic Variables and Loop Current

This command reads the Loop Current and the four Dynamic Variables.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Primary Variable Loop Current (units of mA)
4	Enum	Primary Variable Units Code (see Section 8.4, Table 2)
5-8	Float	Primary Variable
9	Enum	Secondary Variable Units Code (see Section 8.4, Table 2)
10-13	Float	Secondary Variable
14	Enum	Tertiary Variable Units Code (see Section 8.4, Table 2)
15-18	Float	Tertiary Variable
19	Enum	Quaternary Variable Units Code (see Section 8.4, Table 2)
20-23	Float	Quaternary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7		Undefined
8	Warning	Update Failure
9-15		Undefined
16	Error	Access Restricted
17-127		Undefined

8.1.5 Command #6: Write Polling Address

This command permits to write the Polling Address and the Loop Current mode to the field device.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode (see Section 8.4, Table 16)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode (see Section 8.4, Table 16)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Poll Address Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8-11		Undefined
12	Error	Invalid Mode Selection
13-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.6 Command #7: Read Loop Configuration

This command reads the Polling Address and the Loop Current mode.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Polling Address of Device
1	Enum	Loop Current Mode (see Section 8.4, Table 16)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-127		Undefined

8.1.7 Command #8: Read Dynamic Variable Classifications

This command reads the classification associated with the Dynamic Variables.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Enum	Primary Variable Classification (see Section 8.4, Table 21)
1	Enum	Secondary Variable Classification (see Section 8.4, Table 21)
2	Enum	Tertiary Variable Classification (see Section 8.4, Table 21)
3	Enum	Quaternary Variable Classification (see Section 8.4, Table 21)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-127		Undefined

8.1.8 Command #9: Read Device Variables with Status

This command allows a Master to request the value and status of up to 8 Device or Dynamic Variables.
If the Field Device receives 1, 2, 3, 4, 5, 6, or 7 Request Data Bytes it returns only the corresponding number of Device Variables.

N. of Device Variables Requested	N. of Request Data Bytes	N. Response Data Bytes
1	1	13
2	2	21
3	3	29
4	4	37
5	5	45
6	6	53
7	7	61
8	8	69

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Slot 0: Device Variable Code (see Section 9.1)
1	Unsigned-8	Slot 1: Device Variable Code (see Section 9.1)
2	Unsigned-8	Slot 2: Device Variable Code (see Section 9.1)
3	Unsigned-8	Slot 3: Device Variable Code (see Section 9.1)
4	Unsigned-8	Slot 4: Device Variable Code (see Section 9.1)
5	Unsigned-8	Slot 5: Device Variable Code (see Section 9.1)
6	Unsigned-8	Slot 6: Device Variable Code (see Section 9.1)
7	Unsigned-8	Slot 7: Device Variable Code (see Section 9.1)

Response Data Bytes

Byte	Format	Description
0	Bits	Extended Field Device Status (see Section 8.4, Table 17)
1	Unsigned-8	Slot 0: Device Variable Code (see Section 9.1)
2	Enum	Slot 0: Device Variable Classification (see Section 8.4, Table 21)
3	Enum	Slot 0: Units Code (see Section 8.4, Table 2)
4-7	Float	Slot 0: Device Variable Value
8	Bits	Slot 0: Device Variable Status (see Section 9.2)
9	Unsigned-8	Slot 1: Device Variable Code (see Section 9.1)
10	Enum	Slot 1: Device Variable Classification (see Section 8.4, Table 21)
11	Enum	Slot 1: Units Code (see Section 8.4, Table 2)
12-15	Float	Slot 1: Device Variable Value
16	Bits	Slot 1: Device Variable Status (see Section 9.2)
17	Unsigned-8	Slot 2: Device Variable Code (see Section 9.1)
18	Enum	Slot 2: Device Variable Classification (see Section 8.4, Table 21)
19	Enum	Slot 2: Units Code (see Section 8.4, Table 2)
20-23	Float	Slot 2: Device Variable Value
24	Bits	Slot 2: Device Variable Status (see Section 9.2)
25	Unsigned-8	Slot 3: Device Variable Code (see Section 9.1)

26	Enum	Slot 3: Device Variable Classification (see Section 8.4, Table 21)
27	Enum	Slot 3: Units Code (see Section 8.4, Table 2)
28-31	Float	Slot 3: Device Variable Value
32	Bits	Slot 3: Device Variable Status (see Section 9.2)
33	Unsigned-8	Slot 4: Device Variable Code (see Section 9.1)
34	Enum	Slot 4: Device Variable Classification (see Section 8.4, Table 21)
35	Enum	Slot 4: Units Code (see Section 8.4, Table 2)
36-39	Float	Slot 4: Device Variable Value
40	Bits	Slot 4: Device Variable Status (see Section 9.2)
41	Unsigned-8	Slot 5: Device Variable Code (see Section 9.1)
42	Enum	Slot 5: Device Variable Classification (see Section 8.4, Table 21)
43	Enum	Slot 5: Units Code (see Section 8.4, Table 2)
44-47	Float	Slot 5: Device Variable Value
48	Bits	Slot 5: Device Variable Status (see Section 9.2)
49	Unsigned-8	Slot 6: Device Variable Code (see Section 9.1)
50	Enum	Slot 6: Device Variable Classification (see Section 8.4, Table 21)
51	Enum	Slot 6: Units Code (see Section 8.4, Table 2)
52-55	Float	Slot 6: Device Variable Value
56	Bits	Slot 6: Device Variable Status (see Section 9.2)
57	Unsigned-8	Slot 7: Device Variable Code (see Section 9.1)
58	Enum	Slot 7: Device Variable Classification (see Section 8.4, Table 21)
59	Enum	Slot 7: Units Code (see Section 8.4, Table 2)
60-63	Float	Slot 7: Device Variable Value
64	Bits	Slot 7: Device Variable Status (see Section 9.2)
65-68	Time	Slot 0 Data Time Stamp

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7		Undefined
8	Warning	Update Failure
9-13		Undefined
14	Warning	Dynamic Variables Returned for Device Variables
15		Undefined
16	Error	Access Restricted
17-29		Undefined
30	Warning	Command Response Truncated
31-127		Undefined

8.1.9 Command #11: Read Unique Identifier associated with Tag

This command returns identity information about the field device including: Device Type, revision levels, and Device ID.

Request Data Bytes

Byte	Format	Description
0-5	Packed	Tag

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	"254" – Fixed Value
1-2	Enum	Expanded Device Type Code (see Section 8.4, Table 1)
3	Unsigned-8	5 = Minimum number of preambles required for the request message from the Master to the Slave
4	Unsigned-8	7 = HART Protocol Major Revision
5	Unsigned-8	Device Revision
6	Unsigned-8	Software Revision
7	Unsigned-5	MSB (5 bits) – Hardware Revision
7	Enum	LSB (3 bits) – Physical Signalling Code (see Section 8.4, Table 10)
8	Bits	Flag Assignement (see Section 8.4, Table 11)
9-11	Unsigned-24	Device ID
12	Unsigned-8	Minimum Number of preambles to be sent with the response message from the Slave to the Master.
13	Unsigned-8	Maximum Number of Device Variables.
14-15	Unsigned-16	Configuration Change Counter
16	Bits	Extended Field Device Status (see Section 8.4, Table 17)
17-18	Enum	Manufacturer Identification Code (see Section 8.4, Table 8)
19-20	Enum	Private Label Distributor Code (see Section 8.4, Table 8)
21	Enum	Device Profile (see Section 8.4, Table 57)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-127		Undefined

8.1.10 Command #12: Read Message

This command reads the Message contained within the field device.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-23	Packed	Message

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.11 Command #13: Tag, Descriptor, Date

This command reads the Tag, Descriptor and Date contained within the field device. Only Tag is read by this command. Tag and Long Tag are completely separate data items.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

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

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.12 Command #14: Read Primary Variable Transducer Information

This command reads the Transducer Serial Number, Limits/Minimum Span Units Code, Upper Transducer Limit, Lower Transducer Limit, and Minimum Spar for the Primary Variable transducer.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-2	Unsigned-24	Transducer Serial Number
3	Enum	Transducer Limits and Minimum Span units Code (see Section 8.4, Table 2)
4-7	Float	Upper Transducer Limit
8-11	Float	Lower Transducer Limit
12-15	Float	Minimum Span

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.13 Command #15: Read Device Information

This command reads the alarm selection code, transfer function code, range values units code, upper range value, Primary Variable lower range value, damping value and write protect code.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Enum	PV Alarm Selection Code (see Section 8.4, Table 6)
1	Enum	PV Transfer Function Code (see Section 8.4, Table 3)
2	Enum	PV Upper and Lower Range Values Units Code (see Section 8.4, Table 2)
3-6	Float	PV Upper Range Value
7-10	Float	PV Lower Range Value
11-14	Float	PV Damping Value (units of seconds)
15	Enum	Write Protect Code (see Section 8.4, Table 7)
16	Enum	Reserved. "250"
17	Bits	PV Analog Channel Flags (see Section 8.4, Table 26)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.14 Command #16: Read Final Assembly Number

This command reads the final assembly number associated within the field device. The Final Assembly Number is used for identifying the materials and electronics that comprise the field device.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

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

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.15 Command #17: Write Message

This command permits to write the Message into the field device.

Request Data Bytes

Byte	Format	Description
0-23	Packed	A Message string used by the Master for record keeping

Response Data Bytes

Byte	Format	Description
0-23	Packed	Message string

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.16 Command #18: Write Tag, Descriptor, Date

This command permits to write the Tag, Descriptor and Date into the field device. Only the Tag is written here. The Tag and Long Tag are completely separate data items.

Request Data Bytes

Byte	Format	Description
0-5	Packed	Tag
6-17	Packed	Descriptor used by the Master for record keeping
18-20	Date	A Date Code used by the Master for record keeping

Response Data Bytes

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

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8		Undefined
9	Error	Invalid Date Code Detected
10-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.17 Command #19: Write Final Assembly Number

This command permits to write the Final Assembly Number into the field device.

Request Data Bytes

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

Response Data Bytes

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

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.18 Command #20: Read Long Tag

This command reads the Long Tag. Only the Long Tag is read here. The Tag and Long Tag are completely separate data items.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.1.19 Command #21: Read Unique Identifier associated with Long Tag

This command returns identity information about the field device including: the Device Type, revision levels and Device ID.

Request Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	"254" – Fixed Value
1-2	Enum	Expanded Device Type Code (see Section 8.4, Table 1)
3	Unsigned-8	5 = Minimum number of preambles required for the request message from the Master to the Slave
4	Unsigned-8	7 = HART Protocol Major Revision
5	Unsigned-8	Device Revision
6	Unsigned-8	Software Revision
7	Unsigned-5	MSB (5 bits) – Hardware Revision
7	Enum	LSB (3 bits) – Physical Signalling Code (see Section 8.4, Table 10)
8	Bits	Flag Assignement (see Section 8.4, Table 11)
9-11	Unsigned-24	Device ID
12	Unsigned-8	Minimum Number of preambles to be sent with the response message from the Slave to the Master.
13	Unsigned-8	Maximum Number of Device Variables.
14-15	Unsigned-16	Configuration Change Counter
16	Bits	Extended Field Device Status (see Section 8.4, Table 17)
17-18	Enum	Manufacturer Identification Code (see Section 8.4, Table 8)
19-20	Enum	Private Label Distributor Code (see Section 8.4, Table 8)
21	Enum	Device Profile (see Section 8.4, Table 57)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-127		Undefined

8.1.20 Command #22: Write Long Tag

This command allows a Master to write the Long Tag into the field device. Only the Long Tag is written here. The Tag and Long Tag are completely separate data items.

Request Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Response Data Bytes

Byte	Format	Description
0-31	Latin-1	Long Tag

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33	Error	Delayed Response Initiated
34	Error	Delayed Response Running
35	Error	Delayed Response Dead
36	Error	Delayed Response Conflict
37-127		Undefined

8.1.21 Command #38: Reset Configuration Changed Flag

This command allows a Master to reset the Configuration Change Flag into the field device.

Request Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Configuration Change Counter

Response Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Configuration Change Counter

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8		Undefined
9	Error	Configuration Change Counter Mismatch
10-15		Undefined
16	Error	Access Restricted
17-127		Undefined

8.1.22 Command #48: Read Additional Device Status

This command returns the device status information, device specific status information, Extended Device Status, Device Operating Mode and Standardized Status.

Request Data Bytes

Byte	Format	Description
0-5	Bits or Enum	Device-Specific Status
6	Bits	Extended Device Status
7	Bits	Device Operating Mode
8	Bits	Standardized Status 0
9	Bits	Standardized Status 1
10	Bits	Analog Channel Saturated
11	Bits	Standardized Status 2
12	Bits	Standardized Status 3
13	Bits	Analog Channel Fixed
14	Bits	Device-Specific Status1
15	Bits	Device-Specific Status2
16	Bits	Device-Specific Status3
17	Bits	Device-Specific-Status4
18	Bits	Device-Specific Status5
19	Bits	Device-Specific-Status6

See “Request and Response Data Field” table on the next page for details.

Response Data Bytes

Byte	Format	Description
0-5	Bits or Enum	Device-Specific Status
6	Bits	Extended Device Status
7	Bits	Device Operating Mode
8	Bits	Standardized Status 0
9	Bits	Standardized Status 1
10	Bits	Analog Channel Saturated
11	Bits	Standardized Status 2
12	Bits	Standardized Status 3
13	Bits	Analog Channel Fixed
14	Bits or Enum	Device-Specific Status
15	Bits	Device-Specific Status2
16	Bits	Device-Specific Status3
17	Bits	Device-Specific-Status4
18	Bits	Device-Specific Status5
19	Bits	Device-Specific-Status6

See “Request and Response Data Field” table on the next page for details.

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7		Undefined
8	Warning	Update In Progress
9-15		Undefined
16	Error	Access Restricted
17-127		Undefined

Request and Response Data Field

Byte	Bit	Meaning	Class	Device Status Bits Set
0		Reserved		
1		Reserved		
2		Reserved		
3		Reserved		
4		Reserved		
5		Reserved		
6	0	Maintenance Required	Warning	4, 7
	1	Device Variable Alert	Warning	4, 7
	2	Not used		
	3	Not used		
	4	Not used		
	5	Not used		
	6	Not used		
	7	Not used		
7		Reserved - Not used		
8	0	Not used		
	1	Not used		
	2	Not used		
	3	Not used		
	4	Not used		
	5	Not used		
	6	Not used		
	7	Not used		
9		Not used		
10		Not used		
11		Not used		
12		Not used		
13		Not used		

Continue…

Byte	Bit	Meaning	Class	Device Status Bits Set
…Continue				
14	0	PSCL Alarm	Error	4, 7
	1	PSCT Alarm	Error	4, 7
	2	PSSB Alarm	Error	4, 7
	3	PSFB Alarm	Error	4, 7
	4	PSST Alarm	Error	4, 7
	5	PSFT Alarm	Error	4, 7
	6	PSSP Alarm	Error	4, 7
	7	PSSR Alarm	Error	4, 7
15	0	PSLB Alarm	Error	4, 7
	1	PSHB Alarm	Error	4, 7
	2	PSNM Alarm	Error	4, 7
	3	PSA Alarm	Error	4, 7
	4	PSB Alarm	Error	4, 7
	5	SISA Alarm	Error	4, 7
	6	SISB Alarm	Error	4, 7
	7	OPOS Alarm	Error	4, 7
16	0	CPOS Alarm	Error	4, 7
	1	LSP Alarm	Error	4, 7
	2	HSP Alarm	Error	4, 7
	3	LPP Alarm	Error	4, 7
	4	HPP Alarm	Error	4, 7
	5	OPNM Alarm	Error	4, 7
	6	CLNM Alarm	Error	4, 7
	7	OPCT Alarm	Error	4, 7
17	0	CLCT Alarm	Error	4, 7
	1	FSCL Alarm	Error	4, 7
	2	SOBT Alarm	Error	4, 7
	3	FOBT Alarm	Error	4, 7
	4	SOTT Alarm	Error	4, 7
	5	FOTT Alarm	Error	4, 7
	6	SCBT Alarm	Error	4, 7
	7	FCBT Alarm	Error	4, 7
18	0	SCTT Alarm	Error	4, 7
	1	FCTT Alarm	Error	4, 7
	2	OHBP Alarm	Error	4, 7
	3	OLBP Alarm	Error	4, 7
	4	CHBP Alarm	Error	4, 7
	5	CLBP Alarm	Error	4, 7
	6	PS1 Alarm	Error	4, 7
	7	PS2 Alarm	Error	4, 7
Continue…				

Byte	Bit	Meaning	Class	Device Status Bits Set
…Continue				
19	0	PPS Alarm	Error	4, 7
	1	POS Alarm	Error	4, 7
	2	BUS Alarm	Error	4, 7
	3	MNT Alarm	Error	4, 7
	4	CAL Alarm	Error	4, 7
	5	Not Used	Error	4, 7
	6	Not Used	Error	4, 7
	7	Not Used	Error	4, 7

Bytes 0-5 are reserved for manufacturer use; they are always set to 0.
"**Maintenance Required**" bit is set to 1 when the date of the next maintenance operation is reached.
"**Device Variable Alert**" bit is set to 1 if one or more variable values is not correctly loaded by the device.
"**PSCL Alarm**" bit is set to 1 if PSCL alarm is active.
"**PSCT Alarm**" bit is set to 1 if PSCT alarm is active.
"**PSSB Alarm**" bit is set to 1 if PSSB alarm is active.
"**PSFB Alarm**" bit is set to 1 if PSFB alarm is active.
"**PSST Alarm**" bit is set to 1 if PSST alarm is active.
"**PSFT Alarm**" bit is set to 1 if PSFT alarm is active.
"**PSSP Alarm**" bit is set to 1 if PSSP alarm is active.
"**PSSR Alarm**" bit is set to 1 if PSSR alarm is active.
"**PSLB Alarm**" bit is set to 1 if PSLB alarm is active.
"**PSHB Alarm**" bit is set to 1 if PSHB alarm is active.
"**PSNM Alarm**" bit is set to 1 if PSNM alarm is active.
"**PSA Alarm**" bit is set to 1 if PSA alarm is active.
"**PSB Alarm**" bit is set to 1 if PSB alarm is active.
"**SISA Alarm**" bit is set to 1 if SISA alarm is active.
"**SISB Alarm**" bit is set to 1 if SISB alarm is active.
"**OPOS Alarm**" bit is set to 1 if OPOS alarm is active.
"**CPOS Alarm**" bit is set to 1 if CPOS alarm is active.
"**LSP Alarm**" bit is set to 1 if LSP alarm is active.
"**HSP Alarm**" bit is set to 1 if HSP alarm is active.
"**LPP Alarm**" bit is set to 1 if LPP alarm is active.
"**HPP Alarm**" bit is set to 1 if HPP alarm is active.
"**OPNM Alarm**" bit is set to 1 if OPNM alarm is active.
"**CLNM Alarm**" bit is set to 1 if CLNM alarm is active.
"**OPCT Alarm**" bit is set to 1 if OPCT alarm is active.
"**SCTT Alarm**" bit is set to 1 if SCTT alarm is active.
"**FCTT Alarm**" bit is set to 1 if FCTT alarm is active.
"**OHBP Alarm**" bit is set to 1 if OHBP alarm is active.
"**OLBP Alarm**" bit is set to 1 if OLBP alarm is active.
"**CHBP Alarm**" bit is set to 1 if CHBP alarm is active.
"**CLBP Alarm**" bit is set to 1 if CLBP alarm is active.
"**PS1 Alarm**" bit is set to 1 if PS1 alarm is active.
"**PS2 Alarm**" bit is set to 1 if PS2 alarm is active.

"**PPS Alarm**" bit is set to 1 if PPS alarm is active.
"**POS Alarm**" bit is set to 1 if POS alarm is active.
"**BUS Alarm**" bit is set to 1 if BUS alarm is active.
"**MNT Alarm**" bit is set to 1 if MNT alarm is active.
"**CAL Alarm**" bit is set to 1 if CAL alarm is active.
"**Not used**" bits and bytes are always set to 0.

8.2 Common Practice Commands

The following common-practice commands are implemented:

N°	Command Description
40	Enter/Exit Fixed Current Mode
42	Perform Device Reset
50	Read Dynamic Variable Assignment
51	Write Dynamic Variable Assignment
54	Read Device Variable Information
59	Write Number of Response Preambles
79	Write Device Variable
95	Read Device Communications Statistics
103	Write Burst Period
104	Write Burst Trigger
105	Read Burst Mode Configuration
107	Write Burst Device Variables
108	Write Burst Mode Command Number
109	Burst Mode Control

8.2.1 Command #40: Enter/Exit Fixed Current Mode

The device is placed in Fixed Current Mode with the Loop Current set to the value received. The value returned in the response data bytes reflects the rounded or truncated value actually used by the device. A level of '0' exits the Fixed Current Mode. Fixed Current Mode is also exited when the power is removed from device or upon performing a Device Reset.

Request Data Bytes

Byte	Format	Description
0-3	Float	PV Fixed Current Level (units of milliamperes)

Response Data Bytes

Byte	Format	Description
0-3	Float	Actual PV Current Level

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-2		Undefined
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
7	Error	In Write Protect Mode
8-10		Undefined
11	Error	Loop Current Not Active (Device in Multidrop Mode)
12-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.2.2 Command #42: Perform Device Reset

This command resets the field device. This is equivalent to cycling the power off and then back on to the field device. The field device may not respond to subsequent commands until the reset is complete.

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
1-5		Undefined
6	Error	Device-Specific Command Error
7-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.2.2.1 Command #50: Read Dynamic Variable Assignments

Responds with the Device Variable Numbers that are assigned to the Primary, Secondary, Tertiary and Quaternary Variables.
Unsupported Dynamic Variables returns “250” (Not Used) as the Device Variable assigned.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Primary Variable
1	Unsigned-8	Device Variable assigned to the Secondary Variable
2	Unsigned-8	Device Variable assigned to the Tertiary Variable
3	Unsigned-8	Device Variable assigned to the Quaternary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7-15		Undefined
16	Error	Access Restricted
17-127		Undefined

See Command #51: Write Dynamic Variable Assignments for available Device Variable Codes.

8.2.3 Command #51: Write Dynamic Variable Assignments

Assigns Device Variables to the Primary, Secondary, Tertiary and Quaternary Variables.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Primary Variable
1	Unsigned-8	Device Variable assigned to the Secondary Variable
2	Unsigned-8	Device Variable assigned to the Tertiary Variable
3	Unsigned-8	Device Variable assigned to the Quaternary Variable

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable assigned to the Primary Variable
1	Unsigned-8	Device Variable assigned to the Secondary Variable
2	Unsigned-8	Device Variable assigned to the Tertiary Variable
3	Unsigned-8	Device Variable assigned to the Quaternary Variable

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

PV Codes available:
Device Variable 0: Actuator Position (Default PV)
Device Variable 2: Pressure1
Device Variable 3: Pressure2
Device Variable 4: Process Pressure

SV Codes available:
Device Variable 0: Actuator Position
Device Variable 1: Position Request
Device Variable 2: Pressure1 (Default SV)
Device Variable 3: Pressure2
Device Variable 4: Process Pressure
Device Variable 5: Active Alarms
Device Variable 7: Calibration Status
Device Variable 10: Baseline Signature Status
Device Variable 11: Maintenance Signature Status

Device Variable 14: Baseline PST Status
Device Variable 15: Manual PST Status
Device Variable 16: Common Failure Alarm Status
Device Variable 17: Alarms1
Device Variable 18: Alarms2
Device Variable 19: Alarms3

TV Codes available:
Device Variable 0: Actuator Position
Device Variable 1: Position Request
Device Variable 2: Pressure1
Device Variable 3: Pressure2 (Default TV)
Device Variable 4: Process Pressure
Device Variable 5: Active Alarms
Device Variable 7: Calibration Status
Device Variable 10: Baseline Signature Status
Device Variable 11: Maintenance Signature Status
Device Variable 14: Baseline PST Status
Device Variable 15: Manual PST Status
Device Variable 16: Common Failure Alarm Status
Device Variable 17: Alarms1
Device Variable 18: Alarms2
Device Variable 19: Alarms3

QV Codes available:
Device Variable 0: Actuator Position
Device Variable 1: Position Request
Device Variable 2: Pressure1
Device Variable 3: Pressure2
Device Variable 4: Process Pressure (Default QV)
Device Variable 5: Active Alarms
Device Variable 7: Calibration Status
Device Variable 10: Baseline Signature Status
Device Variable 11: Maintenance Signature Status
Device Variable 14: Baseline PST Status
Device Variable 15: Manual PST Status
Device Variable 16: Common Failure Alarm Status
Device Variable 17: Alarms1
Device Variable 18: Alarms2
Device Variable 19: Alarms3

8.2.4 Command #54: Read Device Variable Information

This command reads the Transducer Serial Number, the Limits, Damping Value and Minimum Span of the selected Device Variable along with the corresponding engineering units.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code (see Section 9.1)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code (see Section 9.1)
1-3	Unsigned-24	Device Variable Transducer Serial Number
4	Enum	Device Variable Limits/Minimum Span Units Code (see Section 8.4, Table 2)
5-8	Float	Device Variable Upper Transducer Limit
9-12	Float	Device Variable Lower Transducer Limit
13-16	Float	Device Variable Damping Value
17-20	Float	Device Variable Minimum Span
21	Enum	Device Variable Classification (see Section 8.4, Table 21)
22	Enum	Device Variable Family (see Section 8.4, Table 20)
23-26	Time	Update Time Period
27	Bits	Device Variable Properties (see Section 8.4, Table 65)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.2.5 Command #59: Write Number of Response Preambles

This command sets the number of asynchronous 0xFF preambles bytes to be sent by a device before the start of a response message. This value may be set to no smaller than 5 and no greater than 20.

Request Data Bytes

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

Response Data Bytes

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

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-2		Undefined
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
7	Error	In Write Protect Mode
8	Warning	Set To Nearest Possible Value
9-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy
33-127		Undefined

8.2.6 Command #79: Write Device Variable

This command allows a Device Variable to be set to a fixed value.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code (see Section 9.1)
1	Enum	Write Device Variable Command Code (Section 8.4, Table 19)
2	Enum	Units Code (Section 8.4, Table 2)
3-6	Float	Device Variable Value
7	Bits	Device Variable Status (see Section 9.2)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code (see Section 9.1)
1	Enum	Write Device Variable Command Code (Section 8.4, Table 19)
2	Enum	Units Code (Section 8.4, Table 2)
3-6	Float	Device Variable Value
7	Bits	Device Variable Status (see Section 9.2)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error (Invalid Variable Value)
7	Error	In Write Protect Mode
8	Warning	Device Family status bit not set
9		Undefined
10	Error	Invalid Write Device Variable Command Code
11-13		Undefined
14	Warning	Requested value was returned in command response but Rate-of-Change limit was exceeded. Device Variable tracking to value written at maximum rate allowed.
15		Undefined
16	Error	Access Restricted
17	Error	Invalid Device Variable Index. The Device Variable does not exist in this Field Device.
18	Error	Invalid Units Code
19	Error	Device Variable index not allowed for this command
20-31		Undefined
32	Error	Busy
33	Error	DR Initiated
34	Error	DR Running
35	Error	DR Dead
36	Error	DR Conflict
37-127		Undefined

8.2.7 Command #95: Read Device Communication Statistics

This command returns the field device communication statistics: the number of STX messages received by the device, the number of ACK messages sent by the device and the number of BACK sent by the device.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Count of STX messages received by this device
2-3	Unsigned-16	Count of ACK messages sent from this device
4-5	Unsigned-16	Count of BACK messages sent from this device

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7-127		Undefined

8.2.8 Command #103: Write Burst Period

This command selects the minimum and maximum update period of a burst message. The minimum time must be less than or equal to the maximum time. The update time shall be selected as specified in table below:

< 0.5s Not Allowed	8s
0.5s (default)	16s
1s	32s
2s	60 – 3600s (any value)
4s	> 3600s Not Allowed

The device corrects settings differing from these values and indicates “Update Times Adjusted” in its response message.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Message
1-4	Time	Update Period in 1-32 of a millisecond.
5-8	Time	Maximum Update Period in 1/32 of a millisecond.

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Message
1-4	Time	Update Period in 1-32 of a millisecond.
5-8	Time	Maximum Update Period in 1/32 of a millisecond.

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8	Warning	Update Times Adjusted
9	Error	Invalid Burst Message
10-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy (A Delayed Response could not be initiated)
33	Error	Delayed Response Initiated
34	Error	Delayed Response Running
35	Error	Delayed Response Dead
36	Error	Delayed Response Conflict
37-127		Undefined

8.2.9 Command #104: Write Burst Trigger

This command configures the trigger that forces publishing of the Burst Message. Four trigger modes are supported: Continuous (default), Windowed, Rising and Falling.

Continuous Mode: the burst message is sent when the update period is exceeded.
Windowed Mode: the trigger value must be a positive number and is the symmetric window around the last communicated value. The burst message being published after the window was exceeded.
Rising Mode: the burst message is published when the source value exceeds the threshold established by the trigger value.
Falling Mode: the burst message is published when the source value falls below the trigger value.

In all cases, the burst message is triggered when the maximum update time is command 103 is exceeded.

Burst Message Trigger Source

Command	Trigger Source Value
1	PV
2	Loop Current Percent Range
3	PV
9	Device Variable in Slot 0

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Message
1	Enum	Burst Trigger Mode Selection Code (see Section 8.4, Table 33)
2	Enum	Device Variable Classification for Trigger Level (see Section 8.4, Table 21)
3	Enum	Units Code (see Section 8.4, Table 2)
4-7	Float	Trigger Level

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Message
1	Enum	Burst Trigger Mode Selection Code (see Section 8.4, Table 33)
2	Enum	Device Variable Classification for Trigger Level (see Section 8.4, Table 21)
3	Enum	Units Code (see Section 8.4, Table 2)
4-7	Float	Trigger Level

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3	Error	Passed Parameter Too Large
4	Error	Passed Parameter Too Small
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8		Undefined
9	Error	Invalid Burst Message
10		Undefined
11	Error	Invalid Device Variable Classification
12	Error	Invalid Units Code
13	Error	Invalid Burst Trigger Mode Selection Code
14-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy (A Delayed Response could not be initiated)
33	Error	Delayed Response Initiated
34	Error	Delayed Response Running
35	Error	Delayed Response Dead
36	Error	Delayed Response Conflict
37-127		Undefined

8.2.10 Command #105: Read Burst Mode Configuration

This command reads the Burst Mode configuration from the field device including: the Burst Mode Control Code, the command to be burst and a list of the Device Variables to be transmitted, the burst minimum and maximum update time and he condition for the maximum update time.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Message

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Mode Control Code (see Section 8.4, Table 9)
1	Unsigned-8	Command Number of the response message to be transmitted
2	Unsigned-8	Device Variable Code assigned to Slot0 (see Section 9.1)
3	Unsigned-8	Device Variable Code assigned to Slot1 (see Section 9.1)
4	Unsigned-8	Device Variable Code assigned to Slot2 (see Section 9.1)
5	Unsigned-8	Device Variable Code assigned to Slot3 (see Section 9.1)
6	Unsigned-8	Device Variable Code assigned to Slot4 (see Section 9.1)
7	Unsigned-8	Device Variable Code assigned to Slot5 (see Section 9.1)
8	Unsigned-8	Device Variable Code assigned to Slot6 (see Section 9.1)
9	Unsigned-8	Device Variable Code assigned to Slot7 (see Section 9.1)
10	Unsigned-8	Burst Message
11	Unsigned-8	Total Number of Burst Messages
12-13	Unsigned-16	Extended Command Number
14-17	Time	Update Time in 1/32 of a millisecond
18-21	Time	Maximum Update Time in 1/32 of a millisecond
22	Enum	Burst Trigger Mode Code (see Section 8.4, Table 33)
23	Enum	Device Variable Classification for Trigger Value (see Section 8.4, Table 21)
24	Enum	Units Code (see Section 8.4, Table 2)
25-28	Float	Trigger Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-5		Undefined
6	Error	Device-Specific Command Error
7-8		Undefined
9	Error	Invalid Burst Message
10-31		Undefined
32	Error	Busy
33-127		Undefined

8.2.11 Command #107: Write Burst Device Variables

This command selects the Device Variables that will be used by a bursting device to be return by a command 9 in Burst Mode.
If the trigger mode isn't Continuous in Command 104 and the trigger source's Device Variable Classification does not match the new Slot 0 Device Variable the new values will be accepted and Response Code "Burst Condition Conflict" will be returned. The field device corrects the classification, unit codes, reset to Trigger Mode Continuous and publishes continuously at the Update Period until it receives another Command 104.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code assigned to Slot0 (see Section 9.1)
1	Unsigned-8	Device Variable Code assigned to Slot1 (see Section 9.1)
2	Unsigned-8	Device Variable Code assigned to Slot2 (see Section 9.1)
3	Unsigned-8	Device Variable Code assigned to Slot3 (see Section 9.1)
4	Unsigned-8	Device Variable Code assigned to Slot4 (see Section 9.1)
5	Unsigned-8	Device Variable Code assigned to Slot5 (see Section 9.1)
6	Unsigned-8	Device Variable Code assigned to Slot6 (see Section 9.1)
7	Unsigned-8	Device Variable Code assigned to Slot7 (see Section 9.1)
8	Unsigned-8	Burst Message

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Device Variable Code assigned to Slot0 (see Section 9.1)
1	Unsigned-8	Device Variable Code assigned to Slot1 (see Section 9.1)
2	Unsigned-8	Device Variable Code assigned to Slot2 (see Section 9.1)
3	Unsigned-8	Device Variable Code assigned to Slot3 (see Section 9.1)
4	Unsigned-8	Device Variable Code assigned to Slot4 (see Section 9.1)
5	Unsigned-8	Device Variable Code assigned to Slot5 (see Section 9.1)
6	Unsigned-8	Device Variable Code assigned to Slot6 (see Section 9.1)
7	Unsigned-8	Device Variable Code assigned to Slot7 (see Section 9.1)
8	Unsigned-8	Burst Message

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8	Warning	Burst Condition Conflict
9	Error	Invalid Burst Message
10-127		Undefined

8.2.12 Command #108: Write Burst Mode Command Number

This command selects the response message that the device transmits while in Burst Mode.

Request Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Command Number of the response message to be transmitted
2	Unsigned-8	Burst Message

Response Data Bytes

Byte	Format	Description
0-1	Unsigned-16	Command Number of the response message to be transmitted
2	Unsigned-8	Burst Message

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8	Warning	Burst Condition Conflict
9	Error	Invalid Burst Message
10-127		Undefined

The following commands can be represented in burst messages:

N°	Command Description
1	Read Primary Variable
2	Read Loop Current and Percent of Range
3	Read Dynamic Variables and Loop Current
9	Read Device Variables with status
48	Read Additional Device Status

8.2.13 Command #109: Burst Mode Control

This command is used to enter and exit the Burst Mode on the field device.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Mode Control Code (see Section 8.4, Table 33)
1	Unsigned-8	Burst Message

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Burst Mode Control Code (see Section 8.4, Table 33)
1	Unsigned-8	Burst Message

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too Few Data Bytes Received
6	Error	Device-Specific Command Error
7	Error	In Write Protect Mode
8	Warning	Update Period Increased
9	Error	Insufficient bandwidth
10-15		Undefined
16	Error	Access Restricted
17-31		Undefined
32	Error	Busy (Delayed Response could not be initiated)
33	Error	Delayed Response Initiated
34	Error	Delayed Response Running
35	Error	Delayed Response Dead
36	Error	Delayed Response Conflict
37-127		Undefined

8.3 Device Specific Commands

The following Device-Specific commands are implemented:

N°	Command Description
128	Read Parameters1
129	Write Parameters1
130	Read Parameters2
131	Write Parameters2
132	Read Parameters4
133	Write Parameters4
134	Read ParametersE
135	Write ParametersE
136	Read ParametersF
137	Write ParametersF
138	Read Dates
139	Write Dates
140	Read Times
141	Write Times
142	Read Alarms Log
143	Read Strings20
144	Write Strings20
145	Read Strings16
146	Write Strings16
147	Read Strings12
148	Write Strings12
149	Read Strings10
150	Write Strings10
151	Read Curve ID and Type
152	Write Curve ID and Type
153	Read Curve Data Header
154	Read Curve Samples Pressure1 - Part 1
155	Read Curve Samples Pressure1 - Part 2
156	Read Curve Samples Pressure1 - Part 3
157	Read Curve Samples Pressure1 - Part 4
158	Read Curve Samples Pressure1 - Part 5
159	Read Curve Samples Pressure1 - Part 6
160	Read Curve Samples Pressure1 - Part 7
161	Read Curve Samples Pressure2 - Part 1
162	Read Curve Samples Pressure2 - Part 2
163	Read Curve Samples Pressure2 - Part 3
164	Read Curve Samples Pressure2 - Part 4
165	Read Curve Samples Pressure2 - Part 5
166	Read Curve Samples Pressure2 - Part 6
167	Read Curve Samples Pressure2 - Part 7
168	Read Curve Samples Process Pressure - Part 1
169	Read Curve Samples Process Pressure - Part 2
170	Read Curve Samples Process Pressure - Part 3

Continue…

N°	Command Description
…Continue	
171	Read Curve Samples Process Pressure - Part 4
172	Read Curve Samples Process Pressure - Part 5
173	Read Curve Samples Process Pressure - Part 6
174	Read Curve Samples Process Pressure - Part 7
175	Read Curve Samples Position - Part 1
176	Read Curve Samples Position - Part 2
177	Read Curve Samples Position - Part 3
178	Read Curve Samples Position - Part 4
179	Read Curve Samples Position - Part 5
180	Read Curve Samples Position - Part 6
181	Read Curve Samples Position - Part 7
182	Read Curve Samples P1-P2 - Part 1
183	Read Curve Samples P1-P2 - Part 2
184	Read Curve Samples P1-P2 - Part 3
185	Read Curve Samples P1-P2 - Part 4
186	Read Curve Samples P1-P2 - Part 5
187	Read Curve Samples P1-P2 - Part 6
188	Read Curve Samples P1-P2 - Part 7
189	Read Logic Card Firmware Revision

8.3.1 Command #128: Read Parameter1

This command allows reading the value of one Parameter1.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter1 Code (see Section 10.1)

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter1 Code (see Section 10.1)
1	Unsigned-8	Parameter1 Value
2	Enum	Parameter1 Unit Code (see Section 10.1)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.2 Command #129: Write Parameter1

This command allows forcing the value of one Parameter1.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter1 Code (see Section 10.1)
1	Unsigned-8	Parameter1 Value

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter1 Code (see Section 10.1)
1	Unsigned-8	Parameter1 Value
2	Enum	Parameter1 Unit Code (see Section 10.1)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.3 Command #130: Read Parameter2

This command allows reading the value of one Parameter2.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter2 Code (see Section 10.2)

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter2 Code (see Section 10.2)
1-2	Unsigned-16	Parameter2 Value
3	Enum	Parameter2 Unit Code (see Section 10.2)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.4 Command #131: Write Parameter2

This command allows forcing the value of one Parameter2.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter2 Code (see Section 10.2)
1-2	Unsigned-16	Parameter2 Value

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter2 Code (see Section 10.2)
1-2	Unsigned-16	Parameter2 Value
3	Enum	Parameter2 Unit Code (see Section 10.2)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.5 Command #132: Read Parameter4

This command allows reading the value of one Parameter4.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter4 Code (see Section 10.3)

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter4 Code (see Section 10.3)
1-4	Unsigned-32	Parameter4 Value
5	Enum	Parameter4 Unit Code (see Section 10.3)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.6 Command #133: Write Parameter4

This command allows forcing the value of one Parameter4.

Request Data Bytes

Byte	Format	Description
0	Enum	Parameter4 Code (see Section 10.3)
1-4	Unsigned-32	Parameter4 Value

Response Data Bytes

Byte	Format	Description
0	Enum	Parameter4 Code (see Section 10.3)
1-4	Unsigned-32	Parameter4 Value
5	Enum	Parameter4 Unit Code (see Section 10.3)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.7 Command #134: Read ParameterE

This command allows reading the value of one ParameterE.

Request Data Bytes

Byte	Format	Description
0	Enum	ParameterE Code (see Section 10.4)

Response Data Bytes

Byte	Format	Description
0	Enum	ParameterE Code (see Section 10.4)
1	Enum	ParameterE Value (see Section 10.5)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.8 Command #135: Write ParameterE

This command allows forcing the value of one ParameterE.

Request Data Bytes

Byte	Format	Description
0	Enum	ParameterE Code (see Section 10.4)
1	Enum	ParameterE Value (see Section 10.5)

Response Data Bytes

Byte	Format	Description
0	Enum	ParameterE Code (see Section 10.4)
1	Enum	ParameterE Value (see Section 10.5)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.9 Command #136: Read ParameterF

This command allows reading the value of one ParameterF.

Request Data Bytes

Byte	Format	Description
0	Enum	ParameterF Code (see Section 10.6)

Response Data Bytes

Byte	Format	Description
0	Enum	ParameterF Code (see Section 10.6)
1-4	Float	ParameterF Value
5	Enum	ParameterF Unit Code (see Section 10.6)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.10 Command #137: Write ParameterF

This command allows forcing the value of one ParameterF.

Request Data Bytes

Byte	Format	Description
0	Enum	ParameterF Code (see Section 10.6)
1-4	Float	ParameterF Value

Response Data Bytes

Byte	Format	Description
0	Enum	ParameterF Code (see Section 10.6)
1-4	Float	ParameterF Value
5	Enum	ParameterF Unit Code (see Section 10.6)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.11 Command #138: Read Dates

This command allows reading the value of one Date parameter.

Request Data Bytes

Byte	Format	Description
0	Enum	Date Code (see Section 10.7)

Response Data Bytes

Byte	Format	Description
0	Enum	Date Code (see Section 10.7)
1	Unsigned-8	Day
2	Unsigned-8	Month
3-4	Unsigned-16	Year

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.12 Command #139: Write Dates

This command allows forcing the value of one Date parameter.

Request Data Bytes

Byte	Format	Description
0	Enum	Date Code (see Section 10.7)
1	Unsigned-8	Day
2	Unsigned-8	Month
3-4	Unsigned-16	Year

Response Data Bytes

Byte	Format	Description
0	Enum	Date Code (see Section 10.7)
1	Unsigned-8	Day
2	Unsigned-8	Month
3-4	Unsigned-16	Year

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.13 Command #140: Read Times

This command allows reading the value of one Time parameter.

Request Data Bytes

Byte	Format	Description
0	Enum	Time Code (see Section 10.8)

Response Data Bytes

Byte	Format	Description
0	Enum	Time Code (see Section 10.8)
1	Unsigned-8	Hours
2	Unsigned-8	Minutes

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.14 Command #141: Write Times

This command allows forcing the value of one Time parameter.

Request Data Bytes

Byte	Format	Description
0	Enum	Time Code (see Section 10.8)
1	Unsigned-8	Hours
2	Unsigned-8	Minutes

Response Data Bytes

Byte	Format	Description
0	Enum	Time Code (see Section 10.8)
1	Unsigned-8	Hours
2	Unsigned-8	Minutes

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device Specific Command Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only parameter, response code 6 is generated.
If a master tries to write an illegal parameter value, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.15 Command #142: Read Alarms Log

This command allows reading one Alarms Data from the Alarms Log List.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Alarm Code

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Alarm Code
1	Enum	Alarm Type (see Section 10.9)
2	Enum	Alarm Status (see Section 10.10)
3	Unsigned-8	Alarm Day
4	Unsigned-8	Alarm Month
5-6	Unsigned-16	Alarm Year
7	Unsigned-8	Alarm Hours
8	Unsigned-8	Alarm Minutes

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

“Alarm Code” is the index of the Alarms Log List.
The minimum value is “0”; it indicates the most recent alarm registered by the actuator.
The maximum value is “49”; it indicates the older alarm registered by the actuator.

8.3.16 Command #143: Read String20

This command allows reading the value of one String20.

Request Data Bytes

Byte	Format	Description
0	Enum	String20 Code (see Section 10.11)

Response Data Bytes

Byte	Format	Description
0	Enum	String20 Code (see Section 10.11)
1-20	ASCII	String20 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.17 Command #144: Write String20

This command allows forcing the value of one String20.

Request Data Bytes

Byte	Format	Description
0	Enum	String20 Code (see Section 10.11)
1-20	ASCII	String20 Value

Response Data Bytes

Byte	Format	Description
0	Enum	String20 Code (see Section 10.11)
1-20	ASCII	String20 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6	Error	Device-Specific Error
7-31		Undefined
32	Error	Device Busy
33-127		Undefined

If a master tries to write a read only string, response code 6 is generated.
When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.18 Command #145: Read String16

This command allows forcing the value of one String16.

Request Data Bytes

Byte	Format	Description
0	Enum	String16 Code (see Section 10.12)
1-16	ASCII	String16 Value

Response Data Bytes

Byte	Format	Description
0	Enum	String16 Code (see Section 10.12)
1-16	ASCII	String16 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

When a String16 changes its value, the Configuration Change Counter can be incremented (see section 10.12 for details).

8.3.19 Command #146: Write String16

This command allows forcing the value of one String16.

Request Data Bytes

Byte	Format	Description
0	Enum	String16 Code (see Section 10.12)
1-16	ASCII	String16 Value

Response Data Bytes

Byte	Format	Description
0	Enum	String16 Code (see Section 10.12)
1-16	ASCII	String16 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.20 Command #147: Read String12

This command allows reading the value of one String12.

Request Data Bytes

Byte	Format	Description
0	Enum	String12 Code (see Section 10.13)

Response Data Bytes

Byte	Format	Description
0	Enum	String12 Code (see Section 10.13)
1-12	ASCII	String12 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.21 Command #148: Write String12

This command allows forcing the value of one String12.

Request Data Bytes

Byte	Format	Description
0	Enum	String12 Code (see Section 10.13)
1-12	ASCII	String12 Value

Response Data Bytes

Byte	Format	Description
0	Enum	String12 Code (see Section 10.13)
1-12	ASCII	String12 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.22 Command #149: Read String10

This command allows reading the value of one String10.

Request Data Bytes

Byte	Format	Description
0	Enum	String10 Code (see Section 10.14)

Response Data Bytes

Byte	Format	Description
0	Enum	String10 Code (see Section 10.14)
1-10	ASCII	String10 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.23 Command #150: Write String10

This command allows forcing the value of one String10.

Request Data Bytes

Byte	Format	Description
0	Enum	String10 Code (see Section 10.14)
1-10	ASCII	String10 Value

Response Data Bytes

Byte	Format	Description
0	Enum	String10 Code (see Section 10.14)
1-10	ASCII	String10 Value

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

When this command is executed successfully, the Configuration Change Counter is incremented.

8.3.24 Command #151: Read CurveID and Type

This command allows reading the CurveID and its Type that can be loaded by Commands #153 - #188.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Curve ID
1	Enum	Curve Type (see Section 10.15)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

When “Curve Type” is “FST”:
The “Curve ID” minimum value is 1; the maximum value is equal to “FST Stored”.
“Curve ID” = 1 and “Curve ID” = 2 indicates the Baseline Signature Curves.
“Curve ID” = 3 indicates the most recent FST (not Baseline) registered by the actuator.
“Curve ID” = “FST Stored” indicates the oldest FST (not Baseline) registered by the actuator.

When “Curve Type” is “PST”:
The “Curve ID” minimum value is 1; the maximum value is equal to “PST Stored”.
“Curve ID” = 1 indicates the Baseline PST Curve.
“Curve ID” = 2 indicates the most recent PST (not Baseline) registered by the actuator.
“Curve ID” = “PST Stored” indicates the oldest PST (not Baseline) registered by the actuator.

When “Curve Type” is “SLOT”:
The “Curve ID” minimum value is 1; the maximum value is 20.
The “Curve ID” indicates the slot memory area to read with commands from 153 to 188.

8.3.25 Command #152: Write CurveID and Type

This command allows forcing the CurveID and its Type that can be loaded by Commands #153 - #188.

Request Data Bytes

Byte	Format	Description
0	Unsigned-8	Curve ID
1	Enum	Curve Type (see Section 10.15)

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Curve ID
1	Enum	Curve Type (see Section 10.15)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1		Undefined
2	Error	Invalid Selection
3-4		Undefined
5	Error	Too few data bytes received
6-31		Undefined
32	Error	Device Busy
33-127		Undefined

When “Curve Type” is “FST”:
The “Curve ID” minimum value is 1; the maximum value is equal to “FST Stored”.
“Curve ID” = 1 and “Curve ID” = 2 indicates the Baseline Signature Curves.
“Curve ID” = 3 indicates the most recent FST (not Baseline) registered by the actuator.
“Curve ID” = “FST Stored” indicates the oldest FST (not Baseline) registered by the actuator.

When “Curve Type” is “PST”:
The “Curve ID” minimum value is 1; the maximum value is equal to “PST Stored”.
“Curve ID” = 1 indicates the Baseline PST Curve.
“Curve ID” = 2 indicates the most recent PST (not Baseline) registered by the actuator.
“Curve ID” = “PST Stored” indicates the oldest PST (not Baseline) registered by the actuator.

When “Curve Type” is “SLOT”:
The “Curve ID” minimum value is 1; the maximum value is 20.
The “Curve ID” indicates the slot memory area to read with commands from 153 to 188.

8.3.26 Command #153: Read Curve Data Header

This command allows reading the Header Data of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0	Unsigned-8	Curve ID
1	Enum	Graph Type (see Section 10.16)
2	Enum	Curve Source (see Section 10.17)
3	Unsigned-8	Curve Day
4	Unsigned-8	Curve Month
5-6	Unsigned-16	Curve Year
7	Unsigned-8	Curve Hours
8	Unsigned-8	Curve Minutes
9	Unsigned-8	Curve Seconds
10	Enum	Curve Status (see Section 10.5.9)
11-14	Unsigned-32	Sampling Time in milliseconds
15	Enum	Pressure Unit Code (see Section 8.4, Table 2)
16-19	Float	Pressure1, Pressure2 Minimum Value
20-23	Float	Pressure1 Maximum Value
24-27	Float	Pressure2 Maximum Value
28-31	Float	Process Pressure Minimum Value
32-35	Float	Process Pressure Maximum Value
36-39	Float	Break Pressure
40-43	Unsigned-32	Break Time in milliseconds
44-47	Unsigned-32	Travel Time in milliseconds
48-49	Unsigned-16	Samples Saved
50-53	Unsigned-32	Absolute Count
54-57	Float	Set Point
58	Enum	SOVs Used (see Section 10.18)

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.27 Command #154: Read Curve Samples Pressure1 – Part 1

This command allows reading the Pressure1 samples (1-50) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #1
4-7	Float	Pressure1 Sample #2
8-11	Float	Pressure1 Sample #3
12-15	Float	Pressure1 Sample #4
16-19	Float	Pressure1 Sample #5
20-23	Float	Pressure1 Sample #6
24-27	Float	Pressure1 Sample #7
28-31	Float	Pressure1 Sample #8
32-35	Float	Pressure1 Sample #9
36-39	Float	Pressure1 Sample #10
40-43	Float	Pressure1 Sample #11
44-47	Float	Pressure1 Sample #12
48-51	Float	Pressure1 Sample #13
52-55	Float	Pressure1 Sample #14
56-59	Float	Pressure1 Sample #15
60-63	Float	Pressure1 Sample #16
64-67	Float	Pressure1 Sample #17
68-71	Float	Pressure1 Sample #18
72-75	Float	Pressure1 Sample #19
76-79	Float	Pressure1 Sample #20
80-83	Float	Pressure1 Sample #21
84-87	Float	Pressure1 Sample #22
88-91	Float	Pressure1 Sample #23
92-95	Float	Pressure1 Sample #24
96-99	Float	Pressure1 Sample #25
100-103	Float	Pressure1 Sample #26
104-107	Float	Pressure1 Sample #27
108-111	Float	Pressure1 Sample #28
112-115	Float	Pressure1 Sample #29
116-119	Float	Pressure1 Sample #30
120-123	Float	Pressure1 Sample #31
124-127	Float	Pressure1 Sample #32
128-131	Float	Pressure1 Sample #33
132-135	Float	Pressure1 Sample #34
136-139	Float	Pressure1 Sample #35
140-143	Float	Pressure1 Sample #36
144-147	Float	Pressure1 Sample #37
148-151	Float	Pressure1 Sample #38

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #39
156-159	Float	Pressure1 Sample #40
160-163	Float	Pressure1 Sample #41
164-167	Float	Pressure1 Sample #42
168-171	Float	Pressure1 Sample #43
172-175	Float	Pressure1 Sample #44
176-179	Float	Pressure1 Sample #45
180-183	Float	Pressure1 Sample #46
184-187	Float	Pressure1 Sample #47
188-191	Float	Pressure1 Sample #48
192-195	Float	Pressure1 Sample #49
196-199	Float	Pressure1 Sample #50

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.28 Command #155: Read Curve Samples Pressure1 – Part 2

This command allows reading the Pressure1 samples (51-100) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #51
4-7	Float	Pressure1 Sample #52
8-11	Float	Pressure1 Sample #53
12-15	Float	Pressure1 Sample #54
16-19	Float	Pressure1 Sample #55
20-23	Float	Pressure1 Sample #56
24-27	Float	Pressure1 Sample #57
28-31	Float	Pressure1 Sample #58
32-35	Float	Pressure1 Sample #59
36-39	Float	Pressure1 Sample #60
40-43	Float	Pressure1 Sample #61
44-47	Float	Pressure1 Sample #62
48-51	Float	Pressure1 Sample #63
52-55	Float	Pressure1 Sample #64
56-59	Float	Pressure1 Sample #65
60-63	Float	Pressure1 Sample #66
64-67	Float	Pressure1 Sample #67
68-71	Float	Pressure1 Sample #68
72-75	Float	Pressure1 Sample #69
76-79	Float	Pressure1 Sample #70
80-83	Float	Pressure1 Sample #71
84-87	Float	Pressure1 Sample #72
88-91	Float	Pressure1 Sample #73
92-95	Float	Pressure1 Sample #74
96-99	Float	Pressure1 Sample #75
100-103	Float	Pressure1 Sample #76
104-107	Float	Pressure1 Sample #77
108-111	Float	Pressure1 Sample #78
112-115	Float	Pressure1 Sample #79
116-119	Float	Pressure1 Sample #80
120-123	Float	Pressure1 Sample #81
124-127	Float	Pressure1 Sample #82
128-131	Float	Pressure1 Sample #83
132-135	Float	Pressure1 Sample #84
136-139	Float	Pressure1 Sample #85
140-143	Float	Pressure1 Sample #86
144-147	Float	Pressure1 Sample #87
148-151	Float	Pressure1 Sample #88

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #89
156-159	Float	Pressure1 Sample #90
160-163	Float	Pressure1 Sample #91
164-167	Float	Pressure1 Sample #92
168-171	Float	Pressure1 Sample #93
172-175	Float	Pressure1 Sample #94
176-179	Float	Pressure1 Sample #95
180-183	Float	Pressure1 Sample #96
184-187	Float	Pressure1 Sample #97
188-191	Float	Pressure1 Sample #98
192-195	Float	Pressure1 Sample #99
196-199	Float	Pressure1 Sample #100

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.29 Command #156: Read Curve Samples Pressure1 – Part 3

This command allows reading the Pressure1 samples (101-150) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #101
4-7	Float	Pressure1 Sample #102
8-11	Float	Pressure1 Sample #103
12-15	Float	Pressure1 Sample #104
16-19	Float	Pressure1 Sample #105
20-23	Float	Pressure1 Sample #106
24-27	Float	Pressure1 Sample #107
28-31	Float	Pressure1 Sample #108
32-35	Float	Pressure1 Sample #109
36-39	Float	Pressure1 Sample #110
40-43	Float	Pressure1 Sample #111
44-47	Float	Pressure1 Sample #112
48-51	Float	Pressure1 Sample #113
52-55	Float	Pressure1 Sample #114
56-59	Float	Pressure1 Sample #115
60-63	Float	Pressure1 Sample #116
64-67	Float	Pressure1 Sample #117
68-71	Float	Pressure1 Sample #118
72-75	Float	Pressure1 Sample #119
76-79	Float	Pressure1 Sample #120
80-83	Float	Pressure1 Sample #121
84-87	Float	Pressure1 Sample #122
88-91	Float	Pressure1 Sample #123
92-95	Float	Pressure1 Sample #124
96-99	Float	Pressure1 Sample #125
100-103	Float	Pressure1 Sample #126
104-107	Float	Pressure1 Sample #127
108-111	Float	Pressure1 Sample #128
112-115	Float	Pressure1 Sample #129
116-119	Float	Pressure1 Sample #130
120-123	Float	Pressure1 Sample #131
124-127	Float	Pressure1 Sample #132
128-131	Float	Pressure1 Sample #133
132-135	Float	Pressure1 Sample #134
136-139	Float	Pressure1 Sample #135
140-143	Float	Pressure1 Sample #136
144-147	Float	Pressure1 Sample #137
148-151	Float	Pressure1 Sample #138

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #139
156-159	Float	Pressure1 Sample #140
160-163	Float	Pressure1 Sample #141
164-167	Float	Pressure1 Sample #142
168-171	Float	Pressure1 Sample #143
172-175	Float	Pressure1 Sample #144
176-179	Float	Pressure1 Sample #145
180-183	Float	Pressure1 Sample #146
184-187	Float	Pressure1 Sample #147
188-191	Float	Pressure1 Sample #148
192-195	Float	Pressure1 Sample #149
196-199	Float	Pressure1 Sample #150

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.30 Command #157: Read Curve Samples Pressure1 – Part 4

This command allows reading the Pressure1 samples (151-200) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #151
4-7	Float	Pressure1 Sample #152
8-11	Float	Pressure1 Sample #153
12-15	Float	Pressure1 Sample #154
16-19	Float	Pressure1 Sample #155
20-23	Float	Pressure1 Sample #156
24-27	Float	Pressure1 Sample #157
28-31	Float	Pressure1 Sample #158
32-35	Float	Pressure1 Sample #159
36-39	Float	Pressure1 Sample #160
40-43	Float	Pressure1 Sample #161
44-47	Float	Pressure1 Sample #162
48-51	Float	Pressure1 Sample #163
52-55	Float	Pressure1 Sample #164
56-59	Float	Pressure1 Sample #165
60-63	Float	Pressure1 Sample #166
64-67	Float	Pressure1 Sample #167
68-71	Float	Pressure1 Sample #168
72-75	Float	Pressure1 Sample #169
76-79	Float	Pressure1 Sample #170
80-83	Float	Pressure1 Sample #171
84-87	Float	Pressure1 Sample #172
88-91	Float	Pressure1 Sample #173
92-95	Float	Pressure1 Sample #174
96-99	Float	Pressure1 Sample #175
100-103	Float	Pressure1 Sample #176
104-107	Float	Pressure1 Sample #177
108-111	Float	Pressure1 Sample #178
112-115	Float	Pressure1 Sample #179
116-119	Float	Pressure1 Sample #180
120-123	Float	Pressure1 Sample #181
124-127	Float	Pressure1 Sample #182
128-131	Float	Pressure1 Sample #183
132-135	Float	Pressure1 Sample #184
136-139	Float	Pressure1 Sample #185
140-143	Float	Pressure1 Sample #186
144-147	Float	Pressure1 Sample #187
148-151	Float	Pressure1 Sample #188

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #189
156-159	Float	Pressure1 Sample #190
160-163	Float	Pressure1 Sample #191
164-167	Float	Pressure1 Sample #192
168-171	Float	Pressure1 Sample #193
172-175	Float	Pressure1 Sample #194
176-179	Float	Pressure1 Sample #195
180-183	Float	Pressure1 Sample #196
184-187	Float	Pressure1 Sample #197
188-191	Float	Pressure1 Sample #198
192-195	Float	Pressure1 Sample #199
196-199	Float	Pressure1 Sample #200

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.31 Command #158: Read Curve Samples Pressure1 – Part 5

This command allows reading the Pressure1 samples (201-250) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #201
4-7	Float	Pressure1 Sample #202
8-11	Float	Pressure1 Sample #203
12-15	Float	Pressure1 Sample #204
16-19	Float	Pressure1 Sample #205
20-23	Float	Pressure1 Sample #206
24-27	Float	Pressure1 Sample #207
28-31	Float	Pressure1 Sample #208
32-35	Float	Pressure1 Sample #209
36-39	Float	Pressure1 Sample #210
40-43	Float	Pressure1 Sample #211
44-47	Float	Pressure1 Sample #212
48-51	Float	Pressure1 Sample #213
52-55	Float	Pressure1 Sample #214
56-59	Float	Pressure1 Sample #215
60-63	Float	Pressure1 Sample #216
64-67	Float	Pressure1 Sample #217
68-71	Float	Pressure1 Sample #218
72-75	Float	Pressure1 Sample #219
76-79	Float	Pressure1 Sample #220
80-83	Float	Pressure1 Sample #221
84-87	Float	Pressure1 Sample #222
88-91	Float	Pressure1 Sample #223
92-95	Float	Pressure1 Sample #224
96-99	Float	Pressure1 Sample #225
100-103	Float	Pressure1 Sample #226
104-107	Float	Pressure1 Sample #227
108-111	Float	Pressure1 Sample #228
112-115	Float	Pressure1 Sample #229
116-119	Float	Pressure1 Sample #230
120-123	Float	Pressure1 Sample #231
124-127	Float	Pressure1 Sample #232
128-131	Float	Pressure1 Sample #233
132-135	Float	Pressure1 Sample #234
136-139	Float	Pressure1 Sample #235
140-143	Float	Pressure1 Sample #236
144-147	Float	Pressure1 Sample #237
148-151	Float	Pressure1 Sample #238

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #239
156-159	Float	Pressure1 Sample #240
160-163	Float	Pressure1 Sample #241
164-167	Float	Pressure1 Sample #242
168-171	Float	Pressure1 Sample #243
172-175	Float	Pressure1 Sample #244
176-179	Float	Pressure1 Sample #245
180-183	Float	Pressure1 Sample #246
184-187	Float	Pressure1 Sample #247
188-191	Float	Pressure1 Sample #248
192-195	Float	Pressure1 Sample #249
196-199	Float	Pressure1 Sample #250

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.32 Command #159: Read Curve Samples Pressure1 – Part 6

This command allows reading the Pressure1 samples (251-300) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #251
4-7	Float	Pressure1 Sample #252
8-11	Float	Pressure1 Sample #253
12-15	Float	Pressure1 Sample #254
16-19	Float	Pressure1 Sample #255
20-23	Float	Pressure1 Sample #256
24-27	Float	Pressure1 Sample #257
28-31	Float	Pressure1 Sample #258
32-35	Float	Pressure1 Sample #259
36-39	Float	Pressure1 Sample #260
40-43	Float	Pressure1 Sample #261
44-47	Float	Pressure1 Sample #262
48-51	Float	Pressure1 Sample #263
52-55	Float	Pressure1 Sample #264
56-59	Float	Pressure1 Sample #265
60-63	Float	Pressure1 Sample #266
64-67	Float	Pressure1 Sample #267
68-71	Float	Pressure1 Sample #268
72-75	Float	Pressure1 Sample #269
76-79	Float	Pressure1 Sample #270
80-83	Float	Pressure1 Sample #271
84-87	Float	Pressure1 Sample #272
88-91	Float	Pressure1 Sample #273
92-95	Float	Pressure1 Sample #274
96-99	Float	Pressure1 Sample #275
100-103	Float	Pressure1 Sample #276
104-107	Float	Pressure1 Sample #277
108-111	Float	Pressure1 Sample #278
112-115	Float	Pressure1 Sample #279
116-119	Float	Pressure1 Sample #280
120-123	Float	Pressure1 Sample #281
124-127	Float	Pressure1 Sample #282
128-131	Float	Pressure1 Sample #283
132-135	Float	Pressure1 Sample #284
136-139	Float	Pressure1 Sample #285
140-143	Float	Pressure1 Sample #286
144-147	Float	Pressure1 Sample #287
148-151	Float	Pressure1 Sample #288

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #289
156-159	Float	Pressure1 Sample #290
160-163	Float	Pressure1 Sample #291
164-167	Float	Pressure1 Sample #292
168-171	Float	Pressure1 Sample #293
172-175	Float	Pressure1 Sample #294
176-179	Float	Pressure1 Sample #295
180-183	Float	Pressure1 Sample #296
184-187	Float	Pressure1 Sample #297
188-191	Float	Pressure1 Sample #298
192-195	Float	Pressure1 Sample #299
196-199	Float	Pressure1 Sample #300

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.33 Command #160: Read Curve Samples Pressure1 – Part 7

This command allows reading the Pressure1 samples (301-351) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure1 Sample #301
4-7	Float	Pressure1 Sample #302
8-11	Float	Pressure1 Sample #303
12-15	Float	Pressure1 Sample #304
16-19	Float	Pressure1 Sample #305
20-23	Float	Pressure1 Sample #306
24-27	Float	Pressure1 Sample #307
28-31	Float	Pressure1 Sample #308
32-35	Float	Pressure1 Sample #309
36-39	Float	Pressure1 Sample #310
40-43	Float	Pressure1 Sample #311
44-47	Float	Pressure1 Sample #312
48-51	Float	Pressure1 Sample #313
52-55	Float	Pressure1 Sample #314
56-59	Float	Pressure1 Sample #315
60-63	Float	Pressure1 Sample #316
64-67	Float	Pressure1 Sample #317
68-71	Float	Pressure1 Sample #318
72-75	Float	Pressure1 Sample #319
76-79	Float	Pressure1 Sample #320
80-83	Float	Pressure1 Sample #321
84-87	Float	Pressure1 Sample #322
88-91	Float	Pressure1 Sample #323
92-95	Float	Pressure1 Sample #324
96-99	Float	Pressure1 Sample #325
100-103	Float	Pressure1 Sample #326
104-107	Float	Pressure1 Sample #327
108-111	Float	Pressure1 Sample #328
112-115	Float	Pressure1 Sample #329
116-119	Float	Pressure1 Sample #330
120-123	Float	Pressure1 Sample #331
124-127	Float	Pressure1 Sample #332
128-131	Float	Pressure1 Sample #333
132-135	Float	Pressure1 Sample #334
136-139	Float	Pressure1 Sample #335
140-143	Float	Pressure1 Sample #336
144-147	Float	Pressure1 Sample #337
148-151	Float	Pressure1 Sample #338

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure1 Sample #339
156-159	Float	Pressure1 Sample #340
160-163	Float	Pressure1 Sample #341
164-167	Float	Pressure1 Sample #342
168-171	Float	Pressure1 Sample #343
172-175	Float	Pressure1 Sample #344
176-179	Float	Pressure1 Sample #345
180-183	Float	Pressure1 Sample #346
184-187	Float	Pressure1 Sample #347
188-191	Float	Pressure1 Sample #348
192-195	Float	Pressure1 Sample #349
196-199	Float	Pressure1 Sample #350
200-203	Float	Pressure1 Sample #351

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.34 Command #161: Read Curve Samples Pressure2 – Part 1

This command allows reading the Pressure2 samples (1-50) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #1
4-7	Float	Pressure2 Sample #2
8-11	Float	Pressure2 Sample #3
12-15	Float	Pressure2 Sample #4
16-19	Float	Pressure2 Sample #5
20-23	Float	Pressure2 Sample #6
24-27	Float	Pressure2 Sample #7
28-31	Float	Pressure2 Sample #8
32-35	Float	Pressure2 Sample #9
36-39	Float	Pressure2 Sample #10
40-43	Float	Pressure2 Sample #11
44-47	Float	Pressure2 Sample #12
48-51	Float	Pressure2 Sample #13
52-55	Float	Pressure2 Sample #14
56-59	Float	Pressure2 Sample #15
60-63	Float	Pressure2 Sample #16
64-67	Float	Pressure2 Sample #17
68-71	Float	Pressure2 Sample #18
72-75	Float	Pressure2 Sample #19
76-79	Float	Pressure2 Sample #20
80-83	Float	Pressure2 Sample #21
84-87	Float	Pressure2 Sample #22
88-91	Float	Pressure2 Sample #23
92-95	Float	Pressure2 Sample #24
96-99	Float	Pressure2 Sample #25
100-103	Float	Pressure2 Sample #26
104-107	Float	Pressure2 Sample #27
108-111	Float	Pressure2 Sample #28
112-115	Float	Pressure2 Sample #29
116-119	Float	Pressure2 Sample #30
120-123	Float	Pressure2 Sample #31
124-127	Float	Pressure2 Sample #32
128-131	Float	Pressure2 Sample #33
132-135	Float	Pressure2 Sample #34
136-139	Float	Pressure2 Sample #35
140-143	Float	Pressure2 Sample #36
144-147	Float	Pressure2 Sample #37
148-151	Float	Pressure2 Sample #38

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #39
156-159	Float	Pressure2 Sample #40
160-163	Float	Pressure2 Sample #41
164-167	Float	Pressure2 Sample #42
168-171	Float	Pressure2 Sample #43
172-175	Float	Pressure2 Sample #44
176-179	Float	Pressure2 Sample #45
180-183	Float	Pressure2 Sample #46
184-187	Float	Pressure2 Sample #47
188-191	Float	Pressure2 Sample #48
192-195	Float	Pressure2 Sample #49
196-199	Float	Pressure2 Sample #50

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.35 Command #162: Read Curve Samples Pressure2 – Part 2

This command allows reading the Pressure2 samples (51-100) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #51
4-7	Float	Pressure2 Sample #52
8-11	Float	Pressure2 Sample #53
12-15	Float	Pressure2 Sample #54
16-19	Float	Pressure2 Sample #55
20-23	Float	Pressure2 Sample #56
24-27	Float	Pressure2 Sample #57
28-31	Float	Pressure2 Sample #58
32-35	Float	Pressure2 Sample #59
36-39	Float	Pressure2 Sample #60
40-43	Float	Pressure2 Sample #61
44-47	Float	Pressure2 Sample #62
48-51	Float	Pressure2 Sample #63
52-55	Float	Pressure2 Sample #64
56-59	Float	Pressure2 Sample #65
60-63	Float	Pressure2 Sample #66
64-67	Float	Pressure2 Sample #67
68-71	Float	Pressure2 Sample #68
72-75	Float	Pressure2 Sample #69
76-79	Float	Pressure2 Sample #70
80-83	Float	Pressure2 Sample #71
84-87	Float	Pressure2 Sample #72
88-91	Float	Pressure2 Sample #73
92-95	Float	Pressure2 Sample #74
96-99	Float	Pressure2 Sample #75
100-103	Float	Pressure2 Sample #76
104-107	Float	Pressure2 Sample #77
108-111	Float	Pressure2 Sample #78
112-115	Float	Pressure2 Sample #79
116-119	Float	Pressure2 Sample #80
120-123	Float	Pressure2 Sample #81
124-127	Float	Pressure2 Sample #82
128-131	Float	Pressure2 Sample #83
132-135	Float	Pressure2 Sample #84
136-139	Float	Pressure2 Sample #85
140-143	Float	Pressure2 Sample #86
144-147	Float	Pressure2 Sample #87
148-151	Float	Pressure2 Sample #88

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #89
156-159	Float	Pressure2 Sample #90
160-163	Float	Pressure2 Sample #91
164-167	Float	Pressure2 Sample #92
168-171	Float	Pressure2 Sample #93
172-175	Float	Pressure2 Sample #94
176-179	Float	Pressure2 Sample #95
180-183	Float	Pressure2 Sample #96
184-187	Float	Pressure2 Sample #97
188-191	Float	Pressure2 Sample #98
192-195	Float	Pressure2 Sample #99
196-199	Float	Pressure2 Sample #100

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.36 Command #163: Read Curve Samples Pressure2 – Part3

This command allows reading the Pressure2 samples (101-150) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #101
4-7	Float	Pressure2 Sample #102
8-11	Float	Pressure2 Sample #103
12-15	Float	Pressure2 Sample #104
16-19	Float	Pressure2 Sample #105
20-23	Float	Pressure2 Sample #106
24-27	Float	Pressure2 Sample #107
28-31	Float	Pressure2 Sample #108
32-35	Float	Pressure2 Sample #109
36-39	Float	Pressure2 Sample #110
40-43	Float	Pressure2 Sample #111
44-47	Float	Pressure2 Sample #112
48-51	Float	Pressure2 Sample #113
52-55	Float	Pressure2 Sample #114
56-59	Float	Pressure2 Sample #115
60-63	Float	Pressure2 Sample #116
64-67	Float	Pressure2 Sample #117
68-71	Float	Pressure2 Sample #118
72-75	Float	Pressure2 Sample #119
76-79	Float	Pressure2 Sample #120
80-83	Float	Pressure2 Sample #121
84-87	Float	Pressure2 Sample #122
88-91	Float	Pressure2 Sample #123
92-95	Float	Pressure2 Sample #124
96-99	Float	Pressure2 Sample #125
100-103	Float	Pressure2 Sample #126
104-107	Float	Pressure2 Sample #127
108-111	Float	Pressure2 Sample #128
112-115	Float	Pressure2 Sample #129
116-119	Float	Pressure2 Sample #130
120-123	Float	Pressure2 Sample #131
124-127	Float	Pressure2 Sample #132
128-131	Float	Pressure2 Sample #133
132-135	Float	Pressure2 Sample #134
136-139	Float	Pressure2 Sample #135
140-143	Float	Pressure2 Sample #136
144-147	Float	Pressure2 Sample #137
148-151	Float	Pressure2 Sample #138

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #139
156-159	Float	Pressure2 Sample #140
160-163	Float	Pressure2 Sample #141
164-167	Float	Pressure2 Sample #142
168-171	Float	Pressure2 Sample #143
172-175	Float	Pressure2 Sample #144
176-179	Float	Pressure2 Sample #145
180-183	Float	Pressure2 Sample #146
184-187	Float	Pressure2 Sample #147
188-191	Float	Pressure2 Sample #148
192-195	Float	Pressure2 Sample #149
196-199	Float	Pressure2 Sample #150

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.37 Command #164: Read Curve Samples Pressure2 – Part 4

This command allows reading the Pressure2 samples (151-200) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #151
4-7	Float	Pressure2 Sample #152
8-11	Float	Pressure2 Sample #153
12-15	Float	Pressure2 Sample #154
16-19	Float	Pressure2 Sample #155
20-23	Float	Pressure2 Sample #156
24-27	Float	Pressure2 Sample #157
28-31	Float	Pressure2 Sample #158
32-35	Float	Pressure2 Sample #159
36-39	Float	Pressure2 Sample #160
40-43	Float	Pressure2 Sample #161
44-47	Float	Pressure2 Sample #162
48-51	Float	Pressure2 Sample #163
52-55	Float	Pressure2 Sample #164
56-59	Float	Pressure2 Sample #165
60-63	Float	Pressure2 Sample #166
64-67	Float	Pressure2 Sample #167
68-71	Float	Pressure2 Sample #168
72-75	Float	Pressure2 Sample #169
76-79	Float	Pressure2 Sample #170
80-83	Float	Pressure2 Sample #171
84-87	Float	Pressure2 Sample #172
88-91	Float	Pressure2 Sample #173
92-95	Float	Pressure2 Sample #174
96-99	Float	Pressure2 Sample #175
100-103	Float	Pressure2 Sample #176
104-107	Float	Pressure2 Sample #177
108-111	Float	Pressure2 Sample #178
112-115	Float	Pressure2 Sample #179
116-119	Float	Pressure2 Sample #180
120-123	Float	Pressure2 Sample #181
124-127	Float	Pressure2 Sample #182
128-131	Float	Pressure2 Sample #183
132-135	Float	Pressure2 Sample #184
136-139	Float	Pressure2 Sample #185
140-143	Float	Pressure2 Sample #186
144-147	Float	Pressure2 Sample #187
148-151	Float	Pressure2 Sample #188

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #189
156-159	Float	Pressure2 Sample #190
160-163	Float	Pressure2 Sample #191
164-167	Float	Pressure2 Sample #192
168-171	Float	Pressure2 Sample #193
172-175	Float	Pressure2 Sample #194
176-179	Float	Pressure2 Sample #195
180-183	Float	Pressure2 Sample #196
184-187	Float	Pressure2 Sample #197
188-191	Float	Pressure2 Sample #198
192-195	Float	Pressure2 Sample #199
196-199	Float	Pressure2 Sample #200

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.38 Command #165: Read Curve Samples Pressure2 – Part 5

This command allows reading the Pressure2 samples (201-250) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #201
4-7	Float	Pressure2 Sample #202
8-11	Float	Pressure2 Sample #203
12-15	Float	Pressure2 Sample #204
16-19	Float	Pressure2 Sample #205
20-23	Float	Pressure2 Sample #206
24-27	Float	Pressure2 Sample #207
28-31	Float	Pressure2 Sample #208
32-35	Float	Pressure2 Sample #209
36-39	Float	Pressure2 Sample #210
40-43	Float	Pressure2 Sample #211
44-47	Float	Pressure2 Sample #212
48-51	Float	Pressure2 Sample #213
52-55	Float	Pressure2 Sample #214
56-59	Float	Pressure2 Sample #215
60-63	Float	Pressure2 Sample #216
64-67	Float	Pressure2 Sample #217
68-71	Float	Pressure2 Sample #218
72-75	Float	Pressure2 Sample #219
76-79	Float	Pressure2 Sample #220
80-83	Float	Pressure2 Sample #221
84-87	Float	Pressure2 Sample #222
88-91	Float	Pressure2 Sample #223
92-95	Float	Pressure2 Sample #224
96-99	Float	Pressure2 Sample #225
100-103	Float	Pressure2 Sample #226
104-107	Float	Pressure2 Sample #227
108-111	Float	Pressure2 Sample #228
112-115	Float	Pressure2 Sample #229
116-119	Float	Pressure2 Sample #230
120-123	Float	Pressure2 Sample #231
124-127	Float	Pressure2 Sample #232
128-131	Float	Pressure2 Sample #233
132-135	Float	Pressure2 Sample #234
136-139	Float	Pressure2 Sample #235
140-143	Float	Pressure2 Sample #236
144-147	Float	Pressure2 Sample #237
148-151	Float	Pressure2 Sample #238

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #239
156-159	Float	Pressure2 Sample #240
160-163	Float	Pressure2 Sample #241
164-167	Float	Pressure2 Sample #242
168-171	Float	Pressure2 Sample #243
172-175	Float	Pressure2 Sample #244
176-179	Float	Pressure2 Sample #245
180-183	Float	Pressure2 Sample #246
184-187	Float	Pressure2 Sample #247
188-191	Float	Pressure2 Sample #248
192-195	Float	Pressure2 Sample #249
196-199	Float	Pressure2 Sample #250

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.39 Command #166: Read Curve Samples Pressure2 – Part 6

This command allows reading the Pressure2 samples (251-300) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #251
4-7	Float	Pressure2 Sample #252
8-11	Float	Pressure2 Sample #253
12-15	Float	Pressure2 Sample #254
16-19	Float	Pressure2 Sample #255
20-23	Float	Pressure2 Sample #256
24-27	Float	Pressure2 Sample #257
28-31	Float	Pressure2 Sample #258
32-35	Float	Pressure2 Sample #259
36-39	Float	Pressure2 Sample #260
40-43	Float	Pressure2 Sample #261
44-47	Float	Pressure2 Sample #262
48-51	Float	Pressure2 Sample #263
52-55	Float	Pressure2 Sample #264
56-59	Float	Pressure2 Sample #265
60-63	Float	Pressure2 Sample #266
64-67	Float	Pressure2 Sample #267
68-71	Float	Pressure2 Sample #268
72-75	Float	Pressure2 Sample #269
76-79	Float	Pressure2 Sample #270
80-83	Float	Pressure2 Sample #271
84-87	Float	Pressure2 Sample #272
88-91	Float	Pressure2 Sample #273
92-95	Float	Pressure2 Sample #274
96-99	Float	Pressure2 Sample #275
100-103	Float	Pressure2 Sample #276
104-107	Float	Pressure2 Sample #277
108-111	Float	Pressure2 Sample #278
112-115	Float	Pressure2 Sample #279
116-119	Float	Pressure2 Sample #280
120-123	Float	Pressure2 Sample #281
124-127	Float	Pressure2 Sample #282
128-131	Float	Pressure2 Sample #283
132-135	Float	Pressure2 Sample #284
136-139	Float	Pressure2 Sample #285
140-143	Float	Pressure2 Sample #286
144-147	Float	Pressure2 Sample #287
148-151	Float	Pressure2 Sample #288

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #289
156-159	Float	Pressure2 Sample #290
160-163	Float	Pressure2 Sample #291
164-167	Float	Pressure2 Sample #292
168-171	Float	Pressure2 Sample #293
172-175	Float	Pressure2 Sample #294
176-179	Float	Pressure2 Sample #295
180-183	Float	Pressure2 Sample #296
184-187	Float	Pressure2 Sample #297
188-191	Float	Pressure2 Sample #298
192-195	Float	Pressure2 Sample #299
196-199	Float	Pressure2 Sample #300

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.40 Command #167: Read Curve Samples Pressure2 – Part 7

This command allows reading the Pressure2 samples (301-351) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Pressure2 Sample #301
4-7	Float	Pressure2 Sample #302
8-11	Float	Pressure2 Sample #303
12-15	Float	Pressure2 Sample #304
16-19	Float	Pressure2 Sample #305
20-23	Float	Pressure2 Sample #306
24-27	Float	Pressure2 Sample #307
28-31	Float	Pressure2 Sample #308
32-35	Float	Pressure2 Sample #309
36-39	Float	Pressure2 Sample #310
40-43	Float	Pressure2 Sample #311
44-47	Float	Pressure2 Sample #312
48-51	Float	Pressure2 Sample #313
52-55	Float	Pressure2 Sample #314
56-59	Float	Pressure2 Sample #315
60-63	Float	Pressure2 Sample #316
64-67	Float	Pressure2 Sample #317
68-71	Float	Pressure2 Sample #318
72-75	Float	Pressure2 Sample #319
76-79	Float	Pressure2 Sample #320
80-83	Float	Pressure2 Sample #321
84-87	Float	Pressure2 Sample #322
88-91	Float	Pressure2 Sample #323
92-95	Float	Pressure2 Sample #324
96-99	Float	Pressure2 Sample #325
100-103	Float	Pressure2 Sample #326
104-107	Float	Pressure2 Sample #327
108-111	Float	Pressure2 Sample #328
112-115	Float	Pressure2 Sample #329
116-119	Float	Pressure2 Sample #330
120-123	Float	Pressure2 Sample #331
124-127	Float	Pressure2 Sample #332
128-131	Float	Pressure2 Sample #333
132-135	Float	Pressure2 Sample #334
136-139	Float	Pressure2 Sample #335
140-143	Float	Pressure2 Sample #336
144-147	Float	Pressure2 Sample #337
148-151	Float	Pressure2 Sample #338

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Pressure2 Sample #339
156-159	Float	Pressure2 Sample #340
160-163	Float	Pressure2 Sample #341
164-167	Float	Pressure2 Sample #342
168-171	Float	Pressure2 Sample #343
172-175	Float	Pressure2 Sample #344
176-179	Float	Pressure2 Sample #345
180-183	Float	Pressure2 Sample #346
184-187	Float	Pressure2 Sample #347
188-191	Float	Pressure2 Sample #348
192-195	Float	Pressure2 Sample #349
196-199	Float	Pressure2 Sample #350
200-203	Float	Pressure2 Sample #351

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.41 Command #168: Read Curve Samples Process Pressure – Part 1

This command allows reading the Process Pressure samples (1-50) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #1
4-7	Float	Process Pressure Sample #2
8-11	Float	Process Pressure Sample #3
12-15	Float	Process Pressure Sample #4
16-19	Float	Process Pressure Sample #5
20-23	Float	Process Pressure Sample #6
24-27	Float	Process Pressure Sample #7
28-31	Float	Process Pressure Sample #8
32-35	Float	Process Pressure Sample #9
36-39	Float	Process Pressure Sample #10
40-43	Float	Process Pressure Sample #11
44-47	Float	Process Pressure Sample #12
48-51	Float	Process Pressure Sample #13
52-55	Float	Process Pressure Sample #14
56-59	Float	Process Pressure Sample #15
60-63	Float	Process Pressure Sample #16
64-67	Float	Process Pressure Sample #17
68-71	Float	Process Pressure Sample #18
72-75	Float	Process Pressure Sample #19
76-79	Float	Process Pressure Sample #20
80-83	Float	Process Pressure Sample #21
84-87	Float	Process Pressure Sample #22
88-91	Float	Process Pressure Sample #23
92-95	Float	Process Pressure Sample #24
96-99	Float	Process Pressure Sample #25
100-103	Float	Process Pressure Sample #26
104-107	Float	Process Pressure Sample #27
108-111	Float	Process Pressure Sample #28
112-115	Float	Process Pressure Sample #29
116-119	Float	Process Pressure Sample #30
120-123	Float	Process Pressure Sample #31
124-127	Float	Process Pressure Sample #32
128-131	Float	Process Pressure Sample #33
132-135	Float	Process Pressure Sample #34
136-139	Float	Process Pressure Sample #35
140-143	Float	Process Pressure Sample #36
144-147	Float	Process Pressure Sample #37
148-151	Float	Process Pressure Sample #38

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #39
156-159	Float	Process Pressure Sample #40
160-163	Float	Process Pressure Sample #41
164-167	Float	Process Pressure Sample #42
168-171	Float	Process Pressure Sample #43
172-175	Float	Process Pressure Sample #44
176-179	Float	Process Pressure Sample #45
180-183	Float	Process Pressure Sample #46
184-187	Float	Process Pressure Sample #47
188-191	Float	Process Pressure Sample #48
192-195	Float	Process Pressure Sample #49
196-199	Float	Process Pressure Sample #50

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.42 Command #169: Read Curve Samples Process Pressure – Part 2

This command allows reading the Process Pressure samples (51-100) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #51
4-7	Float	Process Pressure Sample #52
8-11	Float	Process Pressure Sample #53
12-15	Float	Process Pressure Sample #54
16-19	Float	Process Pressure Sample #55
20-23	Float	Process Pressure Sample #56
24-27	Float	Process Pressure Sample #57
28-31	Float	Process Pressure Sample #58
32-35	Float	Process Pressure Sample #59
36-39	Float	Process Pressure Sample #60
40-43	Float	Process Pressure Sample #61
44-47	Float	Process Pressure Sample #62
48-51	Float	Process Pressure Sample #63
52-55	Float	Process Pressure Sample #64
56-59	Float	Process Pressure Sample #65
60-63	Float	Process Pressure Sample #66
64-67	Float	Process Pressure Sample #67
68-71	Float	Process Pressure Sample #68
72-75	Float	Process Pressure Sample #69
76-79	Float	Process Pressure Sample #70
80-83	Float	Process Pressure Sample #71
84-87	Float	Process Pressure Sample #72
88-91	Float	Process Pressure Sample #73
92-95	Float	Process Pressure Sample #74
96-99	Float	Process Pressure Sample #75
100-103	Float	Process Pressure Sample #76
104-107	Float	Process Pressure Sample #77
108-111	Float	Process Pressure Sample #78
112-115	Float	Process Pressure Sample #79
116-119	Float	Process Pressure Sample #80
120-123	Float	Process Pressure Sample #81
124-127	Float	Process Pressure Sample #82
128-131	Float	Process Pressure Sample #83
132-135	Float	Process Pressure Sample #84
136-139	Float	Process Pressure Sample #85
140-143	Float	Process Pressure Sample #86
144-147	Float	Process Pressure Sample #87
148-151	Float	Process Pressure Sample #88

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #89
156-159	Float	Process Pressure Sample #90
160-163	Float	Process Pressure Sample #91
164-167	Float	Process Pressure Sample #92
168-171	Float	Process Pressure Sample #93
172-175	Float	Process Pressure Sample #94
176-179	Float	Process Pressure Sample #95
180-183	Float	Process Pressure Sample #96
184-187	Float	Process Pressure Sample #97
188-191	Float	Process Pressure Sample #98
192-195	Float	Process Pressure Sample #99
196-199	Float	Process Pressure Sample #100

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.43 Command #170: Read Curve Samples Process Pressure – Part 3

This command allows reading the Process Pressure samples (101-150) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #101
4-7	Float	Process Pressure Sample #102
8-11	Float	Process Pressure Sample #103
12-15	Float	Process Pressure Sample #104
16-19	Float	Process Pressure Sample #105
20-23	Float	Process Pressure Sample #106
24-27	Float	Process Pressure Sample #107
28-31	Float	Process Pressure Sample #108
32-35	Float	Process Pressure Sample #109
36-39	Float	Process Pressure Sample #110
40-43	Float	Process Pressure Sample #111
44-47	Float	Process Pressure Sample #112
48-51	Float	Process Pressure Sample #113
52-55	Float	Process Pressure Sample #114
56-59	Float	Process Pressure Sample #115
60-63	Float	Process Pressure Sample #116
64-67	Float	Process Pressure Sample #117
68-71	Float	Process Pressure Sample #118
72-75	Float	Process Pressure Sample #119
76-79	Float	Process Pressure Sample #120
80-83	Float	Process Pressure Sample #121
84-87	Float	Process Pressure Sample #122
88-91	Float	Process Pressure Sample #123
92-95	Float	Process Pressure Sample #124
96-99	Float	Process Pressure Sample #125
100-103	Float	Process Pressure Sample #126
104-107	Float	Process Pressure Sample #127
108-111	Float	Process Pressure Sample #128
112-115	Float	Process Pressure Sample #129
116-119	Float	Process Pressure Sample #130
120-123	Float	Process Pressure Sample #131
124-127	Float	Process Pressure Sample #132
128-131	Float	Process Pressure Sample #133
132-135	Float	Process Pressure Sample #134
136-139	Float	Process Pressure Sample #135
140-143	Float	Process Pressure Sample #136
144-147	Float	Process Pressure Sample #137
148-151	Float	Process Pressure Sample #138

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #139
156-159	Float	Process Pressure Sample #140
160-163	Float	Process Pressure Sample #141
164-167	Float	Process Pressure Sample #142
168-171	Float	Process Pressure Sample #143
172-175	Float	Process Pressure Sample #144
176-179	Float	Process Pressure Sample #145
180-183	Float	Process Pressure Sample #146
184-187	Float	Process Pressure Sample #147
188-191	Float	Process Pressure Sample #148
192-195	Float	Process Pressure Sample #149
196-199	Float	Process Pressure Sample #150

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.44 Command #171: Read Curve Samples Process Pressure – Part 4

This command allows reading the Process Pressure samples (151-200) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #151
4-7	Float	Process Pressure Sample #152
8-11	Float	Process Pressure Sample #153
12-15	Float	Process Pressure Sample #154
16-19	Float	Process Pressure Sample #155
20-23	Float	Process Pressure Sample #156
24-27	Float	Process Pressure Sample #157
28-31	Float	Process Pressure Sample #158
32-35	Float	Process Pressure Sample #159
36-39	Float	Process Pressure Sample #160
40-43	Float	Process Pressure Sample #161
44-47	Float	Process Pressure Sample #162
48-51	Float	Process Pressure Sample #163
52-55	Float	Process Pressure Sample #164
56-59	Float	Process Pressure Sample #165
60-63	Float	Process Pressure Sample #166
64-67	Float	Process Pressure Sample #167
68-71	Float	Process Pressure Sample #168
72-75	Float	Process Pressure Sample #169
76-79	Float	Process Pressure Sample #170
80-83	Float	Process Pressure Sample #171
84-87	Float	Process Pressure Sample #172
88-91	Float	Process Pressure Sample #173
92-95	Float	Process Pressure Sample #174
96-99	Float	Process Pressure Sample #175
100-103	Float	Process Pressure Sample #176
104-107	Float	Process Pressure Sample #177
108-111	Float	Process Pressure Sample #178
112-115	Float	Process Pressure Sample #179
116-119	Float	Process Pressure Sample #180
120-123	Float	Process Pressure Sample #181
124-127	Float	Process Pressure Sample #182
128-131	Float	Process Pressure Sample #183
132-135	Float	Process Pressure Sample #184
136-139	Float	Process Pressure Sample #185
140-143	Float	Process Pressure Sample #186
144-147	Float	Process Pressure Sample #187
148-151	Float	Process Pressure Sample #188

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #189
156-159	Float	Process Pressure Sample #190
160-163	Float	Process Pressure Sample #191
164-167	Float	Process Pressure Sample #192
168-171	Float	Process Pressure Sample #193
172-175	Float	Process Pressure Sample #194
176-179	Float	Process Pressure Sample #195
180-183	Float	Process Pressure Sample #196
184-187	Float	Process Pressure Sample #197
188-191	Float	Process Pressure Sample #198
192-195	Float	Process Pressure Sample #199
196-199	Float	Process Pressure Sample #200

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.45 Command #172: Read Curve Samples Process Pressure – Part 5

This command allows reading the Process Pressure samples (201-250) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #201
4-7	Float	Process Pressure Sample #202
8-11	Float	Process Pressure Sample #203
12-15	Float	Process Pressure Sample #204
16-19	Float	Process Pressure Sample #205
20-23	Float	Process Pressure Sample #206
24-27	Float	Process Pressure Sample #207
28-31	Float	Process Pressure Sample #208
32-35	Float	Process Pressure Sample #209
36-39	Float	Process Pressure Sample #210
40-43	Float	Process Pressure Sample #211
44-47	Float	Process Pressure Sample #212
48-51	Float	Process Pressure Sample #213
52-55	Float	Process Pressure Sample #214
56-59	Float	Process Pressure Sample #215
60-63	Float	Process Pressure Sample #216
64-67	Float	Process Pressure Sample #217
68-71	Float	Process Pressure Sample #218
72-75	Float	Process Pressure Sample #219
76-79	Float	Process Pressure Sample #220
80-83	Float	Process Pressure Sample #221
84-87	Float	Process Pressure Sample #222
88-91	Float	Process Pressure Sample #223
92-95	Float	Process Pressure Sample #224
96-99	Float	Process Pressure Sample #225
100-103	Float	Process Pressure Sample #226
104-107	Float	Process Pressure Sample #227
108-111	Float	Process Pressure Sample #228
112-115	Float	Process Pressure Sample #229
116-119	Float	Process Pressure Sample #230
120-123	Float	Process Pressure Sample #231
124-127	Float	Process Pressure Sample #232
128-131	Float	Process Pressure Sample #233
132-135	Float	Process Pressure Sample #234
136-139	Float	Process Pressure Sample #235
140-143	Float	Process Pressure Sample #236
144-147	Float	Process Pressure Sample #237
148-151	Float	Process Pressure Sample #238

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #239
156-159	Float	Process Pressure Sample #240
160-163	Float	Process Pressure Sample #241
164-167	Float	Process Pressure Sample #242
168-171	Float	Process Pressure Sample #243
172-175	Float	Process Pressure Sample #244
176-179	Float	Process Pressure Sample #245
180-183	Float	Process Pressure Sample #246
184-187	Float	Process Pressure Sample #247
188-191	Float	Process Pressure Sample #248
192-195	Float	Process Pressure Sample #249
196-199	Float	Process Pressure Sample #250

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.46 Command #173: Read Curve Samples Process Pressure – Part 6

This command allows reading the Process Pressure samples (251-300) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #251
4-7	Float	Process Pressure Sample #252
8-11	Float	Process Pressure Sample #253
12-15	Float	Process Pressure Sample #254
16-19	Float	Process Pressure Sample #255
20-23	Float	Process Pressure Sample #256
24-27	Float	Process Pressure Sample #257
28-31	Float	Process Pressure Sample #258
32-35	Float	Process Pressure Sample #259
36-39	Float	Process Pressure Sample #260
40-43	Float	Process Pressure Sample #261
44-47	Float	Process Pressure Sample #262
48-51	Float	Process Pressure Sample #263
52-55	Float	Process Pressure Sample #264
56-59	Float	Process Pressure Sample #265
60-63	Float	Process Pressure Sample #266
64-67	Float	Process Pressure Sample #267
68-71	Float	Process Pressure Sample #268
72-75	Float	Process Pressure Sample #269
76-79	Float	Process Pressure Sample #270
80-83	Float	Process Pressure Sample #271
84-87	Float	Process Pressure Sample #272
88-91	Float	Process Pressure Sample #273
92-95	Float	Process Pressure Sample #274
96-99	Float	Process Pressure Sample #275
100-103	Float	Process Pressure Sample #276
104-107	Float	Process Pressure Sample #277
108-111	Float	Process Pressure Sample #278
112-115	Float	Process Pressure Sample #279
116-119	Float	Process Pressure Sample #280
120-123	Float	Process Pressure Sample #281
124-127	Float	Process Pressure Sample #282
128-131	Float	Process Pressure Sample #283
132-135	Float	Process Pressure Sample #284
136-139	Float	Process Pressure Sample #285
140-143	Float	Process Pressure Sample #286
144-147	Float	Process Pressure Sample #287
148-151	Float	Process Pressure Sample #288

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #289
156-159	Float	Process Pressure Sample #290
160-163	Float	Process Pressure Sample #291
164-167	Float	Process Pressure Sample #292
168-171	Float	Process Pressure Sample #293
172-175	Float	Process Pressure Sample #294
176-179	Float	Process Pressure Sample #295
180-183	Float	Process Pressure Sample #296
184-187	Float	Process Pressure Sample #297
188-191	Float	Process Pressure Sample #298
192-195	Float	Process Pressure Sample #299
196-199	Float	Process Pressure Sample #300

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.47 Command #174: Read Curve Samples Process Pressure – Part 7

This command allows reading the Process Pressure samples (301-351) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Process Pressure Sample #301
4-7	Float	Process Pressure Sample #302
8-11	Float	Process Pressure Sample #303
12-15	Float	Process Pressure Sample #304
16-19	Float	Process Pressure Sample #305
20-23	Float	Process Pressure Sample #306
24-27	Float	Process Pressure Sample #307
28-31	Float	Process Pressure Sample #308
32-35	Float	Process Pressure Sample #309
36-39	Float	Process Pressure Sample #310
40-43	Float	Process Pressure Sample #311
44-47	Float	Process Pressure Sample #312
48-51	Float	Process Pressure Sample #313
52-55	Float	Process Pressure Sample #314
56-59	Float	Process Pressure Sample #315
60-63	Float	Process Pressure Sample #316
64-67	Float	Process Pressure Sample #317
68-71	Float	Process Pressure Sample #318
72-75	Float	Process Pressure Sample #319
76-79	Float	Process Pressure Sample #320
80-83	Float	Process Pressure Sample #321
84-87	Float	Process Pressure Sample #322
88-91	Float	Process Pressure Sample #323
92-95	Float	Process Pressure Sample #324
96-99	Float	Process Pressure Sample #325
100-103	Float	Process Pressure Sample #326
104-107	Float	Process Pressure Sample #327
108-111	Float	Process Pressure Sample #328
112-115	Float	Process Pressure Sample #329
116-119	Float	Process Pressure Sample #330
120-123	Float	Process Pressure Sample #331
124-127	Float	Process Pressure Sample #332
128-131	Float	Process Pressure Sample #333
132-135	Float	Process Pressure Sample #334
136-139	Float	Process Pressure Sample #335
140-143	Float	Process Pressure Sample #336
144-147	Float	Process Pressure Sample #337
148-151	Float	Process Pressure Sample #338

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Process Pressure Sample #339
156-159	Float	Process Pressure Sample #340
160-163	Float	Process Pressure Sample #341
164-167	Float	Process Pressure Sample #342
168-171	Float	Process Pressure Sample #343
172-175	Float	Process Pressure Sample #344
176-179	Float	Process Pressure Sample #345
180-183	Float	Process Pressure Sample #346
184-187	Float	Process Pressure Sample #347
188-191	Float	Process Pressure Sample #348
192-195	Float	Process Pressure Sample #349
196-199	Float	Process Pressure Sample #350
200-203	Float	Process Pressure Sample #351

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.48 Command #175: Read Curve Samples Position – Part 1

This command allows reading the Position samples (1-50) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #1
4-7	Float	Position Sample #2
8-11	Float	Position Sample #3
12-15	Float	Position Sample #4
16-19	Float	Position Sample #5
20-23	Float	Position Sample #6
24-27	Float	Position Sample #7
28-31	Float	Position Sample #8
32-35	Float	Position Sample #9
36-39	Float	Position Sample #10
40-43	Float	Position Sample #11
44-47	Float	Position Sample #12
48-51	Float	Position Sample #13
52-55	Float	Position Sample #14
56-59	Float	Position Sample #15
60-63	Float	Position Sample #16
64-67	Float	Position Sample #17
68-71	Float	Position Sample #18
72-75	Float	Position Sample #19
76-79	Float	Position Sample #20
80-83	Float	Position Sample #21
84-87	Float	Position Sample #22
88-91	Float	Position Sample #23
92-95	Float	Position Sample #24
96-99	Float	Position Sample #25
100-103	Float	Position Sample #26
104-107	Float	Position Sample #27
108-111	Float	Position Sample #28
112-115	Float	Position Sample #29
116-119	Float	Position Sample #30
120-123	Float	Position Sample #31
124-127	Float	Position Sample #32
128-131	Float	Position Sample #33
132-135	Float	Position Sample #34
136-139	Float	Position Sample #35
140-143	Float	Position Sample #36
144-147	Float	Position Sample #37
148-151	Float	Position Sample #38
152-155	Float	Position Sample #39

Continue…

Byte	Format	Description
…Continue		
156-159	Float	Position Sample #40
160-163	Float	Position Sample #41
164-167	Float	Position Sample #42
168-171	Float	Position Sample #43
172-175	Float	Position Sample #44
176-179	Float	Position Sample #45
180-183	Float	Position Sample #46
184-187	Float	Position Sample #47
188-191	Float	Position Sample #48
192-195	Float	Position Sample #49
196-199	Float	Position Sample #50

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.49 Command #176: Read Curve Samples Position – Part 2

This command allows reading the Position samples (51-100) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #51
4-7	Float	Position Sample #52
8-11	Float	Position Sample #53
12-15	Float	Position Sample #54
16-19	Float	Position Sample #55
20-23	Float	Position Sample #56
24-27	Float	Position Sample #57
28-31	Float	Position Sample #58
32-35	Float	Position Sample #59
36-39	Float	Position Sample #60
40-43	Float	Position Sample #61
44-47	Float	Position Sample #62
48-51	Float	Position Sample #63
52-55	Float	Position Sample #64
56-59	Float	Position Sample #65
60-63	Float	Position Sample #66
64-67	Float	Position Sample #67
68-71	Float	Position Sample #68
72-75	Float	Position Sample #69
76-79	Float	Position Sample #70
80-83	Float	Position Sample #71
84-87	Float	Position Sample #72
88-91	Float	Position Sample #73
92-95	Float	Position Sample #74
96-99	Float	Position Sample #75
100-103	Float	Position Sample #76
104-107	Float	Position Sample #77
108-111	Float	Position Sample #78
112-115	Float	Position Sample #79
116-119	Float	Position Sample #80
120-123	Float	Position Sample #81
124-127	Float	Position Sample #82
128-131	Float	Position Sample #83
132-135	Float	Position Sample #84
136-139	Float	Position Sample #85
140-143	Float	Position Sample #86
144-147	Float	Position Sample #87
148-151	Float	Position Sample #88

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #89
156-159	Float	Position Sample #90
160-163	Float	Position Sample #91
164-167	Float	Position Sample #92
168-171	Float	Position Sample #93
172-175	Float	Position Sample #94
176-179	Float	Position Sample #95
180-183	Float	Position Sample #96
184-187	Float	Position Sample #97
188-191	Float	Position Sample #98
192-195	Float	Position Sample #99
196-199	Float	Position Sample #100

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.50 Command #177: Read Curve Samples Position – Part 3

This command allows reading the Position samples (101-150) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #101
4-7	Float	Position Sample #102
8-11	Float	Position Sample #103
12-15	Float	Position Sample #104
16-19	Float	Position Sample #105
20-23	Float	Position Sample #106
24-27	Float	Position Sample #107
28-31	Float	Position Sample #108
32-35	Float	Position Sample #109
36-39	Float	Position Sample #110
40-43	Float	Position Sample #111
44-47	Float	Position Sample #112
48-51	Float	Position Sample #113
52-55	Float	Position Sample #114
56-59	Float	Position Sample #115
60-63	Float	Position Sample #116
64-67	Float	Position Sample #117
68-71	Float	Position Sample #118
72-75	Float	Position Sample #119
76-79	Float	Position Sample #120
80-83	Float	Position Sample #121
84-87	Float	Position Sample #122
88-91	Float	Position Sample #123
92-95	Float	Position Sample #124
96-99	Float	Position Sample #125
100-103	Float	Position Sample #126
104-107	Float	Position Sample #127
108-111	Float	Position Sample #128
112-115	Float	Position Sample #129
116-119	Float	Position Sample #130
120-123	Float	Position Sample #131
124-127	Float	Position Sample #132
128-131	Float	Position Sample #133
132-135	Float	Position Sample #134
136-139	Float	Position Sample #135
140-143	Float	Position Sample #136
144-147	Float	Position Sample #137
148-151	Float	Position Sample #138

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #139
156-159	Float	Position Sample #140
160-163	Float	Position Sample #141
164-167	Float	Position Sample #142
168-171	Float	Position Sample #143
172-175	Float	Position Sample #144
176-179	Float	Position Sample #145
180-183	Float	Position Sample #146
184-187	Float	Position Sample #147
188-191	Float	Position Sample #148
192-195	Float	Position Sample #149
196-199	Float	Position Sample #150

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.51 Command #178: Read Curve Samples Position – Part 4

This command allows reading the Position samples (151-200) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #151
4-7	Float	Position Sample #152
8-11	Float	Position Sample #153
12-15	Float	Position Sample #154
16-19	Float	Position Sample #155
20-23	Float	Position Sample #156
24-27	Float	Position Sample #157
28-31	Float	Position Sample #158
32-35	Float	Position Sample #159
36-39	Float	Position Sample #160
40-43	Float	Position Sample #161
44-47	Float	Position Sample #162
48-51	Float	Position Sample #163
52-55	Float	Position Sample #164
56-59	Float	Position Sample #165
60-63	Float	Position Sample #166
64-67	Float	Position Sample #167
68-71	Float	Position Sample #168
72-75	Float	Position Sample #169
76-79	Float	Position Sample #170
80-83	Float	Position Sample #171
84-87	Float	Position Sample #172
88-91	Float	Position Sample #173
92-95	Float	Position Sample #174
96-99	Float	Position Sample #175
100-103	Float	Position Sample #176
104-107	Float	Position Sample #177
108-111	Float	Position Sample #178
112-115	Float	Position Sample #179
116-119	Float	Position Sample #180
120-123	Float	Position Sample #181
124-127	Float	Position Sample #182
128-131	Float	Position Sample #183
132-135	Float	Position Sample #184
136-139	Float	Position Sample #185
140-143	Float	Position Sample #186
144-147	Float	Position Sample #187
148-151	Float	Position Sample #188

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #189
156-159	Float	Position Sample #190
160-163	Float	Position Sample #191
164-167	Float	Position Sample #192
168-171	Float	Position Sample #193
172-175	Float	Position Sample #194
176-179	Float	Position Sample #195
180-183	Float	Position Sample #196
184-187	Float	Position Sample #197
188-191	Float	Position Sample #198
192-195	Float	Position Sample #199
196-199	Float	Position Sample #200

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.52 Command #179: Read Curve Samples Position – Part 5

This command allows reading the Position samples (201-250) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #201
4-7	Float	Position Sample #202
8-11	Float	Position Sample #203
12-15	Float	Position Sample #204
16-19	Float	Position Sample #205
20-23	Float	Position Sample #206
24-27	Float	Position Sample #207
28-31	Float	Position Sample #208
32-35	Float	Position Sample #209
36-39	Float	Position Sample #210
40-43	Float	Position Sample #211
44-47	Float	Position Sample #212
48-51	Float	Position Sample #213
52-55	Float	Position Sample #214
56-59	Float	Position Sample #215
60-63	Float	Position Sample #216
64-67	Float	Position Sample #217
68-71	Float	Position Sample #218
72-75	Float	Position Sample #219
76-79	Float	Position Sample #220
80-83	Float	Position Sample #221
84-87	Float	Position Sample #222
88-91	Float	Position Sample #223
92-95	Float	Position Sample #224
96-99	Float	Position Sample #225
100-103	Float	Position Sample #226
104-107	Float	Position Sample #227
108-111	Float	Position Sample #228
112-115	Float	Position Sample #229
116-119	Float	Position Sample #230
120-123	Float	Position Sample #231
124-127	Float	Position Sample #232
128-131	Float	Position Sample #233
132-135	Float	Position Sample #234
136-139	Float	Position Sample #235
140-143	Float	Position Sample #236
144-147	Float	Position Sample #237
148-151	Float	Position Sample #238

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #239
156-159	Float	Position Sample #240
160-163	Float	Position Sample #241
164-167	Float	Position Sample #242
168-171	Float	Position Sample #243
172-175	Float	Position Sample #244
176-179	Float	Position Sample #245
180-183	Float	Position Sample #246
184-187	Float	Position Sample #247
188-191	Float	Position Sample #248
192-195	Float	Position Sample #249
196-199	Float	Position Sample #250

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.53 Command #180: Read Curve Samples Position – Part 6

This command allows reading the Position samples (251-300) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #251
4-7	Float	Position Sample #252
8-11	Float	Position Sample #253
12-15	Float	Position Sample #254
16-19	Float	Position Sample #255
20-23	Float	Position Sample #256
24-27	Float	Position Sample #257
28-31	Float	Position Sample #258
32-35	Float	Position Sample #259
36-39	Float	Position Sample #260
40-43	Float	Position Sample #261
44-47	Float	Position Sample #262
48-51	Float	Position Sample #263
52-55	Float	Position Sample #264
56-59	Float	Position Sample #265
60-63	Float	Position Sample #266
64-67	Float	Position Sample #267
68-71	Float	Position Sample #268
72-75	Float	Position Sample #269
76-79	Float	Position Sample #270
80-83	Float	Position Sample #271
84-87	Float	Position Sample #272
88-91	Float	Position Sample #273
92-95	Float	Position Sample #274
96-99	Float	Position Sample #275
100-103	Float	Position Sample #276
104-107	Float	Position Sample #277
108-111	Float	Position Sample #278
112-115	Float	Position Sample #279
116-119	Float	Position Sample #280
120-123	Float	Position Sample #281
124-127	Float	Position Sample #282
128-131	Float	Position Sample #283
132-135	Float	Position Sample #284
136-139	Float	Position Sample #285
140-143	Float	Position Sample #286
144-147	Float	Position Sample #287
148-151	Float	Position Sample #288

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #289
156-159	Float	Position Sample #290
160-163	Float	Position Sample #291
164-167	Float	Position Sample #292
168-171	Float	Position Sample #293
172-175	Float	Position Sample #294
176-179	Float	Position Sample #295
180-183	Float	Position Sample #296
184-187	Float	Position Sample #297
188-191	Float	Position Sample #298
192-195	Float	Position Sample #299
196-199	Float	Position Sample #300

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.54 Command #181: Read Curve Samples Position – Part 7

This command allows reading the Position samples (301-351) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	Position Sample #301
4-7	Float	Position Sample #302
8-11	Float	Position Sample #303
12-15	Float	Position Sample #304
16-19	Float	Position Sample #305
20-23	Float	Position Sample #306
24-27	Float	Position Sample #307
28-31	Float	Position Sample #308
32-35	Float	Position Sample #309
36-39	Float	Position Sample #310
40-43	Float	Position Sample #311
44-47	Float	Position Sample #312
48-51	Float	Position Sample #313
52-55	Float	Position Sample #314
56-59	Float	Position Sample #315
60-63	Float	Position Sample #316
64-67	Float	Position Sample #317
68-71	Float	Position Sample #318
72-75	Float	Position Sample #319
76-79	Float	Position Sample #320
80-83	Float	Position Sample #321
84-87	Float	Position Sample #322
88-91	Float	Position Sample #323
92-95	Float	Position Sample #324
96-99	Float	Position Sample #325
100-103	Float	Position Sample #326
104-107	Float	Position Sample #327
108-111	Float	Position Sample #328
112-115	Float	Position Sample #329
116-119	Float	Position Sample #330
120-123	Float	Position Sample #331
124-127	Float	Position Sample #332
128-131	Float	Position Sample #333
132-135	Float	Position Sample #334
136-139	Float	Position Sample #335
140-143	Float	Position Sample #336
144-147	Float	Position Sample #337
148-151	Float	Position Sample #338

Continue…

Byte	Format	Description
…Continue		
152-155	Float	Position Sample #339
156-159	Float	Position Sample #340
160-163	Float	Position Sample #341
164-167	Float	Position Sample #342
168-171	Float	Position Sample #343
172-175	Float	Position Sample #344
176-179	Float	Position Sample #345
180-183	Float	Position Sample #346
184-187	Float	Position Sample #347
188-191	Float	Position Sample #348
192-195	Float	Position Sample #349
196-199	Float	Position Sample #350
200-203	Float	Position Sample #351

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.55 Command #182: Read Curve Samples P1-P2 – Part 1

This command allows reading the P1-P2 samples (1-50) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #1
4-7	Float	P1-P2 Sample #2
8-11	Float	P1-P2 Sample #3
12-15	Float	P1-P2 Sample #4
16-19	Float	P1-P2 Sample #5
20-23	Float	P1-P2 Sample #6
24-27	Float	P1-P2 Sample #7
28-31	Float	P1-P2 Sample #8
32-35	Float	P1-P2 Sample #9
36-39	Float	P1-P2 Sample #10
40-43	Float	P1-P2 Sample #11
44-47	Float	P1-P2 Sample #12
48-51	Float	P1-P2 Sample #13
52-55	Float	P1-P2 Sample #14
56-59	Float	P1-P2 Sample #15
60-63	Float	P1-P2 Sample #16
64-67	Float	P1-P2 Sample #17
68-71	Float	P1-P2 Sample #18
72-75	Float	P1-P2 Sample #19
76-79	Float	P1-P2 Sample #20
80-83	Float	P1-P2 Sample #21
84-87	Float	P1-P2 Sample #22
88-91	Float	P1-P2 Sample #23
92-95	Float	P1-P2 Sample #24
96-99	Float	P1-P2 Sample #25
100-103	Float	P1-P2 Sample #26
104-107	Float	P1-P2 Sample #27
108-111	Float	P1-P2 Sample #28
112-115	Float	P1-P2 Sample #29
116-119	Float	P1-P2 Sample #30
120-123	Float	P1-P2 Sample #31
124-127	Float	P1-P2 Sample #32
128-131	Float	P1-P2 Sample #33
132-135	Float	P1-P2 Sample #34
136-139	Float	P1-P2 Sample #35
140-143	Float	P1-P2 Sample #36
144-147	Float	P1-P2 Sample #37
148-151	Float	P1-P2 Sample #38
152-155	Float	P1-P2 Sample #39

Continue…

Byte	Format	Description
…Continue		
156-159	Float	P1-P2 Sample #40
160-163	Float	P1-P2 Sample #41
164-167	Float	P1-P2 Sample #42
168-171	Float	P1-P2 Sample #43
172-175	Float	P1-P2 Sample #44
176-179	Float	P1-P2 Sample #45
180-183	Float	P1-P2 Sample #46
184-187	Float	P1-P2 Sample #47
188-191	Float	P1-P2 Sample #48
192-195	Float	P1-P2 Sample #49
196-199	Float	P1-P2 Sample #50

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.56 Command #183: Read Curve Samples P1-P2 – Part 2

This command allows reading the P1-P2 samples (51-100) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #51
4-7	Float	P1-P2 Sample #52
8-11	Float	P1-P2 Sample #53
12-15	Float	P1-P2 Sample #54
16-19	Float	P1-P2 Sample #55
20-23	Float	P1-P2 Sample #56
24-27	Float	P1-P2 Sample #57
28-31	Float	P1-P2 Sample #58
32-35	Float	P1-P2 Sample #59
36-39	Float	P1-P2 Sample #60
40-43	Float	P1-P2 Sample #61
44-47	Float	P1-P2 Sample #62
48-51	Float	P1-P2 Sample #63
52-55	Float	P1-P2 Sample #64
56-59	Float	P1-P2 Sample #65
60-63	Float	P1-P2 Sample #66
64-67	Float	P1-P2 Sample #67
68-71	Float	P1-P2 Sample #68
72-75	Float	P1-P2 Sample #69
76-79	Float	P1-P2 Sample #70
80-83	Float	P1-P2 Sample #71
84-87	Float	P1-P2 Sample #72
88-91	Float	P1-P2 Sample #73
92-95	Float	P1-P2 Sample #74
96-99	Float	P1-P2 Sample #75
100-103	Float	P1-P2 Sample #76
104-107	Float	P1-P2 Sample #77
108-111	Float	P1-P2 Sample #78
112-115	Float	P1-P2 Sample #79
116-119	Float	P1-P2 Sample #80
120-123	Float	P1-P2 Sample #81
124-127	Float	P1-P2 Sample #82
128-131	Float	P1-P2 Sample #83
132-135	Float	P1-P2 Sample #84
136-139	Float	P1-P2 Sample #85
140-143	Float	P1-P2 Sample #86
144-147	Float	P1-P2 Sample #87
148-151	Float	P1-P2 Sample #88
152-155	Float	P1-P2 Sample #89

Continue…

Byte	Format	Description
…Continue		
156-159	Float	P1-P2 Sample #90
160-163	Float	P1-P2 Sample #91
164-167	Float	P1-P2 Sample #92
168-171	Float	P1-P2 Sample #93
172-175	Float	P1-P2 Sample #94
176-179	Float	P1-P2 Sample #95
180-183	Float	P1-P2 Sample #96
184-187	Float	P1-P2 Sample #97
188-191	Float	P1-P2 Sample #98
192-195	Float	P1-P2 Sample #99
196-199	Float	P1-P2 Sample #100

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.57 Command #184: Read Curve Samples P1-P2 – Part 3

This command allows reading the P1-P2 samples (101-150) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #101
4-7	Float	P1-P2 Sample #102
8-11	Float	P1-P2 Sample #103
12-15	Float	P1-P2 Sample #104
16-19	Float	P1-P2 Sample #105
20-23	Float	P1-P2 Sample #106
24-27	Float	P1-P2 Sample #107
28-31	Float	P1-P2 Sample #108
32-35	Float	P1-P2 Sample #109
36-39	Float	P1-P2 Sample #110
40-43	Float	P1-P2 Sample #111
44-47	Float	P1-P2 Sample #112
48-51	Float	P1-P2 Sample #113
52-55	Float	P1-P2 Sample #114
56-59	Float	P1-P2 Sample #115
60-63	Float	P1-P2 Sample #116
64-67	Float	P1-P2 Sample #117
68-71	Float	P1-P2 Sample #118
72-75	Float	P1-P2 Sample #119
76-79	Float	P1-P2 Sample #120
80-83	Float	P1-P2 Sample #121
84-87	Float	P1-P2 Sample #122
88-91	Float	P1-P2 Sample #123
92-95	Float	P1-P2 Sample #124
96-99	Float	P1-P2 Sample #125
100-103	Float	P1-P2 Sample #126
104-107	Float	P1-P2 Sample #127
108-111	Float	P1-P2 Sample #128
112-115	Float	P1-P2 Sample #129
116-119	Float	P1-P2 Sample #130
120-123	Float	P1-P2 Sample #131
124-127	Float	P1-P2 Sample #132
128-131	Float	P1-P2 Sample #133
132-135	Float	P1-P2 Sample #134
136-139	Float	P1-P2 Sample #135
140-143	Float	P1-P2 Sample #136
144-147	Float	P1-P2 Sample #137
148-151	Float	P1-P2 Sample #138

Continue…

Byte	Format	Description
…Continue		
152-155	Float	P1-P2 Sample #139
156-159	Float	P1-P2 Sample #140
160-163	Float	P1-P2 Sample #141
164-167	Float	P1-P2 Sample #142
168-171	Float	P1-P2 Sample #143
172-175	Float	P1-P2 Sample #144
176-179	Float	P1-P2 Sample #145
180-183	Float	P1-P2 Sample #146
184-187	Float	P1-P2 Sample #147
188-191	Float	P1-P2 Sample #148
192-195	Float	P1-P2 Sample #149
196-199	Float	P1-P2 Sample #150

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.58 Command #185: Read Curve Samples P1-P2 – Part 4

This command allows reading the P1-P2 samples (151-200) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #151
4-7	Float	P1-P2 Sample #152
8-11	Float	P1-P2 Sample #153
12-15	Float	P1-P2 Sample #154
16-19	Float	P1-P2 Sample #155
20-23	Float	P1-P2 Sample #156
24-27	Float	P1-P2 Sample #157
28-31	Float	P1-P2 Sample #158
32-35	Float	P1-P2 Sample #159
36-39	Float	P1-P2 Sample #160
40-43	Float	P1-P2 Sample #161
44-47	Float	P1-P2 Sample #162
48-51	Float	P1-P2 Sample #163
52-55	Float	P1-P2 Sample #164
56-59	Float	P1-P2 Sample #165
60-63	Float	P1-P2 Sample #166
64-67	Float	P1-P2 Sample #167
68-71	Float	P1-P2 Sample #168
72-75	Float	P1-P2 Sample #169
76-79	Float	P1-P2 Sample #170
80-83	Float	P1-P2 Sample #171
84-87	Float	P1-P2 Sample #172
88-91	Float	P1-P2 Sample #173
92-95	Float	P1-P2 Sample #174
96-99	Float	P1-P2 Sample #175
100-103	Float	P1-P2 Sample #176
104-107	Float	P1-P2 Sample #177
108-111	Float	P1-P2 Sample #178
112-115	Float	P1-P2 Sample #179
116-119	Float	P1-P2 Sample #180
120-123	Float	P1-P2 Sample #181
124-127	Float	P1-P2 Sample #182
128-131	Float	P1-P2 Sample #183
132-135	Float	P1-P2 Sample #184
136-139	Float	P1-P2 Sample #185
140-143	Float	P1-P2 Sample #186
144-147	Float	P1-P2 Sample #187
148-151	Float	P1-P2 Sample #188

Continue…

Byte	Format	Description
…Continue		
152-155	Float	P1-P2 Sample #189
156-159	Float	P1-P2 Sample #190
160-163	Float	P1-P2 Sample #191
164-167	Float	P1-P2 Sample #192
168-171	Float	P1-P2 Sample #193
172-175	Float	P1-P2 Sample #194
176-179	Float	P1-P2 Sample #195
180-183	Float	P1-P2 Sample #196
184-187	Float	P1-P2 Sample #197
188-191	Float	P1-P2 Sample #198
192-195	Float	P1-P2 Sample #199
196-199	Float	P1-P2 Sample #200

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.59 Command #186: Read Curve Samples P1-P2 – Part 5

This command allows reading the P1-P2 samples (201-250) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #201
4-7	Float	P1-P2 Sample #202
8-11	Float	P1-P2 Sample #203
12-15	Float	P1-P2 Sample #204
16-19	Float	P1-P2 Sample #205
20-23	Float	P1-P2 Sample #206
24-27	Float	P1-P2 Sample #207
28-31	Float	P1-P2 Sample #208
32-35	Float	P1-P2 Sample #209
36-39	Float	P1-P2 Sample #210
40-43	Float	P1-P2 Sample #211
44-47	Float	P1-P2 Sample #212
48-51	Float	P1-P2 Sample #213
52-55	Float	P1-P2 Sample #214
56-59	Float	P1-P2 Sample #215
60-63	Float	P1-P2 Sample #216
64-67	Float	P1-P2 Sample #217
68-71	Float	P1-P2 Sample #218
72-75	Float	P1-P2 Sample #219
76-79	Float	P1-P2 Sample #220
80-83	Float	P1-P2 Sample #221
84-87	Float	P1-P2 Sample #222
88-91	Float	P1-P2 Sample #223
92-95	Float	P1-P2 Sample #224
96-99	Float	P1-P2 Sample #225
100-103	Float	P1-P2 Sample #226
104-107	Float	P1-P2 Sample #227
108-111	Float	P1-P2 Sample #228
112-115	Float	P1-P2 Sample #229
116-119	Float	P1-P2 Sample #230
120-123	Float	P1-P2 Sample #231
124-127	Float	P1-P2 Sample #232
128-131	Float	P1-P2 Sample #233
132-135	Float	P1-P2 Sample #234
136-139	Float	P1-P2 Sample #235
140-143	Float	P1-P2 Sample #236
144-147	Float	P1-P2 Sample #237
148-151	Float	P1-P2 Sample #238

Continue…

Byte	Format	Description
…Continue		
152-155	Float	P1-P2 Sample #239
156-159	Float	P1-P2 Sample #240
160-163	Float	P1-P2 Sample #241
164-167	Float	P1-P2 Sample #242
168-171	Float	P1-P2 Sample #243
172-175	Float	P1-P2 Sample #244
176-179	Float	P1-P2 Sample #245
180-183	Float	P1-P2 Sample #246
184-187	Float	P1-P2 Sample #247
188-191	Float	P1-P2 Sample #248
192-195	Float	P1-P2 Sample #249
196-199	Float	P1-P2 Sample #250

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.60 Command #187: Read Curve Samples P1-P2 – Part 6

This command allows reading the P1-P2 samples (251-300) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #251
4-7	Float	P1-P2 Sample #252
8-11	Float	P1-P2 Sample #253
12-15	Float	P1-P2 Sample #254
16-19	Float	P1-P2 Sample #255
20-23	Float	P1-P2 Sample #256
24-27	Float	P1-P2 Sample #257
28-31	Float	P1-P2 Sample #258
32-35	Float	P1-P2 Sample #259
36-39	Float	P1-P2 Sample #260
40-43	Float	P1-P2 Sample #261
44-47	Float	P1-P2 Sample #262
48-51	Float	P1-P2 Sample #263
52-55	Float	P1-P2 Sample #264
56-59	Float	P1-P2 Sample #265
60-63	Float	P1-P2 Sample #266
64-67	Float	P1-P2 Sample #267
68-71	Float	P1-P2 Sample #268
72-75	Float	P1-P2 Sample #269
76-79	Float	P1-P2 Sample #270
80-83	Float	P1-P2 Sample #271
84-87	Float	P1-P2 Sample #272
88-91	Float	P1-P2 Sample #273
92-95	Float	P1-P2 Sample #274
96-99	Float	P1-P2 Sample #275
100-103	Float	P1-P2 Sample #276
104-107	Float	P1-P2 Sample #277
108-111	Float	P1-P2 Sample #278
112-115	Float	P1-P2 Sample #279
116-119	Float	P1-P2 Sample #280
120-123	Float	P1-P2 Sample #281
124-127	Float	P1-P2 Sample #282
128-131	Float	P1-P2 Sample #283
132-135	Float	P1-P2 Sample #284
136-139	Float	P1-P2 Sample #285
140-143	Float	P1-P2 Sample #286
144-147	Float	P1-P2 Sample #287
148-151	Float	P1-P2 Sample #288

Continue…

Byte	Format	Description
…Continue		
152-155	Float	P1-P2 Sample #289
156-159	Float	P1-P2 Sample #290
160-163	Float	P1-P2 Sample #291
164-167	Float	P1-P2 Sample #292
168-171	Float	P1-P2 Sample #293
172-175	Float	P1-P2 Sample #294
176-179	Float	P1-P2 Sample #295
180-183	Float	P1-P2 Sample #296
184-187	Float	P1-P2 Sample #297
188-191	Float	P1-P2 Sample #298
192-195	Float	P1-P2 Sample #299
196-199	Float	P1-P2 Sample #300

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.61 Command #188: Read Curve Samples P1-P2 – Part 7

This command allows reading the P1-P2 samples (301-351) of the Curve selected by command #152.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-3	Float	P1-P2 Sample #301
4-7	Float	P1-P2 Sample #302
8-11	Float	P1-P2 Sample #303
12-15	Float	P1-P2 Sample #304
16-19	Float	P1-P2 Sample #305
20-23	Float	P1-P2 Sample #306
24-27	Float	P1-P2 Sample #307
28-31	Float	P1-P2 Sample #308
32-35	Float	P1-P2 Sample #309
36-39	Float	P1-P2 Sample #310
40-43	Float	P1-P2 Sample #311
44-47	Float	P1-P2 Sample #312
48-51	Float	P1-P2 Sample #313
52-55	Float	P1-P2 Sample #314
56-59	Float	P1-P2 Sample #315
60-63	Float	P1-P2 Sample #316
64-67	Float	P1-P2 Sample #317
68-71	Float	P1-P2 Sample #318
72-75	Float	P1-P2 Sample #319
76-79	Float	P1-P2 Sample #320
80-83	Float	P1-P2 Sample #321
84-87	Float	P1-P2 Sample #322
88-91	Float	P1-P2 Sample #323
92-95	Float	P1-P2 Sample #324
96-99	Float	P1-P2 Sample #325
100-103	Float	P1-P2 Sample #326
104-107	Float	P1-P2 Sample #327
108-111	Float	P1-P2 Sample #328
112-115	Float	P1-P2 Sample #329
116-119	Float	P1-P2 Sample #330
120-123	Float	P1-P2 Sample #331
124-127	Float	P1-P2 Sample #332
128-131	Float	P1-P2 Sample #333
132-135	Float	P1-P2 Sample #334
136-139	Float	P1-P2 Sample #335
140-143	Float	P1-P2 Sample #336
144-147	Float	P1-P2 Sample #337
148-151	Float	P1-P2 Sample #338

Continue…

Byte	Format	Description
…Continue		
152-155	Float	P1-P2 Sample #339
156-159	Float	P1-P2 Sample #340
160-163	Float	P1-P2 Sample #341
164-167	Float	P1-P2 Sample #342
168-171	Float	P1-P2 Sample #343
172-175	Float	P1-P2 Sample #344
176-179	Float	P1-P2 Sample #345
180-183	Float	P1-P2 Sample #346
184-187	Float	P1-P2 Sample #347
188-191	Float	P1-P2 Sample #348
192-195	Float	P1-P2 Sample #349
196-199	Float	P1-P2 Sample #350
200-203	Float	P1-P2 Sample #351

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.3.62 Command #189: Read Logic Card Firmware Revision

This command allows reading the Logic Card Firmware Revision.

Request Data Bytes

Byte	Format	Description

Response Data Bytes

Byte	Format	Description
0-7	ASCII	Logic Card Firmware Revision

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
1-31		Undefined
32	Error	Device Busy
33-127		Undefined

8.4 Common Tables

Table 1. Expanded Device Type Codes

Expanded Device Code (Hex)	Description	Company Name
B77E	HRT2000v4	BIFFI
B77D	HRTIMVS2000	BIFFI
B77C	HRT_IMVS2000v2	BIFFI

Other manufacturer devices are not listed.

Table 2. Engineering Unit Codes

Code	Description
0	Not Classified
6	bar
7	psi
39	Milliamperes
51	Seconds
53	Days
57	Percent
250	Not Used
251	None

Only Unit Codes used by HRT_IMVS2000v2 are listed.

Table 3. Transfer Function Codes

Code	Transfer Function Description
0	Linear
1	Square Root
2	Square Root Third Power
3	Square Root Fifth Power
4	Special Curve
5	Square
230	Discrete (Switch)
231	Square Root Plus Special Care
232	Square Root Third Power Plus Special Curve
233	Square Root Fifth Power Plus Special Curve
240-250	Not Used
251	None
252	Unknown
253	Special

Table 6. Alarm Selection Codes

Code	Alarm Selection Description
0	High
1	Low
239	Hold Last Output Value
240-250	Not Used
251	None
252	Unknown
253	Special

Table 7. Write Protect Codes

Code	Physical Signal Definition
0	No – No Write Protected
1	Yes – Write Protected
250	Not used
251	None
252	Unknown
253	Special

Table 8. Manufacturer Identification Codes

Code (Dec)	Code (Hex)	Company Name
183	00B7	BIFFI

Other manufacturers are not listed.

Table 9. Burst Mode Control Codes

Code	Burst Mode Control Definition
0	Off
1	Enable Burst on Token-Passing Data Link Layer only
2	Enable Burst on TDMA Data-Link Layer only
3	Enable Burst on TDMA and Token-Passing Data Link Layers
250	Reserved
251	Reserved
252	Reserved
253	Reserved

Only codes 0 and 1 are supported by HRT_IMVS2000v2 field device.

Table 10. Physical Signalling Codes

Code	Physical Signal Definition
0	Bell 202 current
1	Bell 202 voltage
2	RS-485
3	RS-232
4	Wireless
6	Special

Table 11. Flag Assignments

Code	Flag Assignment Definition
0x00	Undefined
0x01	Multi-Sensor Field Device
0x02	EEPROM Control
0x04	Protocol Bridge Device
0x08	IEEE 802.15.4 2.4GHz DSS with O-QPSK Modulation
0x10-0x20	Undefined
0x40	C8psk Capable Field Device
0x80	C8psk In Multi-Drop Only

Table 16. Loop Current Mode Codes

Code	Loop Current Mode Description
0	Disabled
1	Enabled

Table 17. Extended Device Status Codes

Code	Description
0x01	**Maintenance Required.** This bit is set to indicate that, while the device has not malfunctioned, the Field Device requires maintenance.
0x02	**Device Variable Alert.** This bit is set if any Device Variable is in Alarm or Warning State. The host should identify the Device Variable(s) causing this to be set using the Device Variable Status indicators.
0x04	**Critical Power Failure.** For devices that can operate from stored power. This bit is set when that power is becoming critically low.
0x08	**Failure.** When this bit is set one or more Device Variables are invalid due to a malfunction in the field device or its peripherals.
0x10	**Out of Specification.** When set, this bit indicates deviations from the permissible ambient or process conditions have been detected that may compromise measurement or control accuracy.
0x20	**Function Check.** This bit is set if one or more Device Variable are temporarily invalid due to ongoing work on the device.

Table 19. Write Device Variable Code

Code	Write Device Variable Command Description
0	Normal
1	Fixed Value

Table 20. Device Variable Family Codes

Code	Device Variable Family
0-3	Reserved
4	Temperature
5	Pressure
6	Valve / Actuator
7	Simple PID Control
8	pH
9	Conductivity
10	Totalizer
11	Level
12	Vortex Flow
13	Mag Flow
14	Coriolis Flow
132-249	Reserved
250	Not Used

Table 21. Device Variable Classification Codes

Code	Device Variable Classification
0	Device Variable Not Classified
1-63	Reserved
65	Pressure
250	Not Used

Only Classification Codes used by HRT_IMVS2000v2 are listed.

Table 26. Analog Channel Flags

Code	Flag Definition
0x01	When set, this Analog Channel is a field device analog input channel. When reset to 0, the analog channel is an analog output.

Table 33. Burst Message Trigger Modes

Code	Burst Message Trigger Mode Description
0	**Continuous.** The burst message is published continuously at (worst case) the minimum update period.
1	**Window.** The burst message is triggered when the source value deviates more than the specified trigger value.
2	**Rising.** The burst message is triggered when source value rises above the specified trigger value.
3	**Falling.** The burst message is triggered when the source value falls below the specified trigger value.
4	**On-Change.** The burst message is triggered when any value in the message changes.

Table 57. Device Profile Code

Code	Device Profile Code Description
1	HART Process Automation Device
2	HART Discrete Device
3	Hybrid: Process Automation + Discrete
4	I/O System
129	WirelessHART Process Automation Device
130	WirelessHART Discrete Device
131	WirelessHART Hybrid: Process Automation + Discrete
132	WirelessHART Gateway
141	WirelessHART Process Adapter
142	WirelessHART Discrete Adapter
144	WirelessHART-Enable Handheld/Portable Maintenance Tool

Table 65. Device Variable Property Codes

Code	Device Profile Code Description
0x01	Device Variable is not calculated by Field Device
0x02-0x40	Undefined.
0x80	Device Variable is being Simulated.

9 DEVICE VARIABLES

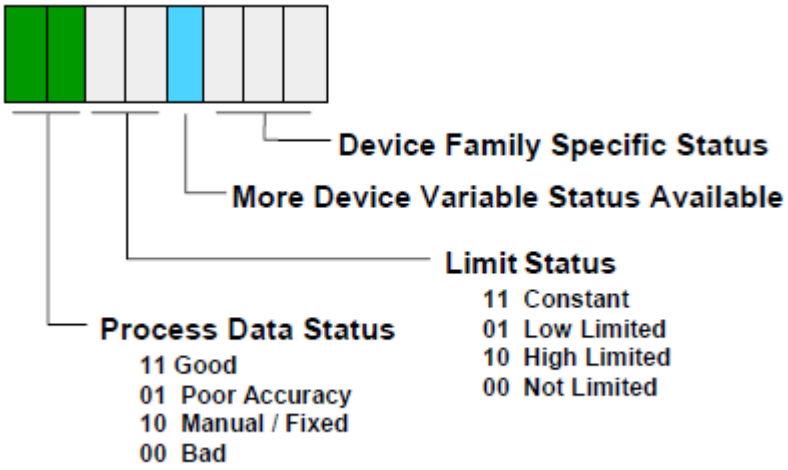
9.1 List of Device Variables

Dev. Var.	Description	Classification	Unit Code	R/W	Min.	Max.	Type
0	Actuator Position	Not Classified	Percent	R	-100	150	FLOAT
1	Position Request	Not Classified	Percent	R	0	100	FLOAT
2	Pressure1	Pressure	bar / psi	R	-100	5800	FLOAT
3	Pressure2	Pressure	bar / psi	R	-100	5800	FLOAT
4	Process Pressure	Pressure	bar / psi	R	-100	5800	FLOAT
5	Alarms Active	Not Classified	None	R	0	255	FLOAT
6	Calibration Command	Not Classified	None	RW	0	1	ENUM
7	Calibration Status	Not Classified	None	R	0	4	ENUM
8	Baseline Signature Command	Not Classified	None	RW	0	1	ENUM
9	Maintenance Signature Command	Not Classified	None	RW	0	1	ENUM
10	Baseline Signature Status	Not Classified	None	R	0	4	ENUM
11	Maintenance Signature Status	Not Classified	None	R	0	4	ENUM
12	Baseline PST Command	Not Classified	None	RW	0	1	ENUM
13	Manual PST Command	Not Classified	None	RW	0	1	ENUM
14	Baseline PTS Status	Not Classified	None	R	0	4	ENUM
15	Manual PST Status	Not Classified	None	R	0	4	ENUM
16	Common Failure Alarm Status	Not Classified	None	R	0	1	ENUM
17	Alarms1	Not Classified	None	R			ENUM_BIT
18	Alarms2	Not Classified	None	R			ENUM_BIT
19	Alarms3	Not Classified	None	R			ENUM_BIT
20	Clear Alarms List	Not Classified	None	RW	0	1	ENUM
21	Reset Alarms	Not Classified	None	RW	0	1	ENUM
22	Pressure Measurement Unit	Not Classified	None	RW	0	1	ENUM
23	Common Failure Alarm Mode	Not Classified	None	RW	0	1	ENUM
244	Percent Range	Not Classified	Percent	R	0	100	FLOAT
245	Loop Current	Not Classified	mA	R			FLOAT
246	PV*			R			
247	SV*			R			
248	TV*			R			
249	QV*			R			

*It depends on field device settings with Command #51 (see Section 8.2.3 for details).
Default PV is Actuator Position (Device Variable 0).
Default SV is Pressure 1 (Device Variable 2).
Default TV is Pressure 2 (Device Variable 3).
Default QV is Process Pressure (Device Variable 4).

9.2 Device Variable Status Byte

All cyclical process data include a Device Variable Status byte.
The most significant two bits (bits 7 and 6) of every Device Variable Status byte return the overall status of the Device or Dynamic Variable value. The next two bits (bits 5 and 4) indicate whether the Device Variable value is limited. These four bits provide useful status about the Device Variable's value. The content of the lower 4 bits depend on the Device Variable Family. Each Device Family can have its own Device Family-specific status defining the least significant bits. If set, bit3 indicates the additional Device Family-specific status is available via the appropriate Device Family Command.



HRT_IMVS2000v2 doesn't provide Device Family-specific status for Dynamic and Device Variables, therefore last 4 bits are always set to 0.

9.3 Device Variable 0: Actuator Position

This variable indicates the current position of the actuator.

9.4 Device Variable 1: Position Request

This variable indicates the position request. It depends on the active commands and on the digital input status (see [1] for details).

9.5 Device Variable 2: Pressure1

This variable indicates the value of Pressure1.

9.6 Device Variable 3: Pressure2

This variable indicates the value of Pressure2.

9.7 Device Variable 4: Process Pressure

This variable indicates the value of Process Pressure.

9.8 Device Variable 5: Active Alarms

This variable indicates the number of active alarms.

9.9 Device Variable 6: Calibration Command

This variable permits to perform a Calibration Command.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Perform Calibration

The device resets automatically to 0 this variable at the end of the command execution.

9.10 Device Variable 7: Calibration Status

This variable indicates the status of the last calibration command.
It's an enumerated variable; it's not possible to write this data. The possible values are:

Value	Description
0	Not Done
1	Passed
2	Failed
3	In Progress
4	Configuration Error

9.11 Device Variable 8: Baseline Signature Command

This variable permits to perform a Baseline Signature Command.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.12 Device Variable 9: Maintenance Signature Command

This variable permits to perform a Maintenance Signature Command.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.13 Device Variable 10: Baseline Signature Status

This variable indicates the status of the last baseline signature command.
It's an enumerated variable; it's not possible to write this data. The possible values are:

Value	Description
0	Not Done
1	Passed
2	Failed
3	In Progress
4	Configuration Error

9.14 Device Variable 11: Maintenance Signature Status

This variable indicates the status of the last maintenance signature command.
It's an enumerated variable; it's not possible to write this data. The possible values are:

Value	Description
0	Not Done
1	Passed
2	Failed
3	In Progress
4	Configuration Error

9.15 Device Variable 12: Baseline PST Command

This variable permits to perform a Baseline PST Command.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.16 Device Variable 13: Manual PST Command

This variable permits to perform a Manual PST Command.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.17 Device Variable 14: Baseline PST Status

This variable indicates the status of the last baseline PST command.
It's an enumerated variable; it's not possible to write this data. The possible values are:

Value	Description
0	Not Done
1	Passed
2	Failed
3	In Progress
4	Configuration Error

9.18 Device Variable 15: Manual PST Status

This variable indicates the status of the last manual PST command.
It's an enumerated variable; it's not possible to write this data. The possible values are:

Value	Description
0	Not Done
1	Passed
2	Failed
3	In Progress
4	Configuration Error

9.19 Device Variable 16: Common Failure Alarm Status

This variable indicates if at least one alarm is active.
It's an enumerated variable; it' not possible to write this data. The possible values are:

Value	Description
0	Not Active
1	Active

9.20 Device Variable 17: Alarms1

This variable shows the alarms status of the actuator.
It's a bit enumerated variable; it's not possible to write this data. The possible values are:

Bit	Description
0	PSCL Alarm
1	PSCT Alarm
2	PSSB Alarm
3	PSFB Alarm
4	PSST Alarm
5	PSFT Alarm
6	PSSP Alarm
7	PSSR Alarm
8	PSLB Alarm
9	PSHB Alarm
10	PSNM Alarm
11	PSA Alarm
12	PSB Alarm
13	SISA Alarm
14	SISB Alarm
15	OPOS Alarm
16-31	Reserved

9.21 Device Variable 18: Alarms2

This variable shows the alarms status of the actuator.
It's a bit enumerated variable; it's not possible to write this data. The possible values are:

Bit	Description
0	CPOS Alarm
1	LSP Alarm
2	HSP Alarm
3	LPP Alarm
4	HPP Alarm
5	OPNM Alarm
6	CLNM Alarm
7	OPCT Alarm
8	CLCT Alarm
9	FSCL Alarm
10	SOBT Alarm
11	FOBT Alarm
12	SOTT Alarm
13	FOTT Alarm
14	SCBT Alarm
15	FCBT Alarm
16-31	Reserved

9.22 Device Variable 19: Alarms3

This variable shows the alarms status of the actuator.
It's a bit enumerated variable; it's not possible to write this data. The possible values are:

Bit	Description
0	SCTT Alarm
1	FCTT Alarm
2	OHBP Alarm
3	OLBP Alarm
4	CHBP Alarm
5	CLBP Alarm
6	PS1 Alarm
7	PS2 Alarm
8	PPS Alarm
9	POS Alarm
10	BUS Alarm
11	MNT Alarm
12	CAL Alarm
13-31	Reserved

9.23 Device Variable 20: Clear Alarm List

This variable permits to clear the alarms list.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.24 Device Variable 21: Reset Alarms

This variable permits to reset all active alarms.
It's an enumerated variable; the possible values are:

Value	Description
0	No
1	Yes – Execute Command

The device resets automatically to 0 this variable at the end of the command execution.

9.25 Device Variable 22: Pressure Measurement Unit

This variable indicates the unit code for all pressure variables.
It's an enumerated variable; the possible values are:

Value	Description
0	bar
1	psi

9.26 Device Variable 23: Common Failure Alarm Mode

This variable indicates the way of work of the "ALARM" Digital Output.
It's an enumerated variable; the possible values are:

Value	Description
0	NO – Normal Open
1	NC – Normal Closed

9.27 Device Variable 244: Percent Range

This variable indicates the percentage corresponding to the Loop Current signal.
It's not possible to write this variable.

9.28 Device Variable 245: Loop Current

This variable indicates the value of the analogue output current.
It's not possible to write this variable.

9.29 Device Variable 246: Primary Variable

This variable indicates the PV.
Default PV is Device Variable 0: Actuator Position.
To select the Primary Variable see Section 8.2.3.

9.30 Device Variable 247: Secondary Variable

This variable indicates the SV.
Default SV is Device Variable 2: Pressure1.
To select the Secondary Variable see Section 8.2.3.

9.31 Device Variable 248: Tertiary Variable

This variable indicates the TV.
Default TV is Device Variable 3: Pressure2.
To select the Tertiary Variable see Section 8.2.3.

9.32 Device Variable 249: Quaternary Variable

This variable indicates the QV.
Default QV is Device Variable 4: Process Pressure.
To select the Quaternary Variable see Section 8.2.3.

10 Device Specific Tables

Legend for all tables in this section:
All unit codes are referenced to Common Table 2 (Section 8.4)

CC = Configuration Change Counter
Y = Configuration Change Counter value is incremented when the parameter value is changed.
N = Configuration Change Counter value isn't incremented when the parameter value is changed.

Min = Minimum value
Max = Maximum value
R = Read Only
W = Write Only (Read as 0)
RW = Read and Write

10.1 Parameter1 Codes

Code	Description	Unit Code	R/W	Min	Max
0	Opening Time Hysteresis	Percent	RW	0	200
1	Closing Time Hysteresis	Percent	RW	0	200
2	FST Pressure Hysteresis	Percent	RW	0	100
3	PST Pressure Hysteresis	Percent	RW	0	100
4	PST Time Hysteresis	Percent	RW	0	200
5	FST Stored	None	R	0	50
6	PST Stored	None	R	0	50

10.2 Parameter2 Codes

Code	Description	Unit Code	R/W	Min	Max
0	High Pressure Limit	bar/psi*	RW	0	5800
1	Low Pressure Limit	bar/psi*	RW	0	5800
2	High Process Pressure Limit	bar/psi*	RW	0	5800
3	Low Process Pressure Limit	bar/psi*	RW	0	5800
4	Auto-PST Period	Days	RW	1	365

*Depends on value of Device Variable 22, Pressure Measurement Unit (see Section 9.25).

10.3 Parameter4 Codes

Code	Description	Unit Code	R/W	Min	Max
0	FST Cycle Limit	None	RW	1	100.000
1	FST Cycle Count	None	RW	0	100.000
2	FST Absolute Count	None	R	0	1.000.000
3	PST Cycle Limit	None	RW	1	100.000
4	PST Cycle Count	None	RW	0	100.000
5	PST Absolute Count	None	R	0	1.000.000

10.4 ParameterE Codes

Code	Description	Unit Code	R/W	Min	Max
0	Acting Mode	None	RW	See section 10.5.1	
1	Opening Rotation	None	R	See section 10.5.2	
2	Fail Action	None	RW	See section 10.5.3	
3	SOVs Quantity	None	RW	See section 10.5.4	
4	Pressure 1-2 Sensor	None	R	See section 10.5.5	
5	Process Pressure Sensor	None	R	See section 10.5.5	
6	Relay A Command	None	RW	See section 10.5.6	
7	Relay B Command	None	RW	See section 10.5.6	
8	Signatures Enabled	None	RW	See section 10.5.7	
9	PST Enabled	None	RW	See section 10.5.7	
10	PST Series SOVs	None	RW	See section 10.5.8	
11	Auto-PST Enabled	None	RW	See section 10.5.7	
12	Calibration Enabled	None	RW	See section 10.5.7	
13	Opening Status	None	R	See section 10.5.9	
14	Closing Status	None	R	See section 10.5.9	
15	PSCL Alarm Enabled	None	RW	See section 10.5.10	
16	PSCT Alarm Enabled	None	RW	See section 10.5.10	
17	PSSB Alarm Enabled	None	RW	See section 10.5.10	
18	PSFB Alarm Enabled	None	RW	See section 10.5.10	
19	PSST Alarm Enabled	None	RW	See section 10.5.10	
20	PSFT Alarm Enabled	None	RW	See section 10.5.10	
21	PSSP Alarm Enabled	None	RW	See section 10.5.10	
22	PSSR Alarm Enabled	None	RW	See section 10.5.10	
23	PSLB Alarm Enabled	None	RW	See section 10.5.10	
24	PSHB Alarm Enabled	None	RW	See section 10.5.10	
25	PSNM Alarm Enabled	None	RW	See section 10.5.11	
26	PSA Alarm Enabled	None	RW	See section 10.5.10	
27	PSB Alarm Enabled	None	RW	See section 10.5.10	
28	SISA Alarm Enabled	None	RW	See section 10.5.10	
29	SISB Alarm Enabled	None	RW	See section 10.5.10	
30	OPOS Alarm Enabled	None	RW	See section 10.5.10	
31	CPOS Alarm Enabled	None	RW	See section 10.5.10	
32	LSP Alarm Enabled	None	RW	See section 10.5.10	
	Continue…				

Code	Description	Unit Code	R/W	Min	Max
	…Continue				
33	HSP Alarm Enabled	None	RW	See section 10.5.10	
34	LPP Alarm Enabled	None	RW	See section 10.5.10	
35	HPP Alarm Enabled	None	RW	See section 10.5.10	
36	OPNM Alarm Enabled	None	RW	See section 10.5.11	
37	CLNM Alarm Enabled	None	RW	See section 10.5.11	
38	OPCT Alarm Enabled	None	RW	See section 10.5.10	
39	CLCT Alarm Enabled	None	RW	See section 10.5.10	
40	FSCL Alarm Enabled	None	RW	See section 10.5.10	
41	SOBT Alarm Enabled	None	RW	See section 10.5.10	
42	FOBT Alarm Enabled	None	RW	See section 10.5.10	
43	SOTT Alarm Enabled	None	RW	See section 10.5.10	
44	FOTT Alarm Enabled	None	RW	See section 10.5.10	
45	SCBT Alarm Enabled	None	RW	See section 10.5.10	
46	FCBT Alarm Enabled	None	RW	See section 10.5.10	
47	SCTT Alarm Enabled	None	RW	See section 10.5.10	
48	FCTT Alarm Enabled	None	RW	See section 10.5.10	
49	OHBP Alarm Enabled	None	RW	See section 10.5.10	
50	OLBP Alarm Enabled	None	RW	See section 10.5.10	
51	CHBP Alarm Enabled	None	RW	See section 10.5.10	
52	CLBP Alarm Enabled	None	RW	See section 10.5.10	
53	PS1 Alarm Enabled	None	RW	See section 10.5.10	
54	PS2 Alarm Enabled	None	RW	See section 10.5.10	
55	PPS Alarm Enabled	None	RW	See section 10.5.10	
56	POS Alarm Enabled	None	RW	See section 10.5.11	
57	BUS Alarm Enabled	None	RW	See section 10.5.10	
58	MNT Alarm Enabled	None	RW	See section 10.5.10	
59	Open/Close DO Mode	None	RW	See section 10.5.12	
60	Bluetooth Enabled	None	RW	See section 10.5.7	
61	Manual FST Alarm Enabled	None	RW	See section 10.5.7	
62	DI SOV A Status	None	R	See section 10.5.13	
63	DI SOV B Status	None	R	See section 10.5.13	
64	DI PST Status	None	R	See section 10.5.13	
65	DI SIS A Status	None	R	See section 10.5.13	
66	DI SIS B Status	None	R	See section 10.5.13	

10.5 ParameterE Values

10.5.1 Table E1

Code	Description
0	Single
1	Double
2	Double-S

10.5.2 Table E2

Code	Description
0	CCW
1	CW

10.5.3 Table E3

Code	Description
0	Closing
1	Opening

10.5.4 Table E4

Code	Description
0	Simplex
1	Series
2	Parallel

10.5.5 Table E5

Code	Description
0	None
1	10 bar
2	20 bar
3	50 bar
4	100 bar
5	200 bar
6	400 bar
7	None
8	145 psi
9	290 psi
10	725 psi
11	1450 psi
12	2900 psi
13	5800 psi

10.5.6 Table E6

Code	Description
0	Not Active
1	Active

10.5.7 Table E7

Code	Description
0	No
1	Yes

10.5.8 Table E8

Code	Description
0	One
1	Both

10.5.9 Table E9

Code	Description
0	Not Done
1	Passed
2	Failed

10.5.10 Table E10

Code	Description
0	No
1	Alarm
2	CFA

10.5.11 Table E11

Code	Description
1	Alarm
2	CFA

10.5.12 Table E12

Code	Description
0	Normal Open
1	Normal Close

10.5.13 Table E13

Code	Description
0	Low
1	High

10.6 ParameterF Codes

Code	Description	Unit Code	R/W	Min	Max
0	Open Position Hysteresis	Percent	RW	0	100
1	Closed Position Hysteresis	Percent	RW	0	100
2	PST Set Point	Percent	RW	5	95
3	PST Position Hysteresis	Percent	RW	0	100
4	Opening Calculated Time	Seconds	R	0	2000
5	Opening Maximum Time	Seconds	RW	0	2000
6	Closing Calculated Time	Seconds	R	0	2000
7	Closing Maximum Time	Seconds	RW	0	2000
8	Baseline Opening Break Time	Seconds	R	0	1000
9	Maintenance Opening Break Time	Seconds	R	0	1000
10	Baseline Opening Travel Time	Seconds	R	0	1000
11	Maintenance Opening Travel Time	Seconds	R	0	1000
12	Baseline Opening Break Pressure	bar/psi*	R	-100	5800
13	Maintenance Opening Break Pressure	bar/psi*	R	-100	5800
14	Baseline Closing Break Time	Seconds	R	0	1000
15	Maintenance Closing Break Time	Seconds	R	0	1000
16	Baseline Closing Travel Time	Seconds	R	0	1000
17	Maintenance Closing Travel Time	Seconds	R	0	1000
18	Baseline Closing Break Pressure	bar/psi*	R	-100	1000
19	Maintenance Closing Break Pressure	bar/psi*	R	-100	1000
20	Baseline PST Calculated Time	Seconds	R	0	2000
21	Baseline PST Maximum Time	Seconds	RW	0	2000
22	Baseline PST Break Time	Seconds	R	0	2000
23	Manual PST Break Time	Seconds	R	0	2000
24	Baseline PST Travel Time	Seconds	R	0	2000
25	Manual PST Travel Time	Seconds	R	0	2000
26	Baseline PST Break Pressure	bar/psi*	R	-100	5800
27	Manual PST Break Pressure	bar/psi*	R	-100	5800

*Depends on value of Device Variable 22, Pressure Measurement Unit (see Section 9.25).

10.7 Date Codes

Code	Description	R/W	Min	Max
0	Current Date	RW	01/01/2014	31/12/2099
1	Device Date Manufacturing	RW	01/01/2014	31/12/2099
2	Actuator Date Manufacturing	RW	01/01/2014	31/12/2099
3	Valve Date Manufacturing	RW	01/01/2014	31/12/2099
4	Auto-PST Date	RW	01/01/2014	31/12/2099
5	Calibration Date	R	01/01/2014	31/12/2099
6	Baseline Signature Date	R	01/01/2014	31/12/2099
7	Maintenance Signature Date	R	01/01/2014	31/12/2099
8	Baseline PST Date	R	01/01/2014	31/12/2099
9	Manual PST Date	R	01/01/2014	31/12/2099
10	Next Maintenance Date	RW	01/01/2014	31/12/2099

10.8 Time Codes

Code	Description	R/W	Min	Max
0	Current Time	RW	00:00	23:59
1	Auto-PST Time	RW	00:00	23:59
2	Calibration Time	R	00:00	23:59
3	Baseline Signature Time	R	00:00	23:59
4	Maintenance Signature Time	R	00:00	23:59
5	Baseline PST Time	R	00:00	23:59
6	Manual PST Time	R	00:00	23:59

10.9 Alarm Type Codes

Code	Description
0	None
1	Reset
2	Power On
3	PSCL
4	PSCT
5	PSSB
6	PSFB
7	PSST
8	PSFT
9	PSSP
10	PSSR
11	PSLB
12	PSHB
13	PSNM
14	PSA
15	PSB
16	SISA
	Continue…

Code	Description
	…Continue
17	SISB
18	OPOS
19	CPOS
20	LSP
21	HSP
22	LPP
23	HPP
24	OPNM
25	CLNM
26	OPCT
27	CLCT
28	FSCL
29	SOBT
30	FOBT
31	SOTT
32	FOTT
33	SCBT
34	FCBT
35	SCTT
36	FCTT
37	OHBP
38	OLBP
39	CHBP
40	CLBP
41	PS1
42	PS2
43	PPS
44	POS
45	BUS
46	MNT
47	CAL

10.10 Alarm Status

Code	Description
0	Cleared
1	Activated

10.11 String20 Codes

Code	Description	R/W
0	Device Serial Number	R
1	Actuator Model	RW
2	Actuator Tag	RW
3	Actuator Serial Number	RW
4	Valve Model	RW
5	Valve Tag	RW
6	Valve Serial Number	RW

10.12 String16 Codes

Code	Description	R/W
0	Device Tag Name	RW

10.13 String12 Codes

Code	Description	R/W
0	Actuator Manufacturer	RW
1	Valve Manufacturer	RW

10.14 String10 Codes

Code	Description	R/W
0	Actuator Pressure Size	RW

10.15 Curve Type Codes

Code	Description
0	FST
1	PST
2	SLOT

10.16 Graph Type Codes

Code	Description
0	FST Close
1	FST Open
2	PST
3	Empty

10.17 Curve Source Codes

Code	Description
0	Not Defined
1	Baseline
2	Maintenance
3	Digital Input
4	External Control
5	Baseline PST
6	Manual PST
7	Auto-PST
8	Digital Input

10.18 SOVs Used

Code	Description
0	-
1	A
2	B
3	A, B

11 Bus Menu

This section describes the IMVS2000v2 HART Bus Menu available by local operator interface and Biffi Assistant (see [1] for details).

Bus	..Exit Bus
	Bus Type
	HART SW Rev.
	HART HW Rev.
	Device ID
	Polling Address
	Loop Current Mode

PARAMETER NAME	DESCRIPTION	RANGE	DEFAULT VALUE	R/W (1)	AVAILABLE ON (2) (3)
Bus Type	It indicates the bus type installed on IMVS2000v2	-	HART	R	Local
HART SW Rev.	It indicates the HRT_IMVS2000v2 Software revision			R	Local, Serial, Bus
HART HW Rev.	It indicates the HRT_IMVS2000v2 Hardware revision			R	Local, Serial, Bus
Device ID	It indicates the HRT_IMVS2000v2 Device ID			R	Local, Serial, Bus
Polling Address	It indicates the HRT_IMVS2000v2 Polling Address	0 – 63	0	RW	Local, Serial, Bus
Loop Current Mode	It indicates the HRT_IMVS2000v2 polling address. If set as “Loop Enabled” the analog output signal is proportional to the PV*. If set as “Loop Disabled” the analog output signal is fixed at 4mA. If set as “Multidrop” the analog output signal is fixed at 4mA.	Loop Enabled, Loop Disabled, Multidrop	Loop Enabled	RW	Local, Serial, Bus

*If PV selected is “Actuator Position”:

- the analog output signal is 20mA when the position is 100%
- the analog output signal is 4mA when the position is 0%

If PV selected is a pressure (“Pressure1”, “Pressure2” or “Process Pressure”):

- the analog output signal is 20mA when the pressure is the maximum sensor pressure
- the analog output signal is 4mA when the pressure is 0

12 Certificate of Registration

HART® REGISTERED

Certificate of Registration
FieldComm Group Verified

BIFFI Manufacturer	HRT_IMVS2000v2 Product Name
00B7 Manufacturer ID (Hex)	B77C Expanded Device Type (Hex)
7 HART Protocol Revision	02 Device Revision (Hex)
01 Hardware Revision (Hex)	01 Software Revision (Hex)
12/12/2016 Test Date	FieldComm Group Verification Method

The above product has successfully completed the validation process and meets the requirements to be "HART REGISTERED".

"HART REGISTERED" products conform to GB/T 29910.1-6-2013 and IEC 61158 standards.

Registration Number: L2-06-1000-629 Registration Issue Date: Dec 22, 2016 Approval: T. H. Masters

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DD Files and other information are available on HART official web site: http://www.hartcomm.org/

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