

HART[®] USER MANUAL

Intelligent Diagnostic Controller

IDC24-A
IDC24-AF
IDC24-AFL
IDC24-F

IDP24-A*
IDP24-AF*
IDP24-AFL*
IDP24-F*

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1 Introduction

This manual covers software version:

Software ID: DID-SW-001

Software Version: 1.18

1.1 Scope

The IDC24 from Val Controls is an Intelligent Diagnostic Controller. To be used for valve testing and operation. It has an integrated microprocessor with very flexible software, so the controller fits almost any hydraulic and pneumatic, rotary and linear, double acting and spring return actuator on the market.

Based on many years of experience with valve testing, we have built this function in the product as standard. Now you have the opportunity to have a diagnostic of the valve, while it is in use. By performing a PST on a valve in operation and compare the performance data with the data from the reference stroke the current state of the valve system can be determined and the maintenance can be adjusted.

Val Controls IDC24 with hart feedback transmitter, complies with Hart Protocol, Revision 7. This document specifies all the device specific features and documents Hart Protocol implementation details. The functionality of this Field Device is described sufficiently to allow its proper application in a process and its complete support in HART capable Host Applications

1.2 Purpose

It is the purpose of this document, to list specifications, protocol commands and functions, the HART communication protocol in Val Control products.

1.3 Safety instructions

For a safe installation of a device, the following must be observed. The module must only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this product as well as all instructions in this manual.

The information in this user manual is subject to changes without notice.

1.1 Abbreviations and definitions

AO0 Analog Output 0

PS Power Supply

1.4 References

DID-UM-002-IDC-user-manual

2 Specifications

2.1 Electrical specifications

AO0	
Impedance	< 470 ohm @20mA and 9.4VDC
Linearity	< 0.1%
Temperature coefficient	0.015% / 1°C
Galvanic isolated – Should be loop powered from external control system.	

2.1.1 Terminals

The table below shows how to connect to the terminals on the positioner.

AO0	
3.	AO0 (+)
4.	AO0 (-)
PS	
5.	24VDC (+)
6.	24VDC (-)

For the other non hart specific terminals in this product see user manual
 DID-UM-002-IDC-user-manual

3 Device Identification

Manufacturer Name:	<u>Val Controls</u>	Model Name(s):	<u>IDC24</u>
Manufacture ID Code:	<u>24622</u> <u>(602E Hex)</u>	Device Type Code:	<u>58106</u> <u>(E2FA Hex)</u>
HART Protocol Revision	<u>7.1</u>	Device Revision:	<u>4</u>
Hardware Revision	<u>0</u>	Software Revision	<u>1 (100dec)</u>
Physical Layers Supported	<u>FSK</u>		
Physical Device Category	<u>Transmitter</u>		

4 Universal Commands

All universal commands are implemented

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 current mode
8	Read Dynamic Variable Classification
9	Read Device Variables with Status
11	Read loop configuration
12	Read message
13	Read device variable status
14	Read unique identifier associated with tag
15	Read Primary Variable output 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

4.1.1 Local Control LCD Display

This device has a local LCD Display with keyboard where the Node Id also can be modified. Default Node Id is 0, follow the guide in the user-manual.

4.1.2 Write Protect

This device do not have hart write protect functionality.

4.1.3 Dynamic Variables

- Primary Variable - PV
 - o Transmitter signal (mA)
- Primary Variable
 - o Transmitter signal (%)
- Secondary Variable - SV
 - o PST status (See Table 1 for values)
- Tertiary Variable – TV
 - o Position signal (%)
- Quaternary Variable – QV
 - o Diagnostic pressure

The value transmitted in SV, TV and QV can be changed from ValConnect to one of the following parameters:

- PST status (See Table 1 for values)
- Transmitter signal (mA)
- Position signal (%)
- LCP close alarm (See Table 2 for values)
- Pressure sensor (bar)
- AI2 (bar)
- AI3 (bar)
- AI4 (bar)

Description	Value
None	0
Pass	1
Fail	2
Warning	3
In progress	4
Abort	5

Table 1 PST status

Description	Value
No alarm	1
Alarm	2

Table 2 LCP close alarm

4.1.4 Device Variables

Device Variables are implemented in CMD 9.

4.1.5 Device Status

Device status is not used.

4.2 Burst Mode

The field device does not support burst mode

5 Common Practice Commands

5.1.1 Commands implemented

Command	Description
38	Reset Configuration Counter
42	Device Reboot
48	Additional Status
59	Write Number of preambles
89	Write Set Real-Time Clock
90	Read Real-Time Clock

5.1.2 Additional Device Status (CMD 48)

Device status in CMD48 is not used, and the command always returns 0 in all registers.

6 User specific Commands

Command 128 – 247 is Val Controls user specific commands, and is typical used by Val Controls configuration software, and can be used by master control systems.

6.1 Live Status – Identification

6.1.1 Read (139) Software version

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
1-4	U32	Software Version Format: Decimal Example : 10203 decimal = '1.02.03'

6.1.2 Read (140) Software Id

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-13	ASCII14	Software – ID Format: ASCII 14 Example 'DDP-SW-004'

6.1.3 Read (141) Manufacturer ID

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-13	ASCII14	Manufacturer ID Format: ASCII 14 Default Value: 'Val Controls '

6.1.4 Read (143) Model No.

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-13	ASCII	Model No. Format: ASCII 14

6.1.5 Read (144) PCB No.

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	PCB No. Value: 0 – 4294967295 Format: U32 MSB First

6.1.6 Read (145) Serial No.

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-31	ASCII 14	Serial no.

6.2 Control Commands

6.2.1 Write (211) Start test and calibration commands

This command starts a system test

Request data bytes

Byte	Format	Description
0-1	U16	1: Start partial stroke 2: Start full stroke 3: Start solenoid test 10: Start auto calibration 11: Start partial stroke reference 12: Start full stroke reference 13: Start solenoid test reference 21: Operational 22: Fail position 30: Start scheduler action 40: Reset after ESD 99: Abort

Response data bytes

Byte	Format	Description
0-1	U16	1: Start partial stroke 2: Start full stroke 3: Start solenoid test 10: Start auto calibration 11: Start partial stroke reference 12: Start full stroke reference 13: Start solenoid test reference 21: Operational 22: Fail position 30: Start scheduler action 40: Reset after ESD 99: Abort

6.3 Clock Functions

6.3.1 Read (128) Read Clock

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Seconds Values: 0 – 59
1	U8	Minutes Values: 0 – 59
2	U8	Hour Values 0 – 23
3	U8	Reserved
4	U8	Day Values: 1 - 31
5	U8	Month Values: 1 – 12
6-7	U16	Year Values: 0 -2200

6.3.2 Write (129) Write Clock

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Seconds Values: 0 – 59
1	U8	Minutes Values: 0 – 59
2	U8	Hour Values 0 – 23
3	U8	Reserved
4	U8	Day Values: 1 - 31
5	U8	Month Values: 1 – 12
6-7	U16	Year Values: 0 -2200

6.4 Live

6.4.1 Read (160) Live test information

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	PS1 Power Status Values: 1 = Power on PS1 (On) 2 = No Power on PS1 (Off)
2-3	U16	Valve Test Service Values: 2 = Auto calibration 3 = Partial stroke 4 = Full stroke 5 = Solenoid test 6 = ESD 9 = Endpoint calibration 10 = PST reference 11 = FST reference 12 = SOT reference
4	U8	In local? Values: 1 = Yes 2 = No
5	U8	In ESD mode? Values: 1 = Yes 2 = No
6	U8	Ready to reset? Values: 1 = Yes 2 = No
7	U8	PS3 Power Status Values: 1 = Power on PS3 (On) 2 = No Power on PS3 (Off)
8	U8	At operational position Values: 1: Yes 2: No

9	U8	At fail position Values: 1: Yes 2: No
10	U8	EST bypass enable Values: 1: Yes 2: No

6.4.2 Read (161) Live test information, elapsed time

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	PST elapsed time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	PST reference total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-11	U32	FST elapsed time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	FST reference total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	SOT elapsed time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
20-23	U32	SOT reference total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.4.3 Read (164) Live test information

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	PS1 Power Status

		Values: 1 = Power on PS1 (On) 2 = No Power on PS1 (Off)
2-3	U16	Valve Test Service Values: 2 = Auto calibration 3 = Partial stroke 4 = Full stroke 5 = Solenoid test 6 = ESD 9 = Endpoint calibration 10 = PST reference 11 = FST reference 12 = SOT reference
4	U8	In local? Values: 1 = Yes 2 = No
5	U8	In ESD mode? Values: 1 = Yes 2 = No
6	U8	Ready to reset? Values: 1 = Yes 2 = No
7	U8	PS3 Power Status Values: 1 = Power on PS3 (On) 2 = No Power on PS3 (Off)
8	U8	At operational position Values: 1: Yes 2: No
9	U8	At fail position Values: 1: Yes 2: No
10	U8	EST bypass enable Values: 1: Yes 2: No

6.4.4 Read (200) Live Digital input status

Request data bytes

Byte	Format	Description
------	--------	-------------

None

Response data bytes

Byte	Format	Description
0	U8	Digital input 1 Values: 1 = On 2 = Off
1	U8	Digital input 2 Values: 1 = On 2 = Off
2	U8	Digital input 3 Values: 1 = On 2 = Off
3	U8	Digital input 4 Values: 1 = On 2 = Off
4	U8	Digital input 5 Values: 1 = On 2 = Off
5	U8	Digital input 6 Values: 1 = On 2 = Off
6	U8	Digital input 7 Values: 1 = On 2 = Off
7	U8	Digital input 8 Values: 1 = On 2 = Off
8	U8	Digital input 9 Values: 1 = On 2 = Off
9	U8	Digital input 10 Values: 1 = On 2 = Off
10	U8	Digital input 11 Values: 1 = On

		2 = Off
11	U8	Digital input 12 Values: 1 = On 2 = Off
12	U8	Digital input 13 Values: 1 = On 2 = Off
13	U8	Digital input 14 Values: 1 = On 2 = Off
14	U8	Digital input 15 Values: 1 = On 2 = Off
15	U8	Digital input 16 Values: 1 = On 2 = Off
16	U8	Digital input 17 Values: 1 = On 2 = Off

6.4.5 Read (201) Live Digital output status

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Digital output 1 Values: 1 = On 2 = Off 5 = Blink
1	U8	Digital output 2 Values: 1 = On 2 = Off 5 = Blink
2	U8	Digital output 3 Values: 1 = On 2 = Off 5 = Blink
3	U8	Digital output 4 Values: 1 = On 2 = Off 5 = Blink
4	U8	Digital output 5 Values: 1 = On 2 = Off 5 = Blink
5	U8	Digital output 6 Values: 1 = On 2 = Off 5 = Blink
6	U8	Digital output 11 Values: 1 = On 2 = Off
7	U8	Digital output 12 Values: 1 = On 2 = Off

6.4.6 Read (202) Live Analogue input mA

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Analogue input 0 Values: 0 - 2400 Units: 0 – 24.00 mA
2-3	U16	Analogue input 1 Values: 0 - 2400 Units: 0 – 24.00 mA
4-5	U16	Analogue input 2 Values: 0 - 2400 Units: 0 – 24.00 mA
6-7	U16	Analogue input 3 Values: 0 - 2400 Units: 0 – 24.00 mA
8-9	U16	Analogue input 4 Values: 0 - 2400 Units: 0 – 24.00 mA
10-11	U16	Analogue input 5 Values: 0 - 2400 Units: 0 – 24.00 mA

6.4.7 Read (203) Live Analogue input unit

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Analogue input 0 Values: 0 – 65000 Units: 0 – 650.00
2-3	U16	Analogue input 1 Values: 0 – 65000 Units: 0 – 650.00
4-5	U16	Analogue input 2 Values: 0 – 65000 Units: 0 – 650.00
6-7	U16	Analogue input 3 Values: 0 – 65000 Units: 0 – 650.00
8-9	U16	Analogue input 4 Values: 0 – 65000 Units: 0 – 650.00
10-11	U16	Analogue input 5 Values: 0 – 65000 Units: 0 – 650.00

6.4.8 Read (204) Live Analogue input per test type

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Partial stroke pressure Values: 0 - 2400 Units: 0 – 24.00 mA
2-3	U16	Full stroke pressure Values: 0 - 2400 Units: 0 – 24.00 mA
4-5	U16	Solenoid test pressure Values: 0 - 2400 Units: 0 – 24.00 mA
6-7	U16	Partial stroke pressure Values: 0 – 65000 Units: 0 – 650.00
8-9	U16	Full stroke pressure Values: 0 – 65000 Units: 0 – 650.00
10-11	U16	Solenoid test pressure Values: 0 – 65000 Units: 0 – 650.00

6.5 Valve testing

6.5.1 Read (159) Last stroke test information

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	Time	Time of the last PST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	Date	Date of the last PST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-9	U16	Last PST Status Values: 0 = Never Run 1 = Ok 2 = Error 3 = Warning
10-13	Time	Time of the last FST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
14-17	Date	Date of the last FST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
18-19	U16	Last FST Status Values: 0 = Never Run 1 = Ok 2 = Error 3 = Warning

20-23	Time	Time of the last SOT Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
24-27	Date	Date of the last SOT Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
28-29	U16	Last SOT Status Values: 0 = Never Run 1 = Ok 2 = Error 3 = Warning

6.5.2 Read (163) Last PST data

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last PST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last PST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-11	U32	Breakaway time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Partial stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	Partial stroke return time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
24-26	U16	Max travel Range: 0 – 10000 Units: 0 – 100%

6.5.3 Read (170) Last PST data, pressure

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	Solenoid reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	Pressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-11	U32	Actuator fill time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-13	U16	Start pressure Range: 0 – 65000 Units: 0 – 650.00 bar
14-15	U16	Breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
16-17	U16	Pressure at SP Range: 0 – 65000 Units: 0 – 650.00 bar
18-19	U16	Minimum pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.4 Read (164) Last reference PST data

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last reference PST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last reference PST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-11	U32	Breakaway time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Partial stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	Partial stroke return time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
24-26	U16	Max travel Range: 0 – 10000 Units: 0 – 100%

6.5.5 Read (171) Last reference PST data, pressure

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	Solenoid reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	Pressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-11	U32	Actuator fill time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-13	U16	Start pressure Range: 0 – 65000 Units: 0 – 650.00 bar
14-15	U16	Breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
16-17	U16	Pressure at SP Range: 0 – 65000 Units: 0 – 650.00 bar
18-19	U16	Minimum pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.6 Read (165) Last FST data

This command reads the values recorded during the last full stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last FST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last FST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-11	U32	Breakaway time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Fail position stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	Operational stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.7 Read (172) Last FST data, pressure

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	Solenoid reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	Pressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-11	U32	Depressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Actuator fill time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-17	U16	Start pressure Range: 0 – 65000 Units: 0 – 650.00 bar
18-19	U16	Breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.8 Read (166) Last reference FST data

This command reads the values recorded during the last reference full stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last reference FST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last reference FST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-11	U32	Breakaway time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Fail position stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	Operational stroke time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.9 Read (173) Last reference FST data, pressure

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	Solenoid reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	Pressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-11	U32	Depressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	Actuator fill time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-17	U16	Start pressure Range: 0 – 65000 Units: 0 – 650.00 bar
18-19	U16	Breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.10 Read (167) Last SOT data

This command reads the values recorded during the last solenoid test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last SOT Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last SOT Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-9	U16	Start pressure: Range: 0 – 50000 Units: 0.00 – 500.00 bar
10-13	U32	Reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
14-17	U32	Reserved
18-19	U16	Reserved
20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.11 Read (168) Last reference SOT data

This command reads the values recorded during the last reference solenoid test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last reference SOT Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last reference SOT Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-9	U16	Start pressure: Range: 0 – 50000 Units: 0.00 – 500.00 bar
10-13	U32	Reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
14-17	U32	Reserved
18-19	U16	Reserved
20-23	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.12 Read (169) Last EST data

This command reads the values recorded during the last emergency shut down

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	TIME	Time of the last EST Values: Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
4-7	DATE	Date of the last EST Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
8-11	U32	Breakaway time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
12-15	U32	FST time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
16-19	U32	Total time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.13 Read (174) Last EST data, pressure

This command reads the values recorded during the last partial stroke test

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-3	U32	Solenoid reaction time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
4-7	U32	Depressurising time Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
8-9	U16	Start pressure Range: 0 – 65000 Units: 0 – 650.00 bar
10-11	U16	Breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.14 Read (180) PST error limits

This command reads the PST error limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	PST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Minimum allowed pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.15 Write (181) PST error limits

This command writes the PST error limits

Request data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	PST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Minimum allowed pressure Range: 0 – 65000 Units: 0 – 650.00 bar

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	PST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar

15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Minimum allowed pressure Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.16 Read (182) PST warning limits

This command reads the PST warning limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	PST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-16	U32	PST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-27	U16	Maximum travel low Range: 0 – 10000 Units: 0 – 100.00 %
28-29	U16	Maximum travel high Range: 0 – 10000 Units: 0 – 100.00 %

6.5.17 Write (183) PST warning limits

This command writes the PST warning limits

Request data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	PST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-16	U32	PST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-27	U16	Maximum travel low Range: 0 – 10000 Units: 0 – 100.00 %
28-29	U16	Maximum travel high Range: 0 – 10000 Units: 0 – 100.00 %

Response data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	PST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

13-16	U32	PST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-27	U16	Maximum travel low Range: 0 – 10000 Units: 0 – 100.00 %
28-29	U16	Maximum travel high Range: 0 – 10000 Units: 0 – 100.00 %

6.5.18 Read (184) PST warning limits

This command reads the PST warning limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
2-3	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.19 Write (185) PST warning limits

This command writes the PST warning limits

Request data bytes

Byte	Format	Description
0-1	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
2-36	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

Response data bytes

Byte	Format	Description
0-1	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
2-36	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.20 Read (186) FST error limits

This command reads the FST error limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	FST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Position limit Range: 0 – 10000 Units: 0 – 100.00%

6.5.21 Write (187) FST error limits

This command writes the FST error limits

Request data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	FST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Position limit Range: 0 – 10000 Units: 0 – 100.00%

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Breakaway timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	FST timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-14	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar

15-16	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
17-18	U16	Minimum breakaway pressure Range: 0 – 65000 Units: 0 – 650.00 bar
19-20	U16	Position limit Range: 0 – 10000 Units: 0 – 100.00%

6.5.22 Read (188) FST warning limits

This command reads the FST warning limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	FST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-16	U32	FST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-26	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
27-28	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.23 Write (189) FST warning limits

This command writes the FST warning limits

Request data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	FST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
13-16	U32	FST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-26	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
27-28	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

Response data bytes

Byte	Format	Description
0	U8	Enable the warnings 1 = No 2 = Yes
1-4	U32	Breakaway time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-8	U32	Breakaway time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
9-12	U32	FST time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

13-16	U32	FST time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
17-20	U32	Total time low Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
21-24	U32	Total time high Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
25-26	U16	Breakaway pressure low Range: 0 – 65000 Units: 0 – 650.00 bar
27-28	U16	Breakaway pressure high Range: 0 – 65000 Units: 0 – 650.00 bar

6.5.24 Read (192) SOT error limits

This command reads the SOT error limits

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-6	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
7-8	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.5.25 Write (193) SOT error limits

This command reads the SOT error limits

Request data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-6	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
7-8	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

Response data bytes

Byte	Format	Description
0	U8	Enable the errors 1 = No 2 = Yes
1-4	U32	Timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms
5-6	U16	Start pressure low limit Range: 0 – 65000 Units: 0 – 650.00 bar
7-8	U16	Start pressure high limit Range: 0 – 65000 Units: 0 – 650.00 bar
9-12	U32	Total timeout Range: 0 – 4294967295 ms Units: 0 – 4294967295 ms

6.6 Log functions

6.6.1 Read (130) Error log

This command reads the entries in the error log and the arguments. See manual for Error messages

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Number of errors in the error log
1-2	U16	Error 1
3-4	U16	Error 2
5-6	U16	Error 3
7-8	U16	Error 4
9-10	U16	Error 5
11-12	U16	Error 6
13-14	U16	Error 7
15-16	U16	Error 8
17-18	U16	Error 9
19-20	U16	Error 10

6.6.2 Read (131) Diagnostic Log

This command reads the entries in the error log and the arguments

See manual for Log messages

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Number of logs
1-2	U16	Diagnostic log 1
3-4	U16	Diagnostic log 2
5-6	U16	Diagnostic log 3
7-8	U16	Diagnostic log 4
9-10	U16	Diagnostic log 5
11-12	U16	Diagnostic log 6
13-14	U16	Diagnostic log 7
15-16	U16	Diagnostic log 8
17-18	U16	Diagnostic log 9
19-20	U16	Diagnostic log 10

6.6.3 Read (132) Read Event log 1 – 2

See manual for Event messages

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Event type – for Event number 1 Values: See manual for values
2-5	U32	Event Date – for Event number 1 Values: Bit 0 – 7 = Day (1 .. 31) Bit 8 – 15 = Month (1 .. 12) Bit 16-31 = Year (2010 .. 2100)
6-9	U32	Event Time – for Event number 1 Bit 0 – 7 = Seconds (0 .. 59) Bit 8 – 15 = Minutes (0 - 59) Bit 16-31 = Hour (0 - 23)
10-11	U16	Event Error – for Event number 1
12-13	U16	Event type – for Event number 2
14-17	U32	Event Date – for Event number 2
18-21	U32	Event Time – for Event number 2
22-23	U16	Event Error – for Event number 2

6.6.4 Read (133) Read Event log 3 - 4

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Event type – for Event number 3
2-5	U32	Event Date – for Event number 3
6-9	U32	Event Time – for Event number 3
10-11	U16	Event Error – for Event number 3
12-13	U16	Event type – for Event number 4
14-17	U32	Event Date – for Event number 4
18-21	U32	Event Time – for Event number 4
22-23	U16	Event Error – for Event number 4

6.6.5 Read (134) Read Event log 5 - 6

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Event type – for Event number 5
2-5	U32	Event Date – for Event number 5
6-9	U32	Event Time – for Event number 5
10-11	U16	Event Error – for Event number 5
12-13	U16	Event type – for Event number 6
14-17	U32	Event Date – for Event number 6
18-21	U32	Event Time – for Event number 6
22-23	U16	Event Error – for Event number 6

6.6.6 Read (135) Read Event log 7 - 8

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Event type – for Event number 7
2-5	U32	Event Date – for Event number 7
6-9	U32	Event Time – for Event number 7
10-11	U16	Event Error – for Event number 7
12-13	U16	Event type – for Event number 8
14-17	U32	Event Date – for Event number 8
18-21	U32	Event Time – for Event number 8
22-23	U16	Event Error – for Event number 8

6.6.7 Read (136) Read Event log 9 - 10

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0-1	U16	Event type – for Event number 9
2-5	U32	Event Date – for Event number 9
6-9	U32	Event Time – for Event number 9
10-11	U16	Event Error – for Event number 9
12-13	U16	Event type – for Event number 10
14-17	U32	Event Date – for Event number 10
18-21	U32	Event Time – for Event number 10
22-23	U16	Event Error – for Event number 10

6.7 Scheduler configuration

6.7.1 Read (220) Scheduler Configuration and Status

This command reads scheduler configuration and status

Request data bytes

Byte	Format	Description
None		

Response data bytes

Byte	Format	Description
0	U8	Scheduler 2 = Off 3 = Auto 4 = Semi-automatic
1	U8	Action required? 1 = Yes 2 = No
2	U8	Action 1 = PST 2 = FST 3 = SOT
3	U8	Scheduler month, January Default: 2 (off) 1 = On 2 = Off
4	U8	Scheduler month, February Default: 2 (off) 1 = On 2 = Off
5	U8	Scheduler month, March

		Default: 2 (off) 1 = On 2 = Off
6	U8	Scheduler month, April Default: 2 (off) 1 = On 2 = Off
7	U8	Scheduler month, May Default: 2 (off) 1 = On 2 = Off
8	U8	Scheduler month, June Default: 2 (off) 1 = On 2 = Off
9	U8	Scheduler month, July Default: 2 (off) 1 = On 2 = Off
10	U8	Scheduler month, August Default: 2 (off) 1 = On 2 = Off
11	U8	Scheduler month, September Default: 2 (off) 1 = On 2 = Off
12	U8	Scheduler month, October Default: 2 (off) 1 = On 2 = Off
13	U8	Scheduler month, November Default: 2 (off) 1 = On 2 = Off
14	U8	Scheduler month, December Default: 2 (off) 1 = On 2 = Off
15	U8	Scheduler Day 1 Default: 0 (not used) Range: 0 – 31, 0 = not used
16	U8	Scheduler Day 2 Default: 0 (not used) Range: 0 – 31, 0 = not used
17	U8	Scheduler Day 3 Default: 0 (not used) Range: 0 – 31, 0 = not used

18	U8	Scheduler Day 4 Default: 0 (not used) Range: 0 – 31, 0 = not used
19	U8	Scheduler Hour Default: 9 Range 0-23

6.7.2 Write (221) Scheduler Configuration

This command write Scheduler configuration

Request data bytes

Byte	Format	Description
0	U8	Scheduler 2 = Off 3 = Auto 4 = Semi-automatic
1	U8	Action 1 = PST 2 = FST 3 = SOT
2	U8	Scheduler month, January Default: 2 (off) 0 = Undefined 1 = On 2 = Off
3	U8	Scheduler month, February Default: 2 (off) 0 = Undefined 1 = On 2 = Off
4	U8	Scheduler month, March Default: 2 (off) 0 = Undefined 1 = On 2 = Off
5	U8	Scheduler month, April Default: 2 (off) 0 = Undefined

		1 = On 2 = Off
6	U8	Scheduler month, May Default: 2 (off) 0 = Undefined = On 2 = Off
7	U8	Scheduler month, June Default: 2 (off) 0 = Undefined 1 = On 2 = Off
8	U8	Scheduler month, July Default: 2 (off) 0 = Undefined 1 = On 2 = Off
9	U8	Scheduler month, August Default: 2 (off) 0 = Undefined 1 = On 2 = Off
10	U8	Scheduler month, September Default: 2 (off) 0 = Undefined 1 = On 2 = Off
11	U8	Scheduler month, October Default: 2 (off) 0 = Undefined 1 = On 2 = Off
12	U8	Scheduler month, November Default: 2 (off) 0 = Undefined

		1 = On 2 = Off
13	U8	Scheduler month, December Default: 2 (off) 0 = Undefined 1 = On 2 = Off
14	U8	Scheduler Day 1 Default: 0 (not used) Range: 0 – 31, 0 = not used
15	U8	Scheduler Day 2 Default: 0 (not used) Range: 0 – 31, 0 = not used
16	U8	Scheduler Day 3 Default: 0 (not used) Range: 0 – 31, 0 = not used
17	U8	Scheduler Day 4 Default: 0 (not used) Range: 0 – 31, 0 = not used
18	U8	Scheduler Hour Default: 9 Range 0-23

Response data bytes

Byte	Format	Description
0	U8	Scheduler 2 = Off 3 = Auto 4 = Semi-automatic
1	U8	Action 1 = PST 2 = FST 3 = SOT
2	U8	Scheduler month, January Default: 2 (off) 1 = On 2 = Off
3	U8	Scheduler month, February Default: 2 (off) 1 = On 2 = Off
4	U8	Scheduler month, March

		Default: 2 (off) 1 = On 2 = Off
5	U8	Scheduler month, April Default: 2 (off) 1 = On 2 = Off
6	U8	Scheduler month, May Default: 2 (off) 1 = On 2 = Off
7	U8	Scheduler month, June Default: 2 (off) 1 = On 2 = Off
8	U8	Scheduler month, July Default: 2 (off) 1 = On 2 = Off
9	U8	Scheduler month, August Default: 2 (off) 1 = On 2 = Off
10	U8	Scheduler month, September Default: 2 (off) 1 = On 2 = Off
11	U8	Scheduler month, October Default: 2 (off) 1 = On 2 = Off
12	U8	Scheduler month, November Default: 2 (off) 1 = On 2 = Off
13	U8	Scheduler month, December Default: 2 (off) 1 = On 2 = Off
14	U8	Scheduler Day 1 Default: 0 (not used) Range: 0 – 31, 0 = not used
15	U8	Scheduler Day 2 Default: 0 (not used) Range: 0 – 31, 0 = not used
16	U8	Scheduler Day 3 Default: 0 (not used) Range: 0 – 31, 0 = not used

17	U8	Scheduler Day 4 Default: 0 (not used) Range: 0 – 31, 0 = not used
18	U8	Scheduler Hour Default: 9 Range 0-23

7 HART Response Codes

All commands can return all the following response codes

Byte	Class	Description
0	Success	
2	Error	Invalid poll address
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	Warning	Update failure
8	Warning	Update in progress
8	Warning	Set to nearest possible value
9	Error	Invalid data code detected
9	Error	Configuration counter mismatch
12	Error	Invalid mode selection
14	Warning	Dynamic variable returned
16	Error	Access restricted
30	Warning	Command response truncated
32	Error	Busy
33	Error	Device initiated
34	Error	Device running
35	Error	Device dead
36	Error	Device conflict
64	Warning	Command not implemented