Interface Description
COM/FMT500-IG/HART-EN

Thermal Mass Flowmeter Sensyflow FMT500-IG

HART protocol 6.0
Valid for software levels from 1.85

Thermal Mass Flowmeter
Sensyflow FMT500-IG

Interface Description

COM/FMT500-IG/HART-EN

07.2009

Valid for software levels from 1.85

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1 HART Commando Overview

This overview lists all the available HART-Commands. It includes both the Universal and Common Practice Commands.

1.1 UNIVERSAL COMMANDS (HCF_SPEC-127, Rev. 6.0)

1.1.1 COMMAND 0

READ UNIQUE IDENTIFIER

COMMAND 0	Description
Request	None
Response	Device Type Code for Expansion; "254", 8-bit unsigned Manufacturer Identification Code, 8-bit unsigned integer, Manufacturer's Device Type Code, 8-bit unsigned integer, Number of Preambles required for the Request message from the Master to the Slave. Revision Level of the Universal Command Document implemented by this device, bit unsigned integer, Levels Revision Level of the Transmitter-Specific Document implemented by this device, 8-bit unsigned integer Software Revision Level of this device, 8-bit unsigned Hardware Revision Level of the electronics in this device; Flags, 8-bit unsigned integer, Refer to Table XI; Flag Assignments Device Identification Number, 24-bit unsigned integer
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.2 COMMAND 1

READ PRIMARY VARIABLE

COMMAND 1	Description
Request	None
Response	Primary Variable Units Code, 8-bit unsigned integer, Primary Variable, IEEE 754
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 8 Warning: Update Failure 16 Access Restricted 32 Busy

1.1.3 COMMAND 2

READ P. V. CURRENT AND PERCENT OF RANGE

COMMAND 0	Description
Request	None
Response	Primary Variable Current, IEEE 754, Units of milliamperes Primary Variable Percent of Range, IEEE 754, Units of percent
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 8 Warning: Update Failure 16 Access Restricted 32 Busy

1.1.4 COMMAND 3

READ DYNAMIC VARIABLES AND P. V. CURRENT

COMMAND 3	Description
Request	None
Response	Primary Variable Current, IEEE 754, Units of milliamperes Primary Variable Units Code, 8-bit unsigned integer, Primary Variable, IEEE 754 Secondary Variable Units Code, 8-bit unsigned integer, Secondary Variable, IEEE 754 Tertiary Variable Units Code, 8-bit unsigned integer, Tertiary Variable, IEEE 754 4th Variable Units Code, 8-bit unsigned integer, Refer to 4th Variable, IEEE 754
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 8 Warning: Update Failure 16 Access Restricted 32 Busy

1.1.5 COMMAND 6

WRITE POLLING ADDRESS

COMMAND 6	Description
Request	Polling Address of Device, 8-bit unsigned integer LoopCurrentMode, unsigned char (Enum)
Response	Polling Address of Device, 8-bit unsigned integer LoopCurrentMode, unsigned char (Enum)
Response Codes	0 No Command Specific Errors 2 Invalid Poll Address Selection 5 Too Few Data Bytes Received 6 Device Specific Command Error 7 In Write Protect Mode 12 Invalid Mode Selection 16 Access Restricted 32 Busy

1.1.6 COMMAND 7

READ LOOP CONFIGURATION

COMMAND 7	Description
Request	None
Response	Data Byte #0 Polling Address of Device, 8-bit unsigned integer LoopCurrentMode, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 16 Access Restricted 32 Busy

1.1.7 COMMAND 8

READ DYNAMIC VARIABLE CLASSIFICATIONS

COMMAND 8	Description
Request	None
Response	PVVariableClassification, 8-bit unsigned char SVVariableClassification, 8-bit unsigned char TVVariableClassification, 8-bit unsigned char QVVariableClassification, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 16 Access Restricted 32 Busy

1.1.8 COMMAND 9

WRITE POLLING ADDRESS

COMMAND 9	Description
	This Field Device does not expose it's Device Variables --> DeviceVariableCode for PVStatus is '0 DeviceVariableCode for SVStatus is '1' DeviceVariableCode for TVStatus is '2'
Request	Slot0: Device Variable Code (0 to 2) Slot1: Device Variable Code (0 to 2) Slot2: Device Variable Code (0 to 2) Slot3: Device Variable Code (0 to 2)
Response	ExtendedFieldDeviceStatus, 8-bit unsigned char 'Bits' DeviceVariableCode for Code in 'Slot0', 8-bit unsigned char DeviceVariableClassification for Code in 'Slot0', 8-bit unsigned char (Enum) UnitsCode for Code in 'Slot0', 8-bit unsigned char (Enum) DeviceVariableValue for Code in 'Slot0', Float DeviceVariableStatus for Code in 'Slot0', 8-bit unsigned char 'Bits' DeviceVariableCode for Code in 'Slot1', 8-bit unsigned char DeviceVariableClassification for Code in 'Slot1', 8-bit unsigned char (Enum) UnitsCode for Code in 'Slot1', 8-bit unsigned char (Enum) DeviceVariableValue for Code in 'Slot1', Float DeviceVariableStatus for Code in 'Slot1', 8-bit unsigned char 'Bits' DeviceVariableCode for Code in 'Slot2', 8-bit unsigned char DeviceVariableClassification for Code in 'Slot2', 8-bit unsigned char (Enum) UnitsCode for Code in 'Slot2', 8-bit unsigned char (Enum) DeviceVariableValue for Code in 'Slot2', Float DeviceVariableStatus for Code in 'Slot2', 8-bit unsigned char 'Bits' DeviceVariableCode for Code in 'Slot3', 8-bit unsigned char DeviceVariableClassification for Code in 'Slot3', 8-bit unsigned char (Enum) UnitsCode for Code in 'Slot3', 8-bit unsigned char (Enum) DeviceVariableValue for Code in 'Slot3', Float DeviceVariableStatus for Code in 'Slot3', 8-bit unsigned char 'Bits'

Fortsetzung nächste Seite

COMMAND 9 (Fortsetzung)	Description
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Device Specific Command Error 8 Update Failure 16 Access Restricted 32 Busy

1.1.9 COMMAND 11

READ UNIQUE IDENTIFIER ASSOCIATED WITH TAG

COMMAND 11	Description
Request	Tag, 6 byte Packed ASCII
Response	Device Type Code for Expansion; "254", 8-bit unsigned Manufacturer Identification Code, 8-bit unsigned integer, Manufacturer's Device Type Code, 8-bit unsigned integer, Number of Preambles required for the Request message Revision Level of the Universal Command Document Revision Level of the Transmitter-Specific Document Software Revision Level of this device, 8-bit unsigned Hardware Revision Level of the electronics in this device; Flags, 8-bit unsigned integer, Refer to Table XI; Flag Assignments Device Identification Number, 24-bit unsigned integer
Response Codes	0 No Command-Specific Errors 32 Busy

1.1.10 COMMAND 12

READ MESSAGE

COMMAND 12	Description
Request	None
Response	Message, Packed-ASCII
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.11 COMMAND 13

READ TAG, DESCRIPTOR, DATE

COMMAND 13	Description
Request	None
Response	Tag, Packed-ASCII Descriptor, Packed-ASCII Date, 8-bit unsigned integers, Respectively day, month, year-1900
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.12 COMMAND 14

READ PRIMARY TRANSDUCER INFORMATION

COMMAND 14	Description
Request	None
Response	Primary Variable Sensor Serial Number, 24-bit unsigned integer Primary Variable Sensor Limits and Minimum Span Units Code, 8-bit unsigned integer Primary Variable Upper Sensor Limit, IEEE 754 Primary Variable Lower Sensor Limit, IEEE 754 Primary Variable Minimum Span, IEEE 754
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.13 COMMAND 15

READ DEVICE INFORMATION

COMMAND 15	Description
Request	None
Response	Primary Variable Alarm Selection Code, 8-bit unsigned integer Primary Variable Transfer Function Code, 8-bit unsigned integer Primary Variable Upper and Lower Range Values Units Code, 8-bit unsigned integer, Primary Variable Upper Range Value, IEEE 754 Primary Variable Lower Range Value, IEEE 754 Primary Variable Damping Value, IEEE 754, Units of seconds Write Protect Code, 8-bit unsigned integer, Refer to Private Label Distributor Code, 8-bit unsigned integer, PVAnalogChannelFlags, 8-bit unsigned char (Bits) is 0x00
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.14 COMMAND 16

READ FINAL ASSEMBLY NUMBER

COMMAND 16	Description
Request	None
Response	Final Assembly Number, 24-bit unsigned integer
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.1.15 COMMAND 17

WRITE MESSAGE

COMMAND 17	Description
Request	Message, 24 Byte Packed-ASCII
Response	Message, 24 Byte Packed-ASCII
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.1.16 COMMAND 18

WRITE TAG, DESCRIPTOR, DATE

COMMAND 18	Description
Request	Tag, Packed-ASCII Descriptor, Packed-ASCII Date, 8-bit unsigned integers, Respectively day', month,year-l900
Response	Tag, Packed-ASCII Descriptor, Packed-ASCII Date, 8-bit unsigned integers, Respectively day', month,year-l900
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 9 Invalid Date Code Detected 16 Access Restricted 32 Busy

1.1.17 COMMAND 19

WRITE FINAL ASSEMBLY NUMBER

COMMAND 19	Description
Request	Final Assembly Number, 24-bit unsigned integer
Response	Final Assembly Number, 24-bit unsigned integer
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.1.18 COMMAND 20

READ LONG TAG

COMMAND 20	Description
Request	None
Response	LongTag, 32-byte Latin-1
Response Codes	0 No Command-Specific Errors 16 Access Restricted 32 Busy

1.1.19 COMMAND 21

READ UNIQUE IDENTIFIER ASSOCIATED WITH LONG TAG

COMMAND 21	Description
Request	LongTag, 32-byte Latin-1
Response	(same as in Command 0) Device Type Code for Expansion; "254", 8-bit unsigned Manufacturer Identification Code, 8-bit unsigned integer, Manufacturer's Device Type Code, 8-bit unsigned integer, Number of Preambles required for the Request message from the Master to the Slave. Revision Level of the Universal Command Document implemented by this device, bit unsigned integer, Levels Revision Level of the Transmitter-Specific Document implemented by this device, 8-bit unsigned integer Software Revision Level of this device, 8-bit unsigned Hardware Revision Level of the electronics in this device; Flags, 8-bit unsigned integer, Refer to Table XI; Flag Assignments Device Identification Number, 24-bit unsigned integerCOMMAND-SPECIFIC
Response Codes	0 No Command-Specific Errors 32 Busy

1.1.20 COMMAND 22

WRITE LONG TAG

COMMAND 22	Description
Request	LongTag, 32-byte Latin-1
Response	LongTag, 32-byte Latin-1
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Device Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2 COMMON PRACTICE COMMANDS (HCF_SPEC-151, Rev. 8.0)

1.2.1 COMMAND 34

WRITE PRIMARY VARIABLE DAMPING VALUE

COMMAND 34	Description
Request	Primary Variable Damping Value, IEEE 754, Units of seconds
Response	Primary Variable Damping Value, IEEE 754, Units of seconds
Response Codes	0 No Command-Specific Errors 3 Passed Parameter too Large 4 Passed Parameter too Small 5 Too Few Data Bytes Received 6 Transmitter-Specifc Command Error 7 In Write Protect Mode 8 Warning: Set to Neasrest Possible Value 16 Access Restricted 32 Busy

1.2.2 COMMAND 35

WRITE PRIMARY VARIABLE RANGE VALUES

COMMAND 35	Description
Request	Primary Variable Upper and Lower Range Values Units Code, 8-bit unsigned integer Primary Variable Upper Range Value,IEEE 754 Primary Variable Lower Range Value,IEEE 754
Response	Primary Variable Upper and Lower Range Values Units Code, 8-bit unsigned integer Primary Variable Upper Range Value,IEEE 754 Primary Variable Lower Range Value,IEEE 754
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Transmitter-Specifc Command Error 7 In Write Protect Mode 9 Lower Range Value too High 10 Lower Range Value too Low 11 Upper Range Value too High 12 Upper Range Value too Low 13 Upper and Lower Range Values Out-of-Limits 14 Span too Small 16 Access Restricted 32 Busy

1.2.3 COMMAND 36

SET PRIMARY VARIABLE UPPER RANGE VALUE

COMMAND 36	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specifc Command Error 7 In Write Protect Mode 9 Applied Process too High 10 Applied Process too Low 14 Span too Small 16 Access Restricted 32 Busy

1.2.4 COMMAND 37

SET PRIMARY VARIABLE LOWER RANGE VALUE

COMMAND 37	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specifc Command Error 7 In Write Protect Mode 9 Applied Process too High 10 Applied Process too Low 14 Warning: New Lower Range Value Pushed 16 Access Restricted 32 Busy

1.2.5 COMMAND 38

RESET CONFIGURATION CHANGED FLAG

COMMAND 38	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specifc Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.6 COMMAND 39

EEPROM CONTROL

COMMAND 39	Description
Request	EEPROM Control Code, 8-bit unsigned integer, 0 Burn EEPROM 1 Restore Shadow RAM 2 - 249 Undefined
Response	EEPROM Control Code, 8-bit unsigned integer, 0 Burn EEPROM 1 Restore Shadow RAM 2 - 249 Undefined
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Transmitter Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.7 COMMAND 40

ENTER/EXIT FIXED PRIMARY VARIABLE CURRENT MODE

COMMAND 40	Description
Request	Actual Fixed Primary Variable Current Level, IEEE 754, Units of milliamperes
Response	Actual Fixed Primary Variable Current Level, IEEE 754, Units of milliamperes
Response Codes	0 No Command-Specific Errors 3 Passed Parameter too Large 4 Passed Parameter too Small 5 Too Few Data Bytes Received 6 Transmitter Specific Command Error 7 In Write Protect Mode 11 In Multidrop Mode 16 Access Restricted 32 Busy

1.2.8 COMMAND 41

PERFORM TRANSMITTER SELF TEST

COMMAND 41	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter Specific Command Error 16 Access Restricted 32 Busy

1.2.9 COMMAND 42

PERFORM DEVICE RESET

COMMAND 42	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specifc Command Error 16 Access Restricted 32 Busy

1.2.10 COMMAND 43

SET PRIMARY VARIABLE ZERO (SET PVLowFlowCutOffValue)

COMMAND 43	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Device-Specifc Command Error 9 Applied Process Too High 10 Applied Process Too Low 16 Access Restricted 32 Busy

1.2.11 COMMAND 44

WRITE PRIMARY VARIABLE UNITS

COMMAND 44	Description
Request	Primary Variable Units Code, 8-bit unsigned integer
Response	Primary Variable Units Code, 8-bit unsigned integer
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.12 COMMAND 45

TRIM PRIMARY VARIABLE CURRENT DAC ZERO

COMMAND 45	Description
Request	Externally Measured Current Level, IEEE milliamperes
Response	Externally Measured Current Level, IEEE milliamperes
Response Codes	0 No Command-Specific Errors 3 Passed Parameter too Large 4 Passed Parameter too Small 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 9 Not In Proper Current Mode 11 In Multidrop Mode 12 - 15 Undefined 16 Access Restricted 32 Busy

1.2.13 COMMAND 46

TRIM PRIMARY VARIABLE CURRENT DAC GAIN

COMMAND 46	Description
Request	Externally Measured Primary Variable Current Level, IEEE 754, Units of milliamperes
Response	Externally Measured Primary Variable Current Level, IEEE 754, Units of milliamperes
Response Codes	0 No Command-Specific Errors 3 Passed Parameter too Large 4 Passed Parameter too Small 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 9 Not In Proper Current Mode 11 In Multidrop Mode 16 Access Restricted 32 Busy

1.2.14 COMMAND 47

WRITE PRIMARY VARIABLE TRANSFER FUNCTION

COMMAND 47	Description
Request	Primary Variable Transfer Function Code, 8-bit unsigned integer
Response	Primary Variable Transfer Function Code, 8-bit unsigned integer
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.15 COMMAND 48

READ ADDITIONAL TRANSMITTER STATUS

COMMAND 48	Description
Request	None
Response	IG DIAG 1 , 8-bit unsigned char IG DIAG 2 , 8-bit unsigned char IG DIAG 3 , 8-bit unsigned char IG DIAG 4 , 8-bit unsigned char IG DIAG 5 , 8-bit unsigned char IG DIAG 6 , 8-bit unsigned char ExtendedDeviceStatus(refer to Common Table 17 Extended Device Status Information) is 0x00 DeviceOperatingMode (refer to Common Table 14, Operating Mode Codes) (is 0x00) AnalogChannelSaturated AnalogChannelFixed Status FLOW TB, 8-bit unsigned integer Status TEMP TB, 8-bit unsigned integer Status HEATER, 8-bit unsigned integer Status CURRENT, 8-bit unsigned integer Status INPUT1, 8-bit unsigned integer Status INPUT2, 8-bit unsigned integer Status OUTPUT1, 8-bit unsigned integer Status OUTPUT2, 8-bit unsigned integer Status FLOW AI, 8-bit unsigned integer Status TEMP AI, 8-bit unsigned integer Status TOTAL, 8-bit unsigned integer
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 8 Warning: Update in Progress 16 Access Restricted 32 Busy

1.2.16 COMMAND 49

WRITE PRIMARY VARIABLE SENSOR SERIAL NUMBER

COMMAND 49	Description
Request	Primary Variable Sensor Serial Number, 24-bit unsigned integer
Response	Primary Variable Sensor Serial Number, 24-bit unsigned integer
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.17 COMMAND 53

WRITE DEVICE VARIABLE UNITS

COMMAND 53	Description
Request	Device Variable Code, unsigned-8 Device Variable Units Code (refer to Common Tables Specification), ENUM
Response	Device Variable Code, unsigned-8 Device Variable Units Code (refer to Common Tables Specification), ENUM
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 11 Invalid Device Variable Code 12 Invalid Units Code 16 Access Restricted 32 Busy

1.2.18 COMMAND 54

READ DEVICE VARIABLE INFORMATION

COMMAND 54	Description
Request	Device Variable Code, 8-it unsigned integer
Response	Device Variable Code, unsigned-8 Device Variable Transducer Serial Number, unsigned-24 Device Variable Limits/Minimum Span Units Code(Common Table Spec.), ENUM Device Variable Upper Transducer Limit, float Device Variable Lower Transducer Limit, float Device Variable Damping Value, float Device Variable Minimum Span, float Device Variable Classification, ENUM (Common Table 21), ENUM Device Variable Family (Common Table 20), ENUM
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 16 Access Restricted 32 Busy

1.2.19 COMMAND 55

WRITE DEVICE VARIABLE DAMPING VALUE

COMMAND 55	Description
Request	Device Variable Code, 8-it unsigned integer Device Variable Damping Value, float
Response	Device Variable Code, 8-it unsigned integer Device Variable Damping Value, float
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 3 Passed Parameter Too Large 4 Passed Parameter Too Small 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 8 Set To nearest possible Value 16 Access Restricted 32 Busy

1.2.20 COMMAND 59

WRITE NUMBER OF RESPONSE PREAMBLES

COMMAND 59	Description
Request	Number of Preambles to be sent with the Response message from the Slave to the Master, 8-bit unsigned integer
Response	Number of Preambles to be sent with the Response message from the Slave to the Master, 8-bit unsigned integer
Response Codes	0 No Command-Specific Errors 3 Passed Parameter too Large 4 Passed Parameter too Small 5 Too Few Data Bytes Received 6 Transmitter-Specific Command Error 7 In Write Protect Mode 16 Access Restricted 32 Busy

1.2.21 COMMAND 72

SQUAWK

COMMAND 72	Description
Request	None
Response	None
Response Codes	0 No Command-Specific Errors 6 Transmitter-Specific Command Error 32 Busy

1.3 DEVICE SPECIFIC COMMANDS

1.3.1 COMMAND 140

READ EXTENDED PV CONFIGURATON

COMMAND 140	Description
Request	None
Response	PVLowFlowCutOffValue, IEEE 754 PVOffset, IEEE 754 PVCalibrationFactor, IEEE 754 PVSimulationMode, 8-bit unsigned char (ENUM) PVSimulationValue, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.2 COMMAND 141

WRITE EXTENDED PV CONFIGURATION

COMMAND 141	Description
Request	PVLowFlowCutOffValue, IEEE 754 PVOffset, IEEE 754 PVCalibrationFactor, IEEE 754 PVSimulationMode, 8-bit unsigned char (ENUM) PVSimulationValue, IEEE 754
Response	PVLowFlowCutOffValue, IEEE 754 PVOffset, IEEE 754 PVCalibrationFactor, IEEE 754 PVSimulationMode, 8-bit unsigned char (ENUM) PVSimulationValue, IEEE 754
Response Codes	0 No Command-Specific Errors 2 InvalidSelection 3 PassedParameterTooLarge 4 PassedParameterTooSmall 5 Too Few Data Bytes Received 32 Busy 42 PVOffsetAndCalFactoerChangeNotAllowed (SUPER USER IS REQUIRED TO CHANGE THOSE VARIABLES)

1.3.3 COMMAND 142

READ CHAR. CURVE NAME CONFIGURATON

COMMAND 142	Description
Request	CharCurve, 8-bit unsinged char (ENUM)
Response	CharCurve, 8-bit unsinged char (ENUM) MaximumNumerOfTransferFunctions, 8-bit unsinged char (ENUM) CharCurveName ASCII(20)
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.4 COMMAND 146

READ EXTENDED SV CONFIGURATON

COMMAND 146	Description
Request	None
Response	SVUpperRangeValue, IEEE 754 SVLowerRangeValue, IEEE 754 SVOffset, IEEE 754 SVDampingValue, IEEE 754 SVSimulationMode, 8-bit unsigned char (ENUM) SVSimulationValue, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.5 COMMAND 147

WRITE EXTENDED SV CONFIGURATON

COMMAND 147	Description
Request	SVUpperRangeValue, IEEE 754 SVLowerRangeValue, IEEE 754 SVOffset, IEEE 754 SVDampingValue, IEEE 754 SVSimulationMode, 8-bit unsigned char (ENUM) SVSimulationValue, IEEE 754
Response	SVUpperRangeValue, IEEE 754 SVLowerRangeValue, IEEE 754 SVOffset, IEEE 754 SVDampingValue, IEEE 754 SVSimulationMode, 8-bit unsigned char (ENUM) SVSimulationValue, IEEE 754
Response Codes	0 No Command-Specific Errors 2 InvalidSelection 3 PassedParameterTooLarge 4 PassedParameterTooSmall 5 Too Few Data Bytes Received 32 Busy 42 PVOffsetAndCalFactoerChangeNotAllowed (SUPER USER IS REQUIRED TO CHANGE THOSE VARIABLES)

1.3.6 COMMAND 150

READ PV ALARM CONFIGURATION

COMMAND 150	Description
Request	None
Response	PVAlarmValueMode, unsigned char (ENUM) PVAlarmBackupValue, IEEE 754 PVAlarmMax, IEEE 754 PVAlarmMin, IEEE 754 PVWarningMax, IEEE 754 PVWarningMin, IEEE 754 PVHysterese, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.7 COMMAND 151

WRITE PV ALARM CONFIGURATION

COMMAND 151	Description
Request	PVAlarmValueMode, unsigned char (ENUM) PVAlarmBackupValue, IEEE 754 PVAlarmMax, IEEE 754 PVAlarmMin, IEEE 754 PVWarningMax, IEEE 754 PVWarningMin, IEEE 754 PVHysterese, IEEE 754
Response	PVAlarmValueMode, unsigned char (ENUM) PVAlarmBackupValue, IEEE 754 PVAlarmMax, IEEE 754 PVAlarmMin, IEEE 754 PVWarningMax, IEEE 754 PVWarningMin, IEEE 754 PVHysterese, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy 40 HystereseOutOfLimits 44 AlarmTooLow 45 AlarmTooHigh 46 WarningTooLow 47 WarningTooHigh

1.3.8 COMMAND 152

READ SV ALARM CONFIGURATION

COMMAND 152	Description
Request	None
Response	SVAlarmValueMode, unsigned char (ENUM) SVAlarmBackupValue, IEEE 754 SVAlarmMax, IEEE 754 SVAlarmMin, IEEE 754 SVWarningMax, IEEE 754 SVWarningMin, IEEE 754 SVHysterese, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.9 COMMAND 153

WRITE SV ALARM CONFIGURATION

COMMAND 153	Description
Request	SVAlarmValueMode, unsigned char (ENUM) SVAlarmBackupValue, IEEE 754 SVAlarmMax, IEEE 754 SVAlarmMin, IEEE 754 SVWarningMax, IEEE 754 SVWarningMin, IEEE 754 SVHysterese, IEEE 754
Response	SVAlarmValueMode, unsigned char (ENUM) SVAlarmBackupValue, IEEE 754 SVAlarmMax, IEEE 754 SVAlarmMin, IEEE 754 SVWarningMax, IEEE 754 SVWarningMin, IEEE 754 SVHysterese, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy 40 HystereseOutOfLimits 44 AlarmTooLow 45 AlarmTooHigh 46 WarningTooLow 47 WarningTooHigh

1.3.10 COMMAND 154

READ TV ALARM CONFIGURATION

COMMAND 154	Description
Request	None
Response	TVAlarmMode unsigned char (ENUM) TVAlarmMax, IEEE 754 TVWarningMax, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.11 COMMAND 155

WRITE TV ALARM CONFIGURATION

COMMAND 155	Description
Request	TVAlarmMode unsigned char (ENUM) TVAlarmMax, IEEE 754 TVWarningMax, IEEE 754
Response	TVAlarmMode unsigned char (ENUM) TVAlarmMax, IEEE 754 TVWarningMax, IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy 44 AlarmTooLow 45 AlarmTooHigh 46 WarningTooLow 47 WarningTooHigh

1.3.12 COMMAND 160

Read External Output 1 Value, Function and Unit

COMMAND 160	Description
Request	None
Response	External Output 1 Function, 8-bit unsigned integer External Output 1 Unit, 8-bit unsigned integer External Output 1 Value Value,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.13 COMMAND 161

Write External Output 1 Configuration Data

COMMAND 161	Description
Request	External Output 1 Connection, 8-bit unsigned integer External Output 1 Function, 8-bit unsigned integer External Output 1 Impulse Length, 8-bit unsigned integer External Output 1 Impulse Polarity, 8-bit unsigned integer External Output 1 Frequency Low Value,IEEE 754 External Output 1 Frequency High Value,IEEE 754 External Output 1 Quantifier ,IEEE 754
Response	External Output 1 Connection, 8-bit unsigned integer External Output 1 Function, 8-bit unsigned integer External Output 1 Impulse Length, 8-bit unsigned integer External Output 1 Impulse Polarity, 8-bit unsigned integer External Output 1 Frequency Low Value,IEEE 754 External Output 1 Frequency High Value,IEEE 754 External Output 1 Quantifier ,IEEE 754
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 17 Wrong Impulse Length 19 Frequency Low Out Of Limits 20 Frequency High Out Of Limits 21 Quantifier Zero 32 Busy 43 Other Output In Frequency Mode

1.3.14 COMMAND 162

Read External Output1 Configuration Information

COMMAND 162	Description
Request	None
Response	External Output 1 Connection, 8-bit unsigned integer External Output 1 Function, 8-bit unsigned integer External Output 1 Unit, 8-bit unsigned integer External Output 1 Impulse Length, 8-bit unsigned integer External Output 1 Impulse Polarity, 8-bit unsigned integer External Output 1 Frequency Low Value,IEEE 754 External Output 1 Frequency High Value,IEEE 754 External Output 1 Quantifier ,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.15 COMMAND 165

READ EXTERNAL OUTPUT2 Value, Function and Unit

COMMAND 165	Description
Request	None
Response	External Output 2 Function, 8-bit unsigned integer External Output 2 Unit, 8-bit unsigned integer External Output 2 Value Value,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.16 COMMAND 166

Write External Output 2 Configuration Data

COMMAND 166	Description
Request	External Output 2 Connection, 8-bit unsigned integer External Output 2 Function, 8-bit unsigned integer External Output 2 Impulse Length, 8-bit unsigned integer External Output 2 Impulse Polarity, 8-bit unsigned integer External Output 2 Frequency Low Value,IEEE 754 External Output 2 Frequency High Value,IEEE 754 External Output 2 Quantifier ,IEEE 754
Response	External Output 2 Connection, 8-bit unsigned integer External Output 2 Function, 8-bit unsigned integer External Output 2 Impulse Length, 8-bit unsigned integer External Output 2 Impulse Polarity, 8-bit unsigned integer External Output 2 Frequency Low Value,IEEE 754 External Output 2 Frequency High Value,IEEE 754 External Output 2 Quantifier ,IEEE 754
Response Codes	0 No Command-Specific Errors 2 nvalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 17 Wrong Impulse Length 19 Frequency Low Out Of Limits 20 Frequency High Out Of Limits 21 Quantifier Zero 32 Busy 43 Other Output In Frequency Mode

1.3.17 COMMAND 167

Read External Output2 Configuration Information

COMMAND 167	Description
Request	None
Response	External Output 2 Connection, 8-bit unsigned integer External Output 2 Function, 8-bit unsigned integer External Output 2 Unit, 8-bit unsigned integer External Output 2 Impulse Length, 8-bit unsigned integer External Output 2 Impulse Polarity, 8-bit unsigned integer External Output 2 Frequency Low Value,IEEE 754 External Output 2 Frequency High Value,IEEE 754 External Output 2 Quantifier ,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.18 COMMAND 170

Read External Input 1 Value Unit and Function

COMMAND 170	Description
Request	None
Response	External Input 1 Function, 8-bit unsigned integer External Input 1 Unit, 8-bit unsigned integer External Input 1 Value Value,IEEE 754 External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.19 COMMAND 171

Write External Input1 Function and Polarity

COMMAND 171	Description
Request	External Input 1 Function, 8-bit unsigned integer External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response	External Input 1 Function, 8-bit unsigned integer External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.20 COMMAND 174

Read External Input 2 Value Unit and Function

COMMAND 174	Description
Request	None
Response	External Input 2 Function, 8-bit unsigned integer External Input 2 Unit, 8-bit unsigned integer External Input 2 Value Value,IEEE 754 External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.21 COMMAND 175

Write External Input2 Function and Polarity

COMMAND 175	Description
Request	External Input 2 Function, 8-bit unsigned integer External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response	External Input 2 Function, 8-bit unsigned integer External Input 1 & 2 Polarity, 8-bit unsigned char (ENUM)
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.22 COMMAND 181

Reset Totalizer with Default and Quantifier

COMMAND 181	Description
Request	Totalizer Default Value Value,IEEE 754 Totalizer Quantifier Value,IEEE 754
Response	Totalizer Default Value Value,IEEE 754 Totalizer Quantifier Value,IEEE 754
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy 38 Default Value Out Of Limits

1.3.23 COMMAND 182

READ TOTALIZER INFORMATION

COMMAND 182	Description
Request	None
Response	Totalizer Default Value Value,IEEE 754 TotaliterStatus, 8-bit unsigned char Totalizer ErrorBehaviour, 8-bit unsigned char (ENUM) Totalizer Time, Date
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.24 COMMAND 191

Read Current Output Configuration Information

COMMAND 191	Description
Request	None
Response	Current Output Loop Current Mode, 8-bit unsigned integer Current Output Function, 8-bit unsigned integer Current Output Alarm Reaction, 8-bit unsigned integer Current Output Fixed Current Level Value,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

1.3.25 COMMAND 193

Write Current Output Configuration Information

COMMAND 193	Description
Request	Current Output Loop Current Mode, 8-bit unsigned integer Current Output Function, 8-bit unsigned integer Current Output Alarm Reaction, 8-bit unsigned integer Current Output Fixed Current Level Value,IEEE 754
Response	Current Output Loop Current Mode, 8-bit unsigned integer Current Output Function, 8-bit unsigned integer Current Output Alarm Reaction, 8-bit unsigned integer Current Output Fixed Current Level Value,IEEE 754
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy PollingAddressNotZero InvalidSelection

1.3.26 COMMAND 195

WRITE SV UNIT CODE

COMMAND 195	Description
Request	SVUnitCode, 8-bit unsigned char
Response	SVUnitCode, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.27 COMMAND 196

WRITE TV UNIT CODE

COMMAND 196	Description
Request	TVUnitCode, 8-bit unsigned char
Response	TVUnitCode, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.28 COMMAND 200

READ SAP_TASKNUMBER, REAL MANUFACTURER FINAL ASSEMBLY NO. AND CALIBRATION DATE

COMMAND 200	Description
Request	None
Response	SAP_TaskNumber ManufacturerFANumber CalDate, Date
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.29 COMMAND 202

WRITE DISPLAY MASK

COMMAND 202	Description
Request	Default_Display_Mask, 8-bit unsigned char
Response	Default_Display_Mask, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.30 COMMAND 203

READ DISPLAY MASK

COMMAND 203	Description
Request	None
Response	Default_Display_Mask, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.31 COMMAND 204

WRITE LANGUAGE

COMMAND 204	Description
Request	Language, 8-bit unsigned char
Response	Language, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.32 COMMAND 205

READ LANGUAGE

COMMAND 205	Description
Request	None
Response	Language, 8-bit unsigned char
Response Codes	0 No Command-Specific Errors 2 Invalid Selection 5 Too Few Data Bytes Received 7 In Write Protect Mode 32 Busy

1.3.33 COMMAND 214

Disable/ Enable Write Protection Mode

COMMAND 214	Description
	There are 3 possibilities to use this Command: 1'st: Use the N_User Password to disable the write protection mode for the normal configure and write Commands 2'nd: Use the S_User Password to have full control about all commands including eeprom restoring a.s.o. 3'rd: Use a wrong Password to enable the write protection again.
Request	Password 20Byte ASCII
Response	Password 20Byte ASCII
Response Codes	0 No Command-Specific Errors 5 Too Few Data Bytes Received 32 Busy

2 Diagnostic

Device diagnostic

Diagnostic signals are shown as an 8-bit code from the right (Bit 0) to the left side (Bit 7). An error is indicated by “1“ whereby the current and common alarms are set, the integrator is stopped, and an “E” is shown in the display.

The connections to the sensors and evaluation electronics as well as the cabling should be checked first, for remote versions of equipment with messages labeled *. If the fault cannot be resolved like that, please contact the service, also for all other error messages.

Diagnostic Byte 1	Bit 7	6	5	4	3	2	1	0	Type
									Hardware failure
									Reserved
									Reserved
									Electronic Temp. to high
									Memory Error
*									Sensor Failure
									Device not initialized
									Self calibration failed

Diagnostic Byte 2	Bit 7	6	5	4	3	2	1	0	Type
									Zero Point Error
									Power supply failed
									Confi. Not valid
									Restart
									Cold start with default data
									Maintenance required
									Characteristics invalid
									Ident Number violation

Diagnostic Byte 3	Bit 7	6	5	4	3	2	1	0	Type
									Reserved
									Reserved
									Reserved
									Flash error
									Reserved
									Reserved
									Reserved
									Reserved

Diagnostic Byte 4	Bit 7	6	5	4	3	2	1	0	Type
									Reserved
									Reserved
									Reserved
									Reserved
									Reserved
									Reserved
									Reserved
									Extended Diagnosis

Diagnostic Byte 5	Bit 7	6	5	4	3	2	1	0	Type
									KOM modules
									MT modules
									Internal CAN Error
									Serial EEPROM Error
									Reserved
									Reserved
									Reserved
									Reserved

Diagnostic Byte 6	Bit 7	6	5	4	3	2	1	0	Type
									CAL-Data Error
									Gas temp. Error
									Heater temp. Error
*									Res. Temp Error
*									Sensor wire Error
									Max. Gastemp. Error
									Reserved
									Reserved

Status signals for the measurements

	Code	Type	Current alarm	Common alarm	Display
FLOW TB/AI TEMP TB/AI	128	ok			
	17	Out of adjusted range - low			A
	18	Out of adjusted range - high			A
	137	Warning LOW			A
	138	Warning HIGH			A
	141	Alarm LOW	x	x	A
	142	Alarm HIGH	x	x	A
TOT	128	ok			
	138	Warning HIGH			A
	142	Alarm HIGH		x	A
HEATER	128	ok			
	16	out of specification	x	x	E
	17	out of specification	x	x	E
	18	out of specification	x	x	E

A = alarm, E = error

Status signals of outputs

	Code	Typ
Current	0	ok
	1	Output saturated
	2	Alarm HIGH/LOW
	8	Fixed
OUT 1/2 IN 1/2	0	ok

3 Parameter sheet

Main Menu	Submenu level 1	Factory setting	Customer setting
Display of gas temperature Display of totalizer value and time Display of flow value, numerically and bar graph Display of totalizer value and flow value Display of characteristic curve, gas temperature, flow value		Factory setting	
OPERATION MODE	STANDARD SPECIALIST → Password SERVICE → Password	Factory setting	
EASY SETUP MENU		See submenus	
PARAMETER MENU	LANGUAGE	Acc. to customer info	
	CHARACTER. CURVE	No. 1 (Calibration cert.)	
	DEFAULT DISPLAY	Charac. curve / Temp/Flow	
	CONTRAST	15	
MEAS DATA MENU	Submenus → Level 2	(see below)	
EXTERNAL I/O MENU	Submenus → Level 2	(see below)	
HART MENU	POLLING ADDRESS	000	
	PREAMBEL	005	
	DIAGNOSE QUART VAR	OFF	
	HART REV 5 KOMP	ON	

MEAS DATA MENU	Submenu level 2	Factory setting	Customer setting
FLOW MEAS MENU	FLOW UNIT	Acc. to char.curve (cal.cert.)	
	FLOW FILTER TIME	0.2 s	
	LOW FLOW CUT-OFF	0	
	FLOW OFFSET	0	
	CALIBRATION FACTOR	1	
	RANGE END VALUE	Acc. to char.curve (cal.cert.)	
	RANGE MIN VALUE	0	
FLOW ALARM MENU	FLOW ALARM HIGH	Cal. range end value	
	FLOW WARNUNG HIGH	Cal. range end value	
	FLOW WARNUNG LOW	0	
	FLOW ALARM LOW	0	
	FLOW FAILSAFE TYPE	FAIL VALUE	
	FAIL SAFE VALUE	0	
	FLOW ALARM HYS	0	
FLOW SIMUL MENU	SIMULATE	OFF	
	SIMUL. VALUE	0	
TEMP MEAS MENU	TEMP UNIT	°C	
	TEMP FILTER TIME	0.2 s	
	TEMP OFFSET	0	
	RANGE END VALUE	400 °C	
	RANGE MIN VALUE	-40 °C	

Continuation next page

MEAS DATA MENU	Submenu level 2	Factory setting	Customer setting
TEMP ALARM MENU	TEMP ALARM HIGH	400 °C	
	TEMP WARNING HIGH	400 °C	
	TEMP WARNING LOW	-40 °C	
	TEMP ALARM LOW	-40 °C	
	TEMP FAILSAFE TYPE	FAIL VALUE	
	FAIL SAFE VALUE	0	
	TEMP ALARM HYS	0	
TEMP SIMUL MENU	SIMULATE	OFF	
	SIMUL VALUE	0	
TOTAL MEAS MENU	TOTAL VALUE	Acc. to char.curve (cal.cert.)	
	TOTAL PRESET VALUE	0	
	TOTAL FAIL MODE	RUN	
TOTAL ALARM MENU	TOTAL ALARM ON/OFF	OFF	
	TOTAL ALARM HIGH	9,999,999	
	TOTAL WARNING HIGH	9,999,999	

EXTERNAL I/O MENU	Submenu level 2	Factory setting	Customer setting
CURRENT OUT MENU	CURRENT FUNCTION	4 ... 20 mA (HART)	
	CURRENT MODE	ON	
	CURRENT FIXED VALUE	4 mA	
	CURRENT ALARM	MAXIMUM	
OUTPUT 1 MENU	OUT 1 FUNCTION	AUS	
	OUT 1 CONNECTION	FLOW	
	OUT 1 MIN FREQ	1 Hz	
	OUT 2 MAX FREQ	1500 Hz	
	OUT 1 PULSE VALUE	1 kg (or corresp. Vol.)	
	OUT 1 PULSE LENGTH	020 ms	
	OUT 1 PULSE PLRTY	TIEF	
OUTPUT 2 MENU	AUS 2 FUNKTION	OFF	
	AUS 2 ANBINDUNG	FLOW	
	AUS 2 FREQ MIN	1 Hz	
	AUS 2 FREQ MAX	1500 Hz	
	AUS 2 IMPULSWERT	1 kg (or corresp. Vol.)	
	AUS 2 IMPULSLAENGE	020 ms	
	AUS 2 POLARITAET	LOW	
INPUT 1 MENU	INPUT 1 FUNCTION	OFF	
	INPUT 1/2 POLARITY	HIGH	
INPUT 2 MENU	INPUT 2 FUNCTION	OFF	
	INPUT 1/2 POLARITY	HIGH	

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