**HART[[1]](#footnote-1)® Field Device Specification:**

Clark Reliance Jerguson JMT

Document Jerguson-FI-JMT-Lit-18, rev. A

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# Introduction

## Scope

The Jerguson JMT Series Magnetostrictive Transmitter, revision 1, complies with HART Protocol Revision 7.0. This document specifies all the device specific features and documents HART Protocol implementation details (e.g., the Engineering Unit Codes supported). 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.

## Purpose

This specification is designed to complement other documentation (e.g., the JMT Series Magnetostrictive Transmitter IOM) by providing a complete, unambiguous description of this Field Device from a HART Communication perspective

## Who should use this document?

The specification is designed to be a technical reference for HART capable Host Application Developers, System Integrators and knowledgeable End Users. It also provides functional specifications (e.g., commands, enumerations and performance requirements) used during Field Device development, maintenance and testing. This document assumes the reader is familiar with HART Protocol requirements and terminology.

## Abbreviations and definitions

|  |  |
| --- | --- |
| **ADC** | Analog to Digital Converter |
| **CPU** | Central Processing Unit (of microprocessor) |
| **DAC** | Digital to Analog Converter |
| **EEPROM** | Electrically-Erasable Read-Only Memory |
| **Ni120** | 120-ohm Nickel (temperature sensor) |
| **Pt100** | 100-ohm Platinum (temperature sensor) |
| **ROM** | Read-Only Memory |
| **RTD** | Resistance Temperature Detector |

## References

*HART Smart Communications Protocol Specification*. HCF\_SPEC-12. Available from the HCF.

*JMT Series Magnetotrictive Transmitter IOM*

# Device Identification

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | |  |  |  |  |  |  |
| **Manufacturer Name:** | The Clark-Reliance Corp. | | | | **Model Name(s):** | Jerguson JMT | | |  |
| **Manufacture ID Code:** | 24800 | | 60E0 Hex | | **Device Type Code:** | 58266 | E39A Hex | |  |
|  |  | |  |  |  |  |  |  |  |
| **HART Protocol Revision** | 7.0 | | |  | **Device Revision:** | 1 | |  |  |
| **Number of Device Variables** | 4 | | |  |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |  |
| **Physical Layers Supported** | FSK | | |  |  |  |  |  |  |
| **Physical Device Category** | Transmitter, Non-DC-isolated Bus Device | | | | |  |  |  |  |
|  |  |  | |  |  |  |  |  |  |

# Product Overview

The JMT™ Series Magnetostrictive Transmitter is a cosmic leap forward in features and versatility. Utilizing Jerguson’s patent pending signal capture technology, the JMT features unsurpassed signal to noise ratio. When installed with the Jerguson Magnicator®’s unique magnetic field, the JMT can be mounted on almost any chamber combination, including Schedule 160, without sacrificing reliability. The dual-entry enclosure allows for safe access to the HMI where information can be had with a single touch of the button including current level information, settings, and a LIVE graph showing you the real-time waveform. The JMT is designed to work and be fully configurable with generic HART®. Every aspect of the JMT has been developed for ease of installation, setup, and connectivity. Just like our wide range of reliable flag indicators, floats, and switches, the JMT adds continuous level control you can trust from Jerguson.

# Product Interfaces

## Process Interface

### Sensor Input Channels

A level probe is internally connected to the device from the factory. No user intervention is necessary for the input.

## Host interface

### Analog Output 1: Any Device Variable

The two-wire 4-to-20mA current loop is connected on two terminals marked "0" and "1". Refer to the Installation Manual for connection details.

## Local Interfaces, Jumpers and Switches

### Local Controls and Displays

An LCD display and set of keys facilitate programming at the device. Please reference the User Guide for further information.

### Jumpers and Switches

***Write Protection***

A jumper on the front of the instrument provides a write-protect function. When the jumper is absent, "write" and "command" commands are disabled. Refer to the Installation Manual for details. See also Section 12.10.

# Device Variables

|  |  |  |
| --- | --- | --- |
| Device Variable # | Variable | Units |
| 0 | Media Level | Level Units (see table below) |
| 1 | Ullage Level | Level Units (see table below) |
| 2 | CPU Temperature | °F, °C |
| 3 | Interface Level | Level Units (see table below) |

# Dynamic Variables

Four Dynamic Variables are implemented.

|  |  |  |
| --- | --- | --- |
|  | **Meaning** | **Units** |
| PV | Primary Value, can be set to any of the device variables | Follows selected device variable units |
| SV | Secondary Value, can be set to any of the device variables | Follows selected device variable units |
| TV | Tertiary Value, can be set to any of the device variables | Follows selected device variable units |
| QV | Quadranary Value, can be set to any of the device variables | Follows selected device variable units |

# Status Information

## Device Status

Bit 4 ("More Status Available") is set whenever any failure is detected. Command #48 gives further detail. (See Section 7.2.)

## Additional Device Status (Command #48)

Command #48 returns 2 bytes of data, with the following status information:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Byte** | **Bit** | **Meaning** | **Class** | **Device Status  Bits Set** |
| 0 | 0 | ROM checksum error | Error | 4,7 |
| 1 | EEPROM checksum error | Error | 4,7 |
| 2 | RAM test failure | Error | 4,7 |
| 3 | CPU test failure | Error | 4,7 |
| 4 | DAC failure | Error | 4,7 |
| 5 | ADC failure | Error | 4,7 |
| 6 | Watchdog time-out | Error | 4,7 |
| 7 | Not used |  |  |
| 1 | 0 | External sensor open circuit | Error | 4,7 |
| 1 | Not used |  |  |
| 2 | Not used |  |  |
| 3 | Not used |  |  |
| 4 | Not used |  |  |
| 5 | Not used |  |  |
| 6 | Not used |  |  |
| 7 | Not used |  |  |

"Not used" bits are always set to 0.

All bits used in this transmitter indicate device or sensor failure, and therefore also set bit 7 and bit 4 of the Device Status byte.

These bits are set or cleared by the self-test executed at power up or following a reset or self-test command. They are also set (but not cleared) by any failure detected during continuous background self-testing.

# Universal Commands

All Universal Commands are supported.

# Common-Practice Commands

## Supported Commands

The following common-practice commands are implemented:

33 Read Device Variables

34 Write Primary Variable Damping Value

35 Write Range Values

36 Set Primary Variable Upper Range Value

37 Set Primary Variable Lower Range Value

40 Enter/Exit Fixed Current Mode

41 Perform Self-Test

42 Perform Device Reset

43 Set Primary Variable Zero

44 Write Primary Variable Units

45 Trim Loop Current Zero

46 Trim Loop Current Gain (Full Scale)

47 Write Primary Variable Transfer Function

49 Write Primary Variable Transducer Serial Number

50 Reset Dynamic Variable Assignments

51 Write Dynamic Variable Assignments

52 Set Device Variable Zero

53 Write Device Variable Units

54 Read Device Variable Information

55 Write Device Variable Damping Value

56 Write Device Variable Transducer Serial Number

59 Write Number of Preambles

71 Lock Device

72 Squawk

73 Find Device

76 Read Lock Device Status

79 Write Device Variable To a fixed value

80 Read Device Variable Trim Points

81 Read Device Variable Trim Guidelines

82 Write Device Variable Trim Point

83 Reset Device Variable Trim

89 Set Real Time Clock

90 Read Real Time Clock

95 Read Device Communication Statistics

100 Write Primary Variable Alarm Code

523 Read Condensed Status Mapping Array

526 Write Status Simulation Mode

527 Simulate Status Bit

524 Write Condensed Status Mapping

525 Reset Condensed Status Map

2816 Read Level Status

2817 Read Level Family Capability

2818 Read Level Family Device Variable Codes

2819 Read Level Family Variable Classification

2820 Read Level Family Device Variable Value

2821 Read Level Family Internal Variable Value

2822 Read Sensor Settings Value

2823 Read Level Settings Values

2824 Read Level Settings Alarm Limits

2825 Read Level Settings Distance Settings

2826 Read Calibration Point

2827 Read Calibration Information

2944 Write Sensor Offset

2945 Write Sensor Compensation

2946 Write Distance Set Distance Unit

2947 Write Distance Set Blocking

2948 Write Distance Set Measurement Distance

2949 Write Level Settings Alarm Limits

2950 Write Level Settings Trim (Wet Cal)

2951 Write Level Settings Level Offset

2952 Write Calibration Point (Dry Cal)

2953 Write Ullage Reference Point

## Burst Mode

This Field Device does not support Burst Mode.

## Catch Device Variable

This Field Device does not support Catch Device Variable.

# Device-Specific Commands

The following device-specific commands are implemented:

## Command #128: Read Factory Calibration Data

Read factory calibration data.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
|  |  |  |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | ExcitationPulseWidth |
| 4 | INTEGER | NotUsedByte |
| 5 | ENUMERATED | FloatType |
| 6 | ENUMERATED | Loop420mA |
| 7 | ENUMERATED | SensorLocation |
| 8-11 | INTEGER | HoldLastValueTime |
| 12-15 | FLOAT | FactoryCalLevelPointA |
| 16-19 | FLOAT | FactoryCalLevelPointB |
| 20-23 | FLOAT | FactorySensorPointA |
| 24-27 | FLOAT | FactorySensorPointB |
| 28-31 | FLOAT | CustomerCalLevelPointA |
| 32-35 | FLOAT | CustomerCalLevelPointB |
| 36-39 | FLOAT | CustomerCalSensorPointA |
| 40-43 | FLOAT | CustomerCalSensorPointB |
| 44-47 | FLOAT | Factory420mAm |
| 48-51 | FLOAT | Factory420mAb |
| 52-55 | FLOAT | Factory420mAm1 |
| 56-59 | FLOAT | Factory420mAb1 |
| 60-63 | FLOAT | Customer420mAm |
| 64-67 | FLOAT | Customer420mAb |
| 68-71 | FLOAT | Customer420mAm1 |
| 72-75 | FLOAT | Customer420mAb1 |
| 76-79 | FLOAT | FloatBlockingDistance |
| 80-83 | FLOAT | MaxCPUTemperature |
| 84 | INTEGER | BornOnDay |
| 85 | INTEGER | BornOnMonth |
| 86 | INTEGER | BornOnYear |
| 87-90 | FLOAT | FactorySensorLength |
| 91-94 | UNSIGNED | BlockingState |
| 95-98 | INTEGER | NumFactoryCalAttempts |
| 99-102 | ENUMERATED | Factory2PtCalEnabled |
| 103-106 | ENUMERATED | Customer2PtCalEnabled |
| 107-110 | FLOAT | SensorUsToInFactor |
| 111-120 | ASCII | SerialNumber |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |

## Command #129: Write Factory Calibration Data

Write factory calibration data.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | ExcitationPulseWidth |
| 4 | INTEGER | NotUsedByte |
| 5 | ENUMERATED | FloatType |
| 6 | ENUMERATED | Loop420mA |
| 7 | ENUMERATED | SensorLocation |
| 8-11 | INTEGER | HoldLastValueTime |
| 12-15 | FLOAT | FactoryCalLevelPointA |
| 16-19 | FLOAT | FactoryCalLevelPointB |
| 20-23 | FLOAT | FactorySensorPointA |
| 24-27 | FLOAT | FactorySensorPointB |
| 28-31 | FLOAT | CustomerCalLevelPointA |
| 32-35 | FLOAT | CustomerCalLevelPointB |
| 36-39 | FLOAT | CustomerCalSensorPointA |
| 40-43 | FLOAT | CustomerCalSensorPointB |
| 44-47 | FLOAT | Factory420mAm |
| 48-51 | FLOAT | Factory420mAb |
| 52-55 | FLOAT | Factory420mAm1 |
| 56-59 | FLOAT | Factory420mAb1 |
| 60-63 | FLOAT | Customer420mAm |
| 64-67 | FLOAT | Customer420mAb |
| 68-71 | FLOAT | Customer420mAm1 |
| 72-75 | FLOAT | Customer420mAb1 |
| 76-79 | FLOAT | FloatBlockingDistance |
| 80-83 | FLOAT | FactorySensorLength |
| 84-87 | UNSIGNED | BlockingState |
| 88-91 | INTEGER | NumFactoryCalAttempts |
| 92-95 | ENUMERATED | Factory2PtCalEnabled |
| 96-99 | ENUMERATED | Customer2PtCalEnabled |
| 100-103 | FLOAT | SensorUsToInFactor |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | ExcitationPulseWidth |
| 4 | INTEGER | NotUsedByte |
| 5 | ENUMERATED | FloatType |
| 6 | ENUMERATED | Loop420mA |
| 7 | ENUMERATED | SensorLocation |
| 8-11 | INTEGER | HoldLastValueTime |
| 12-15 | FLOAT | FactoryCalLevelPointA |
| 16-19 | FLOAT | FactoryCalLevelPointB |
| 20-23 | FLOAT | FactorySensorPointA |
| 24-27 | FLOAT | FactorySensorPointB |
| 28-31 | FLOAT | CustomerCalLevelPointA |
| 32-35 | FLOAT | CustomerCalLevelPointB |
| 36-39 | FLOAT | CustomerCalSensorPointA |
| 40-43 | FLOAT | CustomerCalSensorPointB |
| 44-47 | FLOAT | Factory420mAm |
| 48-51 | FLOAT | Factory420mAb |
| 52-55 | FLOAT | Factory420mAm1 |
| 56-59 | FLOAT | Factory420mAb1 |
| 60-63 | FLOAT | Customer420mAm |
| 64-67 | FLOAT | Customer420mAb |
| 68-71 | FLOAT | Customer420mAm1 |
| 72-75 | FLOAT | Customer420mAb1 |
| 76-79 | FLOAT | FloatBlockingDistance |
| 80-83 | FLOAT | FactorySensorLength |
| 84-87 | UNSIGNED | BlockingState |
| 88-91 | INTEGER | NumFactoryCalAttempts |
| 92-95 | ENUMERATED | Factory2PtCalEnabled |
| 96-99 | ENUMERATED | Customer2PtCalEnabled |
| 100-103 | FLOAT | SensorUsToInFactor |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |
| 2 | Error | Invalid request data |
| 5 | Error | Too few request data bytes |
| 7 | Error | In write protect mode |

## Command #130: Read Gain Pot Settings

Read Gain Pot Settings.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
|  |  |  |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-1 | UNSIGNED | GainPotChannel1 |
| 2-3 | UNSIGNED | GainPotChannel2 |
| 4-5 | UNSIGNED | GainPot1Channel3 |
| 6-7 | UNSIGNED | GainPot2Channel3 |
| 8-11 | FLOAT | TriggerVoltage |
| 12-15 | FLOAT | MinTriggerWidth |
| 16-19 | FLOAT | UllageValue |
| 20-23 | FLOAT | CalibrationCounts |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |

## Command #131: Write Gain Pot Settings

Write Gain Pot Settings.

#### Request Data Bytes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Byte** | **Format** | **Description** | | |
| 0-1 | UNSIGNED | | GainPotChannel1 |
| 2-3 | UNSIGNED | | GainPotChannel2 |
| 4-5 | UNSIGNED | | GainPot1Channel3 |
| 6-7 | UNSIGNED | | GainPot2Channel3 |
| 8-11 | FLOAT | | TriggerVoltage |
| 12-15 | FLOAT | | MinTriggerWidth |
| 16-19 | FLOAT | | UllageValue |
| 20-23 | FLOAT | | CalibrationCounts |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-1 | UNSIGNED | GainPotChannel1 |
| 2-3 | UNSIGNED | GainPotChannel2 |
| 4-5 | UNSIGNED | GainPot1Channel3 |
| 6-7 | UNSIGNED | GainPot2Channel3 |
| 8-11 | FLOAT | TriggerVoltage |
| 12-15 | FLOAT | MinTriggerWidth |
| 16-19 | FLOAT | UllageValue |
| 20-23 | FLOAT | CalibrationCounts |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |
| 2 | Error | Invalid request data |
| 5 | Error | Too few request data bytes |
| 7 | Error | In write protect mode |

## Command #132: Read Rate of Change Filter Settings

Read Rate of Change Filter Settings.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
|  |  |  |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | RateofChangeUser |
| 4-7 | FLOAT | RateofChangeTimeLimit |
| 8-11 | FLOAT | OversamplingTime |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |

## Command #133: Write Rate of Change Filter Settings

Write Rate of Change Filter Settings.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | RateofChangeUser |
| 4-7 | FLOAT | RateofChangeTimeLimit |
| 8-11 | FLOAT | OversamplingTime |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-3 | FLOAT | RateofChangeUser |
| 4-7 | FLOAT | RateofChangeTimeLimit |
| 8-11 | FLOAT | OversamplingTime |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |
| 2 | Error | Invalid request data |
| 5 | Error | Too few request data bytes |
| 7 | Error | In write protect mode |

## Command #135: Write Factory and Customer URV LRV

Write Factory and Customer URV LRV.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0 | ENUMERATED | HartLengthUnitCode |
| 1-4 | FLOAT | SetURV |
| 5-8 | FLOAT | SetLRV |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0 | ENUMERATED | HartLengthUnitCode |
| 1-4 | FLOAT | SetURV |
| 5-8 | FLOAT | SetLRV |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |
| 2 | Error | Invalid request data |
| 5 | Error | Too few request data bytes |
| 7 | Error | In write protect mode |

## Command #142: Write Unique ID and Born On Date

Writes a unique id, serial number, born on date, and other specific settings.

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-2 | ASCII | UniqueIdentifier |
| 3 | INTEGER | BornOnDay |
| 4 | INTEGER | BornOnMonth |
| 5 | INTEGER | BornOnYear |
| 6 | ENUMERATED | DualFloatInstalled |
| 7-14 | ASCII | DevicePassword |
| 15-18 | FLOAT | MaxCPUTemperature |
| 19-28 | ASCII | SerialNumber |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-2 | ASCII | UniqueIdentifier |
| 3 | INTEGER | BornOnDay |
| 4 | INTEGER | BornOnMonth |
| 5 | INTEGER | BornOnYear |
| 6 | ENUMERATED | DualFloatInstalled |
| 7-14 | ASCII | DevicePassword |
| 15-18 | FLOAT | MaxCPUTemperature |
| 19-28 | ASCII | SerialNumber |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |

## Command #146: Read Factory Calibration Sensor Data

Reads factory calibration sensor data

#### Request Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
|  |  |  |

#### Response Data Bytes

|  |  |  |
| --- | --- | --- |
| **Byte** | **Format** | **Description** |
| 0-1 | INTEGER | DetectedSignalCount |
| 2-5 | FLOAT | MedialLevelInInches |
| 6-9 | FLOAT | MediaLevelMicroseconds |
| 10-13 | FLOAT | MediaLevelDampedInInches |

##### Command-Specific Response Codes

| **Code** | **Class** | **Description** |
| --- | --- | --- |
| 0 | Success | No Command-Specific Errors |

# Tables

## Level Units

(subset of HART Common Table 2, Unit Codes)

|  |  |
| --- | --- |
| 44 | Feet |
| 45 | Meters |
| 47 | Inches |
| 48 | Centimeters |
| 49 | Millimeters |
| 151 | Ft-16 |

## Temperature Unit Codes

(subset of HART Common Table 2, Unit Codes)

|  |  |
| --- | --- |
| 32 | degrees Celsius |
| 33 | degrees Fahrenheit |

# Performance

## Power-Up

On power up, the transmitter starts a self-test procedure (see section 12.4) which runs continuously during operation.

## Reset

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

## Self-Test

The self-test procedure is started at power up and runs continuously.

This process continuously checks:

* Program checksums.
* User configured data checksums.
* Health of all other tasks.
* Stack check.
* All measurements for validity
* All data communications between 4-20 mA output chip and CPU.
* Low or high loop voltage.
* Low or high loop current compared to setpoint.

Initial faults hold last good value for a user specified time then place the device in 4-20 mA failsafe, along with digital reporting, until the fault clears.

## Command Response Times

|  |  |
| --- | --- |
| Minimum | 10ms |
| Typical | 20ms |
| Maximum | 100ms |

## Busy and Delayed-Response

Delayed-response is not used.

## Long Messages

The largest data field used is in the response to Command 128: 122 bytes including the two status bytes.

## Non-Volatile Memory

EEPROM is used to hold the device’s configuration parameters. New data is written to this memory immediately on execution of a write command.

## Modes

Fixed current mode is implemented, using Command 40. This mode is cleared by power loss or reset.

## Write Protection

Write-protection is provided, selected by a jumper on the front of the device (see Section 4.3.2). When the jumper is present, all commands are available. When the jumper is absent, no "write" or "command" commands are accepted.

## Damping

Damping is standard, affecting only the PV and the loop current signal.

1. Capability Checklist

|  |  |
| --- | --- |
| Manufacturer, model and revision | Clark Reliance, Jerguson JMT, rev. 0 |
| Device type | Transmitter |
| HART revision | 7.0 |
| Device Description available | Yes |
| Number and type of sensors | 2 (one external, one internal) |
| Number and type of actuators | 0 |
| Number and type of host side signals | 1: 4 - 20mA analog |
| Number of Device Variables | 4 |
| Number of Dynamic Variables | 4 |
| Mappable Dynamic Variables? | Yes |
| Number of common-practice commands | 62 |
| Number of device-specific commands | 9 |
| Bits of additional device status | 8 |
| Alternative operating modes? | No |
| Burst mode? | No |
| Write-protection? | Yes |

1. ® HART is a registered trademark of the FieldComm Group [↑](#footnote-ref-1)