

Your Global Automation Partner

TURCK

LUS211-130...-LI2UPN8 Ultrasonic Level Sensors

IO-Link Parameters – IO-Link Version 1.1



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1 About This Manual

This manual describes the parameterization of devices using IO-Link. The manual contains general information on IO-Link and a list of the available parameters.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:



DANGER

DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.



WARNING

WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.



CAUTION

CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.



NOTICE

NOTICE indicates a situation which may lead to property damage if not avoided.



NOTE

NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.



CALL TO ACTION

This symbol denotes actions that the user must carry out.



RESULTS OF ACTION

This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheet
- Quick Start Guide
- Instructions for use

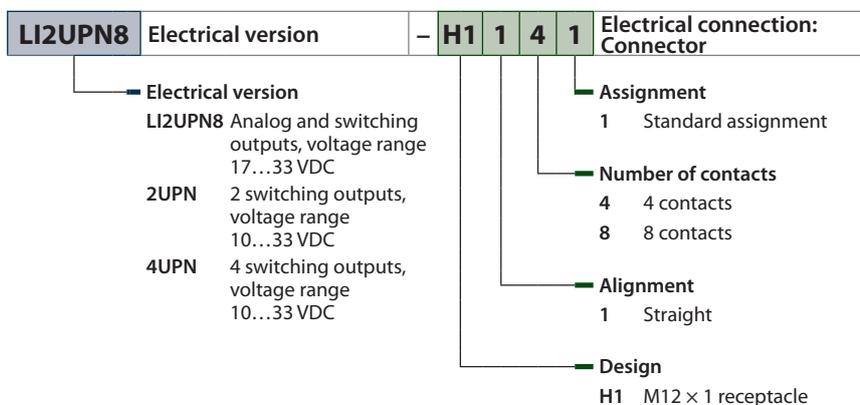
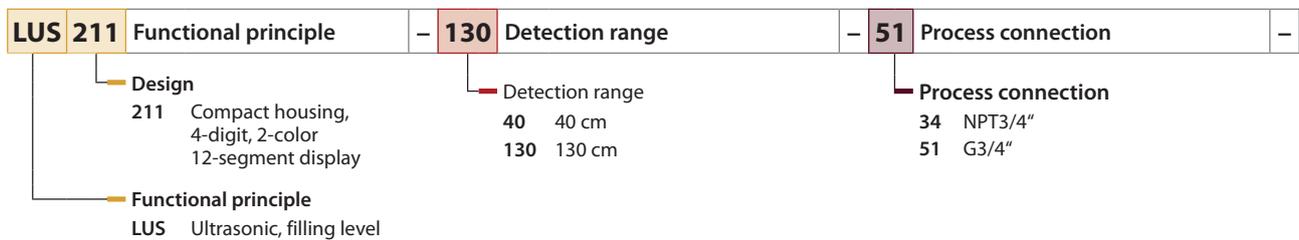
1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Notes on the Product

2.1 Product identification

LUS211 - 130 - 51 - LI2UPN8 - H1141



2.2 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▶ 41].

3 Software-Supported IO-Link Parameterization

The ports of the IO-Link master can be configured in IO-Link mode (IOL) or in Standard IO mode (SIO).

If a port is set to SIO mode, the IO-Link master at this port behaves like a normal digital input. The connected IO-Link device transfers its conventional switching output to the IO-Link master – no communication takes place between the device and the IO-Link master.

If the port is configured in IOL mode, the IO-Link master tries to wake the connected IO-Link device via the "Wake-up Request". If the master receives a response from the IO-Link device, both devices start to communicate with each other. The communication parameters are exchanged first of all; the cyclic data exchange of the process data (process data objects) then starts.

When IO-Link communication (IOL mode) is active, both a cyclic and acyclic communication service is available.

There are two ways of setting the parameters via IO-Link:

- via on-request data objects (e.g. close to the PLC via IO-Link function block)
- via tool-based engineering via FDT/DTM (e.g. PACTware with the use of DTM or the IODD)

Device parameters (on-request data objects)

Device parameters are exchanged acyclically and on request of the IO-Link master. The IO-Link master always sends a request to the device first, then the device responds. This applies when the data is written into the device and also when read from the device. On-request data objects (ORDO) enable parameter values to be written into the device (write) or device states to be read from the device (read).

IO-Link configuration in PROFINET

SIDI (Simple IO-Link Device Integration) enables IO-Link devices in PROFINET applications to be configured directly in the programming environment (e.g. TIA Portal). The Turck IO-Link devices are integrated in the GSDML file of the TBEN, TBPN and FEN20 series IO-Link masters and can be set in the programming environment as submodules of a modular I/O system. The user has access here to all device properties and parameters.

4 IO-Link Parameters

4.1 General parameters

| Parameter | Content |
|-----------------------|---|
| Vendor ID | 317 (0x13D) |
| Device ID | 327936 (0x50100) |
| IO-Link version | 1.1 |
| Bitrate | COM2 (38.4 kbit/s) |
| Minimum cycle time | 5 ms |
| SIO supported | True |
| M-Sequence Capability | PREOPERATE = TYPE_1_2 with 2 octets on-request data OPERATE = TYPE_2_V with 8 octets on-request data ISDU supported |
| Block Parameter | True |
| Data Storage | True |
| ProfileCharacteristic | Device Profile: Smart Sensor (0x0001) Function class: Device Identification (0x8000) |

4.2 Process input data

The internal process data can be multiplied by a factor of 0.0001 to calculate the distance value, level value and volume value. The conversion does not depend on the unit.

Process value in the set unit = $\text{ProcessDataIn} \times 0.0001$

The internal process data must be multiplied by a factor of 0.1 for the signal strength.

Signal strength in % = $\text{SignalStrength} \times 0.1$

| Name | Byte.Bit-Offset | Bit length | Subindex access supported | Data Type | Value | Description |
|----------------|-----------------|------------|---------------------------|-----------|----------------------------|--------------------------------|
| Process data | 0.4 | 28 | False | Integer | -19999999... +134217727 | |
| | | | | | 134217721 | Measurement value is filtered. |
| | | | | | 134217722 | Sensor muted |
| | | | | | 134217723 | Value underrun |
| | | | | | 134217724 | Value overrun |
| | | | | | 134217725 | Geometry error |
| | | | | | 134217726 | No target detected. |
| 134217727 | Internal Error | | | | | |
| Process data 1 | 0.1 | 1 | False | Boolean | False/true | |
| Process data 2 | 0.0 | 1 | False | Boolean | False/true | |

4.3 Standard parameters

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit-Offset | Bit length | Data Type | Value | Default | Description |
|-------------------------------|--------------|---------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|------------|---------------|-------------------------------------|
| Min Cycle Time | 0 | 0x0 | 3 | 0x3 | True | Read | 2.0 | 8 | UInteger | | | |
| IO-Link Version ID | 0 | 0x0 | 5 | 0x5 | True | Read | 4.0 | 8 | UInteger | | 17 | |
| Vendor ID 1 | 0 | 0x0 | 8 | 0x8 | True | Read | 7.0 | 8 | UInteger | | | |
| Vendor ID 2 | 0 | 0x0 | 9 | 0x9 | True | Read | 8.0 | 8 | UInteger | | | |
| Device ID 1 | 0 | 0x0 | 10 | 0xA | True | Read | 9.0 | 8 | UInteger | | | |
| Device ID 2 | 0 | 0x0 | 11 | 0xB | True | Read | 10.0 | 8 | UInteger | | | |
| Device ID 3 | 0 | 0x0 | 12 | 0xC | True | Read | 11.0 | 8 | UInteger | | | |
| Standard Command | 2 | 0x2 | 0 | 0x0 | True | Write | 0.0 | 8 | UInteger | 0... | | System command |
| | | | | | | | | | | 177 | | Device Reset |
| | | | | | | | | | | 128 | | Application Reset |
| | | | | | | | | | | 129 | | Restore Factory Settings |
| | | | | | | | | | | 130 | | Reset lowest recorded level |
| | | | | | | | | | | 160 | | Reset highest recorded level |
| | | | | | | | | | | 161 | | Mute Sensor |
| 176 | | Unmute Sensor | | | | | | | | | | |
| Parameter (write) Access Lock | 12 | 0xC | 1 | 0x1 | False | Read/write | 0.0 | 1 | Boolean | False/true | | Device access locks |
| Data Storage Lock | 12 | 0xC | 2 | 0x2 | False | Read/write | 0.1 | 1 | Boolean | False/true | | Device access locks |
| Local Parameterization Lock | 12 | 0xC | 3 | 0x3 | False | Read/write | 0.2 | 1 | Boolean | False/true | | Device access locks |
| Local User Interface Lock | 12 | 0xC | 4 | 0x4 | False | Read/write | 0.3 | 1 | Boolean | False/true | | Device access locks |
| Vendor Name | 16 | 0x10 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | Turck | Vendor name |
| Vendor Text | 17 | 0x11 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | www.turck.com | Additional manufacturer information |
| Product Name | 18 | 0x12 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | | Manufacturer's device designation |
| Product ID | 19 | 0x13 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | | ID |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit-Offset | Bit length | Data Type | Value | Default | Description |
|--------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|----------------------|---------|--------------------------|----------------------------|
| Product Text | 20 | 0x14 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | ultra-sonic level sensor | Device category |
| Serial Number | 21 | 0x15 | 0 | 0x0 | True | Read | 0.0 | 128 | String | | | Device serial number |
| Hardware Version | 22 | 0x16 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | | Hardware revision |
| Firmware Version | 23 | 0x17 | 0 | 0x0 | True | Read | 0.0 | 512 | String | | | Firmware revision |
| Application Specific Tag | 24 | 0x18 | 0 | 0x0 | True | Read/write | 0.0 | 256 | String | *** | | Any user generated content |
| Error Count | 32 | 0x20 | 0 | 0x0 | True | Read | 0.0 | 16 | UInteger | | | |
| Device Status | 36 | 0x24 | 0 | 0x0 | True | Read | 0.0 | 8 | UInteger | 0...255 | | |
| | | | | | | | | | | 0 | | Device is OK. |
| | | | | | | | | | | 1 | | Maintenance required |
| | | | | | | | | | | 2 | | Out of specification |
| | | | | | | | | | | 3 | | Functional check |
| | | | | | | | | | | 4 | | Failure |
| Detailed Device Status | 37 | 0x25 | 0 | 0x0 | False | Read | 0.0 | 152 | Array | | | |
| Process Data Input | 40 | 0x28 | 0 | 0x0 | True | Read | 0.0 | 32 | Process-DataIn Union | | | |

4.4 Parameters

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|-------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------------------|----------------|--|
| Function specific tag | 25 | 0x19 | 0 | 0x0 | True | Read/write | 0.0 | 256 | String | NaN ... NaN | *** | |
| Location specific tag | 26 | 0x1A | 0 | 0x0 | True | Read/write | 0.0 | 256 | String | NaN ... NaN | *** | |
| Operating hours | 72 | 0x48 | 0 | 0x0 | True | Read | 0.0 | 32 | UInteger | NaN ... NaN | | Total number of operating hours |
| Switching counter | 73 | 0x49 | 0 | 0x0 | True | Read | 0.0 | 32 | UInteger | NaN ... NaN | | Total number of switching cycles |
| Operating hours limit | 74 | 0x4A | 0 | 0x0 | True | Read/write | 0.0 | 32 | UInteger | NaN ... NaN | 10000 00 | Operating hours alert limit |
| Switching counter limit | 75 | 0x4B | 0 | 0x0 | True | Read/write | 0.0 | 32 | UInteger | NaN ... NaN | 10000 00000 | Alert limit for number of switching cycles |
| Output configuration 1 | 81 | 0x51 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...3 | 0 | Output function and switching logic |
| | | | | | | | | | | 0 | | Hysteresis mode, normally open |
| | | | | | | | | | | 1 | | Hysteresis mode, normally closed |
| | | | | | | | | | | 2 | | Windows mode, normally open |
| | | | | | | | | | | 3 | | Windows mode, normally closed |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|--------|----------------------------------|--|
| Output configuration 2 | 82 | 0x52 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...15 | 4 | Output function and switching logic |
| | | | | | | | | | | 0 | Hysteresis mode, normally open | |
| | | | | | | | | | | 1 | Hysteresis mode, normally closed | |
| | | | | | | | | | | 2 | Windows mode, normally open | |
| | | | | | | | | | | 3 | Windows mode, normally closed | |
| | | | | | | | | | | 4 | Auto (4...20 mA/ 0...10 V) | |
| | | | | | | | | | | 5 | 4...20 mA | |
| | | | | | | | | | | 6 | 0...20 mA | |
| | | | | | | | | | | 7 | 20...4 mA | |
| | | | | | | | | | | 8 | 20...0 mA | |
| | | | | | | | | | | 9 | 0...10 V | |
| | | | | | | | | | | 10 | 0...5 V | |
| | | | | | | | | | | 11 | 1...6 V | |
| | | | | | | | | | | 12 | 10...0 V | |
| | | | | | | | | | | 13 | 5...0 V | |
| | | | | | | | | | | 14 | 6...1 V | |
| 15 | 0.5...4.5 V | | | | | | | | | | | |
| PNP/NPN auto-detection | 83 | 0x53 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...2 | 2 | Switch polarity will be set according to connected load. |
| | | | | | | | | | | 0 | PNP | |
| | | | | | | | | | | 1 | NPN | |
| | | | | | | | | | | 2 | Auto | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|----------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|-----------------|---|
| Measurement quantity | 84 | 0x54 | 1 | 0x1 | False | Read/write | 0.0 | 8 | UInteger | 0...5 | 0 | |
| | | | | | | | | | | 0 | Distance | |
| | | | | | | | | | | 1 | Distance % | |
| | | | | | | | | | | 2 | Level | |
| | | | | | | | | | | 3 | Level % | |
| | | | | | | | | | | 4 | Volume | |
| 5 | Volume % | | | | | | | | | | | |
| Length unit | 84 | 0x54 | 2 | 0x2 | False | Read/write | 1.0 | 8 | UInteger | 0...3 | 0 | |
| | | | | | | | | | | 0 | Millimeters | |
| | | | | | | | | | | 1 | Meters | |
| | | | | | | | | | | 2 | Inches | |
| 3 | Feet | | | | | | | | | | | |
| Volume unit | 84 | 0x54 | 3 | 0x3 | False | Read/write | 2.0 | 8 | UInteger | 0...4 | 0 | |
| | | | | | | | | | | 0 | Liters | |
| | | | | | | | | | | 1 | Cubic meters | |
| | | | | | | | | | | 2 | Cubic inches | |
| | | | | | | | | | | 3 | Cubic feet | |
| 4 | Gallons | | | | | | | | | | | |
| Display actualization rate | 85 | 0x55 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...3 | 0 | Display update period |
| | | | | | | | | | | 0 | 50 ms | |
| | | | | | | | | | | 1 | 200 ms | |
| | | | | | | | | | | 2 | 600 ms | |
| 3 | Display off | | | | | | | | | | | |
| Output 1 : Errorstate | 86 | 0x56 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 0 | State of output switch 1 in case of error |
| | | | | | | | | | | 0 | Switch inactive | |
| | | | | | | | | | | 1 | Switch active | |
| Output 2 : Errorstate | 87 | 0x57 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 0 | State of output switch 2 in case of error |
| | | | | | | | | | | 0 | Switch inactive | |
| | | | | | | | | | | 1 | Switch active | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description | |
|------------|--------------|---------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|--|----------------|
| Virtual FH | 89 | 0x59 | 1 | 0x1 | False | Read/write | 0.0 | 28 | Integer | -1999 | 65000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | | | Value underrun |
| | | | | | | | | | | 7723 | | | |
| 13421 | | Value overrun | | | | | | | | | | | |
| 7724 | | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | | |
| 7725 | | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | | |
| 7726 | | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | | |
| 7727 | | | | | | | | | | | | | |
| Virtual FL | 89 | 0x59 | 2 | 0x2 | False | Read/write | 4.0 | 28 | Integer | -1999 | 97500 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | | | Value underrun |
| | | | | | | | | | | 7723 | | | |
| 13421 | | Value overrun | | | | | | | | | | | |
| 7724 | | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | | |
| 7725 | | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | | |
| 7726 | | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | | |
| 7727 | | | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|---------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|----------------------|---------------------|---|
| Display color | 90 | 0x5A | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...7 | 0 | Defines the display color and whether it should depend on switching states or levels. |
| | | | | | | | | | | 0 | Green | |
| | | | | | | | | | | 1 | Red | |
| | | | | | | | | | | 2 | Green Out 1 | |
| | | | | | | | | | | 3 | Red Out 1 | |
| | | | | | | | | | | 4 | Green Out 2 | |
| | | | | | | | | | | 5 | Red Out 2 | |
| | | | | | | | | | | 6 | Green Virtual | |
| 7 | Red Virtual | | | | | | | | | | | |
| Rotation of display | 91 | 0x5B | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 0 | Rotate the display to be readable from above. |
| | | | | | | | | | | 0 | 0° | |
| | | | | | | | | | | 1 | 180° | |
| SP/FH | 96 | 0x60 | 1 | 0x1 | False | Read/write | 0.0 | 28 | Integer | -1999 9999 ... | 65000 00 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| | | | | | | | | | | 13421 7725 | Geometry error | |
| | | | | | | | | | | 13421 7726 | No target detected. | |
| | | | | | | | | | | 13421 7727 | Internal Error | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description | |
|-------|--------------|---------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|--|----------------|
| rP/FL | 96 | 0x60 | 2 | 0x2 | False | Read/write | 4.0 | 28 | Integer | -1999 | 97500 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | 7723 | | Value underrun |
| | | | | | | | | | | 13421 | 7724 | | Value overrun |
| 13421 | 7725 | Geometry error | | | | | | | | | | | |
| 13421 | 7726 | No target detected. | | | | | | | | | | | |
| 13421 | 7727 | Internal Error | | | | | | | | | | | |
| SP/FH | 97 | 0x61 | 1 | 0x1 | False | Read/write | 0.0 | 28 | Integer | -1999 | 65000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | 7723 | | Value underrun |
| | | | | | | | | | | 13421 | 7724 | | Value overrun |
| 13421 | 7725 | Geometry error | | | | | | | | | | | |
| 13421 | 7726 | No target detected. | | | | | | | | | | | |
| 13421 | 7727 | Internal Error | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description | |
|------------|--------------|---------------------|------------------|------------------|---------------------------|----------------|------------------|------------|-----------|-------|---------|--|----------------|
| rP/FL | 97 | 0x61 | 2 | 0x2 | False | Read/ write | 4.0 | 28 | Integer | -1999 | 97500 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | 7723 | | Value underrun |
| | | | | | | | | | | 13421 | 7724 | | Value overrun |
| 13421 | 7725 | Geometry error | | | | | | | | | | | |
| 13421 | 7726 | No target detected. | | | | | | | | | | | |
| 13421 | 7727 | Internal Error | | | | | | | | | | | |
| Startpoint | 98 | 0x62 | 1 | 0x1 | False | Read/ write | 0.0 | 28 | Integer | -1999 | 13000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 00 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | 7723 | | Value underrun |
| | | | | | | | | | | 13421 | 7724 | | Value overrun |
| 13421 | 7725 | Geometry error | | | | | | | | | | | |
| 13421 | 7726 | No target detected. | | | | | | | | | | | |
| 13421 | 7727 | Internal Error | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description | |
|------------------------|--------------|---------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|--|----------------|
| Endpoint | 98 | 0x62 | 2 | 0x2 | False | Read/write | 4.0 | 28 | Integer | -1999 | 13000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | |
| | | | | | | | | | | 9999 | 000 | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | | | Value underrun |
| | | | | | | | | | | 7723 | | | |
| 13421 | | Value overrun | | | | | | | | | | | |
| 7724 | | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | | |
| 7725 | | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | | |
| 7726 | | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | | |
| 7727 | | | | | | | | | | | | | |
| Value at highest level | 105 | 0x69 | 0 | 0x0 | True | Read | 0.0 | 28 | Integer | -1999 | | Measurement value at highest filling level | |
| | | | | | | | | | | 9999 | | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | | | Value underrun |
| | | | | | | | | | | 7723 | | | |
| 13421 | | Value overrun | | | | | | | | | | | |
| 7724 | | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | | |
| 7725 | | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | | |
| 7726 | | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | | |
| 7727 | | | | | | | | | | | | | |
| Value at lowest level | 106 | 0x6A | 0 | 0x0 | True | Read | 0.0 | 28 | Integer | -1999 | | Measurement value at lowest filling level | |
| | | | | | | | | | | 9999 | | | |
| | | | | | | | | | | ... | | | |
| | | | | | | | | | | +1342 | | | |
| | | | | | | | | | | 17727 | | | |
| | | | | | | | | | | 13421 | | | Value underrun |
| | | | | | | | | | | 7723 | | | |
| 13421 | | Value overrun | | | | | | | | | | | |
| 7724 | | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | | |
| 7725 | | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | | |
| 7726 | | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | | |
| 7727 | | | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------------|---------|--|
| Damping (analog out) | 112 | 0x70 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...800 | 0 | Risetime and falltime (0%/90%) of analog output signal (suppress oscillation in control loops) Stepwise: 10 ms |
| Damping (switching) | 113 | 0x71 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...800 | 0 | Risetime and falltime (0%/90%) of analog output signal (suppress oscillation in control loops) Stepwise: 10 ms |
| Temperature compensation mode | 114 | 0x72 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 0 | Use internal temperature sensor or externally set temperature value. |
| | | | | | | | | | | 0 | | Internal temperature compensation |
| | | | | | | | | | | 1 | | External Temperature compensation |
| Temperature compensation value | 115 | 0x73 | 0 | 0x0 | True | Read/write | 0.0 | 16 | Integer | -250...+700 | 250 | Temperature value for external temperature compensation |
| Internal temperature value | 116 | 0x74 | 0 | 0x0 | True | Read | 0.0 | 16 | Integer | NaN...NaN | 0 | Internally measured temperature for temperature compensation. |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|-------------------|---------------------------------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------------|---------------------|---|
| Filter | 118 | 0x76 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...5 | 0 | Set length of moving average filter to 2 ⁿ |
| | | | | | | | | | | 0 | n = 1 | |
| | | | | | | | | | | 1 | n = 2 | |
| | | | | | | | | | | 2 | n = 4 | |
| | | | | | | | | | | 3 | n = 8 | |
| | | | | | | | | | | 4 | n = 16 | |
| 5 | n = 32 | | | | | | | | | | | |
| Output 1: dSP/dFH | 120 | 0x78 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | On switching delay/switching delay at FH Stepwise: 100 ms |
| Output 1: dRP/dFL | 121 | 0x79 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | Off switching delay/switching delay at FL Stepwise: 100 ms |
| Output 2: dSP/dFH | 122 | 0x7A | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | On switching delay/switching delay at FH Stepwise: 100 ms |
| Output 2: dRP/dFL | 123 | 0x7B | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | Off switching delay/switching delay at FL Stepwise: 100 ms |
| Update cycle time | 130 | 0x82 | 0 | 0x0 | True | Read | 0.0 | 16 | UInteger | NaN ... NaN | | Time between consecutive output updates |
| Tank geometry | 136 | 0x88 | 1 | 0x1 | False | Read/write | 0.0 | 8 | UInteger | 0...4 | 0 | |
| | | | | | | | | | | 0 | Vertical cylinder | |
| | | | | | | | | | | 1 | Horizontal cylinder | |
| | | | | | | | | | | 2 | Cone | |
| | | | | | | | | | | 3 | Sphere | |
| 4 | Volume/distance defined by user table | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|-----------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|--|--------------|--|
| Diameter | 136 | 0x88 | 2 | 0x2 | False | Read/write | 1.0 | 32 | UInteger | NaN ... NaN | 56418 95 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. |
| Dished bottoms | 136 | 0x88 | 3 | 0x3 | False | Read/write | 5.0 | 8 | UInteger | 0...1 0 1 | 0 | Flat ends Dished bottoms at both ends |
| Lowest filling level | 136 | 0x88 | 4 | 0x4 | False | Read/write | 6.0 | 28 | Integer | -1999 9999 ... +1342 17727 | 0 | Value underrun Value overrun Geometry error No target detected. Internal Error |
| Highest filling level | 136 | 0x88 | 5 | 0x5 | False | Read/write | 10.0 | 28 | Integer | -1999 9999 ... +1342 17727 | 11700 000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. Value underrun Value overrun Geometry error No target detected. Internal Error |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description | | | | | | | | | | |
|----------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|--|--|--|--|--|--|--|--|--|--|--|
| Sensor position | 136 | 0x88 | 6 | 0x6 | False | Read/write | 14.0 | 28 | Integer | -1999 | 13000 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | | | | | | | | | | |
| | | | | | | | | | | 9999 | 000 | | | | | | | | | | | |
| | | | | | | | | | | ... | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | |
| Length of cylindrical tank | 136 | 0x88 | 7 | 0x7 | False | Read/write | 18.0 | 28 | Integer | -1999 | 11700 | Measured value ÷ 10000 = Value in unit The values change if the unit is adjusted. | | | | | | | | | | |
| | | | | | | | | | | 9999 | 000 | | | | | | | | | | | |
| | | | | | | | | | | ... | | | | | | | | | | | | |
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| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------------------|--------------|---------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|----------------|
| Upper edge of cone | 136 | 0x88 | 8 | 0x8 | False | Read/write | 22.0 | 28 | Integer | -1999 | 0 | |
| | | | | | | | | | | 9999 | | |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 | | |
| | | | | | | | | | | 17727 | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| 13421 | | Value overrun | | | | | | | | | | |
| 7724 | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | |
| 7725 | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | |
| 7726 | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | |
| 7727 | | | | | | | | | | | | |
| Lower edge of cone | 136 | 0x88 | 9 | 0x9 | False | Read/write | 26.0 | 28 | Integer | -1999 | 0 | |
| | | | | | | | | | | 9999 | | |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 | | |
| | | | | | | | | | | 17727 | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| 13421 | | Value overrun | | | | | | | | | | |
| 7724 | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | |
| 7725 | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | |
| 7726 | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | |
| 7727 | | | | | | | | | | | | |
| Diameter at upper edge of cone | 136 | 0x88 | 10 | 0xA | False | Read/write | 30.0 | 28 | Integer | -1999 | 0 | |
| | | | | | | | | | | 9999 | | |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 | | |
| | | | | | | | | | | 17727 | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| 13421 | | Value overrun | | | | | | | | | | |
| 7724 | | | | | | | | | | | | |
| 13421 | | Geometry error | | | | | | | | | | |
| 7725 | | | | | | | | | | | | |
| 13421 | | No target detected. | | | | | | | | | | |
| 7726 | | | | | | | | | | | | |
| 13421 | | Internal Error | | | | | | | | | | |
| 7727 | | | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------------------|--------------|---------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|---|
| Diameter at lower edge of cone | 136 | 0x88 | 11 | 0xB | False | Read/write | 34.0 | 28 | Integer | -1999 | 0 | |
| | | | | | | | | | | 9999 | | |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 | | |
| | | | | | | | | | | 17727 | | |
| | | | | | | | | | | 13421 | 7723 | Value underrun |
| | | | | | | | | | | 13421 | 7724 | Value overrun |
| 13421 | 7725 | Geometry error | | | | | | | | | | |
| 13421 | 7726 | No target detected. | | | | | | | | | | |
| 13421 | 7727 | Internal Error | | | | | | | | | | |
| Signal strength | 137 | 0x89 | 0 | 0x0 | True | Read | 0.0 | 16 | UInteger | NaN | | Signal strength in relation to standard target. |
| Display unit | 138 | 0x8A | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 1 | |
| | | | | | | | | | | 0 | | Unit not displayed |
| | | | | | | | | | | 1 | | Unit displayed for 1 s after 4 s value. |
| Custom geometry height nodes | 139 | 0x8B | 0 | 0x0 | False | Read/write | 60.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| 13421 | 7723 | Value underrun | | | | | | | | | | |
| 13421 | 7724 | Value overrun | | | | | | | | | | |
| Custom geometry height nodes | 139 | 0x8B | 1 | 0x1 | False | Read/write | 56.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| 13421 | 7723 | Value underrun | | | | | | | | | | |
| 13421 | 7724 | Value overrun | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|----------------|
| Custom geometry height nodes | 139 | 0x8B | 2 | 0x2 | False | Read/write | 52.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| Custom geometry height nodes | 139 | 0x8B | 3 | 0x3 | False | Read/write | 48.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry height nodes | 139 | 0x8B | 4 | 0x4 | False | Read/write | 44.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry height nodes | 139 | 0x8B | 5 | 0x5 | False | Read/write | 40.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry height nodes | 139 | 0x8B | 6 | 0x6 | False | Read/write | 36.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry height nodes | 139 | 0x8B | 7 | 0x7 | False | Read/write | 32.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|----------------|
| Custom geometry height nodes | 139 | 0x8B | 8 | 0x8 | False | Read/write | 28.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| Custom geometry height nodes | 139 | 0x8B | 9 | 0x9 | False | Read/write | 24.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| Custom geometry height nodes | 139 | 0x8B | 10 | 0xA | False | Read/write | 20.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| Custom geometry height nodes | 139 | 0x8B | 11 | 0xB | False | Read/write | 16.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| Custom geometry height nodes | 139 | 0x8B | 12 | 0xC | False | Read/write | 12.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| Custom geometry height nodes | 139 | 0x8B | 13 | 0xD | False | Read/write | 8.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |
| Custom geometry height nodes | 139 | 0x8B | 13 | 0xD | False | Read/write | 8.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|----------------|
| Custom geometry height nodes | 139 | 0x8B | 14 | 0xE | False | Read/write | 4.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| Custom geometry height nodes | 139 | 0x8B | 15 | 0xF | False | Read/write | 0.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 0 | 0x0 | False | Read/write | 60.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 1 | 0x1 | False | Read/write | 56.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 2 | 0x2 | False | Read/write | 52.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 3 | 0x3 | False | Read/write | 48.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-----------------------|-------------------|-------------|
| Custom geometry volume nodes | 140 | 0x8C | 4 | 0x4 | False | Read/write | 44.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| Custom geometry volume nodes | 140 | 0x8C | 5 | 0x5 | False | Read/write | 40.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| Custom geometry volume nodes | 140 | 0x8C | 6 | 0x6 | False | Read/write | 36.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| Custom geometry volume nodes | 140 | 0x8C | 7 | 0x7 | False | Read/write | 32.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| Custom geometry volume nodes | 140 | 0x8C | 8 | 0x8 | False | Read/write | 28.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |
| Custom geometry volume nodes | 140 | 0x8C | 9 | 0x9 | False | Read/write | 24.0 | 32 | UInteger | 0... 13421 7724 | | |
| | | | | | | | | | | 13421 7723 | Value underrun | |
| | | | | | | | | | | 13421 7724 | Value overrun | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-------|---------|----------------|
| Custom geometry volume nodes | 140 | 0x8C | 10 | 0xA | False | Read/write | 20.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | |
| | | | | | | | | | | 7724 | | |
| Custom geometry volume nodes | 140 | 0x8C | 11 | 0xB | False | Read/write | 16.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 12 | 0xC | False | Read/write | 12.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 13 | 0xD | False | Read/write | 8.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 14 | 0xE | False | Read/write | 4.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |
| Custom geometry volume nodes | 140 | 0x8C | 15 | 0xF | False | Read/write | 0.0 | 32 | UInteger | 0... | | |
| | | | | | | | | | | 13421 | | Value underrun |
| | | | | | | | | | | 7723 | | Value overrun |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------|--------------|------------------------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|-----------|---------|--|
| Dynamic blind zone | 142 | 0x8E | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...255 | 0 | Increases the blindzone automatically up to nearly the last target position (0 = off). |
| Type of local menu | 143 | 0x8F | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...1 | 0 | Select the type of the sensors menu structure. |
| | | | | | | | | | | 0 | | Turck standard menue |
| | | | | | | | | | | 1 | | VDMA menue |
| Distance | 167 | 0xA7 | 1 | 0x1 | False | Read | 0.0 | 16 | UInteger | NaN...NaN | 0 | Raw distance measurement value |
| Signal strength | 167 | 0xA7 | 2 | 0x2 | False | Read | 2.0 | 16 | UInteger | NaN...NaN | 0 | Raw distance measurement value |
| IO-Link-Index | 168 | 0xA8 | 1 | 0x1 | True | Read | 0.0 | 16 | UInteger | 0...193 | 0 | Block transfer error details |
| | | | | | | | | | | 0 | | No error |
| | | | | | | | | | | 81 | | Configuration output 1 |
| | | | | | | | | | | 82 | | Configuration output 2 |
| | | | | | | | | | | 83 | | Polarity of switching outputs |
| | | | | | | | | | | 84 | | Units |
| | | | | | | | | | | 86 | | Errorstate output 1 |
| | | | | | | | | | | 87 | | Errorstate output 2 |
| | | | | | | | | | | 89 | | Display color setpoints |
| | | | | | | | | | | 90 | | Display color |
| | | | | | | | | | | 91 | | Rotation of display |
| 96 | | Setpoints output 1 | | | | | | | | | | |
| 97 | | Setpoints output 2 | | | | | | | | | | |
| 98 | | Analog start-point/end-point | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------|--------------|--------------|------------------|------------------|---------------------------|--------|------------------|------------|-----------|-------|---------|--|
| | | | | | | | | | | 112 | | Damping (analog) |
| | | | | | | | | | | 113 | | Damping (switching) |
| | | | | | | | | | | 114 | | Temperature compensation mode |
| | | | | | | | | | | 115 | | Temperature compensation value |
| | | | | | | | | | | 118 | | Filter |
| | | | | | | | | | | 120 | | On switching delay/switching delay at FH1 |
| | | | | | | | | | | 121 | | Off switching delay/switching delay at FL1 |
| | | | | | | | | | | 122 | | On switching delay/switching delay at FH1 |
| | | | | | | | | | | 123 | | Off switching delay/switching delay at FL2 |
| | | | | | | | | | | 128 | | Configuration output 3 |
| | | | | | | | | | | 129 | | Configuration output 4 |
| | | | | | | | | | | 131 | | Setpoints output 3 |
| | | | | | | | | | | 132 | | Setpoints output 4 |
| | | | | | | | | | | 133 | | Errorstate output 3 |
| | | | | | | | | | | 134 | | Errorstate output 4 |
| | | | | | | | | | | 136 | | Geometry |
| | | | | | | | | | | 138 | | Display unit |
| | | | | | | | | | | 139 | | Custom geometry: Height nodes |
| | | | | | | | | | | 140 | | Custom geometry: Volume nodes |

| Name | Index (dec.) | Index (hex.) | Sub- index (dec.) | Sub- index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------|-----------------|-----------------|-------------------------|-------------------------|---------------------------------|--------|------------------------|---------------|-----------|-------|---------|--|
| | | | | | | | | | | 142 | | Dynamic blindzone |
| | | | | | | | | | | 143 | | Menu mode |
| | | | | | | | | | | 144 | | Intensity filter mode |
| | | | | | | | | | | 145 | | Filter: max. amplitude |
| | | | | | | | | | | 146 | | Filter: min. amplitude |
| | | | | | | | | | | 148 | | Frontground suppression |
| | | | | | | | | | | 149 | | Background suppression |
| | | | | | | | | | | 177 | | Filter window |
| | | | | | | | | | | 178 | | Filter window mode |
| | | | | | | | | | | 179 | | On switching delay/switching delay at FH3 |
| | | | | | | | | | | 180 | | Off switching delay/switching delay at FL3 |
| | | | | | | | | | | 181 | | On switching delay/switching delay at FH4 |
| | | | | | | | | | | 182 | | Off switching delay/switching delay at FL4 |
| | | | | | | | | | | 192 | | Analog error delay (on) |
| | | | | | | | | | | 193 | | Analog error delay (off) |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|---------------|--------------|----------------------------|------------------|------------------|---------------------------|--------|------------------|------------|-----------|-------|---------|--|
| Error message | 168 | 0xA8 | 2 | 0x2 | True | Read | 2.0 | 16 | UInteger | 0... | 0 | Block transfer error details |
| | | | | | | | | | | 180 | 0 | No error |
| | | | | | | | | | | | 1 | Display brightness is to low. |
| | | | | | | | | | | | 2 | Display brightness is to high. |
| | | | | | | | | | | | 3 | Unknown display update rate |
| | | | | | | | | | | | 4 | Unknown display rotation setting |
| | | | | | | | | | | | 5 | Unknown display color setting |
| | | | | | | | | | | | 6 | Unknown value in the entry whether the unit of measurement should be displayed (DUNI). |
| | | | | | | | | | | | 7 | Unknown length unit |
| | | | | | | | | | | | 8 | Unknown volume unit |
| | | | | | | | | | | | 9 | Unknown measurement mode |
| | | | | | | | | | | | 30 | Unknown polarity setting |
| | | | | | | | | | | | 31 | Unknown output 1 switch mode |
| | 32 | Unknown output error state | | | | | | | | | | |
| | 33 | Output delay is to high. | | | | | | | | | | |
| | 34 | Unknown output 2 mode | | | | | | | | | | |
| | 35 | Unknown output 2 mode | | | | | | | | | | |
| | 36 | Unknown output 2 mode | | | | | | | | | | |

| Name | Index (dec.) | Index (hex.) | Sub- index (dec.) | Sub- index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------|-----------------|-----------------|-------------------------|-------------------------|---------------------------------|--------|------------------------|---------------|-----------|-------|---------|--|
| | | | | | | | | | | 37 | | Unknown output 2 mode |
| | | | | | | | | | | 38 | | A geometry error occurred at the switching point (SP). |
| | | | | | | | | | | 39 | | A geometry error occurred at the switching point (rP). |
| | | | | | | | | | | 40 | | The switching point rP is beyond the detection range limit. |
| | | | | | | | | | | 41 | | The distance between rP and SP is small. |
| | | | | | | | | | | 42 | | The switching point SP is too close to the sensor. |
| | | | | | | | | | | 43 | | The distance between ASP and AEP is too small. |
| | | | | | | | | | | 44 | | The switching point ASP is too close to the sensor. |
| | | | | | | | | | | 45 | | The switching point AEP is beyond the detection range limit. |
| | | | | | | | | | | 47 | | Output damping value is too large. |
| | | | | | | | | | | 60 | | Unknown menu type (Turck/VDMA) |
| | | | | | | | | | | 90 | | Lowest filling level is outside of detection range. |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|------|--------------|--------------|------------------|------------------|---------------------------|--------|------------------|------------|-----------|-------|---------|---|
| | | | | | | | | | | 91 | | Highest filling level is outside of detection range. |
| | | | | | | | | | | 92 | | The distance between highest and lowest filling level is too small. |
| | | | | | | | | | | 93 | | Tank diameter is smaller than highest filling level. |
| | | | | | | | | | | 95 | | Tank length is smaller than highest filling level. |
| | | | | | | | | | | 96 | | Unknown value for tank bottom |
| | | | | | | | | | | 97 | | Unknown value for tank shape |
| | | | | | | | | | | 98 | | Upper edge of conical tank is below lower edge (hTop < hBot). |
| | | | | | | | | | | 99 | | Height node in custom tank geometry is too small. |
| | | | | | | | | | | 120 | | Foreground suppression is too low. |
| | | | | | | | | | | 121 | | Foreground suppression is too high. |
| | | | | | | | | | | 122 | | Background suppression is too low. |
| | | | | | | | | | | 123 | | Background suppression is too high. |
| | | | | | | | | | | 124 | | Unknown signal amplitude filter mode |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|-----------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|----------------|--------------|---|
| | | | | | | | | | | 125 | | Minimum value for signal amplitude filter is to small. |
| | | | | | | | | | | 127 | | Minimum value for signal amplitude filter is to large. |
| | | | | | | | | | | 128 | | Minimum value for signal amplitude filter is to close the maximum filter value. |
| | | | | | | | | | | 129 | | Maximum value for signal amplitude filter is to small. |
| | | | | | | | | | | 130 | | Maximum value for signal amplitude filter is to large. |
| | | | | | | | | | | 131 | | Maximum value for signal amplitude filter is to close the minimum filter value. |
| | | | | | | | | | | 150 | | Unknown value for access locks |
| | | | | | | | | | | 151 | | Unknown IO-Link entry |
| | | | | | | | | | | 180 | | Frontend refused value |
| far point | 177 | 0xB1 | 1 | 0x1 | False | Read/write | 0.0 | 28 | Integer | -1999 9999 | 13000 000 | Filter window |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 17727 | | |
| | | | | | | | | | | 13421 7723 | | Value underrun |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|----------------|-------------|---|
| | | | | | | | | | | 13421 7724 | | Value overrun |
| | | | | | | | | | | 13421 7725 | | Geometry error |
| | | | | | | | | | | 13421 7726 | | No target detected. |
| | | | | | | | | | | 13421 7727 | | Internal Error |
| near point | 177 | 0xB1 | 2 | 0x2 | False | Read/write | 4.0 | 28 | Integer | -1999 9999 | 13000 00 | Filter window |
| | | | | | | | | | | ... | | |
| | | | | | | | | | | +1342 17727 | | |
| | | | | | | | | | | 13421 7723 | | Value underrun |
| | | | | | | | | | | 13421 7724 | | Value overrun |
| | | | | | | | | | | 13421 7725 | | Geometry error |
| | | | | | | | | | | 13421 7726 | | No target detected. |
| | | | | | | | | | | 13421 7727 | | Internal Error |
| Filter window mode | 178 | 0xB2 | 0 | 0x0 | True | Read/write | 0.0 | 8 | UInteger | 0...2 | 0 | Switch to error state for targets inside (bad) or outside the filter window (good). |
| | | | | | | | | | | 0 | | Off |
| | | | | | | | | | | 1 | | Filter Window "bad" |
| | | | | | | | | | | 2 | | Filter Window "good" |

| Name | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access | Byte. Bit Offset | Bit length | Data Type | Value | Default | Description |
|--------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|------------|---------|--|
| Analog error delay | 190 | 0xBE | 1 | 0x1 | False | Read | 1.0 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 2 | 0x2 | False | Read | 1.1 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 3 | 0x3 | False | Read | 1.2 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 4 | 0x4 | False | Read | 1.3 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 5 | 0x5 | False | Read | 1.4 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 6 | 0x6 | False | Read | 1.5 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 7 | 0x7 | False | Read | 1.6 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 8 | 0x8 | False | Read | 1.7 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 9 | 0x9 | False | Read | 0.0 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 10 | 0xA | False | Read | 0.1 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 11 | 0xB | False | Read | 0.2 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 12 | 0xC | False | Read | 0.3 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 13 | 0xD | False | Read | 0.4 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 14 | 0xE | False | Read | 0.5 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 15 | 0xF | False | Read | 0.6 | 1 | Boolean | False/true | False | |
| | 190 | 0xBE | 16 | 0x10 | False | Read | 0.7 | 1 | Boolean | False/true | False | |
| Analog error delay (on) | 192 | 0xC0 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | On switching delay/switching delay at FH |
| Analog error delay (off) | 193 | 0xC1 | 0 | 0x0 | True | Read/write | 0.0 | 16 | UInteger | 0...600 | 0 | On switching delay/switching delay at FH |
| Menu lock password | 2397 | 0x95D | 0 | 0x0 | True | Write | 0.0 | 16 | UInteger | NaN...NaN | 0 | Password to unlock sensor menu |

4.5 Events

| Code | Type | Name | Description |
|-------|--------------|--|--|
| 16384 | Error | Temperature fault | Overload |
| 16912 | Warning | Device temperature over-run | Clear source of heat. |
| 20480 | Error | Device hardware fault | Device Exchange |
| 20736 | Error | General power supply fault | Check availability. |
| 20752 | Warning | Primary supply voltage over-run | Check tolerance. |
| 20753 | Warning | Primary supply voltage under-run | Check tolerance. |
| 30480 | Error | Short circuit | Check installation. |
| 35856 | Warning | Process variable range over-run | Process data uncertain |
| 35888 | Warning | Process variable range under-run | Process data uncertain |
| 36001 | Error | Overload | |
| 36002 | Error | Underload | |
| 36003 | Error | The sensor was unable to perform autode- tection at output 2. | |
| 36006 | Notification | New maximum value recorded | |
| 36007 | Notification | New minimum value recorded | |
| 36009 | Error | Test event | |
| 36011 | Error | Test Event Error 1 | |
| 36015 | Error | Critical error | The sensor encountered a critical error and needs to be replaced. |
| 36016 | Warning | Operating hours limit was reached. | |
| 36017 | Warning | Switching counter limit was reached. | |
| 36048 | Warning | Display is unlocked. | |

5 Turck Subsidiaries - Contact Information

| | |
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