



PLC Integration ODS9_2167

IO - Link service data function block + process data parser function for Siemens S7-1200 / S7 - 1500 (TIA - Portal V15.1 or higher) PLC systems in combination with a PROFIBUS / PROFINET IO - Link Master

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1 Legal information

1.1 Disclaimer

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2 About this document

Please read this chapter carefully before working with this documentation and the Leuze IO-Link device.

2.1 Purpose of use

These instructions have been designed for the technical personnel for the use of the IO-Link PLC blocks.

These instructions are intended to provide support during the commissioning of a Leuze IO-Link sensor using standard software from Siemens. The described module is part of this standard software.

2.2 Target group

These instructions are addressed to programming engineers and the operators of machines and systems, which are operated by one or several IO-Link devices. They also address people, who connect the IO-Link device via an IO-Link-Master-Gateway to a PLC-Control for data exchange.

3 General use of function block

3.1 Short description

The function block "FB_Leuze_ODS9_2167" simplifies the usage of Leuze IO-Link devices on Siemens S7-1200/S7-1500 (TIA-Portal V15.1 or higher) PLC controls. This FB supports IO-Link Masters which can be connected via PROFIBUS / PROFINET to the PLC system.

The function block is device type-specific and thus only suitable for the appropriate Leuze IO-Link devices. The FB interprets the call-up of the acyclic service data between the PLC and the IO-Link device.

The IO-Link function block can only be used in combination with the listed helper functions / libraries.

3.2 Calling and designation

The module can be called as a single-instance.



Fig. 3.1: Example of module call with single instance

3.3 Configuration

Tab. 3.1: Parameter IN

| Parameter | Data type | Description |
|-----------|-----------|--|
| Execute | Bool | Positive trigger: Start data transfer |
| RW | Bool | Read or write the selected IO-Link parameter. FALSE: Read parameter TRUE: Write Parameter |
| Port | Int | Number of the master port the IO-Link device is connected, starting with 1. |
| HwID | HW_IO | Hardware IO-Address of the IO-Link master |
| Cap | DInt | Client access point of the IO-Link function (IO-LinkMaster specific). Siemens: 227 Weidmüller: 227 Other manufacturers: 255 |
| TimeOut | Time | Time, after a Timeout-Error is triggered. |

Tab. 3.2: Parameter INOUT

| Parameter | Data type | Description |
|------------|----------------------|-------------|
| DeviceData | Leuze_type_ODS9_2167 | Sensor data |

See structure description of Leuze_type_ODS9_2167 in chapter 7.

Tab. 3.3: Parameter OUT

| Parameter | Data type | Description |
|-------------|-------------------------|--|
| Done | Bool | Indicates whether data is valid. |
| Busy | Bool | Request in process. FALSE: Request is terminated TRUE: Request is being processed |
| Error | Bool | Error flag FALSE: No error TRUE: Error detected |
| ErrorCode | Leuze_type_lolError | Status of the function block |
| Diagnostics | LIOLink_typeDiagnostics | Detailed diagnostic information of the FB. See description of Siemens Library for IO-Link (LIOLink). |

See structure description of Leuze_type_lolError in chapter 6.

3.4 Method of function

The function block uses the data structure "FB_Leuze_ODS9_2167". The PLC data structure contains the values of all IO-Link variables. Before you can use it, the structure must be instantiated by a data block. Each IO-Link FB parameter has a data point representing it in this data structure. This data point will be actualized every time a read request was executed successfully.

The desired parameters can be selected via the input variables. Depending on the device definition, IO-Link parameters are read or writable. The input variable must be "RW" = FALSE to read parameter. The value that should be written can be defined in the data structure, as soon as the input parameter "RW" = TRUE. You start each transfer by calling up the "FB_Leuze_ODS9_2167" with a positive trigger at the "Execute" input. As long as there is no valid answer the output "Busy" is TRUE. In the case that the chosen timeout period has elapsed a timeout error will be generated and the thread will be terminated. The "Done" = TRUE output shows that the transmission was successful. The outputs retain there states as long as there is no new positive trigger at the "Execute" input again.

The function block allows you to read or write multiple IO-Link parameters sequentially (multiselection). Please note that it may happen, that a single parameter can not be written. The function block aborts at this point and it is possible, that the IO-Link device contains an inconsistent set of parameters.

3.5 Behavior when error occurs


An error bit (Error) is set and an error code (Leuze_type_lolError) generated, if there is a spurious input value or an incorrect input connection of the FB. In this case, no further processing is carried out, until the input has been corrected.

4 Integration into the PLC project

The function block "FB_Leuze_ ODS9_2167" is a part of the TIA-Portal library. To get all relevant blocks into your PLC project, please open the library as a "global" library. Afterwards, the library elements can be copied into the currently opened project.

Integration step by step:

- Downloading the library
- Open the library in the "global" library tab
- Including the blocks of the Leuze library into your project (code-blocks and data type)
- Compiling the PLC project

| NOTICE | |
|---|--|
|  | If several devices connect to the IO-Link Master, you can only exchange acyclic data (service data) with one device at the same time. Due this restriction, the service data communication blocks must to be blocked against each other. |

5 Process data parser function

The function FC_Leuze_PD_ODS9_2167 simplifies the interpretation of composed IO-Link process data. This data is provided as a data structure on the PLC side. Some sensors supports different process data output. User must select mode of PD according to the sensors settings. Each sensor connected to Leuze IO-Link master has its own hardware ID. See Fig. 5.2.

The function is device type-specific and thus only suitable for the appropriated Leuze IO-Link devices.

5.1 Calling and designation



Fig. 5.1: Example of process data parsing function call

5.2 Configuration

Tab. 5.1: Parameters

| Parameter name | Declaration | Data type | Description |
|----------------|-------------|-------------------------|---|
| HwID | INPUT | HW_IO | Hardware IO-Address of the IO-Link master (see HW-Configuration). For masters that do not use the Siemens PCT-Tool please use the HW IOAddress of the configured Master port. |
| RelByteOffset | INPUT | UINT | Relative start address of the IO-Link device on the IO-Link master port (see PCT-Tool -> Addresses -> Inputs Start). If the process date is mapped into a specified logical IO-Address, the relative byte offset = 0. |
| PDMode | INPUT | INT | Mode of the PD. User must select mode of PD according to the sensors settings. |
| ErrorCode | OUTPUT | WORD | Error code details see in the Siemens help system ("DPRD_DAT"). |
| RET_VAL | OUTPUT | Leuze_type_PD_ODS9_2167 | Reference to the instance of the data structure Leuze_type_PD_ODS9_2167. The structure includes the disaggregated values of the process data. |

See structure description of Leuze_type_PD_ODS9_2167 in chapter 7.



Fig. 5.2: Hardware ID for sensors connected to Leuze MD798 IO-Link master

6 Error description

The parameter "ErrorCode" can be interpreted using the PLC data type Leuze_type_IolError. This data type contains the following error information:

Tab. 6.1: Leuze_type_IolError description

| Parameter name | Data type | Description |
|---------------------|-----------|---|
| ErrorCode.status | Word | 16#0000–16#7FFF: Status of the FB, 16#8000–16#FFFF: Error codes |
| ErrorCode.iolMError | Word | IO-Link Master error (see IO-Link specification) |
| ErrorCode.iolError | Word | IO-Link error. Contains the IOL_Error_Code the IOL_Add_Error_Code (see IO-Link specification) and the device specific error codes |
| ErrorCode.isduIndex | Int | IO-Link Index (ISDU) to which the error code refers |

Tab. 6.2: Error description for status

| Error code (status) | Error description |
|---------------------|--|
| 0x0000 | Operation completed, no warning and no further details |
| 0x7000 | No operation in progress (initial value) |
| 0x7001 | First call after input of a new command (rising edge on "execute") |
| 0x7002 | Subsequent cal |
| 0x8001 | Time out error occurred |
| 0x8002 | No parameter selected |
| 0x8201 | Unsupported port |
| 0x8202 | Unsupported index |
| 0x8203 | Unsupported subindex |
| 0x8205 | The length at the "writeLen" parameter does not match the data record that will be written |
| 0x8401 | The IO-Link master has reported an error code, see "diagnostics" |
| 0x8402 | Received data record does not match operation |
| 0x8403 | Operation could not be completed in the specified time |
| 0x8600 | Internal state machine has reached an undefined state |
| 0x8601 | System function WRREC reports an error, see "diagnostics" |
| 0x8602 | System function RDREC reports an error, see "diagnostics" |

Tab. 6.3: Error description for ioLError

| Error code (ioLError) | Error description |
|-----------------------|---|
| 0x0000 | No error |
| 0x0001 ... 0x06FF | Reserved / Master specific |
| 0x7000 | Unexpected Write request instead of read request / Invalid response PDU |
| 0x7001 | Decode error |
| 0x7002 | Port occupied by another task |
| 0x7003 ... 0x7FFF | Reserved / Master specific |
| 0x8000 | Timeout when IOL-Devices or IOL-Master port are busy |
| 0x8001 | IO-Link index > 32767 |
| 0x8002 | Port address beyond defined maximum |
| 0x8003 | Port function not supported |
| 0x8004 | Reserved / Master specific |
| 0x8005 | Invalid length of the data that should be written (>232 / <1) |
| 0x8006 | Reserved / Master specific |
| 0x8007 | IO-Link subindex > 255 |
| 0x8008 ... 0x8051 | Reserved / Master specific |
| 0x8052 | Error during acyclic data access (FB RDREC error) |
| 0x8053 | Error during acyclic data access (FB WRREC error) |
| 0x8054 ... 0x8FFFF | Reserved / Master specific |

For additional information see the technical specification "IO-Link Integration Part 1" (www.profibus.com).

Tab. 6.4: Error description for ioLError

| Error code (ioLError) | Error description |
|-----------------------|------------------------------------|
| 0x0000 | No error |
| 0x1000 | Master communication error |
| 0x1100 | ISDU time out / Device event error |
| 0x5200 | Device checksum error |
| 0x5600 | Device checksum error |

| Error code (ioLError) | Error description |
|-----------------------|--|
| 0x5700 | Master ISDU illegal service |
| 0x5800 | Device error: Byte length does not fit to the chosen parameter |
| 0x8000 | The requested service has been refused by the device application |
| 0x8011 | Read write access to a not existing Index |
| 0x8012 | Read write access to a not existing sub index |
| 0x8020 | Parameter is not accessible for a read or write service due to the current state in the device |
| 0x8021 | Parameter is not accessible for a read or write service due to an ongoing local operation at the device |
| 0x8022 | Parameter is not accessible for a read or write service due to an remote triggered state of the device application |
| 0x8023 | Write service tries to access a read-only parameter |
| 0x8030 | Write service to a parameter outside its permitted range of values |
| 0x8031 | Write service to a parameter above its specified value range |
| 0x8032 | Write service to a parameter below its specified value range |
| 0x8033 | Write service to a parameter above its specified length |
| 0x8034 | Write service to a parameter below its predefined length |
| 0x8035 | Write service with a command value not supported by the device application |
| 0x8036 | Write service with a command value calling a device function not available due to the current state |
| 0x8040 | The value via single parameter transfer collide with other actual parameter settings |
| 0x8041 | Inconsistent parameter set (at least an ISDU cannot be written) |
| 0x8082 | The read or write service is refused due to a temporarily unavailable application |
| 0x8100 | Unspecified |
| 0x8101 ... 0x81FF | Device specific (see device description) |

For additional information see the specification "IO-Link Communication" (www.IO-Link.com).

7 Data structures

Tab. 7.1: Leuze_type_ ODS9_2167

| Parameter name | Data type | Description |
|--|-----------|--|
| DeviceData.Selection.Commands.DeviceReset | Bool | [WRITE_ONLY] Device Reset |
| DeviceData.Selection.Commands.ApplicationReset | Bool | [WRITE_ONLY] Application Reset |
| DeviceData.Selection.Commands.RestoreFactorySettings | Bool | [WRITE_ONLY] Restore Factory Settings |
| DeviceData.Selection.Commands.TeachSp1TeachOfDistantSetpoint | Bool | [WRITE_ONLY] Teach SP1 (Teach of distant setpoint) |
| DeviceData.Selection.Commands.TeachSp2TeachOfNearSetpoint | Bool | [WRITE_ONLY] Teach SP2 (Teach of near setpoint) |
| DeviceData.Selection.Commands.CustomTeachWindowTeachOfBothSetpoints | Bool | [WRITE_ONLY] Custom Teach: Window (Teach of both setpoints) |
| DeviceData.Selection.Commands.CustomTeachSp1aTeachOfAlternativeDistantSetpoint | Bool | [WRITE_ONLY] Custom Teach SP1a (Teach of alternative distant setpoint) |
| DeviceData.Selection.Commands.ClearDsUploadFlag | Bool | [WRITE_ONLY] Clear DS Upload Flag |
| DeviceData.Selection.Commands.SetDsUploadFlag | Bool | [WRITE_ONLY] Set DS Upload Flag |
| DeviceData.Selection.Commands.ActivationWithPriorityOverridingPdoutsTransducerDisableSignalOnlyInputFunctionsHaveAHigherPriority | Bool | [WRITE_ONLY] Activation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| DeviceData.Selection.Commands.DeactivationWithPriorityOverridingPdoutsTransducerDisableSignalOnlyInputFunctionsHaveAHigherPriority | Bool | [WRITE_ONLY] Deactivation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| DeviceData.Selection.Commands.ResetPriorityToUsePdoutsTransducerDisableSignalAgainOnlyInputFunctionsHaveAHigherPriority | Bool | [WRITE_ONLY] Reset priority to use PDout's transducer disable signal again. Only Input functions have a higher priority |
| DeviceData.Selection.Commands.TeachDistanceOfMinimumAnalogOutput | Bool | [WRITE_ONLY] Teach distance of minimum analog output |
| DeviceData.Selection.Commands.TeachDistanceOfMaximumAnalogOutput | Bool | [WRITE_ONLY] Teach distance of maximum analog output |
| DeviceData.Selection.Commands.TeachOffsetInOrderToAchieveThePresetValue | Bool | [WRITE_ONLY] Teach offset in order to achieve the preset value |
| DeviceData.Selection.DirectParameters1.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.DirectParameters1.All | Bool | [READ_WRITE] all parameters of complex data type |

| Parameter name | Data type | Description |
|--|-----------|--|
| DeviceData.Selection.DirectParameters1.Reserved_1 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.MasterCycleTime | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.MinCycleTime | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.MSequenceCapability | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.IoLinkVersionId | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.ProcessDataInputLength | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.ProcessDataOutputLength | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.VendorId1 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.VendorId2 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.DeviceId1 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.DeviceId2 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.DeviceId3 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.Reserved_13 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.Reserved_14 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters1.Reserved_15 | Bool | [READ_ONLY] |
| DeviceData.Selection.DirectParameters2.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter1 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter2 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter3 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter4 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter5 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter6 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter7 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter8 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter9 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter10 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter11 | Bool | [READ_WRITE] |

| Parameter name | Data type | Description |
|--|-----------|---|
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter12 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter13 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter14 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter15 | Bool | [READ_WRITE] |
| DeviceData.Selection.DirectParameters2.DeviceSpecificParameter16 | Bool | [READ_WRITE] |
| DeviceData.Selection.StandardCommand | Bool | [WRITE_ONLY] |
| DeviceData.Selection.DeviceAccessLocks.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.ProfileCharacteristic.All | Bool | [READ_ONLY] all parameters of complex data type |
| DeviceData.Selection.VendorName | Bool | [READ_ONLY] |
| DeviceData.Selection.VendorText | Bool | [READ_ONLY] |
| DeviceData.Selection.ProductName | Bool | [READ_ONLY] |
| DeviceData.Selection.ProductId | Bool | [READ_ONLY] |
| DeviceData.Selection.ProductText | Bool | [READ_ONLY] |
| DeviceData.Selection.SerialNumber | Bool | [READ_ONLY] |
| DeviceData.Selection.HardwareVersion | Bool | [READ_ONLY] |
| DeviceData.Selection.FirmwareVersion | Bool | [READ_ONLY] |
| DeviceData.Selection.ApplicationSpecificTag | Bool | [READ_WRITE] |
| DeviceData.Selection.FunctionTag | Bool | [READ_WRITE] |
| DeviceData.Selection.LocationTag | Bool | [READ_WRITE] |
| DeviceData.Selection.DeviceStatus | Bool | [READ_ONLY] |
| DeviceData.Selection.DetailedDeviceStatus.All | Bool | [READ_ONLY] all parameters of complex data type |
| DeviceData.Selection.TiSelect | Bool | [READ_WRITE] select teach channel, 0=SSC1, 1=SSC1, 2=SSC2, 255=all SSCs |
| DeviceData.Selection.TiResult.All | Bool | [READ_ONLY] all parameters of complex data type |
| DeviceData.Selection.Ssc1Param.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.Ssc1Config.All | Bool | [READ_WRITE] all parameters of complex data type |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Selection.Ssc2Param.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.Ssc2Config.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.Ssc1_Sp1a | Bool | [READ_WRITE] SSC1_SP1a |
| DeviceData.Selection.Ssc2_Sp1a | Bool | [READ_WRITE] SSC2_SP1a |
| DeviceData.Selection.Ssc1_Reserve | Bool | [READ_WRITE] SSC1_Reserve |
| DeviceData.Selection.Ssc2_Reserve | Bool | [READ_WRITE] SSC2_Reserve |
| DeviceData.Selection.SystemStateInformationBits.All | Bool | [READ_ONLY] all parameters of complex data type |
| DeviceData.Selection.DataStorageUploadFlag | Bool | [READ_ONLY] Shows the preference of local changes as opposed to the configuration data, stored in master DS |
| DeviceData.Selection.IntegrationTimeLevel | Bool | [READ_ONLY] Readout of the adjusted integration time level, depending on the target's diffuse reflectance. Small value = short integration time. |
| DeviceData.Selection.SysstateToStatusBitsAssignment.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.InputMode | Bool | [READ_WRITE] Input Handling functionality |
| DeviceData.Selection.TeachCount | Bool | [READ_WRITE] Number of measurement values, used for Teach averaging |
| DeviceData.Selection.SwitchingOutputProperty | Bool | [READ_WRITE] General behaviour of all the Switching Outputs in case of no measurement value is available |
| DeviceData.Selection.Ssc1_WindowWidth | Bool | [READ_WRITE] SSC1_WindowWidth |
| DeviceData.Selection.Ssc1_EvalDepth | Bool | [READ_WRITE] SSC1_EvalDepth |
| DeviceData.Selection.Ssc2_WindowWidth | Bool | [READ_WRITE] SSC2_WindowWidth |
| DeviceData.Selection.Ssc2_EvalDepth | Bool | [READ_WRITE] SSC2_EvalDepth |
| DeviceData.Selection.AnalogOutputProperty | Bool | [READ_WRITE] Output behaviour in case of missing measurement value |
| DeviceData.Selection.PositionOfMaximumAnalogOutput | Bool | [READ_WRITE] Distance giving maximum Analog Output |
| DeviceData.Selection.PositionOfMinimumAnalogOutput | Bool | [READ_WRITE] Distance giving minimum Analog Output |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Selection.AnalogOutputRangeSettings | Bool | [READ_WRITE] Selection of Analog Output current or voltage Range |
| DeviceData.Selection.MeasurementMode | Bool | [READ_WRITE] Application specific processing of raw measurement data |
| DeviceData.Selection.MenuLanguage | Bool | [READ_WRITE] Local device Menu Language settings |
| DeviceData.Selection.DisplayMode | Bool | [READ_WRITE] Display behaviour. Auto: Maximum intensity when pushing a button; dimmed to lower intensity during stand-By. |
| DeviceData.Selection.MenuPasswordLock | Bool | [READ_WRITE] password-lock of the local device menu |
| DeviceData.Selection.DistanceOffset | Bool | [READ_WRITE] Signed distance Offset Value. May be internally modified by preset calculation. |
| DeviceData.Selection.Gradient | Bool | [READ_WRITE] Simple gradient with values 'rising' (+1) or 'falling' (-1). Can be used for fill level detection |
| DeviceData.Selection.RamTeachOption | Bool | [READ_WRITE] If option is set to 'on', the teach results are only stored into the volatile RAM storage. Used for continually re-teaching applications. |
| DeviceData.Selection.MenuExitBehaviour | Bool | [READ_WRITE] Handling of local changed parameters relating to the IO-Link Master's Data Storage. |
| DeviceData.Selection.DeactivationProperty | Bool | [READ_WRITE] Behaviour of measurement output in deactivation state |
| DeviceData.Selection.IntegrationTimeLevelLowerLimit | Bool | [READ_WRITE] set a lower limit to prevent a value that is too high. |
| DeviceData.Selection.IntegrationTimeLevelUpperLimit | Bool | [READ_WRITE] set an upper limit to prevent long measurement loops. For faster detection of an appearing bright target in front of a dark distant background. |
| DeviceData.Selection.PresetValue | Bool | [READ_WRITE] This requested measurement value will be displayed after a Preset-to-Offset calculation |
| DeviceData.Selection.FilterSelection | Bool | [READ_WRITE] Application specific selection of different filtering methods |

| Parameter name | Data type | Description |
|---|-----------|---|
| DeviceData.Selection.AverageCount | Bool | [READ_WRITE] Buffer size of 'Averaging' measurement filter |
| DeviceData.Selection.SpikeSuppressionCount | Bool | [READ_WRITE] Buffer size of 'Spike Suppression' measurement mode |
| DeviceData.Selection.SpikeSuppressionDepth | Bool | [READ_WRITE] Filter depth of 'Spike Suppression' measurement mode |
| DeviceData.Selection.LightSuppressionRepetitionLimit | Bool | [READ_WRITE] Reduction of repetition cycles in 'Light Suppression' measurement mode in order to limit the measurement duration. |
| DeviceData.Selection.WireFunctionArray.All | Bool | [READ_WRITE] all parameters of complex data type |
| DeviceData.Selection.Resolution | Bool | [READ_ONLY] Distance = Measured Value * Resolution |
| DeviceData.Selection.MinimumOfOperatingRangeSspDetectionRange | Bool | [READ_ONLY] Minimum of the allowed output range, with Offset=0 and Gradient=rising. |
| DeviceData.Selection.MaximumOfOperatingRangeSspDetectionRange | Bool | [READ_ONLY] Maximum of the allowed output range, with Offset=0 and Gradient=rising. |
| DeviceData.Selection.MinimumOfMeasuringRangeSspMeasurementRange | Bool | [READ_ONLY] Minimum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Lower Limit. |
| DeviceData.Selection.MaximumOfMeasuringRangeSspMeasurementRange | Bool | [READ_ONLY] Maximum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Upper Limit. |
| DeviceData.Selection.Temperature | Bool | [READ_ONLY] Device temperature in 1/10 °C steps, accuracy: +/-5 °C |
| DeviceData.Selection.MdcDescr.All | Bool | [READ_ONLY] all parameters of complex data type |
| DeviceData.Data.Commands.DeviceReset | UInt | [WRITE_ONLY] Device Reset |
| DeviceData.Data.Commands.ApplicationReset | UInt | [WRITE_ONLY] Application Reset |
| DeviceData.Data.Commands.RestoreFactorySettings | UInt | [WRITE_ONLY] Restore Factory Settings |
| DeviceData.Data.Commands.TeachSp1TeachOfDistantSetpoint | UInt | [WRITE_ONLY] Teach SP1 (Teach of distant setpoint) |
| DeviceData.Data.Commands.TeachSp2TeachOfNearSetpoint | UInt | [WRITE_ONLY] Teach SP2 (Teach of near setpoint) |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Data.Commands.CustomTeachWindowTeachOfBothSetpoints | UInt | [WRITE_ONLY] Custom Teach: Window (Teach of both setpoints) |
| DeviceData.Data.Commands.CustomTeachSp1aTeachOfAlternativeDistantSetpoint | UInt | [WRITE_ONLY] Custom Teach SP1a (Teach of alternative distant setpoint) |
| DeviceData.Data.Commands.ClearDsUploadFlag | UInt | [WRITE_ONLY] Clear DS Upload Flag |
| DeviceData.Data.Commands.SetDsUploadFlag | UInt | [WRITE_ONLY] Set DS Upload Flag |
| DeviceData.Data.Commands.ActivationWithPriorityOverridingPdoutsTransducerDisableSignalOnlyInputFunctionsHaveAHigherPriority | UInt | [WRITE_ONLY] Activation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| DeviceData.Data.Commands.DeactivationWithPriorityOverridingPdoutsTransducerDisableSignalOnlyInputFunctionsHaveAHigherPriority | UInt | [WRITE_ONLY] Deactivation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| DeviceData.Data.Commands.ResetPriorityToUsePdoutsTransducerDisableSignalAgainOnlyInputFunctionsHaveAHigherPriority | UInt | [WRITE_ONLY] Reset priority to use PDout's transducer disable signal again. Only Input functions have a higher priority |
| DeviceData.Data.Commands.TeachDistanceOfMinimumAnalogOutput | UInt | [WRITE_ONLY] Teach distance of minimum analog output |
| DeviceData.Data.Commands.TeachDistanceOfMaximumAnalogOutput | UInt | [WRITE_ONLY] Teach distance of maximum analog output |
| DeviceData.Data.Commands.TeachOffsetInOrderToAchieveThePresetValue | UInt | [WRITE_ONLY] Teach offset in order to achieve the preset value |
| DeviceData.Data.DirectParameters1.Reserved_1 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.MasterCycleTime | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.MinCycleTime | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.MSequenceCapability | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.IoLinkVersionId | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.ProcessDataInputLength | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.ProcessDataOutputLength | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.VendorId1 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.VendorId2 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.DeviceId1 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.DeviceId2 | UInt | [READ_ONLY] |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Data.DirectParameters1.DeviceId3 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.Reserved_13 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.Reserved_14 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters1.Reserved_15 | UInt | [READ_ONLY] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter1 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter2 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter3 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter4 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter5 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter6 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter7 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter8 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter9 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter10 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter11 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter12 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter13 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter14 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter15 | UInt | [READ_WRITE] |
| DeviceData.Data.DirectParameters2.DeviceSpecificParameter16 | UInt | [READ_WRITE] |
| DeviceData.Data.StandardCommand | UInt | [WRITE_ONLY] |
| DeviceData.Data.DeviceAccessLocks.ParameterWriteAccessLock | Bool | [READ_WRITE] |
| DeviceData.Data.DeviceAccessLocks.DataStorageLock | Bool | [READ_WRITE] |
| DeviceData.Data.DeviceAccessLocks.LocalParameterizationLock | Bool | [READ_WRITE] |
| DeviceData.Data.DeviceAccessLocks.LocalUserInterfaceLock | Bool | [READ_WRITE] |
| DeviceData.Data.ProfileCharacteristic.DeviceProfile1 | UInt | [READ_ONLY] 0x0001: Generic Profiled Sensor |

| Parameter name | Data type | Description |
|--|-----------|--|
| DeviceData.Data.ProfileCharacteristic.DeviceProfile2 | UInt | [READ_ONLY] 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable |
| DeviceData.Data.ProfileCharacteristic.ApplicationProfile | UInt | [READ_ONLY] 0x4000: Identification and Diagnosis |
| DeviceData.Data.ProfileCharacteristic.FunctionClass1 | UInt | [READ_ONLY] 0x8001: Switching Signal Channel |
| DeviceData.Data.ProfileCharacteristic.FunctionClass2 | UInt | [READ_ONLY] 0x8004: Teach-in |
| DeviceData.Data.VendorName | String | [READ_ONLY] |
| DeviceData.Data.VendorText | String | [READ_ONLY] |
| DeviceData.Data.ProductName | String | [READ_ONLY] |
| DeviceData.Data.ProductId | String | [READ_ONLY] |
| DeviceData.Data.ProductText | String | [READ_ONLY] |
| DeviceData.Data.SerialNumber | String | [READ_ONLY] |
| DeviceData.Data.HardwareVersion | String | [READ_ONLY] |
| DeviceData.Data.FirmwareVersion | String | [READ_ONLY] |
| DeviceData.Data.ApplicationSpecificTag | String | [READ_WRITE] |
| DeviceData.Data.FunctionTag | String | [READ_WRITE] |
| DeviceData.Data.LocationTag | String | [READ_WRITE] |
| DeviceData.Data.DeviceStatus | UInt | [READ_ONLY] |
| DeviceData.Data.DetailedDeviceStatus.Item_1 | String | [READ_ONLY] |
| DeviceData.Data.DetailedDeviceStatus.Item_2 | String | [READ_ONLY] |
| DeviceData.Data.TiSelect | UInt | [READ_WRITE] select teach channel, 0=SSC1, 1=SSC1, 2=SSC2, 255=all SSCs |
| DeviceData.Data.TiResult.TiResultState | UInt | [READ_ONLY] |
| DeviceData.Data.TiResult.TiResultFlagSp1Tp1 | Bool | [READ_ONLY] |
| DeviceData.Data.TiResult.TiResultFlagSp1Tp2 | Bool | [READ_ONLY] |
| DeviceData.Data.TiResult.TiResultFlagSp2Tp1 | Bool | [READ_ONLY] |
| DeviceData.Data.TiResult.TiResultFlagSp2Tp2 | Bool | [READ_ONLY] |
| DeviceData.Data.Ssc1Param.Sp1 | Int | [READ_WRITE] Value of distant setpoint |

| Parameter name | Data type | Description |
|--|-----------|---|
| DeviceData.Data.Ssc1Param.Sp2 | Int | [READ_WRITE] Value of near setpoint |
| DeviceData.Data.Ssc1Config.Logic | UInt | [READ_WRITE] Output level of switching output when object is detected |
| DeviceData.Data.Ssc1Config.Mode | UInt | [READ_WRITE] Configuration of the switching edge positions from one or both setpoints, using hysteresis and others. |
| DeviceData.Data.Ssc1Config.Hyst | UInt | [READ_WRITE] distance range between the two opposite switching edges related to the same setpoint |
| DeviceData.Data.Ssc2Param.Sp1 | Int | [READ_WRITE] Value of distant setpoint |
| DeviceData.Data.Ssc2Param.Sp2 | Int | [READ_WRITE] Value of near setpoint |
| DeviceData.Data.Ssc2Config.Logic | UInt | [READ_WRITE] Output level of switching output when object is detected |
| DeviceData.Data.Ssc2Config.Mode | UInt | [READ_WRITE] Configuration of the switching edge positions from one or both setpoints, using hysteresis and others. |
| DeviceData.Data.Ssc2Config.Hyst | UInt | [READ_WRITE] distance range between the two opposite switching edges related to the same setpoint |
| DeviceData.Data.Ssc1_Sp1a | Int | [READ_WRITE] SSC1_SP1a |
| DeviceData.Data.Ssc2_Sp1a | Int | [READ_WRITE] SSC2_SP1a |
| DeviceData.Data.Ssc1_Reserve | UInt | [READ_WRITE] SSC1_Reserve |
| DeviceData.Data.Ssc2_Reserve | UInt | [READ_WRITE] SSC2_Reserve |
| DeviceData.Data.SystemStateInformationBits.Zero | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Measure | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Signal | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Warning | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Value | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.CalibratedRange | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.LimitedAccuracy | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Deactivated | Bool | [READ_ONLY] |

| Parameter name | Data type | Description |
|--|-----------|---|
| DeviceData.Data.SystemStateInformationBits.TriggerToggle | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Ssc1State | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Ssc2State | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Ssc3State | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.AnalogInRange | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.AnalogOutMin | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.AnalogOutMax | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.LaserError | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Option1 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Option2 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_19 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_20 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_21 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_22 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_23 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_24 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_25 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_26 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_27 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.Reserved_28 | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.TeachBusy | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.TeachSuccess | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.TeachError | Bool | [READ_ONLY] |
| DeviceData.Data.SystemStateInformationBits.TeachReserved | Bool | [READ_ONLY] |
| DeviceData.Data.DataStorageUploadFlag | UInt | [READ_ONLY] Shows the preference of local changes as opposed to the configuration data, stored in master DS |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Data.IntegrationTimeLevel | UInt | [READ_ONLY] Readout of the adjusted integration time level, depending on the target's diffuse reflectance. Small value = short integration time. |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_1 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_2 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_3 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_4 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_5 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_6 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_7 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.SysstateToStatusBitsAssignment.Item_8 | UInt | [READ_WRITE] 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| DeviceData.Data.InputMode | UInt | [READ_WRITE] Input Handling functionality |
| DeviceData.Data.TeachCount | UInt | [READ_WRITE] Number of measurement values, used for Teach averaging |
| DeviceData.Data.SwitchingOutputProperty | UInt | [READ_WRITE] General behaviour of all the Switching Outputs in case of no measurement value is available |
| DeviceData.Data.Ssc1_WindowWidth | UInt | [READ_WRITE] SSC1_WindowWidth |
| DeviceData.Data.Ssc1_EvalDepth | UInt | [READ_WRITE] SSC1_EvalDepth |
| DeviceData.Data.Ssc2_WindowWidth | UInt | [READ_WRITE] SSC2_WindowWidth |
| DeviceData.Data.Ssc2_EvalDepth | UInt | [READ_WRITE] SSC2_EvalDepth |
| DeviceData.Data.AnalogOutputProperty | UInt | [READ_WRITE] Output behaviour in case of missing measurement value |

| Parameter name | Data type | Description |
|--|-----------|--|
| DeviceData.Data.PositionOfMaximumAnalogOutput | Int | [READ_WRITE] Distance giving maximum Analog Output |
| DeviceData.Data.PositionOfMinimumAnalogOutput | Int | [READ_WRITE] Distance giving minimum Analog Output |
| DeviceData.Data.AnalogOutputRangeSettings | UInt | [READ_WRITE] Selection of Analog Output current or voltage Range |
| DeviceData.Data.MeasurementMode | UInt | [READ_WRITE] Application specific processing of raw measurement data |
| DeviceData.Data.MenuLanguage | UInt | [READ_WRITE] Local device Menu Language settings |
| DeviceData.Data.DisplayMode | UInt | [READ_WRITE] Display behaviour. Auto: Maximum intensity when pushing a button; dimmed to lower intensity during stand-By. |
| DeviceData.Data.MenuPasswordLock | UInt | [READ_WRITE] password-lock of the local device menu |
| DeviceData.Data.DistanceOffset | Int | [READ_WRITE] Signed distance Offset Value. May be internally modified by preset calculation. |
| DeviceData.Data.Gradient | Int | [READ_WRITE] Simple gradient with values 'rising' (+1) or 'falling' (-1). Can be used for fill level detection |
| DeviceData.Data.RamTeachOption | UInt | [READ_WRITE] If option is set to 'on', the teach results are only stored into the volatile RAM storage. Used for continually re-teaching applications. |
| DeviceData.Data.MenuExitBehaviour | UInt | [READ_WRITE] Handling of local changed parameters relating to the IO-Link Master's Data Storage. |
| DeviceData.Data.DeactivationProperty | UInt | [READ_WRITE] Behaviour of measurement output in deactivation state |
| DeviceData.Data.IntegrationTimeLevelLowerLimit | UInt | [READ_WRITE] set a lower limit to prevent a value that is too high. |
| DeviceData.Data.IntegrationTimeLevelUpperLimit | UInt | [READ_WRITE] set an upper limit to prevent long measurement loops. For faster detection of an appearing bright target in front of a dark distant background. |
| DeviceData.Data.PresetValue | Int | [READ_WRITE] This requested measurement value will be displayed after a Preset-to-Offset calculation |

| Parameter name | Data type | Description |
|---|-----------|--|
| DeviceData.Data.FilterSelection | UInt | [READ_WRITE] Application specific selection of different filtering methods |
| DeviceData.Data.AverageCount | UInt | [READ_WRITE] Buffer size of 'Averaging' measurement filter |
| DeviceData.Data.SpikeSuppressionCount | UInt | [READ_WRITE] Buffer size of 'Spike Suppression' measurement mode |
| DeviceData.Data.SpikeSuppressionDepth | UInt | [READ_WRITE] Filter depth of 'Spike Suppression' measurement mode |
| DeviceData.Data.LightSuppressionRepetitionLimit | UInt | [READ_WRITE] Reduction of repetition cycles in 'Light Suppression' measurement mode in order to limit the measurement duration. |
| DeviceData.Data.WireFunctionArray.Item_1 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_2 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_3 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_4 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_5 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_6 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |

| Parameter name | Data type | Description |
|---|-----------|---|
| DeviceData.Data.WireFunctionArray.Item_7 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_8 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_9 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_10 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_11 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.WireFunctionArray.Item_12 | UInt | [READ_WRITE] Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widthes of 20-80 ms, 120-180ms, ..., 1120-1180ms) |
| DeviceData.Data.Resolution | UInt | [READ_ONLY] Distance = Measured Value * Resolution |
| DeviceData.Data. MinimumOfOperatingRangeSspDetectionRange | Int | [READ_ONLY] Minimum of the allowed output range, with Offset=0 and Gradient=rising. |
| DeviceData.Data. MaximumOfOperatingRangeSspDetectionRange | Int | [READ_ONLY] Maximum of the allowed output range, with Offset=0 and Gradient=rising. |
| DeviceData.Data. MinimumOfMeasuringRangeSspMeasurementRange | Int | [READ_ONLY] Minumum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Lower Limit. |

| Parameter name | Data type | Description |
|--|-----------|---|
| DeviceData.Data. MaximumOfMeasuringRangeSspMeasurementRange | Int | [READ_ONLY] Maximum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Upper Limit. |
| DeviceData.Data.Temperature | UInt | [READ_ONLY] Device temperature in 1/10 °C steps, accuracy: +/-5 °C |
| DeviceData.Data.MdcDescr.MdcDescrLowerLimit | Int | [READ_ONLY] |
| DeviceData.Data.MdcDescr.MdcDescrUpperLimit | Int | [READ_ONLY] |
| DeviceData.Data.MdcDescr.MdcDescrUnit | Int | [READ_ONLY] |
| DeviceData.Data.MdcDescr.MdcDescrScale | Int | [READ_ONLY] |

Tab. 7.2: Leuze_type_PD_ODS9_2167

| Parameter name | Data type | Description |
|--|-----------|-------------|
| FC_Leuze_PD_ODS9_2167.DistanceValue | Int | |
| FC_Leuze_PD_ODS9_2167.DistanceScale | Int | |
| FC_Leuze_PD_ODS9_2167.StatusBit0Ssc1OutputState | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit1Ssc2OutputState | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit2Reserved | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit3MeasureState | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit4SignalAvailable | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit5WarningLowSignal | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit6Reserved | Bool | |
| FC_Leuze_PD_ODS9_2167.StatusBit7ToggleBit | Bool | |

8 Parameter descriptions

Tab. 8.1: IODD parameter descriptions

(AR - Access Rights, R - Read only, W - Write only, RW - Read and Write, NS - Not specified)

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|---|-------|----------|-----------|---------|----|---|
| Commands | | | RecordT | | W | |
| Device Reset | | | UIntegerT | 128 | W | Device Reset |
| Application Reset | | | UIntegerT | 129 | W | Application Reset |
| Restore Factory Settings | | | UIntegerT | 130 | W | Restore Factory Settings |
| Teach SP1 (Teach of distant setpoint) | | | UIntegerT | 65 | W | Teach SP1 (Teach of distant setpoint) |
| Teach SP2 (Teach of near setpoint) | | | UIntegerT | 66 | W | Teach SP2 (Teach of near setpoint) |
| Custom Teach: Window (Teach of both setpoints) | | | UIntegerT | 75 | W | Custom Teach: Window (Teach of both setpoints) |
| Custom Teach SP1a (Teach of alternative distant setpoint) | | | UIntegerT | 76 | W | Custom Teach SP1a (Teach of alternative distant setpoint) |
| Clear DS Upload Flag | | | UIntegerT | 160 | W | Clear DS Upload Flag |
| Set DS Upload Flag | | | UIntegerT | 161 | W | Set DS Upload Flag |
| Activation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority | | | UIntegerT | 176 | W | Activation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| Deactivation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority | | | UIntegerT | 177 | W | Deactivation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority |
| Reset priority to use PDout's transducer disable signal again. Only Input functions have a higher priority | | | UIntegerT | 178 | W | Reset priority to use PDout's transducer disable signal again. Only Input functions have a higher priority |
| Teach distance of minimum analog output | | | UIntegerT | 195 | W | Teach distance of minimum analog output |
| Teach distance of maximum analog output | | | UIntegerT | 196 | W | Teach distance of maximum analog output |
| Teach offset in order to achieve the preset value | | | UIntegerT | 212 | W | Teach offset in order to achieve the preset value |
| Direct Parameters 1 | 0 | 0 | RecordT | | RW | |
| Reserved | 0 | 1 | UIntegerT | | R | |
| Master Cycle Time | 0 | 2 | UIntegerT | | R | |
| Min Cycle Time | 0 | 3 | UIntegerT | | R | |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|------------------------------|-------|----------|-----------|---------|----|---|
| M-Sequence Capability | 0 | 4 | UIntegerT | | R | |
| IO-Link Version ID | 0 | 5 | UIntegerT | 17 | R | |
| Process Data Input Length | 0 | 6 | UIntegerT | | R | |
| Process Data Output Length | 0 | 7 | UIntegerT | | R | |
| Vendor ID 1 | 0 | 8 | UIntegerT | | R | |
| Vendor ID 2 | 0 | 9 | UIntegerT | | R | |
| Device ID 1 | 0 | 10 | UIntegerT | | R | |
| Device ID 2 | 0 | 11 | UIntegerT | | R | |
| Device ID 3 | 0 | 12 | UIntegerT | | R | |
| Reserved | 0 | 13 | UIntegerT | | R | |
| Reserved | 0 | 14 | UIntegerT | | R | |
| Reserved | 0 | 15 | UIntegerT | | R | |
| Standard Command | 0 | 16 | UIntegerT | | W | (0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved |
| Direct Parameters 2 | 1 | 0 | RecordT | | RW | |
| Device Specific Parameter 1 | 1 | 1 | UIntegerT | | RW | |
| Device Specific Parameter 2 | 1 | 2 | UIntegerT | | RW | |
| Device Specific Parameter 3 | 1 | 3 | UIntegerT | | RW | |
| Device Specific Parameter 4 | 1 | 4 | UIntegerT | | RW | |
| Device Specific Parameter 5 | 1 | 5 | UIntegerT | | RW | |
| Device Specific Parameter 6 | 1 | 6 | UIntegerT | | RW | |
| Device Specific Parameter 7 | 1 | 7 | UIntegerT | | RW | |
| Device Specific Parameter 8 | 1 | 8 | UIntegerT | | RW | |
| Device Specific Parameter 9 | 1 | 9 | UIntegerT | | RW | |
| Device Specific Parameter 10 | 1 | 10 | UIntegerT | | RW | |
| Device Specific Parameter 11 | 1 | 11 | UIntegerT | | RW | |
| Device Specific Parameter 12 | 1 | 12 | UIntegerT | | RW | |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|-------------------------------|-------|----------|-----------|---------|----|--|
| Device Specific Parameter 13 | 1 | 13 | UIntegerT | | RW | |
| Device Specific Parameter 14 | 1 | 14 | UIntegerT | | RW | |
| Device Specific Parameter 15 | 1 | 15 | UIntegerT | | RW | |
| Device Specific Parameter 16 | 1 | 16 | UIntegerT | | RW | |
| Standard Command | 2 | 0 | UIntegerT | | W | (0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved 65: Teach SP1 (Teach of distant setpoint) 66: Teach SP2 (Teach of near setpoint) 75: Custom Teach: Window (Teach of both setpoints) 76: Custom Teach SP1a (Teach of alternative distant setpoint) 160: Clear DS Upload Flag 161: Set DS Upload Flag 176: Activation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority 177: Deactivation with priority, overriding PDout's transducer disable signal. Only Input functions have a higher priority 178: Reset priority to use PDout's transducer disable signal again. Only Input functions have a higher priority 195: Teach distance of minimum analog output 196: Teach distance of maximum analog output 212: Teach offset in order to achieve the preset value |
| Device Access Locks | 12 | 0 | RecordT | | RW | |
| Parameter (write) Access Lock | 12 | 1 | BooleanT | | RW | |
| Data Storage Lock | 12 | 2 | BooleanT | | RW | |
| Local Parameterization Lock | 12 | 3 | BooleanT | | RW | |
| Local User Interface Lock | 12 | 4 | BooleanT | | RW | |
| Profile Characteristic | 13 | 0 | RecordT | | R | Collection of Profile Identifiers |
| Device Profile 1 | 13 | 1 | UIntegerT | 1 | R | 0x0001: Generic Profiled Sensor 1: 0x0001: Generic Profiled Sensor 12: 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 16384: 0x4000: Identification and Diagnosis 32769: 0x8001: Switching Signal Channel 32772: 0x8004: Teach-in |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|---------------------|-------|----------|-----------|--------------------------------------|----|---|
| Device Profile 2 | 13 | 2 | UIntegerT | 12 | R | 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 1: 0x0001: Generic Profiled Sensor 12: 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 16384: 0x4000: Identification and Diagnosis 32769: 0x8001: Switching Signal Channel 32772: 0x8004: Teach-in |
| Application Profile | 13 | 3 | UIntegerT | 16384 | R | 0x4000: Identification and Diagnosis 1: 0x0001: Generic Profiled Sensor 12: 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 16384: 0x4000: Identification and Diagnosis 32769: 0x8001: Switching Signal Channel 32772: 0x8004: Teach-in |
| Function Class 1 | 13 | 4 | UIntegerT | 32769 | R | 0x8001: Switching Signal Channel 1: 0x0001: Generic Profiled Sensor 12: 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 16384: 0x4000: Identification and Diagnosis 32769: 0x8001: Switching Signal Channel 32772: 0x8004: Teach-in |
| Function Class 2 | 13 | 5 | UIntegerT | 32772 | R | 0x8004: Teach-in 1: 0x0001: Generic Profiled Sensor 12: 0x000C: DMS Digital Measuring Sensor 16bit, Transducer Disable 16384: 0x4000: Identification and Diagnosis 32769: 0x8001: Switching Signal Channel 32772: 0x8004: Teach-in |
| Vendor Name | 16 | 0 | StringT | Leuze electronic GmbH + Co. KG | R | |
| Vendor Text | 17 | 0 | StringT | Leuze electronic - the sensor people | R | |
| Product Name | 18 | 0 | StringT | | R | |
| Product ID | 19 | 0 | StringT | | R | |
| Product Text | 20 | 0 | StringT | Optical distance sensor | R | |
| Serial Number | 21 | 0 | StringT | | R | |
| Hardware Version | 22 | 0 | StringT | | R | |
| Firmware Version | 23 | 0 | StringT | | R | |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|--------------------------|-------|----------|--------------|---------|----|--|
| Application Specific Tag | 24 | 0 | StringT | *** | RW | |
| Function Tag | 25 | 0 | StringT | *** | RW | |
| Location Tag | 26 | 0 | StringT | *** | RW | |
| Device Status | 36 | 0 | UIntegerT | | R | 0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure (5 ... 255): Reserved |
| Detailed Device Status | 37 | 0 | ArrayT | | R | |
| | 37 | 0 | OctetStringT | | R | |
| TI - Select | 58 | 0 | UIntegerT | | RW | select teach channel, 0=SSC1, 1=SSC1, 2=SSC2, 255=all SSCs 0: Select Default SSC (Q1, SSC1) for teach 1: Select Q1 equal SSC1 for teach 2: Select Q2 equal SSC2 for teach 255: Select all SSCs for teach |
| TI Result | 59 | 0 | RecordT | | R | Teach-In Result |
| TI Result - State | 59 | 1 | UIntegerT | | R | 0: Idle. No Teach since power-on 1: Teach of SP1 succeeded 2: Teach of SP2 succeeded 3: Teach of SP1 and SP2 succeeded 5: Busy. Teach is running 7: Teach Error 12: Other Teach succeeded (Analog or Offset) |
| TI Result - Flag SP1 TP1 | 59 | 2 | BooleanT | | R | False: No teach of SP1 TP1 since power-on or teach error True: Teach of SP1 TP1 was successful |
| TI Result - Flag SP1 TP2 | 59 | 3 | BooleanT | | R | False: No teach of SP1 TP2 since power-on or teach error True: Teach of SP1 TP2 was successful |
| TI Result - Flag SP2 TP1 | 59 | 4 | BooleanT | | R | False: No teach of SP2 TP1 since power-on or teach error True: Teach of SP2 TP1 was successful |
| TI Result - Flag SP2 TP2 | 59 | 5 | BooleanT | | R | False: No teach of SP2 TP2 since power-on or teach error True: Teach of SP1 TP2 was successful |
| SSC1 Param | 60 | 0 | RecordT | | RW | Switching Signal Channel 1 Parameters |
| SP1 | 60 | 1 | IntegerT | 12500 | RW | Value of distant setpoint (-20000 ... 20000) |
| SP2 | 60 | 2 | IntegerT | 5000 | RW | Value of near setpoint (-20000 ... 20000) |
| SSC1 Config | 61 | 0 | RecordT | | RW | Switching Signal Channel 1 Configuration |
| Logic | 61 | 1 | UIntegerT | 0 | RW | Output level of switching output when object is detected 0: high active 1: low active |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|-------------------------------|-------|----------|-----------|---------|----|--|
| Mode | 61 | 2 | UIntegerT | 1 | RW | Configuration of the switching edge positions from one or both setpoints, using hysteresis and others. 0: deactivated 1: single point mode (object) 2: window mode 128: single point mode (background) |
| Hyst | 61 | 3 | UIntegerT | 300 | RW | distance range between the two opposite switching edges related to the same setpoint (0 ... 32000) |
| SSC2 Param | 62 | 0 | RecordT | | RW | Switching Signal Channel 2 Parameters |
| SP1 | 62 | 1 | IntegerT | 12500 | RW | Value of distant setpoint (-20000 ... 20000) |
| SP2 | 62 | 2 | IntegerT | 5000 | RW | Value of near setpoint (-20000 ... 20000) |
| SSC2 Config | 63 | 0 | RecordT | | RW | Switching Signal Channel 2 Configuration |
| Logic | 63 | 1 | UIntegerT | 0 | RW | Output level of switching output when object is detected 0: high active 1: low active |
| Mode | 63 | 2 | UIntegerT | 1 | RW | Configuration of the switching edge positions from one or both setpoints, using hysteresis and others. 0: deactivated 1: single point mode (object) 2: window mode 128: single point mode (background) |
| Hyst | 63 | 3 | UIntegerT | 300 | RW | distance range between the two opposite switching edges related to the same setpoint (0 ... 32000) |
| SSC1_SP1a | 64 | 0 | IntegerT | -20000 | RW | SSC1_SP1a (-20000 ... 20000) |
| SSC2_SP1a | 65 | 0 | IntegerT | -20000 | RW | SSC2_SP1a (-20000 ... 20000) |
| SSC1_Reserve | 67 | 0 | UIntegerT | | RW | SSC1_Reserve (0 ... 15000) |
| SSC2_Reserve | 68 | 0 | UIntegerT | | RW | SSC2_Reserve (0 ... 15000) |
| System State Information Bits | 72 | 0 | RecordT | | R | Status information, measurement-, processing- and output states. |
| Zero | 72 | 1 | BooleanT | | R | False: cleared bit |
| Measure | 72 | 2 | BooleanT | | R | False: no measurement (Startup, Teach or deactivated) True: measurement is running |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|------------------|-------|----------|-----------|---------|----|---|
| Signal | 72 | 3 | BooleanT | | R | False: signal too less: no measurement value available True: signal and measurement value available |
| Warning | 72 | 4 | BooleanT | | R | False: No Warning True: Warning: weak Signal |
| Value | 72 | 5 | BooleanT | | R | False: Substitutional value sent to measurement output True: Regular value sent to measurement output |
| Calibrated Range | 72 | 6 | BooleanT | | R | False: Outside calibrated range True: Inside calibrated range |
| Limited Accuracy | 72 | 7 | BooleanT | | R | False: Outside limited accuracy range True: Inside limited accuracy range |
| deactivated | 72 | 8 | BooleanT | | R | False: Activated True: deactivated |
| Trigger Toggle | 72 | 9 | BooleanT | | R | False: Trigger Toggle Clear True: Trigger Toggle Set |
| SSC1 State | 72 | 10 | BooleanT | | R | False: SSC 1 inactive True: SSC 1 active |
| SSC2 State | 72 | 11 | BooleanT | | R | False: SSC 2 inactive True: SSC 2 active |
| SSC3 State | 72 | 12 | BooleanT | | R | False: SSC 3 inactive True: SSC 3 active |
| Analog In Range | 72 | 13 | BooleanT | | R | False: Analog Output outside configured range True: Analog Output inside configured range |
| Analog Out Min | 72 | 14 | BooleanT | | R | False: Analog Output not lower than configured minimum True: Analog Output lower than configured minimum |
| Analog Out Max | 72 | 15 | BooleanT | | R | False: Analog Output not above configured maximum True: Analog Output higher than configured maximum |
| Laser Error | 72 | 16 | BooleanT | | R | False: No laser error True: Laser error detected |
| Option 1 | 72 | 17 | BooleanT | | R | False: Option bit 1 clear True: Option bit 1 set |
| Option 2 | 72 | 18 | BooleanT | | R | False: Option bit 2 clear True: Option bit 2 set |
| reserved | 72 | 19 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 20 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 21 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 22 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 23 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 24 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 25 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 26 | BooleanT | | R | False: reserved bit clear True: reserved bit set |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|------------------------------------|-------|----------|-----------|---------|----|--|
| reserved | 72 | 27 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| reserved | 72 | 28 | BooleanT | | R | False: reserved bit clear True: reserved bit set |
| Teach Busy | 72 | 29 | BooleanT | | R | False: - True: Teach busy (running) |
| Teach Success | 72 | 30 | BooleanT | | R | False: - True: Last Teach succeeded |
| Teach Error | 72 | 31 | BooleanT | | R | False: - True: Last Teach failed |
| Teach Reserved | 72 | 32 | BooleanT | | R | False: - True: Reserved bit set |
| Data Storage Upload Flag | 73 | 0 | UIntegerT | | R | Shows the preference of local changes as opposed to the configuration data, stored in master DS 0: Clear: No upload request for local sensor data 128: Set: Upload request for local sensor data is set |
| Integration Time Level | 74 | 0 | UIntegerT | | R | Readout of the adjusted integration time level, depending on the target's diffuse reflectance. Small value = short integration time. |
| SysState to Status Bits Assignment | 79 | 0 | ArrayT | | RW | 8 element array with SysState Bit numbers assigned to the 8 PDin Status Bits |
| | 79 | 0 | UIntegerT | | RW | 0: Zero 1: Measure 2: Signal 3: Warning 4: Value 5: Calibrated Range 6: Limited Accuracy 7: deactivated 8: Trigger Toggle 9: SSC1 State 10: SSC2 State 11: SSC3 State 12: Analog In Range 13: Analog Out Min 14: Analog Out Max 15: Laser Error 16: Option 1 17: Option 2 18: reserved 19: reserved 20: reserved 21: reserved 22: reserved 23: reserved 24: reserved 25: reserved 26: reserved 27: reserved 28: Teach Busy 29: Teach Success 30: Teach Error 31: Teach Reserved |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|-----------------------------------|-------|----------|-----------|---------|----|---|
| Input Mode | 80 | 0 | UIntegerT | 1 | RW | Input Handling functionality 0: No function 1: Teach 2: Deactivation 3: Activation 4: Trigger on rising edge 5: Trigger on falling edge |
| Teach Count | 81 | 0 | UIntegerT | 50 | RW | Number of measurement values, used for Teach averaging (2 ... 1000) |
| Switching Output Property | 82 | 0 | UIntegerT | | RW | General behaviour of all the Switching Outputs in case of no measurement value is available 0: Switching Off 1: Switching On 2: Unchanged |
| SSC1_WindowWidth | 88 | 0 | UIntegerT | | RW | SSC1_WindowWidth (0 ... 15000) |
| SSC1_EvalDepth | 89 | 0 | UIntegerT | 2 | RW | SSC1_EvalDepth (1 ... 100) |
| SSC2_WindowWidth | 97 | 0 | UIntegerT | | RW | SSC2_WindowWidth (0 ... 15000) |
| SSC2_EvalDepth | 98 | 0 | UIntegerT | 2 | RW | SSC2_EvalDepth (1 ... 100) |
| Analog Output Property | 110 | 0 | UIntegerT | | RW | Output behaviour in case of missing measurement value 0: Minimum Analog Output Value 1: Maximum Analog Output Value 2: Unchanged Analog Output Value |
| Position of maximum Analog Output | 111 | 0 | IntegerT | 20000 | RW | Distance giving maximum Analog Output (-20000 ... 20000) |
| Position of minimum Analog Output | 112 | 0 | IntegerT | 5000 | RW | Distance giving minimum Analog Output (-20000 ... 20000) |
| Analog Output Range Settings | 113 | 0 | UIntegerT | | RW | Selection of Analog Output current or voltage Range 0: 4-20mA Current Output 1: 1-10V Voltage Output 2: 0-10V Voltage Output |
| Measurement Mode | 114 | 0 | UIntegerT | | RW | Application specific processing of raw measurement data 0: Standard 1: Precision 2: Light Suppression |
| Menu Language | 115 | 0 | UIntegerT | | RW | Local device Menu Language settings 0: English 1: German |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|-------------------------------------|-------|----------|-----------|---------|----|---|
| Display Mode | 116 | 0 | UIntegerT | 1 | RW | Display behaviour. Auto: Maximum intensity when pushing a button; dimmed to lower intensity during stand-By. 0: On 1: Auto 2: Auto Off 3: Off |
| Menu Password Lock | 117 | 0 | UIntegerT | | RW | password-lock of the local device menu 0: Disabled 255: Enabled |
| Distance Offset | 118 | 0 | IntegerT | | RW | Signed distance Offset Value. May be internally modified by preset calculation. (-20000 ... 20000) |
| Gradient | 119 | 0 | IntegerT | 1 | RW | Simple gradient with values 'rising' (+1) or 'falling' (-1). Can be used for fill level detection 1: rising -1: falling |
| RAM Teach Option | 120 | 0 | UIntegerT | | RW | If option is set to 'on', the teach results are only stored into the volatile RAM storage. Used for continually re-teaching applications. 0: Inactive 255: Activated |
| Menu Exit Behaviour | 121 | 0 | UIntegerT | | RW | Handling of local changed parameters relating to the IO-Link Master's Data Storage. 0: Report changes to DS (set DSUpload Flag and generate an event) 1: Only local changes (clear DSUpload flag) |
| Deactivation Property | 122 | 0 | UIntegerT | | RW | Behaviour of measurement output in deactivation state 0: Show 'No Measurement Data' (Smart Sensor Profile standard behaviour) 1: Freeze current value |
| Integration Time Level, Lower Limit | 123 | 0 | UIntegerT | | RW | set a lower limit to preven a value that is too high. (0 ... 48) |
| Integration Time Level, Upper Limit | 124 | 0 | UIntegerT | 48 | RW | set an upper limit to prevent long measurement loops. For faster detection of an appearing bright target in front of a dark distant background. (0 ... 48) |
| Preset Value | 126 | 0 | IntegerT | | RW | This requested measurement value will be displayed after a Preset-to-Offset calculation (-20000 ... 20000) |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|------------------------------------|-------|----------|-----------|---------|----|---|
| Filter Selection | 129 | 0 | UIntegerT | | RW | Application specific selection of different filtering methods 0: Off 1: Averaging 2: Spike Suppression |
| Average Count | 130 | 0 | UIntegerT | 10 | RW | Buffer size of 'Averaging' measurement filter (2 ... 99) |
| Spike Suppression Count | 133 | 0 | UIntegerT | 10 | RW | Buffer size of 'Spike Suppression' measurement mode (5 ... 99) |
| Spike Suppression Depth | 134 | 0 | UIntegerT | | RW | Filter depth of 'Spike Suppression' measurement mode 0: Raw: averaging a huge amount of the values around the sorted center 1: Medium: averaging half of the values around the sorted center 2: Fine: averaging a little amount of the values around the sorted center |
| Light Suppression Repetition Limit | 135 | 0 | UIntegerT | 32 | RW | Reduction of repetition cycles in 'Light Suppression' measurement mode in order to limit the measurement duration. (2 ... 32) |
| Wire Function Array | 140 | 0 | ArrayT | | RW | Input Function=Teach. Functions Being Called With all Selection Widthes on Input Wire (low pulse widths of 20-80 ms, 120-180ms, ..., 1120-1180ms) |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|------------|-------|----------|-----------|---------|----|---|
| | 140 | 0 | UIntegerT | | RW | 0: No function, no error 1: No function, error 2: SSP Teach-in of SP1, SSC selection by TI Select 3: SSP Teach-in of SP2, SSC selection by TI Select 4: Custom Teach-in of Window, SSC selection by TI Select 5: Custom Teach-in of SP1a, SSC selection by TI Select 6: Teach-In of Position for Analog Minimum Value 7: Teach-in of Position for Analog Maximum Value 8: Teach-in for Preset Position by modifying Offset 9: Activation, overriding Transducer Disable signal priority (IO-Link PDout) 10: Deactivation, overriding Transducer Disable signal priority (IO-Link PDout) 11: Restore Priority to Transducer Disable signal (IO-Link PDout) after Act-/Deactivation function 12: Teach-in of SSC1 SP1 (distant setpoint) 13: Teach-in of SSC1 SP2 (near setpoint) 14: Object targeting Teach-In of SSC1 SP1 (includes setting to Object Mode) 15: Window center targeting Teach-In of SSC1 SP1-SP2 Window or use WindowWidth (includes setting to Window mode) 16: Background-targeting Teach-In of SSC1 SP1 (includes setting to Background Mode) 17: Teach-in of SSC1 SP1a (alternative distant setpoint) 18: Invert SSC1 Logic 19: Set SSC1 Logic to 'High Active' 20: Set SSC1 Logic to 'Low Active' 21: Teach-in of SSC2 SP1 (distant setpoint) 22: Teach-in of SSC2 SP2 (near setpoint) 23: Object targeting Teach-In of SSC2 SP1 (includes setting to Object Mode) 24: Window center targeting Teach-In of SSC2 SP1-SP2 Window or use WindowWidth (includes setting to Window mode) 25: Background-targeting Teach-In of SSC2 SP1 (includes setting to Background Mode) 26: Teach-in of SSC2 SP1a (alternative distant setpoint) 27: Invert SSC2 Logic 28: Set SSC2 Logic to 'High Active' 29: Set SSC2 Logic to 'Low Active' |
| Resolution | 213 | 0 | UIntegerT | 2 | R | Distance = Measured Value * Resolution 0: Resolution 1 mm 1: Resolution 0.1 mm 2: Resolution 0.01 mm |

| Parameter | Index | Subindex | Data type | Default | AR | Description |
|---|-------|----------|-----------|---------|----|---|
| Minimum of Operating Range (SSP: Detection Range) | 214 | 0 | IntegerT | 4500 | R | Minimum of the allowed output range, with Offset=0 and Gradient=rising. |
| Maximum of Operating Range (SSP: Detection Range) | 215 | 0 | IntegerT | 22000 | R | Maximum of the allowed output range, with Offset=0 and Gradient=rising. |
| Minimum of Measuring Range (SSP: Measurement Range) | 216 | 0 | IntegerT | 5000 | R | Minimum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Lower Limit. |
| Maximum of Measuring Range (SSP: Measurement Range) | 217 | 0 | IntegerT | 20000 | R | Maximum of the range with guaranteed accuracy (Offset=0 and Gradient=rising). Equals MDC Descr parameter Upper Limit. |
| Temperature | 220 | 0 | UIntegerT | | R | Device temperature in 1/10 °C steps, accuracy: +/-5 °C |
| MDC Descr | 16512 | 0 | RecordT | | R | Measuring Data Channel |
| MDC Descr - Lower Limit | 16512 | 1 | IntegerT | | R | |
| MDC Descr - Upper Limit | 16512 | 2 | IntegerT | | R | |
| MDC Descr - Unit | 16512 | 3 | IntegerT | | R | |
| MDC Descr - Scale | 16512 | 4 | IntegerT | | R | |

9 Technical specifications

9.1 General data

Tab. 9.1: Sensor and IODD version

| | |
|-------------------|---------------------------------|
| IODD version | V1.0 |
| IODD release date | 2018-3-28 |
| Device family | Optical distance sensor |
| Device ID | 2167 |
| Device name | ODS9L2.8/LAK-200-M12 |
| Device variants | ODS9L2.8/LAK-200-M12 (50137819) |