



## PLC Integration HT10\_2098

**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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# Table of Contents

- 1 Legal information.....4**
  - 1.1 Disclaimer..... 4
- 2 About this document.....5**
  - 2.1 Purpose of use.....5
  - 2.2 Target group..... 5
- 3 General use of function block..... 6**
  - 3.1 Short description..... 6
  - 3.2 Calling and designation..... 6
  - 3.3 Configuration..... 6
  - 3.4 Method of function..... 7
  - 3.5 Behavior when error occurs.....7
- 4 Integration into the PLC project.....8**
- 5 Process data parser function..... 9**
  - 5.1 Calling and designation..... 9
  - 5.2 Configuration..... 9
- 6 Error description..... 11**
- 7 Data structures..... 14**
- 8 Parameter descriptions..... 26**
- 9 Technical specifications..... 53**
  - 9.1 General data..... 53

# 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\_HT10\_2098" 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_HT10_2098	Sensor data

See structure description of Leuze\_type\_HT10\_2098 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\_HT10\_2098". 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\_HT10\_2098" 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\_ HT10\_2098" 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\_HT10\_2098 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

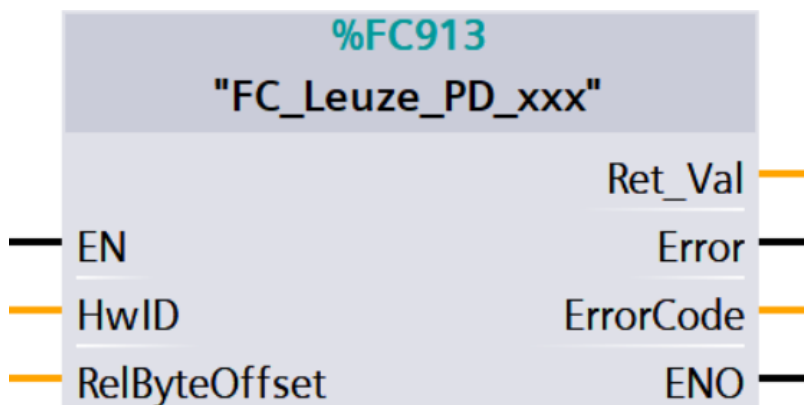


Fig. 5.1: Example of process data parsing function call

### 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_HT10_2098	Reference to the instance of the data structure Leuze_type_PD_HT10_2098. The structure includes the disaggregated values of the process data.

See structure description of Leuze\_type\_PD\_HT10\_2098 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](http://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 (IoError)	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](http://www.IO-Link.com)).

## 7 Data structures

Tab. 7.1: Leuze\_type\_HT10\_2098

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. ClearConfigurationReservationClearDsuploadflag	Bool	[WRITE_ONLY] Clear Configuration Reservation (Clear DsUploadFlag)
DeviceData.Selection.Commands. ReserveConfigurationForDsSetDsuploadflag	Bool	[WRITE_ONLY] Reserve Configuration for DS (Set DsUploadFlag)
DeviceData.Selection.Commands.Activation	Bool	[WRITE_ONLY] Activation
DeviceData.Selection.Commands.Deactivation	Bool	[WRITE_ONLY] Deactivation
DeviceData.Selection.Commands.TeachInOfQ1InObjectMode	Bool	[WRITE_ONLY] Teach-In of Q1 in Object Mode
DeviceData.Selection.Commands.TeachInOfQ2InObjectMode	Bool	[WRITE_ONLY] Teach-In of Q2 in Object Mode
DeviceData.Selection.Commands.TeachInOfQ3InObjectMode	Bool	[WRITE_ONLY] Teach-In of Q3 in Object Mode
DeviceData.Selection.Commands. TeachInOfQ1InBackgroundMode	Bool	[WRITE_ONLY] Teach-In of Q1 in Background Mode
DeviceData.Selection.Commands. TeachInOfQ2InBackgroundMode	Bool	[WRITE_ONLY] Teach-In of Q2 in Background Mode
DeviceData.Selection.Commands. TeachInOfQ3InBackgroundMode	Bool	[WRITE_ONLY] Teach-In of Q3 in Background Mode
DeviceData.Selection.Commands.TeachInOfQ1InWindowMode	Bool	[WRITE_ONLY] Teach-In of Q1 in Window Mode
DeviceData.Selection.Commands.TeachInOfQ2InWindowMode	Bool	[WRITE_ONLY] Teach-In of Q2 in Window Mode
DeviceData.Selection.Commands.TeachInOfQ3InWindowMode	Bool	[WRITE_ONLY] Teach-In of Q3 in Window Mode
DeviceData.Selection.Commands. TeachInOfQ1UpperSwitchingPointSp1	Bool	[WRITE_ONLY] Teach-In of Q1 Upper Switching Point (SP1)
DeviceData.Selection.Commands. TeachInOfQ2UpperSwitchingPointSp1	Bool	[WRITE_ONLY] Teach-In of Q2 Upper Switching Point (SP1)
DeviceData.Selection.Commands. TeachInOfQ3UpperSwitchingPointSp1	Bool	[WRITE_ONLY] Teach-In of Q3 Upper Switching Point (SP1)
DeviceData.Selection.Commands. TeachInOfQ1LowerSwitchingPointSp2	Bool	[WRITE_ONLY] Teach-In of Q1 Lower Switching Point (SP2)
DeviceData.Selection.Commands. TeachInOfQ2LowerSwitchingPointSp2	Bool	[WRITE_ONLY] Teach-In of Q2 Lower Switching Point (SP2)
DeviceData.Selection.Commands. TeachInOfQ3LowerSwitchingPointSp2	Bool	[WRITE_ONLY] Teach-In of Q3 Lower Switching Point (SP2)

Parameter name	Data type	Description
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
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]

Parameter name	Data type	Description
DeviceData.Selection.DirectParameters2.DeviceSpecificParameter9	Bool	[READ_WRITE]
DeviceData.Selection.DirectParameters2.DeviceSpecificParameter10	Bool	[READ_WRITE]
DeviceData.Selection.DirectParameters2.DeviceSpecificParameter11	Bool	[READ_WRITE]
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.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.DeviceStatus	Bool	[READ_ONLY]
DeviceData.Selection.StatusInformation.All	Bool	[READ_ONLY] all parameters of complex data type
DeviceData.Selection.ExtendedStatus.All	Bool	[READ_ONLY] all parameters of complex data type
DeviceData.Selection.DataStorageUploadFlag	Bool	[READ_ONLY] Priority of local changes according to configuration data stored in master DS
DeviceData.Selection.Gain	Bool	[READ_ONLY] Current Gain Control Output Value
DeviceData.Selection.Reserved01	Bool	[READ_ONLY] Reserved For Future Use; Read Only Access



Parameter name	Data type	Description
DeviceData.Selection.SwitchingOutputProperty	Bool	[READ_WRITE] General Behaviour of All Switching Outputs with No Available Measure Value
DeviceData.Selection.Q1LightDark	Bool	[READ_WRITE] Output Q1: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2
DeviceData.Selection.Q1EvaluationDepth	Bool	[READ_WRITE] Q1 Output Changes are Delayed By This Number of Unchanged Measurement Results
DeviceData.Selection.Q1HysteresisClass	Bool	[READ_WRITE] Q1 Hysteresis Adjustment (Raw, Medium or Fine)
DeviceData.Selection.Q1ReserveClass	Bool	[READ_WRITE] Q1 Reserve Adjustment (Raw, Medium or Fine)
DeviceData.Selection.Q2LightDark	Bool	[READ_WRITE] Output Q2: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2
DeviceData.Selection.Q2EvaluationDepth	Bool	[READ_WRITE] Q2 Output Changes are Delayed By This Number of Unchanged Measurement Results
DeviceData.Selection.Q2HysteresisClass	Bool	[READ_WRITE] Q2 Hysteresis Adjustment (Raw, Medium or Fine)
DeviceData.Selection.Q2ReserveClass	Bool	[READ_WRITE] Q2 Reserve Adjustment (Raw, Medium or Fine)
DeviceData.Selection.MinimumGain	Bool	[READ_WRITE] Sets Lower Limit Of Gain Control (if Min less than Max)
DeviceData.Selection.MaximumGain	Bool	[READ_WRITE] Sets Upper Limit Of Gain Control (if Min less than Max)
DeviceData.Selection.XdrExtendedDynamicRange	Bool	[READ_WRITE] Improves the measurement behavior in case of extreme contrast differences.
DeviceData.Selection.Reserved03	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved04	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved05	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved06	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved07	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access

Parameter name	Data type	Description
DeviceData.Selection.Reserved08	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved09	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved10	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.Reserved11	Bool	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Selection.FunctionButton1Level1	Bool	[READ_ONLY] Function Being Called When Button #1 Is Released After 2..7 Seconds
DeviceData.Selection.FunctionButton1Level2	Bool	[READ_ONLY] Function Being Called When Button #1 Is Released After 7..12 Seconds
DeviceData.Selection.FunctionButton1Level3	Bool	[READ_ONLY] Function Being Called When Button #1 Is Released After 12..17 Seconds
DeviceData.Selection.FunctionButton2Level1	Bool	[READ_ONLY] Function Being Called When Button #2 Is Released After 2..7 Seconds
DeviceData.Selection.FunctionButton2Level2	Bool	[READ_ONLY] Function Being Called When Button #2 Is Released After 7..12 Seconds
DeviceData.Selection.FunctionButton2Level3	Bool	[READ_ONLY] Function Being Called When Button #2 Is Released After 12..17 Seconds
DeviceData.Selection.FunctionButton3Level1	Bool	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 2..7 Seconds
DeviceData.Selection.FunctionButton3Level2	Bool	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 7..12 Seconds
DeviceData.Selection.FunctionButton3Level3	Bool	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 12..17 Seconds
DeviceData.Selection.FunctionWireLevel1	Bool	[READ_ONLY] Function Being Called With Selection Width of 20..80 ms On Input Wire
DeviceData.Selection.FunctionWireLevel2	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 120..180 ms On Wire Input
DeviceData.Selection.FunctionWireLevel3	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 220..280 ms On Wire Input

Parameter name	Data type	Description
DeviceData.Selection.FunctionWireLevel4	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 320..380 ms On Wire Input
DeviceData.Selection.FunctionWireLevel5	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 420..480 ms On Wire Input
DeviceData.Selection.FunctionWireLevel6	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 520..580 ms On Wire Input
DeviceData.Selection.FunctionWireLevel7	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 620..680 ms On Wire Input
DeviceData.Selection.FunctionWireLevel8	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 720..780 ms On Wire Input
DeviceData.Selection.FunctionWireLevel9	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 820..880 ms On Wire Input
DeviceData.Selection.FunctionWireLevel10	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 920..980 ms On Wire Input
DeviceData.Selection.FunctionWireLevel11	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 1020..1080 ms On Wire Input
DeviceData.Selection.FunctionWireLevel12	Bool	[READ_ONLY] Function Being Called With Low Pulse Width of 1120..1180 ms On Wire Input
DeviceData.Selection.DefaultValueTest	Bool	[READ_WRITE] Default Value Test
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.ClearConfigurationReservationClearDsuploadflag	UInt	[WRITE_ONLY] Clear Configuration Reservation (Clear DsUploadFlag)
DeviceData.Data.Commands.ReserveConfigurationForDsSetDsuploadflag	UInt	[WRITE_ONLY] Reserve Configuration for DS (Set DsUploadFlag)
DeviceData.Data.Commands.Activation	UInt	[WRITE_ONLY] Activation
DeviceData.Data.Commands.Deactivation	UInt	[WRITE_ONLY] Deactivation
DeviceData.Data.Commands.TeachInOfQ1InObjectMode	UInt	[WRITE_ONLY] Teach-In of Q1 in Object Mode
DeviceData.Data.Commands.TeachInOfQ2InObjectMode	UInt	[WRITE_ONLY] Teach-In of Q2 in Object Mode
DeviceData.Data.Commands.TeachInOfQ3InObjectMode	UInt	[WRITE_ONLY] Teach-In of Q3 in Object Mode

Parameter name	Data type	Description
DeviceData.Data.Commands.TeachInOfQ1InBackgroundMode	UInt	[WRITE_ONLY] Teach-In of Q1 in Background Mode
DeviceData.Data.Commands.TeachInOfQ2InBackgroundMode	UInt	[WRITE_ONLY] Teach-In of Q2 in Background Mode
DeviceData.Data.Commands.TeachInOfQ3InBackgroundMode	UInt	[WRITE_ONLY] Teach-In of Q3 in Background Mode
DeviceData.Data.Commands.TeachInOfQ1InWindowMode	UInt	[WRITE_ONLY] Teach-In of Q1 in Window Mode
DeviceData.Data.Commands.TeachInOfQ2InWindowMode	UInt	[WRITE_ONLY] Teach-In of Q2 in Window Mode
DeviceData.Data.Commands.TeachInOfQ3InWindowMode	UInt	[WRITE_ONLY] Teach-In of Q3 in Window Mode
DeviceData.Data.Commands.TeachInOfQ1UpperSwitchingPointSp1	UInt	[WRITE_ONLY] Teach-In of Q1 Upper Switching Point (SP1)
DeviceData.Data.Commands.TeachInOfQ2UpperSwitchingPointSp1	UInt	[WRITE_ONLY] Teach-In of Q2 Upper Switching Point (SP1)
DeviceData.Data.Commands.TeachInOfQ3UpperSwitchingPointSp1	UInt	[WRITE_ONLY] Teach-In of Q3 Upper Switching Point (SP1)
DeviceData.Data.Commands.TeachInOfQ1LowerSwitchingPointSp2	UInt	[WRITE_ONLY] Teach-In of Q1 Lower Switching Point (SP2)
DeviceData.Data.Commands.TeachInOfQ2LowerSwitchingPointSp2	UInt	[WRITE_ONLY] Teach-In of Q2 Lower Switching Point (SP2)
DeviceData.Data.Commands.TeachInOfQ3LowerSwitchingPointSp2	UInt	[WRITE_ONLY] Teach-In of Q3 Lower Switching Point (SP2)
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]
DeviceData.Data.DirectParameters1.DeviceId3	UInt	[READ_ONLY]

Parameter name	Data type	Description
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.VendorName	String	[READ_ONLY]
DeviceData.Data.VendorText	String	[READ_ONLY]
DeviceData.Data.ProductName	String	[READ_ONLY]

Parameter name	Data type	Description
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.DeviceStatus	UInt	[READ_ONLY]
DeviceData.Data.StatusInformation.Q1OutputState	Bool	[READ_ONLY]
DeviceData.Data.StatusInformation.Q2OutputState	Bool	[READ_ONLY]
DeviceData.Data.StatusInformation.Q3OutputState	Bool	[READ_ONLY]
DeviceData.Data.StatusInformation.MeasureState	Bool	[READ_ONLY]
DeviceData.Data.StatusInformation.ReceivedSignal	Bool	[READ_ONLY]
DeviceData.Data.StatusInformation.WarningReducedAccuracy	Bool	[READ_ONLY]
DeviceData.Data.ExtendedStatus.DeactivationFlag	Bool	[READ_ONLY]
DeviceData.Data.ExtendedStatus.LaserErrorFlag	Bool	[READ_ONLY]
DeviceData.Data.ExtendedStatus.SignalAmplitudeFlag	Bool	[READ_ONLY]
DeviceData.Data.ExtendedStatus.TargetBrightness	UInt	[READ_ONLY]
DeviceData.Data.ExtendedStatus.TeachState	UInt	[READ_ONLY]
DeviceData.Data.DataStorageUploadFlag	UInt	[READ_ONLY] Priority of local changes according to configuration data stored in master DS
DeviceData.Data.Gain	UInt	[READ_ONLY] Current Gain Control Output Value
DeviceData.Data.Reserved01	UInt	[READ_ONLY] Reserved For Future Use; Read Only Access
DeviceData.Data.SwitchingOutputProperty	UInt	[READ_WRITE] General Behaviour of All Switching Outputs with No Available Measure Value
DeviceData.Data.Q1LightDark	UInt	[READ_WRITE] Output Q1: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2

Parameter name	Data type	Description
DeviceData.Data.Q1EvaluationDepth	UInt	[READ_WRITE] Q1 Output Changes are Delayed By This Number of Unchanged Measurement Results
DeviceData.Data.Q1HysteresisClass	UInt	[READ_WRITE] Q1 Hysteresis Adjustment (Raw, Medium or Fine)
DeviceData.Data.Q1ReserveClass	UInt	[READ_WRITE] Q1 Reserve Adjustment (Raw, Medium or Fine)
DeviceData.Data.Q2LightDark	UInt	[READ_WRITE] Output Q2: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2
DeviceData.Data.Q2EvaluationDepth	UInt	[READ_WRITE] Q2 Output Changes are Delayed By This Number of Unchanged Measurement Results
DeviceData.Data.Q2HysteresisClass	UInt	[READ_WRITE] Q2 Hysteresis Adjustment (Raw, Medium or Fine)
DeviceData.Data.Q2ReserveClass	UInt	[READ_WRITE] Q2 Reserve Adjustment (Raw, Medium or Fine)
DeviceData.Data.MinimumGain	UInt	[READ_WRITE] Sets Lower Limit Of Gain Control (if Min less than Max)
DeviceData.Data.MaximumGain	UInt	[READ_WRITE] Sets Upper Limit Of Gain Control (if Min less than Max)
DeviceData.Data.XdrExtendedDynamicRange	UInt	[READ_WRITE] Improves the measurement behavior in case of extreme contrast differences.
DeviceData.Data.Reserved03	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved04	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved05	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved06	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved07	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved08	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved09	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.Reserved10	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access

Parameter name	Data type	Description
DeviceData.Data.Reserved11	UInt	[READ_WRITE] Reserved For Future Use; Read/Write Access
DeviceData.Data.FunctionButton1Level1	UInt	[READ_ONLY] Function Being Called When Button #1 Is Released After 2..7 Seconds
DeviceData.Data.FunctionButton1Level2	UInt	[READ_ONLY] Function Being Called When Button #1 Is Released After 7..12 Seconds
DeviceData.Data.FunctionButton1Level3	UInt	[READ_ONLY] Function Being Called When Button #1 Is Released After 12..17 Seconds
DeviceData.Data.FunctionButton2Level1	UInt	[READ_ONLY] Function Being Called When Button #2 Is Released After 2..7 Seconds
DeviceData.Data.FunctionButton2Level2	UInt	[READ_ONLY] Function Being Called When Button #2 Is Released After 7..12 Seconds
DeviceData.Data.FunctionButton2Level3	UInt	[READ_ONLY] Function Being Called When Button #2 Is Released After 12..17 Seconds
DeviceData.Data.FunctionButton3Level1	UInt	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 2..7 Seconds
DeviceData.Data.FunctionButton3Level2	UInt	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 7..12 Seconds
DeviceData.Data.FunctionButton3Level3	UInt	[READ_ONLY] Function Being Called When Both Buttons Together Are Released After 12..17 Seconds
DeviceData.Data.FunctionWireLevel1	UInt	[READ_ONLY] Function Being Called With Selection Width of 20..80 ms On Input Wire
DeviceData.Data.FunctionWireLevel2	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 120..180 ms On Wire Input
DeviceData.Data.FunctionWireLevel3	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 220..280 ms On Wire Input
DeviceData.Data.FunctionWireLevel4	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 320..380 ms On Wire Input
DeviceData.Data.FunctionWireLevel5	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 420..480 ms On Wire Input



Parameter name	Data type	Description
DeviceData.Data.FunctionWireLevel6	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 520..580 ms On Wire Input
DeviceData.Data.FunctionWireLevel7	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 620..680 ms On Wire Input
DeviceData.Data.FunctionWireLevel8	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 720..780 ms On Wire Input
DeviceData.Data.FunctionWireLevel9	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 820..880 ms On Wire Input
DeviceData.Data.FunctionWireLevel10	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 920..980 ms On Wire Input
DeviceData.Data.FunctionWireLevel11	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 1020..1080 ms On Wire Input
DeviceData.Data.FunctionWireLevel12	UInt	[READ_ONLY] Function Being Called With Low Pulse Width of 1120..1180 ms On Wire Input
DeviceData.Data.DefaultValueTest	UInt	[READ_WRITE] Default Value Test

Tab. 7.2: Leuze\_type\_PD\_HT10\_2098

Parameter name	Data type	Description
FC_Leuze_PD_HT10_2098.Q1OutputState	Bool	
FC_Leuze_PD_HT10_2098.Q2OutputState	Bool	
FC_Leuze_PD_HT10_2098.Q3OutputState	Bool	
FC_Leuze_PD_HT10_2098.MeasureState	Bool	
FC_Leuze_PD_HT10_2098.ReceivedSignal	Bool	
FC_Leuze_PD_HT10_2098.WarningReducedAccuracy	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
Clear Configuration Reservation (Clear DsUploadFlag)			UIntegerT	160	W	Clear Configuration Reservation (Clear DsUploadFlag)
Reserve Configuration for DS (Set DsUploadFlag)			UIntegerT	161	W	Reserve Configuration for DS (Set DsUploadFlag)
Activation			UIntegerT	176	W	Activation
Deactivation			UIntegerT	177	W	Deactivation
Teach-In of Q1 in Object Mode			UIntegerT	197	W	Teach-In of Q1 in Object Mode
Teach-In of Q2 in Object Mode			UIntegerT	198	W	Teach-In of Q2 in Object Mode
Teach-In of Q3 in Object Mode			UIntegerT	199	W	Teach-In of Q3 in Object Mode
Teach-In of Q1 in Background Mode			UIntegerT	200	W	Teach-In of Q1 in Background Mode
Teach-In of Q2 in Background Mode			UIntegerT	201	W	Teach-In of Q2 in Background Mode
Teach-In of Q3 in Background Mode			UIntegerT	202	W	Teach-In of Q3 in Background Mode
Teach-In of Q1 in Window Mode			UIntegerT	203	W	Teach-In of Q1 in Window Mode
Teach-In of Q2 in Window Mode			UIntegerT	204	W	Teach-In of Q2 in Window Mode
Teach-In of Q3 in Window Mode			UIntegerT	205	W	Teach-In of Q3 in Window Mode
Teach-In of Q1 Upper Switching Point (SP1)			UIntegerT	206	W	Teach-In of Q1 Upper Switching Point (SP1)
Teach-In of Q2 Upper Switching Point (SP1)			UIntegerT	207	W	Teach-In of Q2 Upper Switching Point (SP1)
Teach-In of Q3 Upper Switching Point (SP1)			UIntegerT	208	W	Teach-In of Q3 Upper Switching Point (SP1)
Teach-In of Q1 Lower Switching Point (SP2)			UIntegerT	209	W	Teach-In of Q1 Lower Switching Point (SP2)
Teach-In of Q2 Lower Switching Point (SP2)			UIntegerT	210	W	Teach-In of Q2 Lower Switching Point (SP2)
Teach-In of Q3 Lower Switching Point (SP2)			UIntegerT	211	W	Teach-In of Q3 Lower Switching Point (SP2)
Direct Parameters 1	0	0	RecordT		RW	

Parameter	Index	Subindex	Data type	Default	AR	Description
Reserved	0	1	UIntegerT		R	
Master Cycle Time	0	2	UIntegerT		R	
Min Cycle Time	0	3	UIntegerT		R	
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	128	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	

Parameter	Index	Subindex	Data type	Default	AR	Description
Device Specific Parameter 10	1	10	UIntegerT		RW	
Device Specific Parameter 11	1	11	UIntegerT		RW	
Device Specific Parameter 12	1	12	UIntegerT		RW	
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	128	W	(0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved 160: Clear Configuration Reservation (Clear DsUploadFlag) 161: Reserve Configuration for DS (Set DsUploadFlag) 176: Activation 177: Deactivation 197: Teach-In of Q1 in Object Mode 198: Teach-In of Q2 in Object Mode 199: Teach-In of Q3 in Object Mode 200: Teach-In of Q1 in Background Mode 201: Teach-In of Q2 in Background Mode 202: Teach-In of Q3 in Background Mode 203: Teach-In of Q1 in Window Mode 204: Teach-In of Q2 in Window Mode 205: Teach-In of Q3 in Window Mode 206: Teach-In of Q1 Upper Switching Point (SP1) 207: Teach-In of Q2 Upper Switching Point (SP1) 208: Teach-In of Q3 Upper Switching Point (SP1) 209: Teach-In of Q1 Lower Switching Point (SP2) 210: Teach-In of Q2 Lower Switching Point (SP2) 211: Teach-In of Q3 Lower Switching Point (SP2)
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	

Parameter	Index	Subindex	Data type	Default	AR	Description
Vendor Name	16	0	StringT		R	
Vendor Text	17	0	StringT		R	
Product Name	18	0	StringT		R	
Product ID	19	0	StringT		R	
Product Text	20	0	StringT		R	
Serial Number	21	0	StringT		R	
Hardware Version	22	0	StringT		R	
Firmware Version	23	0	StringT		R	
Application Specific Tag	24	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
Status Information	71	0	RecordT		R	Process Input Data with Status Information
Q1 Output State	71	1	BooleanT		R	False: Q1 Off True: Q1 On
Q2 Output State	71	2	BooleanT		R	False: Q2 Off True: Q2 On
Q3 Output State	71	3	BooleanT		R	False: Q3 Off True: Q3 On
Measure State	71	4	BooleanT		R	False: No Measure (Startup, Teach or Deactivated) True: Measure is Running
Received Signal	71	5	BooleanT		R	False: No Signal: no measure value available True: Signal and measurement value available
Warning: reduced accuracy	71	6	BooleanT		R	False: No Warning True: Warning
Extended Status	72	0	RecordT		R	Deactivation and Error Status, Warning Details, Teach State
Deactivation Flag	72	1	BooleanT		R	False: Laser is On, Measure is Running True: Laser is Off, No Measure
Laser Error Flag	72	2	BooleanT		R	False: No Laser Error True: Laser Error
Signal Amplitude Flag	72	3	BooleanT		R	False: Amplitude out of Range True: Amplitude in Range
Target Brightness	72	4	UIntegerT		R	0: In Range 1: Too Light 2: Too Dark
Teach State	72	5	UIntegerT		R	0: Idle, No Teach Since Power Up 5: Busy, Teach is Running 7: Idle, Last Teach Failed 13: Idle, Last Teach Succeeded

Parameter	Index	Subindex	Data type	Default	AR	Description
Data Storage Upload Flag	73	0	UIntegerT		R	Priority of local changes according to 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)
Gain	74	0	UIntegerT		R	Current Gain Control Output Value
Reserved01	75	0	UIntegerT		R	Reserved For Future Use; Read Only Access
Switching Output Property	82	0	UIntegerT		RW	General Behaviour of All Switching Outputs with No Available Measure Value  0: Switching Off 1: Switching On 2: Unchanged
Q1 Light/Dark	85	0	UIntegerT		RW	Output Q1: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2  0: Light Switching 1: Dark Switching
Q1 Evaluation Depth	89	0	UIntegerT		RW	Q1 Output Changes are Delayed By This Number of Unchanged Measurement Results
Q1 Hysteresis Class	90	0	UIntegerT		RW	Q1 Hysteresis Adjustment (Raw, Medium or Fine)  0: Raw 1: Medium 2: Fine
Q1 Reserve Class	91	0	UIntegerT		RW	Q1 Reserve Adjustment (Raw, Medium or Fine)  0: Raw 1: Medium 2: Fine
Q2 Light/Dark	94	0	UIntegerT		RW	Output Q2: Light or Dark Switching Selection: Light=Output Active (On) between SP1 and SP2  0: Light Switching 1: Dark Switching
Q2 Evaluation Depth	98	0	UIntegerT		RW	Q2 Output Changes are Delayed By This Number of Unchanged Measurement Results
Q2 Hysteresis Class	99	0	UIntegerT		RW	Q2 Hysteresis Adjustment (Raw, Medium or Fine)  0: Raw 1: Medium 2: Fine
Q2 Reserve Class	100	0	UIntegerT		RW	Q2 Reserve Adjustment (Raw, Medium or Fine)  0: Raw 1: Medium 2: Fine

Parameter	Index	Subindex	Data type	Default	AR	Description
Minimum Gain	123	0	UIntegerT		RW	Sets Lower Limit Of Gain Control (if Min less than Max) (0 ... 4095)
Maximum Gain	124	0	UIntegerT		RW	Sets Upper Limit Of Gain Control (if Min less than Max) (0 ... 4095)
XDR - Extended Dynamic Range	125	0	UIntegerT		RW	Improves the measurement behavior in case of extreme contrast differences. 0: XDR Off 3: XDR On
Reserved03	126	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved04	127	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved05	128	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved06	129	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved07	136	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved08	137	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved09	138	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved10	139	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access
Reserved11	140	0	UIntegerT		RW	Reserved For Future Use; Read/Write Access

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #1 Level #1	187	0	UIntegerT		R	<p>Function Being Called When Button #1 Is Released After 2..7 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>



Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #1 Level #2	188	0	UIntegerT		R	<p>Function Being Called When Button #1 Is Released After 7..12 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #1 Level #3	189	0	UIntegerT		R	<p>Function Being Called When Button #1 Is Released After 12..17 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #2 Level #1	192	0	UIntegerT		R	<p>Function Being Called When Button #2 Is Released After 2..7 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #2 Level #2	193	0	UIntegerT		R	<p>Function Being Called When Button #2 Is Released After 7..12 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #2 Level #3	194	0	UIntegerT		R	<p>Function Being Called When Button #2 Is Released After 12..17 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #3 Level #1	197	0	UIntegerT		R	<p>Function Being Called When Both Buttons Together Are Released After 2..7 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #3 Level #2	198	0	UIntegerT		R	<p>Function Being Called When Both Buttons Together Are Released After 7..12 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Button #3 Level #3	199	0	UIntegerT		R	<p>Function Being Called When Both Buttons Together Are Released After 12..17 Seconds</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>



Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #1	200	0	UIntegerT		R	<p>Function Being Called With Selection Width of 20..80 ms On Input Wire</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #2	201	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 120..180 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #3	202	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 220..280 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #4	203	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 320..380 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #5	204	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 420..480 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #6	205	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 520..580 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #7	206	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 620..680 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #8	207	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 720..780 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>



Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #9	208	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 820..880 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #10	209	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 920..980 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #11	210	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 1020..1080 ms On Wire Input</p> <p>0: No Function  1: Teach-In of Q1 in ODS Auto Mode  2: Teach-In of Q2 in ODS Auto Mode  3: Teach-In of Q3 in ODS Auto Mode  4: Teach-In of Analog Minimum Value  5: Teach-In of Analog Maximum Value  6: Teach-In of Q1 in Object Mode  7: Teach-In of Q2 in Object Mode  8: Teach-In of Q3 in Object Mode  9: Teach-In of Q1 in Background Mode  10: Teach-In of Q2 in Background Mode  11: Teach-In of Q3 in Background Mode  12: Teach-In of Q1 in Window Mode  13: Teach-In of Q2 in Window Mode  14: Teach-In of Q3 in Window Mode  15: Teach-In of Q1 Upper Switching Point (SP1)  16: Teach-In of Q2 Upper Switching Point (SP1)  17: Teach-In of Q3 Upper Switching Point (SP1)  18: Teach-In of Q1 Lower Switching Point (SP2)  19: Teach-In of Q2 Lower Switching Point (SP2)  20: Teach-In of Q3 Lower Switching Point (SP2)  21: Toggle Q1 Light/Dark Switching  22: Toggle Q2 Light/Dark Switching  23: Toggle Q3 Light/Dark Switching  24: Set Q1 Light Switching  25: Set Q1 Dark Switching  26: Set Q2 Light Switching  27: Set Q3 Dark Switching  28: Set Q3 Light Switching  29: Set Q3 Dark Switching  30: No Function</p>

Parameter	Index	Subindex	Data type	Default	AR	Description
Function Wire Level #12	211	0	UIntegerT		R	<p>Function Being Called With Low Pulse Width of 1120..1180 ms On Wire Input</p> <p>0: No Function            1: Teach-In of Q1 in ODS Auto Mode            2: Teach-In of Q2 in ODS Auto Mode            3: Teach-In of Q3 in ODS Auto Mode            4: Teach-In of Analog Minimum Value            5: Teach-In of Analog Maximum Value            6: Teach-In of Q1 in Object Mode            7: Teach-In of Q2 in Object Mode            8: Teach-In of Q3 in Object Mode            9: Teach-In of Q1 in Background Mode            10: Teach-In of Q2 in Background Mode            11: Teach-In of Q3 in Background Mode            12: Teach-In of Q1 in Window Mode            13: Teach-In of Q2 in Window Mode            14: Teach-In of Q3 in Window Mode            15: Teach-In of Q1 Upper Switching Point (SP1)            16: Teach-In of Q2 Upper Switching Point (SP1)            17: Teach-In of Q3 Upper Switching Point (SP1)            18: Teach-In of Q1 Lower Switching Point (SP2)            19: Teach-In of Q2 Lower Switching Point (SP2)            20: Teach-In of Q3 Lower Switching Point (SP2)            21: Toggle Q1 Light/Dark Switching            22: Toggle Q2 Light/Dark Switching            23: Toggle Q3 Light/Dark Switching            24: Set Q1 Light Switching            25: Set Q1 Dark Switching            26: Set Q2 Light Switching            27: Set Q3 Dark Switching            28: Set Q3 Light Switching            29: Set Q3 Dark Switching            30: No Function</p>
Default value Test	253	0	UIntegerT	0	RW	<p>Default Value Test</p> <p>0: Default Value Test 0            1: Default Value Test 1</p>

## 9 Technical specifications

### 9.1 General data

Tab. 9.1: Sensor and IODD version

IODD version	V1.3
IODD release date	2017-5-22
Device family	Scanner with Background Suppression
Device ID	2098
Device name	HT10L1 Q1,Q2
Device variants	HT10L1.3/L6X-M12 (50128388), HT10L1.3/L6X (50129543), HT10L1.3/L6X,200-M12 (50129548), HT10L1.3/L69-M12 (50129537), HT10L1.3/L69 (50129542), HT10L1.3/L69,200-M12 (50129549), HT10L1.3/L6T-M12 (50129538), HT10L1.3/L6T (50129545), HT10L1.3/L6T,200-M12 (50129550), HT10L1.3/L6T.P1-M12 (50129539), HT10L2.3/L6T-M12 (50136145), HT10L1-25M.3/L69-M12 (50129541), HT10L1-25M.3/L69-M12 (50129547), HT10L1-25M.3/L69-M12 (50129552)