

PLC Integration of DRT25C_2139

IO-Link service data function block + process data parser function for Beckhoff (TwinCAT 3.x) PLC systems in combination with a EtherCAT IO-Link Master

© 2021

Leuze electronic GmbH & Co. KG

In der Braike 1

D-73277 Owen / Germany

Phone: +49 7021 573-0

Fax: +49 7021 573-199

<http://www.leuze.com>

info@leuze.com

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.....10**
- 7 Data structures..... 11**
- 8 Parameter descriptions..... 18**
- 9 Technical specifications..... 28**
 - 9.1 General data..... 28

1 Legal information


1.1 Disclaimer

With the installation, copying or other use of this software product, you agree to the following conditions of use. If you do not agree with the conditions, do not install this software product. If you received the software product by means of download, terminate the download and delete all files that have already been downloaded.

This software product is protected by European and U.S. copyright law and international treaty provisions. You are in no way authorized to rent, lease, lend or sell the software or parts thereof to third parties.

Before you link the library, please close all unnecessary programs to avoid loss of data.

We highly recommend installing the software on a computer which is not already used in the production process or is needed for storing important data. It cannot be completely excluded that existing files will be changed or overwritten. Leuze electronic GmbH & Co. KG is not liable for damages and data loss that result from this installation or the failure to observe this warning notice.

	NOTICE
	<p>Observe the operating instructions!</p> <ul style="list-style-type: none">👉 Observe all safety notices provided in the operating instructions for these devices. Leuze electronic GmbH & Co. KG is not liable for personal injury and property damage that result from failure to comply with these safety notices.👉 Download the operating instructions for these devices at www.leuze.com.

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_IOL_ DRT25C_2139" simplifies the usage of Leuze IO-Link devices on Beckhoff (TwinCAT 3.x) PLC controls. This FB supports IO-Link Masters which can be connected via EtherCAT 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



Fig. 3.1: Example of module call

3.3 Configuration

Tab. 3.1: Parameter IN

Parameter	Data type	Description
bExecute	Bool	Positive trigger: Start data transfer
bRW	Bool	Read or write the selected IO-Link parameter. FALSE: Read parameter TRUE: Write Parameter
nPort	T_AmsPort	Port number of the ADS device.
sNetId	T_AmsNetID	String containing the AMS network identifier of the target device to which the ADS command is directed. Beckhoff EL6224/EP6224: AoeNetId of the IO-Link Master
nIdxGroup	UDInt	Index group number.
tTimeOut	Time	Time, after a Timeout-Error is triggered.

Tab. 3.2: Parameter INOUT

Parameter	Data type	Description
stDeviceData	ST_Leuze_IOL_ DRT25C_2139	Sensor data

See structure description of ST_Leuze_IOL_ DRT25C_2139 in chapter 7.

Tab. 3.3: Parameter OUT

Parameter	Data type	Description
bDone	Bool	Indicates whether data is valid.

Parameter	Data type	Description
bBusy	Bool	Request in process. FALSE: Request is terminated TRUE: Request is being processed
bError	Bool	Error flag FALSE: No error TRUE: Error detected
stErrorCode	ST_Leuze_IOL_Error	Status of the function block

See structure description of ST_Leuze_IOL_Error in chapter 6.

3.4 Method of function

The function block uses the data structure "ST_Leuze_IOL_ DRT25C_2139". 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 "bRW" = FALSE to read parameter. The value that should be written can be defined in the data structure, as soon as the input parameter "bRW" = TRUE. You start each transfer by calling up the "FB_Leuze_IOL_ DRT25C_2139" with a positive trigger at the "bExecute" input. As long as there is no valid answer the output "bBusy" 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 "bDone" = TRUE output shows that the transmission was successful. The outputs retain there states as long as there is no new positive trigger at the "bExecute" input again.

The function block allows you to read or write multiple IO-Link parameters sequentially (multi-selection). 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 (bError) is set and an error code (ST_Leuze_IOL_Error) 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_IOL_DRT25C_2139" is a part of the TwinCAT V3.x library. The library can be installed by using the Library Repository. Afterwards the library can be added to your project (References --> Add library...).

Integration step by step:

- Download the library
- Open the Library repository in Library Manager tab in Beckhoff TwinCAT
- Click Install... and select downloaded library
- Open Add library in Library Manager tab
- Find installed library under Leuze electronic GmbH + Co. KG

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 F_Leuze_PD_DRT25C_2139 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.

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

5.1 Calling and designation

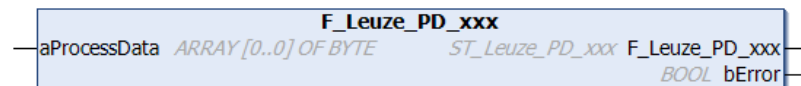


Fig. 5.1: Example of process data parsing function call

5.2 Configuration

Tab. 5.1: Parameters

Parameter name	Declaration	Data type	Description
aProcessData	INPUT	ARRAY OF BYTE	Raw process data of the IO-Link device.
nPDMode	INPUT	INT	Mode of the PD. User must select mode of PD according to the sensors settings.
bError	OUTPUT	BOOL	Error flag FALSE: No error TRUE: Error detected
F_Leuze_PD_DRT25C_2139	OUTPUT	ST_Leuze_PD_DRT25C_2139	Reference to the instance of the data structure ST_Leuze_PD_DRT25C_2139. The structure includes the disaggregated values of the process data.

See structure description of ST_Leuze_PD_DRT25C_2139 in chapter 7.

6 Error description

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

Tab. 6.1: ST_Leuze_IOL_Error description

Parameter name	Data type	Description
ErrorStatus.nBlockError	WORD	Error number representing FB where error occurred
ErrorStatus.nAdsReadError	UDINT	ADS read error code
ErrorStatus.nAdsWriteError	UDINT	ADS write error code
ErrorStatus.nIndex	INT	IO-Link index to which the error code refers
ErrorStatus.nSubIndex	INT	IO-Link sub-index to which the error code refers

Tab. 6.2: Error description for nBlockError

Error code (nBlockError)	Error description
0x0000	No error
0x8001	Time out error occurred
0x8002	No parameter selected
0x8003	Error in FB_Leuze_IOL_AdsReadWrite block

For additional information see the Beckhoff ADS Return Codes (<https://infosys.beckhoff.com>).

7 Data structures

Tab. 7.1: ST_Leuze_IOL_DRT25C_2139

Parameter name	Data type	Description
stDeviceData.stSelection.stCommands.bDeviceReset	BOOL	[WRITE_ONLY] Device Reset
stDeviceData.stSelection.stCommands.bApplicationReset	BOOL	[WRITE_ONLY] Application Reset
stDeviceData.stSelection.stCommands.bRestoreFactorySettings	BOOL	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stSelection.stCommands.bTeachOnReference	BOOL	[WRITE_ONLY] Teach on Reference
stDeviceData.stSelection.stDirectParameters1.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stDirectParameters1.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stDirectParameters1.bReserved_1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMasterCycleTime	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMinCycleTime	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMSequenceCapability	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bIoLinkVersionId	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bProcessDataInputLength	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bProcessDataOutputLength	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bVendorId1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bVendorId2	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId2	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId3	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_13	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_14	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_15	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters2.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter1	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter2	BOOL	[READ_WRITE]

Parameter name	Data type	Description
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter3	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter4	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter5	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter6	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter7	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter8	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter9	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter10	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter11	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter12	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter13	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter14	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter15	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter16	BOOL	[READ_WRITE]
stDeviceData.stSelection.bStandardCommand	BOOL	[WRITE_ONLY]
stDeviceData.stSelection.stDeviceAccessLocks.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stProfileCharacteristic.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bVendorName	BOOL	[READ_ONLY]
stDeviceData.stSelection.bVendorText	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductName	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductId	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductText	BOOL	[READ_ONLY]
stDeviceData.stSelection.bSerialNumber	BOOL	[READ_ONLY]
stDeviceData.stSelection.bHardwareVersion	BOOL	[READ_ONLY]
stDeviceData.stSelection.bFirmwareVersion	BOOL	[READ_ONLY]
stDeviceData.stSelection.bApplicationSpecificTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bFunctionTag	BOOL	[READ_WRITE]

Parameter name	Data type	Description
stDeviceData.stSelection.bLocationTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bDeviceStatus	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDetailedDeviceStatus.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bSsc1Logic	BOOL	[READ_WRITE] SSC1 Logic
stDeviceData.stSelection.stTeachResult.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bTeachThresholdSelect	BOOL	[READ_WRITE] Teach Threshold Select
stDeviceData.stSelection.bTrackingAmplificationWarning	BOOL	[READ_WRITE] Tracking Amplification Warning
stDeviceData.stSelection.bAnalysisDepth	BOOL	[READ_WRITE] number of scans considered for the switching output to toggle
stDeviceData.stSelection.bTrackingEnable	BOOL	[READ_WRITE] Tracking enable
stDeviceData.stSelection.bTimerUnit	BOOL	[READ_WRITE] timer unit
stDeviceData.stSelection.bFunctionOfTimerUnit	BOOL	[READ_WRITE] function of timer unit
stDeviceData.stSelection.bTime_194	BOOL	[READ_WRITE] time
stDeviceData.stSelection.bNumberOfObjects	BOOL	[READ_WRITE] internal object counter
stDeviceData.stSelection.bWireFunctionLevel1	BOOL	[READ_WRITE] Wire function level 1
stDeviceData.stSelection.bWireFunctionLevel2	BOOL	[READ_WRITE] Wire function level 2
stDeviceData.stSelection.bWireFunctionLevel3	BOOL	[READ_WRITE] Wire function level 3
stDeviceData.stSelection.bWireFunctionLevel4	BOOL	[READ_WRITE] Wire function level 4
stDeviceData.stSelection.bWireFunctionLevel5	BOOL	[READ_WRITE] Wire function level 5
stDeviceData.stSelection.bWireFunctionLevel6	BOOL	[READ_WRITE] Wire function level 6
stDeviceData.stSelection.bWireFunctionLevel7	BOOL	[READ_WRITE] Wire function level 7
stDeviceData.stSelection.bWireFunctionLevel8	BOOL	[READ_WRITE] Wire function level 8
stDeviceData.stSelection.bWireFunctionLevel9	BOOL	[READ_WRITE] Wire function level 9
stDeviceData.stSelection.bWireFunctionLevel10	BOOL	[READ_WRITE] Wire function level 10
stDeviceData.stSelection.bWireFunctionLevel11	BOOL	[READ_WRITE] Wire function level 11
stDeviceData.stSelection.bWireFunctionLevel12	BOOL	[READ_WRITE] Wire function level 12
stDeviceData.stSelection.bButtonFunctionLevel1	BOOL	[READ_WRITE] Button function level 1

Parameter name	Data type	Description
stDeviceData.stSelection.bButtonFunctionLevel2	BOOL	[READ_WRITE] Button function level 2
stDeviceData.stSelection.bButtonFunctionLevel3	BOOL	[READ_WRITE] Button function level 3
stDeviceData.stSelection.bPin4Function	BOOL	[READ_WRITE] Pin 4 function
stDeviceData.stSelection.bPin2Function	BOOL	[READ_ONLY] Pin 2 function
stDeviceData.stData.stCommands.nDeviceReset	UINT	[WRITE_ONLY] Device Reset
stDeviceData.stData.stCommands.nApplicationReset	UINT	[WRITE_ONLY] Application Reset
stDeviceData.stData.stCommands.nRestoreFactorySettings	UINT	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stData.stCommands.nTeachOnReference	UINT	[WRITE_ONLY] Teach on Reference
stDeviceData.stData.stDirectParameters1.nReserved_1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMasterCycleTime	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMinCycleTime	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMSequenceCapability	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nIoLinkVersionId	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nProcessDataInputLength	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nProcessDataOutputLength	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nVendorId1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nVendorId2	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId2	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId3	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nReserved_13	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nReserved_14	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nReserved_15	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter1	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter2	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter3	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter4	UINT	[READ_WRITE]

Parameter name	Data type	Description
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter5	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter6	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter7	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter8	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter9	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter10	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter11	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter12	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter13	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter14	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter15	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2. nDeviceSpecificParameter16	UINT	[READ_WRITE]
stDeviceData.stData.nStandardCommand	UINT	[WRITE_ONLY]
stDeviceData.stData.stDeviceAccessLocks. bParameterWriteAccessLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks.bDataStorageLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks. bLocalParameterizationLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks. bLocalUserInterfaceLock	BOOL	[READ_WRITE]
stDeviceData.stData.stProfileCharacteristic.nDeviceProfile1	UINT	[READ_ONLY] 0x0001: Generic Profiled Sensor
stDeviceData.stData.stProfileCharacteristic.nDeviceProfile2	UINT	[READ_ONLY] 0x000C: Fixed Switching Sensor, disable function (SSP 1.2)
stDeviceData.stData.stProfileCharacteristic.nApplicationProfile	UINT	[READ_ONLY] 0x4000: Identification and Diagnosis
stDeviceData.stData.stProfileCharacteristic.nFunctionClass1	UINT	[READ_ONLY] 0x8007: Switching Signal Channel
stDeviceData.stData.sVendorName	STRING	[READ_ONLY]
stDeviceData.stData.sVendorText	STRING	[READ_ONLY]
stDeviceData.stData.sProductName	STRING	[READ_ONLY]
stDeviceData.stData.sProductId	STRING	[READ_ONLY]
stDeviceData.stData.sProductText	STRING	[READ_ONLY]
stDeviceData.stData.sSerialNumber	STRING	[READ_ONLY]

Parameter name	Data type	Description
stDeviceData.stData.sHardwareVersion	STRING	[READ_ONLY]
stDeviceData.stData.sFirmwareVersion	STRING	[READ_ONLY]
stDeviceData.stData.sApplicationSpecificTag	STRING	[READ_WRITE]
stDeviceData.stData.sFunctionTag	STRING	[READ_WRITE]
stDeviceData.stData.sLocationTag	STRING	[READ_WRITE]
stDeviceData.stData.nDeviceStatus	UINT	[READ_ONLY]
stDeviceData.stData.stDetailedDeviceStatus.sltem_1	STRING	[READ_ONLY]
stDeviceData.stData.stDetailedDeviceStatus.sltem_2	STRING	[READ_ONLY]
stDeviceData.stData.nSsc1Logic	UINT	[READ_WRITE] SSC1 Logic
stDeviceData.stData.stTeachResult.nTiResultState	UINT	[READ_ONLY]
stDeviceData.stData.stTeachResult.bTiResultFlagSp1Tp1	BOOL	[READ_ONLY]
stDeviceData.stData.stTeachResult.bTiResultFlagSp1Tp2	BOOL	[READ_ONLY]
stDeviceData.stData.stTeachResult.bTiResultFlagSp2Tp1	BOOL	[READ_ONLY]
stDeviceData.stData.stTeachResult.bTiResultFlagSp2Tp2	BOOL	[READ_ONLY]
stDeviceData.stData.nTeachThresholdSelect	UINT	[READ_WRITE] Teach Threshold Select
stDeviceData.stData.nTrackingAmplificationWarning	UINT	[READ_WRITE] Tracking Amplification Warning
stDeviceData.stData.nAnalysisDepth	UINT	[READ_WRITE] number of scans considered for the switching output to toggle
stDeviceData.stData.nTrackingEnable	UINT	[READ_WRITE] Tracking enable
stDeviceData.stData.nTimerUnit	UINT	[READ_WRITE] timer unit
stDeviceData.stData.nFunctionOfTimerUnit	UINT	[READ_WRITE] function of timer unit
stDeviceData.stData.nTime_194	UINT	[READ_WRITE] time
stDeviceData.stData.nNumberOfObjects	UINT	[READ_WRITE] internal object counter
stDeviceData.stData.nWireFunctionLevel1	UINT	[READ_WRITE] Wire function level 1
stDeviceData.stData.nWireFunctionLevel2	UINT	[READ_WRITE] Wire function level 2
stDeviceData.stData.nWireFunctionLevel3	UINT	[READ_WRITE] Wire function level 3
stDeviceData.stData.nWireFunctionLevel4	UINT	[READ_WRITE] Wire function level 4
stDeviceData.stData.nWireFunctionLevel5	UINT	[READ_WRITE] Wire function level 5

Parameter name	Data type	Description
stDeviceData.stData.nWireFunctionLevel6	UINT	[READ_WRITE] Wire function level 6
stDeviceData.stData.nWireFunctionLevel7	UINT	[READ_WRITE] Wire function level 7
stDeviceData.stData.nWireFunctionLevel8	UINT	[READ_WRITE] Wire function level 8
stDeviceData.stData.nWireFunctionLevel9	UINT	[READ_WRITE] Wire function level 9
stDeviceData.stData.nWireFunctionLevel10	UINT	[READ_WRITE] Wire function level 10
stDeviceData.stData.nWireFunctionLevel11	UINT	[READ_WRITE] Wire function level 11
stDeviceData.stData.nWireFunctionLevel12	UINT	[READ_WRITE] Wire function level 12
stDeviceData.stData.nButtonFunctionLevel1	INT	[READ_WRITE] Button function level 1
stDeviceData.stData.nButtonFunctionLevel2	INT	[READ_WRITE] Button function level 2
stDeviceData.stData.nButtonFunctionLevel3	INT	[READ_WRITE] Button function level 3
stDeviceData.stData.nPin4Function	UINT	[READ_WRITE] Pin 4 function
stDeviceData.stData.nPin2Function	UINT	[READ_ONLY] Pin 2 function

Tab. 7.2: ST_Leuze_PD_DRT25C_2139

Parameter name	Data type	Description
ST_Leuze_PD_DRT25C_2139.bSsc1	BOOL	
ST_Leuze_PD_DRT25C_2139.bMeasure	BOOL	
ST_Leuze_PD_DRT25C_2139.bSignal	BOOL	
ST_Leuze_PD_DRT25C_2139.bWarning	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 on Reference			UIntegerT	65	W	Teach on Reference
Direct Parameters 1	0	0	RecordT		RW	
Reserved	0	1	UIntegerT		R	
Master Cycle Time	0	2	UIntegerT	0	R	
Min Cycle Time	0	3	UIntegerT	4	R	
M-Sequence Capability	0	4	UIntegerT	1	R	
IO-Link Version ID	0	5	UIntegerT	17	R	
Process Data Input Length	0	6	UIntegerT	72	R	
Process Data Output Length	0	7	UIntegerT	8	R	
Vendor ID 1	0	8	UIntegerT	1	R	
Vendor ID 2	0	9	UIntegerT	82	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	

Parameter	Index	Subindex	Data type	Default	AR	Description
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	
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 on Reference
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

Parameter	Index	Subindex	Data type	Default	AR	Description
Device Profile 1	13	1	UIntegerT	1	R	0x0001: Generic Profiled Sensor 1: 0x0001: Generic Profiled Sensor 16384: 0x4000: Identification and Diagnosis 32775: 0x8007: Teach-in single value (SSP 2.0) 32780: 0x800C: TransducerDisable (SSP 2.0)
Device Profile 2	13	2	UIntegerT	16384	R	0x000C: Fixed Switching Sensor, disable function (SSP 1.2) 1: 0x0001: Generic Profiled Sensor 16384: 0x4000: Identification and Diagnosis 32775: 0x8007: Teach-in single value (SSP 2.0) 32780: 0x800C: TransducerDisable (SSP 2.0)
Application Profile	13	3	UIntegerT	32775	R	0x4000: Identification and Diagnosis 1: 0x0001: Generic Profiled Sensor 16384: 0x4000: Identification and Diagnosis 32775: 0x8007: Teach-in single value (SSP 2.0) 32780: 0x800C: TransducerDisable (SSP 2.0)
Function Class 1	13	4	UIntegerT	32780	R	0x8007: Switching Signal Channel 1: 0x0001: Generic Profiled Sensor 16384: 0x4000: Identification and Diagnosis 32775: 0x8007: Teach-in single value (SSP 2.0) 32780: 0x800C: TransducerDisable (SSP 2.0)
Vendor Name	16	0	StringT	Leuze electronic GmbH + Co. KG	R	
Vendor Text	17	0	StringT	The Sensor People	R	
Product Name	18	0	StringT		R	
Product ID	19	0	StringT		R	
Product Text	20	0	StringT	Dynamic reference scanner	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	
Function Tag	25	0	StringT	***	RW	

Parameter	Index	Subindex	Data type	Default	AR	Description
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	
SSC1 Logic	57	0	UIntegerT	0	RW	SSC1 Logic 0: light switching (high active) 1: dark switching (low active)
Teach result	59	0	RecordT		R	Teach-In Ergebnis (Teachstatus und erfolgsanzeigende Flags)
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
Teach Threshold Select	65	0	UIntegerT	1	RW	Teach Threshold Select 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 (for future use) 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use)
Tracking Amplification Warning	100	0	UIntegerT	950	RW	Tracking Amplification Warning (100 ... 1000)
analysis depth	190	0	UIntegerT	6	RW	number of scans considered for the switching output to toggle (1 ... 100)
Tracking enable	191	0	UIntegerT	255	RW	Tracking enable 255: Tracking enabled 0: Tracking disabled

Parameter	Index	Subindex	Data type	Default	AR	Description
timer unit	192	0	UIntegerT	0	RW	timer unit 0: off 255: on
function of timer unit	193	0	UIntegerT	0	RW	function of timer unit 0: on delay 1: off delay 2: pulse stretching 3: pulse suppression
time	194	0	UIntegerT	200	RW	time (1 ... 50000)
number of objects	195	0	UIntegerT		RW	internal object counter
Wire function level 1	201	0	UIntegerT	1	RW	Wire function level 1 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 2	202	0	UIntegerT	2	RW	Wire function level 2 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8

Parameter	Index	Subindex	Data type	Default	AR	Description
Wire function level 3	203	0	UIntegerT	3	RW	Wire function level 3 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 4	204	0	UIntegerT	4	RW	Wire function level 4 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 5	205	0	UIntegerT	5	RW	Wire function level 5 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8

Parameter	Index	Subindex	Data type	Default	AR	Description
Wire function level 6	206	0	UIntegerT	6	RW	Wire function level 6 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 7	207	0	UIntegerT	19	RW	Wire function level 7 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 8	208	0	UIntegerT	20	RW	Wire function level 8 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8

Parameter	Index	Subindex	Data type	Default	AR	Description
Wire function level 9	209	0	UIntegerT	22	RW	Wire function level 9 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 10	210	0	UIntegerT	23	RW	Wire function level 10 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Wire function level 11	211	0	UIntegerT	25	RW	Wire function level 11 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8

Parameter	Index	Subindex	Data type	Default	AR	Description
Wire function level 12	212	0	UIntegerT	26	RW	Wire function level 12 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 22: Reserverd 4 23: Reserverd 5 25: Reserverd 7 26: Reserverd 8
Button function level 1	241	0	IntegerT	1	RW	Button function level 1 -1: disable 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 21: Reserverd 3 22: Reserverd 4 23: Reserverd 5 24: Reserverd 6 25: Reserverd 7 26: Reserverd 8 27: Reserverd 9

Parameter	Index	Subindex	Data type	Default	AR	Description
Button function level 2	242	0	IntegerT	2	RW	Button function level 2 -1: disable 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 21: Reserverd 3 22: Reserverd 4 23: Reserverd 5 24: Reserverd 6 25: Reserverd 7 26: Reserverd 8 27: Reserverd 9
Button function level 3	243	0	IntegerT	-1	RW	Button function level 3 -1: disable 0: no function 1: Teach 1 Robust 2: Teach 2 Standard 3: Teach 3 Sensitive 4: Teach 4 (for future use) 5: Teach 5 (for future use) 6: Teach 6 (for future use) 7: Teach 7 (for future use) 8: Teach 8 (for future use) 9: Teach 9 (for future use) 10: Teach 10 (for future use) 19: Reserverd 1 20: Reserverd 2 21: Reserverd 3 22: Reserverd 4 23: Reserverd 5 24: Reserverd 6 25: Reserverd 7 26: Reserverd 8 27: Reserverd 9
Pin 4 function	251	0	UIntegerT	1	RW	Pin 4 function 0: no function 1: Output SSC1 2: Output !SSC1 7: Output Warning 8: Output !Warning
Pin 2 function	252	0	UIntegerT	14	R	Pin 2 function 14: Input wire teach

9 Technical specifications

9.1 General data

Tab. 9.1: Sensor and IODD version

IODD version	V2.1
IODD release date	2021-5-17
Device family	Dynamic reference scanner
Device ID	2139
Device name	DRT25C.3R/LT
Device variants	DRT25C.3R/LT-M12 (50145968), DRT25C.3R/LT (50145969), DRT25C.3R/LT-200-M12 (50145970), DRT25C.3R/LT-M8 (50145971)