



## PLC Integration of GSL04B\_2522

**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**

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# 1 Legal information

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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\_IOL\_GSL04B\_2522" 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_GSL04B_2522	Sensor data

See structure description of ST\_Leuze\_IOL\_GSL04B\_2522 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\_GSL04B\_2522". 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\_GSL04B\_2522" 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\_GSL04B\_2522" 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\_GSL04B\_2522 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.
nPDMMode	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_GSL04B_2522	OUTPUT	ST_Leuze_PD_GSL04B_2522	Reference to the instance of the data structure ST_Leuze_PD_GSL04B_2522. The structure includes the disaggregated values of the process data.

See structure description of ST\_Leuze\_PD\_GSL04B\_2522 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\_GSL04B\_2522

Parameter name	Data type	Description
stDeviceData.stSelection.stCommands.bCmdDeviceReset	BOOL	[WRITE_ONLY] Device Reset
stDeviceData.stSelection.stCommands.bCmdApplicationReset	BOOL	[WRITE_ONLY] Application Reset
stDeviceData.stSelection.stCommands.bCmdRestoreFactorySettings	BOOL	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stSelection.stCommands.bCmdTeachApply	BOOL	[WRITE_ONLY] Teach Apply
stDeviceData.stSelection.stCommands.bCmdSetpoint1SingleValueTeach	BOOL	[WRITE_ONLY] Setpoint 1 Single Value Teach
stDeviceData.stSelection.stCommands.bCmdSetpoint2SingleValueTeach	BOOL	[WRITE_ONLY] Setpoint 2 Single Value Teach
stDeviceData.stSelection.stCommands.bCmdTwoValueTeachTp1Sp1	BOOL	[WRITE_ONLY] Two Value Teach TP1 SP1
stDeviceData.stSelection.stCommands.bCmdTwoValueTeachTp2Sp1	BOOL	[WRITE_ONLY] Two Value Teach TP2 SP1
stDeviceData.stSelection.stCommands.bCmdTwoValueTeachTp1Sp2	BOOL	[WRITE_ONLY] Two Value Teach TP1 SP2
stDeviceData.stSelection.stCommands.bCmdTwoValueTeachTp2Sp2	BOOL	[WRITE_ONLY] Two Value Teach TP2 SP2
stDeviceData.stSelection.stCommands.bCmdSetpoint1DynamicTeachStart	BOOL	[WRITE_ONLY] Setpoint 1 Dynamic Teach Start
stDeviceData.stSelection.stCommands.bCmdSetpoint1DynamicTeachStop	BOOL	[WRITE_ONLY] Setpoint 1 Dynamic Teach Stop
stDeviceData.stSelection.stCommands.bCmdSetpoint2DynamicTeachStart	BOOL	[WRITE_ONLY] Setpoint 2 Dynamic Teach Start
stDeviceData.stSelection.stCommands.bCmdSetpoint2DynamicTeachStop	BOOL	[WRITE_ONLY] Setpoint 2 Dynamic Teach Stop
stDeviceData.stSelection.stCommands.bCmdTeachCancel	BOOL	[WRITE_ONLY] Teach Cancel
stDeviceData.stSelection.stCommands.bCmdAdoptLocalAdjustment	BOOL	[WRITE_ONLY] Adopt Local Adjustment
stDeviceData.stSelection.stCommands.bCmdResetDiagnosisInformation	BOOL	[WRITE_ONLY] Reset Diagnosis Information
stDeviceData.stSelection.stCommands.bCmdDeactivation	BOOL	[WRITE_ONLY] Deactivation
stDeviceData.stSelection.stCommands.bCmdActivation	BOOL	[WRITE_ONLY] Activation
stDeviceData.stSelection.stCommands.bCmdSingleMeasurement	BOOL	[WRITE_ONLY] Single measurement
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]

Parameter name	Data type	Description
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.bStandardCommand	BOOL	[WRITE_ONLY]
stDeviceData.stSelection.stDeviceAccessLocks.bAll	BOOL	[READ_WRITE] 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.bFirmwareVersion	BOOL	[READ_ONLY]
stDeviceData.stSelection.bApplicationSpecificTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bErrorCount	BOOL	[READ_ONLY]
stDeviceData.stSelection.bDeviceStatus	BOOL	[READ_ONLY]
stDeviceData.stSelection.stTeachState.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.stSetpoint_60.bAll	BOOL	[READ_WRITE] all parameters of complex data type

Parameter name	Data type	Description
stDeviceData.stSelection.stSetpoint_60.bBdc1q11	BOOL	[READ_WRITE] threshold measurement value
stDeviceData.stSelection.stSetpoint_60.bBdc1q12	BOOL	[READ_WRITE] threshold measurement value
stDeviceData.stSelection.stSwitchpoint_61.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stSwitchpoint_61.bLogic	BOOL	[READ_WRITE] switching information is transmitted in inverted or not inverted manner
stDeviceData.stSelection.stSwitchpoint_61.bMode	BOOL	[READ_WRITE] operation mode for binary signal
stDeviceData.stSelection.stSwitchpoint_61.bHysteresis	BOOL	[READ_WRITE]
stDeviceData.stSelection.bLot	BOOL	[READ_ONLY] production lot
stDeviceData.stSelection.bDeviceAdjustment	BOOL	[READ_WRITE] Selection of local / remote adjustment
stDeviceData.stSelection.bOnDelaySwitchingOutput	BOOL	[READ_WRITE] on delay for the binary data channel
stDeviceData.stSelection.bOffDelaySwitchingOutput	BOOL	[READ_WRITE] off delay for the binary data channel
stDeviceData.stSelection.bSwitchingOutput	BOOL	[READ_WRITE] polarity of the switching output
stDeviceData.stSelection.bSensorMode	BOOL	[READ_WRITE] sensor tuning
stDeviceData.stSelection.stTeachpoint.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.stTeachpoint.bTp1	BOOL	[READ_ONLY] detected lower limit during teach-in procedure
stDeviceData.stSelection.stTeachpoint.bTp2	BOOL	[READ_ONLY] detected upper limit during teach-in procedure
stDeviceData.stSelection.stProcessDataLimits.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.stProcessDataLimits.bLower	BOOL	[READ_ONLY] lower limit after power-up or reset
stDeviceData.stSelection.stProcessDataLimits.bUpper	BOOL	[READ_ONLY] upper limit after power-up or reset
stDeviceData.stSelection.bSwitchCounter	BOOL	[READ_ONLY] number of switching after power-up or reset
stDeviceData.stSelection.bTemperature	BOOL	[READ_ONLY] Sensor temperature
stDeviceData.stSelection.bTeachInQuality	BOOL	[READ_ONLY] Last teach in Quality
stDeviceData.stSelection.bSwitchpointPotentiometer	BOOL	[READ_ONLY] position of the local sensibility switch
stDeviceData.stSelection.bSwitchingOutputLogic	BOOL	[READ_ONLY] local switching output logic
stDeviceData.stData.stCommands.nCmdDeviceReset	UINT	[WRITE_ONLY] Device Reset

Parameter name	Data type	Description
stDeviceData.stData.stCommands.nCmdApplicationReset	UINT	[WRITE_ONLY] Application Reset
stDeviceData.stData.stCommands.nCmdRestoreFactorySettings	UINT	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stData.stCommands.nCmdTeachApply	UINT	[WRITE_ONLY] Teach Apply
stDeviceData.stData.stCommands.nCmdSetpoint1SingleValueTeach	UINT	[WRITE_ONLY] Setpoint 1 Single Value Teach
stDeviceData.stData.stCommands.nCmdSetpoint2SingleValueTeach	UINT	[WRITE_ONLY] Setpoint 2 Single Value Teach
stDeviceData.stData.stCommands.nCmdTwoValueTeachTp1Sp1	UINT	[WRITE_ONLY] Two Value Teach TP1 SP1
stDeviceData.stData.stCommands.nCmdTwoValueTeachTp2Sp1	UINT	[WRITE_ONLY] Two Value Teach TP2 SP1
stDeviceData.stData.stCommands.nCmdTwoValueTeachTp1Sp2	UINT	[WRITE_ONLY] Two Value Teach TP1 SP2
stDeviceData.stData.stCommands.nCmdTwoValueTeachTp2Sp2	UINT	[WRITE_ONLY] Two Value Teach TP2 SP2
stDeviceData.stData.stCommands.nCmdSetpoint1DynamicTeachStart	UINT	[WRITE_ONLY] Setpoint 1 Dynamic Teach Start
stDeviceData.stData.stCommands.nCmdSetpoint1DynamicTeachStop	UINT	[WRITE_ONLY] Setpoint 1 Dynamic Teach Stop
stDeviceData.stData.stCommands.nCmdSetpoint2DynamicTeachStart	UINT	[WRITE_ONLY] Setpoint 2 Dynamic Teach Start
stDeviceData.stData.stCommands.nCmdSetpoint2DynamicTeachStop	UINT	[WRITE_ONLY] Setpoint 2 Dynamic Teach Stop
stDeviceData.stData.stCommands.nCmdTeachCancel	UINT	[WRITE_ONLY] Teach Cancel
stDeviceData.stData.stCommands.nCmdAdoptLocalAdjustment	UINT	[WRITE_ONLY] Adopt Local Adjustment
stDeviceData.stData.stCommands.nCmdResetDiagnosisInformation	UINT	[WRITE_ONLY] Reset Diagnosis Information
stDeviceData.stData.stCommands.nCmdDeactivation	UINT	[WRITE_ONLY] Deactivation
stDeviceData.stData.stCommands.nCmdActivation	UINT	[WRITE_ONLY] Activation
stDeviceData.stData.stCommands.nCmdSingleMeasurement	UINT	[WRITE_ONLY] Single measurement
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]

Parameter name	Data type	Description
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.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.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.sFirmwareVersion	STRING	[READ_ONLY]
stDeviceData.stData.sApplicationSpecificTag	STRING	[READ_WRITE]
stDeviceData.stData.nErrorCount	UINT	[READ_ONLY]
stDeviceData.stData.nDeviceStatus	UINT	[READ_ONLY]
stDeviceData.stData.stTeachState.nSp2TeachPointStatus	UINT	[READ_ONLY] indication for the success of a teach point setting
stDeviceData.stData.stTeachState.nSp1TeachPointStatus_2	UINT	[READ_ONLY] indication for the success of a teach point setting
stDeviceData.stData.stTeachState.nTeachState_3	UINT	[READ_ONLY] indication of the current state of the teach-in procedure
stDeviceData.stData.stSetpoint_60.nBdc1q11	UINT	[READ_WRITE] threshold measurement value
stDeviceData.stData.stSetpoint_60.nBdc1q12	UINT	[READ_WRITE] threshold measurement value

Parameter name	Data type	Description
stDeviceData.stData.stSwitchpoint_61.nLogic	UINT	[READ_WRITE] switching information is transmitted in inverted or not inverted manner
stDeviceData.stData.stSwitchpoint_61.nMode	UINT	[READ_WRITE] operation mode for binary signal
stDeviceData.stData.stSwitchpoint_61.nHysteresis	UINT	[READ_WRITE]
stDeviceData.stData.sLot	STRING	[READ_ONLY] production lot
stDeviceData.stData.nDeviceAdjustment	UINT	[READ_WRITE] Selection of local / remote adjustment
stDeviceData.stData.nOnDelaySwitchingOutput	UINT	[READ_WRITE] on delay for the binary data channel
stDeviceData.stData.nOffDelaySwitchingOutput	UINT	[READ_WRITE] off delay for the binary data channel
stDeviceData.stData.nSwitchingOutput	UINT	[READ_WRITE] polarity of the switching output
stDeviceData.stData.nSensorMode	UINT	[READ_WRITE] sensor tuning
stDeviceData.stData.stTeachpoint.nTp1	UINT	[READ_ONLY] detected lower limit during teach-in procedure
stDeviceData.stData.stTeachpoint.nTp2	UINT	[READ_ONLY] detected upper limit during teach-in procedure
stDeviceData.stData.stProcessDataLimits.nLower	UINT	[READ_ONLY] lower limit after power-up or reset
stDeviceData.stData.stProcessDataLimits.nUpper	UINT	[READ_ONLY] upper limit after power-up or reset
stDeviceData.stData.nSwitchCounter	UINT	[READ_ONLY] number of switching after power-up or reset
stDeviceData.stData.nTemperature	INT	[READ_ONLY] Sensor temperature
stDeviceData.stData.nTeachInQuality	INT	[READ_ONLY] Last teach in Quality
stDeviceData.stData.nSwitchpointPotentiometer	UINT	[READ_ONLY] position of the local sensibility switch
stDeviceData.stData.nSwitchingOutputLogic	UINT	[READ_ONLY] local switching output logic

Tab. 7.2: ST\_Leuze\_PD\_GSL04B\_2522

Parameter name	Data type	Description
ST_Leuze_PD_GSL04B_2522.nMeasurementValue	UINT	
ST_Leuze_PD_GSL04B_2522.bStability	BOOL	
ST_Leuze_PD_GSL04B_2522.bSwitchStateBdc1Q1	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 Apply			UIntegerT	64	W	Teach Apply
Setpoint 1 Single Value Teach			UIntegerT	65	W	Setpoint 1 Single Value Teach
Setpoint 2 Single Value Teach			UIntegerT	66	W	Setpoint 2 Single Value Teach
Two Value Teach TP1 SP1			UIntegerT	67	W	Two Value Teach TP1 SP1
Two Value Teach TP2 SP1			UIntegerT	68	W	Two Value Teach TP2 SP1
Two Value Teach TP1 SP2			UIntegerT	69	W	Two Value Teach TP1 SP2
Two Value Teach TP2 SP2			UIntegerT	70	W	Two Value Teach TP2 SP2
Setpoint 1 Dynamic Teach Start			UIntegerT	71	W	Setpoint 1 Dynamic Teach Start
Setpoint 1 Dynamic Teach Stop			UIntegerT	72	W	Setpoint 1 Dynamic Teach Stop
Setpoint 2 Dynamic Teach Start			UIntegerT	73	W	Setpoint 2 Dynamic Teach Start
Setpoint 2 Dynamic Teach Stop			UIntegerT	74	W	Setpoint 2 Dynamic Teach Stop
Teach Cancel			UIntegerT	79	W	Teach Cancel
Adopt Local Adjustment			UIntegerT	160	W	Adopt Local Adjustment
Reset Diagnosis Information			UIntegerT	163	W	Reset Diagnosis Information
Deactivation			UIntegerT	164	W	Deactivation
Activation			UIntegerT	165	W	Activation
Single measurement			UIntegerT	166	W	Single measurement
IO-Link 1.1 system test command 240, Event 8DFE appears			UIntegerT	240	W	IO-Link 1.1 system test command 240, Event 8DFE appears
IO-Link 1.1 system test command 241, Event 8DFE disappears			UIntegerT	241	W	IO-Link 1.1 system test command 241, Event 8DFE disappears

Parameter	Index	Subindex	Data type	Default	AR	Description
IO-Link 1.1 system test command 242, Event 8DFF appears			UIntegerT	242	W	IO-Link 1.1 system test command 242, Event 8DFF appears
IO-Link 1.1 system test command 243, Event 8DFF disappears			UIntegerT	243	W	IO-Link 1.1 system test command 243, Event 8DFF disappears
Direct Parameters 1	0	0	RecordT		RW	
Reserved	0	1	UIntegerT		R	
Master Cycle Time	0	2	UIntegerT		R	
Min Cycle Time	0	3	UIntegerT		R	
M-Sequence Capability	0	4	UIntegerT		R	
IO-Link Version ID	0	5	UIntegerT	17	R	
Process Data Input Length	0	6	UIntegerT		R	
Process Data Output Length	0	7	UIntegerT		R	
Vendor ID 1	0	8	UIntegerT		R	
Vendor ID 2	0	9	UIntegerT		R	
Device ID 1	0	10	UIntegerT		R	
Device ID 2	0	11	UIntegerT		R	
Device ID 3	0	12	UIntegerT		R	
Reserved	0	13	UIntegerT		R	
Reserved	0	14	UIntegerT		R	
Reserved	0	15	UIntegerT		R	
Standard Command	0	16	UIntegerT		W	(0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved

Parameter	Index	Subindex	Data type	Default	AR	Description
Standard Command	2	0	UIntegerT		W	(0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved 64: Teach Apply 65: Setpoint 1 Single Value Teach 66: Setpoint 2 Single Value Teach 67: Two Value Teach TP1 SP1 68: Two Value Teach TP2 SP1 69: Two Value Teach TP1 SP2 70: Two Value Teach TP2 SP2 71: Setpoint 1 Dynamic Teach Start 72: Setpoint 1 Dynamic Teach Stop 73: Setpoint 2 Dynamic Teach Start 74: Setpoint 2 Dynamic Teach Stop 79: Teach Cancel 160: Adopt Local Adjustment 163: Reset Diagnosis Information 164: Deactivation 165: Activation 166: Single measurement 240: IO-Link 1.1 system test command 240, Event 8DFE appears 241: IO-Link 1.1 system test command 241, Event 8DFE disappears 242: IO-Link 1.1 system test command 242, Event 8DFF appears 243: IO-Link 1.1 system test command 243, Event 8DFF disappears
Device Access Locks	12	0	RecordT		RW	
Parameter (write) Access Lock	12	1	BooleanT	0	RW	
Data Storage Lock	12	2	BooleanT		RW	
Local Parameterization Lock	12	3	BooleanT	0	RW	
Local User Interface Lock	12	4	BooleanT		RW	
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		R	
Firmware Version	23	0	StringT		R	
Application Specific Tag	24	0	StringT		RW	
Error Count	32	0	UIntegerT		R	

Parameter	Index	Subindex	Data type	Default	AR	Description
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
Teach State	59	0	RecordT		R	indication of the current state of the teach-in procedure and teach point setting
SP2 teach point Status	59	1	UIntegerT	0	R	indication for the success of a teach point setting  0: Teachpoint 1 and 2 not taught or not successful 1: Teachpoint 1 successfully taught 2: Teachpoint 2 successfully taught 3: Teachpoint 1 and 2 successfully taught
SP1 teach point Status	59	2	UIntegerT	0	R	indication for the success of a teach point setting  0: Teachpoint 1 and 2 not taught or not successful 1: Teachpoint 1 successfully taught 2: Teachpoint 2 successfully taught 3: Teachpoint 1 and 2 successfully taught
Teach State	59	3	UIntegerT		R	indication of the current state of the teach-in procedure  0: Idle 1: Switchpoint Set 2: Switchpoint 2 Set 3: Switchpoint 1+2 Set 4: Wait for Command 5: Busy 6: Reserved 7: Error
Setpoint	60	0	RecordT		RW	threshold measurement value of a sensor for the edge of a binary output signal
BDC1Q1 1	60	1	UIntegerT	50	RW	threshold measurement value (4 ... 88)
BDC1Q1 2	60	2	UIntegerT	50	RW	threshold measurement value (4 ... 88)
Switchpoint	61	0	RecordT		RW	mode, logic and hysteresis for binary data channel 1
Logic	61	1	UIntegerT	0	RW	switching information is transmitted in inverted or not inverted manner  0: low active 1: high active
Mode	61	2	UIntegerT	1	RW	operation mode for binary signal  0: Deactivated 1: Single point mode 2: Window mode 3: Two point mode
Hysteresis	61	3	UIntegerT	0	RW	(0 ... 20)

Parameter	Index	Subindex	Data type	Default	AR	Description
Lot	64	0	StringT		R	production lot
Device Adjustment	65	0	UIntegerT	1	RW	Selection of local / remote adjustment 0: Remote 1: Local
On delay switching output	66	0	UIntegerT	0	RW	on delay for the binary data channel (0 ... 10000)
Off delay switching output	67	0	UIntegerT	0	RW	off delay for the binary data channel (0 ... 10000)
Switching Output	70	0	UIntegerT	0	RW	polarity of the switching output 0: PP 1: NPN 2: PNP
Sensor Mode	73	0	UIntegerT	0	RW	sensor tuning 0: Standard 1: Precision 2: Power 3: Speed
Teachpoint	80	0	RecordT		R	Values detected during teach
TP1	80	1	UIntegerT		R	detected lower limit during teach-in procedure
TP2	80	2	UIntegerT		R	detected upper limit during teach-in procedure
Process data limits	84	0	RecordT		R	Process data limit values
lower	84	1	UIntegerT		R	lower limit after power-up or reset
upper	84	2	UIntegerT		R	upper limit after power-up or reset
Switch counter	85	0	UIntegerT		R	number of switching after power-up or reset
Temperature	86	0	IntegerT		R	Sensor temperature
Teach-In Quality	87	0	IntegerT	0	R	Last teach in Quality 0: OK 1: OK 2: Not OK 3: Not OK
Switchpoint Potentiometer	90	0	UIntegerT		R	position of the local sensibility switch
switching output logic	91	0	UIntegerT		R	local switching output logic 0: low active 1: high active

## 9 Technical specifications

### 9.1 General data

Tab. 9.1: Sensor and IODD version

IODD version	V1.0
IODD release date	2021-11-18
Device family	Fork sensor for object detection
Device ID	2522
Device name	GSL04B/1
Device variants	GSL04B/1.1-30-M8.3 (50146187), GSL04B/1.1-50-M8.3 (50146188), GSL04B/1.1-80-M8.3 (50146189), GSL04B/1.1-120-M8.3 (50146190)