

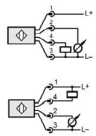
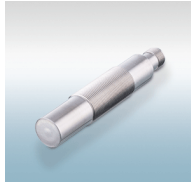
IO-Link Interface Description

UGT305

EN



Device variant

UGT305 Ultrasonic sensor, 80...1200 mm, M12-4		
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Vendor ID	310 / Bytes 1-54 (hex: 01-36)
Device ID	1814 / Bytes 0-7-22 (hex: 00-07-16)
Bit rate	COM2
Minimum cycle time	3,2 ms
SIO mode supported	Yes
Block parameterization	Yes
Data storage	Yes
Supported profiles	16 / hex: 0x10 SSP 4.1.1 - Measuring and Switching Sensor, 1 channel 16384 / hex: 0x4000 Identification and Diagnosis 32780 / hex: 0x800C Sensor control 32787 / hex: 0x8013 Object detection 33025 / hex: 0x8101 Locator 33026 / hex: 0x8102 ProductURI



NOTE:

If the Vendor ID and Device ID are specified in your PLC system, it is ensured that

- the correct device is connected,
- the IO-Link data storage is enabled,
- your application is still able to function, even if your device is replaced by a successor model at a later date



For the process value update rate, as well as further information regarding sensor performance, see data sheet.



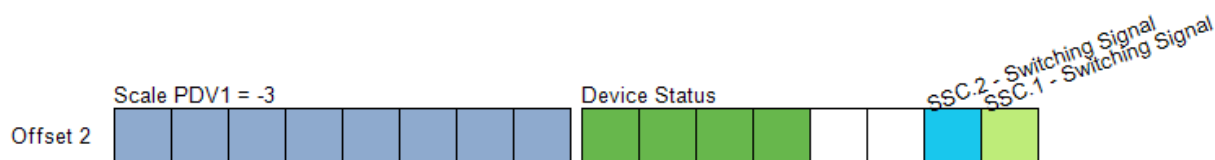
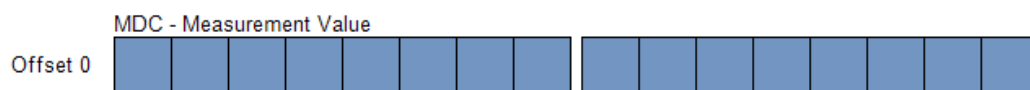
Process data

Process data input		RecordT (32 Bit)
MDC - Measurement Value		IntegerT (16 Bit)
Shows the current measurement value of the sensing element.		
Value range [mm]	(80 to 1200) * 1 32764 -32760 32760	(No measurement data) 0x7FFC (Out of range (-)) 0xFFFF8008 (Out of range (+)) 0x7FF8

SSC.1 - Switching Signal		BooleanT
Indicates the detection status of an object or measurement value below/above a threshold.		
Value range	false true	(Low) (High)

SSC.2 - Switching Signal		BooleanT
Indicates the detection status of an object or measurement value below/above a threshold.		
Value range	false true	(Low) (High)

Device Status		UIntegerT (4 Bit)
Current device status, a copy of the parameter [Device Status, Index 36] in the process data channel		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)



Scale PDV1: A PLC profile function block calculates the distance (from WORD 0) into the unit [m]

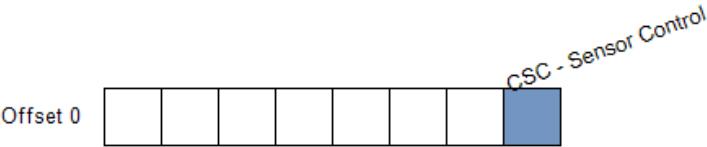


Data is transmitted in BigEndian format.
The position of the process data bytes is shown according to the device transmission sequence.
The content of your PLCs input buffer may vary according to your PLCs data format.
Please do not apply any byte swap feature.
Example function blocks incl. documentation are available on www.ifm.com --> Startup Packages



Process data

Process data output		RecordT (8 Bit)
CSC - Sensor Control		BooleanT
Controls the sensor operation. If disabled, a substitute value is applied to the process data.		
Value range	false true	(Enabled) (Disabled)





Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Vendor name	16		StringT (19 Byte)	ifm electronic gmbh	8
Vendor text	17		StringT (11 Byte)	www.ifm.com	8
Product Name	18		StringT (6 Byte)	UGT305	8
Product ID	19		StringT (6 Byte)	UGT305	8
Product Text	20		StringT (26 Byte)	Ultrasonic Distance Sensor	8
Serial Number	21		StringT (16 Byte)		8
Hardware Revision	22		StringT (2 Byte)		8
Firmware Revision	23		StringT (5 Byte)		8
Application-specific Tag	24		StringT (32 Byte)	***	8
Function Tag	25		StringT (32 Byte)	***	8
Location Tag	26		StringT (32 Byte)	***	8
Product URI	27		StringT (100 Byte)		8
Device Status	36		UIntegerT (8 Bit)	0 (Device is OK)	13
Detailed Device Status	37		OctetStringT (3 Byte) [4]	0x00,0x00,0x00	13
Process data input	40		RecordT (32 Bit)		3
MDC - Measurement V...	40		IntegerT (16 Bit)		3
SSC.1 - Switching S...	40		BooleanT		3
SSC.2 - Switching S...	40		BooleanT		3
Device Status	40		UIntegerT (4 Bit)		3
Process data output	41		RecordT (8 Bit)		4
CSC - Sensor Control	41		BooleanT		4
Teach Select	58		UIntegerT (8 Bit)	1 (SSC.1)	9
Teach Result	59		RecordT (8 Bit)		9
State	59		UIntegerT (4 Bit)	0 (Idle)	9
SSC.1 Param	60		RecordT (64 Bit)		9
SP1	60	1	IntegerT (32 Bit)	1000	9
SP2	60	2	IntegerT (32 Bit)	100	9
SSC.1 Config	61		RecordT (48 Bit)		9
Logic	61	1	UIntegerT (8 Bit)	0 (High active)	9
Mode	61	2	UIntegerT (8 Bit)	2 (Window)	9
Hyst	61	3	IntegerT (32 Bit)	0 (Auto)	9
SSC.2 Param	62		RecordT (64 Bit)		10
SP1	62	1	IntegerT (32 Bit)	1000	10
SP2	62	2	IntegerT (32 Bit)	100	10
SSC.2 Config	63		RecordT (48 Bit)		10
Logic	63	1	UIntegerT (8 Bit)	0 (High active)	10
Mode	63	2	UIntegerT (8 Bit)	2 (Window)	10
Hyst	63	3	IntegerT (32 Bit)	0 (Auto)	10
SSC.1 Delay	320		RecordT (32 Bit)		10
Switching delay	320	1	UIntegerT (16 Bit)	0	10
Reset delay	320	2	UIntegerT (16 Bit)	0	10
SSC.2 Delay	321		RecordT (32 Bit)		11
Switching delay	321	1	UIntegerT (16 Bit)	0	11
Reset delay	321	2	UIntegerT (16 Bit)	0	11
SSC Counter	349		RecordT (64 Bit)		11



Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
SSC.1	349	1	IntegerT (32 Bit)	0	11
SSC.2	349	2	IntegerT (32 Bit)	0	11
P-n	500		UIntegerT (8 Bit)	0 (PnP)	11
FILT	515		UIntegerT (8 Bit)	2 (MEdl)	11
Power cycles	541		IntegerT (32 Bit)	0	13
Operating hours	542		IntegerT (32 Bit)	0	13
Internal temperature	543		IntegerT (16 Bit)		13
Param configuration fault	546		UIntegerT (32 Bit) [10]	0 (OK)	13
ou2	590		UIntegerT (8 Bit)	2 (U / Analog signal 0...10 V)	11
ASP2	630		IntegerT (16 Bit)	100	11
AEP2	631		IntegerT (16 Bit)	1000	12
ECHO	2300		UIntegerT (8 Bit)	0 (no)	12
Background suppression	2301		UIntegerT (8 Bit)	0 (OFF)	12
Sound cone	2304		UIntegerT (8 Bit)	0 (Std / Standard sound cone)	12
MDC Descriptor	16512		RecordT (88 Bit)		14
Lower Value	16512		IntegerT (32 Bit)	80	14
Upper Value	16512		IntegerT (32 Bit)	1200	14
Unit Code	16512		UIntegerT (16 Bit)	1010	14
Scale	16512		IntegerT (8 Bit)	-3	14



System Command



Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

System Command information:

- Address: Index 2, Subindex 0
- Datatype: UInteger (8 Bit)
- AccessRight: Write Only

#	Text	Description
1	Upload Start	Start block parameter upload
2	Upload End	End block parameter upload
3	Download Start	Start block parameter download
4	Download End	Stop block parameter download
5	Store	Finalize block parameterization and start Data Storage
6	Break	Cancel block parameterization
65	Teach SP1	Determine setpoint 1 in a single teach procedure.
66	Teach SP2	Determine setpoint 2 in a single teach procedure.
126	Locator Start	The visual indicators of the device are switched to the localization display pattern, which makes it easier to spot a device in an application.
127	Locator Stop	The localization indication pattern is stopped. The optical indicators of the device will show again the device specific states of operation.
129	Application Reset	The parameter of the technology-specific application are set to default values. Identification parameter remain unchanged. An upload to the data storage of the master will be executed, if activated in the port configuration of the master.
131	Back-to-box	The parameter of the device are set to factory default values and communication will be inhibited until the next power cycle. Note: Directly detach the device from the master port!
228	Reset counter to zero	
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	



Identification

Vendor name	Index 16	Subindex 0	StringT (19 Byte)	ReadOnly
The vendor name that is assigned to a Vendor ID.				
Factory setting	ifm electronic gmbh			
Vendor text	Index 17	Subindex 0	StringT (11 Byte)	ReadOnly
Additional information about the vendor.				
Factory setting	www.ifm.com			
Product Name	Index 18	Subindex 0	StringT (6 Byte)	ReadOnly
Complete product name.				
Factory setting	UGT305			
Product ID	Index 19	Subindex 0	StringT (6 Byte)	ReadOnly
Vendor-specific product or type identification (e.g., item number or model number).				
Factory setting	UGT305			
Product Text	Index 20	Subindex 0	StringT (26 Byte)	ReadOnly
Additional product information for the device.				
Factory setting	Ultrasonic Distance Sensor			
Serial Number	Index 21	Subindex 0	StringT (16 Byte)	ReadOnly
Unique, vendor-specific identifier of the individual device.				
Hardware Revision	Index 22	Subindex 0	StringT (2 Byte)	ReadOnly
Unique, vendor-specific identifier of the hardware revision of the individual device.				
Firmware Revision	Index 23	Subindex 0	StringT (5 Byte)	ReadOnly
Unique, vendor-specific identifier of the firmware revision of the individual device.				
Application-specific Tag	Index 24	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with user- or application-specific information.				
Factory setting	***			
Function Tag	Index 25	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with function-specific information.				
Factory setting	***			
Location Tag	Index 26	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with location-specific information.				
Factory setting	***			
Product URI	Index 27	Subindex 0	StringT (100 Byte)	ReadOnly
Provides a unique instance identification compliant to DIN-SPEC 91406.				



Parameters

Teach Select	Index 58	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selects the switching signal channel for which a teach procedure will be applied.				
Factory setting	1	(SSC.1)		
Value range	1 2	(SSC.1) (SSC.2)		
Teach Result	Index 59	Subindex 0	RecordT (8 Bit)	ReadOnly
Shows the complete result information of the teach procedure including current state and result flags.				
State		Bit offset 0	UIntegerT (4 Bit)	
Indicates the current state of the teach procedure.				
Factory setting	0	(Idle)		
Value range	0 1 2 3 4 5 7	(Idle) (SP1 success) (SP2 success) (SP1, SP2 success) (Wait for command) (Busy) (Error)		
SSC.1 Param	Index 60	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	1000			
Value range [mm]	(100 to 1000) * 1			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	100			
Value range [mm]	(100 to 1000) * 1			
SSC.1 Config	Index 61	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	0	(High active)		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	2	(Window)		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	0	(Auto)		
Value range [mm]	(1 to 50) * 1 0	(Auto)		



Parameters

SSC.2 Param	Index 62	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	1000			
Value range [mm]	(100 to 1000) * 1			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	100			
Value range [mm]	(100 to 1000) * 1			

SSC.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	0	(High active)		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	2	(Window)		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	0	(Auto)		
Value range [mm]	(1 to 50) * 1 0	(Auto)		

SSC.1 Delay	Index 320	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.1.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	0			
Value range [ms]	(0 to 2000) * 1			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	0			
Value range [ms]	(0 to 2000) * 1			



Parameters

SSC.2 Delay	Index 321	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.2.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	0			
Value range [ms]	(0 to 2000) * 1			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	0			
Value range [ms]	(0 to 2000) * 1			

SSC Counter	Index 349	Subindex 0	RecordT (64 Bit)	ReadOnly
Available switching signal counters. Counts the SSC transitions from 0 to 1.				
SSC.1		Subindex 1	IntegerT (32 Bit)	
SSC.1 counter				
Factory setting	0			
Value range	(0 to 2147483647)			
SSC.2		Subindex 2	IntegerT (32 Bit)	
SSC.2 counter				
Factory setting	0			
Value range	(0 to 2147483647)			

P-n	Index 500	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output polarity for the switching outputs.				
Factory setting	0	(PnP)		
Value range	0 1	(PnP) (nPn)		

FILT	Index 515	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Filter or response time of the measured signal, LOW indicates fast, HIGH indicates slow response.				
Factory setting	2	(MEdI)		
Value range	0 1 2 3	(OFF) (LOW) (MEdI) (HIGH)		

ou2	Index 590	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 2].				
Factory setting	2	(U / Analog signal 0...10 V)		
Value range	2 11	(U / Analog signal 0...10 V) (UnEG / Analog signal 10...0 V)		

ASP2	Index 630	Subindex 0	IntegerT (16 Bit)	ReadWrite
Analogue start point 2. Measured value for the minimum value of the analogue signal at the output 2. For details, see operating manual.				
Factory setting	100			
Value range [mm]	(100 to 1000) * 1			



Parameters

AEP2	Index 631	Subindex 0	IntegerT (16 Bit)	ReadWrite
Analogue end point 2. Measured value for the maximum value of the analogue signal at the output 2. For details, see operating manual.				
Factory setting	1000			
Value range [mm]	(100 to 1000) * 1			

ECHO	Index 2300	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Echo quality.				
Factory setting	0	(no)		
Value range	0 1 2 3 4	(no) (LOW) (Mid) (GOOd) (ECLT)		

Background suppression	Index 2301	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Background suppression.				
Factory setting	0	(OFF)		
Value range	0 1	(OFF) (On)		

Sound cone	Index 2304	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Sound cone width.				
Factory setting	0	(Std / Standard sound cone)		
Value range	0 2	(Std / Standard sound cone) (Nrw / Narrow sound cone)		



Diagnosis

Device Status	Index 36	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Indicator for the current device condition and diagnosis state.				
Factory setting	0	(Device is OK)		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)		

Detailed Device Status	Index 37	Subindex 0	OctetStringT (3 Byte) [4]	ReadOnly
List of all currently pending events in the device.				
Factory setting	0x00,0x00,0x00			

Power cycles	Index 541	Subindex 0	IntegerT (32 Bit)	ReadOnly
Number of power cycles since delivery.				
Factory setting	0			
Value range	(0 to 2000000) * 1			

Operating hours	Index 542	Subindex 0	IntegerT (32 Bit)	ReadOnly
Counter of the operating hours since delivery.				
Factory setting	0			
Value range [h]	(0 to 2000000) * 1			

Param configuration fault	Index 546	Subindex 0	UIntegerT (32 Bit) [10]	ReadOnly
Displays the incorrectly set parameters.				
Factory setting	0	(OK)		
Value range	0 41353216 41287680 33751040 32768000 3997696 3997697 3997698 3997699 20971520 20971521 20971522 3932160 3932161 3932162 4128768 4128769 4128770 4128771 21037056 21037057 21037058 4063232 4063233 4063234 150994944 3801088 150798336 38666240	(OK) (AEP2, Index = 631) (ASP2, Index = 630) (FILT, Index = 515) (P-n, Index = 500) (SSC.1 Config, Index = 61) (SSC.1 Config, Index = 61, Subindex = 1) (SSC.1 Config, Index = 61, Subindex = 2) (SSC.1 Config, Index = 61, Subindex = 3) (SSC.1 Delay, Index = 320) (SSC.1 Delay, Index = 320, Subindex = 1) (SSC.1 Delay, Index = 320, Subindex = 2) (SSC.1 Param, Index = 60) (SSC.1 Param, Index = 60, Subindex = 1) (SSC.1 Param, Index = 60, Subindex = 2) (SSC.2 Config, Index = 63) (SSC.2 Config, Index = 63, Subindex = 1) (SSC.2 Config, Index = 63, Subindex = 2) (SSC.2 Config, Index = 63, Subindex = 3) (SSC.2 Delay, Index = 321) (SSC.2 Delay, Index = 321, Subindex = 1) (SSC.2 Delay, Index = 321, Subindex = 2) (SSC.2 Param, Index = 62) (SSC.2 Param, Index = 62, Subindex = 1) (SSC.2 Param, Index = 62, Subindex = 2) (Sound cone, Index = 2304) (Teach Select, Index = 58) (Background suppression, Index = 2301) (ou2, Index = 590)		

Internal temperature	Index 543	Subindex 0	IntegerT (16 Bit)	ReadOnly
Current internal temperature of the device.				
Value range [°C]	(-20 to 90) * 1 -32760 32760 32764	(UL - underload) 0x8008 (OL - overload) 0x7FF8 (NoData) 0x7FFC		



Diagnosis

MDC Descriptor	Index 16512	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel (process data MV).				
Lower Value		Bit offset 56	IntegerT (32 Bit)	
Factory setting	80			
Shows the lower value of measurement range.				
Upper Value		Bit offset 24	IntegerT (32 Bit)	
Factory setting	1200			
Shows the upper value of measurement range.				
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Factory setting	1010			
Shows the unique code for the physical unit.				
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - $10^{\text{exp}(\text{scale})}$.				
Factory setting	-3			



Events

Code	Device status	PQ *	Class	Name	Description
0x4210 16912d	2 (Out of specification)	valid	Warning	Device temperature overrun	Clear source of heat
0x7710 30480d	3 (Functional check)	valid	Error	Short circuit	Check installation
0x8DFE 36350d	1 (Maintenance required)	valid	Warning	Test Event 1. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
0x8DFF 36351d	1 (Maintenance required)	valid	Warning	Test Event 2. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243



Events are reported by the device itself to signal irregular device states.
PQ* = Process data quality.



Error types

Code	Name	Description
0x8000 32768d	Device application error - no details	Service was denied by the technology-specific application. No detailed root-cause information is available.
0x8011 32785d	Index not available	Read or write access attempt to a non-existing index.
0x8012 32786d	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
0x8020 32800d	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
0x8021 32801d	Service temporarily unavailable - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
0x8022 32802d	Service temporarily unavailable - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
0x8023 32803d	Access denied	Write access to a read-only parameter or read access to write-only parameter.
0x8030 32816d	Parameter value out of range	Written parameter value is outside of the permitted value range.
0x8031 32817d	Parameter value above limit	Written parameter value is above its specified value range.
0x8032 32818d	Parameter value below limit	Written parameter value is below its specified value range.
0x8033 32819d	Parameter length overrun	Written parameter is longer than specified.
0x8034 32820d	Parameter length underrun	Written parameter is shorter than specified.
0x8035 32821d	Function unavailable	Written command is not supported by the technology-specific application.
0x8036 32822d	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
0x8040 32832d	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
0x8041 32833d	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.
0x8082 32898d	Application not ready	Read or write access denied. The technology-specific application is temporarily unavailable.



Error types are used for the ISDU response. Values unequal to '0' indicate the cause of a failed ISDU read or write procedure.



ErrorTypes



The table shows all IO-Link ISDU error codes.
The device does not need to support all listed error types.