

IO-Link Parameter Datasheet

Ultrasonic sensor

UDC-18GS-3EP1-IO-0,2M-V19

Support: fa-info@pepperl-fuchs.com
Internet: www.pepperl-fuchs.com

DOCT-8189A - Version 1.00.001 / 23.09.2022

General Information

Device Identification

Vendor ID	1 (0x0001)
Device ID	3148290 (0x300A02)

Features

Data Storage	Yes
Block Parameterization	Yes

Communication Characteristics

IO-Link revision	V1.1 (specification V1.1.3)
IO-Link backward compatibility	n/a
Data transmission rate	COM2 (38.4 kbit/s)
Min. cycle time	2.8 ms
Process data input	2 byte
Process data output	1 byte
SIO mode support	yes
Compatible master port type	Class A, Class B (see NOTE)

Profile

Identification & Diagnosis	16384 (0x4000)
- Function Class – Product URI	33026 (0x8102)

NOTE:

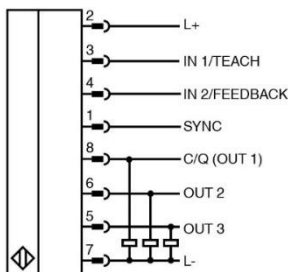
For use at master with port class A, an adapter cable is available as an accessory.
For use at master with port class B, use an additional 3-pole adapter or 3-wire cable.

Supported Product Variants

Product ID	Product Name	Description	Connector
70120101-100005	UDC-18GS-3EP1-IO-0,2M-V19	Sensing range 20 ... 60 mm, 3x switching output, push-pull, configurable, M12 plug, 8-pin	Plug, M12, 8-pin

Connection

Connection Diagram



Description

- Plug, M12, 8-pole**
- 1: White – SYNC
 - 2: Brown – L+
 - 3: Green – IN 1/TEACH
 - 4: Yellow – IN 2/FEEDBACK
 - 5: Gray – OUT 3
 - 6: Pink – OUT 2
 - 7: Blue – L-
 - 8: Red – C/Q (OUT 1)

Process Data

Process Data Input

Sub	Name	Data type	Length	Bitoffs.	Value	Unit	Description
.5	MV - Measurement Value	Integer	8 bit	8	0 .. 250 255		Shows the current measurement value. <i>Measurement invalid</i>
.4	Status - Threshold Set	Integer	2 bit	4	0 1 2 3		Shows the currently selected threshold set. <i>Threshold set 1</i> <i>Threshold set 2</i> <i>Threshold set 3</i> <i>Threshold set 4</i>
.3	SSC3 - Double Sheet	Bool	1 bit	2	0 1		Shows the current status of the switching signal 3. This signal is active, if a double sheet is detected. <i>Low</i> <i>High</i>
.2	SSC2 - Single Sheet	Bool	1 bit	1	0 1		Shows the current status of the switching signal 2. This signal is active, if one single sheet is detected. <i>Low</i> <i>High</i>
.1	SSC1 - Air	Bool	1 bit	0	0 1		Shows the current status of the switching signal 1. This signal is active, if no sheet is detected. <i>Low</i> <i>High</i>

NOTE: The process data input content can be accessed in addition over parameter 'Process Data Input' at index 40 (0x28)

Process Data Output

Sub	Name	Data type	Length	Bitoffs.	Value	Unit	Description
.2	Control Value – Threshold Set	Integer	2 bit	4	0 1 2 3		Controls the selection of the threshold set used for evaluation, if configured via parameters 'PD Output Config: Sensor Control' and 'SSC Config - Selected Threshold Set: PDO-controlled'. <i>Threshold set 1</i> <i>Threshold set 2</i> <i>Threshold set 3</i> <i>Threshold set 4</i>
.1	Control Signal – Transmitter Control	Bool	1 bit	0	0 1		Controls the transmitter. '1' disables the transmitter, '0' enables the transmitter. <i>Enabled</i> <i>Disabled</i>

NOTE: The process data output content can be accessed in addition over parameter 'Process Data Output' at index 41 (0x29)

Parameter Data								
Identification								
Index	Parameter	Access	Data type	Length	Default	Description	DS	R
16 (0x10)	Vendor Name	ro	String	13 byte	Pepperl+Fuchs	The vendor name that is assigned to a Vendor ID.		
17 (0x11)	Vendor Text	ro	String	29 byte	www.pepperl-fuchs.com/io-link	Additional information about the vendor.		
18 (0x12)	Product Name	ro	String	max. 32 byte	See table <i>Supported Product Variants</i>	Complete product name.		
19 (0x13)	Product ID	ro	String	max. 16 byte	See table <i>Supported Product Variants</i>	Vendor-specific product or type identification (e.g., item number or model number).		
20 (0x14)	Product Text	ro	String	max. 32 byte	Ultrasonic sensor	Additional product information for the device.		
21 (0x15)	Serial Number	ro	String	max. 16 byte		Unique, vendor-specific identifier of the individual device.		
22 (0x16)	Hardware Revision	ro	String	7 byte	HW**.**	Unique, vendor-specific identifier of the hardware revision of the individual device.		
23 (0x17)	Firmware Revision	ro	String	7 byte	FW**.**	Unique, vendor-specific identifier of the firmware revision of the individual device.		
24 (0x18)	Application Specific Tag	rw	String	max. 32 byte	Your automation, our passion.	Possibility to mark a device with user- or application-specific information.	Y	F
25 (0x19)	Function Tag	rw	String	max. 32 byte	***	Possibility to mark a device with function-specific information.	Y	F
26 (0x1A)	Location Tag	rw	String	max. 32 byte	***	Possibility to mark a device with location-specific information.	Y	F
191 (0xBF)	Unique Product ID	ro	String	max. 128 byte	https://pefu.de/<serial number>	Provides a unique instance identification compliant to DIN-SPEC 91406.		

Diagnosis											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
36 (0x24)	Device Status	ro	UInteger	8 bit		0	0 1 2 3 4		Indicator for the current device condition and diagnosis state. <i>Device is OK</i> <i>Maintenance required</i> <i>Out of specification</i> <i>Functional check</i> <i>Failure</i>		F
37 (0x25)	Detailed Device Status	ro	Array ^{SO}	3 byte					List of all currently pending events in the device.		F
.1	Element 1		Octetstr	3 byte	0	0					
127 (0x7F)	Indication Control	rw	Record ^{SO}	8 bit					Provides control functions for diagnosis purposes for indicators or display.		FA
.1	Locator Indication	rw	Boolean	1 bit	0	0	0 1		Enables a defined flashing pattern of the indicator LEDs for better spotting a sensor in field application. <i>Disabled</i> <i>Enabled</i>		FA
224 (0xE0)	Operating Hours	ro	UInteger	32 bit			0 .. 2 ³² -1	h	The number of hours that the sensor has been in operation.		
225 (0xE1)	Temperature Indicator	ro	UInteger	8 bit			0 1 2 3 4		Used to report whether the sensor is currently being operated within its allowed temperature range or not. <i>Safe operation</i> <i>Close to upper limit</i> <i>Overtemperature</i> <i>Close to lower limit</i> <i>Undertemperature</i>		
226 (0xE2)	Temperature Monitor	ro	Record ^{SO}	9 byte					Provides information about the thermal load and history of the connected device.		
.1	OVT Operating Hours	ro	UInteger	32 bit	40		0 .. 2 ³² -1	h	Shows the overall hours of operation above the specified temperature limit.		
.2	OVT Exceeded Counter	ro	UInteger	16 bit	24		0 .. 2 ¹⁶ -1		Shows the number of transitions to operating temperatures above the specified limit.		
.3	Max. Temperature	ro	Integer	8 bit	16		-128 .. +127	°C	Indicates the highest temperature value to which the sensor has been exposed during its operating time.		
.4	Min. Temperature	ro	Integer	8 bit	8		-128 .. +127	°C	Indicates the lowest temperature value to which the sensor has been exposed during its operating time.		
.5	Operating Temperature	ro	Integer	8 bit	0		-128 .. +127	°C	Shows the current operation temperature.		

Diagnosis

Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
232 (0xE8)	Device Characteristic	ro	Record ^{S0}	6 byte					Shows relevant key characteristics of the device for use in applications.		
	.1 Operating Distance Min	ro	Integer	16 bit	32			mm	Shows the minimum specified operating distance.		
	.2 Operating Distance Max	ro	Integer	16 bit	16			mm	Shows the maximum specified operating distance.		
	.3 Supply Current Requirement	ro	UInteger	16 bit	0			mA	Shows the maximum specified supply current for the device excluding load.		
238 (0xEE)	Device State Flags	ro	Record ^{S0}	8 bit					Shows status information for current device state.		
	.1 Alignment Aid	ro	Boolean	1 bit	0		0 1		Indicates the current status of the alignment aid. <i>Inactive</i> <i>Active</i>		

Parameterization & Configuration											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
64 (0x40)	SSC Threshold Set 1	rw	Record	2 byte					Defines the threshold set 1.	Y	FA
	SP1	rw	Integer	8 bit	8	50	15 .. 165		Setpoint 1: This setpoint represents the threshold between 'single sheet' and 'double sheet'.	Y	FA
	SP2	rw	Integer	8 bit	0	160	15 .. 165		Setpoint 2: This setpoint represents the threshold between 'air' and 'single sheet'.	Y	FA
65 (0x41)	SSC Threshold Set 2	rw	Record	2 byte					Defines the threshold set 2.	Y	FA
	SP1	rw	Integer	8 bit	8	15	15 .. 165		Setpoint 1: This setpoint represents the threshold between 'single sheet' and 'double sheet'.	Y	FA
	SP2	rw	Integer	8 bit	0	160	15 .. 165		Setpoint 2: This setpoint represents the threshold between 'air' and 'single sheet'.	Y	FA
66 (0x42)	SSC Threshold Set 3	rw	Record	2 byte					Defines the threshold set 3.	Y	FA
	SP1	rw	Integer	8 bit	8	100	15 .. 165		Setpoint 1: This setpoint represents the threshold between 'single sheet' and 'double sheet'.	Y	FA
	SP2	rw	Integer	8 bit	0	160	15 .. 165		Setpoint 2: This setpoint represents the threshold between 'air' and 'single sheet'.	Y	FA
67 (0x43)	SSC Threshold Set 4	rw	Record	2 byte					Defines the threshold set 4.	Y	FA
	SP1	rw	Integer	8 bit	8	50	6 .. 245		Setpoint 1: This setpoint represents the threshold between 'single sheet' and 'double sheet'.	Y	FA
	SP2	rw	Integer	8 bit	0	160	6 .. 245		Setpoint 2: This setpoint represents the threshold between 'air' and 'single sheet'.	Y	FA
68 (0x44)	SSC Config - Logic	rw	UInteger	8 bit		1	0 1		Defines the logical behavior of all switching signals and related output signals. <i>High active (normally open)</i> <i>Low Active (normally closed)</i>	Y	FA
71 (0x47)	SSC Extended Config	rw	Record	2 byte					Defines extended configuration options for all switching signals.	Y	FA
	Threshold Hysteresis	rw	UInteger	8 bit	8	1	0 1 2		Defines the hysteresis around the thresholds (setpoints) of threshold sets 1-3. <i>Low</i> <i>Medium (Standard)</i> <i>High</i>	Y	FA
	Pulse Extension	rw	UInteger	8 bit	0	0	0 1 2		Extends the active level of the switching signal at least to the selected time Auto: pulse extension based on IO-Link master cycle time <i>Off</i> <i>Auto (IOL master cycle time)</i> <i>100 ms</i>	Y	FA

Parameterization & Configuration											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
78 (0x4E)	Teach Config	rw	Record	2 byte					Defines the configuration settings for the teach functionality of the sensor.	Y	FA
	.1 Teach Mode	rw	UInteger	8 bit	8	0			This parameter is used to set whether the standard amplitude value range or the extended amplitude value range is allowed and used for the teach-in process. <i>Standard</i> <i>Extended</i>	Y	FA
	.2 Teach Threshold Distance	rw	UInteger	8 bit	0	2			This parameter determines how close the upper and lower thresholds are placed around the amplitude value range detected during a teach-in process. <i>Minimum</i> <i>Narrow</i> <i>Standard</i>	Y	FA
79 (0x4F)	TI Result	ro	Record ^{SO}	8 bit					Shows the current state and progress of a teach-in process.		F
.1	State	ro	UInteger	4 Bit	0				Indicates the current state of the teach procedure. <i>0</i> <i>3</i> <i>4</i> <i>5</i> <i>7</i> <i>Idle</i> <i>SP1, SP2 success</i> <i>Wait for command</i> <i>Busy</i> <i>Error</i>		
80 (0x50)	SSC Config – Selected Threshold Set	rw	UInteger	8 bit		5			It is possible to select a threshold set directly via this parameter. Alternatively, the threshold set can be selected externally (PDO-controlled / IO-controlled). <i>0</i> <i>1</i> <i>2</i> <i>3</i> <i>4</i> <i>5</i> <i>Threshold set 1</i> <i>Threshold set 2</i> <i>Threshold set 3</i> <i>Threshold set 4 (Teach-In)</i> <i>PDO-controlled</i> <i>IO-controlled</i>	Y	FA
96 (0x60)	Sensor Config – Operating Distance	rw	Record	2 byte					Defines the configuration settings for the operating distance.	Y	FA
	.1 AutoDetection	rw	UInteger	8 bit	8	1			Defines whether the automatic detection of the operating distance is enabled or the configuration value of 'Fixed Distance' is used as operating distance. <i>0</i> <i>1</i> <i>Disabled</i> <i>Enabled</i>	Y	FA
	.2 Fixed Distance	rw	UInteger	8 bit	0	45	20 .. 60	mm	Defines a fixed value which is used as operating distance, if 'Auto Detection' is disabled.	Y	FA
97 (0x61)	Sensor Config – Cycle Time	rw	UInteger	16 bit		33	5 .. 60000	100 µs	Defines the duration of a measuring cycle. If the sensor is not operated at the minimum cycle time, the sensor pauses after its measurement until the set time has elapsed before performing a new measurement.	Y	FA

Parameterization & Configuration											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
99 (0x63)	Eval Config	rw	Record	6byte					Defines the configuration settings for the evaluation of the sensor.	Y	FA
	.1 Eval Method	rw	UInteger	8 bit	40	1	0 1 2		Defines the method, the measured amplitude values are evaluated with. <i>None</i> <i>Average value</i> <i>Low pass</i>	Y	FA
	.2 Averages + Skip Count	rw	UInteger	8 bit	32	7	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		Defines the average determination. 'Measure' defines the total number of measurements used to generate average determination. 'Skip' defines the number of measurements from this total which are excluded for average determination. <i>Measure 2 - Skip 0</i> <i>Measure 3 - Skip 0</i> <i>Measure 3 - Skip 1</i> <i>Measure 4 - Skip 0</i> <i>Measure 4 - Skip 1</i> <i>Measure 5 - Skip 0</i> <i>Measure 5 - Skip 1</i> <i>Measure 5 - Skip 2</i> <i>Measure 6 - Skip 0</i> <i>Measure 6 - Skip 1</i> <i>Measure 6 - Skip 2</i> <i>Measure 7 - Skip 0</i> <i>Measure 7 - Skip 1</i> <i>Measure 7 - Skip 2</i> <i>Measure 7 - Skip 3</i> <i>Measure 8 - Skip 0</i> <i>Measure 8 - Skip 1</i> <i>Measure 8 - Skip 2</i> <i>Measure 8 - Skip 3</i>	Y	FA
	.3 Low Pass Weight	rw	UInteger	8 bit	24	75	1 .. 99	%	This parameter defines the percentage with which the previous measurement result is included in the calculation of the new measurement result.	Y	FA
	.4 Low Pass Deviation	rw	UInteger	8 bit	16	10	10 .. 50	%	The maximum value by which the new measured value may deviate from the previous measurement result to be included in the calculation of the new measurement result. If exceeded, the measured values are ignored until the 'Skip Time' has elapsed.	Y	FA
.5 Low Pass Skip Time	rw	UInteger	16 bit	0	0	0 .. 60000	ms	The new measured values will be ignored for the configured 'Skip Time', if they deviate from the previous measurement result by more than the configured 'Deviation'.	Y	FA	
101 (0x65)	Synchronization Mode	rw	UInteger	8 bit		254	0 1 2..10 254 255		Defines the synchronization mode to avoid mutual interference if multiple ultrasonic sensors are operated in close proximity. <i>Auto multiplex mode</i> <i>Auto common mode</i> <i>Reserved</i> <i>Disabled</i> <i>External</i>	Y	FA

Parameterization & Configuration											
<i>Index</i> <i>.sub</i>	<i>Parameter</i>	<i>Access</i>	<i>Data type</i>	<i>Length</i>	<i>Bitoffs.</i>	<i>Default</i>	<i>Value</i>	<i>Unit</i>	<i>Description</i>	<i>DS</i>	<i>R</i>
104 (0x68)	PD Output Config	rw	Record	8 bit		0			Allows enabling or disabling specific functions controlled via PD Output.	Y	FA
.1	CSC - Sensor Control	rw	Boolean	1 bit	0	0	0 1		Enabled: the sensor operation is controlled via process data output (threshold set selection & transmitter control). Requires 'Selected Threshold Set' = PDO-controlled. <i>Disabled</i> <i>Enabled</i>	Y	FA
118 (0x76)	IO Configuration – Sensor Inputs Usage	rw	UInteger	8 bit		1	0 1 2		This parameter determines whether the two sensor connections 'IN1/TEACH' and 'IN2/FEEDBACK' are active and if so, in which mode they are used. <i>Inactive</i> <i>Threshold set selection</i> <i>Teach-in</i>	Y	FA

Observation											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
36 (0x24)	Device Status	ro	UInteger	8 bit		0	0 1 2 3 4		Indicator for the current device condition and diagnosis state. <i>Device is OK</i> <i>Maintenance required</i> <i>Out of specification</i> <i>Functional check</i> <i>Failure</i>		F
236 (0xEC)	Measurement Data	ro	Record ^{S0}	8 byte					Collection of measurement data relevant for observation of device operational state.		
.1	Measurement Value	ro	UInteger	8 bit	56	0	0 .. 255		Shows the current measurement value.		
.2	SSC1 – Air	ro	UInteger	8 bit	48	0	0 1		Shows the current status of the switching signal 1. This signal is active, if no sheet is detected. <i>Low</i> <i>High</i>		
.3	SSC2 – Single Sheet	ro	UInteger	8 bit	40	0	0 1		Shows the current status of the switching signal 2. This signal is active, if a single sheet is detected. <i>Low</i> <i>High</i>		
.4	SSC3 – Double Sheet	ro	UInteger	8 bit	32	0	0 1		Shows the current status of the switching signal 3. This signal is active, if a double sheet is detected. <i>Low</i> <i>High</i>		
.5	Teach-In Value	ro	UInteger	8 bit	24	0			Shows the last value acquired by a teach-in process.		
.6	Digital Input 1	ro	UInteger	8 bit	16	0	0 1		Shows the current state at the digital input 1. <i>Low</i> <i>High</i>		
.7	Digital Input 2	ro	UInteger	8 bit	8	0	0 1		Shows the current state at the digital input 2. <i>Low</i> <i>High</i>		
.8	Operating Distance	ro	UInteger	8 bit	0	0		mm	Shows the current operating distance.		

NOTE 1: The parameter data provide the attributes DS (Data Storage) and R (Reset behavior). The following rules apply:

DS: Parameter marked with 'Y' (yes) are exchanged with the master via the data storage mechanism.

R: Parameter marked with 'F' are reset to the factory default value upon reception of the command 'Back-to-box'.

Parameter marked with 'A' are reset to the factory default value upon reception of the command 'Application Reset'.

NOTE 2: Parameter with datatype Record or Array, which are marked with 'S0' can only be accessed over subindex 0 (whole parameter object). Subindex access to single items is not possible.

Command Interface

<i>Index</i>	<i>Parameter</i>	<i>Access</i>	<i>Data type</i>	<i>Length</i>	<i>Value</i>	<i>Description</i>
2 (0x02)	System Command	wo	UInteger	8 bit	See command value	Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

<i>Command Value</i>	<i>Command</i>	<i>Description</i>
129 (0x81)	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 (0x83)	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!
167 (0xA7)	SP Dynamic Teach Start	Start dynamic teach of setpoints of threshold set 4.
168 (0xA8)	SP Dynamic Teach Stop	Stop dynamic teach of setpoints of threshold set 4.
175 (0xAF)	Teach Cancel	Discard acquired teach values and keep previous setpoints.
176 (0xB0)	Alignment Aid Start	Starts the sensor-internal optical alignment aid.
177 (0xB1)	Alignment Aid Stop	Stops the sensor-internal optical alignment aid.

Error Codes

<i>Code</i>	<i>Additional code</i>	<i>Name</i>	<i>Description</i>
128 (0x80)	17 (0x11)	Index not available	Read or write access attempt to a non-existing index.
128 (0x80)	18 (0x12)	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
128 (0x80)	32 (0x20)	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
128 (0x80)	33 (0x21)	Service temporarily not available - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
128 (0x80)	34 (0x22)	Service temporarily not available - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
128 (0x80)	35 (0x23)	Access denied	Write access to a read-only parameter or read access to write-only parameter.
128 (0x80)	48 (0x30)	Parameter value out of range	Written parameter value is outside of the permitted value range.
128 (0x80)	49 (0x31)	Parameter value above limit	Written parameter value is above its specified value range.
128 (0x80)	50 (0x32)	Parameter value below limit	Written parameter value is below its specified value range.
128 (0x80)	51 (0x33)	Parameter length overrun	Written parameter is longer than specified.
128 (0x80)	52 (0x34)	Parameter length underrun	Written parameter is shorter than specified.
128 (0x80)	53 (0x35)	Function not available	Written command is not supported by the technology-specific application.
128 (0x80)	54 (0x36)	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
128 (0x80)	64 (0x40)	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
128 (0x80)	65 (0x41)	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.

Event Codes

<i>Code</i>	<i>Type</i>	<i>Name</i>	<i>Description</i>
36163 (0x8D43)	Warning	Ambient temperature outside specified temperature range	Check sensor environment.