

IO-Link interface description

DMU420B

Ultrasonic distance sensor



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1 IO-Link interface

Available on pin 4 is the IO-Link interface in accordance with specification 1.1.2 (July 2013) with support of Smart Sensor Profile 2nd Edition (March 2017). You can easily, quickly and economically configure the devices via the IO-Link interface. Furthermore, the sensor transmits the process data via the IO-Link interface and makes diagnostic information available through it.

1.1 IO-Link identification

VendorID dec/hex	DeviceID dec/hex	Device
338/0x152	3097/0x000C19	DMU420B-250.3/LC-M8
	3098/0x000C1A	DMU420B-250.3/LV-M8
	3099/0x000C1B	DMU420B-500.3/LC-M8
	3100/0x000C1C	DMU420B-500.3/LV-M8
	3101/0x000C1D	DMU420B-1000.3/LC-M8
	3102/0x000C1E	DMU420B-1000.3/LV-M8

Please refer to the respective product data sheet for the identification data of other IO-Link devices.

1.2 IO-Link process data

Device input data (PDout – 1-bit data length)

Bit offset	Data width in bits	Assignment	Meaning
2	1	Trigger	The "trigger" executes a single measurement if index 78 subindex 13 has the value 2.
1	1	Find me	The "Find me" function causes the green, yellow and red LEDs to flash to aid in locating the sensor.
0	1	Disable Transducer	"Disable Transducer" enables the deactivation of the transmitter- and receiving element. Measurement values or transmission signals are no longer transmitted.

Byte 0	x	x	x	x	x	Trigger	Find Me	Disable
	7	6	5	4	3	2	1	0

Device output data (PDIn - 48-bit data length)

Bit offset	Data width in bits	Assignment	Meaning
16	32	Measurement value	Current measurement value Value range 10000 ... 270000 (Device ID 3097 & 3098) Value range 15000 ... 530000 (Device ID 3099 & 3100) Value range 20000 ... 1060500 (Device ID 3101 & 3102)
8	8	Scale	Measurement value multiplier as power of ten
5	1	SSC.4	SSC.4
3	1	Alarm Output	Alarm Output
2	1	Quality Bit	Quality Bit
1	1	SSC.2	SSC.2
0	1	SSC.1	SSC.1

Byte 0	Measurement value							
	31	30	29	28	27	26	25	24

Byte 1	Measurement value							
	23	22	21	20	19	18	17	16

Byte 2	Measurement value							
	15	14	13	12	11	10	9	8

Byte 3	Measurement value							
	7	6	5	4	3	2	1	0

Byte 4	Scale							
	7	6	5	4	3	2	1	0

Byte 5	x	x	SSC.4	x	Alarm	Quality Bit	SSC.2	SSC.1
	7	6	5	4	3	2	1	0

1.3 Device-specific IODD

At www.leuze.com in the download area for IO-Link sensors you will find the IODD zip file with all files required for the installation.

On the IODDfinder platform (<https://ioddfinder.io-link.com/>), a central cross-manufacturer database, you can also find the description files (IODDs) of the IO-Link sensors.

1.4 IO-Link parameters documentation

The complete description of the IO-Link parameters can be found in the *.html files. Double-click on a language variant in the directory containing the extracted files:

- German: *IODD*-de.html
- English: *IODD*-en.html

If the html file within the ZIP archive is opened, the image files are not displayed.

↳ Extract the ZIP file first.

1.5 Device-specific information

- This is a device with the Data Storage function, i.e., device exchange is possible without additional measures (such as teaching).
- In the PREOPERATE state, this device uses TYPE_1_V with 8 octets of on-request data.


Fundamentals:

- IO-Link Interface and System Specification Version 1.1.2, July 2013
- IO-Link Test Specification Version 1.1.2 July 2014

2 Functions configurable via IO-Link

PC configuration and visualization is performed comfortably with the USB-IO-Link Master SET MD12-US2-IL1.1 (part no. 50121098) and the *Sensor Studio* configuration software (in the download area of the sensor at www.leuze.com).

System commands

NOTICE	
	The system commands trigger an action in the device.

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
System command	2	0	UIntegerT, 1	WO	64, 65, 66, 79, 130		64: Apply teach 65: Switching point 1 teach 66: Switching point 2 teach 79: Cancel teach 130: Set factory defaults

General configuration

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Device Access Locks	12	0	UIntegerT, 2	RW	0, 1	0	0: Parameter write access not disabled 1: Parameter write access disabled
Application Specific-Tag	24	0	String, max. 32	RW		***	Application-specific marking
Function-Tag	25	0	String, max. 32	RW		***	Function identifier
Location-Tag	26	0	String, max. 32	RW		***	Location indicator
Teach Select	58	0	UIntegerT, 1	RW	0 ... 2	0	0: Default (SSC1) 1: SSC 1 2: SSC 2
Teach Status	59	1	UIntegerT, 4 bits	RO	0, 1, 2, 3, 4, 5, 7		Status of teach event: 0: Not active 1: SP1 successful 2: SP2 successful 3: SP1, SP2 successful 4: Waiting for command 5: Working 7: Error

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
SSC.1 Param	60	1	IntegerT, 4	RW	10000 ... 270000	250000	Numerical input of switching point SP1 (Device ID 3097 & 3098)
		2	IntegerT, 4	RW	10000 ... 270000	10000	Numerical input of switching point SP2 (Device ID 3097 & 3098)
SSC.1 Param	60	1	IntegerT, 4	RW	15000 ... 530000	50000	Numerical input of switching point SP1 (Device ID 3099 & 3100)
		2	IntegerT, 4	RW	15000 ... 530000	15000	Numerical input of switching point SP2 (Device ID 3099 & 3100)
SSC.1 Param	60	1	IntegerT, 4	RW	20000 ... 1060500	100000	Numerical input of switching point SP1 (Device ID 3101 & 3102)
		2	IntegerT, 4	RW	20000 ... 1060500	20000	Numerical input of switching point SP2 (Device ID 3101 & 3102)
SSC.1 Config	61	1	UIntegerT, 1	RW	0, 1	0	Logic: 0: NO 1: NC
		2	UIntegerT, 1	RW	0, 1, 2	1	Operating mode: 0: Deactivated 1: Switching point mode 2: Window mode
		3	UIntegerT, 2	RW	1 ... 3	3	Determines the hysteresis at the switching point. 1: Left - hysteresis in direction of sensor 2: Center - hysteresis in center 3: Right - hysteresis in direction of object
SSC.2 Param	62	1	IntegerT, 4	RW	10000 ... 270000	250000	Numerical input of switching point SP1 (Device ID 3097 & 3098)
		2	IntegerT, 4	RW	10000 ... 270000	10000	Numerical input of switching point SP2 (Device ID 3097 & 3098)
SSC.2 Param	62	1	IntegerT, 4	RW	15000 ... 530000	50000	Numerical input of switching point SP1 (Device ID 3099 & 3100)
		2	IntegerT, 4	RW	15000 ... 530000	15000	Numerical input of switching point SP2 (Device ID 3099 & 3100)

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
SSC.2 Param	62	1	IntegerT, 4	RW	20000 ... 1060500	1000000	Numerical input of switching point SP1 (Device ID 3101 & 3102)
		2	IntegerT, 4	RW	20000 ... 1060500	20000	Numerical input of switching point SP2 (Device ID 3101 & 3102)
SSC.2 Config	63	1	UIntegerT, 1	RW	0, 1	0	Logic: 0: NO 1: NC
		2	UIntegerT, 1	RW	0, 1, 2	1	Operating mode: 0: Deactivated 1: Switching point mode 2: Window mode
		3	UIntegerT, 2	RW	1 ... 3	3	Determines the hysteresis at the switching point. 1: Left - hysteresis in direction of sensor 2: Center - hysteresis in center 3: Right - hysteresis in direction of object
Quality	64	0	UIntegerT, 2	RO			The quality value indicates the quality of the reflected signal.
Quality Bit	65	0	UIntegerT, 2	RW	0 ... 400	120	Selects the quality threshold value. If the quality value is below the threshold value, the LED begins to flash and the quality bit in the process data is set to 1.
Hysteresis	69	1	UIntegerT, 4	RW	0 ... 99	4	SSC.1 Hysteresis width Adjusts the hysteresis width as a percentage of the switching point distance
		11	UIntegerT, 4	RW	0 ... 99	4	SSC.2 Hysteresis width Adjusts the hysteresis width as a percentage of the switching point distance
Unit Selection	74	2	UIntegerT, 2	RW	1054, 1058, 1059	1054	Selection of the time unit 1054: seconds 1058: minutes 1059: hours
Pin 4 Function	78	1	UIntegerT, 1	RW	1	1	Output configuration for switching output 1 on Pin4 1: Push-pull
		2	UIntegerT, 2	RW	100, 200, 400	100	Selection of the switching channel for pin 4 100: SSC1 200: SSC2 400: SSC4

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
LED Settings	79	2	UIntegerT, 1	RW	0, 1	1	Green LED, deactivation has no effect on other functions 0: Off 1: On
		12	UIntegerT, 1	RW	0 ... 2	1	Yellow LED, deactivation has no effect on other functions 0: Off 1: On 2: Inverted
		22	UIntegerT, 1	RW	0 ... 2	1	Red LED, deactivation has no effect on other functions 0: Off 1: On 2: Inverted
		32	UIntegerT, 1	RW	0, 1	1	Blue LED, deactivation has no effect on other functions 0: Off 1: On
Teach Button Lock Time	80	1	UIntegerT, 1	RW	0 ... 120	5	Length of time after which the teach button is locked after being switched on or after the last actuation. 0: Never 255: Always
Counter Source Settings	85	31	UIntegerT, 1	RW	2, 3	2	Selection of which counter is to be selected as SSC.4 source. 2: SSC.1 object counter 3: SSC.2 object counter
		32	UIntegerT, 1	RW	0, 2	2	Automatic resetting of the counter if value SSC.4 SP1 was reached (index 16386 subindex 1). 0: Deactivated 2: Activated
Temperature Settings	96	1	UIntegerT, 1	RW	0, 1	0	Selection of which temperature source is to be evaluated as the ambient temperature. 0: Internal device temperature 1: External entry of the ambient temperature
		2	Float32T, 4	RW	-40.05 ... 84.85	20	Only applies if "External entry of the ambient temperature" is active. Entry is used for temperature compensation while measuring.

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
On delay switching output	120	2	UIntegerT, 4	RW	0 ... 60000	0	SSC.1 switch-on delay of switching output in ms.
		12	UIntegerT, 4	RW	0 ... 60000	0	SSC.2 switch-on delay of switching output in ms.
		32	UIntegerT, 4	RW	0 ... 60000	0	SSC.4 switch-on delay of switching output in ms.
Off delay switching output	121	2	UIntegerT, 4	RW	0 ... 60000	0	SSC.1 switch-off delay of switching output in ms.
		12	UIntegerT, 4	RW	0 ... 60000	0	SSC.2 switch-off delay of switching output in ms.
		32	UIntegerT, 4	RW	0 ... 60000	0	SSC.4 switch-off delay of switching output in ms.
Minimal Pulse Duration	122	2	UIntegerT, 4	RW	0 ... 60000	0	Specifies the minimum pulse length in milliseconds for SSC.1
		3	UIntegerT, 1	RW	1 ... 3	1	SSC.1 mode 1: Both pulses: positive and negative pulses are extended 2: Positive pulse: Only positive pulses are extended 3: Negative pulse: Only negative pulses are extended
		12	UIntegerT, 4	RW	0 ... 60000	0	Specifies the minimum pulse length in milliseconds for SSC.2
		13	UIntegerT, 1	RW	1 ... 3	1	SSC.2 mode 1: Both pulses: positive and negative pulses are extended 2: Positive pulse: Only positive pulses are extended 3: Negative pulse: Only negative pulses are extended
		32	UIntegerT, 4	RW	0 ... 60000	0	Specifies the minimum pulse length in milliseconds for SSC.4
		33	UIntegerT, 1	RW	1 ... 3	1	SSC.4 mode 1: Both pulses: positive and negative pulses are extended 2: Positive pulse: Only positive pulses are extended 3: Negative pulse: Only negative pulses are extended
Distance value averaging	161	2	UIntegerT, 2	RW	5 ... 500	5	Selects the length of the distance average value filter. Has no effect on the cycle time. (Device ID 3097 & 3098)
Distance value averaging	161	2	UIntegerT, 2	RW	8 ... 800	8	Selects the length of the distance average value filter. Has no effect on the cycle time. (Device ID 3099 & 3100)
Distance value averaging	161	2	UIntegerT, 2	RW	12 ... 1200	12	Selects the length of the distance average value filter. Has no effect on the cycle time. (Device ID 3101 & 3102)

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Disruption Filter	164	2	UIntegerT, 2	RW	0 ... 10000	15	Maximum fault duration Duration (in time units) until a signal (as in the Distance parameter) is visible at the output. (Device ID 3097 & 3098)
		2	UIntegerT, 2	RW	0 ... 10000	24	Maximum fault duration Duration (in time units) until a signal (as in the Distance parameter) is visible at the output. (Device ID 3099 & 3100)
		2	UIntegerT, 2	RW	0 ... 10000	36	Maximum fault duration Duration (in time units) until a signal (as in the Distance parameter) is visible at the output. (Device ID 3101 & 3102)
		3	UIntegerT, 4	RW	1000 ... 100000 0	5000 0	Distance deviations from the current measurement value that are ignored if shorter than the "maximum fault duration" set by the parameter.
Analog Range (LC)	202	2	UIntegerT, 4	RW	10000 ... 270000	1000 0	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3097)
		2	UIntegerT, 4	RW	15000 ... 530000	1500 0	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3099)
		2	UIntegerT, 4	RW	20000 ... 106050 0	2000 0	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3101)
		3	UIntegerT, 4	RW	40 ... 200	40	Sets the minimum value of the analog output. (Device ID 3097, 3099, 3101)
		4	UIntegerT, 4	RW	10000 ... 270000	2500 00	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3097)
		4	UIntegerT, 4	RW	15000 ... 530000	5000 00	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3099)
		4	UIntegerT, 4	RW	20000 ... 106050 0	1000 000	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3101)
		5	UIntegerT, 4	RW	40 ... 200	200	Sets the maximum value of the analog output. (Device ID 3097, 3099, 3101)

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Analog Range (LV)	202	2	UIntegerT, 4	RW	10000 ... 270000	10000	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3098)
		2	UIntegerT, 4	RW	15000 ... 530000	15000	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3100)
		2	UIntegerT, 4	RW	20000 ... 1060500	20000	Sets the distance value in mm to the minimum value of the analog output. (Device ID 3102)
		3	UIntegerT, 4	RW	0 ... 100	0	Sets the minimum value of the analog output. (Device ID 3098, 3100, 3102)
		4	UIntegerT, 4	RW	10000 ... 270000	25000	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3098)
		4	UIntegerT, 4	RW	15000 ... 530000	50000	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3100)
		4	UIntegerT, 4	RW	20000 ... 1060500	100000	Sets the distance value in mm to the maximum value of the analog output. (Device ID 3102)
		5	UIntegerT, 4	RW	0 ... 100	100	Sets the maximum value of the analog output. (Device ID 3098, 3100, 3102)
Analog Range Teach	203	2	IntegerT, 4	RO	0 ... 2		Status of analog teach event: 0: Not active 1: Successful 2: Error
Temperature internal	208	1	Float32T, 4	RO			Internal device temperature
		2	Float32T, 4	RO			Lowest measured internal device temperature (can be reset with index 1000)
		3	Float32T, 4	RO			Highest measured internal device temperature (can be reset with index 1000)
		4	Float32T, 4	RO			Lowest measured internal device temperature (cannot be reset)
		5	Float32T, 4	RO			Highest measured internal device temperature (cannot be reset)
Power Supply Voltage	210	1	Float32T, 4	RO			Current supply voltage
		2	Float32T, 4	RO			Lowest measured supply voltage (can be reset with index 1000)
		3	Float32T, 4	RO			Highest measured supply voltage (can be reset with index 1000)
		4	Float32T, 4	RO			Lowest measured supply voltage (cannot be reset)
		5	Float32T, 4	RO			Highest measured supply voltage (cannot be reset)

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Operation Time	211	1	UIntegerT, 4	RO			Operation time since start-up
		2	UIntegerT, 4	RO			Operation time (can be reset with index 1000)
		3	UIntegerT, 4	RO			Total operation time (cannot be reset)
Boot counter	224	2	UIntegerT, 4	RO			Total number of boot cycles over the entire service life
Switch counter	225	2	UIntegerT, 4	RO			Object counter for switching channel SSC.1 (can be reset with index 1000)
		12	UIntegerT, 4	RO			Object counter for switching channel SSC.2 (can be reset with index 1000)
		32	UIntegerT, 4	RO			Object counter for switching channel SSC.4 (can be reset with index 1000)
Sonic cone settings	232	1	UIntegerT, 2	RW	0 ... 2	1	Adjustment of the width of the sound cone 0: Narrow 1: Medium 2: Wide
Reset Commands	1000		UIntegerT, 4	WO	1, 2, 4, 5, 12, 13, 15, 16, 84, 85		Reset commands of various counters and statistics: 1: Reset all resettable counter and statistics data 2: Internal temperature reset 4: Supply voltage reset 5: Operating time reset 12: Reset SSC.1 object counter 13: Reset SSC.2 object counter 15: Reset SSC.4 object counter 16: Distance and histogram reset 84: Reset scaled analog minimum value 85: Reset scaled analog maximum value
SSC.4 Param	16386	1	IntegerT, 4	RW	0 ... 214748 3639	20	Define the number of the object counter at which the SSC is set to active (or inactive if inverted).
		2	IntegerT, 4	RW	0 ... 214748 3639	0	Define the number of the object counter at which the SSC is set to inactive (or active if inverted). Only active if SSC is set to window mode.
SSC.4 Config	16387	1	UIntegerT, 1	RW	0, 1	0	Logic: 0: NO 1: NC
		2	UIntegerT, 1	RW	0 ... 2	0	Operating mode: 0: Deactivated 1: Switching point mode 2: Window mode