



IO-Link data sheet

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IO-Link data sheet



ipc+15/CFF

Ultrasonic proximity switch with one push-pull switching output and IO-Link interface

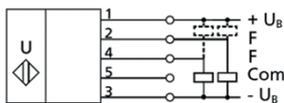


ipc+15/CFF/WK

Physical layer

Vendor Name	microsonic GmbH
Vendor ID	419 (0x01a3)
Product Name	ipc+15/CFF ipc+15/CFF/WK
Product ID	36000 36001
Device ID	33 (0x000021)
IO-Link Spezifikation	1.1
Transmission Rate	COM 2 (38.400 Bd)
Process Data Length	32 Bit PDI
Minimum Cycle Time	8 ms
IO-Link Port Type	A (<200mA)
SIO Mode Supported	Yes
Smart Sensor Profile	Yes, Digital Measuring Sensor
Block Parameter	Yes
Data Storage	Yes

Pin assignment



IO-Link-Mode

The ipc+ sensors are IO-Link capable in accordance with IO-Link specification 1.1. The sensor has an IO-Link communication interface on pin 4.

Direct access to process and diagnosis data is possible via the IO-Link interface. The parameterization of the sensor is possible during operation.

Smart Sensor Profile

ipc+ sensors support the Smart Sensor Profile. The following profiles and function classes are integrated:

- › 0x000A - Device Profile: Digital measuring sensors
- › 0x8000 - Device Identification
- › 0x8001 - Multichannel: Binary Data Channel
- › 0x8003 - Device Diagnosis
- › 0x8004 - Teach Channel
- › 0x800A - Measurement Data Channel (standard resolution)

SSC1 configuration

The sensor has five modes:

- › Single point (SP1: switching point)
- › Window (SP1, SP2: window mode)
- › Two point (SP1, SP2: hysteresis mode)
- › Single point + set point offset (SP1 switching point + offset)
- › Window ± set point offset (SP1 two-way reflective barrier)

IODD description file

Each device has its own electronic device description, the IODD file (IO Device Description). The IODD contains comprehensive data for the purpose of better system integration:

- › Communication features
- › Device parameter with allowed values and default value
- › Identification-, processing and diagnosis data
- › Device data
- › Text description
- › Picture of the device
- › Logo of the manufacturer

The IODD-library contains the IODD files of all IO-Link capable microsonic sensors. You will find the latest IODD files online at www.microsonic.de/IODD.

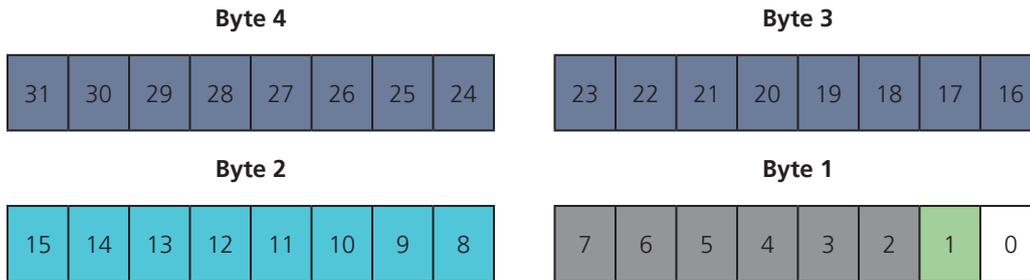


Process data

The process data are cyclically transmitted data. The length of the process data of lpc+ sensors is 4 byte.

Note

microsonic sensors with an operating range of up to 1000 mm indicate distance values with a resolution of 0.1 mm. Operating ranges greater than 1000 mm have distance values with a resolution of 1 mm.



	Description	Value range
	= Switched Signal Channel 1 (SSC1) state	0-1
	= Switched Signal Channel 2 (SSC2) state	0-1
	= Vacant	
	= Process Data Scale	-1; 0; Default: -1
	= Process Data Measuring Value	0-32.000, -32.760-32.760, 32.764

Switched Signal Channel 1 state:

- › 0: inactive
- › 1: active

Switched Signal Channel 2 state:

- › 0: inactive
- › 1: active

Process Data Measuring Value

- › 0-32,000: Process data measuring value
- › 32,764: No measuring value
- › -32,760: Outside the detection range (-)
- › 32,760: Outside the detection range (+)

Measurement data channel description

Index	Subindex	Term	Format	Access
16512	1	Lower Limit	UInt32	RO
	2	Upper Limit	UInt32	RO
	3	Unit Code	UInt16	RO
	4	Scale	Int8	RO

Lower Limit:

The value of the Lower Limit corresponds to the foreground suppression currently set.

Upper limit:

The value of the Upper Limit corresponds to the maximum range currently set.

Unit Code:

The Unit Code is based on the official IO-Link Unit Code:

- › 1013: [mm]

Scale:

The sensor outputs the scale of the current process data. The sensor uses the scale in accordance with the following scheme to calculate the measured values:

$$\text{Process data value} * 10^{(\text{scale})} * [\text{Unit Code}] = \text{measured value in mm}$$

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
2		System Command	UInt8	WO		130: Restore factory settings	
12		Device Access Locks	Record	R/W			
16		Vendor Name	OctetString	RO	microsonic GmbH		
17		Vendor Text	OctetString	RO	Unser Herz schallt ultra.		
18		Product Name	OctetString	RO			
19		Product ID	OctetString	RO			
20		Product Text	OctetString	RO	Ultrasonic Sensor		
21		Serial Number	OctetString	RO			
23		Firmware Revision	OctetString	RO			
24		Application Specific Tag	OctetString [32]	R/W			
32		Error Count	UInt16	RO			
36		Device Status	UInt8	RO	0	0-4: 0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure	
37		Detailed Device Status	ARRAY[10]	RO			
40		Process Data Input	OctetString	RO			
58		Teach-in Channel	UInt8	R/W	0	0; 1: 0: SSC1: pin 4 (push-pull) 1: SSC1: pin 4 (push-pull) 2: SSC2:pin 2 (push-pull)	
59		Teach-in Status	UInt8	RO	0	0-3; 4; 5; 7: 0: Idle 1: Setpoint 1 (SP1) successful 2: Setpoint 2 (SP2) successful 3: Setpoint 1 and Setpoint 2 (SP12) successful 4: Waiting for command 5: Busy 7: Error	
	2	SP1 TP1	Boolean		0		
	3	SP2 TP1	Boolean		0		
60	0	SSC1 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	1,500	200-2,500 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	1,700	200-2,500 Setpoint 2 for switching output	0.1 mm

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
61	0	SSC1 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	20	10-2,300 Hysteresis for SP1 and SP2	0.1 mm
62	0	SSC2 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	1,500	200-2,500 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	1,700	200-2,500 Setpoint 2 for switching output	0.1 mm
63	0	SSC2 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	20	10-2,300 Hysteresis for SP1 and SP2	0.1 mm
100	0	SSC1 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
101	0	SSC2 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%
200	0	Measurement configuration	Record				
	1	Foreground suppression	Int16	R/W	200	200-600	
256	0	Filter	Record				
	1	Type	UInt8	R/W	1	0-4: 0 = F00: no filter 1 = F01: standard filter 2 = F02: averaging filter 3 = F03: foreground filter 4 = F04: background filter	
	2	Strength	UInt8	R/W	0	0-9: 0 = P00 ... 9 = P09 For each measured value filter a filter strength between 0, weak filtering up to 9, strong filtering, can be selected.	
	3	Maximums object speed	UInt8	R/W	25	10..25	
300	0	Temperature compensation	Record				
	1	Source of temperature	UInt8	R/W	1	0-1: 0: Reference temperature 1: Internal Temperatur	
	2	Reference temperature	UInt8	R/W	20	-25-70	1° C

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
350	0	Synchronisation and multiplex operation	Record				
	1	Mode	UInt8	R/W	1	0; 1: 0: inactive 1: Active	
	2	Sensor operation	UInt8	R/W	0	0-10: 0: Synchronisation active 1: Multiplex address 1 2: Multiplex address 2 3: Multiplex address 3 4: Multiplex address 4 5: Multiplex address 5 6: Multiplex address 6 7: Multiplex address 7 8: Multiplex address 8 9: Multiplex address 9 10: Multiplex address 10 128: IO-Link synchronisation active	
	3	Multiplex number of participants	UInt8	R/W	10	2-10: 2: 2 participants 3: 3 participants 4: 4 participants 5: 5 participants 6: 6 participants 7: 7 participants 8: 8 participants 9: 9 participants 10: 10 participants	
370	1	Pin 5	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
371	1	LED	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
2000	0	Temperature compensation diagnosis	UInt24	RO	0		
	1	Sensor temperature	UInt16	RO			
	2	Heating-up phase	UInt8	RO		0; 1: 0: Not completed 1: Completed	
16512	0	Measurement data channel description	Record				
	1	Lower limit	Int32	RO	180	Lower limit of the measuring range (blind zone)	
	2	Upper limit	Int32	RO	2,500	Upper limit of the measuring range (maximum range)	
	3	Unit code	Int16	RO	1013	IO-Link unit code: 1013 = [mm]	
	4	Scale	Int8	RO	-1	Process data value * (10 ^{scale}) [Unit code] = measuring value in mm	

Appendix IO-Link data

Events

Code		Type	Name	Description
dezimal	hex			
16384	0x4000	Error	Temperature fault	Overload
16912	0x4210	Warning	Device temperature over-run	Clear source of heat
16928	0x4220	Warning	Device temperature under-run	Insulate device
20736	0x5100	Error	General power supply fault	Check availability
30480	0x7710	Error	Short circuit	Check installation
36000	0x8ca0	Notification	Teach-in error	Teach-in process was not successful.
36001	0x8ca1	Notification	Teach-in success	Teach-in process was successful.
36002	0x8ca2	Notification	CycleTime error	CycleTime error is triggered if cycle time does not correspond to the permitted configuration.

IO-Link data sheet



ipc+25/CFF

Ultrasonic proximity switch with one push-pull switching output and IO-Link interface

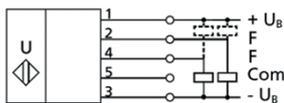


ipc+25/CFF/WK

Physical layer

Vendor Name	microsonic GmbH
Vendor ID	419 (0x01a3)
Product Name	ipc+25/CFF ipc+25/CFF/WK
Product ID	36100 36101
Device ID	34 (0x000022)
IO-Link Spezifikation	1.1
Transmission Rate	COM 2 (38.400 Bd)
Process Data Length	32 Bit PDI
Minimum Cycle Time	8 ms
IO-Link Port Type	A (<200mA)
SIO Mode Supported	Yes
Smart Sensor Profile	Yes, Digital Measuring Sensor
Block Parameter	Yes
Data Storage	Yes

Pin assignment



IO-Link-Mode

The ipc+ sensors are IO-Link capable in accordance with IO-Link specification 1.1. The sensor has an IO-Link communication interface on pin 4.

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Smart Sensor Profile

ipc+ sensors support the Smart Sensor Profile. The following profiles and function classes are integrated:

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- › 0x8000 - Device Identification
- › 0x8001 - Multichannel: Binary Data Channel
- › 0x8003 - Device Diagnosis
- › 0x8004 - Teach Channel
- › 0x800A - Measurement Data Channel (standard resolution)

SSC1 configuration

The sensor has five modes:

- › Single point (SP1: switching point)
- › Window (SP1, SP2: window mode)
- › Two point (SP1, SP2: hysteresis mode)
- › Single point + set point offset (SP1 switching point + offset)
- › Window ± set point offset (SP1 two-way reflective barrier)

IODD description file

Each device has its own electronic device description, the IODD file (IO Device Description). The IODD contains comprehensive data for the purpose of better system integration:

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- › Picture of the device
- › Logo of the manufacturer

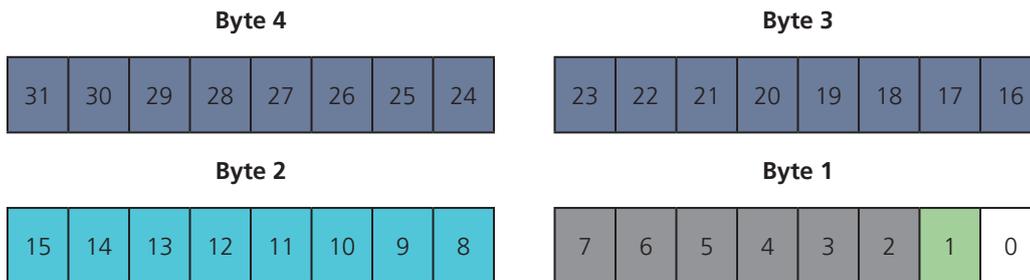
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Process data

The process data are cyclically transmitted data. The length of the process data of lpc+ sensors is 4 byte.

Note

microsonic sensors with an operating range of up to 1000 mm indicate distance values with a resolution of 0.1 mm. Operating ranges greater than 1000 mm have distance values with a resolution of 1 mm.



	Description	Value range
	= Switched Signal Channel 1 (SSC1) state	0-1
	= Switched Signal Channel 2 (SSC2) state	0-1
	= Vacant	
	= Process Data Scale	-1; 0; Default: -1
	= Process Data Measuring Value	0-32.000, -32.760-32.760, 32.764

Switched Signal Channel 1 state:

- › 0: inactive
- › 1: active

Switched Signal Channel 2 state:

- › 0: inactive
- › 1: active

Process Data Measuring Value

- › 0-32,000: Process data measuring value
- › 32,764: No measuring value
- › -32,760: Outside the detection range (-)
- › 32,760: Outside the detection range (+)

Measurement data channel description

Index	Subindex	Term	Format	Access
16512	1	Lower Limit	UInt32	RO
	2	Upper Limit	UInt32	RO
	3	Unit Code	UInt16	RO
	4	Scale	Int8	RO

Lower Limit:

The value of the Lower Limit corresponds to the foreground suppression currently set.

Upper limit:

The value of the Upper Limit corresponds to the maximum range currently set.

Unit Code:

The Unit Code is based on the official IO-Link Unit Code:

- › 1013: [mm]

Scale:

The sensor outputs the scale of the current process data. The sensor uses the scale in accordance with the following scheme to calculate the measured values:

$$\text{Process data value} * 10^{(\text{scale})} * [\text{Unit Code}] = \text{measured value in mm}$$

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
2		System Command	UInt8	WO		130: Restore factory settings	
12		Device Access Locks	Record	R/W			
16		Vendor Name	OctetString	RO	microsonic GmbH		
17		Vendor Text	OctetString	RO	Unser Herz schallt ultra.		
18		Product Name	OctetString	RO			
19		Product ID	OctetString	RO			
20		Product Text	OctetString	RO	Ultrasonic Sensor		
21		Serial Number	OctetString	RO			
23		Firmware Revision	OctetString	RO			
24		Application Specific Tag	OctetString [32]	R/W			
32		Error Count	UInt16	RO			
36		Device Status	UInt8	RO	0	0-4: 0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure	
37		Detailed Device Status	ARRAY[10]	RO			
40		Process Data Input	OctetString	RO			
58		Teach-in Channel	UInt8	R/W	0	0; 1: 0: SSC1: pin 4 (push-pull) 1: SSC1: pin 4 (push-pull) 2: SSC2:pin 2 (push-pull)	
59		Teach-in Status	UInt8	RO	0	0-3; 4; 5; 7: 0: Idle 1: Setpoint 1 (SP1) successful 2: Setpoint 2 (SP2) successful 3: Setpoint 1 and Setpoint 2 (SP12) successful 4: Waiting for command 5: Busy 7: Error	
	2	SP1 TP1	Boolean		0		
	3	SP2 TP1	Boolean		0		
60	0	SSC1 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	2,500	300-3,500 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	2,800	300-3,500 Setpoint 2 for switching output	0.1 mm

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
61	0	SSC1 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	30	10-3,200 Hysteresis for SP1 and SP2	0.1 mm
62	0	SSC2 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	2,500	300-3,500 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	2,800	300-3,500 Setpoint 2 for switching output	0.1 mm
63	0	SSC2 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	30	10-3,200 Hysteresis for SP1 and SP2	0.1 mm
100	0	SSC1 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
101	0	SSC2 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%
200	0	Measurement configuration	Record				
	1	Foreground suppression	Int16	R/W	300	300-900	
256	0	Filter	Record				
	1	Type	UInt8	R/W	1	0-4: 0 = F00: no filter 1 = F01: standard filter 2 = F02: averaging filter 3 = F03: foreground filter 4 = F04: background filter	
	2	Strength	UInt8	R/W	0	0-9: 0 = P00 ... 9 = P09 For each measured value filter a filter strength between 0, weak filtering up to 9, strong filtering, can be selected.	
	3	Maximums object speed	UInt8	R/W	25	10..25	
300	0	Temperature compensation	Record				
	1	Source of temperature	UInt8	R/W	1	0-1: 0: Reference temperature 1: Internal Temperatur	
	2	Reference temperature	UInt8	R/W	20	-25-70	1° C

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
350	0	Synchronisation and multiplex operation	Record				
	1	Mode	UInt8	R/W	1	0; 1: 0: inactive 1: Active	
	2	Sensor operation	UInt8	R/W	0	0-10: 0: Synchronisation active 1: Multiplex address 1 2: Multiplex address 2 3: Multiplex address 3 4: Multiplex address 4 5: Multiplex address 5 6: Multiplex address 6 7: Multiplex address 7 8: Multiplex address 8 9: Multiplex address 9 10: Multiplex address 10 128: IO-Link synchronisation active	
	3	Multiplex number of participants	UInt8	R/W	10	2-10: 2: 2 participants 3: 3 participants 4: 4 participants 5: 5 participants 6: 6 participants 7: 7 participants 8: 8 participants 9: 9 participants 10: 10 participants	
370	1	Pin 5	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
371	1	LED	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
2000	0	Temperature compensation diagnosis	UInt24	RO	0		
	1	Sensor temperature	UInt16	RO			
	2	Heating-up phase	UInt8	RO		0; 1: 0: Not completed 1: Completed	
16512	0	Measurement data channel description	Record				
	1	Lower limit	Int32	RO	270	Lower limit of the measuring range (blind zone)	
	2	Upper limit	Int32	RO	3,500	Upper limit of the measuring range (maximum range)	
	3	Unit code	Int16	RO	1013	IO-Link unit code: 1013 = [mm]	
	4	Scale	Int8	RO	-1	Process data value * (10 ^{scale}) [Unit code] = measuring value in mm	

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36001	0x8ca1	Notification	Teach-in success	Teach-in process was successful.
36002	0x8ca2	Notification	CycleTime error	CycleTime error is triggered if cycle time does not correspond to the permitted configuration.

IO-Link data sheet



ipc+35/CFF

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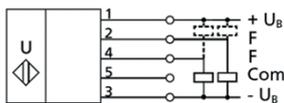


ipc+35/CFF/WK

Physical layer

Vendor Name	microsonic GmbH
Vendor ID	419 (0x01a3)
Product Name	ipc+35/CFF ipc+35/CFF/WK
Product ID	36200 36201
Device ID	35 (0x000023)
IO-Link Spezifikation	1.1
Transmission Rate	COM 2 (38.400 Bd)
Process Data Length	32 Bit PDI
Minimum Cycle Time	16 ms
IO-Link Port Type	A (<200mA)
SIO Mode Supported	Yes
Smart Sensor Profile	Yes, Digital Measuring Sensor
Block Parameter	Yes
Data Storage	Yes

Pin assignment



IO-Link-Mode

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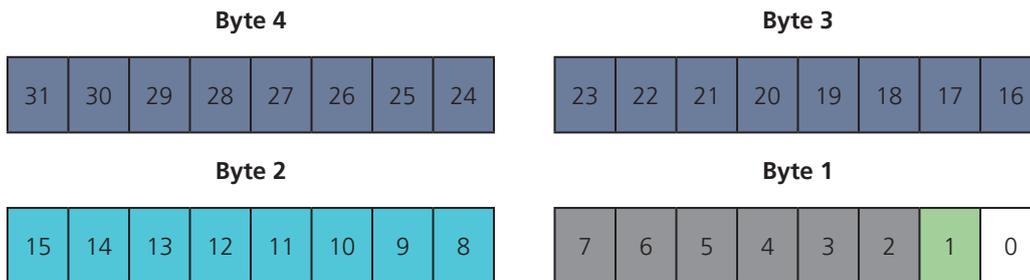
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	= Switched Signal Channel 2 (SSC2) state	0-1
	= Vacant	
	= Process Data Scale	-1; 0; Default: -1
	= Process Data Measuring Value	0-32.000, -32.760-32.760, 32.764

Switched Signal Channel 1 state:

- › 0: inactive
- › 1: active

Switched Signal Channel 2 state:

- › 0: inactive
- › 1: active

Process Data Measuring Value

- › 0-32,000: Process data measuring value
- › 32,764: No measuring value
- › -32,760: Outside the detection range (-)
- › 32,760: Outside the detection range (+)

Measurement data channel description

Index	Subindex	Term	Format	Access
16512	1	Lower Limit	UInt32	RO
	2	Upper Limit	UInt32	RO
	3	Unit Code	UInt16	RO
	4	Scale	Int8	RO

Lower Limit:

The value of the Lower Limit corresponds to the foreground suppression currently set.

Upper limit:

The value of the Upper Limit corresponds to the maximum range currently set.

Unit Code:

The Unit Code is based on the official IO-Link Unit Code:

- › 1013: [mm]

Scale:

The sensor outputs the scale of the current process data. The sensor uses the scale in accordance with the following scheme to calculate the measured values:

$$\text{Process data value} * 10^{(\text{scale})} * [\text{Unit Code}] = \text{measured value in mm}$$

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
2		System Command	UInt8	WO		130: Restore factory settings	
12		Device Access Locks	Record	R/W			
16		Vendor Name	OctetString	RO	microsonic GmbH		
17		Vendor Text	OctetString	RO	Unser Herz schallt ultra.		
18		Product Name	OctetString	RO			
19		Product ID	OctetString	RO			
20		Product Text	OctetString	RO	Ultrasonic Sensor		
21		Serial Number	OctetString	RO			
23		Firmware Revision	OctetString	RO			
24		Application Specific Tag	OctetString [32]	R/W			
32		Error Count	UInt16	RO			
36		Device Status	UInt8	RO	0	0-4: 0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure	
37		Detailed Device Status	ARRAY[10]	RO			
40		Process Data Input	OctetString	RO			
58		Teach-in Channel	UInt8	R/W	0	0; 1: 0: SSC1: pin 4 (push-pull) 1: SSC1: pin 4 (push-pull) 2: SSC2:pin 2 (push-pull)	
59		Teach-in Status	UInt8	RO	0	0-3; 4; 5; 7: 0: Idle 1: Setpoint 1 (SP1) successful 2: Setpoint 2 (SP2) successful 3: Setpoint 1 and Setpoint 2 (SP12) successful 4: Waiting for command 5: Busy 7: Error	
	2	SP1 TP1	Boolean		0		
	3	SP2 TP1	Boolean		0		
60	0	SSC1 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	3,500	650-6,000 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	4,000	650-6,000 Setpoint 2 for switching output	0.1 mm

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
61	0	SSC1 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window \pm set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	50	10-5,350 Hysteresis for SP1 and SP2	0.1 mm
62	0	SSC2 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	3,500	650-6,000 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	4,000	650-6,000 Setpoint 2 for switching output	0.1 mm
63	0	SSC2 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window \pm set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	50	10-5,350 Hysteresis for SP1 and SP2	0.1 mm
100	0	SSC1 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
101	0	SSC2 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%
200	0	Measurement configuration	Record				
	1	Foreground suppression	Int16	R/W	650	650-1,950	
256	0	Filter	Record				
	1	Type	UInt8	R/W	1	0-4: 0 = F00: no filter 1 = F01: standard filter 2 = F02: averaging filter 3 = F03: foreground filter 4 = F04: background filter	
	2	Strength	UInt8	R/W	0	0-9: 0 = P00 ... 9 = P09 For each measured value filter a filter strength between 0, weak filtering up to 9, strong filtering, can be selected.	
	3	Maximums object speed	UInt8	R/W	25	10..25	
300	0	Temperature compensation	Record				
	1	Source of temperature	UInt8	R/W	1	0-1: 0: Reference temperature 1: Internal Temperatur	
	2	Reference temperature	UInt8	R/W	20	-25-70	1° C

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
350	0	Synchronisation and multiplex operation	Record				
	1	Mode	UInt8	R/W	1	0; 1: 0: inactive 1: Active	
	2	Sensor operation	UInt8	R/W	0	0-10: 0: Synchronisation active 1: Multiplex address 1 2: Multiplex address 2 3: Multiplex address 3 4: Multiplex address 4 5: Multiplex address 5 6: Multiplex address 6 7: Multiplex address 7 8: Multiplex address 8 9: Multiplex address 9 10: Multiplex address 10 128: IO-Link synchronisation active	
	3	Multiplex number of participants	UInt8	R/W	10	2-10: 2: 2 participants 3: 3 participants 4: 4 participants 5: 5 participants 6: 6 participants 7: 7 participants 8: 8 participants 9: 9 participants 10: 10 participants	
370	1	Pin 5	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
371	1	LED	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
2000	0	Temperature compensation diagnosis	UInt24	RO	0		
	1	Sensor temperature	UInt16	RO			
	2	Heating-up phase	UInt8	RO		0; 1: 0: Not completed 1: Completed	
16512	0	Measurement data channel description	Record				
	1	Lower limit	Int32	RO	590	Lower limit of the measuring range (blind zone)	
	2	Upper limit	Int32	RO	6,000	Upper limit of the measuring range (maximum range)	
	3	Unit code	Int16	RO	1013	IO-Link unit code: 1013 = [mm]	
	4	Scale	Int8	RO	-1	Process data value * (10 ^{scale}) [Unit code] = measuring value in mm	

Appendix IO-Link data

Events

Code		Type	Name	Description
dezimal	hex			
16384	0x4000	Error	Temperature fault	Overload
16912	0x4210	Warning	Device temperature over-run	Clear source of heat
16928	0x4220	Warning	Device temperature under-run	Insulate device
20736	0x5100	Error	General power supply fault	Check availability
30480	0x7710	Error	Short circuit	Check installation
36000	0x8ca0	Notification	Teach-in error	Teach-in process was not successful.
36001	0x8ca1	Notification	Teach-in success	Teach-in process was successful.
36002	0x8ca2	Notification	CycleTime error	CycleTime error is triggered if cycle time does not correspond to the permitted configuration.

IO-Link data sheet



ipc+100/CFF

Ultrasonic proximity switch with one push-pull switching output and IO-Link interface

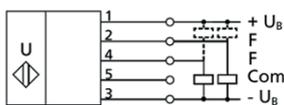


ipc+100/CFF/WK

Physical layer

Vendor Name	microsonic GmbH
Vendor ID	419 (0x01a3)
Product Name	ipc+100/CFF ipc+100/CFF/WK
Product ID	36300 36301
Device ID	36 (0x000024)
IO-Link Spezifikation	1.1
Transmission Rate	COM 2 (38.400 Bd)
Process Data Length	32 Bit PDI
Minimum Cycle Time	20 ms
IO-Link Port Type	A (<200mA)
SIO Mode Supported	Yes
Smart Sensor Profile	Yes, Digital Measuring Sensor
Block Parameter	Yes
Data Storage	Yes

Pin assignment



IO-Link-Mode

The ipc+ sensors are IO-Link capable in accordance with IO-Link specification 1.1. The sensor has an IO-Link communication interface on pin 4.

Direct access to process and diagnosis data is possible via the IO-Link interface. The parameterization of the sensor is possible during operation.

Smart Sensor Profile

ipc+ sensors support the Smart Sensor Profile. The following profiles and function classes are integrated:

- › 0x000A - Device Profile: Digital measuring sensors
- › 0x8000 - Device Identification
- › 0x8001 - Multichannel: Binary Data Channel
- › 0x8003 - Device Diagnosis
- › 0x8004 - Teach Channel
- › 0x800A - Measurement Data Channel (standard resolution)

SSC1 configuration

The sensor has five modes:

- › Single point (SP1: switching point)
- › Window (SP1, SP2: window mode)
- › Two point (SP1, SP2: hysteresis mode)
- › Single point + set point offset (SP1 switching point + offset)
- › Window ± set point offset (SP1 two-way reflective barrier)

IODD description file

Each device has its own electronic device description, the IODD file (IO Device Description). The IODD contains comprehensive data for the purpose of better system integration:

- › Communication features
- › Device parameter with allowed values and default value
- › Identification-, processing and diagnosis data
- › Device data
- › Text description
- › Picture of the device
- › Logo of the manufacturer

The IODD-library contains the IODD files of all IO-Link capable microsonic sensors. You will find the latest IODD files online at www.microsonic.de/IODD.

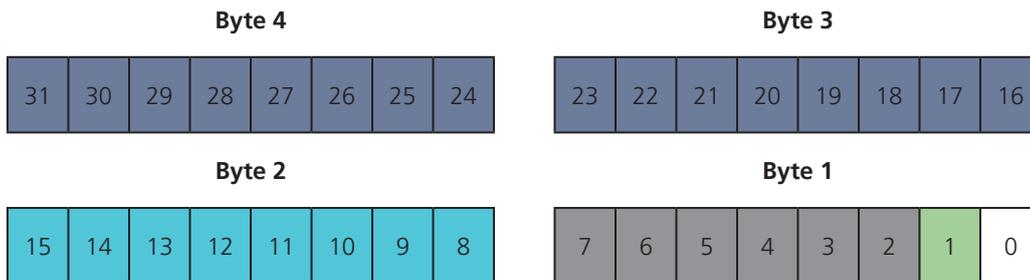


Process data

The process data are cyclically transmitted data. The length of the process data of lpc+ sensors is 4 byte.

Note

microsonic sensors with an operating range of up to 1000 mm indicate distance values with a resolution of 0.1 mm. Operating ranges greater than 1000 mm have distance values with a resolution of 1 mm.



	Description	Value range
	= Switched Signal Channel 1 (SSC1) state	0-1
	= Switched Signal Channel 2 (SSC2) state	0-1
	= Vacant	
	= Process Data Scale	-1; 0; Default: -1
	= Process Data Measuring Value	0-32.000, -32.760-32.760, 32.764

Switched Signal Channel 1 state:

- › 0: inactive
- › 1: active

Switched Signal Channel 2 state:

- › 0: inactive
- › 1: active

Process Data Measuring Value

- › 0-32,000: Process data measuring value
- › 32,764: No measuring value
- › -32,760: Outside the detection range (-)
- › 32,760: Outside the detection range (+)

Measurement data channel description

Index	Subindex	Term	Format	Access
16512	1	Lower Limit	UInt32	RO
	2	Upper Limit	UInt32	RO
	3	Unit Code	UInt16	RO
	4	Scale	Int8	RO

Lower Limit:

The value of the Lower Limit corresponds to the foreground suppression currently set.

Upper limit:

The value of the Upper Limit corresponds to the maximum range currently set.

Unit Code:

The Unit Code is based on the official IO-Link Unit Code:

- › 1013: [mm]

Scale:

The sensor outputs the scale of the current process data. The sensor uses the scale in accordance with the following scheme to calculate the measured values:

$$\text{Process data value} * 10^{(\text{scale})} * [\text{Unit Code}] = \text{measured value in mm}$$

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
2		System Command	UInt8	WO		130: Restore factory settings	
12		Device Access Locks	Record	R/W			
16		Vendor Name	OctetString	RO	microsonic GmbH		
17		Vendor Text	OctetString	RO	Unser Herz schallt ultra.		
18		Product Name	OctetString	RO			
19		Product ID	OctetString	RO			
20		Product Text	OctetString	RO	Ultrasonic Sensor		
21		Serial Number	OctetString	RO			
23		Firmware Revision	OctetString	RO			
24		Application Specific Tag	OctetString [32]	R/W			
32		Error Count	UInt16	RO			
36		Device Status	UInt8	RO	0	0-4: 0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure	
37		Detailed Device Status	ARRAY[10]	RO			
40		Process Data Input	OctetString	RO			
58		Teach-in Channel	UInt8	R/W	0	0; 1: 0: SSC1: pin 4 (push-pull) 1: SSC1: pin 4 (push-pull) 2: SSC2:pin 2 (push-pull)	
59		Teach-in Status	UInt8	RO	0	0-3; 4; 5; 7: 0: Idle 1: Setpoint 1 (SP1) successful 2: Setpoint 2 (SP2) successful 3: Setpoint 1 and Setpoint 2 (SP12) successful 4: Waiting for command 5: Busy 7: Error	
	2	SP1 TP1	Boolean		0		
	3	SP2 TP1	Boolean		0		
60	0	SSC1 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	10,000	1,200-13,000 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	12,000	1,200-13,000 Setpoint 2 for switching output	0.1 mm

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
61	0	SSC1 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	200	10-11,800 Hysteresis for SP1 and SP2	0.1 mm
62	0	SSC2 Parameter	Record				
	1	SP1 (SetPoint 1)	UInt16	R/W	10,000	1,200-13,000 Setpoint 1 for switching output	0.1 mm
	2	SP2 (SetPoint 2)	UInt16	R/W	12,000	1,200-13,000 Setpoint 2 for switching output	0.1 mm
63	0	SSC2 Configuration	Record				
	1	Logic	UInt8	R/W	0	0; 1: 0: High active 1: Low active	
	2	Mode	UInt8	R/W	1	0-3; 128-129: 0: Deactivated 1: Single point (SP1: switching point) 2: Window (SP1, SP2: window mode) 3: Two point (SP1, SP2: hysteresis mode) 128: Single point + set point offset (SP1: switching point + offset) 129: Window ± set point offset (SP1: two-way reflective barrier)	
	3	Hysteresis	UInt16	R/W	200	10-11,800 Hysteresis for SP1 and SP2	0.1 mm
100	0	SSC1 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
101	0	SSC2 Advanced Configuration	Record				
	1	Switch-on delay	UInt8	R/W	0	0-20	1 s
	2	Switch-off delay	UInt8	R/W	0	0-20	1 s
	3	Set point offset	UInt8	R/W	8	1-20	1%
200	0	Measurement configuration	Record				
	1	Foreground suppression	Int16	R/W	1,200	1,200-3,600	
256	0	Filter	Record				
	1	Type	UInt8	R/W	1	0-4: 0 = F00: no filter 1 = F01: standard filter 2 = F02: averaging filter 3 = F03: foreground filter 4 = F04: background filter	
	2	Strength	UInt8	R/W	0	0-9: 0 = P00 ... 9 = P09 For each measured value filter a filter strength between 0, weak filtering up to 9, strong filtering, can be selected.	
	3	Maximums object speed	UInt8	R/W	25	10..25	
300	0	Temperature compensation	Record				
	1	Source of temperature	UInt8	R/W	1	0-1: 0: Reference temperature 1: Internal Temperatur	
	2	Reference temperature	UInt8	R/W	20	-25-70	1° C

Appendix IO-Link data

Index	Sub-index	Term	Data type	Access	Default value	Value range	Resolution
350	0	Synchronisation and multiplex operation	Record				
	1	Mode	UInt8	R/W	1	0; 1: 0: inactive 1: Active	
	2	Sensor operation	UInt8	R/W	0	0-10: 0: Synchronisation active 1: Multiplex address 1 2: Multiplex address 2 3: Multiplex address 3 4: Multiplex address 4 5: Multiplex address 5 6: Multiplex address 6 7: Multiplex address 7 8: Multiplex address 8 9: Multiplex address 9 10: Multiplex address 10 128: IO-Link synchronisation active	
	3	Multiplex number of participants	UInt8	R/W	10	2-10: 2: 2 participants 3: 3 participants 4: 4 participants 5: 5 participants 6: 6 participants 7: 7 participants 8: 8 participants 9: 9 participants 10: 10 participants	
370	1	Pin 5	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
371	1	LED	UInt8	R/W	1	0; 1: 0: Inactive 1: Active	
2000	0	Temperature compensation diagnosis	UInt24	RO	0		
	1	Sensor temperature	UInt16	RO			
	2	Heating-up phase	UInt8	RO		0; 1: 0: Not completed 1: Completed	
16512	0	Measurement data channel description	Record				
	1	Lower limit	Int32	RO	1,090	Lower limit of the measuring range (blind zone)	
	2	Upper limit	Int32	RO	13,000	Upper limit of the measuring range (maximum range)	
	3	Unit code	Int16	RO	1013	IO-Link unit code: 1013 = [mm]	
	4	Scale	Int8	RO	-1	Process data value * (10 ^{scale}) [Unit code] = measuring value in mm	

Appendix IO-Link data

Events

Code		Type	Name	Description
dezimal	hex			
16384	0x4000	Error	Temperature fault	Overload
16912	0x4210	Warning	Device temperature over-run	Clear source of heat
16928	0x4220	Warning	Device temperature under-run	Insulate device
20736	0x5100	Error	General power supply fault	Check availability
30480	0x7710	Error	Short circuit	Check installation
36000	0x8ca0	Notification	Teach-in error	Teach-in process was not successful.
36001	0x8ca1	Notification	Teach-in success	Teach-in process was successful.
36002	0x8ca2	Notification	CycleTime error	CycleTime error is triggered if cycle time does not correspond to the permitted configuration.