Leuze

IO-Link interface description

KRT3CM
KRT3CL1
KRT3CW
Contrast sensor

The Sensor People

We reserve the right to make technical changes
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1 IO link interface

Sensors with KRT3C variant have a dual channel architecture when pin 2 is configured as a switching output. Pin 4 provides the IO-Link interface in accordance with specification 1.1.4 (June 2024) with support for the Smart Sensor Profile 1.2 (January 2024) with profile type SSP 4.1.1 (Measuring and Switching Sensor, 1 Channel). You can configure the devices via the IO-Link interface quickly, easily and cost-effectively. Furthermore, the sensor transmits the process data via the IO-Link interface and makes diagnostic information available through it.

In parallel with the IO-Link communication, the sensor can output the continuous switching signal for object detection on pin 2 (SSC1 inverted by default) by means of the dual channel architecture. The IO-Link communication does not interrupt this signal.

1.1 IO-Link identification

VendorID dec/hex	DeviceID dec/hex	Device
338/0x152	3201/0x000C80	KRT3CM.L3S2/LG-M8
		KRT3CM.Q3S2/LG-M8
	3210/0x000C8A	KRT3CL1.3S2/LG-M8
	3220/0x000C94	KRT3CW.L3S2/LG-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
0	1	CSC – Sensor control	0: Transmitter active 1: Transmitter not active

Byte 0	x	x	x	x	x	x	x	CSC
	7	6	5	4	3	2	1	0

Device output data (PDIn) – 32-bit data length

Bit offset	Data width in bits	Assignment	Meaning
16	16	MDC – Measurement Value	Current measurement value Value range 0 … 4095
8	8	MDC – Scale	Display of the multiplier associated with the measurement value as a power of ten Value range 0 … 1
0	1	SSC.1 – Switching signal	0: Switching output 1 not active 1: Switching output 1 active
1	1	SSC.2 – Switching signal	0: Switching output 2 not active 1: Switching output 2 active
3	1	Measure	0: Measurement not active 1: Measurement active
4	1	Signal	0: No valid measurement value 1: Measurement value available
5	1	Warning	0: No warning 1: Warning

Byte 0	MDC – Measurement Value							
	15	14	13	12	11	10	9	8

Byte 1	MDC – Measurement Value							
	7	6	5	4	3	2	1	0

Byte 2	MDC – Scale							
	7	6	5	4	3	2	1	0

Byte 3	x	x	Warning	Signal	Measure	x	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 of data storage class 1 (automatic DS), i.e., device exchange is possible without additional measures (such as teaching).
- Changes to the transferred PDOut information are ignored if they are marked as invalid. On the sensor side, the replacement value 0 is assumed.
  If the device was previously activated, it remains activated.
  If the device was previously deactivated, it changes to the activated state.
- If there is a lack of communication, the last setting (activation or deactivation) remains unchanged.

Fundamentals:

- IO-Link Interface and System Specification Version 1.1.4 (June 2024)
- IO-Link Test Specification Version 1.1.4 (June 2024)

2 Functions configurable via IO-Link

PC configuration and visualization is performed conveniently with the USB-IO-Link Master SET MD12-US2-IL1.1 (part no. 50121098) and the *Sensor Studio* configuration and diagnosis 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, 67, 68, 71, 72, 75, 79, 128, 129, 130, 131, 176, 177, 178, 192, 193, 226, 227		64: Apply teach, calculate teach points 67: Perform static 2-point teach, teach point 1 for setpoint 1 68: Perform static 2-point teach, teach point 2 for setpoint 1 71: Start dynamic 2-point teach for setpoint 1 72: Stop dynamic 2-point teach for setpoint 1 75: Perform static 1-point window teach for setpoint 1 79: Cancel teach 128: Reset device 129: Reset application 130: Reset to factory settings 131: Back-to-box 176: Activation (priority over PDOut) 177: Deactivation (priority over PDOut) 178: Priority reset (PDout has priority) 192: EasyTune up (increase sensitivity) 193: EasyTune down (reduce sensitivity) 226: Save work parameters via V_WorkLoadSaveIndex 227: Load work parameters via V_WorkLoadSaveIndex

General configuration

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Device Access Locks	12	0	UIntegerT, 2	RW	0, 8	0	0: Teach button not locked 8: Teach button locked
Application Specific Tag	24	0	String, max. 32	RW		***	Application-specific marking

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Function Tag	25	0	String, max. 32	RW		***	Function identifier
Location Tag	26	0	String, max. 32	RW		***	Location indicator
Teach Select	58	0	UInte-gerT, 1	RW	0, 1, 2, 255	1	0: Default channel (SSC.1) 1: SSC.1 2: SSC.2 255: All channels
Teach Result	59	1	UInte-gerT, 4 bit	RO	0, 1, 2, 3, 4, 5, 7		Teach event status: 0: No teach has yet taken place after PowerOn 1: Last teach successfully completed (SP or SP1) 2: Reserve 3: Last teach successfully completed (SP1 and SP2) 4: Teach waiting for input 5: Teach is currently running 7: Last teach returned error
		2	Boolean	RO	0, 1		Teach-in-ok-Signal SP1: 0: Teach point 1 not Ok 1: Teach point 1 Ok
		3	Boolean	RO	0, 1		Teach-in-ok-Signal SP1: 0: Teach point 2 not Ok 1: Teach point 2 Ok
SSC.1 parameter	60	1	UInte-gerT, 4	RW	0 … 4095	2100	Numerical input of switching point SP1
		2	UInte-gerT, 4	RW	0 … 4095	1900	Numerical input of switching point SP2
SSC.1 Configu-ration	61	1	UInte-gerT, 1	RW	0, 1	0	Logic: 0: Active on mark 1: Active on background
		2	UInte-gerT, 1	RW	0 … 2	1	Evaluation mode: 0: Deactivated 1: Object (only for 2-point teach) 2: Window mode (only for 1-point teach)
		3	UInte-gerT, 4	RW	0 … 4095	0	Determines the hysteresis at the switching point. A higher hysteresis can help increase the stability in critical applications.
Teach color selection	84	0	UInte-gerT, 1	RW	1 – 7	7	Teach color selection: 1: red 2: green 3: red/green 4: blue 5: red/blue 6: blue/green 7: red/green/blue

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Position of switching threshold, 2-point teach, IO-Link	86	0	UIntegerT, 1	RW	6, 12, 25, 50, 70, 82, 90	50	Position of the switching point between background and target in % (center = 50%) for 2-point teach-in via IO-Link: 6: Very near the mark = 6% 12: Near the mark = 12% 25: Towards mark = 25% 50: In the middle between mark and background = 50% 70: Towards background = 70% 82: Near background = 82% 90: Very near background = 90%
Working parameter load / save index	98	1	UIntegerT, 1	RW	0 – 30		Working parameters' storage location in the recipe memory for loading or saving
Working parameter	99	1	UIntegerT, 1	RW	0 … 2		Color: 0: red 1: green 2: blue
		2	UIntegerT, 1	RW	0 … 255		Gain value
		3	UIntegerT, 2	RW	0 … 4095		Background value
		4	UIntegerT, 2	RW	0 … 4095		Mark value
		5	UIntegerT, 2	RW	0 … 4095		Offset value

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Dataset 0 – 29	100 – 129	1	UInteger T, 1	RW	0 … 2		Color: 0: red 1: green 2: blue
		2	UInteger T, 1	RW	0 … 255		Gain value
		3	UInteger T, 2	RW	0 … 4095		Background value
		4	UInteger T, 2	RW	0 … 4095		Mark value
		5	UInteger T, 2	RW	0 … 4095		SSC.1 switching point 1
		6	UInteger T, 2	RW	0 … 4095		SSC.1 switching point 2
		7	UInteger T, 2	RW	0 … 4095		SSC.1 hysteresis
		8	UInteger T, 2	RW	0 … 2		SSC.1 switching mode: 0: Deactivated 1: Object mode 2: Window mode
		9	UInteger T, 2	RW	0 … 4095		Offset value
		10	UInteger T, 2	RW	0 … 4095		SSC.2 switching point 1
		11	UInteger T, 2	RW	0 … 4095		SSC.2 switching point 2
		12	UInteger T, 2	RW	0 … 4095		SSC.2 hysteresis
		13	UInteger T, 2	RW	0 … 2		SSC.2 switching mode: 0: Deactivated 1: Object mode 2: Window mode
Analysis Depth SSC.2	180	0	UInteger T, 1	RW	1 – 100	2	Analysis depth: to suppress interference, changing of the switching output is delayed by this number of identical measurement results. The default setting in the factory settings refers to the specified response time in the device data sheet.
Timer Unit SSC.2	182	0	UInteger T, 1	RW	0, 255	0	0: Time module not active 255: Time module active Time module: *On* (255) activates the internal time function.

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Function of Timer Unit SSC.2	183	0	UIntegerT, 1	RW	0 … 3	3	Function selection of switching delay SSC.2: 0: Switch-on delay 1: Switch-off delay 2: Pulse stretching 3: Pulse suppression Function selection of the switching delay: activation of a suitable switching delay is possible. It is not possible to combine switching delays.
Time SSC.2	184	0	UIntegerT, 2	RW	1 – 50000	200	Definition of the time basis in 100 µs increments, configurable from 100 µs to 5000 ms.
Number of Objects SSC.2	185	0	UIntegerT, 4	RW	0 – 4294967295		Object counter: The device has an internal, volatile object counter. This counts the switching events and can be freely read out, edited and reset. This function enables a simple validation of the process. As soon as the object counter has reached the maximum end value, the count process starts over again at 0.
Analysis Depth SSC.1	190	0	UIntegerT, 1	RW	1 – 100	2	Analysis depth: to suppress interference, changing of the switching output is delayed by this number of identical measurement results. The default setting in the factory settings refers to the specified response time in the device data sheet.
Timer Unit SSC.1	192	0	UIntegerT, 1	RW	0, 255	0	0: Time module not active 255: Time module active Time module: *On* (255) activates the internal time function.
Function of Timer Unit SSC.1	193	0	UIntegerT, 1	RW	0 … 3	3	Function selection of switching delay SSC.1: 0: Switch-on delay 1: Switch-off delay 2: Pulse stretching 3: Pulse suppression Function selection of the switching delay: activation of a suitable switching delay is possible. It is not possible to combine switching delays.
Time SSC.1	194	0	UIntegerT, 2	RW	1 – 50000	200	Definition of the time basis in 100 µs increments, configurable from 100 µs to 5000 ms.
Number of Objects SSC.1	195	0	UIntegerT, 4	RW	0 – 4294967295		Object counter: The device has an internal, volatile object counter. This counts the switching events and can be freely read out, edited and reset. This function enables a simple validation of the process. As soon as the object counter has reached the maximum end value, the count process starts over again at 0.

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 1	201	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	5	Cable function Level 1: 20 – 80 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 2	202	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	6	Cable function Level 1: 120 – 180 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 3	203	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	22	Cable function Level 1: 220 – 280 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 4	204	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	23	Cable function Level 1: 320 – 380 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 5	205	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	19	Cable function Level 1: 420 – 480 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 6	206	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	20	Cable function Level 1: 520 – 580 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 7	207	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 620 – 680 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 8	208	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 720 – 780 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 9	209	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 820 – 880 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 10	210	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 920 – 980 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Wire function level 11	211	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 1020 – 1080 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Wire function level 12	212	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	0	Cable function Level 1: 1120 – 1180 ms: 0: No cable function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Temperature	220	0	UIntegerT, 2	RO		0	The device is equipped with an integrated temperature sensor for transmitting the internal temperature in 1/10°C.
Wire Legacy Mode	221	0	Boolean	RW	TRUE FALSE	FALSE	Pin 2 line behavior: TRUE: KRT3B line behavior FALSE: Standard line behavior
Disable EasyTune	230	0	Boolean	RW	TRUE FALSE	FALSE	TRUE: EasyTune function disabled on button FALSE: EasyTune function enabled on button

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Button EasyTune function level 1	231	0	UIntegerT, 1	RW	0, 15, 16	15	Button press < 0.2 s: 0: Button not assigned 15: Reduce EasyTune 16: Increase EasyTune
Button EasyTune function level 2	232	0	UIntegerT, 1	RW	0, 15, 16	16	Button press > 0.2 s < 2 s: 0: Button not assigned 15: Reduce EasyTune 16: Increase EasyTune
All-time Run Time	234	0	UIntegerT, 4	RO			The device has an integrated operating hours counter for displaying the non-volatile count of completed operating hours.
Button function level 1	241	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	5	Selection of the function to be executed after pressing the button for 2 to 6 seconds. 0: No button function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Button function level 2	242	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	6	Selection of the function to be executed after pressing the button for 7 to 11 seconds. 0: No button function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Button function level 3	243	0	UIntegerT, 1	RW	0, 3, 4, 5, 6, 7, 8, 15, 16, 19, 20, 21, 22, 23, 24	24	Selection of the function to be executed after pressing the button for 12 to 16 seconds. 0: No button function 3: Static 1-point teach SSC.1, standard sensitivity 4: Static 1-point teach SSC.1, high sensitivity 5: Static 2-point teach SSC.1, standard sensitivity 6: Static 2-point teach SSC.1, high sensitivity 7: Static 2-point teach SSC.1, standard sensitivity 8: Static 2-point teach SSC.1, high sensitivity 15: EasyTune down (reduce sensitivity) 16: EasyTune up (increase sensitivity) 19: SSC.1 logic not inverted 20: SSC.1 logic inverted 21: Switch SSC.1 logic 22: Activate SSC.1 time module 23: Deactivate SSC.1 time module 24: Switch SSC.1 time module
Pin 4 function	251	0	UIntegerT, 1	RW	0, 1, 2, 3, 4	1	Setting the functionality of PIN 4: 0: Pin without function 1: Pin as SSC.1 2: Pin as SSC.1 inverted 3: Pin as SSC.2 4: Pin as SSC.2 inverted

Parameter	Index	Sub-index	Data type, octets	Access	Value range	Default	Explanation
Pin 2 function	252	0	UIntegerT, 1	RW	0, 1, 2, 3, 4, 14, 15, 16	2	Setting the functionality of PIN 2: 0: Pin without function 1: Pin as SSC.1 2: Pin as SSC.1 inverted 3: Pin as SSC.2 4: Pin as SSC.2 inverted 14: Pin as teach input 15: Pin as deactivation input 16: Pin as activation input
Teach Error Code	902	0	UIntegerT, 2	RO	0, 33040, 33041, 33042, 33043, 33044, 33045, 33046, 33047, 33048, 33049, 33050, 33051, 33052	0	Detailed description of a possible teach error. 0: No error 33040: S1P signal too weak 33041: S1P signal too large 33042: DS2P contrast too low 33043: EasyTune limit reached (upward) 33044: EasyTune limit reached (downward) 33045: Teach Stop command, but no teach active 33046: Transmitter color not permitted 33047: Background and mark must be different 33048: Upper switching point must be greater than lower switching point 33049: Sensitivity value too low for background 33050: Sensitivity value too high 33051: Lower switching point must be between background and mark 33052: Upper switching point must be between background and mark
Teach Window Size	16511	-	UIntegerT, 4	RW	1 – 100	12	Distance of the threshold from the reference value in % (reference value = 100%) for 1-point teach-in via IO-Link

3 Recipe management

General description

The KRT3CM, KRT3CW, and KRT3CL1 contrast sensors enable recipe management via IO-Link. The contrast sensors allow up to 30 teach values (and thus the teach settings for 30 different label formats) to be saved directly in the sensor as recipes and retrieved as needed.

When changing a roll to a new label format, it is then possible to simply load the corresponding recipe without needing to perform a teach event. After calling up the recipe for the new label format, the sensor operates reliably with the teach value stored for that format. This eliminates the need to re-teach the sensor when changing a roll to a different label format, and the format change is performed faster and more easily.

Tab. 3.1: Parameters for recipe management

Index	Parameter	Action
99	Working parameter	Save current teach value after the teach event
98	Working parameter load/save index	Storage location of the recipe (values 0 – 29)
2	System command	Value 226: Save work parameters via V_WorkLoadSaveIndex Value 227: Load work parameters via V_WorkLoadSaveIndex

The current teach value, which is saved after the teach event, is stored under parameter *Working parameter* at index 99. It includes the taught-in color, the gain, background and mark value, switch-on and switch-off thresholds, and the background offset for the contrast mark to be detected.

Save current teach value as recipe

- Select the storage location of the recipe for the current teach value by writing a value from 0 – 29 in index 98 (parameter *Working parameter load/save index*).
- Save the recipe in the selected storage location by writing value 226 (parameter *Save work index*) in index 2 (parameter *System command*).

Example:

1. Save the teach value for contrast mark A in storage location 3:
   Write value 3 to index 98.
2. Save contrast mark A as recipe at storage location 3:
   Write value 226 in index 2.

If the sensor is taught to a new contrast mark (e.g., contrast mark B), the teach value for the new contrast mark B is again stored under parameter *Working parameter* on index 99. The teach value for contrast mark A is still available as a recipe in the sensor and can be reloaded if necessary.

The steps described above can be used to store up to 30 different recipes in the sensor (e.g., saving the teach value for contrast mark B as recipe on value 1 in index 101).

Load saved teach value as recipe

- Select the storage location of the desired recipe by writing the corresponding value (0 – 29) in index 98 (parameter *Working parameter load/save index*).
- Load the recipe form the selected storage location by writing value 227 (parameter *Load work index*) in index 2 (parameter *System command*).
- ⇨ The recipe for contrast mark A is thereby loaded with the corresponding teach value and active in the sensor. The corresponding marks can be detected by the sensor without re-teaching.

Example:

1. Select recipe with the teach value for contrast mark A from storage location 3:
   Write value 3 in index 98.
2. Load selected recipe:
   Write value 227 in index 2.