

FT 10-RLA

Sub-miniature laser distance sensor



PRODUCT HIGHLIGHTS

- Measurement value output via IO-Link
- Minimum weight
- Also suited to smallest installation spaces thanks to minimal dimensions
- Adjustable averaging times
- Laser class 1 for optimum eye safety

Optical data		Functions	
Measurement range	10 ... 70 mm ¹	Indicator LED, green	Operating voltage indicator
Resolution	0.01 mm	Indicator LED, yellow	Switching output indicator
Linearity	± 0.2 ... 0.8 mm (see characteristics) ²	Measurement range adjustment	Via IO-Link
Repeatability	0.01 ... 0.2 mm (6 σ , see characteristics) ^{2,3}	Adjustment possibilities	Button lock via control input N.O./N.C. and Auto-Detect / NPN / PNP via Teach-in button or IO-Link Smart functions and averaging times via IO-Link
Type of light	Laser, red, 655 nm	Default settings	See selection table
Light spot size	1 x 3 mm		
Laser class (IEC 60825-1)	1		
Resistance to ambient light	≤ 5000 Lux		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	21.1 x 14.6 x 8 mm
No-load current, I ₀	≤ 12 mA	Enclosure rating	IP 67 ⁵
Output current, I _{e Q}	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	See selection table
Switching output, Q	1x Auto-Detect (PNP/NPN) ⁴	Ambient temperature: operation	-20 ... +50 °C ⁶
Output function Q	N.O./N.C.	Ambient temperature: storage	-20 ... +60 °C
Switching frequency, f (ti/tp 1:1) Q	≤ 1000 Hz	Weight (cable device)	22 g
Response time Q	500 μ s	Weight (pigtail)	10 g
Warm-up time	10 min.	Resistance to vibrations and impacts	EN 60947-5-2
Response time measurement value	4 ms		
Averaging times	4 / 40 / 80 / 120 / 160 / 200 / 240 / 280 / 320 / 360 / 400 ms (Default setting 4 ms)		
Temperature-specific measurement deviation	0.01 mm/K (typ.)		
IO-Link			
Communication mode	COM 2		
Min. cycletime	2.7 ms		
SIO mode	Compatible		
Data storage	Compatible		
Length process data	24 Bit		
Specification	1.1		

¹ Reference material 5...90 % reflectivity be fixed ⁵With connected IP 67 plug

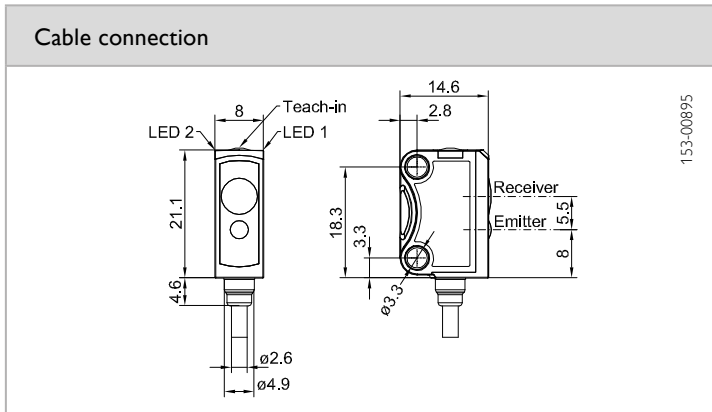
² Reference material 90 % reflectivity

³ Stationary object,

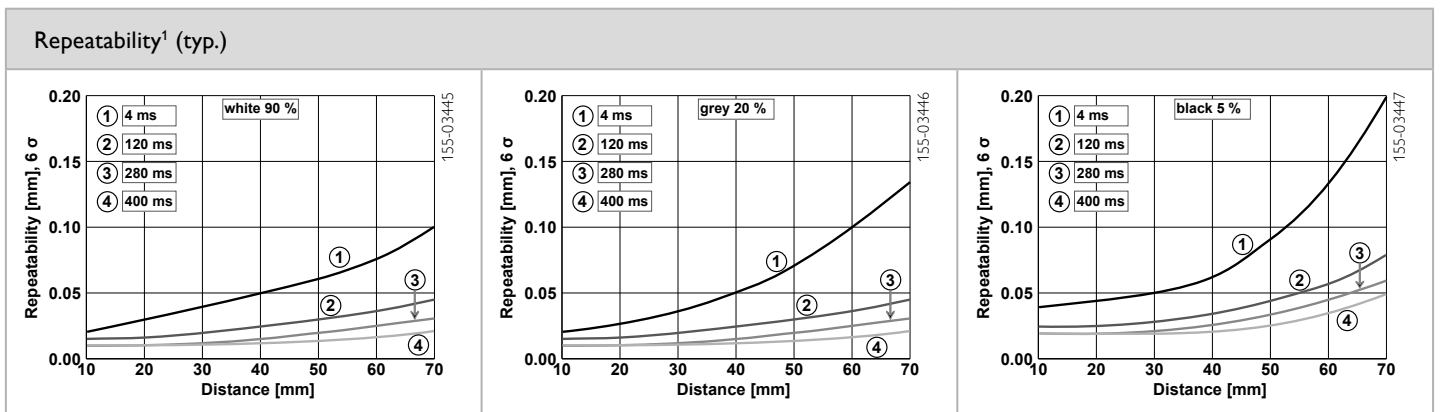
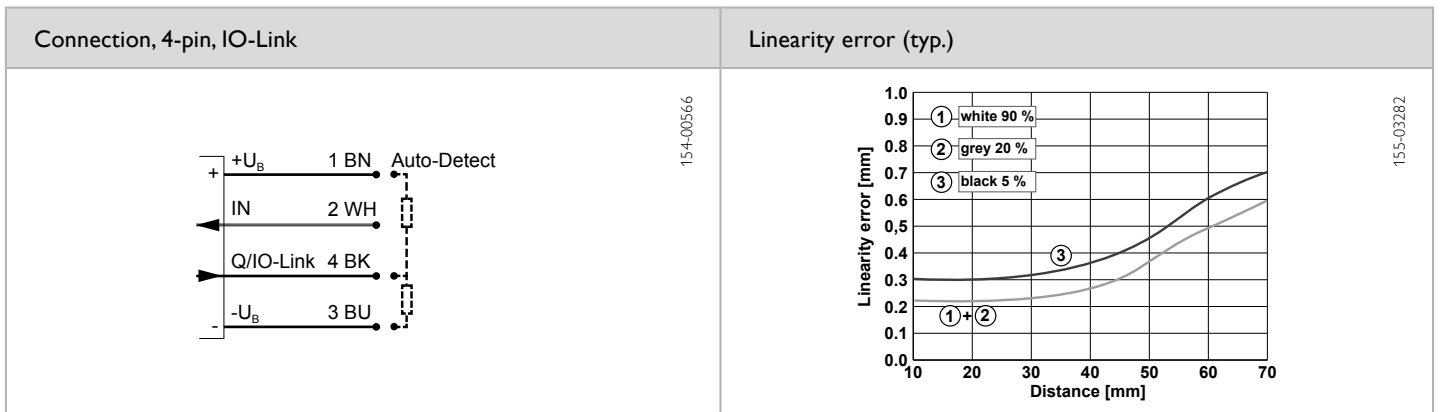
⁴ Auto-Detect: Automatic selection of PNP or NPN by the sensor; PNP or NPN can

⁶ UL: max. +30 °C

Measurement range	Measurement value output	Switching output	Type of connection	Part number	Article number
10 ... 70 mm	IO-Link	Auto-Detect	Pigtail, 200 mm with plug, M8 4-pin, IO-Link	FT 10-RLA-60-PNSL-KM4	600-11175
10 ... 70 mm	IO-Link	Auto-Detect	Cable, 2 m, 4-wire, IO-Link	FT 10-RLA-60-PNSL-K4	600-11176



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¹ At constant ambient conditions, minimum distance between sensors 3 mm

Accessories

Connection cables	From Page A-46
Brackets	From Page A-4
SensolO (901-01000)	From Page A-56

GENERAL INFORMATION	
Communication mode IO-Link	COM 2
Min. cycle time	2.7 ms
SIO mode	supported
Length process data	24 Bit
Vendor ID	347 (0x01 0x5B)
Device ID	11009
Data storage	supported
Specification IO-Link	1.1

PROCESS DATA																							
SMART-SENSOR PROFILE																							
Byte 0								Byte 1								Byte 2							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
MSB D7	D6	D5	D4	D3	D2	D1	LSB D0	MSB D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	LSB D0	Signal quality	Switching output Q2	Switching output Q1
Signal quality 0 ... 100 %								Process value - distance in μm (adapted in IODD into mm), characteristic curve not adjustable															
Signal quality score - adjustable via index 0xC4																							
Switching output 2 - virtual switching output																							
Switching output 1 - corresponds to switching output Q in SIO-mode																							

MEASUREMENT OUTPUT																							
Byte 0								Byte 1								Byte 2							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
MSB D7	D6	D5	D4	D3	D2	D1	LSB D0	MSB D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	LSB D0
Signal quality 0 ... 100 %								Process value - distance in μm (adapted in IODD into mm), characteristic curve adjustable, average filter applicable															

IDENTIFICATION DATA						
Index dec / hex	Access	Data type	Length	Description	Comment	
16 / 0x10	Read	String	Max. 64 Byte	Vendor name	SensoPart Industriesensorik GmbH	
17 / 0x11				Vendor text	www.sensopart.com	
18 / 0x12				Product name	FT 10-RLA-60-PNSL-M4M / KM4	
19 / 0x13				Product ID	600-11175 600-11176	
20 / 0x11				Product text	Device specific	
23 / 0x17				Firmware revision	1.0	

SMART SENSOR PROFILE PARAMETER								
Index in dec / hex	Access	Data type	Length	Subindex	Default value	Range	Description	Comment
12 / 0x0C	Read / write	Uint	16 Bit		0x00 0x00	D1, D3	Lock functions	D1 - data storage lock D3 - local user interface lock
24 / 0x18	Read / write	StringT	32 characters		**** ... ****	0 ... 32 char.	Application text	Free text, e.g. item designation
58 / 0x3A	Read / write	Uint	8 Bit		0	0, 1, 2	Teach channel	0 / 1 = switching channel 1 2 = switching channel 2
59 / 0x3B	Read	Uint	8 Bit				Teach-in status	
Define switching output Q ₁ (physical pin)								
60 / 0x3C	Read / write	Uint	16 Bit	1	1000	1000 ... 7000	Switching point 1	Needed for single window and two-point mode, in 1/100 mm, adapted in IODD into mm
				2	7000	1000 ... 7000	Switching point 2	Needed for window and two-point mode, in 1/100 mm, adapted in IODD into mm
Set-Up switching output Q ₁ (physical pin)								
61 / 0x3D	Read / write	Uint	8 Bit	1	0	0, 1	NO / NC	0 = NO, 1 = NC
				2	2	0, 1, 2, 3	Switching mode	0 - disable 1 - single-point mode 2 - window mode ¹⁾ 3 - two-point mode ¹⁾
Define switching output Q ₂ (only virtual via IO-Link)								
62 / 0x3E	Read / write	Uint	16 Bit	1	1000	1000 ... 7000	Switching point 1	Needed for single window and two-point mode, in 1/100 mm, adapted in IODD into mm
				2	7000	1000 ... 7000	Switching point 2	Needed for window and two-point mode, in 1/100 mm, adapted in IODD into mm
Set-Up switching output Q ₂ (only virtual via IO-Link)								
63 / 0x3F	Read / write	Uint	8 Bit	1	0	0, 1	NO / NC	0 = NO, 1 = NC
				2	0	0, 1, 2, 3	Switching mode	0 - disable 1 - single-point mode 2 - window mode ¹⁾ 3 - two-point mode ¹⁾

¹⁾ Min. difference between both switchpoints 1 mm

PARAMETER									
Index dec / hex	Access	Data type	Length	Subindex	Default value	Range	Description	Comment	
88 / 0x58	Read	Uint	32 Bit	1			Read operating data		
				2			Counter operating hours	No reset possible	
							Counter switch cycle	No reset possible	
95 / 0x5F	Read	String		1			Type label		
				5			10 ... 70 mm	Measurement range	
				6			Laser, red 655 nm, class 1	Type of light	
				7			≤ 20 mA	No-load current	
				8			≤ 1000 Hz	Switching frequency	
				9			10 min.	Warm-up time	
							Ambient temperature		
189 / 0xBD	Read / write	Uint	8 Bit		0	0 ... 10	Intensity average filter	0 = No averaging response time 3.4 ms 1 = 10x response time 2 = 20x response time ... 10 = max.	
193 / 0xC1	Read / write	Int	16 Bit		0	-7000 ... 7000	Offset	In 1/100 mm, adapted in IODD into mm	
185 / 0xC3	Read / write	Uint	8 Bit		1	0, 1	Invert characteristic curve	Rise: 0 = negative 1 = positive	
202 / 0xCA	Read / write	Uint	8 Bit		1	0, 1	Process data output	0 = measurement output 1 = smart sensor profile	
196 / 0xC4	Read / write	Uint	8 Bit		10	0 ... 100	Signal quality level	%	
208 / 0xD0	Read / write	Uint	16 Bit	1	0	0 ... 65535	Counter		
				2	0	0 ... 65535	On delay	In ms, adjustable in 1 ms	
				3	0	0 ... 65535	Off delay	In ms, adjustable in 1 ms	
				4	0	0 ... 65535	Impulse	In ms, adjustable in 1 ms	
				5	0	0 ... 500	Monitoring frequency	In Hz, adjustable in 0.1 Hz steps ²⁾	
209 / 0xD1	Read / write	Uint	16 Bit	1	0	0 ... 65535	Counter		
				2	0	0 ... 65535	On delay	In ms, adjustable in 1 ms	
				3	0	0 ... 65535	Off delay	In ms, adjustable in 1 ms	
				4	0	0 ... 65535	Impulse	In ms, adjustable in 1 ms	
				5	0	0 ... 500	Monitoring frequency	In Hz, adjustable in 0.1 Hz steps ²⁾	
213 / 0xD5	Read / write	Uint	8 Bit	1	2	0, 1, 2	Function switching output Q ₁		
							PNP / NPN	0 = NPN 1 = PNP 2 = auto-detect	
221 / 0xDD	Read / write	Uint	8 Bit	1	1	0, 1	Control input		
							Control input PIN 2	0 = PIN 2 disable 1 = PIN 2 active	

²⁾ Differs to real frequency ± 10 %

SYSTEM COMMANDS								
Index dec / hex	Access	Data type	Length	Function dec / hex	Range	Description	Comment	
2 / 0x02	Read / write	Uint	8 Bit	64 / 0x40		Teach apply	Adopt teach values on sensor	
				65 / 0x41		Single value teach - switching point 1	The switching point is on the teach value	
				66 / 0x42		Single value teach - switching point 2		
				67 / 0x43		Two value teach - teachpoint 1 for switching point 1		The switching point is in the middle of both teachpoints
				68 / 0x44		Two value teach - teachpoint 2 for switching point 1		
				69 / 0x45		Two value teach - teachpoint 1 for switching point 2		
				70 / 0x46		Two value teach - teachpoint 2 for switching point 2		
				71 / 0x47		Dynamic teach - switching point 1 - start	The switching point is in the middle of the min. / max. value	
				72 / 0x48		Dynamic teach - switching point 1 - stop		
				73 / 0x49		Dynamic teach - switching point 2 - start		
				74 / 0x4A		Dynamic teach - switching point 2 - stop		
				79 / 0x4F		Teach cancel		
				160 / 0xA0		Emitter off		
				161 / 0xA1		Emitter on		
				162 / 0xA2		Reset switching channel	Reset of current switching channel	
				174 / 0xAE		Offset teach		
				175 / 0xAF		Detect sensor	1x activated - sensor flashes 60 s 2x activated - permanent flashing 3x activated - stop permanent flashing	
128 / 0x80		Reset sensor						
130 / 0x82		Factory setting						

EVENTS				
Event	Status value	Warning		
20480 / 0x5000	4	Error	Device hardware fault	Default: deactivated ³⁾
20497 / 0x5011	4	Error	Non-volatile memory loss	
65425 / 0xFF91	0	Notice	Data storage - upload request	
16384 / 0x4000	4	Error	Temperature fault	Temperature range exceeded; default: deactivated ³⁾

³⁾ For activation use function 0x51