

FT 25-RA – Optical short range distance sensor

Precise miniature distance sensor for measurement and control tasks



 made in Germany



FT 25-RA for dancer roll regulation

The precise control of the FT 25-RA ensures a constant tension of the paper roll during unwinding.

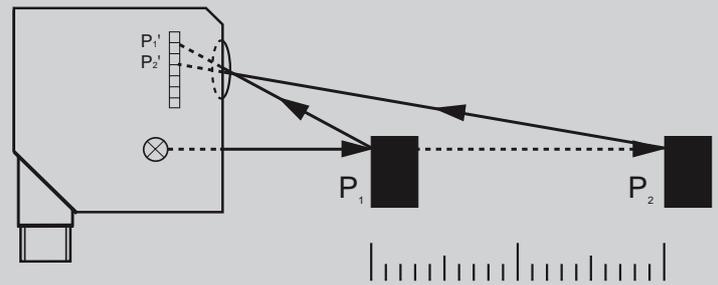
TYPICAL FT 25-RA

- Miniature housing for an easy integration and high flexibility 34 × 12 × 20 mm
- Measurement ranges 20...80 mm / 30...200 mm
- High precision and high repeatability – especially for control tasks
- Surface independent detection – constant values on colored or glossy surfaces
- Separate adjustment of analogue (Q_A) and switching output (Q) via easy Teach-in
- Invertible analogue output
- Window mode (e.g. for two-step control tasks)

Distance measurement using triangulation

The measurement principle of optical triangulation is suitable for the precise determination of distances at close range. With the help of special receiver optics and a position-sensitive detector (e.g. a photodiode line), the sensor can determine the object distance regardless of its reflectivity (see illustration below). The colour and surface properties (e.g. highly reflective) thus have practically no effect on measurement accuracy.

The **FT 25-RA distance sensor** provides a signal proportional to the distance, transmitted via the analogue output (1 ... 10V). Additionally, an arbitrary switching window is adjustable within the measuring range (via the teach-in button). The output of the two switching points is supplied at the digital switching output.



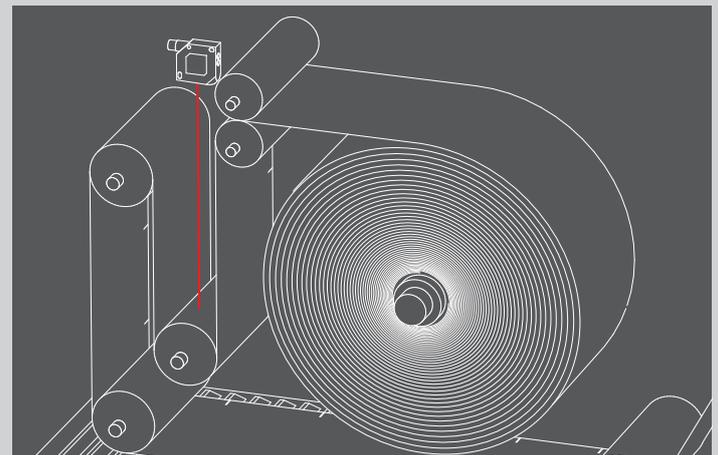
The triangulation process: with the help of a line-shaped position-sensitive detector, the distance sensor measures the distance to the object regardless of the amount of light reflected.

The light reflected back from the object (P_1) hits the line at point P_1 . The sensor determines the distance signal from this. The light correspondingly hits the detector at a different point (P_2) at object distance P_2 .

Dancer roll regulation and sag monitoring

Due to its high repeatability, the **FT 25-RA distance sensor** accurately detects the change of position of the dancer roll. This ensures a precise control of the unwinding.

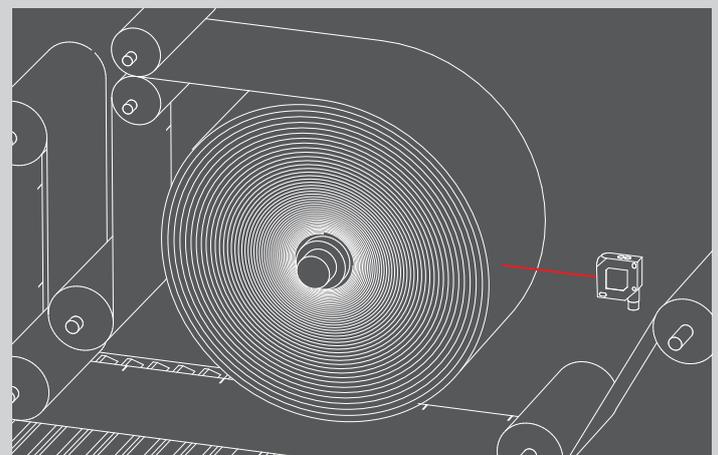
- Precise determination of dancer roll position for active traction force regulation of the web being wound
- Reliable detection regardless of the target object's surface properties
- Short response time for rapid processes
- Measurement ranges up to 200 mm
- Analogue and switching output for precise two-step control tasks



Determining the roll diameter of an unwinding machine

The **FT 25-RA distance sensor** precisely determines the diameter of the unwinding machine to provide an early information for an upcoming roll change.

- Small housing for easy integration
- High accuracy regardless of target object's surface properties
- Short response time



Further key applications of the FT 25-RA include:

- Stacking height measurement, double layer detection and height measurements in the wood processing, packaging- and handling industry
- Distance measurement and positioning on robot grippers at „pick & place“ applications

FT 25 RA

Miniature distance sensor



PRODUCT HIGHLIGHTS

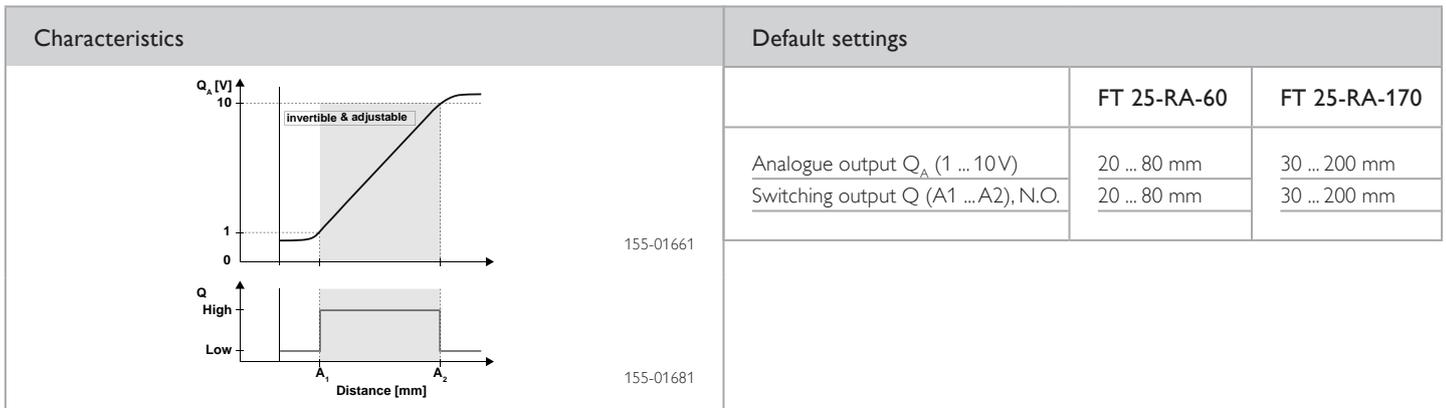
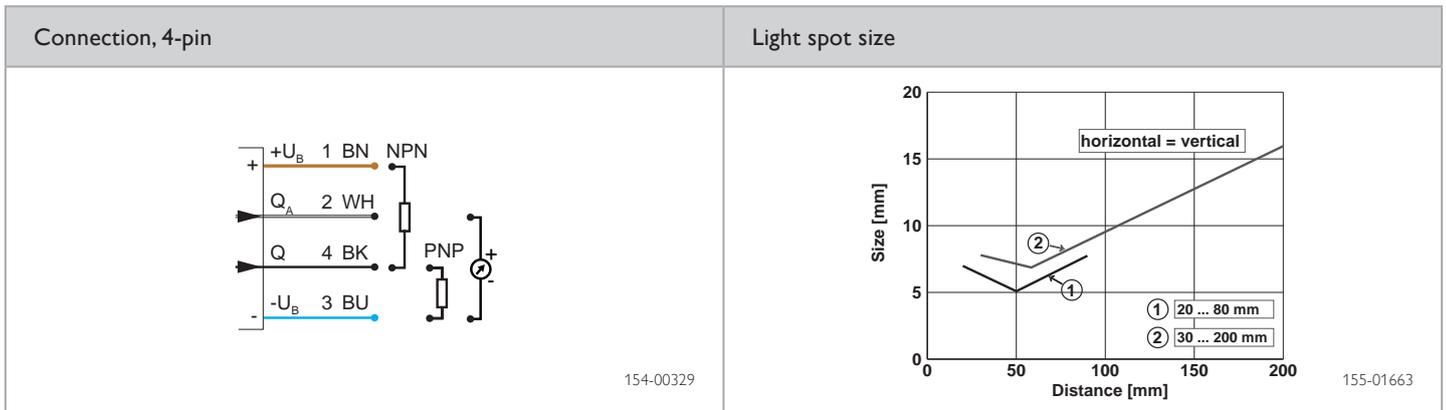
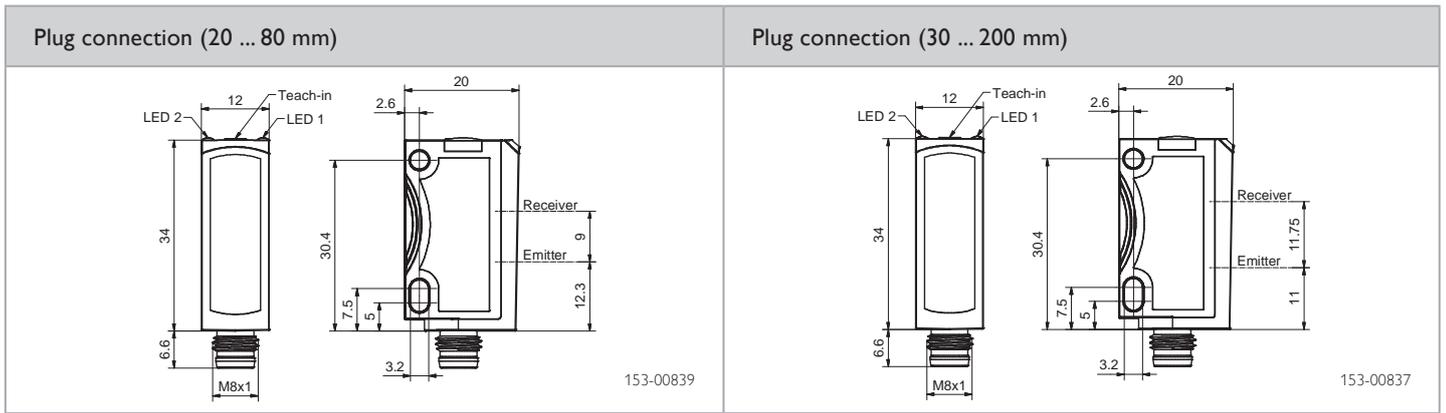
- Miniature housing with measurement ranges up to 200 mm for an easy integration and high flexibility
- High linearity and high repeatability for precise control tasks
- Almost surface independent detection on homogeneous object surfaces
- Invertible analogue characteristic
- Window mode e.g. for two-step controls separately adjustable

Optical data		Functions	
Measurement range	20 ... 80 mm ¹	30 ... 200 mm ¹	Indicator LED, green
Resolution	20 µm	50 µm	Indicator LED, yellow
Linearity	± 0.4 mm ²	± 2 mm ²	Measurement range adjustment
Repeatability	< 0.4 mm ^{2,3}	< 1 mm ^{2,3}	Adjustment possibilities
Type of light	LED, red, 632 nm	LED, red, 632 nm	Default settings
			Operating voltage indicator
			Switching output indicator
			Via Teach-in button
			Analogue measurement range Q _A
			Invertible analogue characteristic
			Switching output Q (window mode)
			N.O./N.C. via teach-in button
			See Table
Electrical data		Mechanical data	
Operating voltage, +U _B	13 ... 30V DC	Dimensions	34 × 20 × 12 mm
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 / IP69 K ⁴
Output current, I _{e Q}	≤ 100 mA	Material, housing	ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Time to readiness	< 300 ms	Ambient temperature: operation	-20 ... +60 °C ⁵
Switching output, Q	PNP/NPN (See Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	10 g
Max. capacitive load Q	10 nF	Resistance to vibrations and impacts	EN 60947-5-2
Switching frequency, f (ti/tp 1:1) Q	≤ 1000 Hz		
Response time Q	500 µs		
Analogue output Q _A	1 ... 10V / max. 3 mA		
Response time Q _A	400 µs (FT 25-RA-60)		
	3.4 µs (FT 25-RA-170)		
Warm-up time	10 min.		
Temperature drift	< 0.1 mm/K (FT 25-RA-60)		
	< 0.2 mm/K (FT 25-RA-170)		

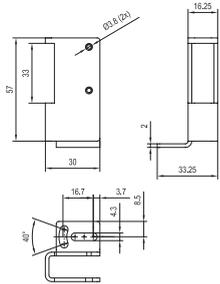
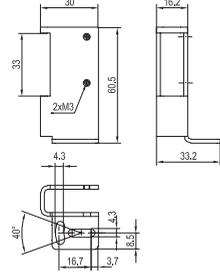
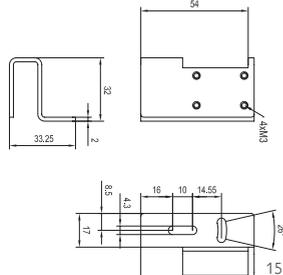
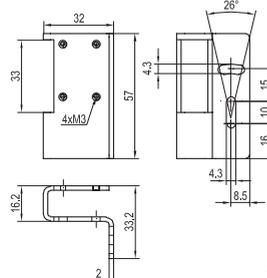
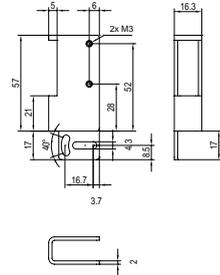
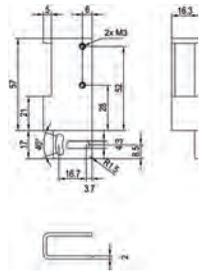
¹ Reference material: 6...90 % reflectivity, ² Reference material grey, 18 % reflectivity, ³ at constant ambient conditions,

⁴ with connected IP 67 / IP 69K plug, ⁵ UL: -20°C...+50 °C

Measurement range	Analogue output	Switching output	Type of connection	Part number	Article number
20 ... 80 mm	1 ... 10V	PNP	Metal plug, M8x1, 4-pin	FT 25 RA-60-PSU-M4M	604-41000
20 ... 80 mm	1 ... 10V	NPN	Metal plug, M8x1, 4-pin	FT 25 RA-60-NSU-M4M	604-41001
30 ... 200 mm	1 ... 10V	PNP	Metal plug, M8x1, 4-pin	FT 25 RA-170-PSU-M4M	604-41002
30 ... 200 mm	1 ... 10V	NPN	Metal plug, M8x1, 4-pin	FT 25 RA-170-NSU-M4M	604-41003



Brackets

Brackets for F 25			
	 <p>153-01017</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-11 / 558-41006</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240</p>
	 <p>153-00296</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-1 / 558-41004</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 F 25 UT 20 FL 20</p>
	 <p>153-00908</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-23 / 558-41011</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240</p>
	 <p>153-00297</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-2 / 558-41005</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240</p>
	 <p>153-00973</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-13 / 558-41008</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240</p>
	 <p>153-00972</p>	<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>MSP F 20-12 / 558-41007</p> <p>Protective sensor angle bracket with screws, very robust Material: stainless steel V2A</p> <p>F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240</p>

Brackets for F 25			
	<p>153-00974</p>	Part number / Article number	MSP F 20-21 / 558-41009
		Description	Protective sensor angle bracket with screws, very robust Material: stainless steel V2A
		Suitable for	F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240
	<p>153-00975</p>	Part number / Article number	MSP F 20-22 / 558-41010
		Description	Protective sensor angle bracket with screws, very robust Material: stainless steel V2A
		Suitable for	F 20 UT 20-150 F 25 UT 20-S150 FL 20 UT 20-240

Part number	Article number	Description
M8, 4-pin		
K4-2m-G-PUR	902-50801	2 m, straight, PUR
K4-5m-G-PUR	902-51617	5 m, straight, PUR
K4-10m-G-PUR	902-51610	10 m, straight, PUR
K4-2m-W-PUR	902-50803	2 m, 90°, PUR
K4-5m-W-PUR	902-51618	5 m, 90°, PUR
K4-10m-W-PUR	902-51629	10 m, 90°, PUR
K4-2m-W-PL-PUR	902-51642	2 m, 90°, PUR, with indicator LED
K4-5m-W-PL-PUR	902-51643	5 m, 90°, PUR, with indicator LED
CM4 FG-E-5m-PVC	902-50221	5 m, straight, PVC, with hex nut SW 9 stainless steel (IP 69K)
CM4 FW-E-5m-PVC	902-50222	5 m, 90°, PVC, with hex nut SW 9 stainless steel (IP 69K)

VISOR[®] and sensors

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You can very easily call up this catalogue with your smart phone – using the code opposite.



*SensoPart sets new standards for industrial sensors with the optoelectronic sensors of the **F 10**, **F 25** and **F 55** series: all three housing sizes share excellent optical performance data, very precisely adjustable background suppression, intuitive and comfortable operation, and excellent quality – made in Germany. And our application-specific pre-configured – and thus immediately usable – all-in-one solutions in the **VISOR[®]** series show what is now possible in the vision segment.*

We look ahead.

Yesterday, today and in the future.



“We gauge ourselves not by what is possible today, but by our vision of what can be achieved” – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

With our easy to integrate VISOR® Vision sensors and our compact laser sensors with an amazing background suppression made in Germany, we stick up to this motto.

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VISION

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