TLμ

DATALOGIC

ALL REGISTRATION MARK DETECTION APPLICATIONS

- Teach-in, Remote settings
- Red/green or white LED emission
- Various interchangeable lenses and fiber-optic models
- Metal housing with orientable optics and connector

APPLICATIONS

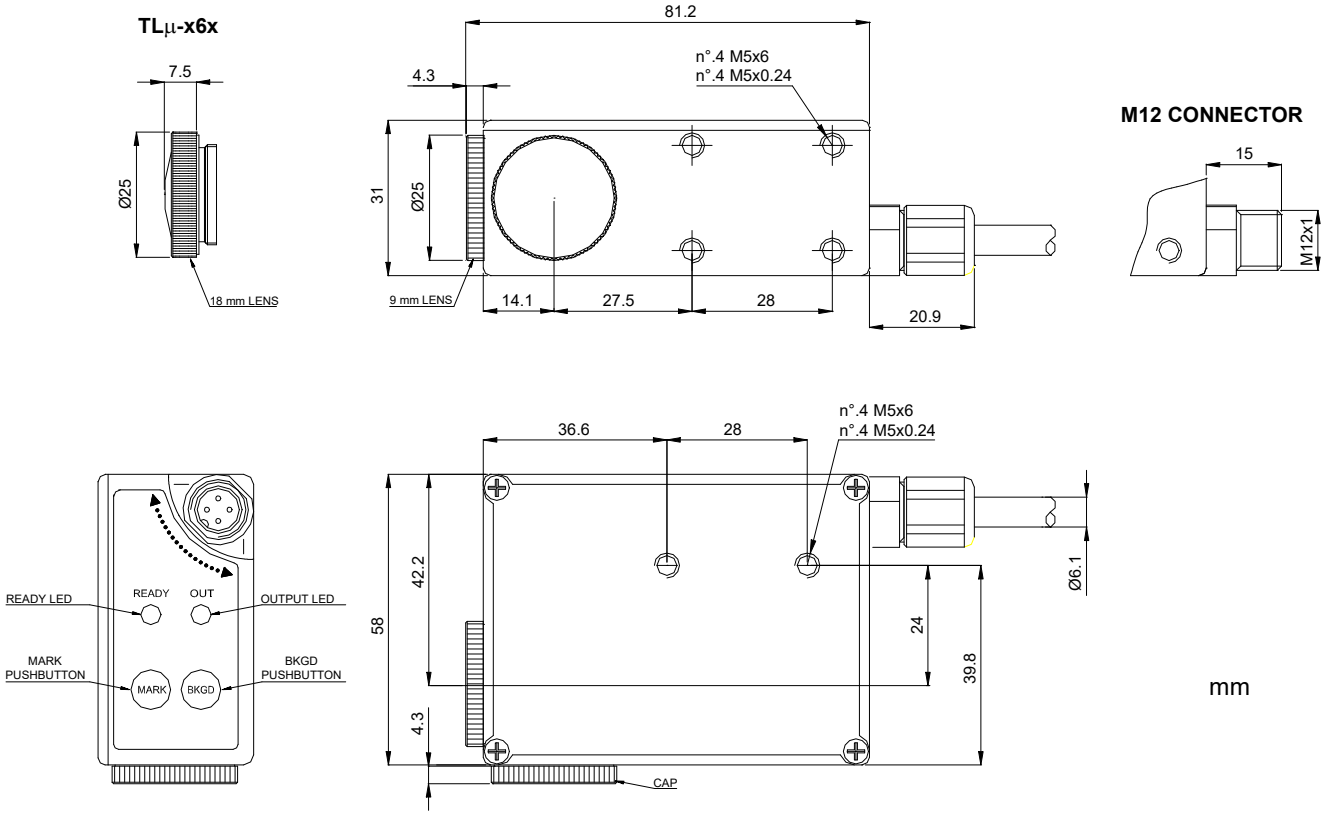
- Packaging and labeling machinery
- Beverage/Food/Cosmetic/Pharmaceutical industries
- Printing machinery

TLμ		
Contrast sensor		6...12 mm (9 mm lens)
		14...22 mm (18 mm lens)
		22...34 mm (28 mm lens)
		40...60 mm (50 mm lens)
Contrast sensor with fiber optic		0...3 mm (proximity)
		0...10 mm (through beam)
Switching frequency		10 kHz
		20 kHz
Light emission		red/green LED
		white LED
Setting		push buttons
		remote
Power supply	Vdc	10...30 V
	Vac	
	Vac/dc	
Output	PNP	•
	NPN	•
	NPN/PNP	
	relay	
	other	0...5 V Analog Output
Connection	cable	•
	connector	•
	pig-tail	
Approximate dimensions (mm)		31x81x58
Housing material		Zama
Mechanical protection		IP67

TECHNICAL DATA

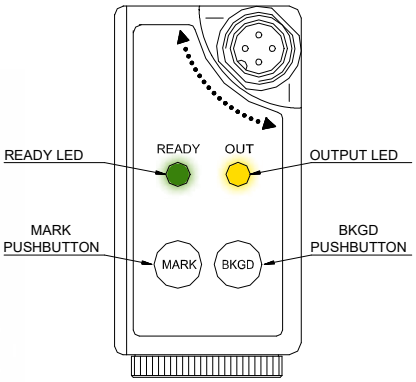
Power supply	10 ... 30 Vdc (limit values; reverse polarity protection)
Ripple	2 Vpp max.
Consumption (output current excluded)	80 mA max.
Light emission	green LED 526 nm/red LED 630 nm (mod. TLμ-0/1xx) white LED 400-700 nm (mod. TLμ-4/5xx)
Setting	teach-in push-buttons/remote by 2 wires, 4 settings storage cable version
Operating mode	Light/Dark automatic setting with teach-in procedure
Indicators	red OUTPUT LED green READY LED
Output	PNP or NPN; analog output
Output current	200 mA max.
Saturation voltage	1 V max. NPN vers., 2 V max. PNP vers.
Response time	50 μs max. (mod. TLμ-4xx) 25 μs max. (mod. TLμ-5xx)
Switching frequency	10 kHz max. (mod. TLμ-4xx) 20 kHz max. (mod. TLμ-5xx)
Connection	3 m shielded cable Ø 6.1 mm, M12 4-pole connector
Dielectric strength	500 Vac, 1 min between electronics and housing
Insulating resistance	>20 MΩ, 500 Vdc between electronics and housing
Electrical protection	class 1
Mechanical protection	IP67
Ambient light rejection	according to EN 60947-5-2
Vibrations	0,5 mm amplitude, 10 ... 55 Hz frequency, for every axis (EN60068-2-6)
Shock resistance	11 ms (30 G) 6 shock for every axis (EN60068-2-27)
Minimum spot dimension	1,5 x 5 mm (TLμ-x1x), 2 x 7 mm (TLμ-x6x), Ø 3 mm (TLμ-4xx/5xx)
Depth of field	± 3 mm (TLμ-x1x/4xx/5xx) / ± 4 mm (TLμ-x6x)
Housing material	ZAMA
Lens material	glass
Operating temperature	-10 ... 55 °C
Storage temperature	-20 ... 70 °C
Weight	450 g max. cable vers., 310 g max. connector vers.

DIMENSIONS



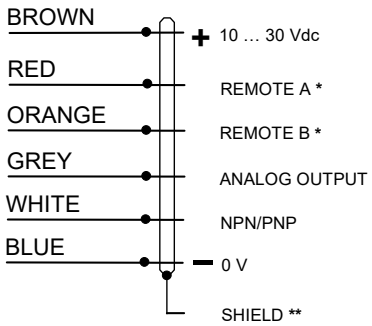
mm

INDICATORS AND SETTINGS



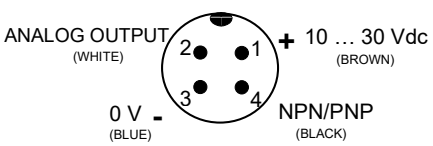
CONNECTIONS

CABLE

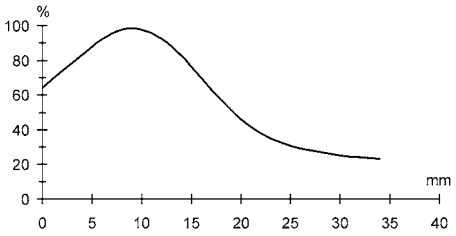


* = Connect the unused REMOTE wires to 0 V.
** = The cable shield is insulated from the sensor housing; it is recommended to connect the shield to 0 V.

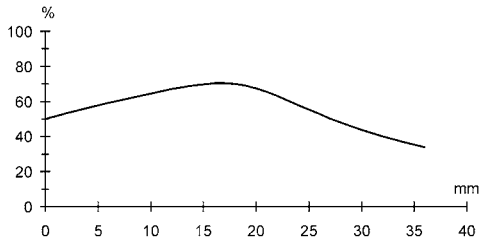
M12 CONNECTOR



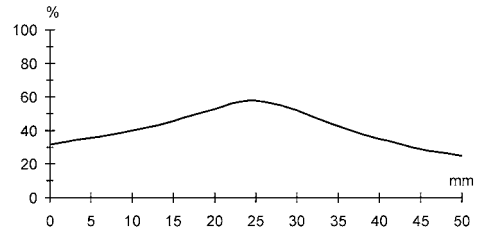
DETECTION DIAGRAMS



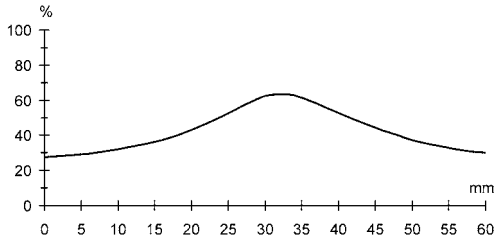
9 mm lens



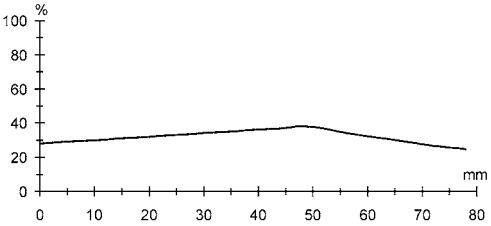
18 mm lens



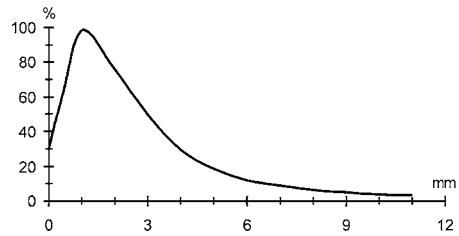
22 mm lens



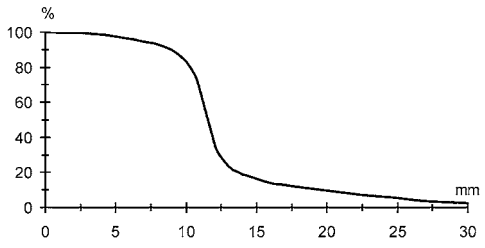
28 mm lens



50 mm lens



Proximity fiber-optics



Through beam fiber-optics

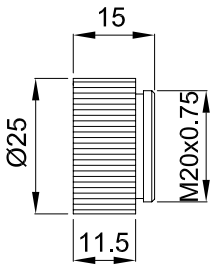
The detection diagrams indicate the typical operating distance.

MODEL SELECTION AND ORDER INFORMATION

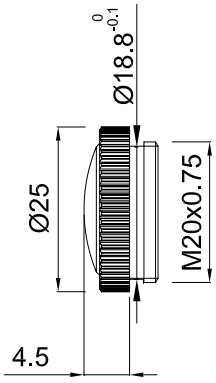
OPTIC FUNCTION	EMISSION	OPTICS	CONNECTION	OUTPUT	MODEL	ORDER No.
Contrast sensor	Red/Green (Vertical spot)	9 mm	3m Cable	NPN	TLμ-011	964401000
				PNP	TLμ-111	964401080
			M12 Connector	NPN	TLμ-015	964401020
				PNP	TLμ-115	964401100
	Red/Green (Horizontal spot)		3m Cable	NPN	TLμ-011L	964401010
				PNP	TLμ-111L	964401090
			M12 Connector	NPN	TLμ-015L	964401030
				PNP	TLμ-115L	964401110
	Red/Green (Vertical spot)	18 mm	M12 Connector	NPN	TLμ-065	964401060
				PNP	TLμ-165	964401140
	White (Circular spot)	9 mm	M12 Connector	NPN	TLμ-415C	954151330
				PNP	TLμ-515C	954151360
			3m Cable	NPN	TLμ-411C	954151410
				PNP	TLμ-511C	954151420
Fiber optic contrast sensor	White	Fiber optics	M12 Connector	PNP	TLμ-545	954151380
				NPN	TLμ-445	954151350

ACCESSORIES

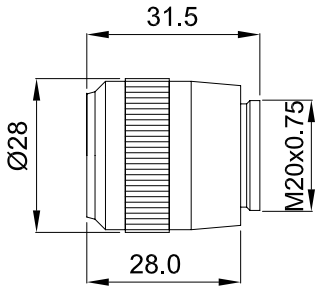
HI-RES LENS



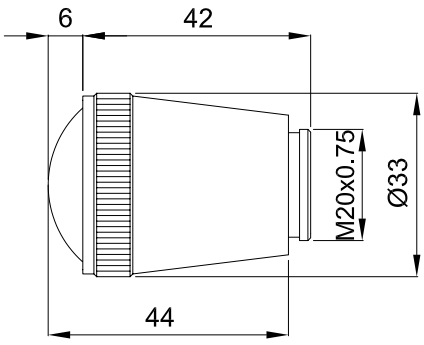
18 mm LENS



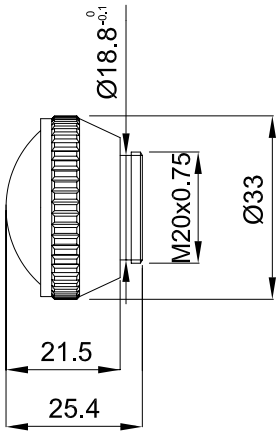
22 mm LENS



28 mm LENS



40 mm LENS



MODEL	DESCRIPTION	ORDER No.
Lens Hi-Res	additional focussing glass lens with 9 mm focus (*)	95ACC1050
Lens No.18	glass lens with 18 mm focus	95ACC2680
Lens No.22	glass lens with 22 mm focus	95ACC1100
Lens No.28	glass lens with 28 mm focus	890000194
Lens No.40	glass lens with 40 mm focus	95ACC2740
Lens No.50	glass lens with 50 mm focus	S73030511
OF -30-5	plastic fiber-optic L 50 cm - point-shaped spot proximity	96B001070
OF -31-10	glass fiber-optic L 100 cm - point-shaped spot proximity	96B201000
OF -32-10	glass fiber-optic L 100 cm - rectangular spot proximity	96B211000
OF -33-10	glass fiber-optic L 100 cm - through beam	96B221000
OF -34-10	glass fiber-optic L 100 cm - horizontal spot 90° proximity	96B231000
OF -35-10	glass fiber-optic L 100 cm - vertical spot 90° proximity	96B24100

* focussing lens to screw between the sensor and the normal 9 mm lens

CABLES

TYPE	DESCRIPTION	LENGTH	MODEL	ORDER No.
Axial M12 Connector	4-pole, grey, P.V.C.	3 m	CS-A1-02-G-03	95A251380
		5 m	CS-A1-02-G-05	95A251270
		7 m	CS-A1-02-G-07	95A251280
		10 m	CS-A1-02-G-10	95A251390
	4-pole, P.U.R.	2 m	CS-A1-02-R-02	95A251540
		5 m	CS-A1-02-R-05	95A251560
Radial M12 Connector	4-pole, grey, P.V.C.	3 m	CS-A2-02-G-03	95A251360
		5 m	CS-A2-02-G-05	95A251240
		7 m	CS-A2-02-G-07	95A251245
		10 m	CS-A2-02-G-10	95A251260
	4-pole, P.U.R.	2 m	CS-A2-02-R-02	95A251550
		5 m	CS-A2-02-R-05	95A251570
Axial M12 Connector	4-pole, shielded, black, P.V.C.	3 m	CV-A1-22-B-03	95ACC1480
		5 m	CV-A1-22-B-05	95ACC1490
		10 m	CV-A1-22-B-10	95ACC1500
		15 m	CV-A1-22-B-15	95ACC2070
		25 m	CV-A1-22-B-25	95ACC2090
Radial M12 Connector		3 m	CV-A2-22-B-03	95ACC1540
		5 m	CV-A2-22-B-05	95ACC1550
		10 m	CV-A2-22-B-10	95ACC1560
Axial M12 Connector	4-pole, U.L., black, P.V.C.	3 m	CS-A1-02-U-03	95ASE1120
		5 m	CS-A1-02-U-05	95ASE1130
		10 m	CS-A1-02-U-10	95ASE1140
		15 m	CS-A1-02-U-15	95ASE1150
		25 m	CS-A1-02-U-25	95ASE1160
	4-pole, black	Connector- not cabled	CS-A1-02-B-NC	G5085002
Radial M12 Connector		Connector- not cabled	CS-A2-02-B-NC	G5085003

Rev. 03, 04/2019

TLμ SERIES
INSTRUCTION MANUAL

CONTROLS

OUTPUT LED
The red LED indicates the output status.

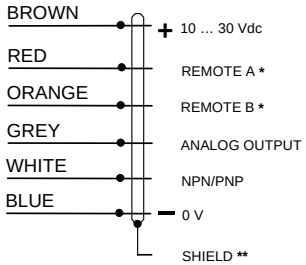
READY LED
During functioning, the green LED permanently ON indicates a normal operating condition; fast blinking indicates an output overload condition. See the “SETTING” paragraph for setup procedure indications.

MARK / BKGD PUSHBUTTON
The pushbutton activates the setup procedure.

INSTALLATION

Operating distance is rated starting from the lens front face.
The M12 connector or cable exit can be rotated in three positions by loosening the locking screw. Tighten the locking screw when finished.
The beam direction may be changed swapping the cap and the lens.
Detecting marks on a reflective surface is improved adjusting the beam direction to 5° … 20° from surface axis.

CONNECTIONS



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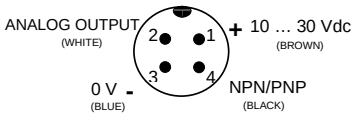
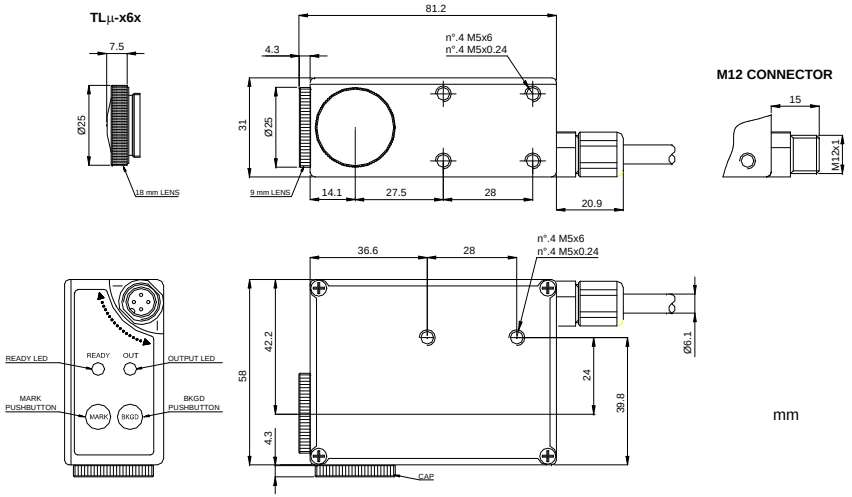
M12 CONNECTOR



DIMENSIONS



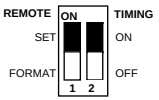
mm

TECHNICAL DATA

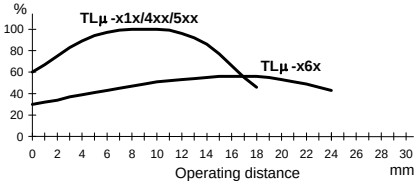
Power supply:	10 … 30 Vdc limit values; reverse polarity protection
Ripple:	2 Vpp max.
Current consumption (output current excluded):	80 mA max.
Output:	NPN or PNP, pull down/up resistance 10 kΩ (short-circuit protection)
Output current:	200 mA max.
Analog output:	0 … 2 V ± 10% (white 90%); 5.5 V max.; ripple 40 mVpp max.; output resistance 2.2 kΩ
Output saturation voltage:	1V max. NPN versions / 2V max PNP versions
Response time:	50 μs max. / 25 μs max. (TLμ-4xx/5xx)
Switching frequency:	10 kHz max. / 20 kHz max. (TLμ-4xx/5xx)
Timing function:	20 ms minimum output ON
Indicators:	OUTPUT LED (RED) / READY LED (GREEN)
Setting:	by pushbuttons / by wires; 4 settings storage cable version
Retention data:	non volatile EEPROM memory
Operating temperature:	-10 … 55 °C
Storage temperature:	-20 … 70 °C
Electric shock protection:	Class 1
Operating distance:	9 mm (TLμ-x1x/4xx/5xx) / 18 mm (TLμ-x6x)
Minimum spot dimension:	1.5 x 5 mm (TLμ-x1x) / 2 x 7 mm (TLμ-x6x) / ∅ 3 mm (TLμ-4xx/5xx)
Depth of field:	± 3 mm (TLμ-x1x/4xx/5xx) / ± 4 mm (TLμ-x6x)
Emission type:	green (526 nm) / red (630 nm) with automatic selection or white (400-700 nm)
Ambient light rejection:	according to EN 60947-5-2
Vibration:	0.5 mm amplitude, 10 … 55 Hz frequency, in every axis (EN60068-2-6)
Shock resistance:	11 ms (30 G) 6 shock in every axis (EN60068-2-27)
DARK/LIGHT selection:	teach-in procedure
Housing:	ZAMA
Protection class:	IP67
Connections:	3 m shielded cable ∅ 6.1 mm / M12 4-pole connector
Weight:	450 g. max. cable versions / 310 g. max. connector versions
AtEx 2014/34/EU:	II 3G EX nA II T6 ; II 3D EX tD A22 IP67 T85°C

CONFIGURATION

A double selector and a switch are available removing the sensor side cover. The selector allows to enable the output timing function and choose the pushbuttons and REMOTE inputs operating mode; the switch allows to select the output type (NPN or PNP).



DETECTION DIAGRAM



FUNCTION SELECTION

When **FORMAT** is selected (configuration selector section 1), the MARK and BKGD puskbuttons are enabled and connecting the REMOTE inputs (TLμ-xx1) to the power supply as shown in the table allows to select up to 4 different settings (formats). This is the factory setting.

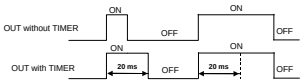
N°. FORMAT	1	2	3	4
input REMOTE A	0V	0V	+V	+V
input REMOTE B	0V	+V	0V	+V

If a non-set format is selected, the sensor is disabled and the green LED flashes at a low rate.
A setting can be stored selecting a format and executing the procedure described in the “SETTING” paragraph.

When **SET** is selected (configuration selector section 1), the MARK and BKGD pushbuttons are disabled; the REMOTE inputs (TLμ-x1x) replace the pushbuttons functionality.
Connecting the REMOTE A and B inputs to the positive power supply rail is equivalent to pressing the MARK and BKGD pushbuttons respectively. Connect the unused inputs to 0V.

TIMING FUNCTION

When ON is selected (configuration selector section 2), a delay timer function is enabled which extends the minimum ON output time to 20 ms. The factory setting is OFF (timer disabled).



SETTING

A two-step setup procedure adjusts the switching threshold and the LIGHT/DARK mode. Using the procedure given below the sensor output is set to be ON when a mark is detected.

1) Output ON state acquisition (MARK)
Place the target mark into the emission spot and press the MARK pushbutton until the green LED turns OFF.
Don’t move the mark during the setting phase (about 1 sec).

2) Output OFF state acquisition (BKGD)
Place the background into the emission spot and press the BKGD pushbutton; the green LED blinks once.
Don’t move the background during the setting phase.

If the green LED lights permanently ON, a safe operation has been obtained; if it flashes at a low rate the setup procedure has failed due to insufficient contrast; repeat the procedure from the beginning.

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