



- *'Teach-in', 'Remote' setting and models with 'Auto-Set'*
- *Red/green or white LED emission*
- *Various interchangeable lenses and fibre-optic versions*
- *Metal housing with orientable optics and connector*

TL μ SERIES

The TL μ series offers the most reliable and innovative solutions for all detection applications of register marks and other neutral or coloured references.

The microprocessor-based setting can be either 'Teach-in' using two push-buttons or 'Remote' by cable with the possibility of rapidly memorising and recalling 4 different formats. The setting can also be dynamic and completely automatic in the models with the 'Auto-Set' function.

The LED emission can be red/green with automatic selection, or white offering the possibility of operating on all contrasts, also amongst same-coloured objects and backgrounds, presenting different surface treatments or workings.

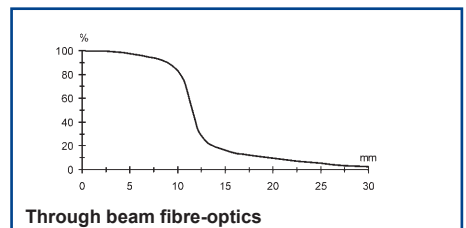
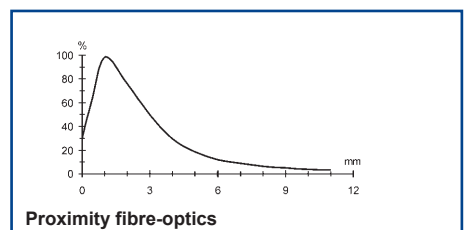
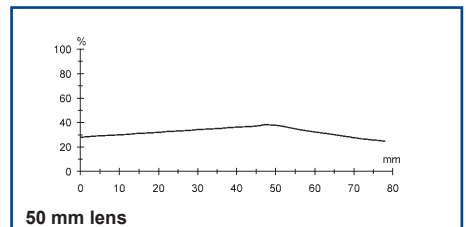
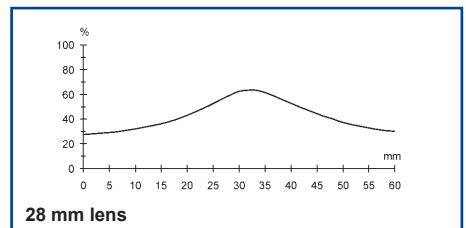
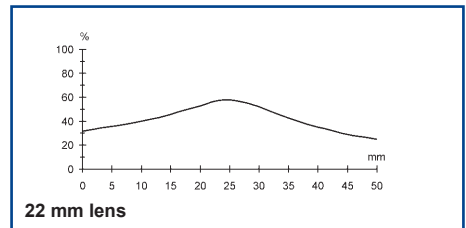
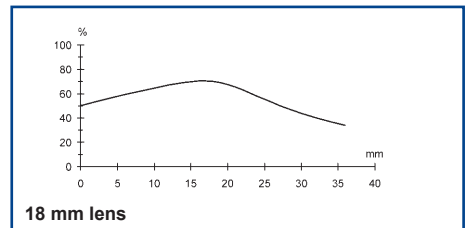
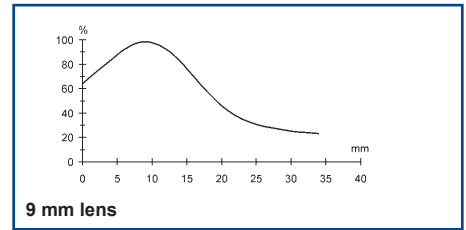
Models with interchangeable 9 mm or 18 mm lenses are available; 22, 28 and 50 mm lenses are supplied as accessories. Moreover many different fibre-optic models are available. The output is NPN or PNP according to the model, but is always selectable by means of an internal switch; an analog output proportional to the received light is also present.

TECHNICAL DATA

Power supply:	10 ... 30 Vdc, reverse polarity protection
Consumption:	80 mA max.
Light emission:	red 635 nm / green 565 nm LED white LED (TL μ -4/5xx vers.)
Spot dimension:	1.5 x 5 mm (9 mm lens) 2 x 7 mm (18 mm lens)
Operating distance:	6 ... 12 mm (9 mm lens) 14 ... 22 mm (18 mm lens) 22 ... 34 mm (28 mm lens) 40 ... 60 mm (50 mm lens)
Operating distance with fibre-optics:	0 ... 3 mm proximity 0 ... 10 mm through beam
Depth of field:	\pm 3 mm (9 mm lens) \pm 4 mm (18 mm lens) \pm 6 mm (28 mm lens) \pm 10 mm (50 mm lens)
Setting:	Teach-in with 2 push-buttons Remote with 2 wires dynamic Auto-Set (vers.TL μ -417/517)
Indicators:	red OUTPUT LED green POWER LED (vers.TL μ -417/517) green READY LED
Output type:	NPN or PNP, Rpull-down/up 10 k Ω
Saturation voltage:	1 V max. (NPN vers.) 2 V max. (PNP vers.)
Output current:	200 mA max., short-circuit protection
Response time:	50 μ s max., 25 μ s max. (TL μ -4/5xx vers.)
Switching frequency:	10 kHz max., 20 kHz max. (TL μ -4/5xx vers.)
Operating mode:	automatic dark/light selection
Analog output range:	0 ... 5.5 Vdc (2 Vdc on white 90%) 2.2 k Ω output resistance
Timing function:	20 ms minimum output ON
Connection:	M12 4-pole connector 3m \varnothing 6.1 mm shielded cable
Electrical protection:	class 1
Mechanical protection:	IP67
Housing material:	ZAMA
Lens material:	glass
Fibre-optic material:	fibre in glass / sheath in metal fibre in PMMA / sheath in PE (OF-30)
Weight:	310 g max. (connector vers.) 450 g max. (cable vers.)
Operating temperature:	-10 ... +55 $^{\circ}$ C
Storage temperature:	-25 ... +70 $^{\circ}$ C
Fibre operating temperature:	-30 ... +150 $^{\circ}$ C (glass OF vers.) -30 ... +60 $^{\circ}$ C (OF-30)
Reference standard:	EN 60947-5-2
Certifications:	CE

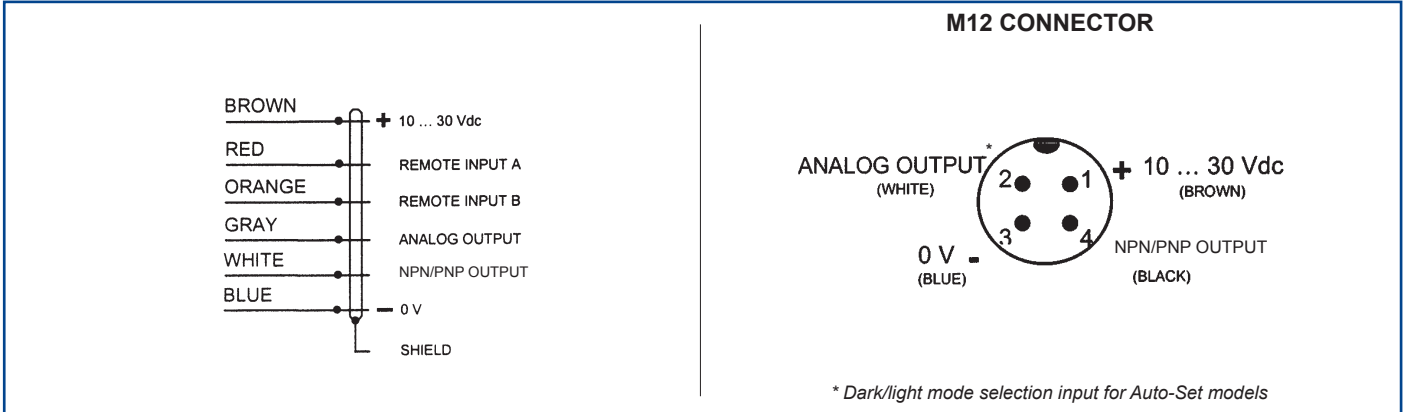
The operating distances indicate the typical detection distance.

DETECTION DIAGRAMS

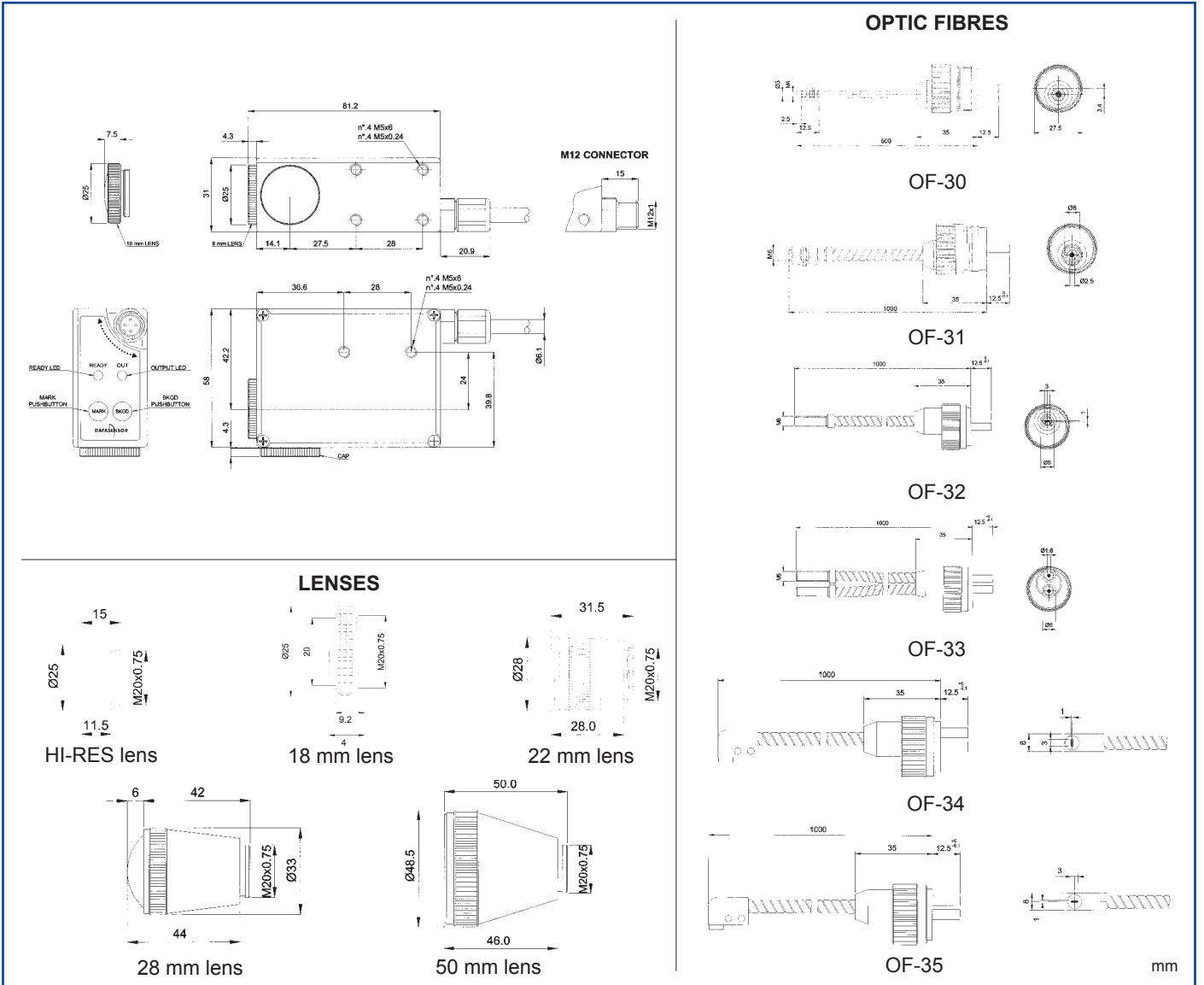


The detection diagrams indicate the typical operating distance.

CONNECTIONS



DIMENSIONS



MODELS

MODEL	EMISSION	SPOT	OPTICS	CONNECTION	OUTPUT	CODE N°
TLμ-011	red/green	vertical	9 mm	cable	NPN	964401000
TLμ-011L	red/green	horizontal	9 mm	cable	NPN	964401010
TLμ-015	red/green	vertical	9 mm	M12 connector	NPN	964401020
TLμ-015L	red/green	horizontal	9 mm	M12 connector	NPN	964401030
TLμ-061	red/green	vertical	18 mm	cable	NPN	964401040
TLμ-061L	red/green	horizontal	18 mm	cable	NPN	964401050
TLμ-065	red/green	vertical	18 mm	M12 connector	NPN	964401060
TLμ-065L	red/green	horizontal	18 mm	M12 connector	NPN	964401070
TLμ-111	red/green	vertical	9 mm	cable	PNP	964401080
TLμ-111L	red/green	horizontal	9 mm	cable	PNP	964401090
TLμ-115	red/green	vertical	9 mm	M12 connector	PNP	964401100
TLμ-115L	red/green	horizontal	9 mm	M12 connector	PNP	964401110
TLμ-161	red/green	vertical	18 mm	cable	PNP	964401120
TLμ-161L	red/green	horizontal	18 mm	cable	PNP	964401130
TLμ-165	red/green	vertical	18 mm	M12 connector	PNP	964401140
TLμ-165L	red/green	horizontal	18 mm	M12 connector	PNP	964401150
TLμ-415C	white	circular	9 mm	M12 connector	NPN	954151330
TLμ-417C (*)	white	circular	9 mm	M12 connector	NPN	954151340
TLμ-445	white	<i>refer to fibres</i>	fibre-optic	M12 connector	NPN	954151350
TLμ-515C	white	circular	9 mm	M12 connector	PNP	954151360
TLμ-517C (*)	white	circular	9 mm	M12 connector	PNP	954151370
TLμ-545	white	<i>refer to fibres</i>	fibre-optic	M12 connector	PNP	954151380

* Automatic dynamic setting with 'Auto-Set' function

ACCESSORIES

MODEL	DESCRIPTION	CODE N°
Lens Hi-Res	9 mm high resolution lens (*)	95ACC1050
Lens No.18	lens for 14 - 22 mm operating distance (typ.)	95ACC1030
Lens No.22	lens for 17 - 27 mm operating distance (typ.)	95ACC1100
Lens No.28	lens for 22 - 34 mm operating distance (typ.)	890000194
Lens No.50	lens for 40 - 60 mm operating distance (typ.)	S73030511
OF-30-5	plastic fibre-optic L 50 cm - point-shaped spot proximity	96B001070
OF-31-10	glass fibre-optic L 100 cm - point-shaped spot proximity	96B201000
OF-32-5	glass fibre-optic L 50 cm - rectangular spot proximity	96B001060
OF-32-10	glass fibre-optic L 100 cm - rectangular spot proximity	96B211000
OF-33-10	glass fibre-optic L 100 cm - through beam	96B221000
OF-34-10	glass fibre-optic L 100 cm - horizontal spot 90° proximity	96B231000
OF-35-10	glass fibre-optic L 100 cm - vertical spot 90° proximity	96B241000

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

Please refer also to **Sensor Accessories**

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HEADQUARTERS

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