

TL46 SERIES

TL46 line offers the best performance and most complete selection of contrast sensors for print registration mark detection.

TL46-A version has a new patented multi-turn digital trimmer for an easy and quick adjustment of the switching threshold.

Models with Red or White LED emission are available, both with 20 KHz switching frequency to solve the most of contrast detection applications.

TL46-W basic models allow a teach-in setting by means of two pushbuttons, clearly defined as MARK and BACKGROUND.

TL46-WL has three pushbuttons and a 5-LED bar-graph for a fine automatic or manual adjustment of the switching threshold.

TL46-WLF offers the most complete interface with three pushbuttons and a 4-digit display, allowing also the dynamic setting.

These models offer the automatic selection of RGB LED emission and have respectively 15, 20, or 30 KHz switching frequency.

The operating distance is from 6 to 12 mm with a good depth of field, and many accessory lens are available for longer ranges.

The IP67 metal case with standard "TL" dimensions and fixing holes offers the best protection and installation in all applications.



SENSORS

HIGHLIGHTS

- Red, White, or RGB LED emission
- Automatic, manual and dynamic setting
- Trimmer or Teach-in with 4 digit display
- 15, 20 or 30 kHz switching frequency
- NPN/PNP selection and analogue output

APPLICATIONS

Packaging lines



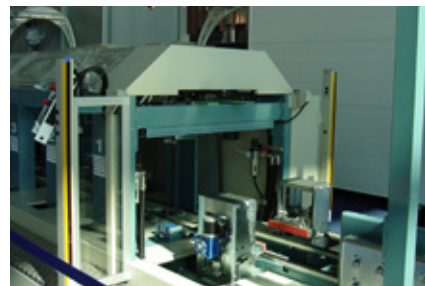
Beverage & Bottling



Printing Machinery



Ceramics



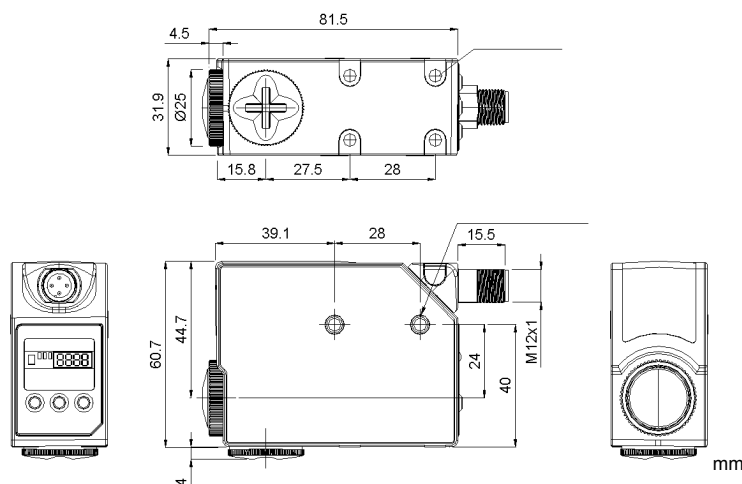
SETTING

TL46-A: a multi-turn digital trimmer is present for an easy and quick adjustment of the switching threshold.

TL46W: the MARK pushbutton is used for the target acquisition and the BKGD pushbutton for the background acquisition, the threshold is then automatically set.

TL46-WL/WLF: the switching threshold is set pressing twice the SET push-button; the first for the mark the second for the background. The threshold level can be set manually pressing the '+' and '-' push-buttons which increase or reduce the threshold as visualized on the bar-graph or display. The dynamic setting, present in the TL46-WLF version, detects the moving mark by simply keeping the SET push-button pressed, or activating the Remote/Dynamic input.

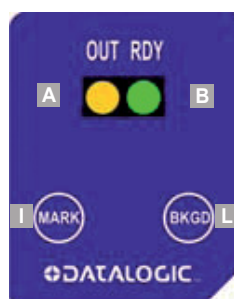
DIMENSIONS



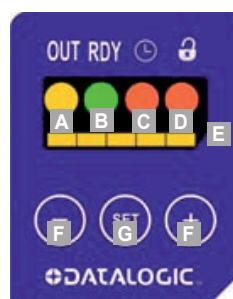
INDICATORS AND PUSH-BUTTONS



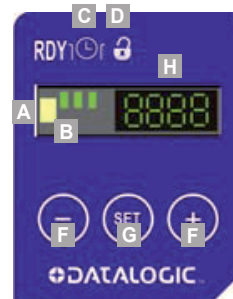
TL46-A
TRIMMER



TL46-W
BASE



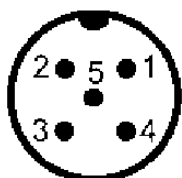
TL46-WL
STANDARD



TL46-WLF
ENHANCED

- | | | |
|-----------------------------|---------------------------|--------------------------------------|
| A yellow OUTPUT LED | F +/- push-buttons | L BKGD push-button |
| B green READY LED | G SET push-button | M Light/Dark Switch |
| C orange DELAY LED | H Display | N Orange Indicators Arrows |
| D orange KEYLOCK LED | I MARK push-button | O Sensitivity Adjustment Knob |
| E Bargraph | | |

CONNECTIONS



M12 CONNECTOR

Version	pin 1	pin 2	pin 3	pin 4	pin 5 *
	(brown)	(white)	(blue)	(black)	(gray)
TL46-A Trimmer	+10...30Vdc	0,5...5,5Vdc output	0Vdc	PNP or NPN output	Delay
TL46-W Base	+10...30Vdc	1...5,5Vdc output	0Vdc	NPN/PNP output	Delay
TL46-WL Std.	+10...30Vdc	1...5,5Vdc output	0Vdc	NPN/PNP output	Remote
TL46-WLF Enh.	+10...30Vdc	Dark/Light Dyn.	0Vdc	NPN/PNP output	Remote/Dyn.

* A M12 4-pole connector can be used if the PIN5 function is not necessary.

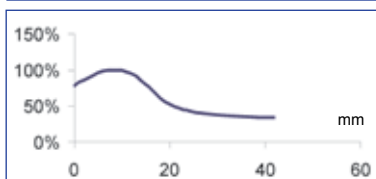
TECHNICAL DATA

	TL46-A	TL46-W	TL46-WL	TL46-WLF
Power supply	10+30 Vdc (limit values)			
Ripple	2 Vpp max			
Current Consumption (output current excluded)	40mA max @ 24 Vdc	50mA max @ 24 Vdc	85mA max @ 24Vdc (bargraph ON) 55mA max @ 24Vdc (bargraph OFF)	35mA max @ 24 Vdc
Output	PNP or NPN	1 PNP/NPN selectable output (default PNP configuration)		
Output current	100mA max			
Output saturation voltage	≤ 2V			
Response time	25 μs	33 μs	25 μs	16 μs
Switching frequency	20 kHz	15 kHz	20 kHz	30 kHz
Analogue output	0.5...5.5V ±10% 2V on white target 90%	1...3V ±10%(white 90%); 5.5V max	1...3V ±10%(white 90%); 5.5V max	n/a
Analogue output impedance	2.2 kΩ (short circuit protection)			n/a
Delay	0...20ms selectable via delay input			0...100ms programmed
Dark/light selection	Switch	Automatic		Automatic/manual remote/dynamic
Auxiliary function	n/a	n/a	Keylock	
Indicators	OUT LED (yellow) READY LED (green) INDICATORS ARROWS (orange)	OUT LED (yellow) READY LED (green)	n/a OUT LED (yellow) READY LED (green) DELAY and KEYLOCK LED (orange) 5-segment BARGRAPH	Fine Hysteresis regulation OUT LED (yellow) READY LED (green) DELAY and KEYLOCK LED (green) 4-digit DISPLAY (green)
Operating temperature	-10...55°C			
Storage temperature	-20...70°C			
Electric shock protection	double insulation			
Operating distance	9mm			
Depth of field	±3mm			
Spot Orientation	Vertical	Horizontal or Vertical		
Minimun spot dimension	1,5x5mm			
Emission type¹	White(400-700nm) Red(630nm)	Red(630nm) Green(520nm) Blue(465nm)		
Ambient light rejection	According to EN 60947-5-2			
Vibrations	0,5mm amplitude, 10...55Hz frequency, for each axis (EN60068-2-6)			
Shock resistance	11ms (30G) 6 shock for each axis (EN 60068-2-27)			
Housing material	Aluminium			
Lens material	Glass	PMMA	Glass	
Mechanical protection	IP67			
Protection device	Reverse polarity protection, overload and short circuit protection			
Connections	M12 5-pole connector rotable on 5 position			
Weight	170g max			

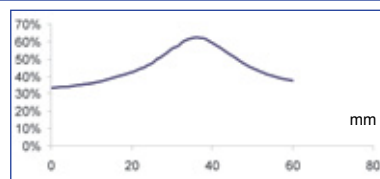
Average life of 100.000 h with TA= +25°C

¹Average life of 100.000 h with TA= +25°C

READING DIAGRAM



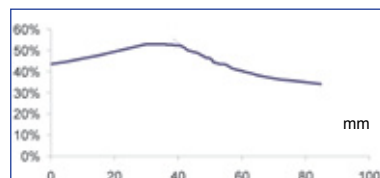
Standard 9 mm lens
(1.5 x 5 mm spot on focal point)



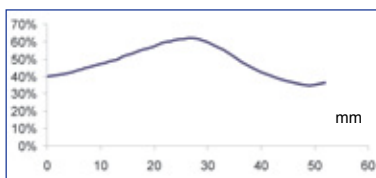
Accessory 28 mm lens
(2 x 9 mm spot on focal point)



Accessory 18 mm lens
(2 x 7 mm spot on focal point)



Accessory 40 mm lens
(2.5 x 11 mm spot on focal point)



Accessory 22 mm lens
(2 x 8 mm spot on focal point)

VERTICAL SPOT



HORIZONTAL SPOT



Horizontal spot is present in the TL46 models with final '-L' suffix

MODEL SELECTION AND ORDER INFORMATION

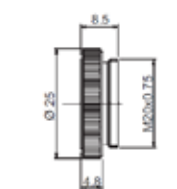
SETTINGS	INDICATORS	LIGHT EMISSION	OUTPUT	MODEL	ORDER NO.
Trimmer	2 LEDs	WHITE vertical spot	PNP	TL46-A-415	954601070
			NPN	TL46-A-425	954601080
		RED vertical spot	PNP	TL46-A-615	954601090
			NPN	TL46-A-625	954601100
Teach-in	2 LEDs	R.G.B. vertical spot	selectable PNP/NPN	TL46-W-815	954601000
		R.G.B. horizontal spot	selectable PNP/NPN	TL46-W-815L	954601010
	4 LEDs bargraph	R.G.B. vertical spot	selectable PNP/NPN	TL46-WL-815	954601020
		R.G.B. horizontal spot	selectable PNP/NPN	TL46-WL-815L	954601030
	4 LEDs display	R.G.B. vertical spot	selectable PNP/NPN	TL46-WLF-815	954601040
		R.G.B. horizontal spot	selectable PNP/NPN	TL46-WLF-815L	954601050

ACCESSORY SELECTION AND ORDER INFORMATION

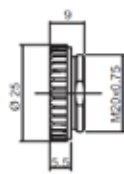
DESCRIPTION	MODEL	ORDER NO.
axial M12 NO-NC 5-poles 3 m	CS-A1-03-G-03	95ACC2110
axial M12 NO-NC 5-poles 5 m	CS-A1-03-G-05	95ACC2120
axial M12 NO-NC 5-poles 10 m	CS-A1-03-G-10	95ACC2140
glass lens with 9 mm focus	Lens No.9 glass	95ACC2670
plastic lens with 9 mm focus	Lens No.9 PMMA	95ACC2540
additional focussing glass lens (*)	Lens Hi-Res glass	95ACC1050
glass lens with 18 mm focus	Lens No.18 glass	95ACC2680
glass lens with 22 mm focus	Lens No.22 glass	95ACC1100
glass lens with 28 mm focus	Lens No.28 glass	890000194
glass lens with 40 mm focus	Lens No.40 glass	95ACC2740

* focussing lens to screw between the sensor and normal 9 mm lens to reduce the light spot dimension and increase resolution.
Please refer also to Sensor Accessories

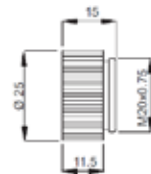
ACCESSORY LENS DIMENSIONS



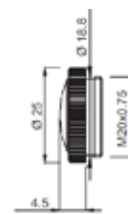
Lens No.9 glass



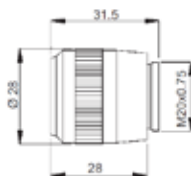
Lens No.9 PMMA



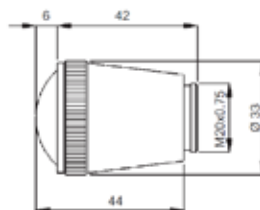
Lens HI-RES glass



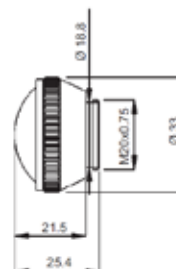
Lens 18 mm glass



Lens 22 mm glass



Lens 28 mm glass



Lens 40 mm glass



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