



**TL46-WLF**  
Contrast sensor

**INSTRUCTION MANUAL**

**CONTROLS**

**OUT LED (yellow)**

The yellow LED indicates the output status.

**DISPLAY (green 4-digit display)**

During normal functioning, the display indicates a value relative to the light quantity diffused by the target.

**READY LED (RDY)**

The green READY LED ON indicates a normal operating condition where the received signal has a safety margin respect to the output switching value: stability condition.

**DELAY LED**

The green DELAY LED ON indicates the timing activation on the digital output.

**KEYLOCK LED**

The green KEYLOCK LED ON indicates the active keyboard status.

(**SET**) (white), (+) (red), and (-) (green) PUSH-BUTTONS

See the "SETTING" paragraph for the correct adjustment phase indications.



**INSTALLATION**

The sensor can be positioned by means the two Ø3.5mm housing's holes using or threaded M5 holes with 6mm max. depth.

**Warning:** the use of excessively long screws can damage the product.

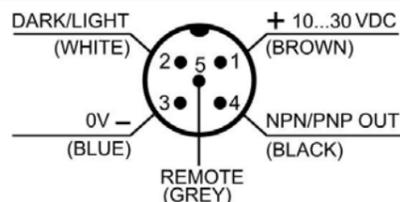
The connector can be oriented at five different positions by rotating the block. The position chosen is guaranteed by a mechanical blocking system. The rotation can be carried-out even after sensor installation as the connector block is completely self-contained inside the housing.



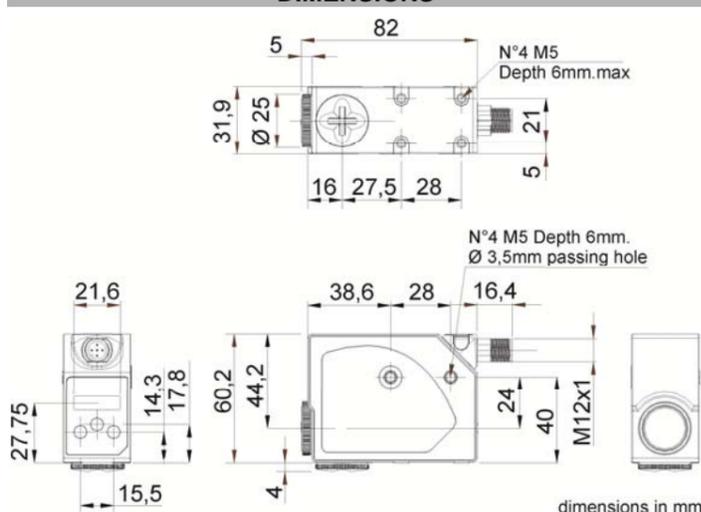
The operating distance is measured starting from the lens front face. The reading direction can be changed inverting the cap and lens. Mark detection on a reflective surface is improved adjusting the beam direction to 5° ... 20° from surface axis.



**CONNECTIONS**



**DIMENSIONS**



**TECHNICAL DATA**

Power supply:	10...30 Vdc limit values
Ripple:	2 Vpp max.
Current consumption (output current excluded):	35 mA max. @ 24 Vdc
Output:	1 selectable PNP/NPN output 30 Vdc max. (short-circuit protection) default PNP configuration
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	16 μs
Switching frequency:	30 kHz
Indicators:	4-digit display (GREEN) / OUT LED (YELLOW) / READY LED (GREEN) / DELAY LED (GREEN) / KEYLOCK LED (GREEN)
Push-buttons:	push-buttons: -, SET, +
Delay	0...100 ms programmed default configuration without delay
Dark/light selection:	Automatic in the target/background detection selectable via wire in the dynamic detection
Operating temperature:	-10 ... 55 °C
Storage temperature:	-20 ... 70 °C
Electric shock protection:	double insulation
Operating distance:	9 mm
Depth of field:	± 3 mm
Minimum spot dimension:	1.5x5 mm
Emission type:	blue (465 nm) / green (520 nm) / red (630 nm) with automatic selection
Ambient light rejection:	according to EN 60947-5-2
Vibrations:	0.5 mm amplitude, 10 ... 55 Hz frequency, for each axis (EN60068-2-6)
Shock resistance:	11 ms (30 G) 6 shocks for each axis (EN60068-2-27)
Housing material:	Aluminium
Lens material:	Glass (*)
Mechanical protection:	IP67
Connections:	M12 5-pole connector
Weight:	170 g. max.
AtEx 2014/34/EU:	II 3G EX nA II T6 ; II 3D EX ID A22 IP67 T85°C

(\*) It's available on request, PMMA plastic lens with 9mm focus.

**SETTING**

**KEYLOCK FUNCTION (PATENT-COVERED)**

The KEYLOCK function deactivates the keyboard avoiding any accidental changes in sensor setting. At sensor powering, the keyboard is blocked (KEYLOCK LED OFF). The (SET) push-button has to be pressed for 5 sec. until the KEYLOCK LED turns ON. The keyboard is blocked automatically if not used for 2 minutes. The keyboard has to be unlocked to proceed with sensor setting.



**DETECTION (MARK-BACKGROUND)**

- Position mark in front of the sensor light spot and press the (SET) push-button until the 'SE1' text appears. The sensor detects the mark alternating the red, green and blue emissions. Avoid mark movements until the 'SE2' text appears and the OUT LED blinking.



- Position the background in front of the sensor light spot and press the (SET) push-button again. The sensor detects the background and automatically selects the best emission to detect the contrast. Avoid background movements during this phase.

The DARK/LIGHT operating mode is automatically selected by the sensor. Dark mark - light background → dark mode; light mark - dark background → light mode.



If the detection has been successful, the sensor returns to normal functioning. If it fails due to insufficient contrast, the 'FAIL' test blinks on the display. Press the (SET) push-button and the sensor returns to the previous setting. Repeat the procedure from the beginning.



**DYNAMIC SETTING**

Use the dynamic setting to detect moving target. The sensor sets automatically the threshold value during target movement. The DARK/LIGHT mode has to be previously set. To select the light mode connect the DARK/LIGHT signal (white wire) to 0V or leave unconnected. To select the dark mode connect the DARK/LIGHT signal to the power supply.

- Position the sensor spot in front of the target to detect. Press (SET) until the 'dYn' text blinks (4sec) and keep it pressed. The sensor detects the mark and automatically selects the best emission to detect the contrast. To end the dynamic detection procedure release the (SET) push-button.



If the detection has been successful, the sensor returns to normal functioning. If it fails due to insufficient contrast, the 'Lo' test blinks on the display. Press the (SET) push-button to repeat procedure until releasing the button (the 'dYn' text blinks on the display). The sensor returns to the previous setting by pressing (+) or (-).



**SWITCHING THRESHOLD SETTING**

The sensor switching threshold can be adjusted in this manner. The 'Adj' text appears pressing (+) on the display. Releasing the push-button, the threshold value blinks.



The switching threshold is increased or reduced by pressing (+) or (-). Press (SET) to save the new threshold value.

**HYSTERESIS SETTING**

The sensor hysteresis level is adjusted. The 'HYS' text appears pressing green (-) on the display.



Releasing the push-button the previously set value blinks.

**HIGH HYSTERESIS**



**NORMAL HYSTERESIS**



**LOW HYSTERESIS**



The level switches by pressing (+) or (-). Press (SET) to save the new hysteresis value.

**OUTPUT OVERLOAD**

The overload of the digital output is signalled by the '\_SC\_' text on the display. The sensor return to normal working when the overload condition disappears.

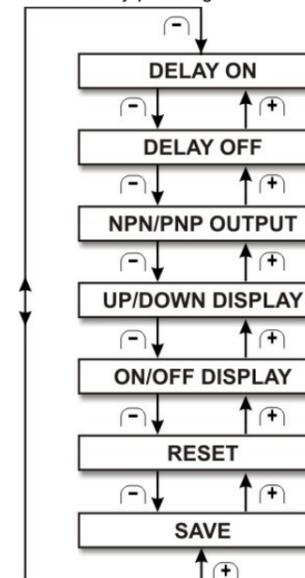


**PARAMETER SETTING**

Some parameters can be changed entering in the menu: DELAY ON, DELAY OFF, PNP/NPN switching output, display orientation and powering on/off of the display. Press (+) and (-) contemporarily until the 'Menu' text appears.

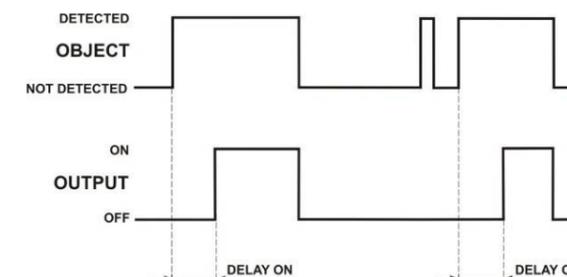


Releasing the push-button, the first Delay ON parameter appears. The parameter list is visualised by pressing (+) and (-):



**DELAY ON setting**

The DELAY ON represents the output delay activation after the reference mark has entered in the detection area. The delay avoids the detection of events that occur rapidly. An example can be a mark with shaded colours (light-dark-light) that can be detected twice.



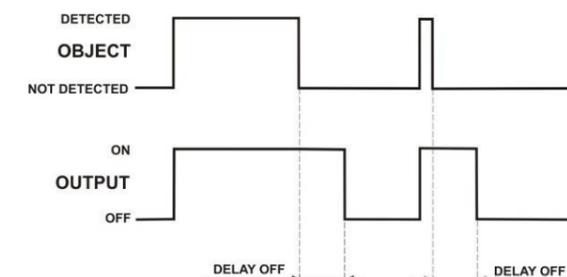
Select "dLoN" in the parameter menu to set the DELAY ON function. The parameter programming is accessed by pressing (SET). The previously set delay value appears on the display.



Pressing (+) or (-) the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping press (+) or (-) the delay value is increased or decreased by incremental step. The setting of a delay different from zero is signalled by the DELAY LED on. Press (SET) to confirm the value and return to the parameter menu.

**DELAY OFF setting**

The DELAY OFF represents the output delay deactivation after the reference target has left the detection area. The delay extends the output activation allowing slower system interfacing with sensors to detect shorter pulses.



Select "dLOF" from the parameter menu to set DELAY OFF function.

The parameter programming is accessed by pressing (SET).  
The previously set delay value appears on the display.



Pressing (+) or (-) the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping press (+) or (-) the delay value is increased or decreased by incremental step. The setting of a delay different from zero is signalled by the DELAY LED on. Press (SET) to confirm the value and return to the parameter menu.

#### PNP/NPN output setting

The digital output can be configured as PNP or NPN.  
Select '\_nPn' or '\_nPN' in the parameter menu to switch the output.



The previously set output switches by pressing (SET).

#### UP/DOWN DISPLAY setting

The selection of the UP/DOWN display sets the reading direction on the display.  
Select "dSUP" or "dSdn" in the parameter menu to set the UP or DOWN direction.



Press (SET) to switch the reading direction previously set.

#### ON/OFF DISPLAY setting

Turn off the display during normally working to save power consumption.  
Setting the OFF mode, when the sensor is functioning normally, the display is OFF. It turns on for 5s after a keyboard command. Select "dSON" or "dSOF" in the parameter menu to set the display ON or OFF.



Press (SET) to switch the display mode previously set.

#### RESET of default parameters

Select "rSEt" in the parameter menu to reset the default parameters.



The "rSEt" text blinks when pressing (SET).

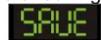
Releasing the push-button the sensor returns to normal functioning.  
The default reset parameters are:

PARAMETER	DISPLAY	DESCRIPTION
Emission	---	Green
DARK/LIGHT mode	---	Light
Threshold	2050	2050
Hysteresis	HyNo	Medium (Normal)
Delay ON and OFF	d 0	Deactivated
Digital output	_nPn	PNP output
Display	dSON dSUP	Display UP ON

**NOTE: if the parameters are reset before turning the sensor off, when repowered the "rSEt" text blinks on the display for 3s before returning to normal visualisation.**

#### Saving parameter set - "SAVE"

Select "SAVE" to save the parameter setting



The parameters are saved pressing (SET) and releasing it the display returns to normal visualisation.

**NOTE: Set the data, the operator exits from the menu using the "SAVE" or "RESET" function. If these operations are not carried-out 30s after the last setting, the sensor returns to normal mode saving the parameters changed.**

### ACCESSORY FUNCTIONS

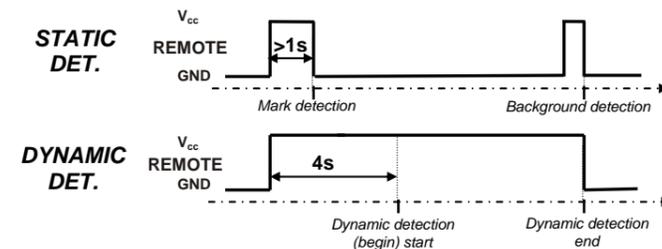
#### REMOTE INPUT

The REMOTE signals carries-out the acquisition functions without using the (SET) push-button.

The REMOTE wire connected to +Vdc is equal to pressing the (SET) push-button. Whereas, if the REMOTE wire is connected to GND or not connected it is equal to not pressing the (SET) push-button.

REMOTE	(SET) PUSH-BUTTON
0V	NOT PRESSED
+Vdc	PRESSED

- The duration of the REMOTE wire connection to +Vdc determines the acquisition type:



#### DARK/LIGHT input

The DARK/LIGHT signal allows the operator to select the DARK/LIGHT operating mode for dynamic detection.  
In the LIGHT mode the output is active with light marks on dark backgrounds, in the DARK mode the output is active with dark marks on light backgrounds. The connection of the DARK/LIGHT wire to Vdc sets the DARK mode. If connected to 0V or not connected set the LIGHT mode.

DARK/LIGHT	MODE
0V	LIGHT
+Vdc	DARK

**EX-II-3DG IP67 T6**  
 Temperature class: T6 (<85°C)  
 Max. Power consumption: 1000 mW at 30 Vdc  
 Max. Internal capacitance: 100 nF  
 Internal inductance: negligible

*The sensors are NOT safety devices, and so MUST NOT be used in the safety control of the machines where installed.*

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Helpful links at [www.datalogic.com](http://www.datalogic.com): [Contact Us](#), [Terms and Conditions](#), [Support](#).

The warranty period for this product is 36 months. See General Terms and Conditions of Sales for further details.

Under current Italian and European laws, Datalogic is not obliged to take care of product disposal at the end of its life. Datalogic recommends disposing of the product in compliance with local laws or contacting authorised waste collection centres.

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