

TL46 IO-Link

Instruction Manual

IO-Link®

CONTROLS (W model)

OUTPUT LED (yellow)

The yellow LED indicates the output status.

READY LED (green)

The steady green LED ON indicates normal functioning. If quickly flashing, it indicates an output overload.

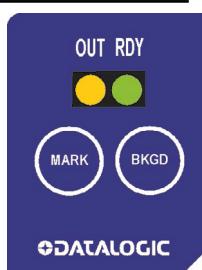
MARK PUSH-BUTTON

Pressing the MARK push-button activates the mark acquisition.

BKGD PUSH-BUTTON

Pressing the BKGD push-button activates the background acquisition.

Refer to "Settings (W model)" for the correct procedures during the setting phase.



CONTROLS (WH model)

OUTPUT LED (yellow)

The yellow LED indicates the output status.

DISPLAY (4 green digits)

In MARK mode the display indicates a value relative to the light quantity diffused by the target, in COLOR mode it shows the text "COL". The display turns off after 10s of keyboard inactivity.

READY LED (green)

The steady green LED ON indicates normal functioning. If quickly flashing, it indicates an output overload.



DELAY LED (green)

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

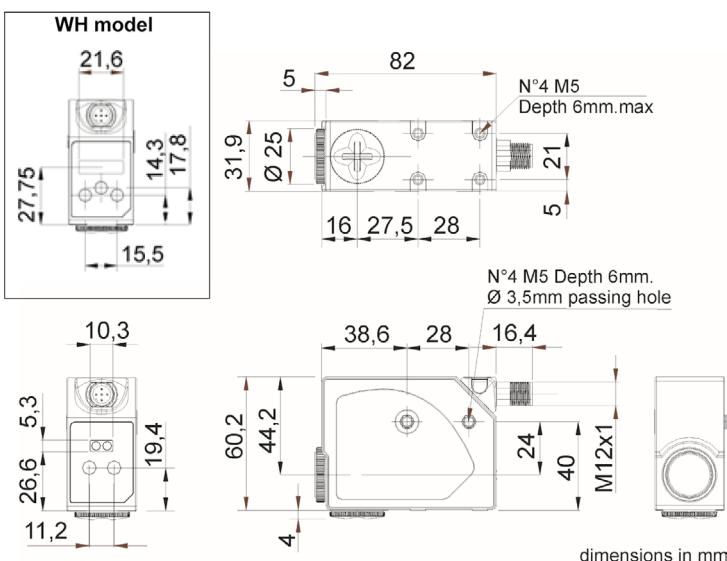
KEYLOCK LED (green)

The green KEYLOCK LED ON indicates that the keylock is active.

(SET), (+), (-) PUSH-BUTTONS

Please refer to "Settings" for the correct use procedures during the setting or acquisition phases.

DIMENSIONS



Datalogic S.r.l.
Via S. Vitalino 13 - 40012 Calderara di Reno - Italy
Tel: +39 051 3147011 - Fax: +39 051 3147205 - www.datalogic.com

Helpful links at www.datalogic.com: Contact Us, Terms and Conditions, Support.



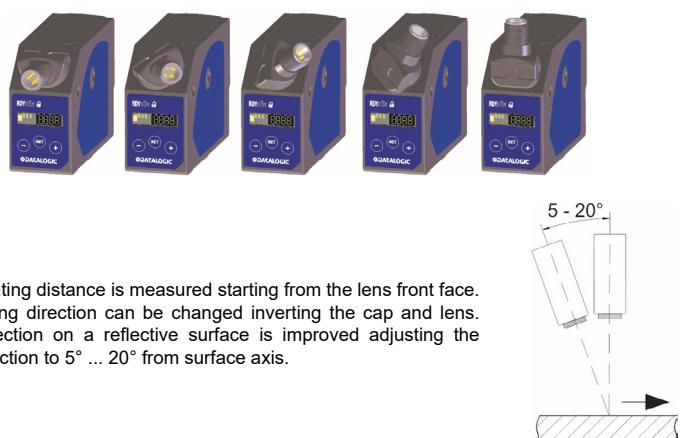
For information about the disposal of Waste Electrical and Electronic Equipment (WEEE), please refer to the website at www.datalogic.com.

INSTALLATION

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

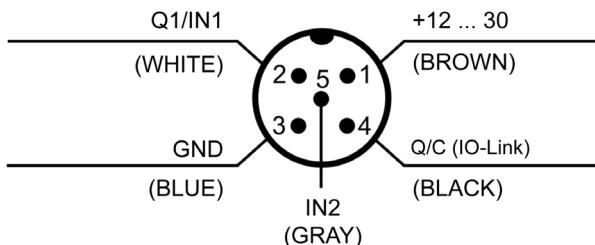
Warning: the use of excessively long screws can damage the product.

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



TECHNICAL DATA

W model

Power Supply	12 ... 30 Vcc (limit values)
Ripple	2 Vpp max.
Current consumption (output current excluded)	<30 mA max. @ 24 Vcc (display off)
Output	2 outputs type PNP or Push-Pull (selectable); 30 Vcc max. (short-circuit protection) (Push-Pull factory configuration)
Output current	100 mA max. (total of both outputs)
Output saturation voltage	≤ 2 V
Response time	20 µs
Switching frequency	25 kHz
Delay	No delay in factory configuration (programmable through IO-Link)
LIGHT/DARK selection	Automatic in Mark/Background acquisition; Selectable through wire or IO-Link in Dynamic acquisition
Indicators	OUTPUT LED (yellow) / READY LED (green)
Push-buttons	MARK, BACKGROUND
Operating temperature	-10 ... 55 °C
Storage temperature	-20 ... 70 °C
Operating distance	9 mm
Depth of field	± 3 mm
Min. spot dimension	0.8 x 4 mm²
Emission type	blue (465nm) / green (520nm) / red (630nm) with automatic selection
Ambient light rejection	according to EN 60947-5-2
Dielectric strength	1500 VAC, 1 min between electronics and housing
Insulating resistance	> 20 MΩ, 500 VDC between electronics and housing
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	Aluminum
Lens material	PMMA
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 tD A22 IP67 T85°C

WH model	
Power Supply	12 ... 30 Vcc (limit values)
Ripple	2 Vpp max.
Current consumption (output current excluded)	<30 mA max. @ 24 Vcc (display off)
Output	2 outputs type PNP or Push-Pull (selectable); 30 Vcc max. (short-circuit protection) (PP factory configuration)
Output current	100 mA max. (total of both outputs)
Output saturation voltage	≤ 2 V
Response time	6 µs (MARK mode), 10 µs (COLOR mode)
Switching frequency	80 kHz (MARK mode), 50 kHz (COLOR mode)
Jitter	3 µs (MARK mode), 6 µs (COLOR mode)
Delay	0...100 ms programmable through display or IO-Link (no delay in factory configuration)
LIGHT/DARK selection / NO-NC selection	Automatic for Mark/Background acquisition, NO-NC selectable through wire or IO-Link for Dynamic acquisition, selectable through MENU in COLOR mode
Indicators	4-digit display (GREEN) / OUTPUT LED (yellow) / READY LED (green) / DELAY LED (green)
Push-buttons	
Operating temperature	-10 ... 55 °C
Storage temperature	-20 ... 70 °C
Operating distance	9 mm
Depth of field	± 3 mm
Min. spot dimension	0.8 x 4 mm ²
Emission type	blue (465nm) / green (520nm) / red (630nm) with automatic selection in MARK mode
Ambient light rejection	according to EN 60947-5-2
Dielectric strength	1500 VAC, 1 min between electronics and housing
Insulating resistance	> 20 MΩ, 500 VDC between electronics and housing
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	Aluminum
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 tD A22 IP67 T85°C

KEYLOCK function (PATENTED)

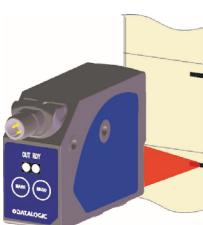
The KEYLOCK function allows deactivating the keyboard preventing accidental changes in the sensor settings.
When the sensor is turned on, the keyboard is locked (LED keylock off in WH model). To enable it, press the SET push-button (WH model) / the MARK push-button (W model) for 5 seconds until the LED keylock turns on / the READY LED turns off.
The keyboard locks automatically after 2 minutes of inactivity.
Unlock the keyboard to make sensor adjustments.



SETTINGS in MARK mode

DETECTION (MARK-BACKGROUND)

- Position the mark in front of the sensor light spot and press the SET push-button (WH model) / MARK push-button (W model) for 1s until the "SEt1" text appears on the display (WH model) or the green READY LED turns off (W model). The sensor detects the mark alternating the red, green and blue emissions. Avoid mark movements during this phase.

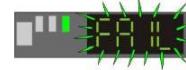


- Position the background in front of the sensor light spot and press the SET push-button again (WH model) / the Background push-button (W model). The sensor detects the mark alternating the red, green and blue emissions. Avoid background movements during this phase.



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

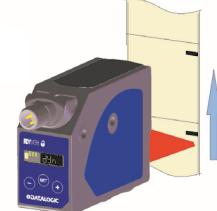
If the acquisition has been successful, the sensor returns to normal operation. If it has failed due to insufficient contrast, the "FAIL" text blinks on the display (WH model) / the READY LED blinks quickly (W model). Press the SET push-button (WH model) / MARK push-button (W model) and the sensor returns to the previous setting.
Repeat the procedure from the beginning.



DYNAMIC ACQUISITION

Use dynamic acquisition to acquire moving marks. The sensor detects the contrast between the mark and the moving background, and automatically sets the threshold value. The DARK/LIGHT mode must be set first. It can be set either through input or IO-Link. To select the dark mode through input, connect the DARK/LIGHT signal to 0V or leave it disconnected. To select the light mode connect the DARK/LIGHT signal to the power supply.

- Position the sensor spot in front of the target to detect.
- WH model:** press the SET push-button until the "dYn" text blinks (3s) and keep it pressed.
- W model:** press the MARK push-button until the READY LED (green) turns off and on again (3s) and keep it pressed.
- To end the dynamic acquisition procedure, release the SET push-button (WH model) / MARK push-button (W model).



If the acquisition has been successful, the sensor returns to normal operation. If it has failed due to insufficient contrast, the "Lo" text blinks on the display (WH model) / the READY LED blinks quickly (W model).

Press the SET push-button to repeat the procedure until the button is released (the "dYn" text blinks on the display) (WH model) / press the MARK push-button to repeat the procedure (W model).

The sensor returns to the previous setting by pressing or (WH model) / the BKGD push-button (W model).



OTHER SETTINGS in MARK mode (WH model)

SWITCHING THRESHOLD SETTING

The switching threshold can be adjusted as follows.

The "Adj" text appears pressing on the display. Releasing the push-button, the threshold value blinks.

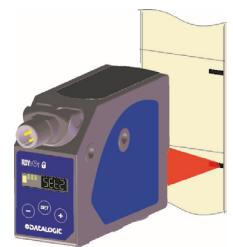


The switching threshold is increased or reduced by pressing or . Press the SET push-button to save the new threshold value.

SETTINGS in COLOR mode (WH model)

COLOR DETECTION

Position the color in front of the sensor light spot and press the SET push-button until the "SEtC" text appears. The sensor detects the color. Avoid color movements until the "SEtC" text disappears.



If the acquisition has been successful, the sensor returns to normal functioning. If it has failed due to insufficient intensity, the "FAIL" text blinks on the display. Press the SET push-button and the sensor returns to the previous setting.

Repeat the procedure from the beginning.



TOLERANCE SETTING

The sensor tolerance can be adjusted as follows.

The "Tolx" text appears on the display after pressing . Release the push-button.



The tolerance level increases from "tol0" to "tol9". To detect slight chromatic differences, select lower tolerance levels.

The tolerance value is increased or reduced by pressing or . Press the SET push-button to save the new tolerance value.

SETTINGS in both modes (WH model)

Hysteresis Setting

The sensor hysteresis level can be adjusted.

The "HYST" text appears on the display by pressing the  push-button.



When the push-button is released, the previously set value blinks.



The level switches by pressing  or .

Press the SET push-button to save the new hysteresis value.

PARAMETER SETTING (WH model)

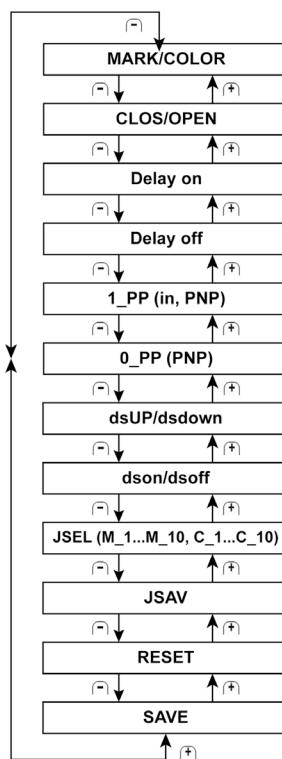
Some parameters can be changed entering the menu: MARK/COLOR mode, NORMALLY OPEN/CLOSE, DELAY ON, DELAY OFF, outputs type or input selection, display orientation, powering on/off, job selection and job save, RESET and save setting.

Press  and  together until the "Menu" text appears.



Releasing the push-buttons, the first MARK/COLOR parameter is displayed.

The parameter list is shown by pressing  and .



MARK/COLOR SETTING

The sensor can be configured in MARK or COLOR mode.

Select "MARk" or "COLr" in the parameter menu to switch the mode.



The previously set mode switches by pressing SET.

NORMALLY OPEN/CLOSE SETTING (only in COLOR mode)

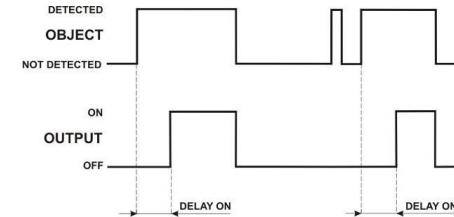
The output in COLOR mode can be configured as normally open or normally close. Select "OPEn" or "CLOS" in the parameter menu to switch the output.



Press SET to switch to the previously set mode.

DELAY ON SETTING

The DELAY ON is the output delay activation after the reference mark has entered the detection area. The delay avoids the detection of events that occur rapidly. An example can be a mark with shaded colors (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.

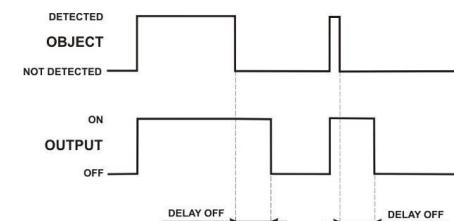


Pressing  or  the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100 ms.

Keeping  or  pressed, the delay value is increased or decreased by incremental steps. The setting of a delay different from zero is signaled by the DELAY LED on. Press SET to confirm the value and return to the parameter menu.

DELAY OFF SETTING

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



Select "dLOF" in the parameter menu to set the 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 100 ms.

Keeping  or  pressed, the delay value is increased or decreased by incremental steps. The setting of a delay different from zero is signaled by the DELAY LED on. Press SET to confirm the value and return to the parameter menu.

OUT 1 SETTING (WHITE WIRE)

Selecting 1_PP on the display sets the output 1 mode (PP, PNP or input).



Press the SET push-button to switch through the three options.

OUT 0 SETTING (BLACK WIRE)

Selecting 0_PP on the display sets the output 0 mode (PP or PNP).



Press the SET push-button to switch to the OUT 0 setting previously set.

UP/DOWN DISPLAY SETTING

Selecting UP/DOWN on the 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 to the reading direction previously set.

ON/OFF DISPLAY SETTING

Turn off the display during normal operation to save power consumption. Setting the OFF mode, the display turns off when the sensor is normally functioning. It turns on for 10s after a keyboard command. Select "dSON" or "dSOF" in the parameter menu to set the display ON or OFF.



Press SET to switch to the display mode previously set.

SELECT JOB

The parameter JSEL on the display allows selecting the previously saved settings. Up to 10 JOBS can be selected for MARK mode (M_1...M_10) and COLOR mode (C_1...C_10) respectively.



Press the SET push-button to select the Job Selection function. Pressing [+/-] switches through the different jobs. Press the SET push-button to select the job shown on the display.

SAVE JOB

The parameter JSAV on the display allows saving the sensor settings in one JOB, which can then be selected. Up to 10 JOBS can be saved for MARK mode (M_1...M_10) and COLOR mode (C_1...C_10) respectively.



Press the SET push-button to select the Job Save function. Pressing [+/-] switches through the different jobs. Press the SET push-button to save the current configuration in the job shown on the display.

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 operation.

The default reset parameters are:

Parameter	Display	Description
Emission	_____	Red
Mode	_____	MARK
DARK/LIGHT mode	_____	Dark
Threshold	2050	2050
Hysteresis	W3no	Medium (Normal)
Delay ON and OFF	d 0	Disabled
Display	dSOF dSUP	Display UP off
Sensitivity	_____	2



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" on the menu to save the parameter settings.



The parameters are saved pressing SET. The display returns to normal visualisation after releasing the push-button.



NOTE: After setting the data, the operator exits the menu with the "SAVE" or "RESET" functions. If these operations are not performed the sensor returns to normal mode after 30s from the last setting and saves the modified parameters.

ACCESSORY FUNCTIONS (all models)

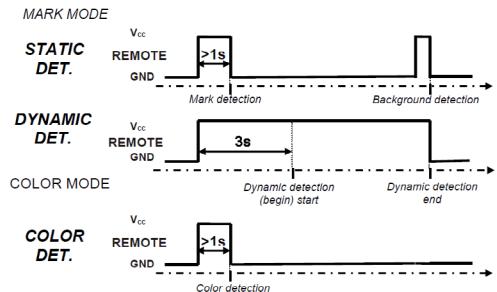
REMOTE INPUT

The REMOTE signal can perform the acquisition functions without using the SET push-button. Select pin 2 or 5 through IO-Link.

The REMOTE wire connected to +Vcc is equal to pressing the SET push-button. If it is connected to GND or not connected, it is equal to not pressing the SET push-button.

REMOTE	SET push-button
0V	Not pressed
+Vcc	Pressed

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



DARK/LIGHT INPUT (only for dynamic acquisition in MARK mode)

The DARK/LIGHT signal allows selecting the DARK/LIGHT mode for dynamic acquisition. Select pin 2 or 5 through IO-Link.

In LIGHT mode, the output is active with light marks on dark backgrounds.

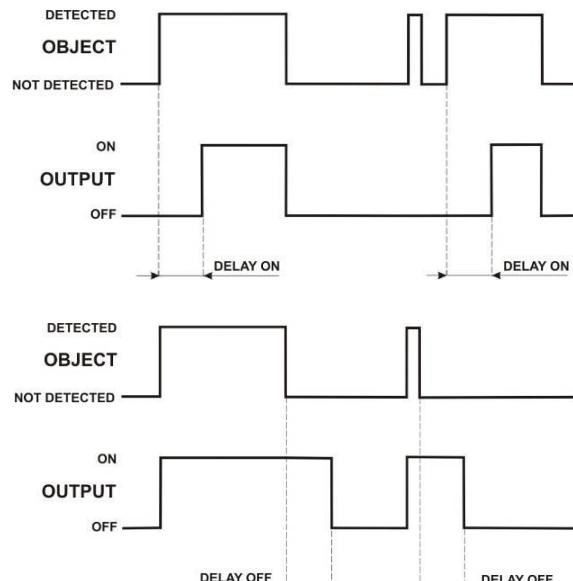
In DARK mode, the output is active with dark marks on light backgrounds.

The connection of the DARK/LIGHT wire to Vcc sets the LIGHT mode. If connected to 0V or not connected, it sets the DARK mode.

DARK/LIGHT	Mode
+Vcc	LIGHT
0V	DARK

DELAY SETTING THROUGH INPUT (only W model)

The DELAY set through IO-Link extends the minimum duration of the active output allowing slower interfacing systems to detect shorter pulses or active status delay.



Delay activation

Connect the Delay signal (gray or white wire) to power supply.

Delay deactivation

Connect the Delay signal (gray or white wire) to 0V or leave disconnected.

OUTPUT OVERLOAD

The overload of the digital output is signaled by the "_SC_" text on the display (WH model) / the READY LEAD blinking quickly (W model). The sensor returns to normal operation when the overload condition disappears.



TL46

IO-Link® parameters

PHYSICAL LAYER

Description	
IO-Link Revision	1.1
SIO Modus	YES
Min Cycle Time	2.3 ms
Transmission Rate	38.4 kbit/s (COM2)
Process Data Length	PDIInput: 16 Bit PDOOutput: Not used
M-Sequence Capability	PREOPERATE: TYPE_0 OPERATE: TYPE_2_1 ISDU: supported

FEATURES

Description	
Data Storage	YES
Supported Access Locks	Data Storage
Profile Characteristic	Device Profile: Smart Sensor Function Class: Device Identification Function Class: Switching Signal Channel Function Class: Device Diagnosis Function Class: Teach Channel Function Class: Teach-in Single Value

SERVICE DATA

The following ISDUs will not be saved via Data Storage: Device Access Lock (index 0xC), Emitter Status (index 0x51), Device Temperature Threshold (index 0x53), Quality of Signal Threshold (index 0x61) TI select (index 0x3A), Load Job (index 0x66), Select Job Number (index 0x67), Vibration Threshold (index 0x4C), Tilt Threshold (index 0x4F), Shock Threshold (index 0x55), Timestamp Trigger (index 0xB8), Timestamp Sync Value (index 0xBB).

System Parameters						
Index (dec)	Parameter Object Name	Length	Value/Range	Description	Data Type	Access*
0x000C (12)	Device Access Locks	2 octets	Bit 1: Data Storage (0 = unlocked, 1 = locked)	Standardized Device locking functions: Bit 1: Data Storage Bit 2: Local parameterization (Not used) Bit 3: Local user interface (Not used) Bit 4-15: Reserved Bit 0: not used	RecordT	R/W
0x000D (13)	Profile Characteristics	2 octets 2 octets 2 octets 2 octets 2 octets 2 octets	0x0001 0x8000 0x8001 0x8003 0x8004 0x8007	Smart Sensor Profile Device Identification Switching Signal Channel (SSC) Device Diagnosis Teach Channel Teach-in single value	ArrayT of UIntegerT16	RO
0x000E (14)	PDIInput Descriptor	3 octets 3 octets 3 octets 3 octets	0x01.0x01.0x00 0x01.0x01.0x01 0x01.0x02.0x02 0x01.0x0C.0x04	SSC1 (OUT0) Quality of signal Emission color Analog signal	ArrayT of OctetStringT3	RO

Identification Parameters

Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0010 (16)	Vendor Name	9 octets		DATALOGIC	Informative	StringT	RO	
0x0011 (17)	Vendor Text	19 octets		Empower your vision		StringT	RO	
0x0012 (18)	Product Name	14 octets		See "Device variant collection"	Detailed product name	StringT	RO	
0x0013 (19)	Product ID	5 octets		See "Device variant collection"	Product identification	StringT	RO	
0x0014 (20)	Product Text	15 octets		Contrast Sensor	Product text	StringT	RO	
0x0015 (21)	Serial Number	9 octets			Unique serial number	StringT	RO	
0x0016 (22)	Hardware Revision	5 octets		1.0.0		StringT	RO	
0x0017 (23)	Firmware Revision	5 octets		1.0.6		StringT	RO	
0x0018 (24)	Application Specific Tag	32 octets		*** (default)	Tag application defined by user	StringT	R/W	Saved in non-volatile memory
0x0019 (25)	Function Tag	32 octets		*** (default)	Additional tag for device function identification	StringT	R/W	Saved in non-volatile memory
0x001A (26)	Location Tag	32 octets		*** (default)	Additional tag for device function identification	StringT	R/W	Saved in non-volatile memory

Observation / Diagnostic Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0028 (40)	Process Data Input	2 octets			Read last valid Process Data Input from PDin channel	Device specific	RO	
0x0045 (69)	Sampled Analog Signal value RED	2 octets		0..4095	Value of analog signal with RED emission (COLOR mode, WH model only)	UIntegerT	RO	
0x0046 (70)	Sampled Analog Signal value GREEN	2 octets		0..4095	Value of analog signal with GREEN emission (COLOR mode, WH model only)	UIntegerT	RO	
0x0047 (71)	Sampled Analog Signal value BLUE	2 octets		0..4095	Value of analog signal with BLUE emission (COLOR mode, WH model only)	UIntegerT	RO	
0x0052 (82)	Device Temperature	2 octets 2 octets 2 octets 2 octets 2 octets	1(64) 2(48) 3(32) 4(16) 5(0)		Device temperature actual Device min. temperature since powerup Device max. temperature since powerup Device min. temperature during lifetime Device max. temperature during lifetime	IntegerT IntegerT IntegerT IntegerT IntegerT	RO RO RO RO RO	Temperature during lifetime is saved in non-volatile memory every hour.
0x0053 (83)	Device Temperature Threshold	2 octets 2 octets	1(16) 2(0)	-40..130 (-40 default) -40..130 (130 default)	Device min. temperature threshold Device max. temperature threshold	IntegerT IntegerT	R/W	Events are generated if the device temperature exceeds the thresholds.
0x0057 (87)	Operating Hours	4 octets 4 octets 4 octets	1(64) 2(32) 3(0)	0...(2^32)-1	Operating Hours: device operating hours. Not resettable by user. Operating Hours Maintenance: device operating hours, reset on system command "Confirm Maintenance". Operating Hours Power Up: Time in hours since power up.	UIntegerT UIntegerT UIntegerT	RO RO RO	Operating Hours are saved in non-volatile memory every hour.
0x0024 (36)	Device Status	1 octet		0x00 → Device operating properly 0x01 → Maintenance Required 0x02 → Out of specification 0x03 → Functional Check 0x04 → Failure	Contains current status of the device	UIntegerT	RO	
0x0025 (37)	Detailed Device Status	3 octets			Information about currently pending Events. Implemented as dynamic list.	ArrayT OctetStringT	RO	
0x0051 (81)	Emitter Status	1 octet		0x00 = Emitter OFF 0x01 = Emitter ON	Contains current status of the emitter	BooleanT	RO	
0x0059 (89)	RGB selection	1 octet		0x01 = Red emission (default) 0x02 = Green emission 0x03 = Blue emission	Selects emission type	UIntegerT	R/W	Saved in non-volatile memory
0x0060 (96)	Quality of Signal (%)	1 octet		0..200%	Indicates the signal quality during mark detection compared to the acquisition	UIntegerT	RO	Values from 100 to 200 % indicate a better signal than in acquisition phase
0x0061 (97)	Quality of Signal Threshold (%)	1 octet			Signal quality threshold. When the signal quality falls below the threshold, an event is sent	UIntegerT	R/W	Saved in non-volatile memory. The max. value depends on the acquired contrast. When an out-of-range value is set, the max. value is automatically selected.
0x0062 (98)	Quality of Teach (%)	1 octet		0..100%	Quality of the acquired contrast	UIntegerT	RO	Indicates how wide the acquired contrast is (100% wide contrast). A low value indicates a difficult contrast but the photocell can still read it.

*RO = read only, WO = write only, R/W = read/write

Teach-in Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x003A (58)	TI Select	1 octet		0x00 = SSC1 (default, C/Q pin and DO pin)	Selection for Teach-in channel (volatile)	UIntegerT	R/W	C/Q and DO outputs are antivalent. Teach SSC1 equals to teach SSC2
0x003B (59)	TI Result	1 octet	1(0) 2(4) 3(5)	Teach-in State Flag SP1 TP1 Flag SP2 TP1	See IO-Link Smart Sensor Profile	UIntegerT4 BooleanT BooleanT	RO	
0x003C (60)	SSC1 Param	2 octets 2 octets	1(16) 2(0)	220 ..4000 Not used	Switching threshold	UIntegerT	R/W	Saved in non-volatile memory *Setting a higher threshold reduces the operating distance progressively to 0 (output always active)
0x003D (61)	SSC1 Config	1 octet 1 octet 2 octets	1(24) 2(16) 3(0)	0x00: High Active 0x01: Low Active (default) 0x01: Single Point (default) 0 ..2 Hysteresis 0 = low 1 = medium 2 = high	C/Q pin configuration	UIntegerT UIntegerT UIntegerT	R/W	Saved in non-volatile memory *In Color Mode (WH model only): Subindex 1 0x00: NC (default) 0x01: NO
0x003E (62)	SSC2 Param	2 octets 2 octets	1(16) 2(0)	220 ..4000 Not used	Switching threshold	UIntegerT	R/W	Saved in non-volatile memory *Setting a higher threshold reduces the operating distance progressively to 0 (output always active)
0x003F (63)	SSC2 Config	1 octet 1 octet 2 octets	1(24) 2(16) 3(0)	0x00: High Active 0x01: Low Active (default) 0x01: Single Point (default) 0 ..2 Hysteresis 0 = low 1 = medium 2 = high	DO pin configuration	UIntegerT UIntegerT UIntegerT	R/W	Saved in non-volatile memory *In Color Mode (WH model only): Subindex 1 0x00: NC (default) 0x01: NO
0x005A (90)	Sensitivity selection	1 octet		0 ..9 Sensitivity	Sensitivity	UIntegerT	R/W	Saved in non-volatile memory *The sensitivity will be set during the next acquisition.
0x0068 (104)	Color Threshold Settings	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	220..4000 (2000 default) 220..4000 (2000 default) 220..4000 (2000 default)	Red Emission Threshold Value Green Emission Threshold Value Blue Emission Threshold Value	UIntegerT UIntegerT UIntegerT	R/W	Saved in non-volatile memory *COLOR mode, WH model only
0x0069 (105)	Tolerance	1 octet		0..9 (5 default)	Tolerance in Color Mode (WH model only)	UIntegerT	R/W	Saved in non-volatile memory

*RO = read only, WO = write only, R/W = read/write

Device Specific Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0048 (72)	Delay Settings	1 octet 4 octets 4 octets	1(64) 2(32) 3(0)	0 = no delay (default) 0x1 = Delay OFF ENABLED 0x2 = Delay ON ENABLED 0x3 = Delay ON+OFF ENABLED 0 ..15000 0 ..15000	Select Delay mode (OFF/ON/OFF-ON) Delay ON value [ms] Delay OFF value [ms]	UIntegerT UIntegerT UIntegerT UIntegerT	R/W R/W R/W R/W	Saved in non-volatile memory. Max. Value 15000 ms By setting 'no delay' the delay on and off values are reset to zero. Set the delay type first and then the values.
0x00B4 (180)	Output type	1 octet 1 octet	1(8) 2(0)	0x01 = PNP 0x02 = Push Pull (default) 0x01 = PNP 0x02 = Push Pull (default) 0x03 = Input	Output type of C/Q pin when in SIO mode Output type of DO pin	UIntegerT UIntegerT	R/W R/W	Saved in non-volatile memory
0x005B (91)	Input Function Configuration	1 octet 1 octet	1(8) 2(0)	<u>White wire functions</u> 0: No Function 1: Remote 2: Light/Dark Selection (default) 3: Delay Enable (W model only) <u>Gray wire functions</u> 0: No Function 1: Remote (default) 2: Light/Dark Selection 3: Delay Enable (W model only)	White wire functions Gray wire functions	UIntegerT UIntegerT	R/W R/W	Saved in non-volatile memory The white wire function remains selected even if the wire is set as output from the output configuration parameter (180).
0x005E (94)	Mark/Color Mode Selection	1 octet		0: Mark Mode (WH model only) (default) 1: Color Mode (WH model only)	Mode selection	UIntegerT	R/W	Saved in non-volatile memory

Standard Command									
Index (dec)	Command Name	Length	Value (dec)	Description					Access*
0x0002 (2)	SP1 Single Value Teach	1 octet	0x41 (65)	Color Acquisition					WO
0x0002 (2)	SP1 Teach TP1	1 octet	0x43 (67)	Acquisition FINE: Mark Detection (refer to User's Manual)					WO
0x0002 (2)	SP1 Teach TP2	1 octet	0x44 (68)	Acquisition FINE: Background Detection (refer to User's Manual)					WO
0x0002 (2)	Teach Dynamic Start	1 octet	0x4B (75)	Dynamic Detection					WO
0x0002 (2)	Teach Dynamic End	1 octet	0x4F (79)	Exit from Dynamic Detection					WO
0x0002 (2)	Restore Factory Settings	1 octet	0x82 (130)	Restore factory settings (Device Access Locks, Application Specific Tag, Function Tag, Location Tag, Device Temperature Threshold, TI Result, SSC1 Param, SSC2 Param, SSC1 Config, SSC2 Config, Delay Settings, Output Type, Switch Counter Settings, Switch Counter Value, Time Stamp Trigger, Time Stamp List, Time Stamp Synch Value, RGB selection, Quality of Signal Threshold, Quality of teach, Sensitivity, Color Threshold Settings, Input Function Configuration, Mark/Color Selection, Job Load, Job Select, Vibration/Tilt/Shock thresholds, Display UP/OFF, Tolerance, Vibration/Tilt Autotuning, Switch Counter Threshold Reached, Time Stamp New Event Flag).					WO
0x0002 (2)	Confirm Maintenance	1 octet	0xA5 (165)	Reset Maintenance parameters (Operating Hours Maintenance, Minimum device temperature since powerup, Maximum device temperature since powerup, Device Status, Detailed Device Status)					WO
0x0002 (2)	Disable/enable emission	1 octet	0xB0 (176)	Toggle emission (enable / disable emission)					WO
0x0002 (2)	Start / Stop Ping	1 octet	0xAF (175)	Feature to identify the sensor by yellow LED blinking					WO

*RO = read only, WO = write only, R/W = read/write

Events						
Event code (dec)		Event name	Event mode	Event type	Device status	Remarks
0x4220 (16928)		Temperature underrun	Appears / Disappears	Warning	Out of specification	
0x4210 (16912)		Temperature overrun	Appears / Disappears	Warning	Out of specification	
0x5100 (20736)		General power supply fault	Appears / Disappears	Error	Failure	
0x8CAA (36010)		Short circuit - Check installation	Appears / Disappears	Error	Failure	
0x8CA0 (36000)		Vibration overrun	Appears / Disappears	Warning	Out of specification	
0x8CA1 (36001)		Shock detected	One Shot	Warning	Out of specification	
0x8CA2 (36002)		Tilt angle exceeded	Appears / Disappears	Warning	Out of specification	
0x8CA3 (36003)		Quality of signal underrun	Appears / Disappears	Warning	Out of specification	

DEVICE VARIANT COLLECTION

Product name	Product ID
TL-46-WH-815-PZ	90004
TL-46-W-815-PZ	90005

PROCESS DATA

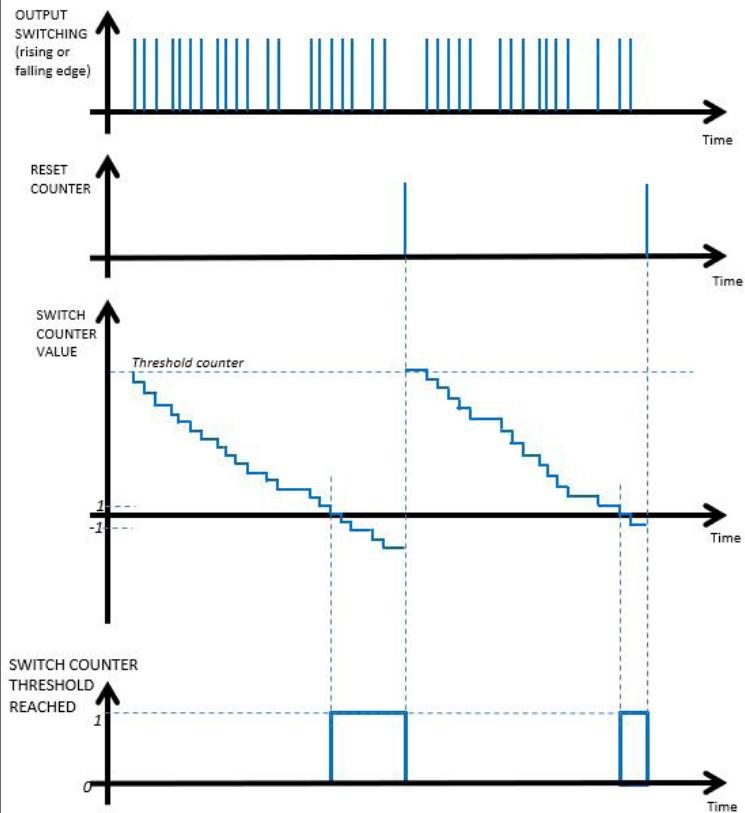
Process Data Input							
Byte 0							
7	6	5	4	3	2	1	0
Analog signal (in Mark mode) LSB				Emission colors		Quality of signal alarm	SSC1 (C/Q pin)
Byte 1							
7	6	5	4	3	2	1	0
Analog signal (in Mark mode) MSB							

EXTENDED PARAMETERS

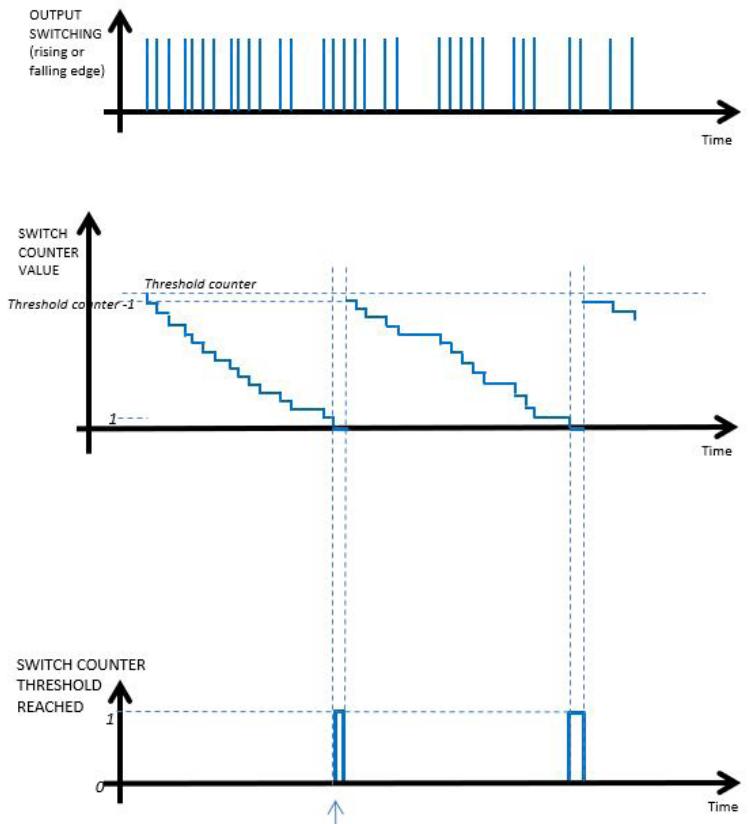
Switch Counter									
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark	
0x00B5 (181)	Switch Counter Threshold Reached	1 octet		0: false 1: true	State of Switch Counter Threshold Reached	Boolean	RO		
0x00B6 (182)	Switch counter settings	1 octet 1 octet 2 octets	1(24) 2(16) 3(0)	0: OFF (default) 1: Counter (STATIC) 2: Counter (AUTO) 0: Output Rising Edge 1: Output Falling Edge 0-32767	Mode Trigger counter Threshold counter	UIntegerT Boolean UIntegerT	RW RW RW	Saved in non-volatile memory. Stop or reset the running counter before changing configuration, then re-enable the counter with Set counter commands. *Rising and falling edges are referred to DO pin.	
0x00B7 (183)	Switch counter values	1 octet 2 octets	1(16) 2(0)	0: counting UP 1: counting DOWN 2: counting INACTIVE (default) -32,768..32,767	Counting direction Switch counter value	UIntegerT IntegerT	RO RO		
Index (dec)	Parameter Object Name	Length	Value (dec)	Description					Access
0x0002 (2)	Reset counter	1 octet	0xA0(160)	Reset counter value and the switch counter threshold exceeded (Static Mode only)					WO
0x0002 (2)	Enable counter UP	1 octet	0xA1(161)	Enable counter and start count UP					WO
0x0002 (2)	Enable counter DOWN	1 octet	0xA2(162)	Enable counter and start count DOWN					WO
0x0002 (2)	Stop/Resume counter	1 octet	0xA3(163)	Freeze the counting function (all commutations are neglected: counting INACTIVE) or resume the counting function					WO

COUNTING DIRECTION DOWN

COUNTER MODE - static

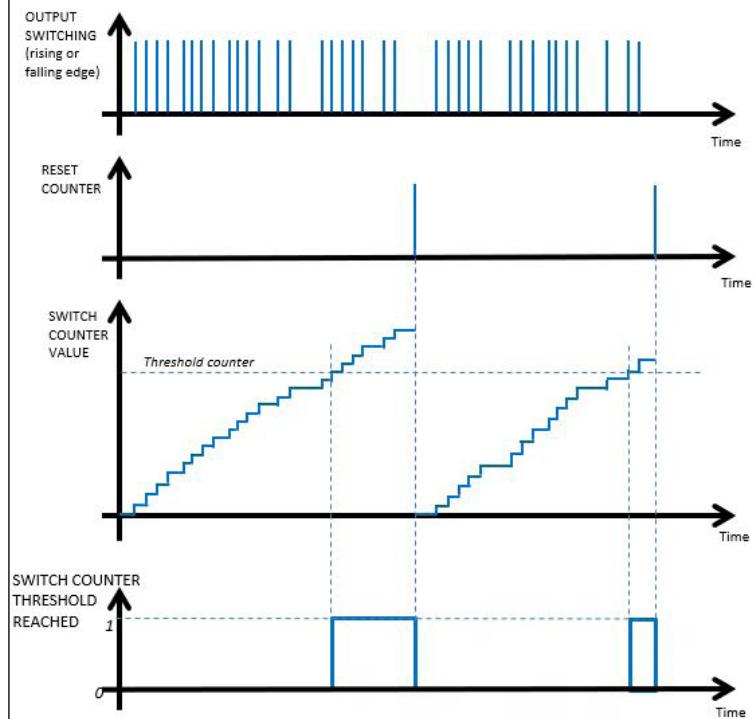


COUNTER MODE - auto

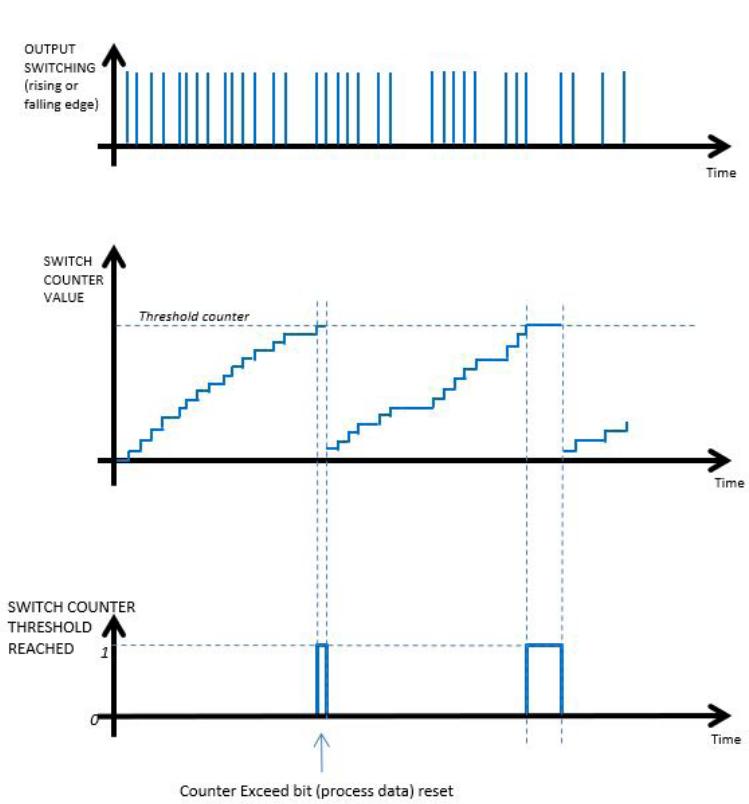


COUNTING DIRECTION UP

COUNTER MODE - static



COUNTER MODE - auto



Timestamp									
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark	
0x00B8 (184)	Timestamp Trigger	1 octet 1 octet 1 octet 1 octet 1 octet	1(32) 2(24) 3(16) 4(8) 5(0)	0x00: disabled (default) 0x01: enabled	EVENT_1 (ID=0x01): Switch Counter Threshold Reached EVENT_2 (ID=0x02): Temperature underrun (Event mode APPEARS) EVENT_3 (ID=0x03): Temperature overrun (Event mode APPEARS) EVENT_4 (ID=0x04): Short circuit EVENT_5 (ID=0x05): Power fault	UIntegerT	R/W	Event that generates a timestamp	
0x00B9 (185)	Timestamp Features	1 octet 1 octet	1(8) 2(0)	3 [ms] 1 [ms]	Maximum timestamp latency time Timestamp resolution	UIntegerT UIntegerT	RO RO	Latency between event and timestamp (hardware dependent). Typically 3ms	
0x00BA (186)	Timestamp List	70 octets		*See format in Timestamp table		ArrayT OctetStringT	RO	Last timestamp trigger starts counting from Power Up or from Timestamp Synch Value	
0x00BB (187)	Timestamp Synch Value	2 octets 1 octet 1 octet 1 octet 1 octet	1(32) 2(24) 3(16) 4(8) 5(0)	0...999 0...59 0...59 0...23 0...255	milliseconds seconds minutes hours days	UIntegerT	R/W	Reset value for timestamp synchronization command	
0x00BC (188)	Time Stamp New Event Flag	1 octet		0: false 1: true	Time Stamp New Event signaling	Boolean	RO		
Index (dec)	Command Name	Length	Value (dec)	Description					Access*
0x0002 (2)	Reset Timestamp Application	1 octet	0xB1(177)	Reset Timestamp application (Timestamp Trigger, Timestamp List and Timestamp New Event Flag)					WO
0x0002 (2)	Reset Timestamp	1 octet	0xB2(178)	Reset clock counter					WO
0x0002 (2)	Timestamp Synchronization	1 octet	0xB3(179)	Start counting from the Timestamp Synch Value (index 187). This command clears the Timestamp List and resets the Timestamp New Event Flag					WO
0x0002 (2)	Reset Timestamp New Event Flag	1 octet	0xB4(180)	Reset the Timestamp New Event Flag					WO

TIMESTAMP TABLE

ID event	day	hours	minutes	seconds	milliseconds	
Last EVENT_X occurred	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6 Byte7
	Byte8	Byte9	Byte10	Byte11	Byte12	Byte13 Byte14
	Byte15	Byte16	Byte17	Byte18	Byte19	Byte20 Byte21

First EVENT_X occurred	Byte64	Byte65	Byte66	Byte67	Byte68	Byte69 Byte70

The Job function allows saving the configuration and retrieving it later.

Job									
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark	
0x0066 (102)	Load Job	1 octet		1..20 (WH) 1..10 (W)	Load the job corresponding to the selected number 1..10 select the 10 configurations in Mark mode, 11...20 select the 10 configurations in Color mode	UIntegerT	R/W	Saved in non-volatile memory	
0x0067 (103)	Select job number	1 octet		1..20 (WH) 1..10 (W)	Select the job number for the next save operation 1..10 select the 10 configurations in Mark mode, 11...20 select the 10 configurations in Color mode	UIntegerT	R/W	Saved in non-volatile memory	
Index (dec)	Command Name	Length	Value (dec)	Value/Range	Description			Access*	
0x0002 (2)	Job Save	1 octet	0x00AA (170)		Save current Job settings and Teach-In values into the Job position indicated using parameter 0x67 (103)			WO	



VIBRATIONS, TILT, AND SHOCKS (WH model)

Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0049 (73)	Maximum Lifetime Vibration Value	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	0..8000	Maximum value of vibration during lifetime in mg on axis X Maximum value of vibration during lifetime in mg on axis Y Maximum value of vibration during lifetime in mg on axis Z	IntegerT	RO	Saved in non-volatile memory
0x004A (74)	Vibration values	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	0..8000	Indicates the value of actual vibration in mg on axis X Indicates the value of actual vibration in mg on axis Y Indicates the value of actual vibration in mg on axis Z	UIntegerT	RO	
0x004B (75)	Vibration AUTOTUNING values	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	0..8000	Indicates the value of vibration during autotuning acquisition in mg on axis X Indicates the value of vibration during autotuning acquisition in mg on axis Y Indicates the value of vibration during autotuning acquisition in mg on axis Z	UIntegerT	RO	
0x004C (76)	Vibration threshold	2 octets		1000..7874	Vibration Threshold value [mg]	UIntegerT	R/W	Events are generated if the actual vibration value exceeds the threshold
0x004D (77)	Tilt values	1 octet 1 octet 1 octet	1(16) 2(8) 3(0)	0..90	Indicates the actual degrees of Roll on X Indicates the actual degrees of Pitch on Y Indicates the actual degrees ofYaw on Z	IntegerT	RO	
0x004E (78)	Tilt AUTOTUNING values	1 octet 1 octet 1 octet	1(16) 2(8) 3(0)	0..90	Indicates the degrees of Roll on X measured during autotuning acquisition Indicates the degrees of Pitch on Y measured during autotuning acquisition Indicates the degrees of Yaw on Z measured during autotuning acquisition	IntegerT	RO	
0x004F (79)	Tilt threshold	1 octet		0..90	Tilt Threshold value [degrees]	UIntegerT	R/W	Events are generated if the actual tilt value exceeds the threshold
0x0054 (84)	Shock values	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	0..8000	Indicates the last shock value exceeded the threshold in mg on axis X Indicates the last shock value exceeded the threshold in mg on axis Y Indicates the last shock value exceeded the threshold in mg on axis Z	IntegerT	RO	
0x0055 (85)	Shock threshold	2 octets		1000..7874	Shock Threshold value [mg]	UIntegerT	R/W	Events are generated if the shock value exceeds the threshold
0x0056 (86)	Maximum Lifetime Shock Value	2 octets 2 octets 2 octets	1(32) 2(16) 3(0)	0..8000	Maximum value of shock during lifetime in mg on axis X Maximum value of shock during lifetime in mg on axis Y Maximum value of shock during lifetime in mg on axis Z	IntegerT	RO	Saved in non-volatile memory
Index (dec)	Command Name	Length	Value (dec)	Description	Access*			
0x0002 (2)	Accelerometer Autotuning	1 octet	0xA4(164)	Take a "photo" of the Vibrations and Tilt values	WO			

TL46 IO-Link

说明手册

IO-Link®

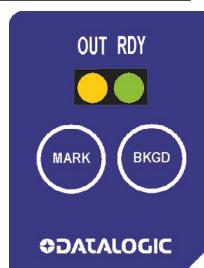
控件 (W 型号)

输出 LED (黄色)
黄色 LED 指示输出状态。

READY LED (绿色)
绿色 LED 长亮表示正常运行。如果快速闪烁，则指示输出过载。

MARK 按钮
按下 MARK 按钮可激活标记采集。

BKGD 按钮
按下 BKGD 按钮可激活背景采集。



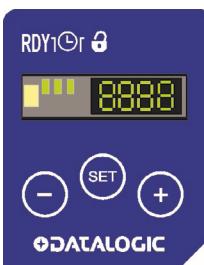
请参阅“MARK 模式下的其他设置 (WH 型号)”获取设置阶段的正确步骤。

控件 (WH 型号)

输出 LED (黄色)
黄色 LED 指示输出状态。

显示面板 (4 个绿色字节)
在 MARK 模式下，显示面板将指示目标散射光量的相关值，在 COLOR 模式下，显示屏显示文本“COLr”。显示器会在键盘不活跃 10 秒后关闭。

READY LED (绿色)
绿色 LED 长亮表示正常运行。如果快速闪烁，则指示输出过载。



DELAY LED

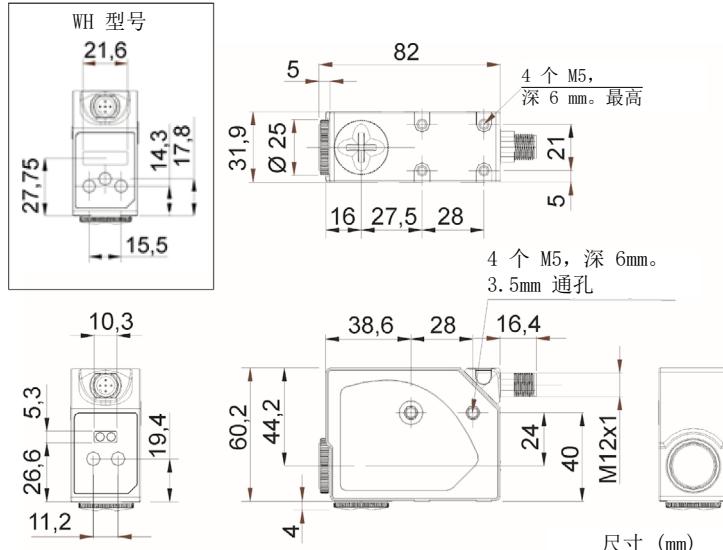
绿色 DELAY LED 亮起指示数字输出的定时激活。

键锁 LED

绿色键锁 LED 亮起表示键锁已激活。

请参阅“设置”获取设置或采集阶段的正确步骤。

尺寸



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www.datalogic.com 上的网站帮助链接: 联系我们、条款和条件、支持。

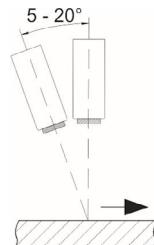


有关处置报废电子电气设备 (WEEE) 的信息, 请参阅网站 www.datalogic.com。

安装

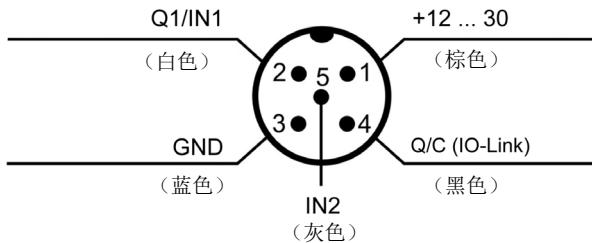
可以使用两个 03.5mm 的外壳孔或最大深度为 6mm 的 M5 螺纹孔来定位传感器。
警告: 使用过长的螺钉会损坏产品。

旋转连接器块可将连接器定位在五个不同位置。所选位置由机械锁定系统保证。
由于连接器块完全独立于外壳内部, 因此即使在安装传感器之后也可以进行旋转。



从镜头正面开始测量工作距离。可以通过反转镜头盖和镜头来更改读取方向。将光束方向调整为与表面轴成 5° ... 20°, 可改善反射表面上的标记检测。

连接



技术数据

W 型号	
电源	12 ... 30 Vcc (极限值)
纹波	最大 2 Vpp
电流消耗 (不含输出电流)	24 Vcc 下最大不超过 30 mA (显示面板关闭)
输出	2 种输出类型, PNP 或推挽式 (可选); 最大 30 Vcc (短路保护) (推挽式出厂配置)
输出电流	最大 100 mA (两种输出)
输出饱和电压	≤ 2 V
响应时间	20 μs
开关频率	25 kHz
延迟	出厂配置中无延迟 (可通过 IO-Link 进行编程)
亮/暗选择	自动标记/背景采集; 在动态采集中可通过电线或 IO-Link 选择
指示器	输出 LED (黄色) / 就绪 LED (绿色)
按钮	MARK, BACKGROUND
工作温度	-10 ... 55 °C
储存温度	-20 ... 70 °C
工作距离	9 mm
景深	± 3 mm
最小光斑尺寸	0.8 x 4 mm²
发射类型	蓝色 (465nm) / 绿色 (520nm) / 红色 (630nm) 自动选择
环境光抑制	符合 EN 60947-5-2
介电强度	1500 VAC, 1 min (电子设备与外壳之间)
绝缘电阻	> 20 MΩ, 500 VDC (电子设备与外壳之间)
振动	0.5 mm 振幅, 10...55 Hz 频率, 每个轴 (EN60068-2-6)
抗冲击性	每个轴 11 ms (30 G) 6 次冲击 (EN60068-2-27)
外壳材料	铝
镜头材料	PMMA
机械保护	IP67
连接	M12 5-针连接器
重量	最大 170 g.
AtEx 2014/34/EU	II 3G EX nA II T6; II 3D EX tD A22 IP67 T85 °C

WH 型号	
电源	12 ... 30 Vcc (极限值)
纹波	最大 2 Vpp
电流消耗 (不含输出电流)	24 Vcc 下最大不超过 30 mA (显示面板关闭)
输出	2 种输出类型, PNP 或推挽式 (可选); 最大 30 Vcc (短路保护) (PP 出厂配置)
输出电流	最大 100 mA (两种输出)
输出饱和电压	$\leq 2 \text{ V}$
响应时间	6 μs (MARK 模式), 10 μs (COLOR 模式)
开关频率	80 kHz (MARK 模式), 50 kHz (COLOR 模式)
抖动	3 μs (MARK 模式), 6 μs (COLOR 模式)
延迟	0...100 ms, 可通过显示面板或 IO-Link 进行编程 (出厂配置中无延迟)
亮/暗选择 /常开-常闭选择	自动标记/背景采集, 在动态采集中可通过电线或 IO-Link 选择常开-常闭 可通过 COLOR 模式中的菜单进行选择
指示器	4 位显示器 (绿色) /输出 LED (黄色) / READY LED (绿色) /DELAY LED (绿色)
按钮	
工作温度	-10 ... 55 °C
储存温度	-20 ... 70 °C
工作距离	9 mm
景深	$\pm 3 \text{ mm}$
最小光斑尺寸	0.8 x 4 mm ²
发射类型	蓝色 (465nm) /绿色 (520nm) /红色 (630nm) MARK 模式下自动选择
环境光抑制	符合 EN 60947-5-2
介电强度	1500 VAC, 1 min (电子设备与外壳之间)
绝缘电阻	> 20 MΩ, 500 VDC (电子设备与外壳之间)
振动	0.5 mm 振幅, 10...55 Hz 频率, 每个轴 (EN60068-2-6)
抗冲击性	每个轴 11 ms (30 G) 6 次冲击 (EN60068-2-27)
外壳材料	铝
镜头材料	玻璃
机械保护	IP67
连接	M12 5-针连接器
重量	最大 170 g.
AtEx 2014/34/EU	II 3G EX nA II T6; II 3D EX tD A22 IP67 T85° C

键锁功能 (专利保护)

键锁功能可禁用键盘, 以防意外更改传感器设置。

当传感器开启时, 键盘将锁定 (WH 型号中键锁 LED 熄灭)。如要启用, 按下 SET 按钮 (WH 型号) /MARK 按钮 (W 型号) 5 秒钟直到 LED 键锁亮起/READY LED 熄灭。

键盘在不活动 2 分钟后自动锁定。

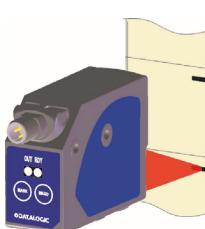
解锁键盘以进行传感器调整。



MARK 模式下的设置

检测 (标记-背景)

- 将标记置于传感器光斑前方然后按下 SET 按钮 (WH 型号) /MARK 按钮 (W 型号) 1 秒直到显示面板上显示 “SET1” 文本 (WH 型号) 或 READY LED 熄灭 (W 型号)。传感器交替发射红绿蓝光来检测标记。在此阶段避免标记移动。



- 将背景放置在传感器光斑的前方, 然后再次按下 SET 按钮 (WH 型号) /背景按钮 (W 型号)。传感器交替发射红绿蓝光来检测标记。在此阶段避免背景移动。



亮/暗模式由传感器自动选择。暗标记 - 亮背景 = 暗模式; 亮标记 - 暗背景 = 亮模式。

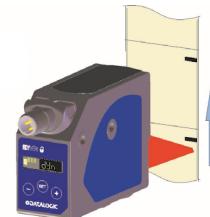
如果采集成功, 传感器返回正常工作状态。如果因对比度不足导致失败, 显示面板闪烁 “FAIL” 文本 (WH 型号) /READY LED 快速闪烁 (W 型号)。按下 SET 按钮 (WH 型号) / MARK 按钮 (W 型号) , 传感器返回到之前的设置。从头开始重复该步骤。



动态采集

使用动态采集来采集移动标记传感器检测标记和移动背景之间的对比度, 并自动设置阈值。必须先设置暗/亮模式。可通过输入或 IO-Link 进行设置。要通过输入选择暗模式, 请将暗/亮信号连接到 OV 或使其断开。要选择亮模式, 请将暗/亮信号连接到电源。

- 将传感器光斑放置在要检测的目标之前。WH 型号: 按下 SET 按钮直到 “dYn” 文本闪烁 (3 秒) 并保持按下。
W 型号: 按下 MARK 按钮, 直到 READY LED (绿色) 熄灭并再次亮起 (3 秒) 并保持按下。



- 要结束动态采集过程, 请释放 SET 按钮 (WH 型号) / MARK 按钮 (W 型号)。

如果采集成功, 传感器返回正常工作状态。如果因对比度不足导致失败, 显示器上闪烁 “Lo” 文本 (WH 型号) /READY LED 快速闪烁 (W 型号)。按下 SET 按钮重复该过程, 直到释放按钮 (“dYn” 文本在显示屏上闪烁) (WH 型号) / 按下 MARK 按钮重复该过程 (W 型号)。

按下 或 (WH 型号) /BKGD 按钮 (W 型号) , 传感器将返回之前的设置。



MARK 模式下的其他设置 (WH 型号)

切换阈值设置

切换阈值可以按照以下方式调整。

按下 后, 显示面板将显示 “AdJ” 文本。松开按钮, 阈值闪烁。



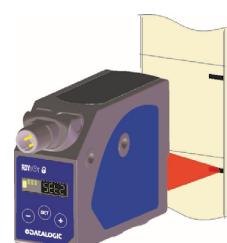
按下 或 可以增加或减少切换阈值。

按下 SET 按钮保存新的阈值。

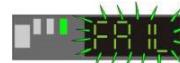
COLOR 模式下的设置 (WH 型号)

颜色检测

将颜色置于传感器光斑前部, 然后按下 SET 按钮, 直到出现 “SEtC” 文本。传感器检测到颜色。避免颜色移动, 直到 “SEtC” 文本消失。



如果采集成功, 则传感器返回正常功能。如果由于强度不足而失败, 则 “FAIL” 文本将在显示面板上闪烁。按下 SET 按钮, 传感器返回到之前的设置。从头开始重复该步骤。



公差设置

传感器公差可以按照以下方式调整。

按下 后, 显示器上显示 “Tolx” 释放按钮。



公差等级从 “toL0” 增加到 “toL9”。要检测轻微的色差, 请选择较低的公差级别。

按下 或 可以增加或减少公差值。

按下 SET 按钮保存新的公差值。

两种模式下的设定 (WH 型号)

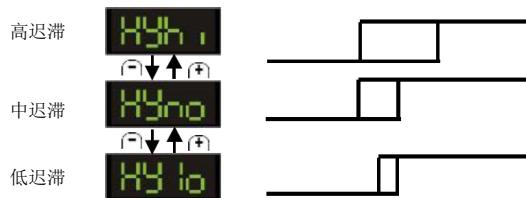
迟滞设置

传感器迟滞水平可进行调节。

按下 [+/-] 后，显示器上显示 “HYSt” 文本。



释放按钮时，先前设置的值将闪烁。



通过按下 [+/-] 或 [SET] 来进行水平切换。

按下 SET 按钮保存新的迟滞值。

参数设置 (WH 型号)

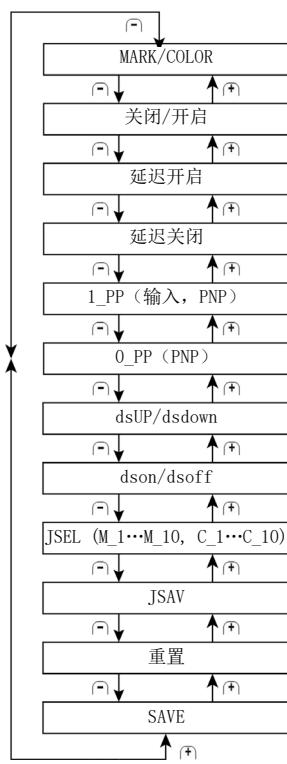
可以通过菜单更改一些参数：MARK/COLOR 模式，常开/常闭，DELAY ON，DELAY OFF，输出类型或输入选择，显示方向，电源开/关，作业选择和作业保存，RESET 和保存设定。

同时按下 [+/-] 和 [SET] ，直到出现 “Menu” 文本。



松开按钮，将首先显示 MARK/COLOR 参数。

按下 [+/-] 和 [SET] 将显示参数列表：



MARK/COLOR 设置

可在 MARK 或 COLOR 模式下配置传感器。

在参数菜单中选择 “Mark” 或 “Colr” 以切换模式。



按下 SET 可以切换先前设置的模式。

常开/闭设置 (仅在 COLOR 模式下)

COLOR 模式下的输出可以配置为常开或常闭。

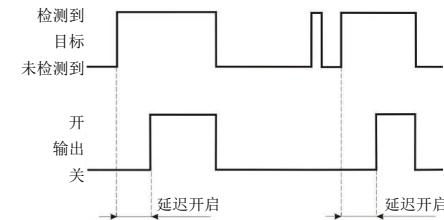
在参数菜单中选择 “OPEN” 或 “CLOS” 以切换输出。



按下 SET 切换到先前设置的模式。

延迟开启设置

DELAY ON 是参考标记进入检测区域后的输出延迟激活。延迟避免了对快速发生事件的检测。例如，阴影颜色（亮-暗-亮）的标记可以被检测到两次。



在参数菜单中选择 “dLOn” 以设置 DELAY ON 功能。

按下 SET 访问参数编程。

先前设置的延迟值出现在显示面板上。

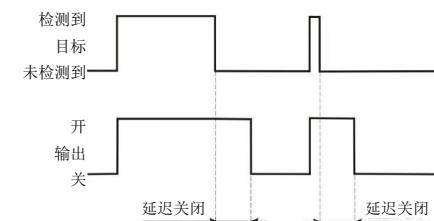


按下 [+/-] 或 [SET] ，延迟值以 1 ms 的间隔递增或递减，直到最大延迟 100 ms。

按住 [+/-] 或 [SET] 不放，延迟值将以增量间隔增加或减少。非零的延迟设置将以 DELAY LED 亮起来表示。按下 SET 确认该值并返回参数菜单。

延迟关闭设置

DELAY OFF 是参考标记离开检测区域后的输出延迟解除。延迟扩展了输出激活，允许实现更慢的系统与传感器连接，从而检测更短的脉冲。



在参数菜单中选择 “dLOF” 以设置 DELAY OFF 功能。

按下 SET 访问参数编程。

先前设置的延迟值出现在显示面板上。



按下 [+/-] 或 [SET] ，延迟值以 1 ms 的间隔递增或递减，直到最大延迟 100 ms。

按住 [+/-] 或 [SET] 不放，延迟值将以增量间隔增加或减少。非零的延迟设置将以 DELAY LED 亮起来表示。按下 SET 确认该值并返回参数菜单。

OUT_1 设置 (白线)

在显示面板上选择 1_PP 可以设置输出 1 的模式 (PP, PNP 或输入)。



按下 SET 按钮可以在三个选项之间切换。

OUT_0 设置 (黑线)

在显示面板上选择 0_PP 可以设置输出 0 的模式 (PP 或 PNP)。



按下 SET 按钮，切换到先前设置的 OUT_0 设置。

UP/DOWN 显示设置

在显示面板上选择 UP/DOWN 可以在显示面板上设置读取方向。

在参数菜单中选择 “dSUP” 或 “dSDn” 以设置 UP 或 DOWN 方向。



按下 SET 切换到先前设置的读取方向。

开/关显示面板设置

在正常运行期间，请关闭显示面板以节省功耗。

设置 OFF 模式，当传感器正常工作时，显示面板关闭。输入键盘命令后，显示面板将开启 10 秒钟。在参数菜单中选择 “dSOOn” 或 “dSOF” 以将显示面板设置为 ON 或 OFF。



按下 SET 切换到先前设置的显示模式。

选择作业

显示面板上的参数 JSEL 允许选择以前保存的设置。MARK 模式 (M_1...M_10) 和 COLOR 模式 (C_1...C_10) 最多可各选择 10 个作业。



按下 SET 按钮选择作业选择功能。按下 $\lceil + \rceil$ 或 $\lfloor - \rfloor$ 切换不同的作业。按下 SET 按钮选择显示面板上显示的作业。

保存作业

显示面板上的参数 JSAV 允许将传感器设置保存在一个作业中，可进行选择。MARK 模式 (M_1...M_10) 和 COLOR 模式 (C_1...C_10) 最多可各保存 10 个作业。



按下 SET 按钮选择作业保存功能。按下 $\lceil + \rceil$ 或 $\lfloor - \rfloor$ 切换不同的作业。按下 SET 按钮可将当前配置保存在显示面板上显示的作业中。

默认参数重置

在参数菜单中选择 “rSET” 以重置默认参数。



按下 SET 时，“rSET”文本闪烁。松开按钮，传感器将返回正常工作。

默认的重置参数为：

参数	显示面板	说明
发射	——	红色
模式	——	MARK
暗/亮模式	——	暗
阈值	2050	2050
迟滞	W3no	中（正常）
延迟开启和关闭	d 0	禁用
显示面板	dSOF dSUP	显示面板 UP 关闭
灵敏度	——	2



注意：如果在关闭传感器之前已重置参数，则在重新通电后，“rSET”文本将在显示面板上闪烁 3 秒钟，然后返回正常显示内容。

保存参数设置：“SAVE”

在菜单上选择 “SAVE” 以保存参数设置。



按下 SET 保存参数。释放按钮后，显示将恢复为正常显示内容。



注释：设置数据后，操作员使用 “SAVE” 或 “RESET” 功能退出菜单。如果未执行这些操作，则传感器从上次设置起 30 秒后将返回正常模式，并保存修改后的参数。

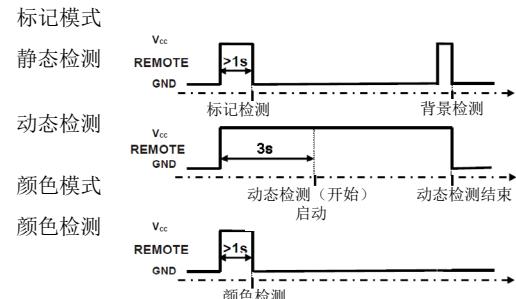
辅助功能（所有型号）

REMOTE 输入

REMOTE 信号无需使用 SET 按钮即可执行采集功能。通过 IO-Link 选择引脚 2 或 5。REMOTE 线连接到 +Vcc 等同于按下 SET 按钮。如果连接到 GND 或未连接，则等同于未按下 SET 按钮。

REMOTE	SET 按钮
0V	未按下
+Vcc	按下

REMOTE 线与 +Vcc 的连接持续时间决定了采集类型：



暗/亮输入（仅限 MARK 模式下的动态采集）

暗/亮信号允许选择暗/亮模式进行动态采集。通过 IO-Link 选择引脚 2 或 5。在亮模式下，输出在暗背景亮标记下激活。

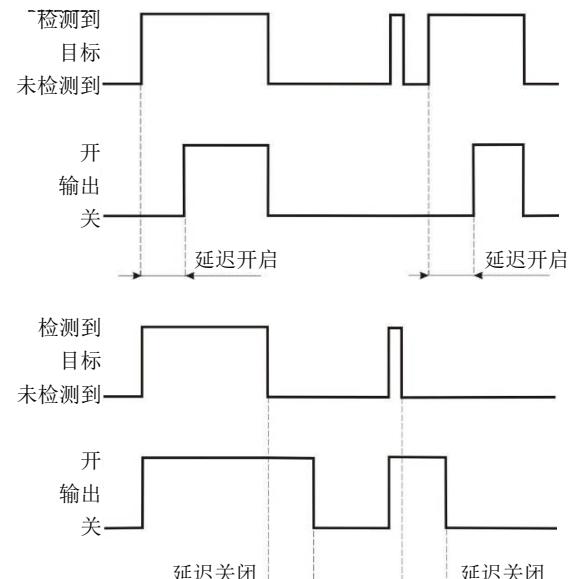
在暗模式下，输出在亮背景暗标记下激活。

暗/亮线与 Vcc 连接将设置为亮模式。如果连接到 0V 或未连接，则设置为暗模式。

暗/亮	模式
+Vcc	亮
0V	暗

通过输入的延迟设置（仅 W 型号）

通过 IO-Link 设置的延迟扩展了有效输出的最小持续时间，允许实现更慢的系统连接，从而检测更短的脉冲或活动状态延迟。



延迟激活
将延迟信号（灰线或白线）连接到电源。

延迟停用
将延迟信号（灰线或白线）连接到 0V 或保持断开状态。

输出过载

数字输出的过载通过显示面板上的 “_SC_” 文本表示 (WH 型号) / 就绪 LED 快速闪烁 (W 型号)。当过载情况消失后，传感器将恢复正常运行。



物理层

说明	
IO-Link 版本	1.1
SIO Modbus	是
最小周期时间	2.3 ms
传输速率	38.4 kb/s (COM2)
处理数据长度	PDIInput: 16 字节 PDOOutput: 未使用
M 序列能力	预操作: TYPE_0 操作: TYPE_2_1 ISDU: 支持

功能

说明	
数据存储	是
支持的访问锁	数据存储
配置文件特性	设备配置文件: 智能传感器 功能等级: 设备标识 功能等级: 切换信号通道 功能等级: 设备诊断 功能等级: 教学通道 功能等级: 示教单值

服务数据

以下 ISDU 将不会通过数据存储保存: 设备访问锁 (索引 0xC)、发射器状态 (索引 0x51)、设备温度阈值 (索引 0x53)、信号质量阈值 (索引 0x61)、TI 选择 (索引 0x3A)、负载作业 (索引 0x66)、选择作业编号 (索引 0x67)、振动阈值 (索引 0x4C)、倾角阈值 (索引 0x4F)、冲击阈值 (索引 0x55)、时间戳触发器 (索引 0xB8)、时间戳同步值 (索引 0xBB)。

系统参数

索引 (十进制)	参数对象名称	长度	值/范围	说明	数据类型	访问*
0x000C (12)	设备访问锁	2 个八位字节	位 1: 数据存储 (0 = 已解锁, 1 = 已锁定)	标准化设备锁定功能: 位 1: 数据存储 位 2: 本地参数化 (未使用) 位 3: 本地用户界面 (未使用) 位 4-15: 预留 位 0: 未使用	RecordT	R/W
0x000D (13)	配置文件特性	2 个八位字节 2 个八位字节 2 个八位字节 2 个八位字节 2 个八位字节 2 个八位字节	0x0001 0x8000 0x8001 0x8003 0x8004 0x8007	智能传感器配置文件 设备标识 切换信号通道 (SSC) 设备诊断 教学通道 示教单值	UIntegerT16 的 ArrayT	RO
0x000E (14)	PDIInput 描述符号	3 个八位字节 3 个八位字节 3 个八位字节 3 个八位字节	0x01.0x01.0x00 0x01.0x01.0x01 0x01.0x02.0x02 0x01.0x0C.0x04	SSC1 (OUT0) 信号质量 发射颜色 模拟信号	OctetStringT3 的 ArrayT	RO

标识参数

索引 (十进制)	参数对象名称	长度	子索引 (偏移)	值/范围	说明	数据类型	访问*	备注
0x0010 (16)	供应商名称	9 个八位字节		DATALOGIC	信息性	StringT	RO	
0x0011 (17)	供应商文本	19 个八位字节		强化您的视野		StringT	RO	
0x0012 (18)	产品名称	14 个八位字节		请参见 “时间戳表格”	详细产品名称	StringT	RO	
0x0013 (19)	产品 ID	5 个八位字节		请参见 “时间戳表格”	产品标识	StringT	RO	
0x0014 (20)	产品文本	15 个八位字节		对比度传感器	产品文本	StringT	RO	
0x0015 (21)	序列号	9 个八位字节			唯一序列号	StringT	RO	
0x0016 (22)	硬件版本	5 个八位字节		1.0.0		StringT	RO	
0x0017 (23)	固件版本	5 个八位字节		1.0.6		StringT	RO	
0x0018 (24)	应用场合指定标签	32 个八位字节		*** (默认)	用户定义的标签应用场合	StringT	R/W	保存在非易失性存储中
0x0019 (25)	功能标签	32 个八位字节		*** (默认)	设备功能标识的附加标签	StringT	R/W	保存在非易失性存储中
0x001A (26)	位置标签	32 个八位字节		*** (默认)	设备功能标识的附加标签	StringT	R/W	保存在非易失性存储中

观察/诊断参数								
索引 (十进制)	参数对象名称	长度	子索引 (偏移)	值/范围	说明	数据类型	访问*	备注
0x0028 (40)	处理数据输入	2 个八位字节			从 PDI 通道读取上一有效处理数据输入	设备指定	RO	
0x0045 (69)	红色采样模拟信号值	2 个八位字节		0...4095	红色发射模拟信号值 (COLOR 模式, 仅限 WH 型号)	UIntegerT	RO	
0x0046 (70)	绿色采样模拟信号值	2 个八位字节		0...4095	绿色发射模拟信号值 (COLOR 模式, 仅限 WH 型号)	UIntegerT	RO	
0x0047 (71)	蓝色采样模拟信号值	2 个八位字节		0...4095	蓝色发射模拟信号值 (COLOR 模式, 仅限 WH 型号)	UIntegerT	RO	
0x0052 (82)	设备温度	2 个八位字节 2 个八位字节 2 个八位字节 2 个八位字节 2 个八位字节	1(64) 2(48) 3(32) 4(16) 5(0)		设备实际温度 上电后设备最低温度 上电后设备最高温度 使用寿命中设备最低温度 使用寿命中设备最高温度	IntegerT IntegerT IntegerT IntegerT IntegerT	RO RO RO RO RO	使用寿命中的温度每小时保存在非易失性存储器中。
0x0053 (83)	设备温度阈值	2 个八位字节 2 个八位字节	1(16) 2(0)	-40..130 (-40 默认) -40..130 (130 默认)	设备最低温度阈值 设备最高温度阈值	IntegerT IntegerT	R/W	如果设备温度超过阈值，则会生成事件。
0x0057 (87)	工作小时	4 个八位字节 4 个八位字节 4 个八位字节	1(64) 2(32) 3(0)	0...(2^32)-1	工作小时：设备工作小时。用户不可重置。 工作小时维护：设备工作小时，通过系统命令“确认维护”重置。 上电工作小时：上电后小时数。	UIntegerT UIntegerT UIntegerT	RO RO RO	工作时间每小时保存在非易失性存储器中。
0x0024 (36)	设备状态	1 个八位字节		0x00 → 设备正常工作 0x01 → 所需维护 0x02 → 超出规格 0x03 → 功能性检查 0x04 → 故障	包含设备当前状态	UIntegerT	RO	
0x0025 (37)	详细设备状态	3 个八位字节			有关当前待定事件的信息。 实现为动态列表。	ArrayT OctetStringT	RO	
0x0051 (81)	发射器状态	1 个八位字节		0x00 = 发射器关闭 0x01 = 发射器开启	包含发射器当前状态	BooleanT	RO	
0x0059 (89)	RGB 选项	1 个八位字节		0x01 = 红色发射 (默认) 0x02 = 绿色发射 0x03 = 蓝色发射	选择发射类型	UIntegerT	R/W	保存在非易失性存储中
0x0060 (96)	信号质量 (%)	1 个八位字节		0..200%	指示标记检测期间与采集相比的信号质量	UIntegerT	RO	100 到 200 % 的值表示比采集阶段更好的信号
0x0061 (97)	信号质量阈值 (%)	1 个八位字节			信号质量阈值。当信号质量低于阈值时，将发送一次事件	UIntegerT	R/W	保存在非易失性存储中。 最大值取决于采集到的对比度。当设置了超出范围的值时，将自动选择最大值。
0x0062 (98)	教学质量 (%)	1 个八位字节		0..100%	采集到的对比度的质量	UIntegerT	RO	指示采集到的对比度有多宽 (100% 宽对比度)。较低的值指示较差的对比度，但光电管仍可以读取。

*RO = 只读, WO = 只写, R/W = 读/写

示教参数								
索引 (十进制)	参数对象名称	长度	子索引 (偏移)	值/范围	说明	数据类型	访问*	备注
0x003A (58)	TI 选择	1 个八位字节		0x00 = SSC1 (默认, C/Q 引脚和 DO 引脚)	示教通道选择 (易失)	UIntegerT	R/W	C/Q 和 DO 输出非等价。教学 SSC1 和教学 SSC2 相等
0x003B (59)	TI 结果	1 个八位字节	1(0) 2(4) 3(5)	示教状态 旗帜 SP1 TP1 旗帜 SP2 TP1	请参见 IO-Link 智能传感器配置文件	UIntegerT4 BooleanT BooleanT	RO	
0x003C (60)	SSC1 参数	2 个八位字节 2 个八位字节	1(16) 2(0)	220 .. 4000 未使用	切换阈值	UIntegerT	R/W	保存在非易失性存储中 *设置较高的阈值将工作距离逐渐减小到 0 (输出总是活动)。
0x003D (61)	SSC1 配置	1 个八位字节 1 个八位字节 2 个八位字节	1(24) 2(16) 3(0)	0x00: 高活动 0x01: 低活动 (默认) 0x01: 单点 (默认) 0 .. 2 迟滞 0 = 低 1 = 中 2 = 高	C/Q 引脚配置	UIntegerT UIntegerT UIntegerT	R/W	保存在非易失性存储中 *颜色模式 (仅限 WH 型号)： 子索引 1 0x00: 常闭 (默认) 0x01: 常开
0x003E (62)	SSC2 参数	2 个八位字节 2 个八位字节	1(16) 2(0)	220 .. 4000 未使用	切换阈值	UIntegerT	R/W	保存在非易失性存储中 *设置较高的阈值将工作距离逐渐减小到 0 (输出总是活动)。
0x003F (63)	SSC2 配置	1 个八位字节 1 个八位字节 2 个八位字节	1(24) 2(16) 3(0)	0x00: 高活动 0x01: 低活动 (默认) 0x01: 单点 (默认) 0 .. 2 迟滞 0 = 低 1 = 中 2 = 高	DO 引脚配置	UIntegerT UIntegerT UIntegerT	R/W	保存在非易失性存储中 *颜色模式 (仅限 WH 型号)： 子索引 1 0x00: 常闭 (默认) 0x01: 常开
0x005A (90)	灵敏度选项	1 个八位字节		0 .. 9 灵敏度	灵敏度	UIntegerT	R/W	保存在非易失性存储中 *灵敏度将在下一次采集期间设置。
0x0068 (104)	颜色阈值设置	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	220..4000 (2000 默认) 220..4000 (2000 默认) 220..4000 (2000 默认)	红色发射阈值 绿色发射阈值 蓝色发射阈值	UIntegerT UIntegerT UIntegerT	R/W	保存在非易失性存储中 *COLOR 模式, 仅限 WH 型号
0x0069 (105)	公差	1 个八位字节		0..9 (5 默认)	颜色模式公差 (仅限 WH 型号)	UIntegerT	R/W	保存在非易失性存储中

*RO = 只读, WO = 只写, R/W = 读/写

设备指定参数								
索引（十进制）	参数对象名称	长度	子索引（偏差）	值/范围	说明	数据类型	访问*	备注
0x0048 (72)	延迟设置	1 个八位字节 4 个八位字节 4 个八位字节	1(64) 2(32) 3(0)	0 = 无延迟（默认） 0x1 = 延迟关闭已启用 0x2 = 延迟开启已启用 0x3 = 延迟开启+关闭已启用 0 .. 15000 0 .. 15000	选择延迟模式 (关闭/开启/关闭-开启) 延迟开启值 [ms] 延迟关闭值 [ms]	UIntegerT UIntegerT UIntegerT UIntegerT	R/W R/W R/W R/W	保存在非易失性存储中。 最大值 15000 ms 设置“无延迟”后，延迟开启和关闭值都将重置为零。先设置延迟类型，然后设置值。
0x00B4 (180)	输出类型	1 个八位字节 1 个八位字节	1(8) 2(0)	0x01 = PNP 0x02 = 推挽式（默认） 0x01 = PNP 0x02 = 推挽式（默认） 0x03 = 输入	SIO 模式下的 C/Q 引脚输出类型 DO 引脚输出类型	UIntegerT UIntegerT	R/W R/W	保存在非易失性存储中
0x005B (91)	输入功能配置	1 个八位字节 1 个八位字节	1(8) 2(0)	白线功能 0: 无功能 1: 远程 2: 亮/暗选择（默认） 3: 延迟启用（仅限 W 型号） 灰线功能 0: 无功能 1: 远程（默认） 2: 亮/暗选择 3: 延迟启用（仅限 W 型号）	白线功能 灰线功能	UIntegerT UIntegerT	R/W R/W	保存在非易失性存储中 即便在输出配置参数（180）中将线缆设置为输出，白线功能依旧保持选中。
0x005E (94)	标记/颜色模式选择	1 个八位字节		0: 颜色模式（仅限 WH 型号）（默认） 1: 标记模式（仅限 WH 型号）	模式选择	UIntegerT	R/W	保存在非易失性存储中

标准命令									
索引（十进制）	命令名称	长度	值（十进制）	说明					访问*
0x0002 (2)	SP1 单值教学	1 个八位字节	0x41 (65)	颜色采集					WO
0x0002 (2)	SP1 教学 TP1	1 个八位字节	0x43 (67)	精细采集：标记检测（请参阅用户手册）					WO
0x0002 (2)	SP1 教学 TP2	1 个八位字节	0x44 (68)	精细采集：背景检测（请参阅用户手册）					WO
0x0002 (2)	教学动态启动	1 个八位字节	0x4B (75)	动态检测					WO
0x0002 (2)	教学动态结束	1 个八位字节	0x4F (79)	退出动态检测					WO
0x0002 (2)	恢复出厂设置	1 个八位字节	0x82 (130)	恢复出厂设置（设备访问锁、应用场合指定标签、功能标签、位置标签、设备温度阈值、TI 结果、SSC1 参数、SSC2 参数、SSC1 配置、SSC2 配置、延迟设置、输出类型、切换计数器设置、切换计数器值、时间戳触发器、时间戳列表、时间戳同步值、RGB 选择、信号质量阈值、教学质量、灵敏度、颜色阈值设置、输入功能配置、标记/颜色选择、作业负载、作业选择、振动/倾斜/冲击阈值、显示面板开启/关闭、公差、振动/倾斜自动调谐、切换计数器已到达阈值、时间戳新事件旗帜）。					WO
0x0002 (2)	确认维护	1 个八位字节	0xA5 (165)	重置维护参数（工作小时维护、上电后设备最低温度、上电后设备最高温度、设备状态、详细设备状态）					WO
0x0002 (2)	禁用/启用发射	1 个八位字节	0xB0 (176)	切换发射（启用/禁用发射）					WO
0x0002 (2)	启动/停止 Ping	1 个八位字节	0xAF (175)	通过黄色 LED 闪烁来识别传感器的功能					WO

*RO = 只读, WO = 只写, R/W = 读/写

事件					
时间代码（十进制）	事件名称	事件模式	事件类型	设备状态	备注
0x4220 (16928)	温度不足	出现/消失	报警	超出规格	
0x4210 (16912)	温度过高	出现/消失	报警	超出规格	
0x5100 (20736)	总电源故障	出现/消失	错误	失败	
0x8CAA (36010)	短路 - 检查安装	出现/消失	错误	失败	
0x8CA0 (36000)	振动超限	出现/消失	报警	超出规格	
0x8CA1 (36001)	检测到冲击	单次	报警	超出规格	
0x8CA2 (36002)	倾角超限	出现/消失	报警	超出规格	
0x8CA3 (36003)	信号质量不足	出现/消失	报警	超出规格	

设备版本收集

产品名称	产品 ID
TL-46-WH-815-PZ	90004
TL-46-W-815-PZ	90005

处理数据

处理数据输入							
字节 0							
7	6	5	4	3	2	1	0
模拟信号（标记模式下）				发射颜色		信号质量警报	SSC1 (C/Q 引脚)
模拟信号（标记模式下） MSB				字节 1			
7	6	5	4	3	2	1	0

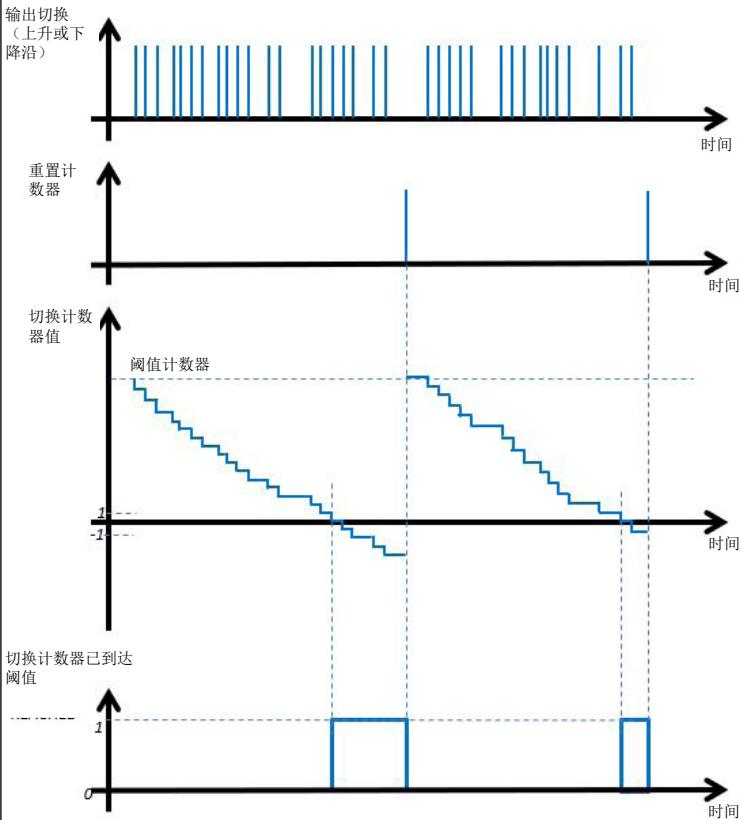
扩展参数

切换计数器								
索引 (十进制)	参数对象名称	长度	子索引 (偏移)	值/范围	说明	数据类型	访问*	备注
0x00B5 (181)	切换计数器已到达阈值	1 个八位字节		0: 假 1: 真	切换计数器已到达阈值的状态	布尔型	RO	
0x00B6 (182)	切换计数器设置	1 个八位字节 1 个八位字节 2 个八位字节	1(24) 2(16) 3(0)	0: 关（默认） 1: 计数器（静态） 2: 计数器（自动） 0: 输出上升沿 1: 输出下降沿 0-32767	模式 触发计数器 阈值计数器	UIntegerT 布尔型 UIntegerT	RW RW RW	保存在非易失性存储中。 在更改配置之前，请停止或重置运行中的计数器，然后使用“设置计数器”(Set counter) 命令重新启用计数器。 *上升和下降沿参考 DO 引脚。
0x00B7 (183)	开关计数器值	1 个八位字节 2 个八位字节	1(16) 2(0)	0: 向上计数 1: 向下计数 2: 计数无效（默认） -32,768..32,767	计数方向 切换计数器值	UIntegerT IntegerT	RO RO	

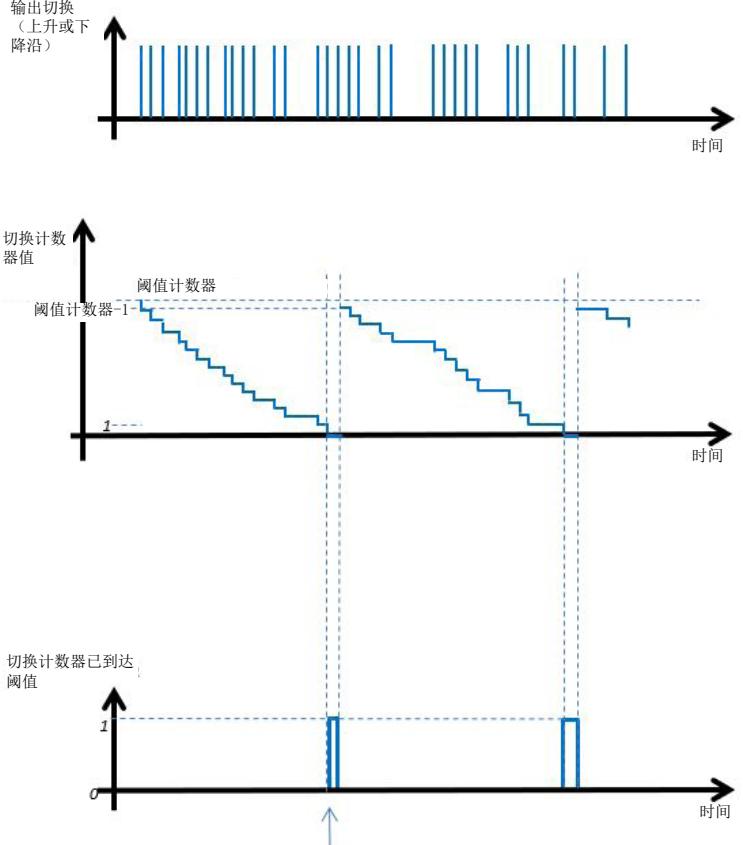
索引 (十进制)	参数对象名称	长度	值 (十进制)	说明	访问
0x0002 (2)	重置计数器	1 个八位字节	0xA0(160)	重置计数器值，切换计数器阈值已超出（仅限静态模式）	WO
0x0002 (2)	启用向上计数器	1 个八位字节	0xA1(161)	启用计数器并启动向上计数	WO
0x0002 (2)	启用向下计数器	1 个八位字节	0xA2(162)	启用计数器并启动向下计数	WO
0x0002 (2)	停止/恢复计数器	1 个八位字节	0xA3(163)	冻结计数功能（忽略所有换向：计数无效）或恢复计数功能	WO

向下计数

计数器模式 - 静态

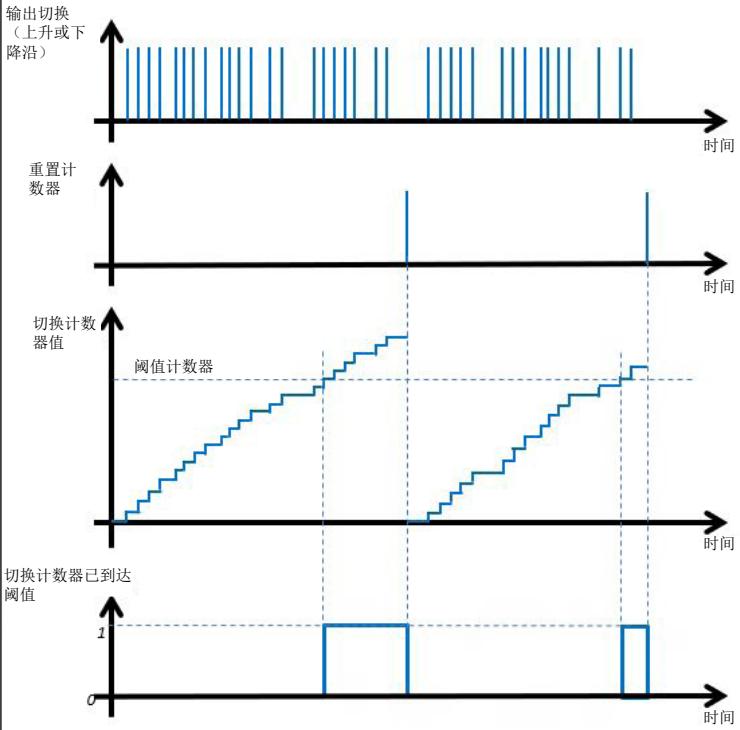


计数器模式 - 自动

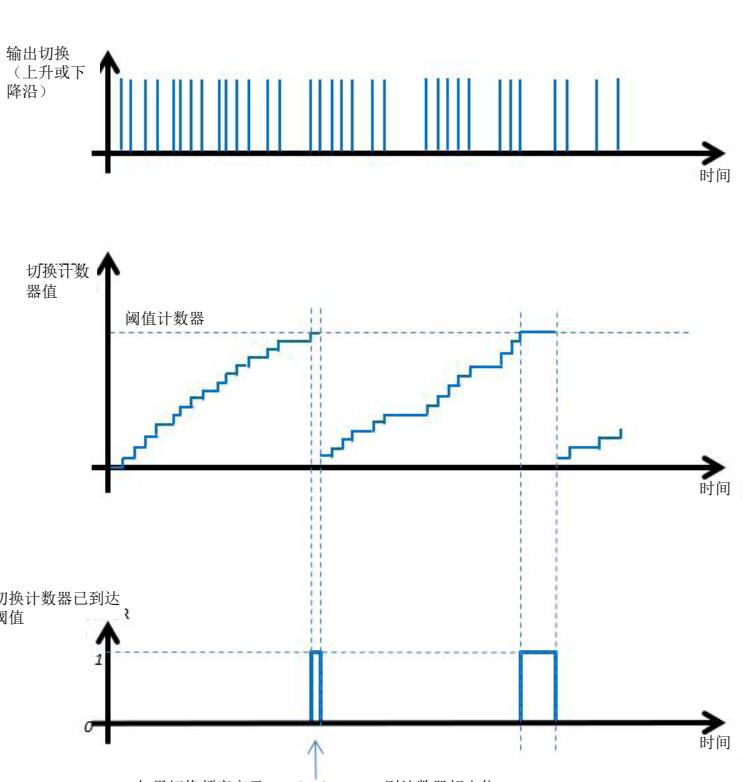


向上计数

计数器模式 - 静态



计数器模式 - 自动



时间戳								
索引 (十进制)	参数对象名称	长度	子索引 (偏差)	值/范围	说明	数据类型	访问*	备注
0x00B8 (184)	时间戳触发	1 个八位字节 1 个八位字节 1 个八位字节 1 个八位字节 1 个八位字节	1(32) 2(24) 3(16) 4(8) 5(0)	0x00: 已禁用 (默认) 0x01: 已启用	EVENT_1 (ID=0x01): 切换计数器已到达阈值 EVENT_2 (ID=0x02): 温度不足 (事件模式出现) EVENT_3 (ID=0x03): 温度过高 (事件模式出现) EVENT_4 (ID=0x04): 短路 EVENT_5 (ID=0x05): 电源故障	UIntegerT	R/W	生成时间戳的事件
0x00B9 (185)	时间戳特征	1 个八位字节 1 个八位字节	1(8) 2(0)	3 [ms] 1 [ms]	最大时间戳延迟时间 时间戳分辨率	UIntegerT UIntegerT	RO RO	事件和时间戳之间的延迟 (取决于硬件)。通常为 3ms
0x00BA (186)	时间戳列表	70 个八位字节		*请参见时间戳表格中的规格		ArrayType OctetStringT	RO	上一次时间戳触发从上电或时间戳同步值开始计数
0x00BB (187)	时间戳同步值	2 个八位字节 1 个八位字节 1 个八位字节 1 个八位字节 1 个八位字节	1(32) 2(24) 3(16) 4(8) 5(0)	0...999 0...59 0...59 0...23 0...255	毫秒 秒 分钟 小时 天	UIntegerT	R/W	时间戳同步命令的重置值
0x00BC (188)	时间戳新事件旗帜	1 个八位字节		0: 假 1: 真	时间戳新事件发信号	布尔型	RO	

索引 (十进制)	命令名称	长度	值 (十进制)	说明	访问*
0x0002 (2)	重置时间戳应用	1 个八位字节	0xB1(177)	重置时间戳应用 (时间戳触发、时间戳列表和时间戳新事件旗帜)	WO
0x0002 (2)	重置时间戳	1 个八位字节	0xB2(178)	重置时钟计数器	WO
0x0002 (2)	时间戳同步	1 个八位字节	0xB3(179)	从时间戳同步值 (索引 187) 开始计数。此命令将清除时间戳列表并重置时间戳新事件旗帜	WO
0x0002 (2)	重置时间戳新事件旗帜	1 个八位字节	0xB4(180)	重置时间戳新事件旗帜	WO

时间戳表格

ID 事件	天	小时	分钟	秒	毫秒	
上次发生 EVENT_X	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6 Byte7
	Byte8	Byte9	Byte10	Byte11	Byte12	Byte13 Byte14
	Byte15	Byte16	Byte17	Byte18	Byte19	Byte20 Byte21

首次发生 EVENT_X	Byte64	Byte65	Byte66	Byte67	Byte68	Byte69 Byte70

作业功能允许保存配置并在以后检索。

作业								
索引 (十进制)	参数对象名称	长度	子索引 (偏差)	值/范围	说明	数据类型	访问*	备注
0x0066 (102)	加载作业	1 个八位字节		1..20 (WH) 1..10 (W)	加载与所选编号对应的作业 1..10 在标记模式下选择 10 种配置, 11...20 在颜色模式下选择 10 种配置	UIntegerT	R/W	保存在非易失性存储中
0x0067 (103)	选择作业编号	1 个八位字节		1..20 (WH) 1..10 (W)	选择下一保存操作的作业编号 1..10 在标记模式下选择 10 种配置, 11...20 在颜色模式下选择 10 种配置	UIntegerT	R/W	保存在非易失性存储中

索引 (十进制)	命令名称	长度	值 (十进制)	值/范围	说明	访问*
0x0002 (2)	作业保存	1 个八位字节	0x00AA (170)		使用参数 0x67 (103) 将当前作业设置和示教值保存到指示的作业位置	W0



振动、倾斜和冲击 (WH 型号)

索引 (十进制)	参数对象名称	长度	子索引 (偏差)	值/范围	说明	数据类型	访问*	备注
0x0049 (73)	最大使用寿命振动值	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	0..8,000	使用寿命内 X 轴上的最大振动值 (以 mg 计) 使用寿命内 Y 轴上的最大振动值 (以 mg 计) 使用寿命内 Z 轴上的最大振动值 (以 mg 计)	IntegerT	RO	保存在非易失性存储中
0x004A (74)	振动值	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	0..8,000	指示 X 轴上实际振动值 (以 mg 计) 指示 Y 轴上实际振动值 (以 mg 计) 指示 Z 轴上实际振动值 (以 mg 计)	UIntegerT	RO	
0x004B (75)	振动自动调谐值	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	0..8,000	指示 X 轴上自动调谐采集期间振动值 (以 mg 计) 指示 Y 轴上自动调谐采集期间振动值 (以 mg 计) 指示 Z 轴上自动调谐采集期间振动值 (以 mg 计)	UIntegerT	RO	
0x004C (76)	振动阈值	2 个八位字节		1,000..7,874	振动阈值 [mg]	UIntegerT	R/W	如果实际振动值超过阈值，则会生成事件
0x004D (77)	倾斜值	1 个八位字节 1 个八位字节 1 个八位字节	1(16) 2(8) 3(0)	0..90	指示沿 X 轴的实际转角 指示沿 Y 轴的实际转角 指示沿 Z 轴的实际转角	IntegerT	RO	
0x004E (78)	倾斜自动调谐值	1 个八位字节 1 个八位字节 1 个八位字节	1(16) 2(8) 3(0)	0..90	指示自动调谐采集期间测量的沿 X 轴转角 指示自动调谐采集期间测量的沿 Y 轴转角 指示自动调谐采集期间测量的沿 Z 轴转角	IntegerT	RO	
0x004F (79)	倾斜阈值	1 个八位字节		0..90	倾斜阈值 [度]	UIntegerT	R/W	如果实际倾斜值超过阈值，则会生成事件
0x0054 (84)	冲击值	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	0..8,000	指示 X 轴方向上一次超出阈值的冲击值 (以 mg 计) 指示 Y 轴方向上一次超出阈值的冲击值 (以 mg 计) 指示 Z 轴方向上一次超出阈值的冲击值 (以 mg 计)	IntegerT	RO	
0x0055 (85)	冲击阈值	2 个八位字节		1,000..7,874	冲击阈值 [mg]	UIntegerT	R/W	如果冲击值超过阈值，则会生成事件
0x0056 (86)	最大使用寿命冲击值	2 个八位字节 2 个八位字节 2 个八位字节	1(32) 2(16) 3(0)	0..8,000	使用寿命内 X 轴上的最大冲击值 (以 mg 计) 使用寿命内 Y 轴上的最大冲击值 (以 mg 计) 使用寿命内 Z 轴上的最大冲击值 (以 mg 计)	IntegerT	RO	保存在非易失性存储中

索引 (十进制)	命令名称	长度	值 (十进制)	说明	访问*
0x0002 (2)	加速度计自动调谐	1 个八位字节	0xA4(164)	对振动和倾斜值进行“拍照”	W0

WARRANTY

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EN**CE Compliance**

CE marking states the compliance of the product with essential requirements listed in the applicable European directive. Since the directives and applicable standards are subject to continuous updates, and since the manufacturer promptly adopts these updates, therefore the EU declaration of conformity is a living document. The EU declaration of conformity is available for competent authorities and customers through the manufacturer's commercial reference contacts. Since April 20th, 2016 the main European directives applicable to the products require inclusion of an adequate analysis and assessment of the risk(s). This evaluation was carried out in relation to the applicable points of the standards listed in the Declaration of Conformity. These products are mainly designed for integration purposes into more complex systems. For this reason, it is under the responsibility of the system integrator to do a new risk assessment regarding the final installation.

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

IT**Conformità CE**

La marcatura CE dichiara la conformità del prodotto con i requisiti essenziali elencati nella direttiva europea applicabile. Essendo le direttive e le normative applicabili soggette a continui aggiornamenti, e dato che il costruttore adotta immediatamente tali aggiornamenti, la dichiarazione di conformità CE è un documento vivo. La dichiarazione di conformità CE è disponibile per le autorità competenti e i clienti tramite i contatti commerciali di riferimento al costruttore. Dal 20 aprile 2016, le principali direttive europee applicabili ai prodotti richiedono l'inserimento di un'adeguata analisi e valutazione del/i rischi(o). Tale valutazione è stata realizzata in relazione ai punti applicabili delle normative elencate nella Dichiarazione di Conformità. Questi prodotti sono progettati principalmente per essere integrati in sistemi più complessi. Per questo motivo, l'integratore di sistemi è responsabile della realizzazione di una nuova valutazione dei rischi riguardante l'installazione finale.

Attenzione

Si tratta di un prodotto di Classe A. In un ambiente domestico questo prodotto può generare interferenze radio. In tal caso è necessario prendere le dovute misure.

DE**EG-Konformität**

Die CE-Kennzeichnung bestätigt die Konformität des Produkts mit den wesentlichen Anforderungen der geltenden europäischen Richtlinien. Da die Richtlinien und anwendbaren Normen laufend aktualisiert werden und der Hersteller diese Aktualisierungen umgehend übernimmt, ist die EU-Konformitätserklärung ein fortschreitendes Dokument. Die EU-Konformitätserklärung ist für zuständige Behörden und Kunden über die Handelskontakte von dem Hersteller erhältlich. Seit dem 20. April 2016 erfordern die wichtigsten für diese Produkte anwendbaren Europäischen Richtlinien die Integration einer angemessenen Analyse und der Bewertung der Risiken. Diese Bewertung wird in Bezug auf die anwendbaren Punkte der in der Konformitätserklärung aufgelisteten Normen durchgeführt. Diese Produkte werden in erster Linie für die Integration in komplexere Systeme ausgelegt. Aus diesem Grund liegt es in der Verantwortung des Systemintegrators, eine neue Risikobewertung der Endinstallation vorzunehmen.

Warnung

Dies ist ein Produkt nach Klasse A. In einem häuslichen Umfeld kann dieses Produkt Funkstörungen auslösen, gegebenenfalls hat der Benutzer dann angebrachte Maßnahmen zu ergreifen.

FR**Conformité CE**

La marque CE indique la conformité du produit aux exigences essentielles énoncées dans la directive européenne applicable. Les directives et les normes applicables sont sujettes à des mises à jour de manière continue et le constructeur adopte rapidement ces mises à jour ; la déclaration de conformité UE est par conséquent un document vivant. La déclaration de conformité UE est disponible aux autorités compétentes et aux clients à travers les interlocuteurs commerciaux de référence des constructeurs. Depuis le 20 Avril 2016 les principales directives européennes applicables aux produits exigent l'inclusion d'une analyse et d'une évaluation adéquates du/des risque/s. Cette évaluation a été réalisée en relation avec les points applicables des normes indiquées dans la Déclaration de Conformité. Ces produits sont principalement conçus à des fins d'intégration dans des systèmes plus complexes. Pour cette raison, il est de la responsabilité de l'intégrateur de système d'effectuer une nouvelle évaluation des risques concernant l'installation finale.

Avertissement

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit peut provoquer des interférences radio auquel cas l'utilisateur peut se trouver dans l'obligation de prendre des mesures adéquates.

ES**Conformidad CE**

La marca CE establece la conformidad del producto con los requisitos fundamentales enumerados en la directiva europea aplicable. Debido a que las directivas y normativas aplicables están sujetas a actualización continua, como el constructor adopta estas actualizaciones de inmediato, la declaración de conformidad UE es un documento activo. La declaración de conformidad UE está disponible para las autoridades competentes y para los clientes a través de los contactos comerciales de referencia del constructor. Desde el 20 de abril de 2016, las principales directivas europeas aplicables a los productos exigen la inclusión de un idóneo análisis y evaluación de riesgos. Esta evaluación ha sido efectuada sobre los puntos aplicables de la normativa indicada en la Declaración de Conformidad. Estos productos han sido diseñados a fin de ser integrados en sistemas más complejos. Por ello, es responsabilidad del integrador del sistema efectuar una nueva evaluación de riesgos relativa a la instalación final.

Advertencia

Este es un producto de Clase A. En un entorno doméstico, este producto puede causar interferencias radioeléctricas; en este caso, el usuario debería tomar medidas adecuadas.

NL**EU-conformiteitsverklaring**

Met de CE-markering wordt verklaard dat het product voldoet aan de essentiële eisen zoals vermeld in de toepasselijke Europese richtlijnen. Daar de richtlijnen en de toepasselijke normen onderhevig zijn aan voortdurende aanpassingen, en de fabrikant deze aanpassingen direct toepast, is de EU-conformiteitsverklaring een levend document. De EU-conformiteitsverklaring is beschikbaar voor bevoegde autoriteiten en klanten via contactgegevens voor commerciële referentie. Sinds 20 april 2016 vereisen de belangrijkste Europese richtlijnen de inclusie van een adequate risicoanalyse- en beoordeling. Deze beoordeling werd uitgevoerd met betrekking tot de toepasselijke punten van de normen zoals vermeld in de Conformiteitsverklaring. Deze producten zijn voornamelijk ontworpen voor integratie in complexere systemen. Om deze reden is het de verantwoordelijkheid van de systeemintegrator om een nieuwe risicobeoordeling uit te voeren met betrekking tot de definitieve installatie.

Waarschuwing

Dit is een Klasse A product. In een woonomgeving kan dit product radiostoring veroorzaken, in welk geval de gebruiker mogelijk verplicht is om adequate maatregelen te treffen.



TL46-A Contrast sensor

INSTRUCTION MANUAL

CONTROLS

OUT LED (yellow)

The red LED indicates the output status.



READY LED (green)

During functioning, the green LED permanently ON indicates a normal operating condition; fast blinking indicates an output overload condition.

INDICATORS ARROWS (orange)

The arrows show the direction of knob rotation to adjust threshold.

LIGHT/DARK SWITCH

Switch to select LIGHT/DARK operation mode.

SENSITIVITY ADJUSTMENT KNOB

The knob rotation change the sensors sensitivity. Clockwise rotation → Increase sensitivity.

Clockwise rotation → Decrease sensitivity.

See the "SETTING" paragraph for setup procedure indications.

INSTALLATION

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

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

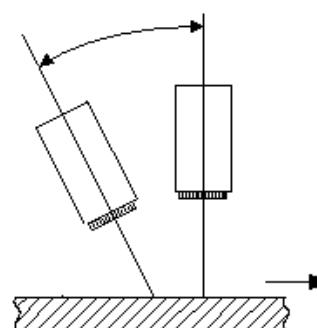
The connector can be oriented at five different positions, rotating the block. The position chosen is guaranteed by a mechanical blocking system.

The rotation can be carried-out even after sensor installation as the connector block is completely self-contained inside the housing.

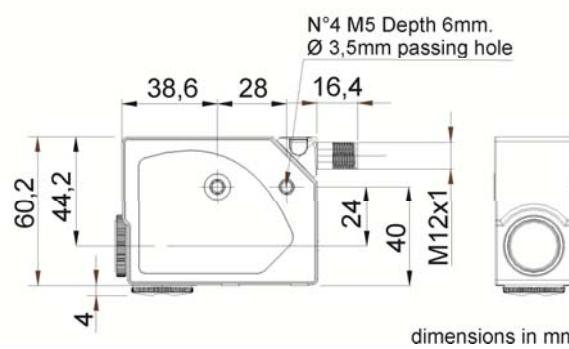
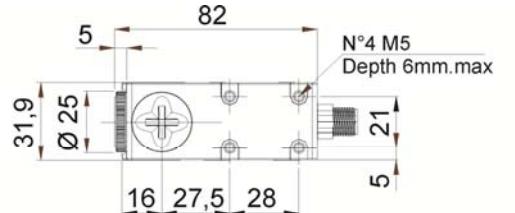


The operating distance is measured starting from the lens front face. The reading direction can be changed inverting the cap and lens.

Mark detection on a reflective surface is improved adjusting the beam direction to 5° ... 20° from surface axis.



DIMENSIONS

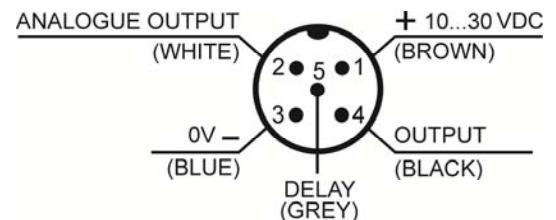


dimensions in mm

TECHNICAL DATA

Power supply:	10...30 VDC limit values Class 2 (Type 1) UL508
Ripple:	2 Vpp max.
Current consumption (output current excluded):	40 mA max. @ 24 VDC
Output:	PNP o NPN 30 VDC max. (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	25 µs
Switching frequency:	20 kHz
Analogue output:	0 ... 5 V 2.2 V on white target 90% ± 10%
Analogue output impedance:	2.2 kΩ (short-circuit protection)
Delay:	0 / 20 ms selectable via delay input
Light-dark selection:	switch
Indicators:	OUT LED (yellow) / READY LED (green) / INDICATORS ARROWS (orange)
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:	TL46-A-4xx: WHITE (400-700 nm) TL46-A-6xx: RED (630 nm)
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 shock for each axis (EN60068-2-27)
Housing material:	aluminium
Lens material:	mirror
Mechanical protection:	IP67
Connections:	M12 5-pole connector
Weight:	170 g. max. II 3G EX nA II T6 ; II 3D EX tD A22 IP67 T85°C
AtEx 2014/34/EU:	

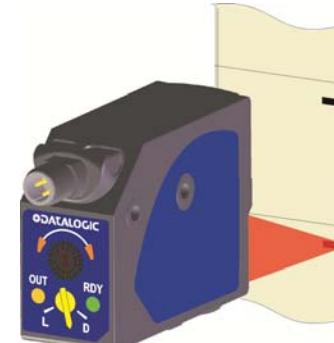
CONNECTIONS



SETTING

SENSITIVITY ADJUSTMENT

- Select the function mode through light-dark switch.
- The setting procedure is faster rotating the sensitivity knob quickly (application with high contrasts), otherwise rotate the knob slowly to detect difficult contrast.
- Position mark in front of the sensor light spot and rotate the sensitivity adjustment knob until the OUT LED is ON. The orange arrows indicate the direction of rotation. When the sensor reach the maximum/minimum sensitivity the indicator arrows blinks.
- During adjustment phase the READY LED (green) turns OFF.



LIGHT mode



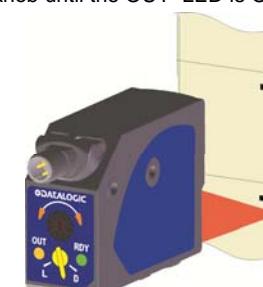
Rotate the sensitivity adjustment knob in clockwise direction until OUT LED turns ON.

DARK mode



Rotate the sensitivity adjustment knob in counterclockwise direction until OUT LED turns ON.

Position the background in front of the sensor light spot and rotate the sensitivity adjustment knob until the OUT LED is ON.



LIGHT mode



Rotate the sensitivity adjustment knob in counterclockwise direction until OUT LED turns ON.

DARK mode



Rotate the sensitivity adjustment knob in clockwise direction until OUT LED turns ON.

Rotate the knob in opposite direction for ½ the number of turns required to detect the background. Position mark in front of the sensor light spot to verify the correct commutation of the output.

At the end of the setting fase the READY LED (green) turns ON: the sensors had set the new sensitivity.

LIGHT mode



Rotate the sensitivity adjustment knob in counterclockwise direction.

DARK mode



Rotate the sensitivity adjustment knob in clockwise direction.

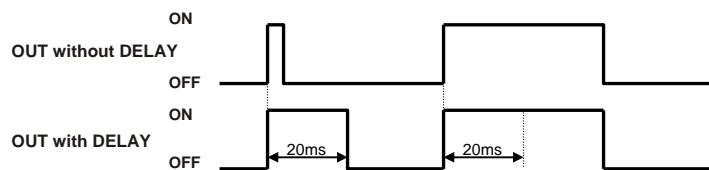
ACCESSORY FUNCTIONS

ANALOGUE output

The analogue output supplies a voltage proportional to the signal received by the sensor. The voltage supplied is 0 ÷ 5V. The maximum voltage is obtained with reflective objects; on 90% white the voltage is equal to 2.2 V.

DELAY SETTING

The DELAY extends to 20ms the minimum duration of the active output allowing the slower interfacing systems to detect shorter pulses.



Delay activation

Connect Delay signal (grey wire) to power supply.

Delay deactivation

Connect Delay signal (grey wire) to 0V or leave unconnected.

OUTPUT OVERLOAD

The digital output overload is signalled by the rapid blinking of the READY LED.

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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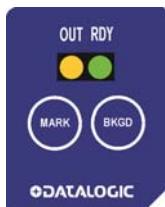
TL46-W
Contrast sensor

INSTRUCTION MANUAL

CONTROLS

OUT LED (yellow)

The red LED indicates the output status.



READY LED (green)

During functioning, the green LED permanently ON indicates a normal operating condition; fast blinking indicates an output overload condition.

MARK PUSH-BUTTON

The mark detection procedure is activated by pressing MARK push-button.

BKGD PUSH-BUTTON

The background detection procedure is activated by pressing BKGD push-button.

See the "SETTING" paragraph for setup procedure 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, rotating the block.

The position chosen is guaranteed by a mechanical blocking system.

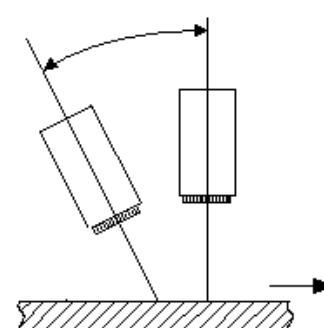
The rotation can be carried-out even after sensor installation as the connector block is completely self-contained inside the housing.



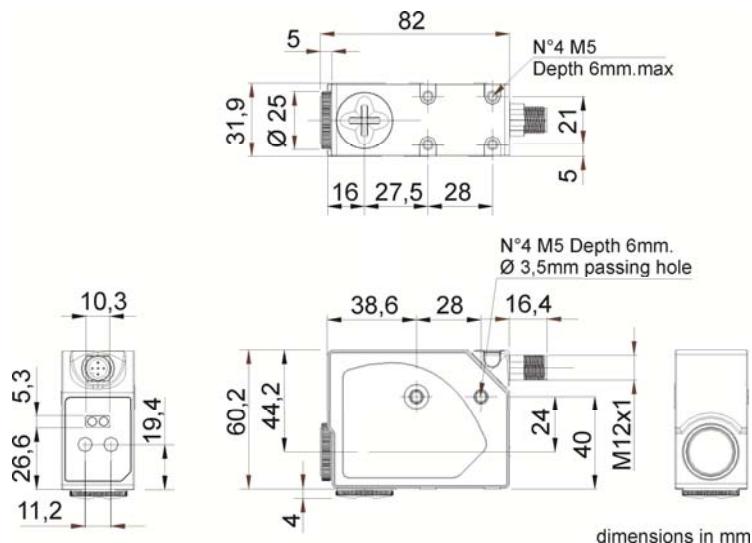
The operating distance is measured starting from the lens front face.

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.



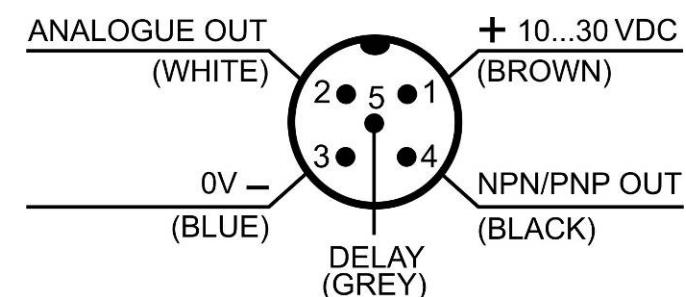
DIMENSIONS



TECHNICAL DATA

Power supply:	10...30 Vdc limit values
Ripple:	2 Vpp max.
Current consumption (output current excluded):	50 mA max. @ 24Vcc
Output:	1 PNP/NPN selectable output 30 Vdc max. (short-circuit protection) (PNP is the default configuration)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	33 µs
Switching frequency:	15 kHz
Analogue output:	0 ... 5 V
Analogue output impedance:	2.2 kΩ (short-circuit protection)
Delay:	0 / 20 ms selectable via delay input
Dark/light selection	automatic
Indicators:	OUT LED (yellow) / READY LED (green)
Operating temperature:	-10 ... 55 °C
Storage temperature:	-20 ... 70 °C
Electric shock protection:	double insulation <input type="checkbox"/>
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 shock for each axis (EN60068-2-27)
Housing material:	aluminium
Lens material:	PMMA
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 tD A22 IP67 T85°C

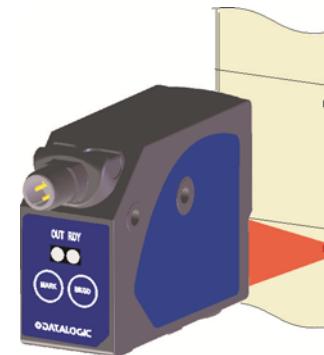
CONNECTIONS



SETTING

DETECTION (MARK-BACKGROUND)

- Position mark in front of the sensor light spot and press MARK push-button until the READY LED (green) turns OFF.
- The sensor detects the mark alternating the red, green and blue emissions. Avoid mark movements during this phase.

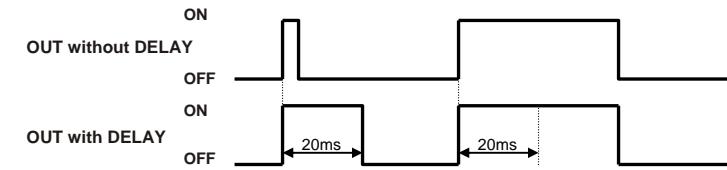


- Position the background in front of the sensor light spot and press BKGD push-button. The sensor detects the mark alternating the red, green and blue emissions. Avoid background movements during this phase.



DELAY SETTING

The DELAY extends to 20ms the minimum duration of the active output allowing the slower interfacing systems to detect shorter pulses.



Delay activation

- Connect Delay signal (grey wire) to power supply.

Delay deactivation

- Connect Delay signal (grey wire) to 0V or leave unconnected.

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 READY LED is permanently ON, the detection is successful.

If the LED blinks slowly, the detection has failed due to insufficient contrast.

The sensor returns to the previous setting by pressing MARK or BKGD push-button.

Repeat the procedure from the beginning.

PNP/NPN OUTPUT SETTING

The digital output can be PNP or NPN configured.

- To change output press MARK and BKGD contemporaneously for 2 sec.

- The setting is signalled by the status change of the READY LED.

If the READY LED turns off after a 1 sec. pressure, release push-buttons only after the re-powering of the LED (2sec).

- The output setting is signalled by the READY LED. Releasing the push-buttons, the READY LED blinks once if the PNP output is set, blinks twice if the NPN output is set.

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INSTRUCTION MANUAL

CONTROLS

OUT LED (yellow)

The yellow LED indicates the output status.

DISPLAY (green 4-digit display)

In MARK mode the display indicates a value relative to the light quantity diffused by the target, in color mode on the display 'Col' text is written.

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 (D)

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

KEYLOCK LED (K)

The green KEYLOCK LED ON isn't active.

SET, + and - PUSH-BUTTONS

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

INSTALLATION

The sensor can be positioned by means of the two Ø3.5mm housing's holes or using 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.

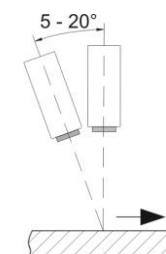
The rotation can be carried out even after sensor installation as the connector block is completely self-contained inside the housing.



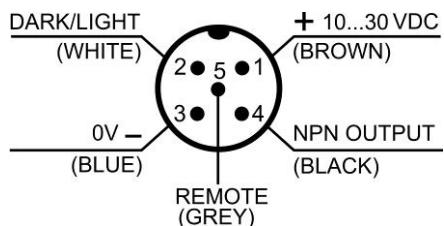
The operating distance is measured starting from the lens front face.

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



SETTING IN MARK MODE

DETECTION (MARK-BACKGROUND)

- Position mark in front of the sensor light spot and press the **SET** push-button until the 'SEt1' text appears.
The sensor detects the mark alternating the red, green and blue emissions.
Avoid mark movements until the 'SEt2' 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.

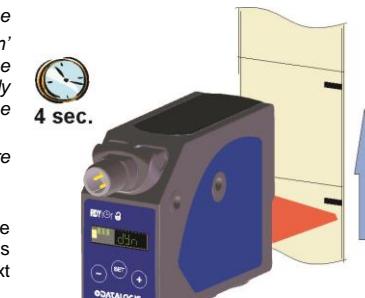
Repeat the procedure from the beginning.



DYNAMIC SETTING

Use the dynamic setting to detect moving target. The sensor sets automatically the threshold value during target movement. The DARK/LIGHT mode must be set first. 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' text 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 as follows.

The 'AdJ' text appears pressing **+** on the display. Releasing the push-button, the threshold value blinks.

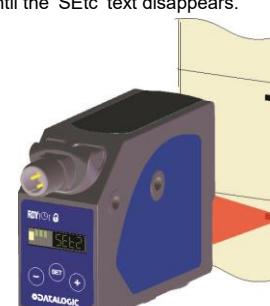


The switching threshold is increased or reduced by pressing **+** or **-**. Press **SET** to save the new threshold value.

SETTING IN COLOR MODE

COLOR DETECTION

- Position the color in front of the sensor light spot and press the **SET** push-button until the 'SEtC' text appears.
The sensor detects the color.
Avoid color movements until the 'SEtC' text disappears.



- If the detection has been successful, the sensor returns to normal functioning. If it fails due to insufficient intensity, 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.



SWITCHING TOLERANCE SETTING

The sensor tolerance can be adjusted as follows.

The 'Tol' text appears pressing **+** on the display. Releasing the push-button.



The tolerance level increases from "tol0" to "tol9". To detect small chromatic differences, select lower tolerance levels.

The Tolerance value is increased or reduced by pressing **+** or **-**.

Press **SET** to save the new Tolerance value.

SETTING IN ALL MODES

HYSTERESIS SETTING

The sensor hysteresis level is adjusted.

The 'HYSt' text appears pressing green **-** on the display.



When the push-button is released, 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 returns to normal operation when the overload condition disappears.

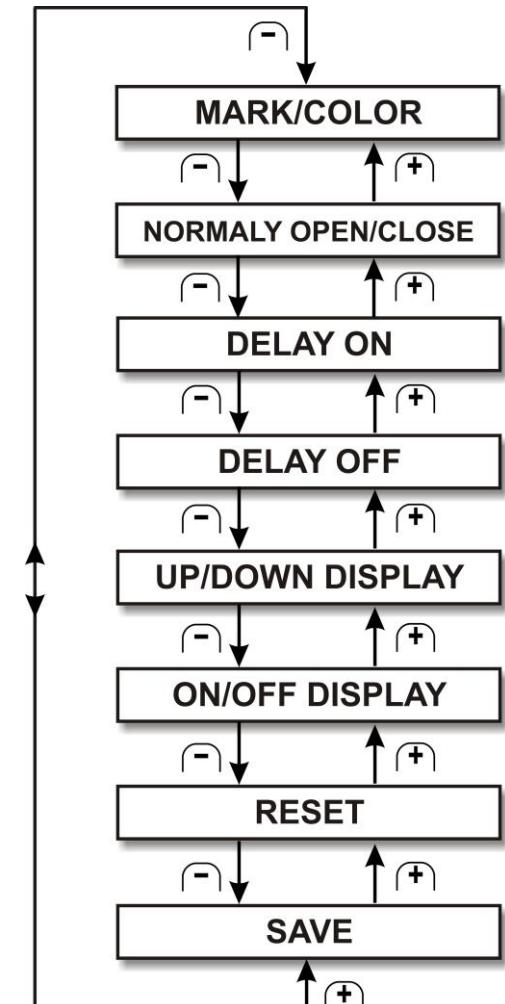


PARAMETER SETTING

Some parameters can be changed entering the menu: MARK/COLOR mode, NORMALLY OPEN/CLOSE, DELAY ON, DELAY OFF, display orientation and powering on/off, RESET and save setting.
Press **+** and **-** together until the 'Menu' text appears.



Releasing the push-button, the first Mark/Clor parameter appears.
The parameter list is shown by pressing **+** and **-**.



MARK/COLOR setting

The sensor can be configured in MARK or COLOR mode. Select 'Mark' or 'Col' in the parameter menu to switch the mode.



The previously set mode switches by pressing **SET**.

NORMALLY OPEN/CLOSE setting (only in COLOR mode)

The output in color mode can be configured as normally open or normally close.

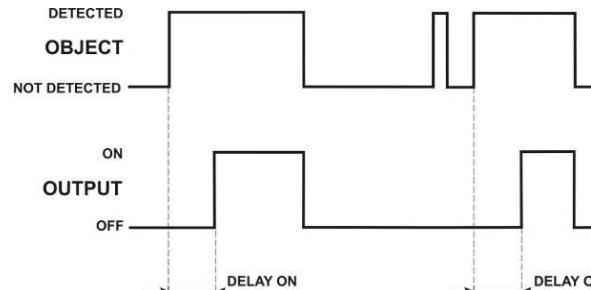
Select 'OPEN' or 'CLOS' in the parameter menu to switch the output.



The previously set output switches by pressing **SET**.

DELAY ON setting

The DELAY ON represents the output delay activation after the reference mark has entered 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.



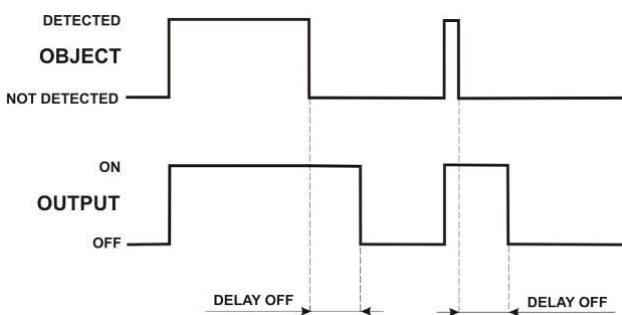
Select "dLOn" in the parameter menu to set the DELAY ON function.
The parameter programming is accessed by pressing **SET**.
The previously set delay value appears on the display.

dLOn **SET** **0 100**

Pressing **+** or **-** the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping **+** or **-** pressed, the delay value is increased or decreased by incremental steps. 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.

dLOF **SET** **0 100**

Pressing **+** or **-** the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping **+** or **-** pressed, the delay value is increased or decreased by incremental steps. 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.

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.

dSUP **SET** **dSDn**

Press **SET** to switch the reading direction previously set.

ON/OFF DISPLAY setting

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

dSOOn **SET** **dSOF**

Press **SET** to switch the display mode previously set.

RESET of default parameters

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

rSET

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
MODE	_____	MARK
DARK/LIGHT mode	_____	Light
Threshold	2050	2050
Hysteresis	Hysto	Medium (Normal)
Delay ON and OFF	d 0	Deactivated
Display	dSOOn 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

SAVE

The parameters are saved pressing **SET**. The display returns to normal visualisation after releasing the button.

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

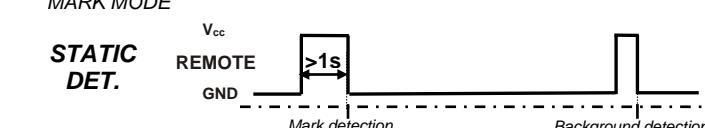
REMOTE INPUT

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.

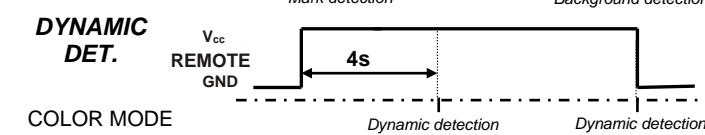
REMOTE	SET PUSH-BUTTON
0V	NOT PRESSED
+Vdc	PRESSED

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

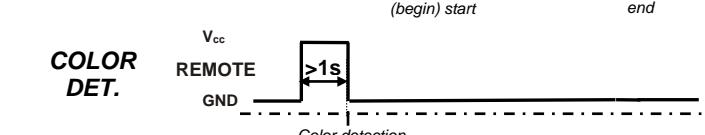
MARK MODE



DYNAMIC DET.



COLOR MODE



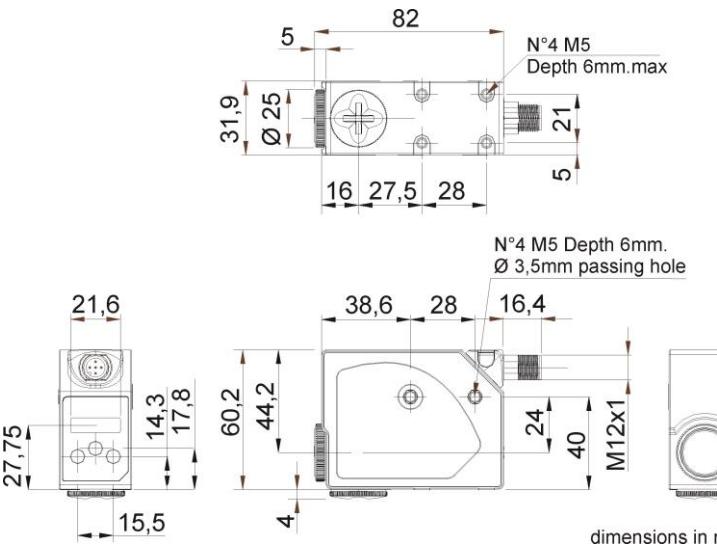
DARK/LIGHT input (only in MARK mode)

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

DIMENSIONS



dimensions in mm

TECHNICAL DATA

Power supply:	10...30 Vdc limit values
Ripple:	2 Vpp max.
Current consumption (output current excluded):	35 mA max. @ 24 Vdc
Output:	NPN output 30 Vdc max. (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	16 µs (MARK mode), 100µs (COLOR mode)
Switching frequency:	30 kHz (MARK mode), 10KHz (COLOR mode)
Indicators:	4-digit display (GREEN) / OUT LED (YELLOW) / READY LED (GREEN) / DELAY 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, selectable via MENU in the color detection
Operating temperature:	-10 ... 55 °C
Storage temperature:	-20 ... 70 °C
Electric shock protection:	double insulation <input checked="" type="checkbox"/>
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) in MARK mode the selection is automatic
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 tD A22 IP67 T85°C

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

The sensors are NOT safety devices, therefore they MUST NOT be used in the safety control of the machines where installed.

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TL46-WE...PNP

INSTRUCTION MANUAL

CONTROLS

OUT LED (yellow)

The yellow LED indicates the output status.

DISPLAY (green 4-digit display)

In MARK mode the display indicates a value relative to the light quantity diffused by the target, in color mode on the display 'Col' text is written.

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 (D)

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

KEYLOCK LED (K)

The green KEYLOCK LED ON isn't active.

SET, + and - PUSH-BUTTONS

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

INSTALLATION

The sensor can be positioned by means of the two Ø3.5mm housing's holes or using 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.

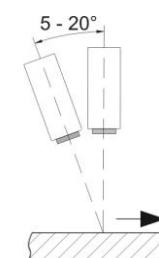
The rotation can be carried out even after sensor installation as the connector block is completely self-contained inside the housing.



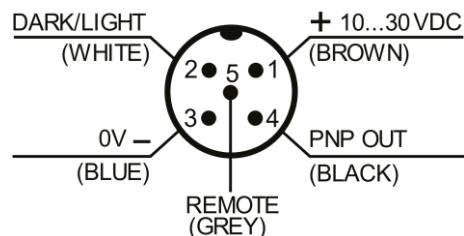
The operating distance is measured starting from the lens front face.

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



SETTING IN MARK MODE

DETECTION (MARK-BACKGROUND)

- Position mark in front of the sensor light spot and press the **SET** push-button until the 'SEt1' text appears.
The sensor detects the mark alternating the red, green and blue emissions.
Avoid mark movements until the 'SEt2' 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 must be set first. 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' text 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 as follows.

The 'AdJ' text appears pressing **+** on the display. Releasing the push-button, the threshold value blinks.

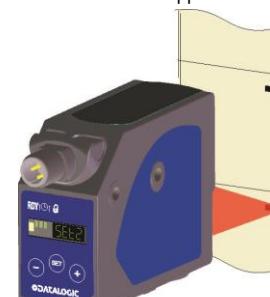


The switching threshold is increased or reduced by pressing **+** or **-**. Press **SET** to save the new threshold value.

SETTING IN COLOR MODE

COLOR DETECTION

- Position the color in front of the sensor light spot and press the **SET** push-button until the 'SEtC' text appears.
The sensor detects the color.
Avoid color movements until the 'SEtC' text disappears.



- If the detection has been successful, the sensor returns to normal functioning. If it fails due to insufficient intensity, 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.



SWITCHING TOLERANCE SETTING

The sensor tolerance can be adjusted as follows.

The 'Tol' text appears pressing **+** on the display. Releasing the push-button.



The tolerance level increases from "tol0" to "tol9". To detect small chromatic differences, select lower tolerance levels.

The Tolerance value is increased or reduced by pressing **+** or **-**.

Press **SET** to save the new Tolerance value.

SETTING IN ALL MODES

HYSTERESIS SETTING

The sensor hysteresis level is adjusted.

The 'HYSt' text appears pressing green **-** on the display.



When the push-button is released, 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 returns to normal operation when the overload condition disappears.



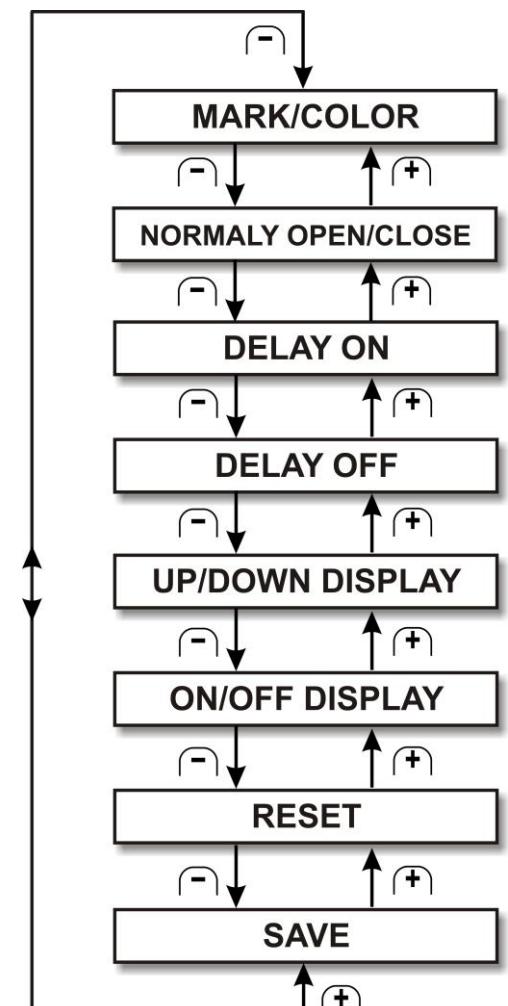
PARAMETER SETTING

Some parameters can be changed entering the menu: MARK/COLOR mode, NORMALLY OPEN/CLOSE, DELAY ON, DELAY OFF, display orientation and powering on/off, RESET and save setting.

Press **+** and **-** together until the 'Menu' text appears.



Releasing the push-button, the first Mark/Colr parameter appears. The parameter list is shown by pressing **+** and **-**.



MARK/COLOR setting

The sensor can be configured in MARK or COLOR mode. Select 'Mark' or 'Col' in the parameter menu to switch the mode.



The previously set mode switches by pressing **SET**.

NORMALLY OPEN/CLOSE setting (only in COLOR mode)

The output in color mode can be configured as normally open or normally close.

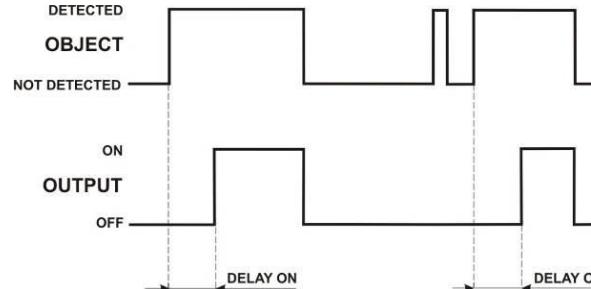
Select 'OPEN' or 'CLOS' in the parameter menu to switch the output.



The previously set output switches by pressing **SET**.

DELAY ON setting

The DELAY ON represents the output delay activation after the reference mark has entered 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.



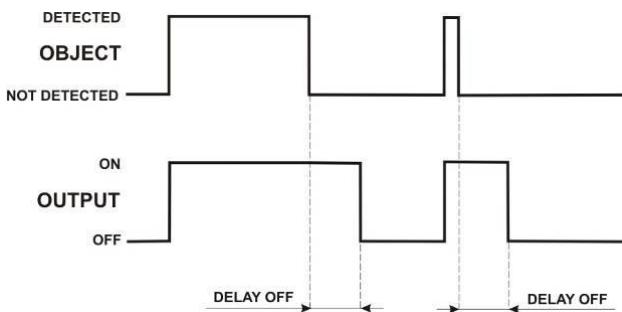
Select "dLOn" in the parameter menu to set the DELAY ON function.
The parameter programming is accessed by pressing **SET**.
The previously set delay value appears on the display.

dLOn **SET** 0 100

Pressing **+** or **-** the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping **+** or **-** pressed, the delay value is increased or decreased by incremental steps. 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.

dLOF **SET** 0 100

Pressing **+** or **-** the delay value is increased or decreased by one step of 1 ms until a maximum delay of 100ms. Keeping **+** or **-** pressed, the delay value is increased or decreased by incremental steps. 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.

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.

dSUP **SET** dSDn

Press **SET** to switch the reading direction previously set.

ON/OFF DISPLAY setting

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

dSOOn **SET** dSOF

Press **SET** to switch the display mode previously set.

RESET of default parameters

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

rSET

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
MODE	_____	MARK
DARK/LIGHT mode	_____	Light
Threshold	2050	2050
Hysteresis	Hysto	Medium (Normal)
Delay ON and OFF	d 0	Deactivated
Display	dSOOn 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

SAVE

The parameters are saved pressing **SET**. The display returns to normal visualisation after releasing the button.

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

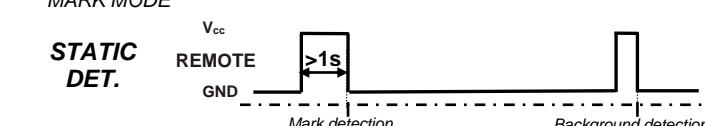
REMOTE INPUT

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.

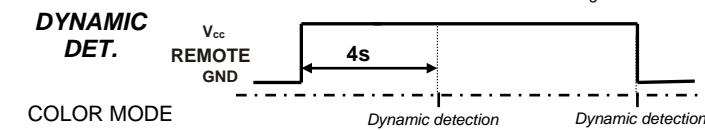
REMOTE	SET PUSH-BUTTON
0V	NOT PRESSED
+Vdc	PRESSED

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

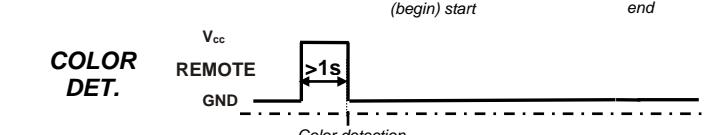
MARK MODE



DYNAMIC DET.



COLOR MODE



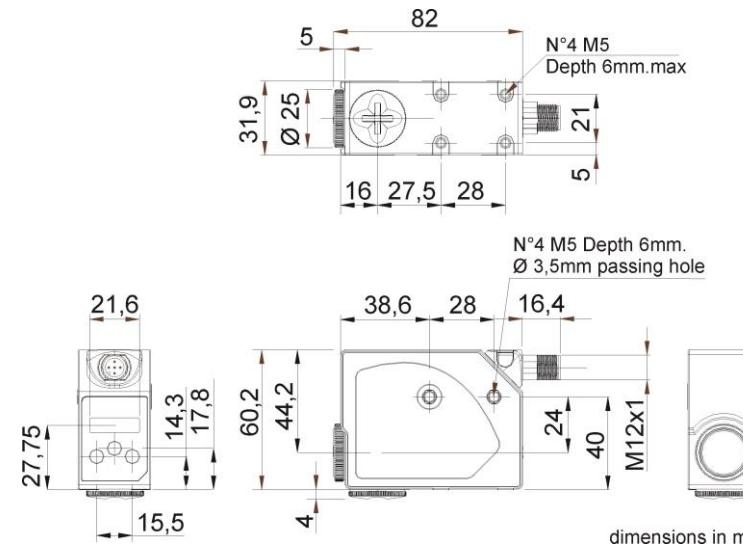
DARK/LIGHT input (only in MARK mode)

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

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:	PNP output 30 Vdc max. (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	16 µs (MARK mode), 100µs (COLOR mode)
Switching frequency:	30 kHz (MARK mode), 10KHz (COLOR mode)
Indicators:	4-digit display (GREEN) / OUT LED (YELLOW) / READY LED (GREEN) / DELAY 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, selectable via MENU in the color 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) in MARK mode the selection is automatic
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 tD A22 IP67 T85°C

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

The sensors are NOT safety devices, therefore they MUST NOT be used in the safety control of the machines where installed.

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Helpful links at 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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