DATALOGIC

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.

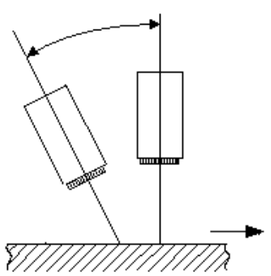
See the "SETTING" paragraph for setup procedure indications.

INSTALLATION

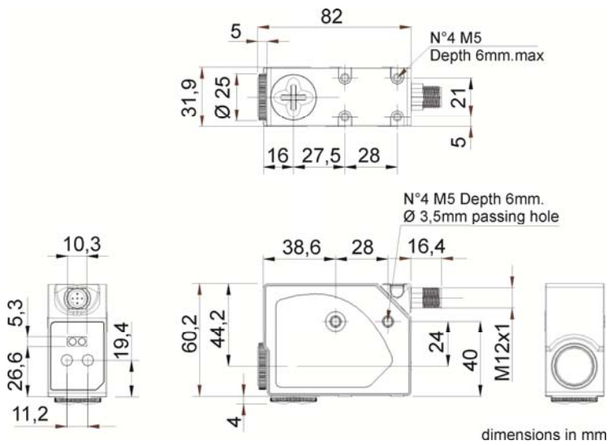
The sensor can be positioned by means the two Ø3.5mm housing's holes using or threaded M5 holes with 6mm max. depth.
Warning: the use of excessively long screws can damage the product.

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.



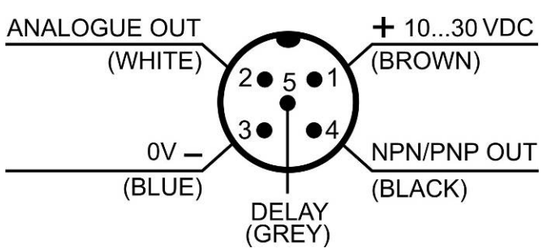
DIMENSIONS



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 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
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 ⧈
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

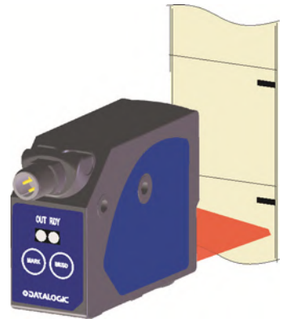


SETTING

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.*



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.*

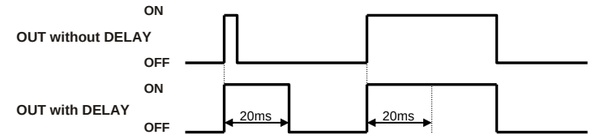
1 sec pressure of MARK and BKGD	*10 sec pressure of MARK and BKGD*	*Release of push-buttons*
● ●	● ●	✸

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

ACCESSORY FUNCTIONS

ANALOGUE output
The analogue output supplies a voltage proportional to the signal received by the sensor. The voltage supplied is 0 ÷ 5 V.
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.*

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

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**.

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.

826003065 Rev.G

DATALOGIC

TL46-WL

Contrast sensor

INSTRUCTION MANUAL

CONTROLS

OUT LED *(yellow)*
The yellow 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.

DELAY LED *(orange)*
The orange DELAY LED ON indicates the timing function activation on the digital output.

KEYLOCK LED *(orange)*
The orange KEYLOCK LED ON indicates the active keyboard status.

BARGRAPH
The switching threshold level is signalled on the bargraph.

(SET) PUSH-BUTTON *(bianco)*
The detection procedure is activated by pressing the (SET) push-button.

(+) *(red)* and (−) *(green)* PUSH-BUTTONS
The threshold adjustment procedure is activated by pressing the (+) and (−) push-buttons.

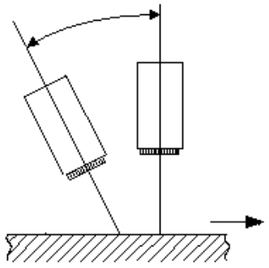
See the "SETTING" paragraph for the correct adjustment phase indications.

INSTALLATION

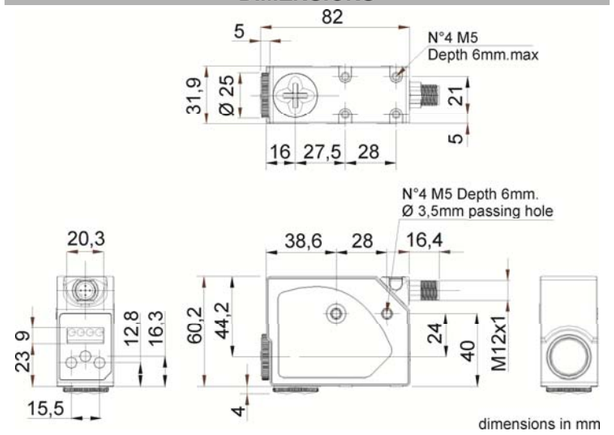
The sensor can be positioned by means the two Ø3.5mm housing's holes using or threaded M5 holes with 6mm max. depth.
Warning: the use of excessively long screws can damage the product.

The connector can be oriented at five different positions, 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

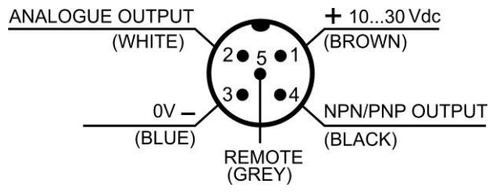


TECHNICAL DATA

Power supply:	10…30 Vdc (limit values)
Ripple:	2 Vpp max.
Current consumption *(output current excluded)*:	85 mA max @ 24 Vdc with bargraph ON in threshold adjustment mode, 55 mA max @ 24 Vdc with bargraph OFF in normal functioning mode
Output:	1 selectable PNP/NPN output 30 Vdc max. *(short-circuit protection)* *(default PNP configuration)*
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	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 / 20ms selectable default configuration without delay
Dark/light selection:	Automatic
Indicators:	OUT LED (yellow) / READY LED (green) DELAY LED and KEYLOCK LED (orange) 5-segment bargraph
Operating temperature:	-10 … 55 °C
Storage temperature:	-20 … 70 °C
Electric shock protection:	double insulation ⧈
Operating distance:	9 mm
Depth of field:	± 3 mm
Minimum spot dimension:	1.5x5 mm
Emission type:	Blue (465 nm) / Green (520 nm) / Red (630 nm) with automatic selection
Ambient light rejection:	According to EN 60947-5-2
Vibrations:	0.5 mm amplitude, 10 … 55 Hz frequency, for each axis (EN60068-2-6)
Shock resistance:	11 ms (30 G) 6 shock 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.

CONNECTIONS



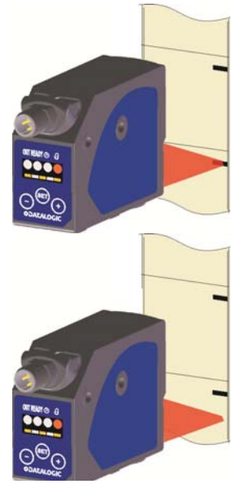
SETTING

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

DETECTION (MARK-BACKGROUND)

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

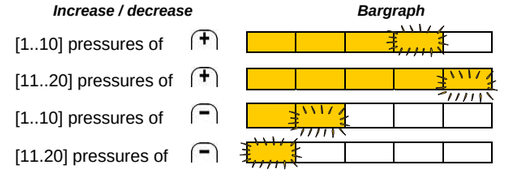


The DARK/LIGHT operating mode is automatically selected by the sensor.
Dark mark - light background = dark mode; light mark - dark background = light mode.

If the 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 white (SET) push-button.
Repeat the procedure from the beginning.

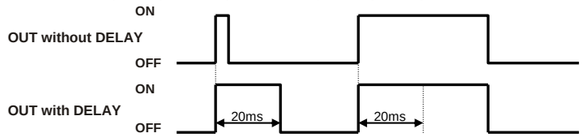
SWITCHING THRESHOLD SETTING
The sensor switching threshold is adjusted by pressing the (+) or (−) push-buttons (respectively increasing or decreasing the value).
At the first pressure of the (+) or (−) push-buttons, the first three LEDs of the bargraph turn ON.

Increasing or decreasing the threshold, the right or left LEDs blink with a frequency proportional to the difference from the initial threshold value.



To save the new threshold value press white (SET) push-button or wait 30 sec. from last change (automatic save).

DELAY SETTING
The DELAY extends to 20ms the minimum duration of the active output allowing the slower interfacing systems to detect shorter pulses.
The active delay is signalled by the corresponding orange LED ON.



DELAY ACTIVATION

- *Press (+) and (−) contemporaneously for 2 sec. until the DELAY LED turns ON.*

DELAY DEACTIVATION

- *Press (+) and (−) contemporaneously for 2 sec. until the DELAY LED turns OFF.*

PNP/NPN OUTPUT SETTING
The digital output can be PNP or NPN configured.

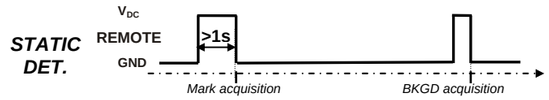
- *To change output press red (+) push-button and green (−) push-button contemporaneously for 10 sec.*
- *The setting is signalled by the status change of the DELAY LED.*
  If the delay is active after pressing the push-buttons for 2 seconds, the DELAY LED turns OFF, release the push-buttons only after LED re-powering (10 sec.).
  If the delay is deactivated after pressing the push-buttons for 2 seconds, the DELAY LED turns ON, release the push-buttons only after LED turning off (10sec.).
- *The output setting is signalled by the KEYLOCK LED. Releasing the push-buttons, the KEYLOCK LED blinks once if the PNP output is set, blinks twice if the NPN output is set.*

	2 sec. pressure of (+) and (−)	*10 sec. pressure of (+) and (−)*	*Release of push-buttons*
Delay ON	● ● ● ●	● ● ● ●	● ● ● ✸
Delay OFF	● ● ● ●	● ● ● ●	● ● ● ✸

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

ACCESSORY FUNCTIONS

REMOTE INPUT
The REMOTE signals carries-out the acquisition functions without using the white (SET) push-button.
The REMOTE wire connected to +Vdc is equal to pressing the white (SET) push-button. Whereas, if the REMOTE wire is connected to GND or not connected it is equal to not pressing the white (SET) push-button.



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

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

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826003006 Rev.H

TL46-WLF

Contrast sensor

INSTRUCTION MANUAL

CONTROLS

OUT LED (yellow)
The yellow LED indicates the output status.

DISPLAY (green 4-digit display)
During normal functioning, the display indicates a value relative to the light quantity diffused by the target.

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

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

KEYLOCK LED
The green KEYLOCK LED ON indicates the active keyboard status.

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

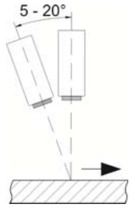
See the “SETTING” paragraph for the correct adjustment phase indications.

INSTALLATION

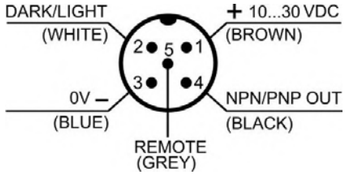
The sensor can be positioned by means the two Ø3.5mm housing’s holes using or threaded M5 holes with 6mm max. depth.
Warning: the use of excessively long screws can damage the product.

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

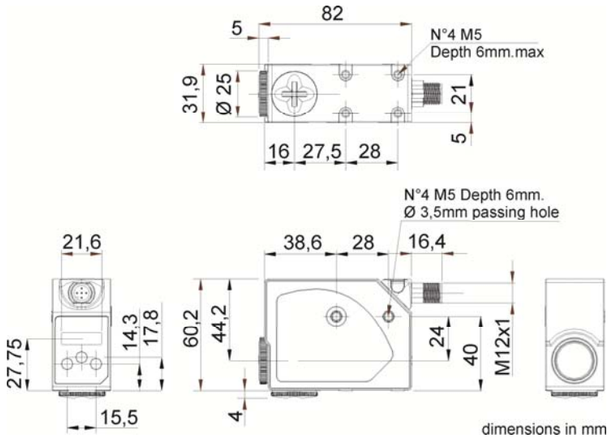
The operating distance is measured starting from the lens front face.
The reading direction can be changed inverting the cap and lens.
Mark detection on a reflective surface is improved adjusting the beam direction to 5° … 20° from surface axis.



CONNECTIONS



DIMENSIONS



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

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

SETTING

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

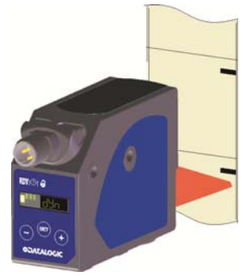
DETECTION (MARK-BACKGROUND)

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

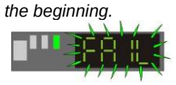
Avoid mark movements until the ‘SEt2’ text appears and the OUT LED blinking.

- *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.



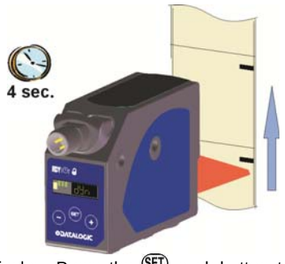
If the detection has been successful, the sensor returns to normal functioning. If it fails due to insufficient contrast, the ‘FAIL’ test blinks on the display. Press the SET push-button and the sensor returns to the previous setting.
Repeat the procedure from the beginning.



DYNAMIC SETTING

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

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



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

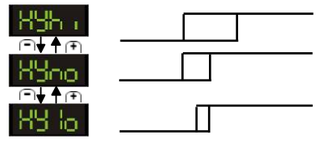
SWITCHING THRESHOLD SETTING
The sensor switching threshold can be adjusted in this manner.
The ‘AdJ’ text appears pressing + on the display. Releasing the push-button, the threshold value blinks.

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

HYSTERESIS SETTING
The sensor hysteresis level is adjusted.
The ‘HYSt’ text appears pressing green – on the display.

Releasing the push-button the previously set value blinks.

HIGH HYSTERESIS
NORMAL HYSTERESIS
LOW HYSTERESIS



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

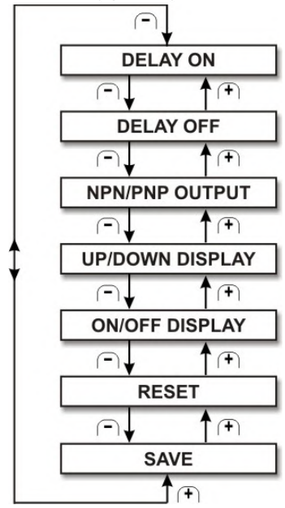
OUTPUT OVERLOAD

The overload of the digital output is signalled by the ‘_SC_’ text on the display. The sensor return to normal working when the overload condition disappears.

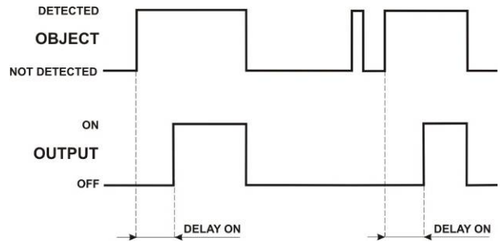
PARAMETER SETTING

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

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



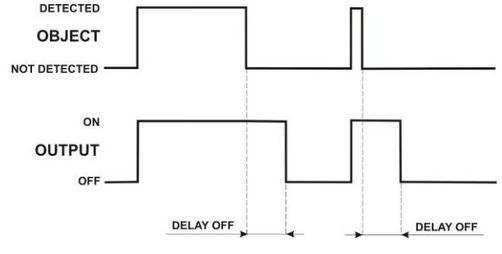
DELAY ON setting
The DELAY ON represents the output delay activation after the reference mark has entered in the detection area. The delay avoids the detection of events that occur rapidly. An example can be a mark with shaded colours (light-dark-light) that can be detected twice.



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

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

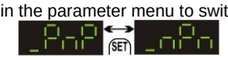
DELAY OFF setting
The DELAY OFF represents the output delay deactivation after the reference target has left the detection area.
The delay extends the output activation allowing slower system interfacing with sensors to detect shorter pulses.



Select “dLOF” from the parameter menu to set DELAY OFF function.
The parameter programming is accessed by pressing (SET).
The previously set delay value appears on the display.

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

PNP/NPN output setting
The digital output can be configured as PNP or NPN.
Select ‘_PnP’ or ‘_nPn’ in the parameter menu to switch the output.



The previously set output switches by pressing (SET).

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

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

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

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

RESET of default parameters
Select “rSEt” in the parameter menu to reset the default parameters.

The “rSEt” text blinks when pressing (SET).
Releasing the push-button the sensor returns to normal functioning.
The default reset parameters are:

PARAMETER	*DISPLAY*	*DESCRIPTION*
Emission	————	*Green*
DARK/LIGHT mode	————	*Light*
Threshold	2050	*2050*
Hysteresis	HYno	*Medium (Normal)*
Delay ON and OFF	d 0	*Deactivated*
Digital output	_PnP	*PNP output*
Display	dSOn dSUP	*Display UP ON*

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

Saving parameter set - “SAVE”
Select “SAVE” to save the parameter setting

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

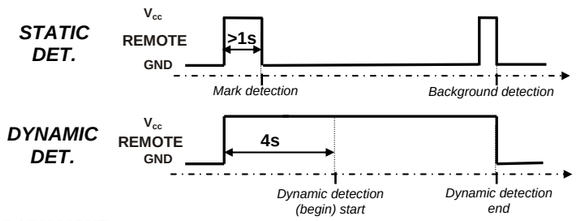
NOTE: Set the data, the operator exits from the menu using the “SAVE” or “RESET” function. If these operations are not carried-out 30s after the last setting, the sensor returns to normal mode saving the parameters changed.

ACCESSORY FUNCTIONS

REMOTE INPUT
The REMOTE signals carries-out the acquisition functions without using the (SET) push-button.
The REMOTE wire connected to +Vdc is equal to pressing the (SET) push-button. Whereas, if the REMOTE wire is connected to GND or not connected it is equal to not pressing the (SET) push-button.

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

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



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

DARK/LIGHT	*MODE*
0V	LIGHT
+Vdc	DARK

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

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

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**.

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.

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

KEYLOCK LED
The green KEYLOCK LED ON isn't active.

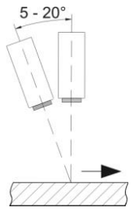
SET, + and − PUSH-BUTTONS
See the "SETTING" paragraph for the correct adjustment phase indications.

INSTALLATION

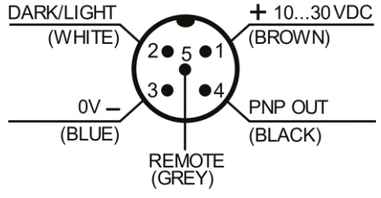
The sensor can be positioned by means of the two Ø3.5mm housing's holes or using threaded M5 holes with 6mm max. depth.
Warning: the use of excessively long screws can damage the product.

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

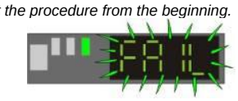


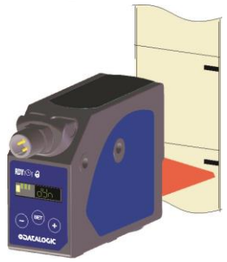
SETTING IN MARK MODE

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.

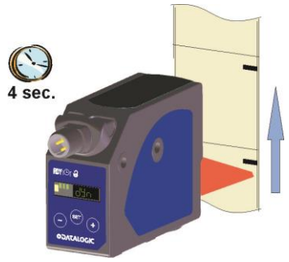




DYNAMIC SETTING

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 'Tolx' 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.

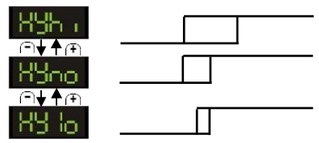
SETTING IN ALL MODES

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.

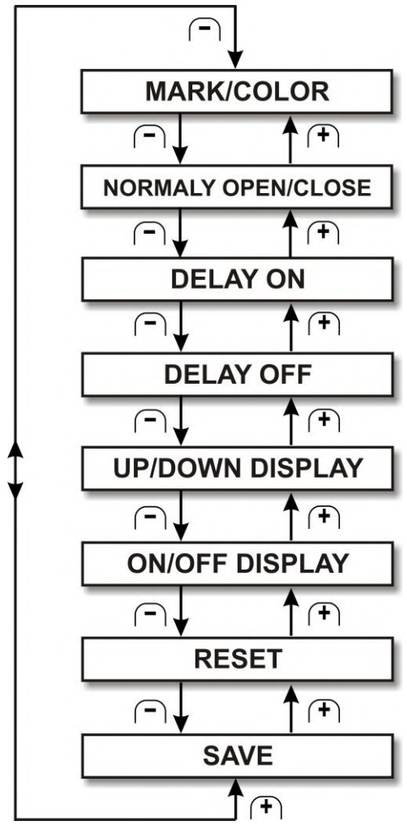
OUTPUT OVERLOAD

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 'Colr' in the parameter menu to switch the mode.

The previously set mode switches by pressing SET.

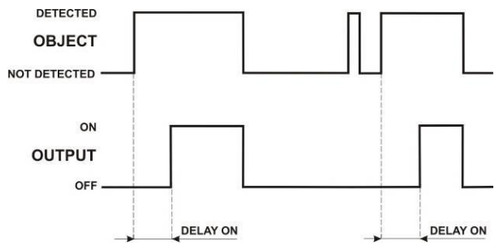
NORMALLY OPEN/CLOSE setting (only in COLOR mode)

The output in color mode can be configured as normally open or normally close.
Select 'OPEn' or 'CIOS' 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.

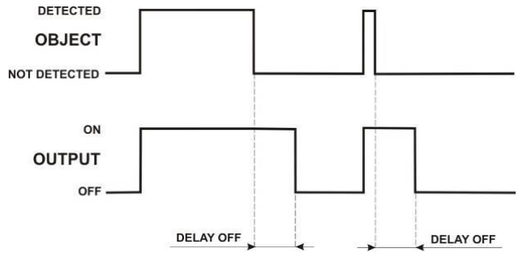


Select “dLOn” in the parameter menu to set the DELAY ON function.
The parameter programming is accessed by pressing (SET).
The previously set delay value appears on the display.

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.

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.

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 “dSOn” or “dSOF” in the parameter menu to set the display ON or OFF.

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

RESET of default parameters

Select “rSEt” in the parameter menu to reset the default parameters.

The “rSEt” text blinks when pressing (SET).
Releasing the push-button the sensor returns to normal functioning.
The default reset parameters are:

PARAMETER	DISPLAY	DESCRIPTION
Emission	_____	Green
MODE	_____	MARK
DARK/LIGHT mode	_____	Light
Threshold	2050	2050
Hysteresis	HYno	Medium (Normal)
Delay ON and OFF	d 0	Deactivated
Display	dSOn / dSUP	Display UP ON

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

Saving parameter set - “SAVE”

Select “SAVE” to save the parameter setting

The parameters are saved pressing (SET) . 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

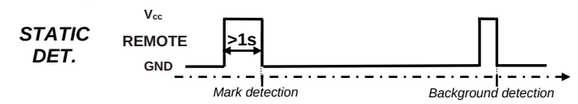
REMOTE INPUT

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.

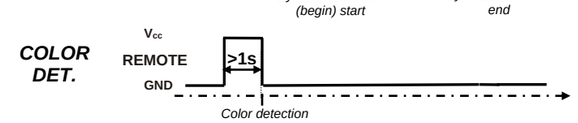
REMOTE	*(SET) PUSH-BUTTON*
0V	NOT PRESSED
+Vdc	PRESSED

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

MARK MODE



COLOR MODE

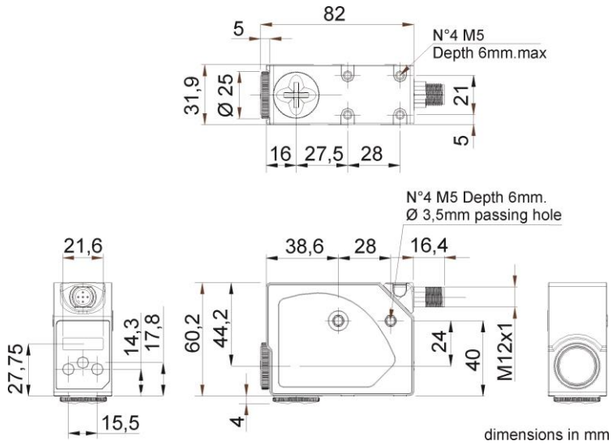


DARK/LIGHT input (only in MARK mode)

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:	PNP output 30 Vdc max. (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	16 μs (MARK mode), 100us (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.

Datalogic S.r.l.
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821005660 Rev. A

TL46-WE…NPN

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

KEYLOCK LED
The green KEYLOCK LED ON isn't active.

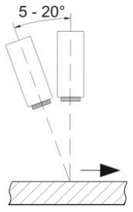
SET, + and − PUSH-BUTTONS
See the "SETTING" paragraph for the correct adjustment phase indications.

INSTALLATION

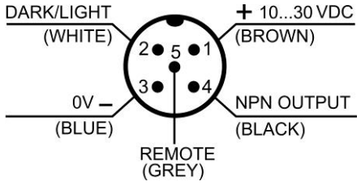
The sensor can be positioned by means of the two Ø3.5mm housing's holes or using threaded M5 holes with 6mm max. depth.
Warning: the use of excessively long screws can damage the product.

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)

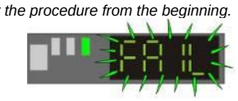
- *Position mark in front of the sensor light spot and press the SET push-button until the 'SEt1' text appears.*
  The sensor detects the mark alternating the red, green and blue emissions.

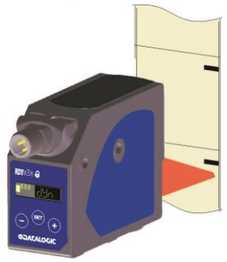
Avoid mark movements until the 'SEt2' text appears and the OUT LED blinking.

- *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.

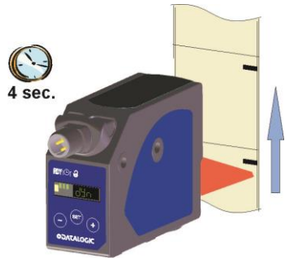




DYNAMIC SETTING

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 'Tolx' 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.

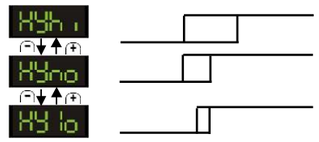
SETTING IN ALL MODES

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.

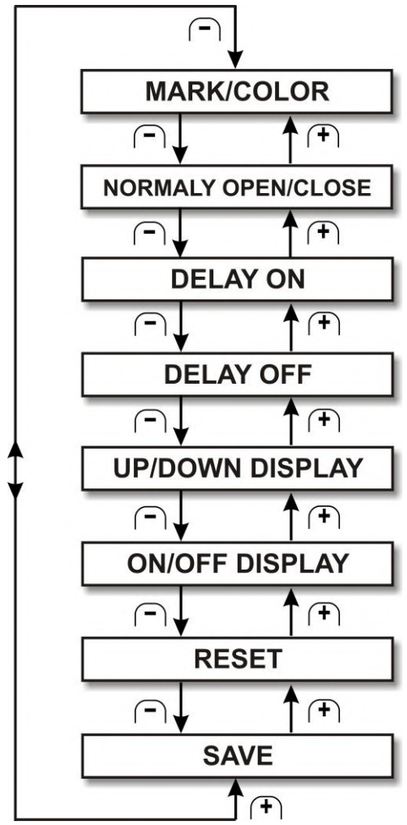
OUTPUT OVERLOAD

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 'Colr' in the parameter menu to switch the mode.

The previously set mode switches by pressing SET.

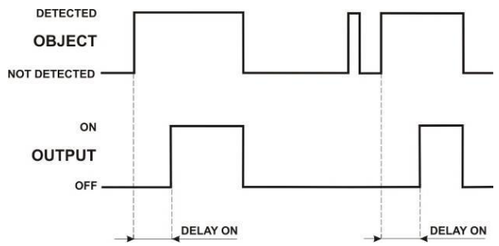
NORMALLY OPEN/CLOSE setting (only in COLOR mode)

The output in color mode can be configured as normally open or normally close.
Select 'OPEn' or 'CIOS' 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.

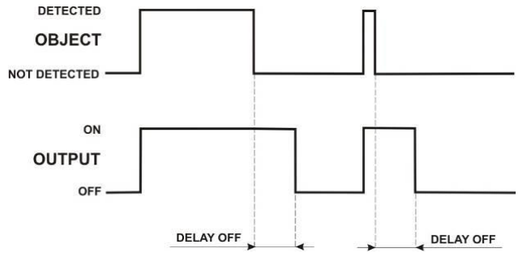


Select “dLOn” in the parameter menu to set the DELAY ON function.
The parameter programming is accessed by pressing (SET).
The previously set delay value appears on the display.

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.

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.

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 “dSOn” or “dSOF” in the parameter menu to set the display ON or OFF.

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

RESET of default parameters

Select “rSEt” in the parameter menu to reset the default parameters.

The “rSEt” text blinks when pressing (SET).
Releasing the push-button the sensor returns to normal functioning.
The default reset parameters are:

PARAMETER	DISPLAY	DESCRIPTION
Emission	_____	Green
MODE	_____	MARK
DARK/LIGHT mode	_____	Light
Threshold	2050	2050
Hysteresis	HYno	Medium (Normal)
Delay ON and OFF	d 0	Deactivated
Display	dSOn / dSUP	Display UP ON

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

Saving parameter set - “SAVE”

Select “SAVE” to save the parameter setting

The parameters are saved pressing (SET) . 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

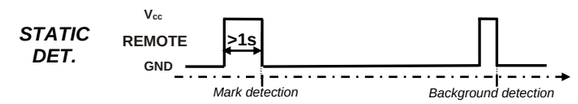
REMOTE INPUT

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.

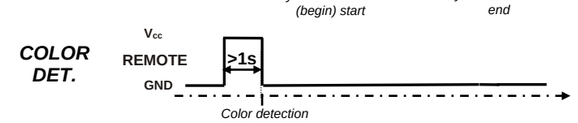
REMOTE	*(SET) PUSH-BUTTON*
0V	NOT PRESSED
+Vdc	PRESSED

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

MARK MODE



COLOR MODE

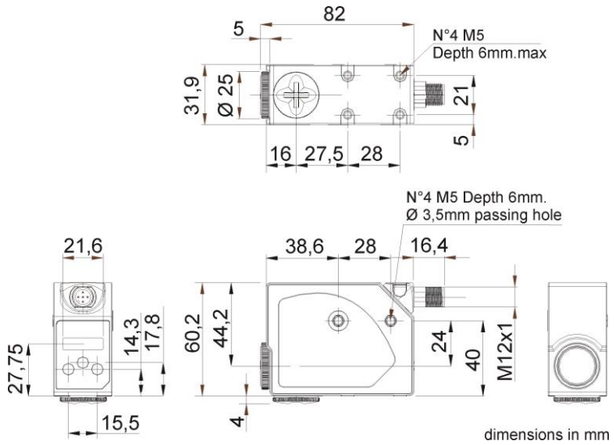


DARK/LIGHT input (only in MARK mode)

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), 100us (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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Via S. Vitalino 13 - 40012 Calderara di Reno - Italy
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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.

821005670 Rev. A

TL46-WJ

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.

MARK PUSH-BUTTON
Dynamic setting procedure is activated by pressing MARK push-button.

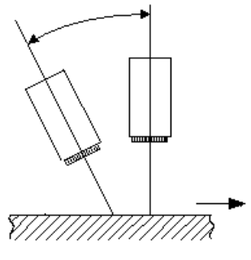
BKGD PUSH-BUTTON
Dynamic setting procedure is activated by pressing BKGD push-button.

See the "SETTING" paragraph for setup procedure indications.

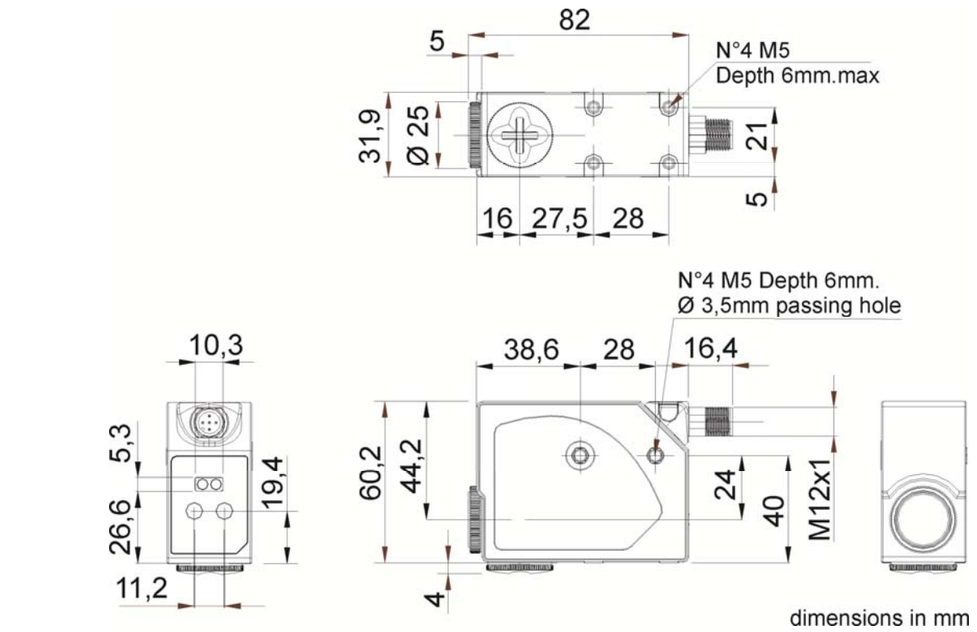
INSTALLATION

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



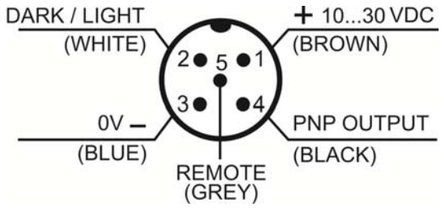
DIMENSIONS



TECHNICAL DATA

Power supply:	10…30 VDC limit values
Ripple:	2 Vpp max.
Current consumption *(output current excluded):*	50 mA max. @ 24VDC
Output:	1 PNP selectable output
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Response time:	10 µs
Jitter:	<7 µs
Switching frequency:	50 kHz
Dark/light selection:	selectable by white wire
Indicators:	OUT LED (yellow) / READY LED (green)
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:	0.8 x 4 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



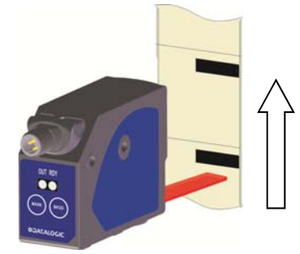
SETTING

<u>DYNAMIC SETTING</u>

The sensor sets automatically the threshold value during target movement. The DARK/LIGHT mode has to be previously set.

To select the DARK mode connect the DARK/LIGHT signal (white wire) to 0V or leave unconnected. To select the LIGHT mode connect the DARK/LIGHT signal to the power supply.

- Position the sensor spot in front of the contrast to detect.
  Press MARK or BKGD push-buttons until the green LED READY is OFF and keep it pressed. The green LED READY blinks.
- To end the dynamic detection procedure release the push-button.

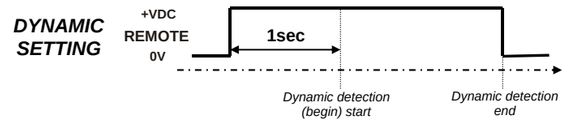


If the green LED permanently ON, the detection has been successful, the sensor returns to normal functioning.
If the green LED slowly blinks, the detection fails due to insufficient contrast.
The sensor returns to the previous setting by pressing MARK or BKGD push-buttons. Repeat the procedure from the beginning.

ACCESSORY FUNCTIONS

<u>REMOTE INPUT</u>
The REMOTE signals carries-out the acquisition functions without using the keyboard.
The REMOTE wire connected to +VDC is equal to pressing the MARK or BKGD push-buttons. Whereas, if the REMOTE wire is connected to 0V or not connected it is equal to not pressing the push-button.

REMOTE	*MARK/BKGD PUSH-BUTTON*
0V	NOT PRESSED
+VDC	PRESSED



<u>DARK/LIGHT input</u>
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 background, in the DARK mode the output is active with dark marks on light background.
The connection of the DARK/LIGHT wire to +VDC sets the LIGHT mode.
If connected to 0V or not connected set the DARK mode.
Select the operating mode before start the dynamic acquisition.

DARK/LIGHTT	*MODE*
0V	DARK
+VDC	LIGHT

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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Via S. Vitalino 13 - 40012 Calderara di Reno - Italy
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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.

821003821 Rev.01

TL46 IO-Link

Instruction Manual

IO-Link®

CONTROLS (W model)

OUTPUT LED (yellow)
The yellow LED indicates the output status.

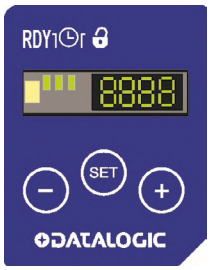
READY LED (green)
The steady green LED ON indicates normal functioning. If quickly flashing, it indicates an output overload.

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 "COLr". The display turns off after 10s of keyboard inactivity.

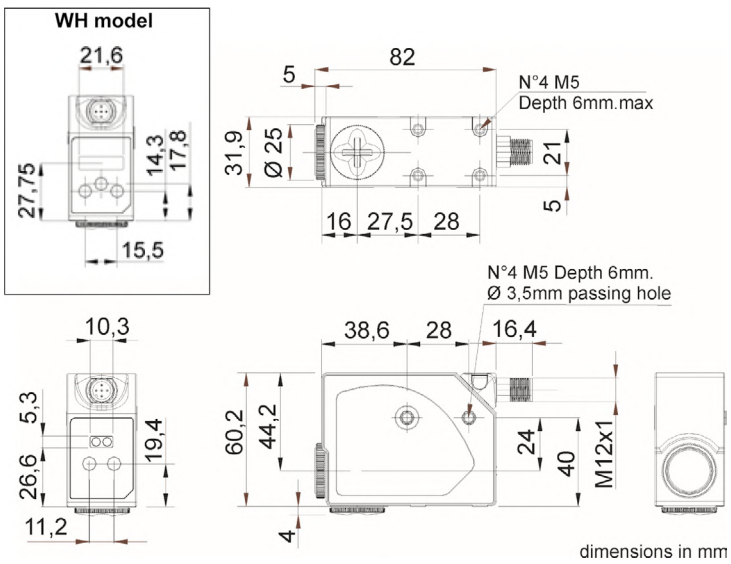
READY LED (green)
The steady green LED ON indicates normal functioning. If quickly flashing, it indicates an output overload.

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

KEYLOCK LED
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



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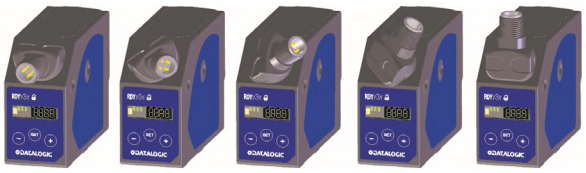
For information about the disposal of Waste Electrical and Electronic Equipment (WEEE), please refer to the website at www.datalogic.com.

821006511 Rev. B

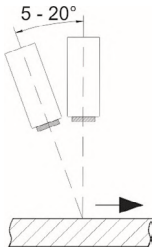
INSTALLATION

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.

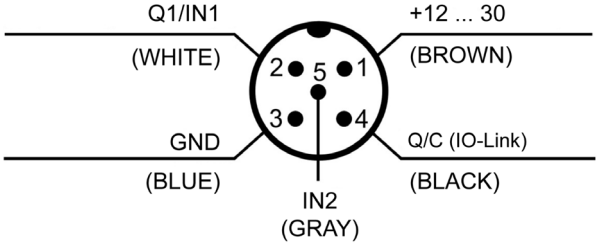
The connector can be oriented at five different positions by rotating the block. The position chosen is guaranteed by a mechanical blocking system.
The rotation can be carried out even after sensor installation as the connector block is completely self-contained inside the housing.



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 mm^2
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	(−) SET (+)
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 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

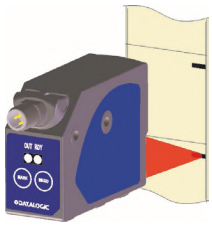
KEYLOCK function (PATENTED)

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.

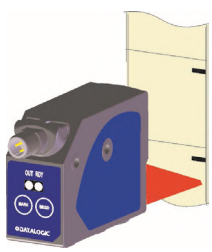
SETTINGS in MARK mode

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.



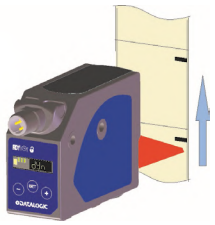
The DARK/LIGHT operating mode is automatically selected by the sensor. Dark mark - light background = dark mode; light mark - dark background = light mode.

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.

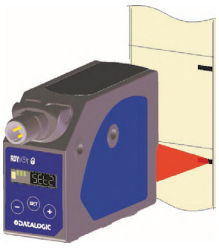
The “AdJ” text appears pressing (+) on the display. Releasing the push-button, the threshold value blinks

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.

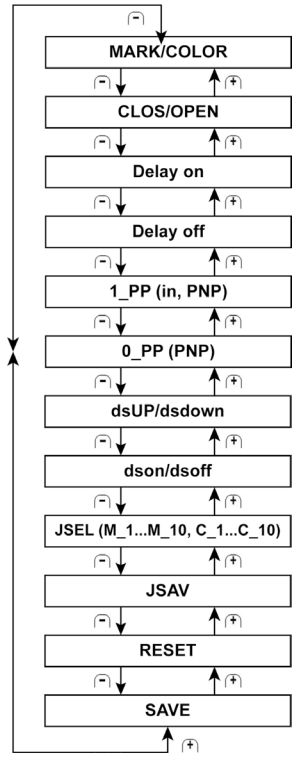
PARAMETER SETTING (WH model)

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.

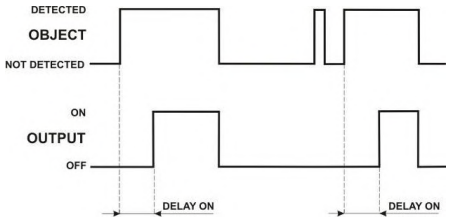
NORMALLY OPEN/CLOSE SETTING (only in COLOR mode)

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.



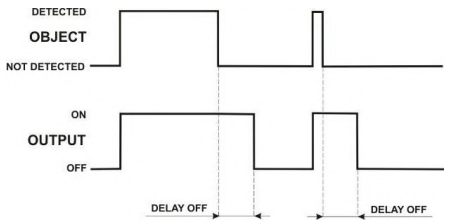
Select “dLOn” in the parameter menu to set the DELAY ON function.
The parameter programming is accessed by pressing SET.
The previously set delay value appears on the display.

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 (+) or (-) switches through the diffent 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 (+) or (-) switches through the diffent 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	HYno	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.

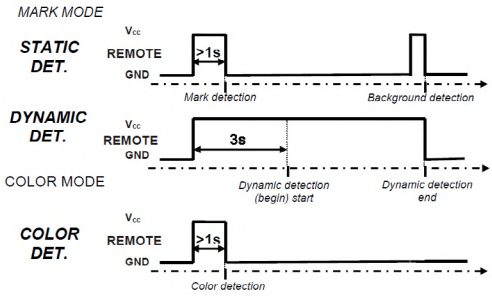
ACCESSORY FUNCTIONS (all models)

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:



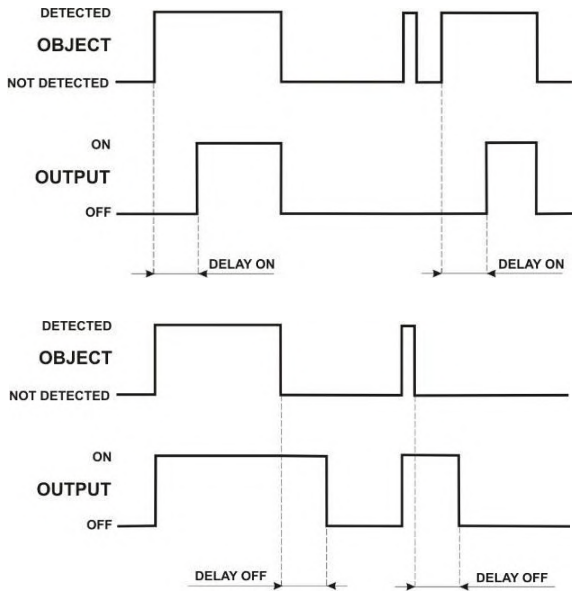
DARK/LIGHT INPUT (only for dynamic acquisition in MARK mode)

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 thougth 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	PDInput: 16 Bit PDOutput: 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)	PDInput 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

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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 statuts 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

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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

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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

Bit offset

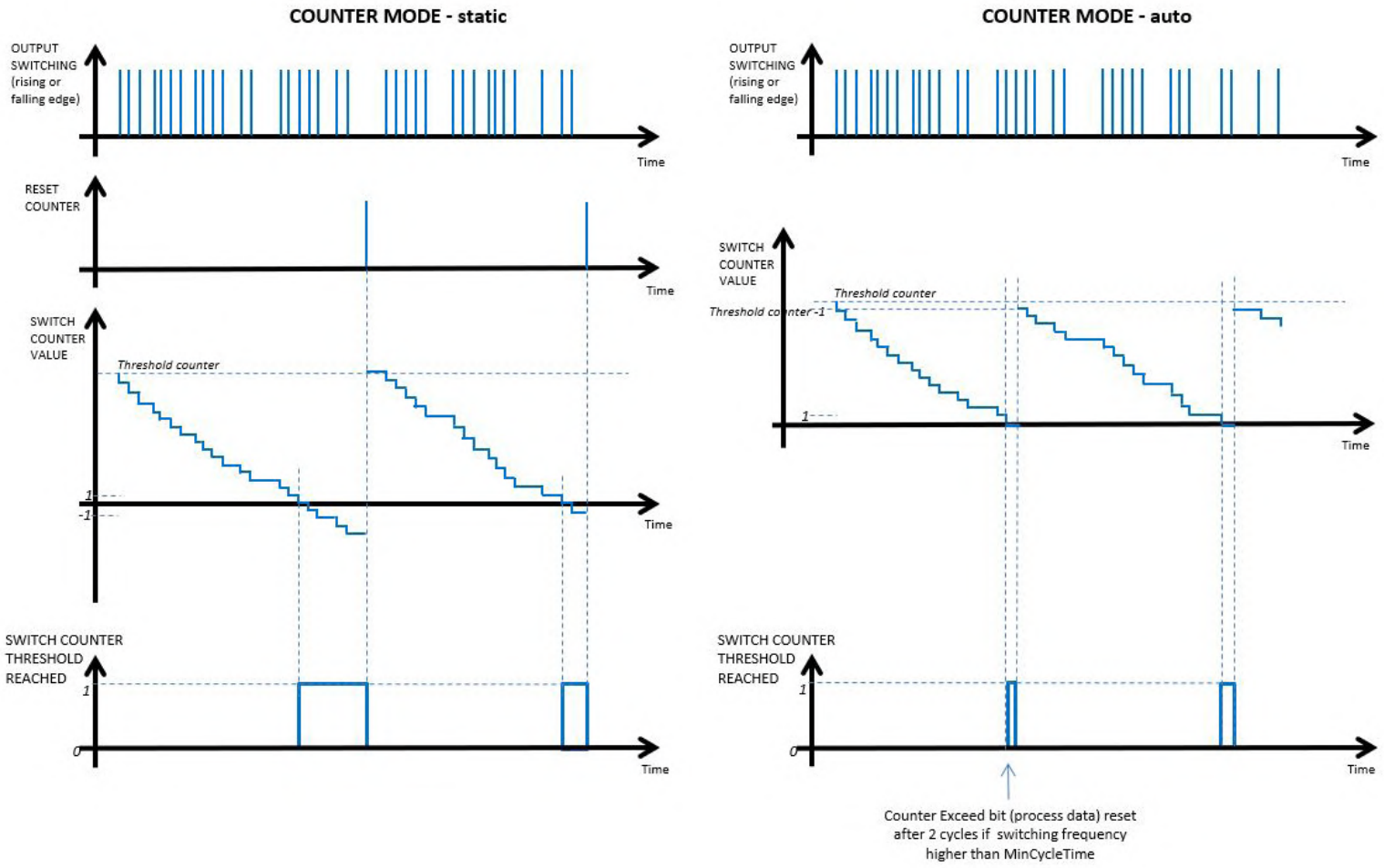
	7	6	5	4	3	2	1	0
Byte 0	Analog signal (in Mark mode) LSB				Emission colors		Quality of signal alarm	SSC1 (C/Q pin)
Byte 1	Analog signal (in Mark mode) MSB							

EXTENDED PARAMETERS

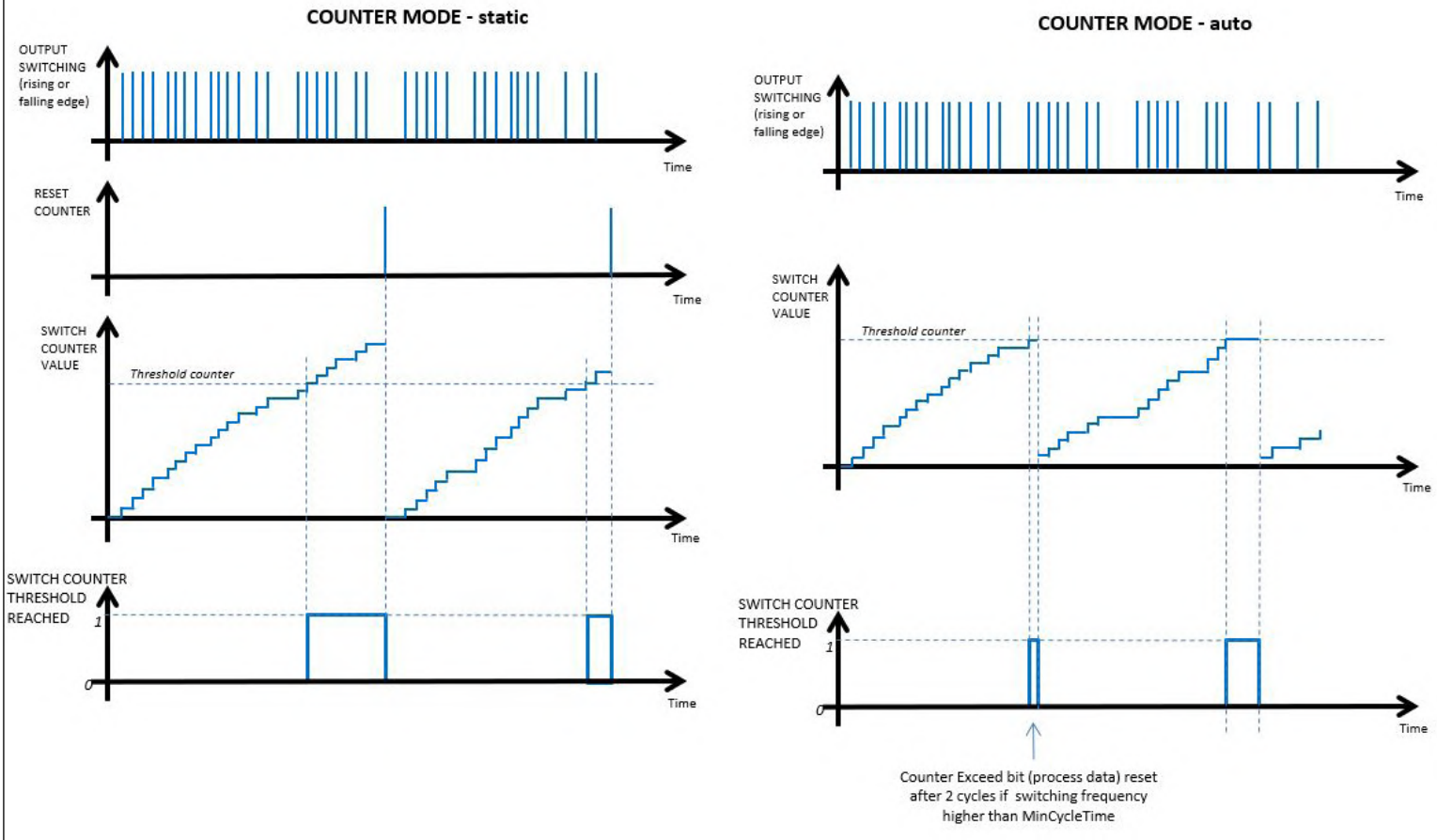
Switch Counter								
Index (dec)	**Parameter Object Name**	**Length**	**Subindex (offset)**	**Value/Range**	**Description**	**Data Type**	**Access***	**Remark**
0x00B5 (181)	Switch Counter Threshold Reached	1 octet		0: false 1: true	State of Switch Counter Threshold Reached	Boolean	RO	
0x00B6 (182)	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	UIntergerT 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 egdes 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



COUNTING DIRECTION UP



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 (harware 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 minuts 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 occured	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
	Byte8	Byte9	Byte10	Byte11	Byte12	Byte13	Byte14
	Byte15	Byte16	Byte17	Byte18	Byte19	Byte20	Byte21
	...	...	...	...	...	...	...
	...	...	...	...	...	...	...
	...	...	...	...	...	...	...
First EVENT_X occured	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 of Yaw 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 exceded the threshold in mg on axis X Indicates the last shock value exceded the threshold in mg on axis Y Indicates the last shock value exceded 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	

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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.