

TFM

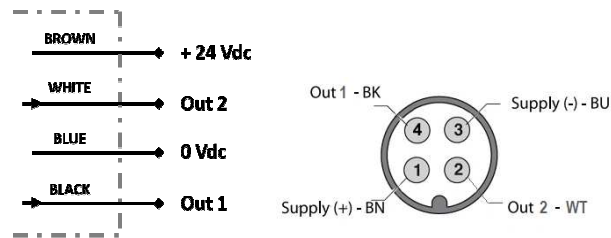
Time Of Flight Sensor

CAT8ETM1572701 - Created: 07/11/2016

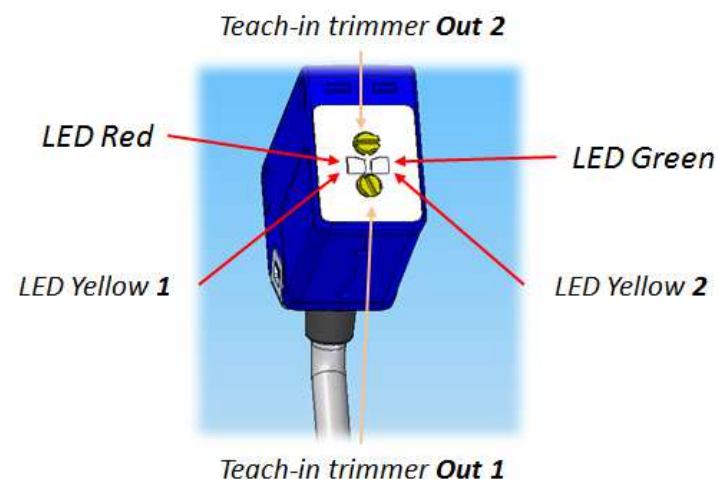
GENERAL DESCRIPTION

Measuring Sensor based on ToF (*Time Of Flight*) technology.

ELECTRICAL DIAGRAM OF THE CONNECTIONS



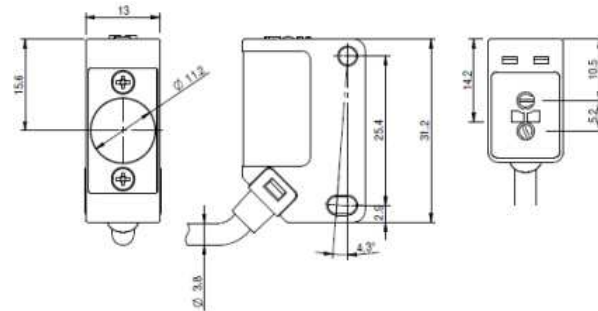
USER INTERFACE



- "Green" LED indicates standard operation of the product (RUN) and the target is inside of the operative range.
- "Red" LED indicates if the distance is out of the operative range or the energy returned from the target is too low
- "Yellow 1" LED signals output state "Out 1"
- "Yellow 2" LED signals output state "Out 2"

If, at power up, during the system check, the sensor detects a fault, the "Red" LED will start flashing.

DIMENSIONS

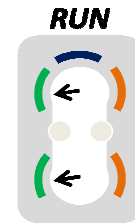


TECHNICAL DATA

Supply Voltage	24 Vdc +/- 20%
Operative Range	Programmable: 0..180 mm (white 90%) 0..600 mm (white 90%)
Resolution	1 mm @ range 0..180 mm 3 mm @ range 0..600 mm
Switching Frequency	Programmable: < 10 Hz < 80 Hz
Hysteresis	Frequency 10Hz: +/- 4 mm @ range 0..180 mm +/- 6 mm @ range 0..600 mm Frequency 80Hz: +/- 12 mm @ range 0..180 mm
Technology	ToF (<i>Time Of Flight</i>)
Digital Output	2 programmable digital outputs: PNP/NPN/PushPull
Digital Resolution	8 bit
Emission	LASER Infrared (Classe 1)
Spot Dimension	Divergent (25°)
Wavelength	850 nm
Humidity	< 80 % without condensation
Temperature Range	-10° C ... +50° C
Storage Temperature	-30° ... +90° C without ice
Electrical Protections	Polarity Reversal, overvoltage pulses
Mechanical Protection Degree	IP 67 (EN60529)
Housing Material	Plastic
Connections	4 poles cable 4 poles Pig Tail M12
Dimensions	21x12,8x31,2 mm
Weight	26 gr. (pig tail)

FUNCTIONING

At the power on, after the system check, the device recalls from memory the last saved configuration and goes into normal operation (RUN) reported by the flashing of "Green" LED.



If the configuration trimmer are both placed in the first sector (as in the picture above) the sensor starts in "CONFIGURATION" mode and after changing the operating parameters, it waits for the end user sets both trimmers in RUN position (refer to "CONFIGURATION" paragraph).

STANDARD CONFIGURATION

The default configuration (Factory) of the product is the following:

- Operative range (0 .. 180 mm)
- Output types (Push Pull)
- Switching distance Out 1 (150 mm)
- Switching distance Out 2 (50 mm)

GENERAL WARNINGS

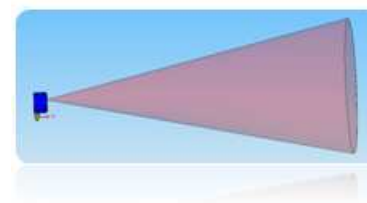
Make sure the power supply is properly stabilized.

The sensor must not be connected to the power supply line if it is powered: this can cause damage to the device.

If the interference induced from power lines is greater than that required by EC legislation (interference immunity), separate the sensor cables from the power lines and high voltage and insert the cable in a metal conduit connected to the ground.

Do not expose the sensor to water, steam, acids or solvents. To clean the sensor use a damp cloth and dry.

SPOT DIMENSION



Distance	Spot Diameter
50 mm	~ 22 mm
100 mm	~ 44 mm
150 mm	~ 66 mm
200 mm	~ 88 mm
250 mm	~ 111 mm
300 mm	~ 133 mm
400 mm	~ 177 mm
500 mm	~ 222 mm

ADJUSTMENT

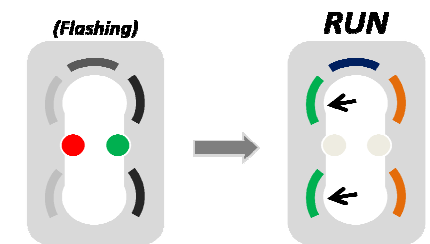
CONFIGURATION

The two trimmers placed on the sensor control panel are used for the configuration of the product and for the teach-in of the thresholds for the digital outputs. During normal operation of the product (RUN) the trimmers are used only the teach-in of the thresholds (refer to "TEACH-IN" paragraph). To enter in the configuration mode, it is needed, at the power on, that both the trimmers has not to be in the first sector.

The stroke of the trimmer (about 270°) is divided in 3 "sectors" and each of these areas is used to encode the configuration information.

The change of the sectors should be realized with the device switched off and it is possible to change one parameter per time.

When switched on, the sensor detects and saves in the memory the new configuration. Then the sensor goes in stand-by mode (indicated by alternate flashing of the LED "Red" and "Green") until the end user positions both trimmer in RUN position.

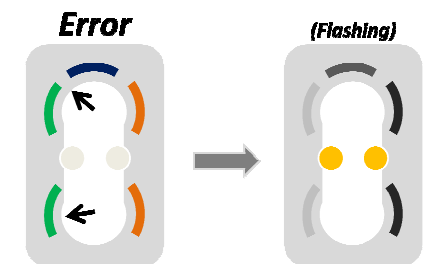


In this way, the sensor goes in RUN mode with the new configuration.

In case the end user needs to configure another parameter, it is requested to switch off the device and repeat the configuration cycle.

CONFIGURATION ERROR

If the position of one or more trimmer is uncertain (that is positioned between a sector and the adjacent one), or the combination of the trimmer is not one of those permitted, the sensor communicates the configuration error by the alternate flashing of the "Yellow 1" and "Yellow 2" LEDs.



In this case the sensor waits that the end user positions both the trimmers in RUN mode or it is requested to switch off the sensor and repeat properly the product configuration.



TEACH - IN

It is possible to assign a new threshold only during normal operation of the product (RUN).

It is requested to place the target within the sensor operating range, in front of the emission beam and to check the proper detection highlighted by "Green" LED.

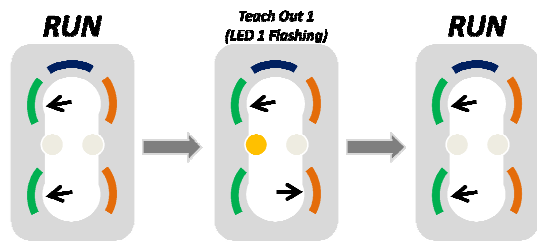
At this stage, it is possible to proceed with the threshold teach using the trimmers.

TEACH-IN OUT 1

To save the new threshold, it is requested to position trimmer 1 in the last sector and trimmer 2 must remain in the first sector.

The confirmation of the storage of the new threshold is highlighted by the flashing of the "Yellow 1" output LED.

At this stage, it is requested to position the trimmer in RUN mode:

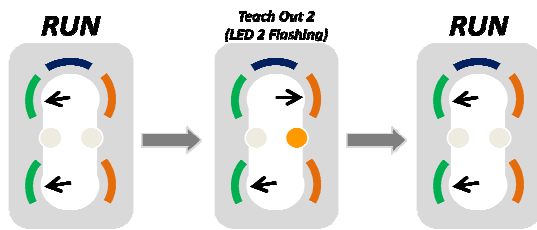


TEACH-IN OUT 2

To save the new threshold, it is requested to position trimmer 2 in the last sector and trimmer 1 must remain in the first sector.

The confirmation of the storage of the new threshold is highlighted by the flashing of the "Yellow 2" output LED.

At this stage, it is requested to position the trimmer in RUN mode:



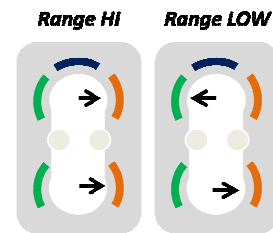
A. MODIFICATION OF THE OPERATIVE RANGE

NB: This function is available for versions **partially programmable**

The sensor has 2 operative ranges with 2 different resolution:

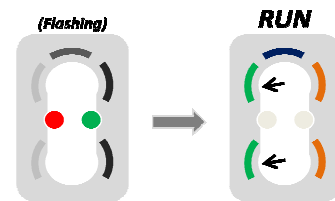
- **0..180 mm** (white 90%) with resolution of **1 mm**
- **0..600 mm** (white 90%) with resolution of **3 mm**

To choose the operative range, it is requested to position the trimmers as in the picture below reported:



The alternate flashing of the LED "Red" and "Green" confirms the new configuration.

At this stage, it is requested to position both the trimmers in RUN mode:



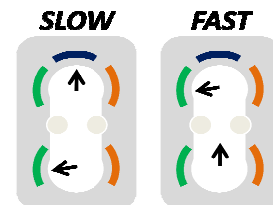
B. MODIFICATION OF SWITCHING FREQUENCY

NB: This function is available for versions **partially programmable**

The sensor has 2 different switching frequencies:

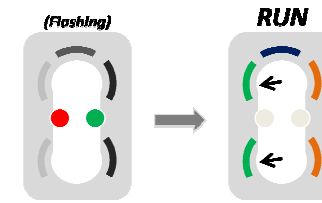
- **< 10Hz** (Slow)
- **< 80Hz** (Fast)

To choose the switching frequency, it is requested to position the trimmers as in the picture below reported:



The alternate flashing of the LED "Red" and "Green" confirms the new configuration.

At this stage, it is requested to position both the trimmers in RUN mode:



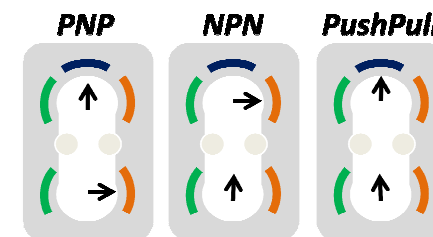
C. MODIFICATION OF OUTPUT TYPOLOGY

NB: In the versions **fully programmable**, it is possible to configure:

- Operative Range (see section "A")
- Switching frequency (see section "B")
- Output typology

Both the digital outputs can be programmed in 3 different modalities: **PNP**, **NPN**, **Push Pull**.

To assign the output type, the trimmers have to be positioned as in the following picture:



The alternate flashing of the LED "Red" and "Green" confirms the new outputs configuration. At this stage, it is requested to position both the trimmers in RUN mode.

RESPONSE DIAGRAMS

