

"ESA Control" Ltd



PHOTOELECTRIC SENSORS

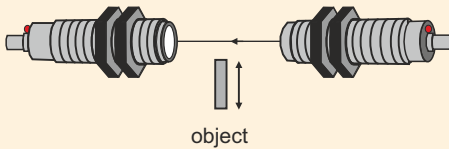


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Types of photoelectric sensors

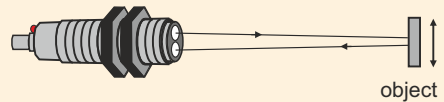
Thru-beam sensor

It is a system of two housings (transmitter and receiver) situated one against the other and connected by a modulated infrared ray of light. When an object passes between the transmitter and the receiver, the ray of light becomes disconnected and the output of the receiver change state.



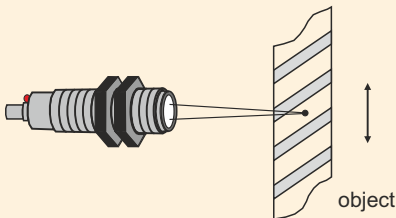
Diffuse sensor

It consists of one housing, in which transmitter and receiver are situated. The sensor emits modulated ray of light, which is reflected by the passing (coming near) object and returns back to the sensor. In such case the output of the switch change state. It is intended for detection on different objects of the automatics.



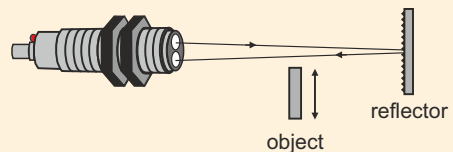
Mark sensor

It consists of one housing, in which transmitter and receiver are situated. They serve to register coloured mark stripes inflicted on object, that is passing in a strictly fixed zone (of $10 \times 20 \text{ mm}$) in front of the active surface of the sensor. The width of mark stripes can not be less 3 mm.



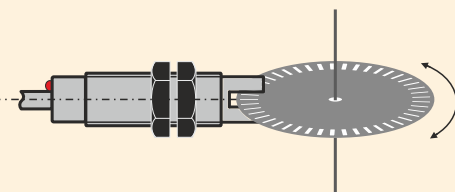
Retro-reflective sensor

It consists of one housing, in which transmitter and receiver are situated. The sensor emits infrared modulated ray of light which reflects on a reflector and returns back to the sensor. When an object passes between the sensor and the reflector, the ray of light becomes disconnected and the output of the sensor change state.



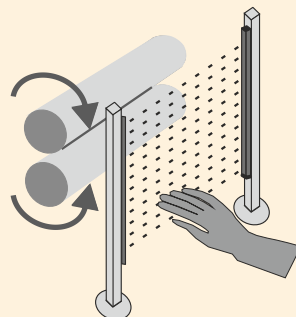
Fork sensor

It acts on the principle of emitting and receiving non-modulated ray of light in infrared area of the spectrum. They are used for measuring cycles of shafts etc. They have good sharing ability (0,5mm).



Safety light curtain

The specialized product is used to protect the machines and other moving elements from accidental interventions and to protect the machine operator from injuries.



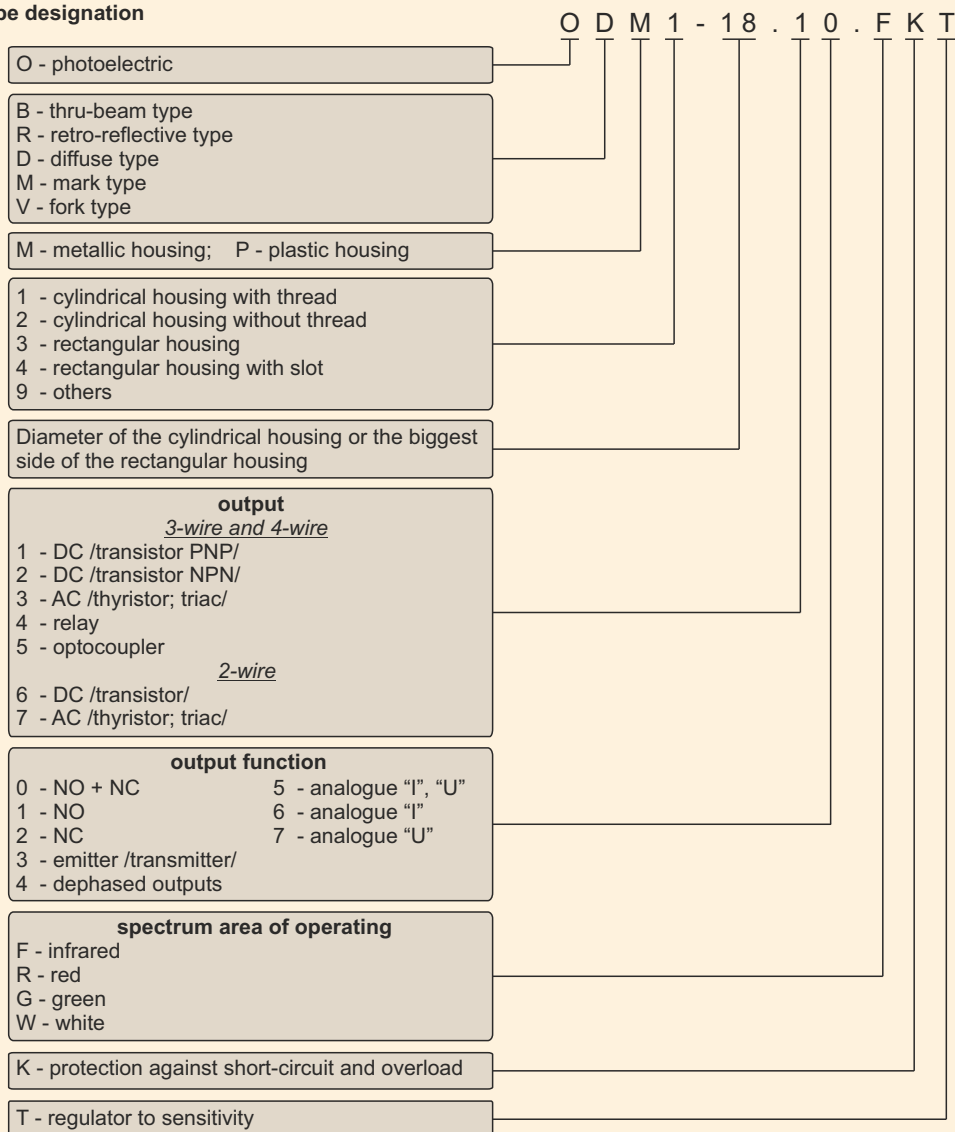
Purpose and areas of application

The presented photoelectric sensors serve for switching direct current and alternating current electric circuits. Their principle of action consists in the emitting and receiving ray of light in infrared or visible area of the spectrum. The sensors are activated by interruption or reflection of the light rays when passing an object. They are used to automate production processes in the textile, packaging, bottling and other industries.

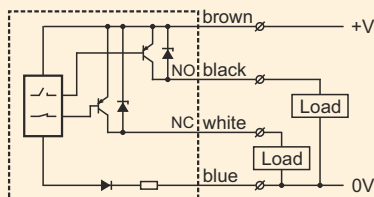
Conditions of exploitation

Photoelectric switches are not to be used in places where high level of water-vapour, thick fog, aggressive gases, splashes of oil, strong vibration could occur and also in dusty environment. The receiving part must not be influenced directly by the sun rays or other powerful light transmitters. The joining cable has not to be close to powerful electric circuits.

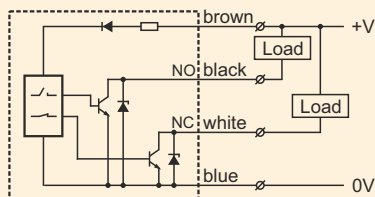
Type designation



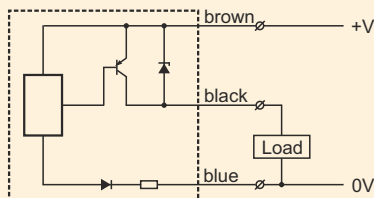
Electrical connection circuits of 3-wire and 4-wire direct current sensors, DC



Scheme 10 (PNP / NO+NC)

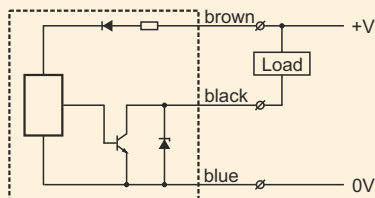


Scheme 20 (NPN / NO+NC)



Scheme 11 (PNP / NO)

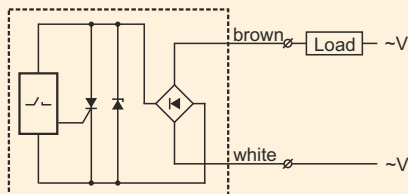
Scheme 12 (PNP / NC)



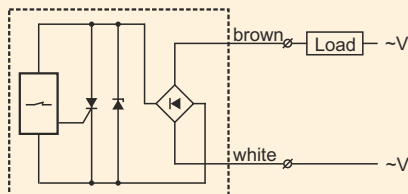
Scheme 21 (NPN / NO)

Scheme 22 (NPN / NC)

Electrical connection circuits of sensors of 2-wire alternating current, AC



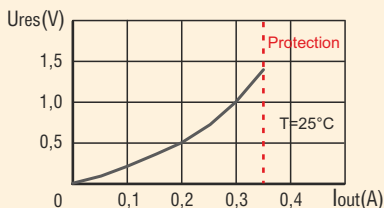
Scheme 71 (NO)



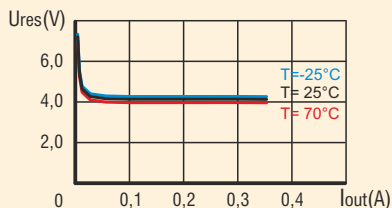
Scheme 72 (NC)

Output characteristic /residual voltage/

Direct current sensors, 3- and 4-wire, DC



Alternating current sensors, 2-wire, AC



Features when working with capacitive load of sensors that have pulse protection against current overload and short circuit

When connecting a capacitive load to the output of the sensors that have pulse protection against short circuit, it is necessary to be connected in series a resistor R_x , which limits the current when initially charging the load capacitor C . R_x is added if capacitor C is larger than 100nF.

$$R_x = U_s / 0,5 \quad (R_x = 20\Omega \dots 60\Omega)$$

