

Electronic contact block for position switches



Description and technical data

The article E1 is an electronic contact block, design to replace the traditional mechanical contact block placed inside the position switches of Pizzato Elettrica. The settlement between the body and the head of a position switch with this electronic contact block makes a mechatronic device, that increase the applications range of position switches.

General data

Ambient temperature:	from -25°C to +80°C
Max operating frequency:	3600 operations cycles ¹ /hour
Mechanical endurance:	20 million operations cycles ¹
Adjustable intervention distance:	0,2 ÷ 2 mm or 2° ÷ 30°
Differential travel:	< 0,1 mm or 1°

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by IEC 947-5-1 standard.

Conforms to the standards:

IEC 947-5-1, IEC 337-1, EN 60947-5-1, CEI EN 60947-5-1, CEI 17-45, IEC 529, EN 60529, CEI 70-1, EN 50081-1, EN 50082-2

Markings:



Complying with the requirements requested by:

Low Voltage Directive 73/23/EEC and subsequent modifications and completions, Machinery Directive 98/37/EEC, Electromagnetic Compatibility 89/336/EEC and subsequent modifications and completions.

Electrical data

Rated operation voltage (U _e):	10 ÷ 30 VDC
Rated operation current (I _e):	200 mA
Utilization category:	DC13
Rated insulation voltage (U _i):	30 V
Pollution degree:	3
Conditional short circuit current:	100 A
Voltage drop (U _d):	2 V
Min. operation current (I _m):	0 mA
Current in the lock state (I _r):	0,05 mA
Max. residual ripple:	10%
Absorbed current with no load (I _o):	< 10 mA
Protection against the short circuit of the load:	yes
Protection against polarity inversions:	yes
Kind of output:	PNP
Power supply LED:	yes
Switching LED:	yes
Protection fuse:	315 mA fast type

Cross section of the conductors (flexible lead wire)

Contact block E1:	min. 1 x 0,5 mm ² (1 x AWG 20)
	max. 1 x 2,5 mm ² (1 x AWG 14)

- Not suitable to be used for safety application.

- To be used only with FD, FP, FL, FR, FM, FX and FZ series.

Technical features

The contact block E1 is made by a photoelectric sensor that check the position of the mechanic actuator with following features:

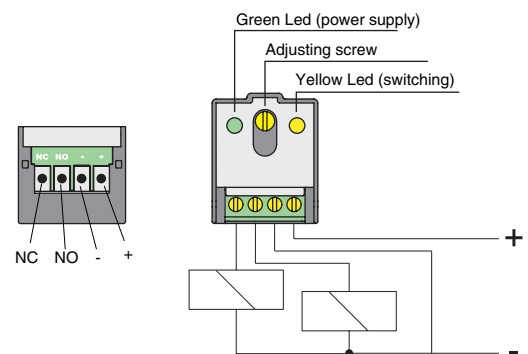
- 1) Feasibility of adjusting the switching point by a screw directly applied on the contact block. The adjusting screw is positioned on the cap of the contact block, purpose to allow an easy setting point, without extract contact block from the switch body.
- 2) Differential travel below 0,1 mm, guaranteed for whole range of working temperature.
- 3) Reduced actuating force.
- 4) Two static PNP output, 1NO+1NC, protected against short circuit.
- 5) Exit signal without bounce.
- 6) Wide range of working temperature.
- 7) Power supply and switching signal LEDs.

Above performances allow to solve following problems:

- 1) When it is needed to interface the switches with PLC and there are problems because of contacts bouncing or in the case of very low voltages.
- 2) When it is necessary to sense light objects and so it is requested a contact block with high sensibility and reduced actuating forces.
- 3) When it is necessary to sense very small objects and it is needed a very low differential travel.
- 4) When it is requested to adjust the switching point. The internal LED show the switching point when you turn the adjusting screw.
- 5) In the case it is requested the simultaneous commutation of the two outputs.
- 6) When it is necessary to detect transparent objects or where is not feasible the use of normal sensors, keeping in mind that special sensors could reach a rather higher price in comparison with this solution.

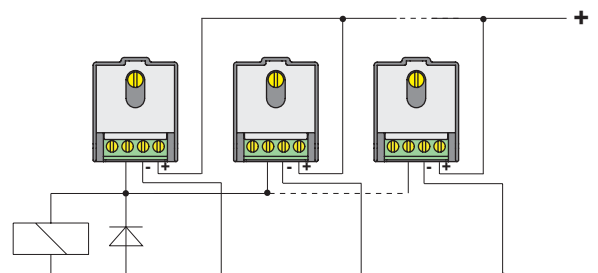
Connection diagrams

The wiring connection comes through a marked terminal block indicating the function of the each pole. There are two signal LEDs, the first one shows power supply presence and the second shows the commutation.



Parallel connection of several units E1 (OR)

To connect in parallel many electronic contact blocks (OR) does not required any special precaution. With inductive loads (relay) it is advisable to install a protection diode.



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Series connection of several units E1 (AND)

To connect the units in series (AND), it is necessary to comply following conditions:

The electric current of the first unit is the addition of the electric load and the max. load absorbed by the other units : If we consider the connection of n units, the nominal current " I_e ", results:

$$I_e = (200 - 20 \times n) \text{ mA}$$

Where I_e : rated operation current
 n : number of units connected in series

Example: with 3 units you can switch maximum 140 mA.

When working, each unit cause a drop of tension. The load should be suitable to work with one tension of:

$$U_c = U_a - 2 \times n$$

Where U_c : rated operation voltage
 U_a : tension on the load
 n : number of switches connected in series

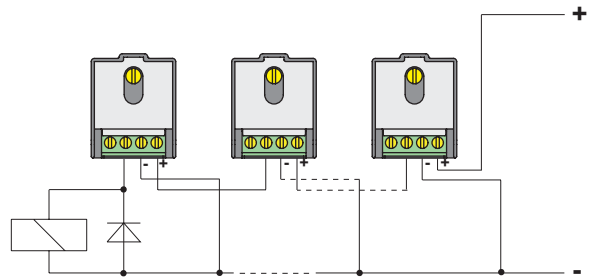
Example: with 3 units powered at 24 VDC, the load should work at 18 VDC.

The maximum number of units that it is possible to connect in series depends of the supply voltage. In any case the number should be lower to:

$$n_{\max} \leq \frac{V_a - 10}{2} + 1$$

Where n_{\max} : max. number of units connected in series
 V_a : supply voltage

Example: with 24 VDC it is possible to connect a maximum of 7 units. With 30 VDC it is possible to connect 11 units. With inductive loads (relay) it is advisable to install a protection diode.



Installation advises

E1 contact block is protected against industrial environment electric interference. When used on extreme conditions, as for example installed close to high overloads (electric motors, welding machines, etc.) it is advisable to adopt following precautions:

- Exclude or limit the interference from the source.
- Filter with adequate capacity the power supply.
- Separate the power wires from the units wires.
- Limit the cable length to max. 200 mt.

Check the drop of tension along the power supply wires.

When necessary, twist and shield the output wires of the units or use a suitable twisted and shield wire, having a suitable section.

Particular loads

The unit is protected against overload and against short-circuit, so it is necessary to limit the inrush current of electric load. Typical examples are capacitor loads that require an high current impulse and the incandescence lamps which cold electric resistance is the tenth part of hot electric resistance. For the capacitive loads, when necessary, connect a limit resistance in series whereas for the lamps, when necessary, use a suitable electric resistance of pre-heating.

