## Correct use

Precision multiple limit switches are used for positioning and controlling machines and in industrial installations.

Correct use includes compliance with the relevant requirements for installation and operation, in particular

- EN 60204-1
- EN ISO 12100

## Incorrect use

Precision multiple limit switches with switching elements ES 552, ES 592 and ES 614 (snap-action switching contacts not positively driven) must not be used in safety circuits.

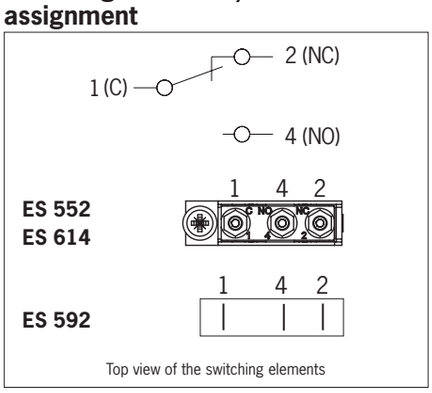
## Function

Precision multiple limit switches possess several switching elements arranged in a row.

The switching elements are actuated by means of plungers. Different plunger types and trip dogs are used depending on the application (operating point accuracy and approach speed).

The plungers are actuated by trip dogs that are mounted with an interference fit in trip rails.

## Switching elements / terminal assignment




Top view of the switching elements

*Fig. 1: Switching elements and terminal assignment*

## Mounting

**NOTICE**

Device damage due to improper mounting and unsuitable ambient conditions

- Precision multiple limit switches must not be used as an end stop.
- The specified IP degree of protection is applicable only if the housing screws, cable entries and plug connectors are properly tightened. Observe the tightening torques.

Fit precision multiple limit switches so that

- connecting cables and plug connectors are not damaged by moving parts of the machine
- sealing is ensured on cable entry through the base.

## Protection against environmental effects

Safety venting valves are used to equalize the pressure to protect against the pumping action of the plunger. They must not be sealed with paint.

- Mask plunger, plunger guide, safety venting valves and rating plate during painting work!

## Electrical connection

**⚠ WARNING**

- Strip the insulation from the ends of the individual wires over a length of $6^{\pm 1}$ mm to ensure a safe contact.

- Open switch cover
- Conductor cross-section 0.14 … 1.0 mm²
- For terminal assignment, see Fig. 1
- Fit suitable cable gland with captive O-ring
- Seal cable carefully. Sealing ring must be matched to the cable diameter
- Tighten screws for connections to the switching element to 0.2 Nm
- Close switch cover and tighten cover screws to 0.5 Nm.

## Function test

### Mechanical function test

- Actuate plunger and check the switching functions.

### Electrical function test

- Check correct function sequence.

## Service and inspection

No servicing is required. **Regular inspection** of the following is necessary to ensure trouble-free long-term operation:

- correct switching function
- secure mounting of components
- precise adjustment of trip dogs in relation to multiple limit switch
- dirt and wear
- sealing of cable entry
- loose cable connections.

## Exclusion of liability under the following circumstances:

- Incorrect use
- Non-compliance with safety regulations
- Installation and electrical connection not performed by authorized personnel
- Failure to perform functional checks.

## Notes about c UL us

**The following information applies to devices with plug connector:**

This device is intended to be used and applied with a Class 2 power source in accordance with UL1310. Connecting cables for safety switches installed at the place of use must be separated from all moving and permanently installed cables and un-insulated active elements of other parts of the system that operate at a voltage of over 150 V. A constant clearance of 50.8 mm must be maintained. This does not apply if the moving cables are equipped with suitable insulation materials that possess an identical or higher dielectric strength compared to the other relevant parts of the system.

## EU declaration of conformity

The declaration of conformity is part of the operating instructions, and it is included as a separate sheet with the device.

The original EU declaration of conformity can also be found at: www.euchner.com

## Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen

**Service telephone**:
+49 711 7597-500

**E-mail**:
support@euchner.de

**Internet**:
www.euchner.com

## Technical data

| Parameter | | Value |
|---|---|---|
| Housing material | | |
| Series | GL, GS | Sand-cast aluminum, anodized |
| | SB, SN | Die-cast aluminum, anodized |
| Plunger material | | Stainless steel |
| Degree of protection | | IP67 |
| Mech. operating cycles | | 30 x $10^6$ |
| Actuation frequency | | ≤ 200 $min^{-1}$ |
| Ambient temperature with switching element | | |
| ES 552, ES 614 | | -5 … +80 °C |
| ES 592 | | -5 … +125 °C (manufacturer's data max. +140 °C) |
| Installation orientation | | Any |
| Approach speed, max. | | |
| Plunger | Chisel D | 20 m/min |
| | Roller R (slide bearing) | 50 m/min |
| | Ball K | 8 m/min |
| Approach speed, min. | | 0.01 m/min |
| Actuating force | | ≥ 15 N |
| Switching element | | 1 changeover contact |
| Switching principle | | Snap-action switching contact |
| Switching hysteresis max. | | 0.1 mm |
| Contact material | | |
| ES 552, ES 592 | | Silver |
| ES 614 | | Gold cross cut contacts |
| Connection | | |
| ES 552, ES 614 | | Screw terminal |
| ES 592 | | Soldered connection |
| Tightening torque of screw terminal (hexagon socket, A/F 1.3 mm) | | 0.2 Nm |
| Conductor cross-section | | 0.14 … 1.0 mm² |
| Rated impulse withstand voltage | | $U_{imp}$ = 2.5 kV |
| Rated insulation voltage | | |
| with cable entry | | $U_i$ = 250 V |
| with plug connector | | $U_i$ = 50 V |
| **Rated data for the switching elements** | | |
| **ES 552** | | |
| Convent. thermal current $I_{th}$ | | 6 A |
| Utilization category AC-15 | | 230 V / 2 A |
| Utilization category DC-13 | | 24 V / 2 A |
| Switching current, min., at switching voltage | | 10 mA DC 24 V |
| Short circuit protection | | 6 A gG |
| Mechanical life | | Up to 10 x $10^6$ operating cycles |
| **ES 592** | | |
| Convent. thermal current $I_{th}$ | | 3 A |
| Utilization category AC-15 | | 230 V / 3 A |
| Utilization category DC-13 | | 24 V / 1 A |
| Switching current, min., at switching voltage | | 10 mA DC 24 V |
| Short circuit protection | | 3 A gG |
| Mechanical life | | 5 x $10^5$ operating cycles (manufacturer's data 5 x $10^6$) |
| **ES 614** | | |
| Convent. thermal current $I_{th}$ | | 2 A |
| Utilization category DC-13 | | 30 V / 1 A |
| Switching current, min., at switching voltage | | 1 mA DC 5 V |
| Short circuit protection | | 2 A gG |
| Mechanical life | | Up to 10 x $10^6$ operating cycles |
| Ideal application | | 1 mA; 5 V … 0.3 A; 30 V |

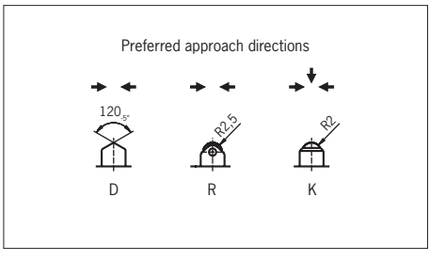
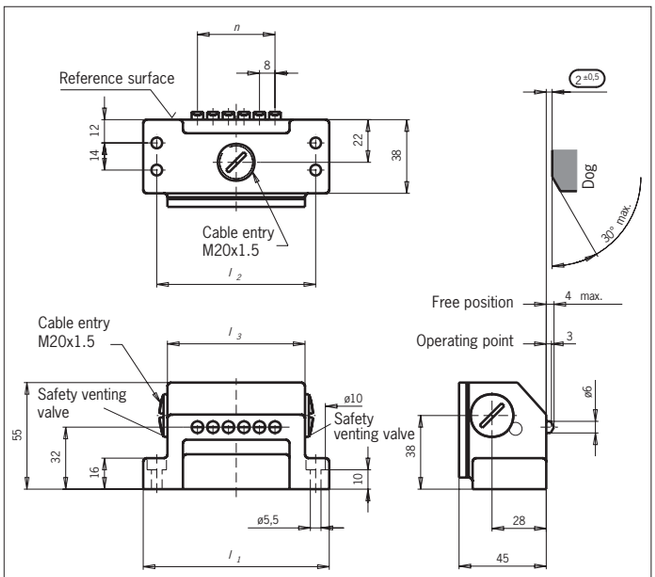
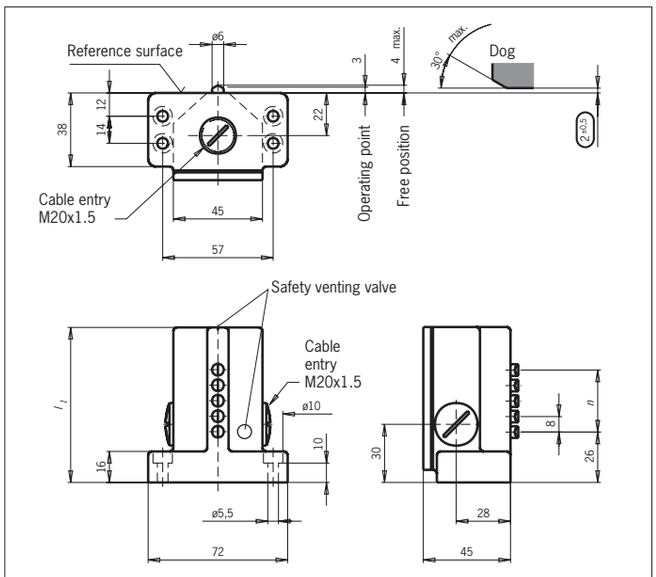



*Fig. 2: Plungers and approach directions*



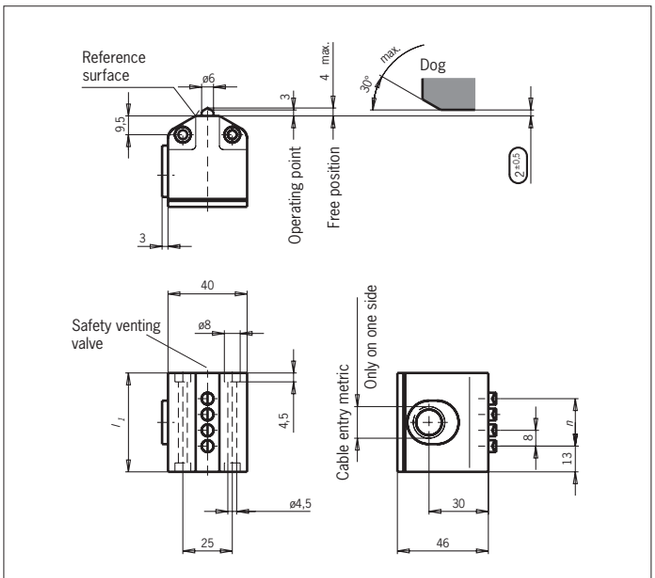

| n<br>Number of plungers | Plunger spacing 8 mm<br>$l_1$ | $l_2$ | $l_3$ |
|---|---|---|---|
| 2 | 64 | 50 | 39 |
| 3 | 80 | 66 | 55 |
| 4 | 80 | 66 | 55 |
| 5 | 96 | 82 | 71 |
| 6 | 96 | 82 | 71 |
| 8 | 112 | 98 | 87 |

*Fig. 3: Dimension drawing for GL...*



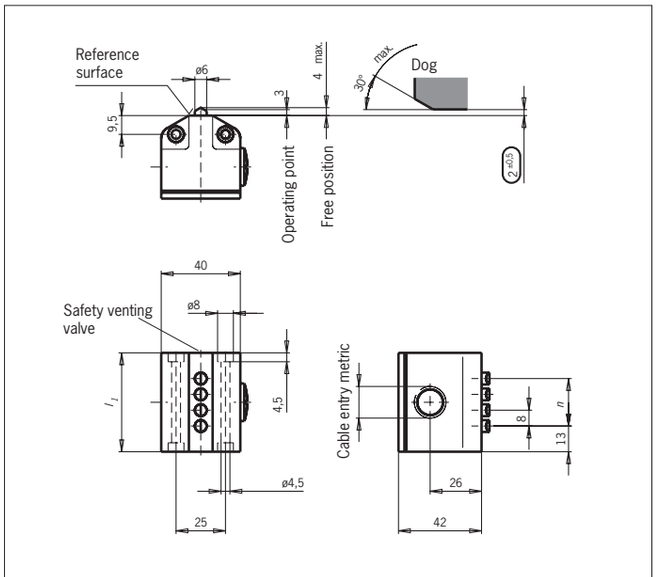

| n<br>Number of plungers | Plunger spacing 8 mm<br>$l_1$ |
|---|---|
| 2 | 48 |
| 3 | 64 |
| 4 | 64 |
| 5 | 80 |
| 6 | 80 |
| 8 | 96 |

*Fig. 4: Dimension drawing for GS...*




| n<br>Number of plungers | Plunger spacing 8 mm<br>$l_1$ | Cable entry |
|---|---|---|
| 2 | 34 | M16x1.5 |
| 3 | 42 | |
| 4 | 50 | |
| 5 | 58 | M20x1.5 |

*Fig. 5: Dimension drawing for SB...*




| n<br>Number of plungers | Plunger spacing 8 mm<br>$l_1$ | Cable entry |
|---|---|---|
| 2 | 34 | M16x1.5 |
| 3 | 42 | |
| 4 | 50 | |
| 5 | 58 | M20x1.5 |
| 6 | 66 | |

*Fig. 6: Dimension drawing for SN...*