

E100

Enabling Switch



Described product

E100

Manufacturer

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Original document

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1 Scope

These operating instructions apply to the enabling switch E100 from the date of manufacture:

- 1724

You will find the device's date of manufacture on the type label in the field Date Code in the format yyww (yy = year, ww = calendar week).

This document is an original document.

2 On safety

This chapter deals with your own safety and the safety of the equipment users.

- Please read this chapter carefully before working with the E100 or with the machine protected by the E100.

The national/international rules and regulations apply to the installation, commissioning, use and periodic technical inspections of the enabling switch, in particular:

- Machinery Directive
- Work Equipment Directive
- EMC directive
- the work safety regulations/safety rules

2.1 Qualified safety personnel

Only qualified safety personnel are authorised to mount, install and commission the enabling switch E100. Qualified safety personnel are defined as persons who ...

- have undergone the appropriate technical training and
- who have been instructed by the responsible machine operator in the operation of the machine and the current valid safety guidelines and
- who have access to these operating instructions.

2.2 Applications of the enabling switch

The enabling switch E100 is a hand-operated control switch that enables personnel to work in the hazardous area of automatic manufacturing systems in the “machine setup” operating mode. In accordance with IEC 60204-1 this operating mode must be set using a lockable selector switch.

The enabling switch is to be linked with the machine controller such that the requirements on circuits related to safety as per ISO 10218 are met. The protection provided by moveable protective devices can be bypassed by the enabling signal under the conditions stated in this standard. Authorised operators can enter the hazardous area:

- during machine set up
- when observing sequences of operation
- during maintenance

Prior to the use of the enabling switch, a risk assessment must be performed on the machine in accordance with:

- ISO 13849-1, Safety of machinery – Safety-Related Parts of Control Systems
- ISO 12100, Safety of machinery, principles of risk assessment
- IEC 62061, Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems

Correct use includes:

- the observance of the applicable requirements on installation and operation, in particular
 - ISO 13849-1, Safety of machinery – Safety-Related Parts of Control Systems
 - IEC 60204-1, Safety of machinery. Electrical equipment of machines. Specification for general requirements
- the regular inspection of the protective device by qualified safety personnel in accordance with section 4.3

**WARNING**

The user is responsible for the safe integration of the safety switch in a safe overall system. For this purpose the overall system must be validated, e.g. in accordance with ISO 13849-2.

If the simplified procedure in accordance with section 6.3 of the current ISO 13849-1 is used for validation, the Performance Level (PL) may be reduced if several devices are connected one after the other. The user of the enabling switch must assess and document remaining residual risks.

2.3 Correct use

The enabling switch E100 must be used only as defined in chapter 2.2 “Applications of the enabling switch”. The enabling switch must only be used on the machine where it has been fitted, installed and initialised by qualified safety personnel and in compliance with these operating instructions.

The product may be used in safety functions.

If the enabling switch is used for any other purposes or modified in any way – also during mounting and installation – any warranty claim against SICK AG shall become void.

2.4 General safety notes and protective measures

Enabling switches provide a protective function for persons. Incorrect installation or manipulation can result in serious injuries.

**WARNING**

No commands that initiate dangerous states are allowed to be triggered using only the enabling switch.

**WARNING**

The safety function of enabling switches is not allowed to be bypassed (contacts bridged), tampered with, or made ineffective by any other means.

**WARNING**

The enabling signal is not allowed to be simulated by fixing the switching element at position 2.

**WARNING**

Enabling switches are only allowed to be operated by authorised personnel who can recognise hazards in good time and immediately take corrective action.

**WARNING**

Every person who is in the hazard area must carry an enabling switch.

**WARNING**

The maximum cable length given in the technical specifications must not be exceeded.

3 Electrical installation

**WARNING**

The electrical connection is allowed to be made by specialist personnel only.

**WARNING**

All switching elements E1 to E4 must be connected to the same circuit.

**WARNING**

It must be ensured that a short circuit is detected.

**WARNING**

When setting up a system, the cables and wires (except earth conductors) used that are accessible on physical contact without opening or removing a cover, or that are laid on other conductive parts, must have either double or reinforced insulation between core and surface or must be enclosed in a metal sheath of adequate current carrying capacity in case of a short between core and sheath.

For use in accordance with cULus requirements, a power supply rated as suitable „for use in class 2 circuits“ must be used. No currents ≥ 8 A are allowed to flow!

The cable cores connected to the evaluation unit (control) are to be individually screened. The screening is to be connected to the earth system on the machine or system. In this way cable short-circuits will be detected and the control shut down immediately by the short-circuit contactor.

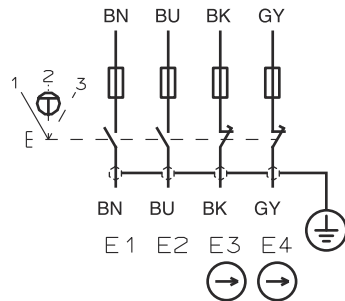


Figure 1: Circuit diagram E100-A 2 normally open contacts and 2 positively driven normally closed contacts. Short-circuit protection see Technical data

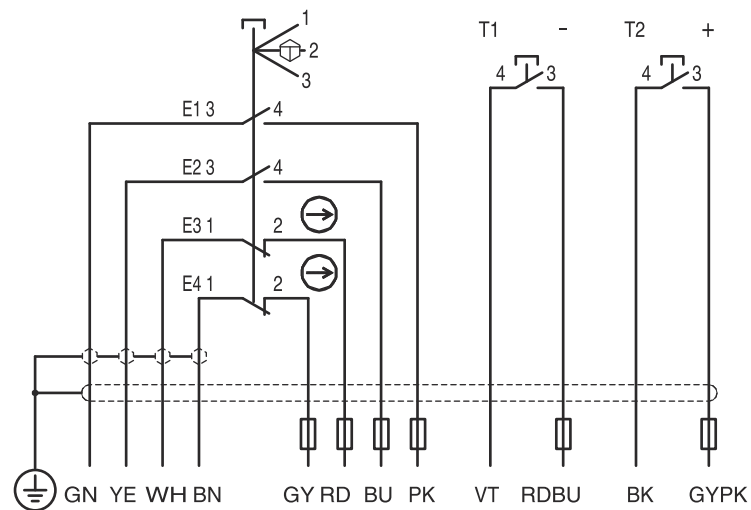


Figure 2: Circuit diagram E100-B 2 normally open contacts, 2 positively driven normally closed contacts and 2 momentary contacts (normally open) Short-circuit protection see Technical data

4 Commissioning

4.1 Function

- Position 1: Off function, operating element not pressed
 Position 2: Enabling function, operating element pressed to the middle position (pressure point)
 Position 3: Off function with positively driven separation, operating element pressed beyond the pressure point

The enabling function is disabled by releasing the operating element or pressing the operating element beyond the pressure point. On the return from position 3 to position 1 (see “b” in Fig. 3) the enabling function does not become effective.

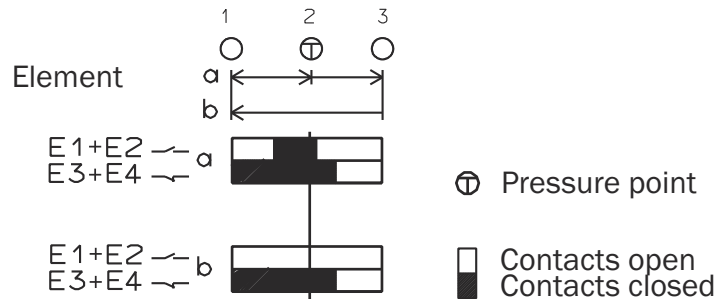


Figure 3: Function (a = operation, b = return from position 3)

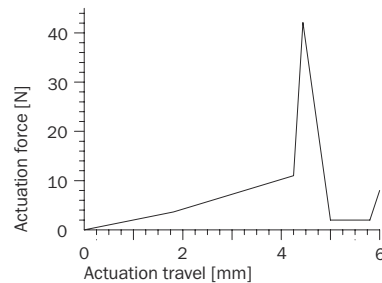


Figure 4: Diagram of the actuation force as a function of the actuation travel

4.2 Tests before the first commissioning

Inspection of the enabling switch (enabling function and positively driven separation of contacts) with function check.

- Off function (enabling switch not pressed): No dangerous states can be initiated.
- Enabling function (enabling switch pressed to the middle position (pressure point)): Dangerous states can only be initiated in this position.
- Off function with positively driven separation (enabling switch pressed beyond the pressure point): Enabling function must be disabled; no dangerous states can be initiated.

4.3 Regular technical inspections

Maintenance work is not necessary. To ensure correct function over the long term, regular checks are necessary.

Daily or prior to the start of the shift the operator must check for:

- correct function
- no visible evidence of tampering

If the enabling switch is not operated frequently, a function check is to be performed at least weekly:

- correct switching function
- correct sealing of cable entry
- loose cable connections or plug connectors



WARNING

In case of malfunctions or damage, the enabling switch must be replaced. Repair only by the manufacturer!

5 Disposal

Procedure

- Always dispose of unusable devices in accordance with national waste disposal regulations.



Complementary information

SICK will be glad to help you dispose of these devices on request.

6 Technical data

6.1 General system data

	E100-A	E100-B
Function	Standard	With additional +/- buttons
Housing material	Plastic	
Enclosure rating in compliance with EN 60529	IP67	IP65
Service life	10 ⁵ Cycles	
B10 _D	5 × 10 ⁵ switching operations with low load as per ISO 13849-1	
Ambient temperature	-5 ... +50 °C	
Switching principle	Slow action switching element	
Type of connection	Cable	
Contamination level (external, according to IEC 60947-1)	3	
Conductor cross section	8 × 0,34 mm ²	4 × 0,5 mm ² (individually screened) + 4 × 0,5 mm ² + 8 × 0,14 mm ²
Max. cable length	25 m	
Rated impulse withstand voltage U _{imp}	2,5 kV	0,8 kV
Rated insulation voltage U _i	250 V	32 V
Usage category in compliance with IEC 60947-5-1	AC-15 2 A 230 V DC-13 2 A 24 V	E1-E4 (PELV ¹⁾): DC-13 2 A 24 V T1-T2 (PELV ¹⁾): DC 24 V 100 mA
Switching voltage min. at 10 mA	12 V	
Switching current min. at 24 V DC	1 mA	
Conditional short circuit current	100 A	
Short-circuit protection at 24 V DC ²⁾	E1-E4: 2 A gG	E1-E4: 2 A gG T1-T2: 0,1 A gG
Weight	Approx. 1,1 kg	

¹⁾ PELV: protective extra-low voltage.

²⁾ For operating voltages other than 24 V DC, the short-circuit protection must be appropriately dimensioned and checked.

6.2 Dimensional drawings

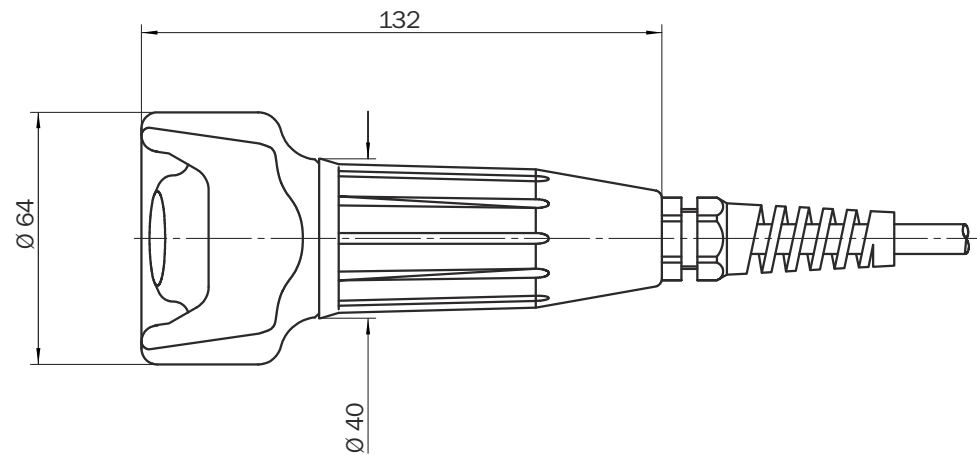


Figure 5: Dimensional drawing E100-A (enabling switch Standard)

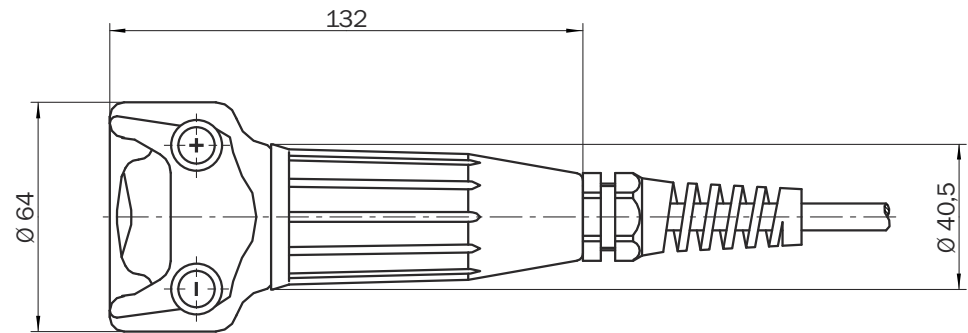


Figure 6: Dimensional drawing E100-B (enabling switch with additional +/- buttons)

7 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at www.sick.com. To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

7.1 EU declaration of conformity

Excerpt

The undersigned, representing the manufacturer, herewith declares that the product is in conformity with the provisions of the following EU directive(s) (including all applicable amendments), and that the standards and/or technical specifications stated in the EU declaration of conformity have been used as a basis for this.

- ROHS DIRECTIVE 2011/65/EU
- EMC DIRECTIVE 2014/30/EU
- MACHINERY DIRECTIVE 2006/42/EC

7.2 UK declaration of conformity

Excerpt

The undersigned, representing the following manufacturer herewith declares that this declaration of conformity is issued under the sole responsibility of the manufacturer. The product of this declaration is in conformity with the provisions of the following relevant UK Statutory Instruments (including all applicable amendments), and the respective standards and/or technical specifications have been used as a basis.

- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
- Electromagnetic Compatibility Regulations 2016
- Supply of Machinery (Safety) Regulations 2008

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