

## Function and technology used in hand-held pendant stations

The most important machine functions can be monitored, e.g. axis selection and axis movement can be controlled decentrally using hand-held pendant stations. The freedom of movement of the machine operator is increased and the operator can monitor and control processes without being tied to a fixed control panel.

In addition to the control function, hand-held pendant stations can also have a safety function. For this purpose the hand-held pendant stations are equipped with emergency stop buttons and enabling switches.

### Hand-held pendant stations with enabling function

Hand-held pendant stations with enabling function are essentially similar to classic enabling switches.

Enabling switches are manually operated control devices that, together with other control switches, enable commands related to potentially hazardous conditions to be run, as long as the enabling switches are actuated continuously. These switches are used wherever personnel must work directly in the danger area on machines and systems. This is necessary, e.g. during setting up, programming, testing or servicing work. As per annex 1 of the Machinery directive, the protective action of movable safety guards can be disabled in these operating modes. The Machinery directive places the condition that these operating modes must be secured using a lockable device (e.g. key-operated switch) and machine operation is only allowed to be triggered by a second, separate action. To enable the operator in the danger area of a machine to trigger a machine movement, an enabling device should also be actuated.

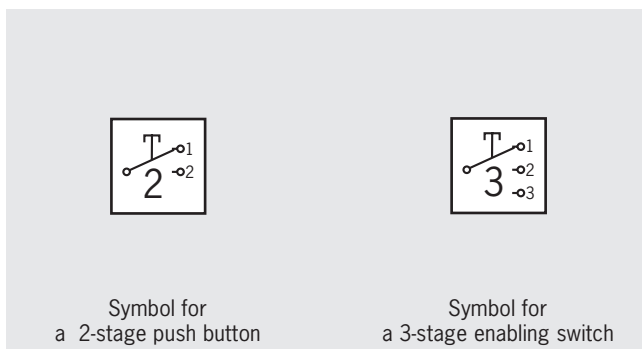
The operator must also be able to stop the machine movement using the enabling device. This task is performed by the enabling switch. Every person who is in the hazardous area must carry an enabling device so that suitable action can be taken in case of danger.

### Two-stage pushbutton or three-stage enabling switch?

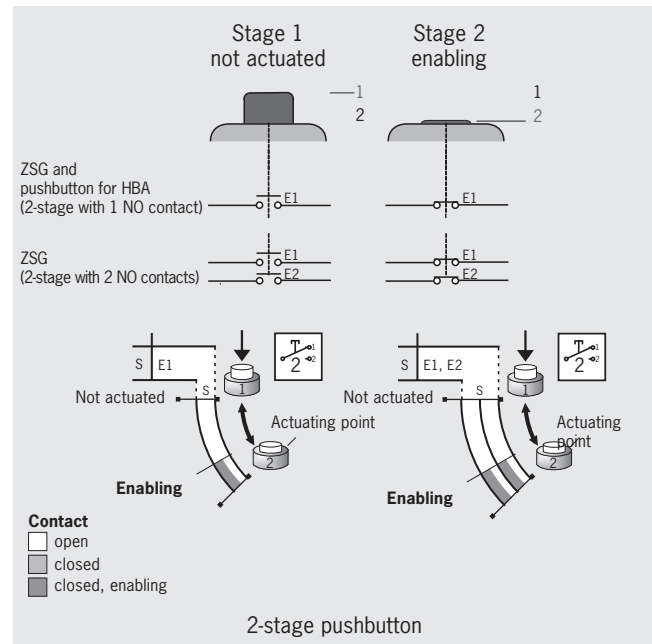
The operator can only start a machine movement if he/she actuates the enabling device and keeps it in the actuated position. The movement is stopped again when the switch is released. This two-stage function (OFF-ON) is provided by all pushbuttons and all three-stage enabling switches. However, experience shows that the operator often clenches the enabling device in an emergency.

In this case a three-stage enabling switch is better and is specifically requested in many C standards. This switch has three switch positions (OFF-ON-OFF) and, if the operator clenches the switch, it is actuated beyond the enabling position (middle position) and the machine is shut down as a result.

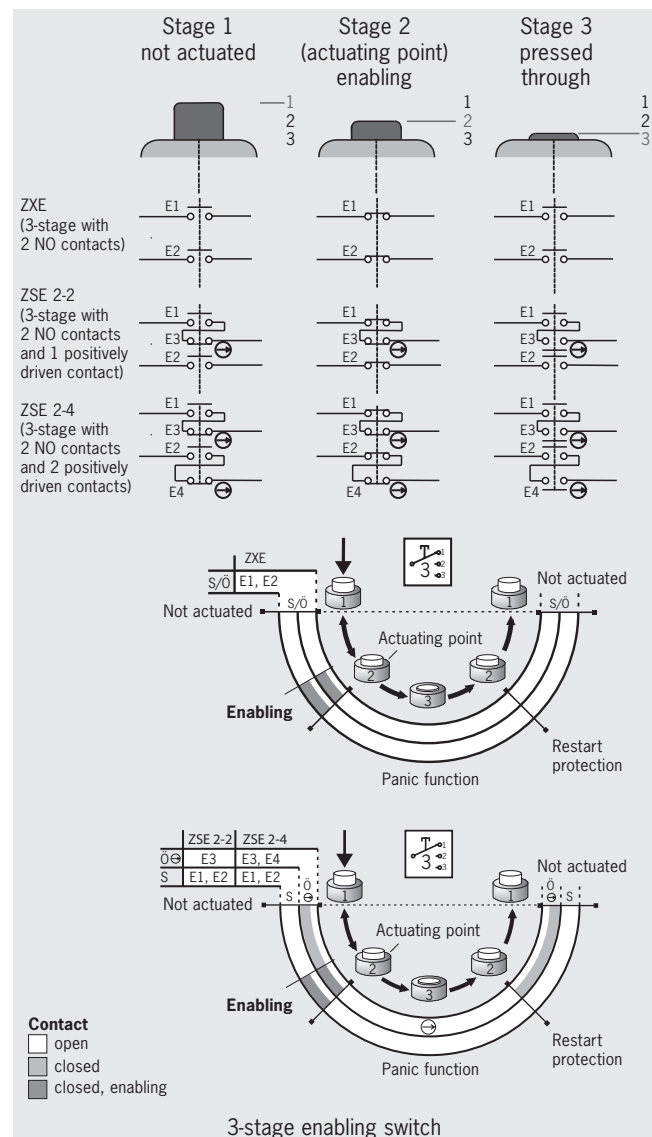
If a 2-stage pushbutton is used, it must also be ensured that, in an emergency, the operator is in a position to activate an emergency stop device in close proximity (VDI 2853). To identify the type of enabling device in the catalog, the following symbols are used:



### Function sequence for two-stage pushbutton



### Function sequence for three-stage enabling switch



As can be clearly seen in the figure, the enabling function can only be achieved at stage 2. This function is provided by the closing of the normally open contacts (NO = E1 and E2).

If the button is released, that is back from stage 2 to stage 1, the normally open contacts are opened again. The 2-stage pushbuttons and the 3-stage enabling switches are identical in this function.

If, in this example, the button on a 3-stage enabling switch is pressed past the actuating point (stage 2) in panic (to stage 3), then not only the normally open contacts (NO) are reset, but at the series ZSE also the safe positively driven contacts (NC  $\ominus$ ) are opened additionally.

The patented switch system ensures that the enabling function does not become active at stage 2 on the resetting of the pushbutton from stage 3 to stage 1. In this example the enable can only be given if normally open and normally closed contacts are closed at the same time. This situation is only possible on actuation from stage 1 to stage 2. In the other direction, from stage 3 to stage 1, stage 2 is skipped and unintentional restarting prevented.

Once the pushbutton has reached stage 1, the function sequence can be started again.

Due to its design, the switch unit also provides a wear-free, constant actuating point (stage 2).

## Ergonomic housing

To make the operation of machines even easier and safer for the user, EUCHNER is the first manufacturer of hand-held pendant stations to have designed the housing taking into account ergonomic aspects. This means the HBL and HBA housings have been developed such that they fit optimally in the hand. Well-known manufacturers of machine tools and controllers all over the world are already using EUCHNER hand-held pendant stations. The wide product range extends from standard housings to custom-built hand-held pendant stations, e.g. with LCD displays, membrane keypads and serial communication ports.



## Custom hand-held pendant stations

Customized hand-held pendant stations based on the standard devices can also be produced in small quantities. In order to use these ergonomically designed housings for the various requirements, EUCHNER offers the option of customized solutions. In the Appendix you will find forms which can be used to describe your requirements. We will be pleased to draw up a quotation based on your requirements.

## Kits for hand-held pendant stations

To enable you to use ergonomically designed housings even for small quantities, e. g. prototypes or special versions, EUCHNER provides kits for hand-held pendant stations. As a result, you can assemble a hand-held pendant station in a user-friendly housing to suit your requirements.

## Explanation of symbols and notation

Symbols and specific notation related to the switches or the contact element are used time and again in the catalog.



The following example is intended to explain these aspects:

► Notation 1 NC  $\ominus$  + 1 NO

Explanation:

Normally closed contacts are termed *NC*, normally open contacts *NO*. The number indicates how many contacts are available. The symbol  $\ominus$  after the *NC* defines that the *NC* contact is a positively driven contact. This switch therefore has one *NC* contact and one *NO* contact; the *NC* contact is a positively driven contact.

## Overview of hand-held pendant stations

Version	Features										
	Selector switch	Key-operated switch	Push-button	Enabling device		EMERGENCY STOP device	Hand-wheel	Membrane keypad	RS422 interface, 3964R protocol	LCD display	Page
				2-st.	3-st.						
<b>Hand-held pendant stations HBA</b> 	●		●	●	●	●	●	●	●	●	10ff
<b>Hand-held pendant stations HBL</b> 	●	●	●	●	●	●	●	●	●	●	20ff

## Hand-held pendant stations HBA



- ▶ Handwheel 100 pulses, wear-free magnetic detent
- ▶ 2 pushbuttons, 2-stage, 1 NO contact each, e.g. for enabling function

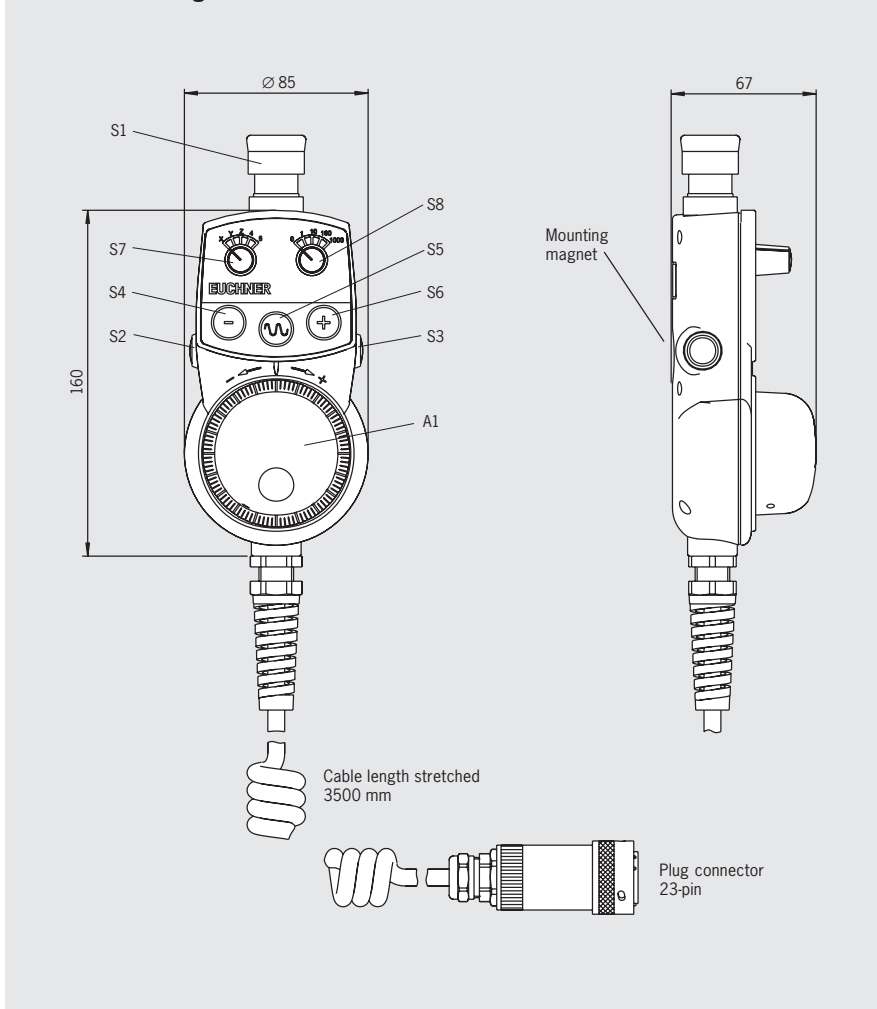
### Depending on version:

- ▶ Tamper-proof EMERGENCY STOP device according to EN ISO 13850, dual-channel
- ▶ 2 selector switches, 5 positions each (X, Y, Z, 4, 5 and 0, 1, 10, 100, 1000)
- ▶ 3 membrane pushbuttons, 1 NO contact each

### Notes

- ▶ For holder HBA for hand-held pendant stations, see Accessories page 48
- ▶ For related 23-pin flange socket, see Accessories page 41





Dimension drawing



### Technical data

Parameter	Value	Unit
<b>Housing HBA</b>		
Material	Plastic	
Color	Gray RAL 7040	
Operating temperature	0 ... +50	°C
Storage temperature	-20 ... +50	°C
Degree of protection according to EN 60529 / NEMA	IP 65 / 250-12	
Connection	Coiled cable, expandable to 3.5 m, 23-pin plug connector	
Weight	Approx. 1.3	kg
<b>Handwheel</b>		
Pulses / revolution	100	
Power supply	5 ± 5%	V DC
Output specifications	RS422A	
<b>Pushbutton, 2-stage, e.g. for enabling function</b>		
Switching elements	2, 1 NO contact each	
Connection ratings	30 V DC / 100 mA	
<b>EMERGENCY STOP device</b>		
Standard	EN ISO 13850	
Switching elements	2 NC contacts	
Utilization category to IEC 60947-5-1	DC-13, U <sub>e</sub> 24 V, I <sub>e</sub> 3 A	
<b>Selector switch</b>		
Output code	See wiring diagram	
Switching voltage max.	25	V AC/DC
Switching capacity max.	0.2	VA
<b>Membrane keypad</b>		
Switching elements	3, 1 NO contact each	
Switching voltage max.	30	V DC
Switching current max.	100	mA
Breaking capacity max.	1	W

## Ordering table

Version/item	Features					Order No.
	2 selector switches 5 positions each S7, S8	3 membrane pushbuttons 1 NO contact each S4, S5, S6	2 pushbuttons 2-stage S2, S3	EMERGENCY STOP device S1	Handwheel 100 pulses A1	
HBA - 079 828 			●		●	079 828
HBA - 079 826 	●		●	●	●	079 826
HBA - 072 936 		●	●	●	●	072 936
HBA - 079 827 	●	●	●	●	●	079 827

## Wiring diagram

