Safety Two-Hand Control Unit S2HC

The S2HC is a very compact all-purpose two-hand control unit conforming to the requirements of EN574, type III C. It is designed for the use in safety circuits in accordance to EN60204-1, e.g. in presses, stamping machines or bending tools. Despite its compact dimensions the S2HC is suitable for any application up to the highest safety category 4 according to EN954-1 and type III C according to EN574 due to the internal error monitoring.



- *STOP category: 0*
- *Up to safety category: 4 / III C*
- *Two-channel control system*
- *Very compact housing 22.5 mm*
- *2 force-guided contacts*
- *Redundancy and cyclical monitoring*
- *Cross short-circuit monitoring*
- *Conforms to EN574, EN954-1, EN60204-1, VDE0113-1*

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Application

The ZANDER two-hand control unit **S2HC** is suitable for the construction and monitoring of two-hand controls providing the safety of the operating personnel. Operations jeopardizing the operator's safety are only actuated if both two-hand switch buttons are connected and pressed at the same time, i.e. within 0.5 s.

A single failure will **not** result in a loss of the safety function. Due to the cyclical monitoring, the failure will be detected at last before the next actuation. In addition to the requirements of EN60204-1 and EN574, the **S2HC** also meets the requirements for the safety category 4 of EN954-1.

To avoid inadvertent activation of the switch buttons and easy bypassing of the protective function, the switches of the two-hand control have to be arranged and designed accordingly. **The relevant safety regulations and standards must be attended, especially EN 574 and EN 999.**

The **S2HC** is designed for the connection to two-hand switch buttons with a break (N/C) and a make contact (N/O) each.

Function

After applying operating voltage to A1-A2 and closing the feedback circuit, the **S2HC** is ready for operation. The output relays must be in the de-energized condition in order to be able to initialise a switching operation. The output relays switch over to their working position when the two-hand switch buttons T1 and T2 are activated simultaneously, i.e. within 0.5 s. The output relays will not switch on,

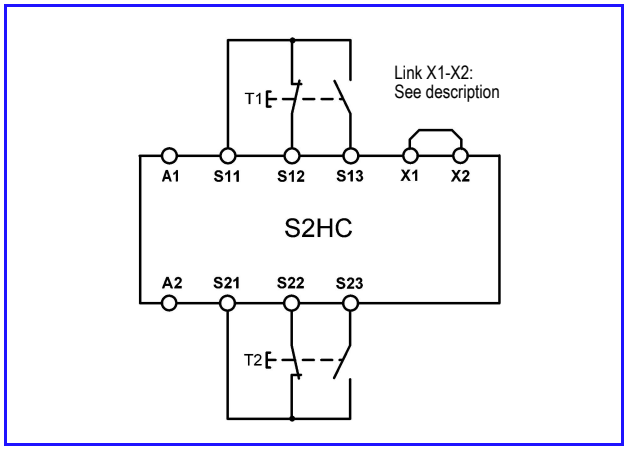
- if the two-hand switch buttons are not activated simultaneously within 0.5s
- if the feedback circuit is open (failure at the external contactors)
- if any other failure has occurred (short-circuit, cable break, internal failure of the two-hand control unit).

As soon as T1 and/or T2 are released, the output relays return to their de-energized condition. To actuate a new operation, both two-hand switch buttons must be released and the feedback circuit must be closed again.

Due to the feedback circuit, the monitoring of external contactors or relays is possible to increase the number of contacts or enhance the switching capacity. If no external contactors or extension units are used the terminals X1 and X2 must be connected to each other. Provided that the system has been installed properly, no maintenance is necessary.

Safety Warnings

- **Installation and operation must be carried out by qualified personnel only.**
- **The electrical installation must be performed after disconnecting the device and the machine from the mains supply.**
- **The wiring must be carried out according to the instructions of this operating manual, or the safety function may be lost.**
- **In accordance to EN60204-1 the device is designed for the installation into service cabinets with a minimum protection of IP54.**
- **Opening the device, any manipulation of the device and the avoidance of the safety facilities are not permitted.**
- **All relevant safety regulations and standards must be attended to.**
- **Non-observance of the safety regulations may cause death, severe injuries or substantial damage to property.**



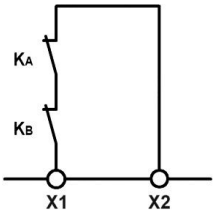
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Feedback circuit X1-X2

If external contactors or extension modules (e.g. SREC) shall be connected to the two hand control unit in order to increase the number of contacts or enhance the switching capacity, their force-guided monitoring contacts K_A and K_B must be wired in series and connected to X1 and X2.



Avoiding inadvertent actuation or bypassing the safety function

According to the standard EN 574, the arrangement of the two-hand switch buttons must be carried out in a way that an inadvertent actuation or an easy bypassing of the safety function is impossible. The actuation of both buttons with only one hand must be inhibited by a sufficient distance between them (min. 260 mm) or by a partition wall. The operation with the forearm, ellbow knee, hip or other parts of the body can be inhibited effectively by further increasing of the distance, sufficient distance to the floor and/or covers and/or partition walls.

Distance between the two-hand switch button and the danger zone

It is required to keep a minimum distance between the two-hand switch buttons and the danger zone of the machine. After releasing of one or both buttons the dangerous movement of the machine must have stopped before the danger zone can be reached.

According to the standard EN999 the minimum distance can be calculated with the following equation:

$$S = (K \times T) + C$$

The identifiers mean:

S: Minimum distance measured between the nearest actuator component (two-hand switch button) and the danger zone

K: Constant (mm/s), derived from data about the approach speeds of the body or parts of the body, 1600 mm/s for two-hand controls.

T: Running-down time of the complete system (seconds), i.e. the time between the release of the two-hand switch button and the termination of the dangerous movement.

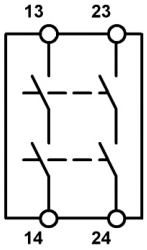
C: Additional distance (mm) based on the penetration into the danger zone before activation of the safety unit. This is 250 mm for two-hand controls. If a suitable cover is used, it may be set to 0, however, S must be 100 mm at minimum. *Example:* The running-down time of the system is 90 s. The result of the equation provides the minimum distance:

S = (1600 mm/s × 0,09 s) + 250 mm
S = 144 mm + 250 mm = **394 mm**

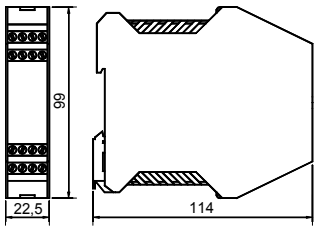
If a suitable cover is used, S can be reduced to 144 mm (see above).

Safety Contacts

S2HC provides two force-guided, redundant safety contacts (13-14, 23-24, NO).



Specifications	
Conforms to	EN574:1996, VDE0113 part 1 / 07.98, EN60204-1:1998, EN954-1:1996
Operating voltage	AC 230V, AC 115V, AC/DC 24V, frequency AC: 50-60 Hz At AC/DC 24V an insulating transformer acc. to EN 61558-1 and EN61558-2-4 must be used.
Allowable tolerance	+/-10%
Power consumption	approx. 4VA / 2W
Control voltage at S12/S13 and S22/S23	DC 24V
Control current	Approx. 2x20 mA
Break time of the safety relays	< 20 ms
Synchronization time	< 0.5 s
Safety contacts	2 N/O
Max. switching voltage	AC250V
Switching capacity	AC: 250V, 1500VA, 6A (resistive load) 230V, 4A (AC-15) DC: 24V, 30W, 1,25A (resistive load) 24V, 30W, 2A (DC-13)
Cumulative current of the safety contacts	Max. 8.4A
Min. load	24V, 20mA
Contact protection	4A slow fuse or 6A fast fuse
Wire width	2,5 mm²
Length of control lines	Max. 1000m at 0,75 mm²
Contact material	AgNi
Service life	mech. $1x10^7$, elect. $1x10^5$ switching cycles
Rated impulse withstand voltage	2,5 kV (control voltage/contacts)
Dielectric strength	4 kV acc. to DIN VDE 0110-1:1997-04 degree of pollution 2
Protection	IP20
Temperature range	AC/DC 24V: -15°C to +60°C AC 230V/115V: -15°C to +40°C
Weight	approx. 230g
Mounting	35 mm rail DIN EN 50022-35



Order No.	Type
472400	S2HC, AC230V
472401	S2HC, AC115V
472403	S2HC, AC/DC24V

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