

One and two hand devices

Safeball™



A two hand device which is comfortable and easy to use.



SAFEBALL™

Unique World Wide Two hand device

Safeball™ consists of a spherical ball containing two embedded pushbutton switches, one on each side of the ball. By using this pushbutton configuration, the risk of unintentional activation is minimised and the device is simple and ergonomic to use.

Safeball™ can be utilised for either One hand (one Safeball™) or Two hand (two Safeballs™) applications. In either application, and in order to meet the required level of safety, the Safeball™ switches are monitored by specified/certified ABB Jokab Safety Safety relays (see electrical connection).

In the case where Two hand control is used, both Safeballs™ i.e. all four pushbuttons have to be activated within 0.5 seconds. If one or more pushbuttons are released a Stop signal is given to the machine. In order to provide the highest level of safety the Safeball™ design provides the operator with a dual switching function and short-circuit supervision in each hand.

Each Safeball™ is ergonomically designed and has both its cover and actuator made of environmentally-friendly polypropylene. The design allows for comfort of use for all hand sizes and operation from numerous gripping positions. Mounting of the Safeball™ is also very flexible allowing the device to be mounted in the most ergonomic position for the operator.

When can a Two hand or One hand control be used ?

A Two hand control can be used when it is necessary to

Approvals:



Safeball for:

- Presses
- Punches
- Fixtures
- Shearing machines

Features:

- Ergonomic
- Low activation force
- Flexible mounting
- Several grip possibilities
- Highest safety level
- Two channel switching in each hand

ensure that the operator is outside and must be prevented from reaching into the hazardous area. If the operator decides, after the start signal has been given to the machine, to make an 'after-grasp' i.e. try to adjust the part that has been placed into the machine, then a dual stop signal is given to the machine.

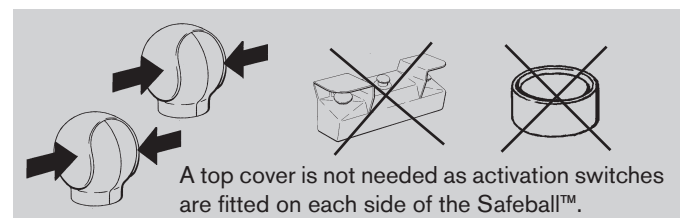
A one hand control device can be used when the operator cannot reach the hazardous area with his/her free hand or on less dangerous machines.

Highest Safety Level

The Safeball™ is certified by Inspecta in Sweden for use as a Two hand control device, when used with a JSBR4 ABB Jokab Safety Safety relay or Pluto Safety-PLC, in accordance with the highest safety level in standard EN 574 (type IIIc).

Two hand device adapted for AS-i

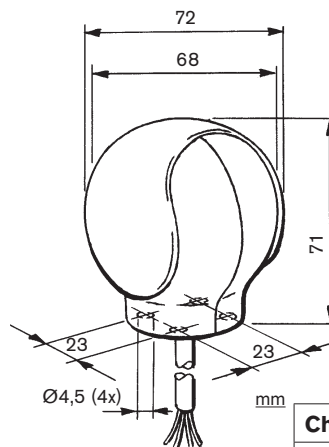
The two hand device, Safeball also comes in a version adapted for direct attachment to the AS-i bus.



A top cover is not needed as activation switches are fitted on each side of the Safeball™.

Technical data - Safeball	
Manufacturer:	ABB AB/Jokab Safety, Sweden
Article number/Ordering data:	
JSTD1-A Safeball 1 NO + 1 NC with 2 m cable	2TLJ020007R3000
JSTD1-B Safeball Safeball 1 NO + 1 NC with 0.2 m cable	2TLJ020007R3100
JSTD1-C Safeball 1 NO + 1 NC with 10 m cable	2TLJ020007R3200
JSTD1-E Safeball 2 NO 0,2 m cable	2TLJ020007R3400
Material:	Polypropylene
Colour:	Yellow and black
Size:	Height: approx. 71 mm, Diameter, min.: 68 mm Diameter, max.: 72 mm Diameter, base: 42 mm
Weight:	0.2 kg with 2 m cable 0.7 kg with 10 m cable 0.1 kg with 4x0.2 m wires
Safety level:	
EN ISO 13849-1	Up to category 4/PLe
EN 954-1	Up to category 4
Temperature:	0°C to +55°C (operating) -20°C to +70°C (storage)
Protection class:	IP67. Not intended for use under water
Operating force:	Approx. 2 N
Actuator travel:	1.3 +/- 0.6 mm
Max switching load:	30 V 2A DC, resistive load
Recommended load:	24 V 10mA DC
Min switching load:	6V 10mA DC, resistive load
Contact resistance:	100 mohm
Life, mechanical:	> 1x10 ⁶ operations at max. 1 Hz

Life, electrical:	Dependant upon electrical load characteristics
Connection cable:	
JSTD1-A:	2m PVC-cable, 4 x 0.75mm ²
JSTD1-B, JSTD1-E:	4 x 0.75mm ² wires, approx. 0.2 m
JSTD1-C:	10 m PVC-cable, 4x0.75 mm ²
Conformity:	EN ISO 12100-1:2003, EN ISO 12100-2:2003, EN 574+A1:2008



Chemical resistance at 20°C	
Chemical	Resistance
Alcohols	good
Paraffin oil	good
Milk	good
Silicon oil	good
Acetone	good

Please contact us for more information.

Function - Safeball

Two hand control device

The Two hand control device is implemented by using two Safeballs™, each having two internal pushbuttons. The Safe-balls™ must be mounted a minimum distance between each other (see Mounting description).

By utilising two pushbuttons in each device a double safety function is provided in each hand.

The highest safety level is achieved by connecting all four pushbuttons to the ABB Jokab Safety JSBR4 safety relay or Pluto Safety-PLC. The safety relay gives a dual and supervised safety function and requires input activation within 0.5 seconds in order to start the machine. It also checks that all four pushbuttons have returned to their deactivated positions before a new start is allowed. The JSBR4 safety relay also provides a stop signal if one or more pushbuttons are released.

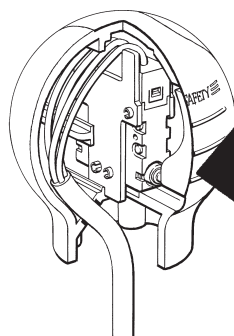
One hand control device

Safeball™ is also a very practical method of providing a one hand control device as it is very easy to find and activate by the machine operator. One hand devices should only be used when the operator cannot reach into the hazardous area with his/her free hand or on less dangerous machines. Before fitting the necessary risk assessment must be made to determine suitability of this type of control. To achieve the highest safety level for One hand control the Safeball™ must be connected to a ABB Jokab Safety safety relay (See Electrical Connection).

Versions

Safeball is available in several versions to meet different mounting requirements.

- **JSTD1-A** - The standard version with actuators made of plastic and 2 m of cable.
- **JSTD1-B** - Similar to the standard version but without a cable. Instead it has four wires, each 0.2 m long.
- **JSTD1-C** - Similar to JSTD1-A but with 10 m cable.
- **JSTD1-E** - Similar to JSTD1-B but with 2 NO contacts.



Activation of a pushbutton.

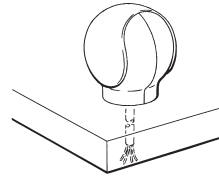
Safeball™, JSTD1, is certified by DNV Inspecta.
Approval number:
01-MAL-CM-0101 (Two-hand device)
01-MAL-CM-0100 (One-hand device)

Mounting - Safeball

The Safeballs™ can be mounted in many different ways. They can be mounted on a table, a machine, on a support or wherever suitable for ergonomic reasons. The Safeball™ can be mounted in a fixed position or on a tilting and/or rotating support. This flexibility of mounting permits the Safeball™ to be fitted in the best ergonomic position for the ease of operation by the operator. The distance requirement between two Safeballs™ or between a Safeball™ and a wall or edge of a table depends on how the Safeball™ is mounted. Safeball™ can be mounted with four M5 screws or ST4.8 self-tapping screws.

Note: When Safeballs™ are mounted in such a way that the distance between them can be adjusted to less than the specified minimum, the mounting screws must be locked to ensure any changes in the distance between the two balls cannot be made.

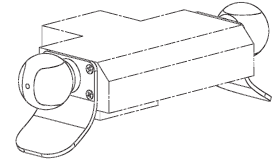
Alternative mounting methods



Mounting on a table.



Mounting with ball joint, which can be rotated and angled.



Example of alternative mounting.

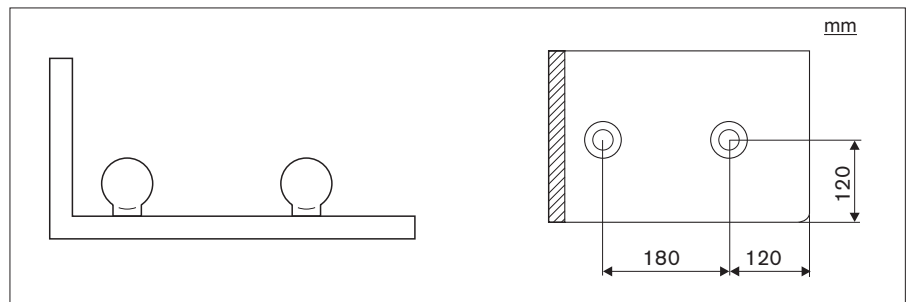
Approved Two hand device

To be an approved Two hand device, both Safeballs™ must be mounted a minimum distance apart in order to prevent operation of both balls with one hand. Safeballs™ must be fitted a minimum distance from the edges of tables or a wall. It is essential that Safeballs™ are correctly installed in order to prevent unintended activation of the devices with part of the body in combination for example with a wall.

Mounting distance - Safety distance - Safeball

Mounting distance

Table mounting of two Safeballs™. In order to prevent cheating the distances shown are the minimum allowed.

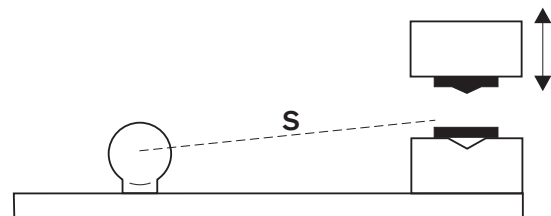


Safety distance

The Safety distance is the distance between the Safeballs™ and the dangerous machine movement. The safety distance requirement can be calculated using the following formula for Safeball™ in accordance with the approving authority and EN ISO 13855:
 $S = K \times T + C$

Where

- S= safety distance in mm
- K= hand speed, 1600 mm/s
- T= total stopping time for the dangerous movement (including the response time of the safety relays in seconds)
- C= Constant= 0 mm for Safeball.



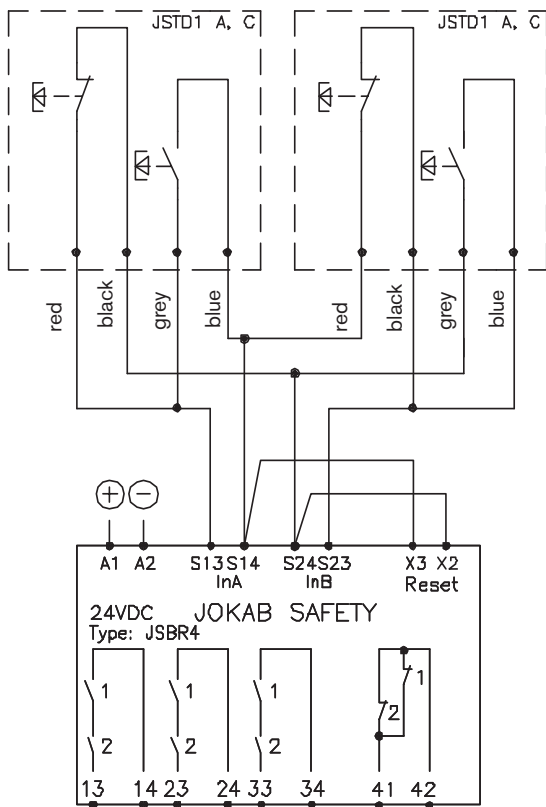
The safety distance is the distance between the Safeballs™ and the dangerous machine movement.

Note: S must never be less than 100 mm.

Electrical connection - Safeball

Two hand device

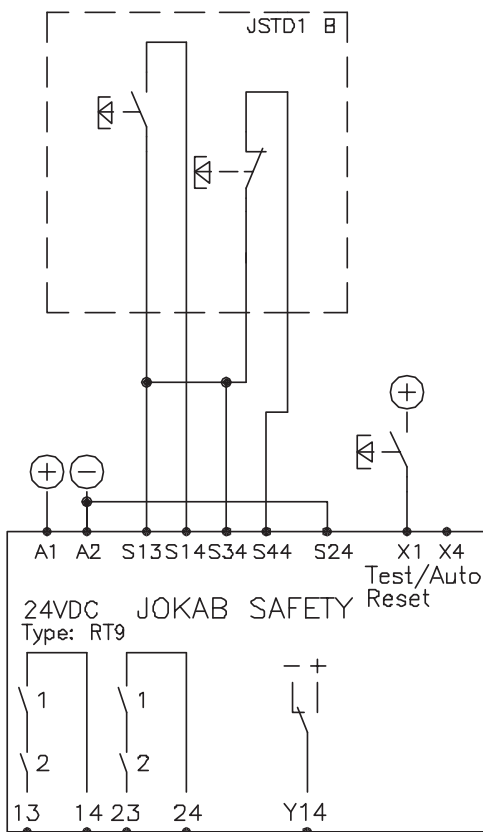
Safeballs™ are designed to be connected to a ABB Jokab Safety JSBR4 Safety relay or Safety PLC to achieve the highest safety requirements for a Two hand device.



Example of two devices connected to a ABB Jokab Safety JSBR4 safety relay. Response time on receiving a stop signal from JSTD1 < 15 ms.

One hand device

When used as a One hand device the Safeball™ is designed to be connected to a ABB Jokab Safety RT6, RT7 or RT9 Safety relay in order to achieve the highest possible safety level for this type of control.



Example of a single Safeball™ connected to a ABB Jokab Safety relay RT9. The response time at 'stop' is < 20 ms.