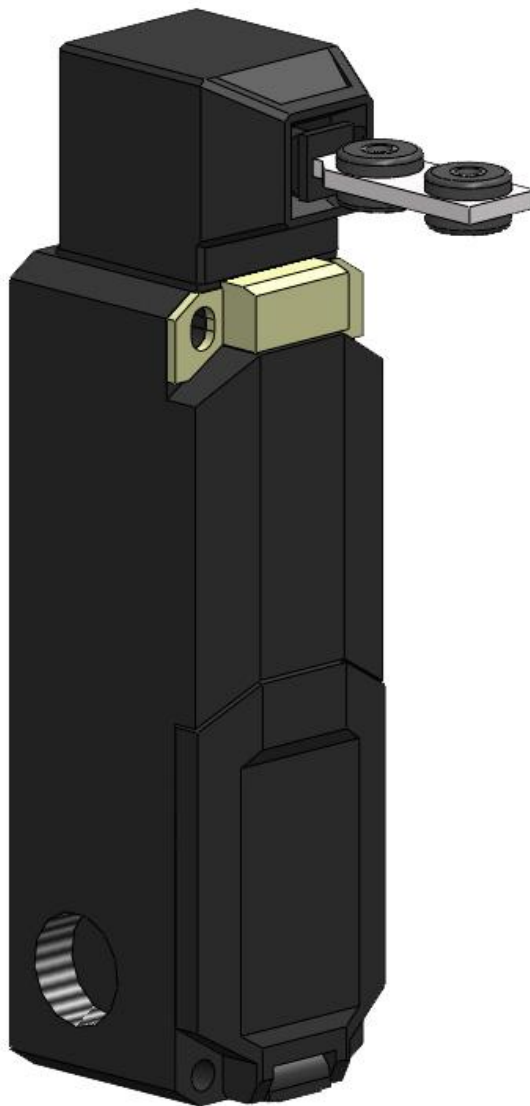


Original instructions

JSNY9

Safety interlock switch



Read and understand this document

Please read and understand this document before using the products. Please consult your ABB/JOKAB SAFETY representative if you have any questions or comments.

WARRANTY

ABB/JOKAB SAFETY's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by ABB/JOKAB SAFETY.

ABB/JOKAB SAFETY MAKES NO WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS, ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OR THEIR INTENDED USE. ABB/JOKAB SAFETY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED.

LIMITATIONS OF LIABILITY

ABB/JOKAB SAFETY SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of ABB/JOKAB SAFETY for any act exceed the individual price of the product on which liability asserted.

IN NO EVENT SHALL ABB/JOKAB SAFETY BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS ABB/JOKAB SAFETY'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

ABB/JOKAB SAFETY shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product. At the customer's request, ABB/JOKAB SAFETY will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.

Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, and installations subject to separate industry or government regulations.

Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE ABB/JOKAB SAFETY PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

While every effort has been taken to ensure the accuracy of the information contained in this manual ABB/JOKAB SAFETY cannot accept responsibility for errors or omissions and reserves the right to make changes and improvements without notice. Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of ABB/JOKAB SAFETY'S test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the ABB/JOKAB SAFETY Warranty and Limitations of Liability.

Table of Contents

1	Introduction	4
	Scope	4
	Audience	4
	Prerequisites	4
	Special notes	4
2	Overview	5
	General description.....	5
	Safety regulations	5
	Function description.....	6
3	Connections	7
	Connection examples	8
4	Installation and maintenance	10
	Installation precautions	14
	Maintenance	14
5	Operation	15
6	Model overview.....	16
	Accessories.....	16
7	Technical data	17
	Dimensions	19
8	EC Declaration of conformity	20

1 Introduction

Scope

The purpose of these instructions is to describe the safety interlock switch JSNY9 and to provide the necessary information required for installation and operation.

Audience

This document is intended for authorized installation personnel.

Prerequisites

It is assumed that the reader of this document has knowledge of the following:

- Basic knowledge of ABB/Jokab Safety products.
- Knowledge of safety devices and safety locks.
- Knowledge of machine safety.

Special notes

Pay attention to the following special notes in the document:

**Warning!**

Danger of severe personal injury!

An instruction or procedure which, if not carried out correctly, may result in injury to the technician or other personnel.

Caution!

Danger of damage to the equipment!

An instruction or procedure which, if not carried out correctly, may damage the equipment.

NB: Notes are used to provide important or explanatory information.

2 Overview

General description


JSNY9 is a safety interlock switch with a locking function. The switch can only be actuated using a corresponding triple coded actuator and can be mounted in any direction (the switch head can be rotated 4x90 degrees). The actuation direction can be either linear or radial by using a specific actuator. The switch head can also be flipped upwards which allows both horizontal and vertical actuation directions. The holding force is 1500 N.

Additionally, the JSNY9 is tamper-proof (the switch cannot be actuated with screwdrivers, magnets or other tools).


The switch is well suited to lock a door or hatch to prevent access to machines:

- When the machine perform tasks that are not allowed to be stopped during the process, e.g. welding
- When the machine have long stopping time, e.g. paper machines with a long brake process
- To keep unauthorized persons away from a certain area

NB: To reach a high safety level when connected to the machine control system, it is recommended to use an ABB/Jokab Safety safety relay, Pluto safety-PLC or a Vital safety module with a Tina adaptor unit.

 **Warning!** In order to maintain the safety level the actuator may only be procured and used as an integral part of the associated safety switch.

Safety regulations

 **Warning!** Carefully read through this entire manual before using the device.

The devices shall be installed by a trained electrician following the Safety regulations, standards and the Machine directive.

Failure to comply with instructions, operation that is not in accordance with the use prescribed in these instructions, improper installation or handling of the device can affect the safety of people and the plant.

For installation and prescribed use of the product, the special notes in the instructions must be carefully observed and the technical standards relevant to the application must be considered.

In case of failure to comply with the instructions or standards, especially when tampering with and/or modifying the product, any liability is excluded.

Function description

JSNY9 has 2 pairs (1NC + 1NO) contacts; the first pair change states when the actuator is inserted into the switch, and the second pair change states when the locking mechanism is in its locked position. The locking device is controlled through terminals E1-E2, and locking/unlocking characteristics is depending on the model.

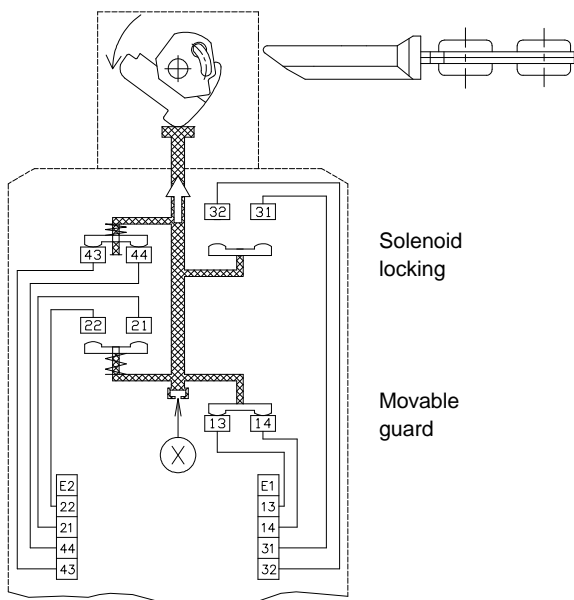
There are two main models of the JSNY9, one with spring interlocking (JSNY9S) and one with solenoid interlocking (JSNY9M).

Spring interlocking (JSNY9S)

Spring interlocking (constant current circuit) means that the unit is locked as soon as the actuator is inserted into the switch, and power must be supplied to E1-E2 to unlock the device.

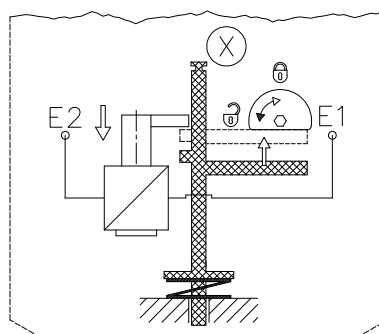
Solenoid interlocking (JSNY9M)

Solenoid interlocking (open circuit principle) means that power must be supplied to E1-E2 to lock the unit. This unlocks the door at power failure.

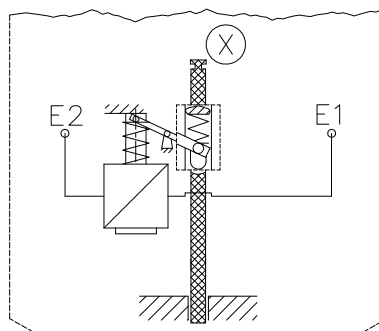


Solenoid
locking

Movable
guard



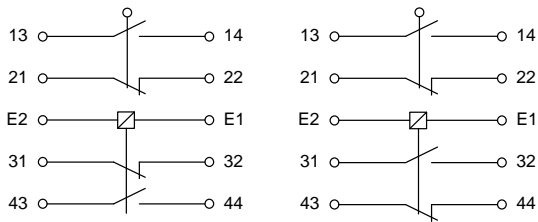
JSNY9S
(spring interlocking)



JSNY9M
(solenoid interlocking)

3 Connections

JSNY9 electrical connections

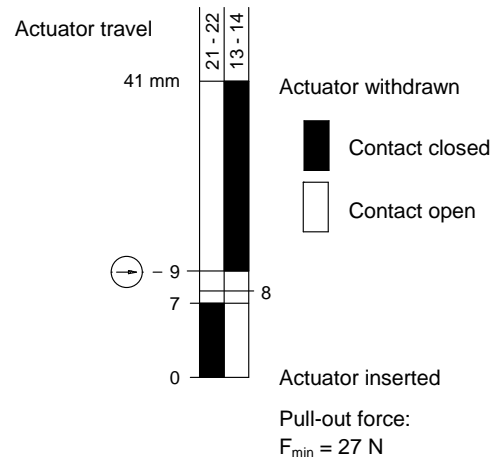


JSNY9S

Actuator inserted
Device locked
(No power applied to
E1-E2)

JSNY9M

Actuator inserted
Device unlocked
(No power applied to
E1-E2)



Contacts description:

Normal state when protection is active, i.e. when the actuator is inserted into the switch and the device is locked.

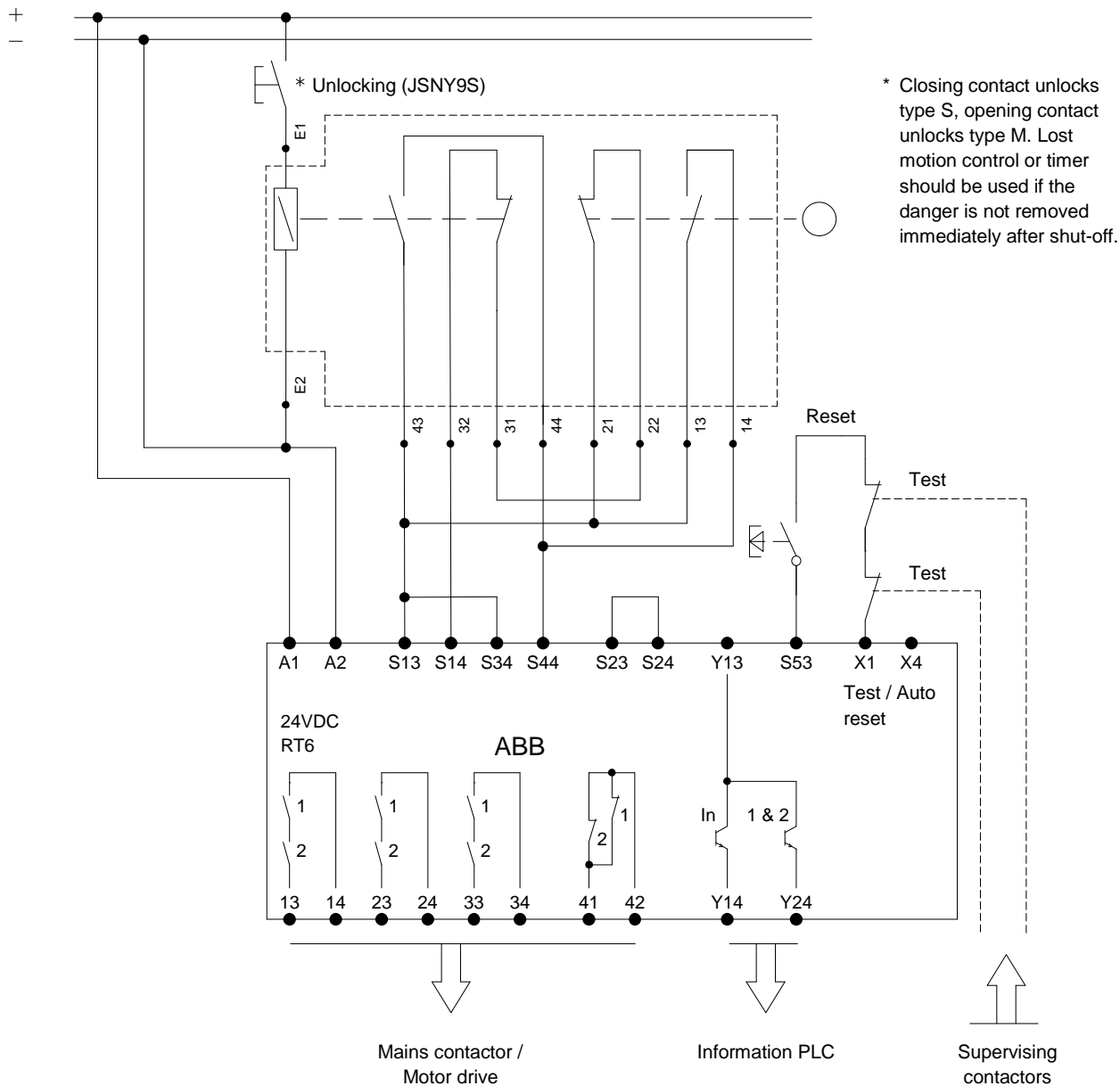
- 13-14** NO-contact. Closed when actuator is withdrawn.
- 21-22** NC-contact. Opened when actuator is withdrawn.
- E1-E2** Power for locking (M-type) / unlocking (S-type)
- 31-32** NC-contact. Opened when JSNY9 is unlocked.
- 43-44** NO-contact. Closed when JSNY9 is unlocked.

By design, locking is not possible unless the actuator is fully inserted into the actuator head. The contacts used to monitor the locking can therefore also be used to monitor the actuator position. The two NC-contacts (positive-opening NC) should be used to achieve the electrical dual-channel connection for the safety function.

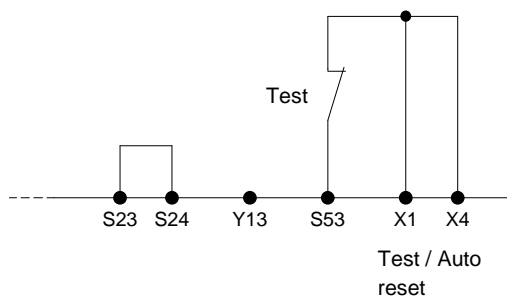
Connection examples

Connection example: JSNY9S connected to safety relay RT6, actuator inserted and locked

A) Interlocking safety switch with manual reset and supervising of external relay contacts



B) with automatic reset



System description / Application example

While the machine is running the movable guard is closed. The separate actuator is nested in the head of the safety switch. In this state the safety outputs are closed and unlocking is disabled. In case of e.g. maintenance the operator will need to gear into the machine behind the movable guard. In this case the operator will stop the machine first. The safety switch will keep the actuator locked until the dangerous machine has come to a safe stop. This can be achieved by using a suitable control device, such as a timer or lost motion detector. When the machine is stopped, unlocking is enabled. An unlock command (power supplied or power cut off, depending on type), will unlock the actuator and open the safety circuit. The safety relay will fall, and the machine cannot be started. The movable guard can now be opened. The positive-opening NC contacts should be used in the safety circuit and the auxiliary contacts can be used for signals or as a complement in the safety circuit to the safety relay, to achieve certain functions.

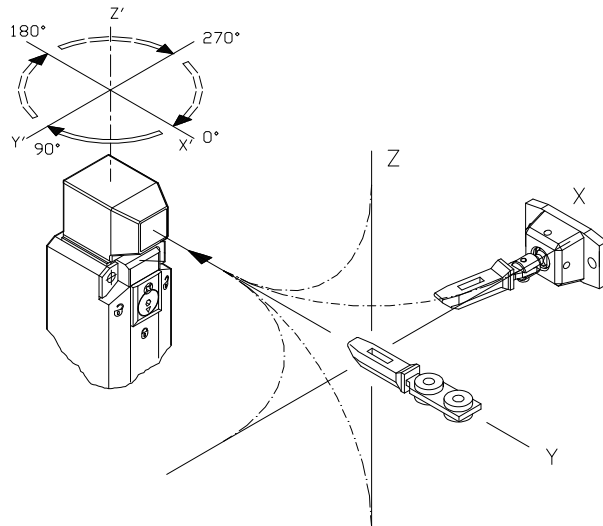
The contacts for monitoring the position of the actuator are operated directly by the actuator in order to register the position of the guard directly. The contacts for monitoring the locking function are directly connected with the locking bolt. A failure of the locking function can be detected by the safety relay. The design of the locking is of such a kind that the locking cannot be activated unless the actuator is completely inserted into the head of the safety switch. Thus the contacts for monitoring the locking function can also be used to monitor the position of the movable guard. The possibility to monitor both contacts (movable guard and locking function) separately leads to a dual channel mode.

4 Installation and maintenance

JSNY9 is easily fitted on the ABB/Jokab Safety Quick-Guard fencing system using special brackets found in the "Accessory"-section below.

The actuation direction can be chosen either linear or curved, using the appropriate actuator.

Actuators and installation



Standard actuator

For sliding doors and hinged doors with actuating radius >400 mm.

Head position: 0°, 90°, 180°, 270°.

NB: Washers for M4 with outer diameter Ø12 mm MUST be used to achieve form-locking!

Universal actuator

For hinged doors with actuating radius >150 mm

Head position: 0°, 90°, 180°, 270°.

NB: Fixing holes Ø 5.5 mm symmetric in position with X- or Z-axis.

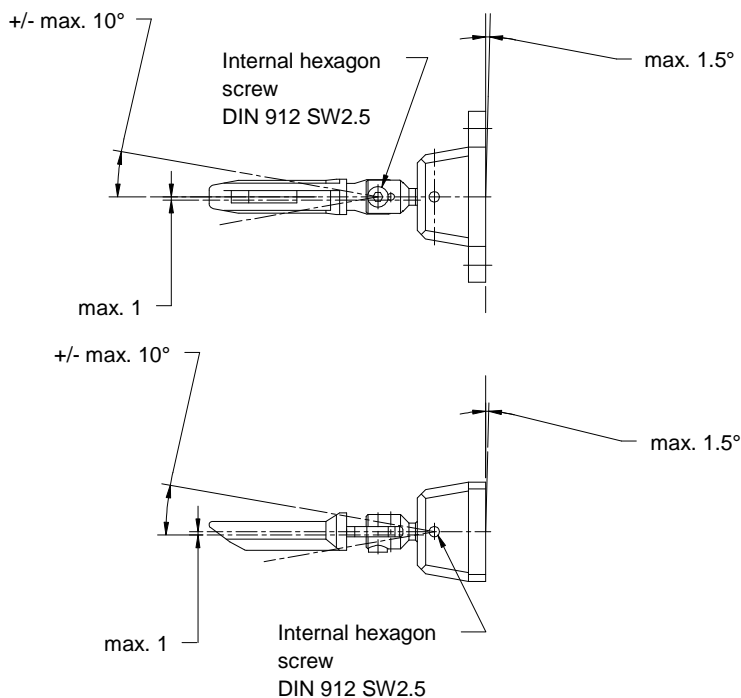
Actuator mounting

2 x M5 DIN 912 or EN ISO 1207

$M_{max} = 4 \text{ Nm}$

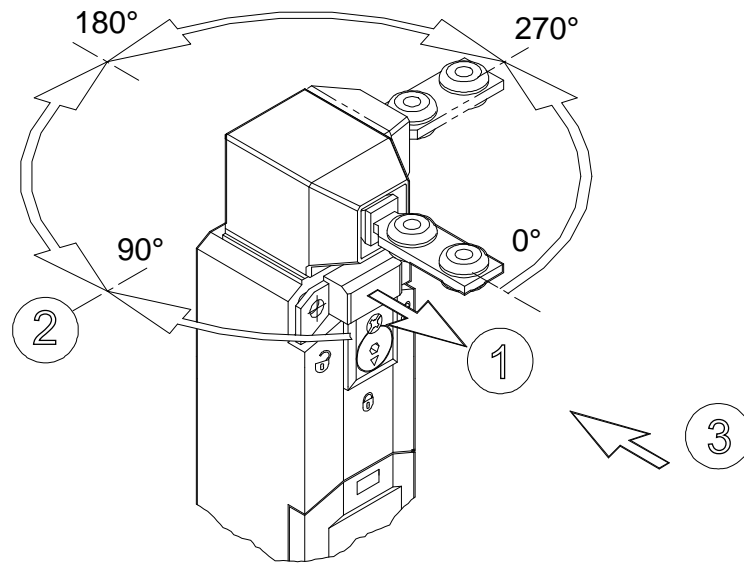
Universal actuator pre-adjustment

When using the flexible (universal) actuator, proper pre-adjustment of the actuator using the internal hexagon screws are necessary to avoid unnecessary shearing forces on the actuator.

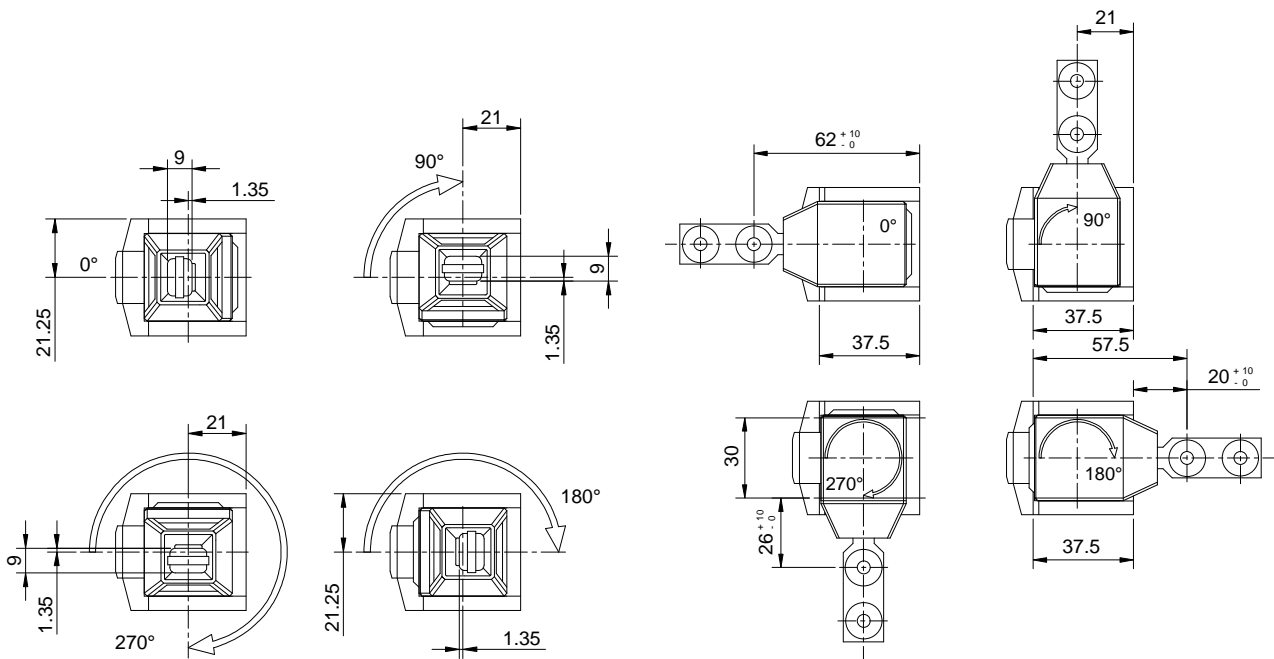


Align the actuator with the machine guard so that opening or closing the machine guard does not apply lateral force to the actuator head. Verify by opening and closing the guards several times.

Actuator head direction



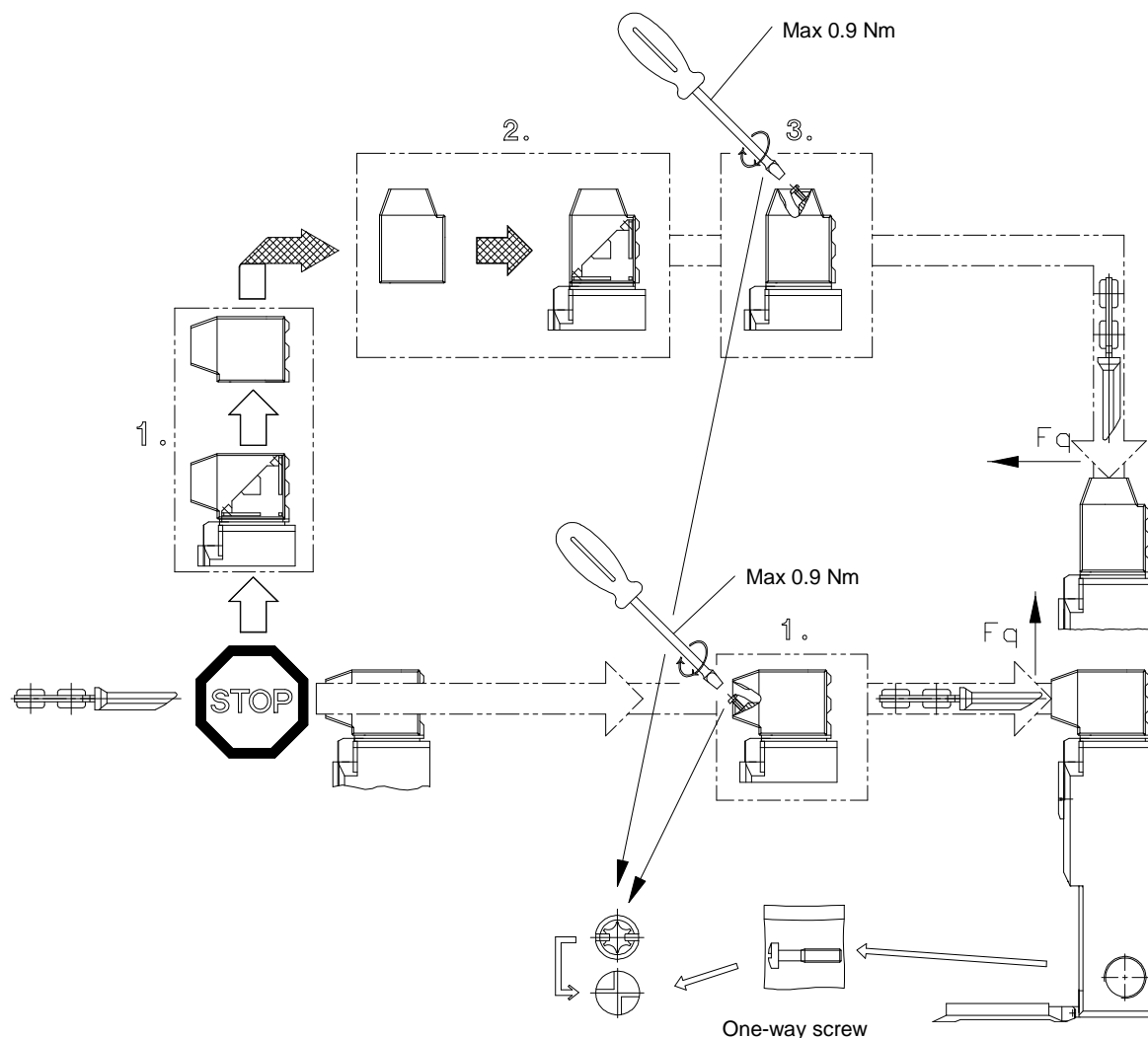
Actuator head rotation



Horizontal directions

Vertical directions

Securing the actuator head



Warning!

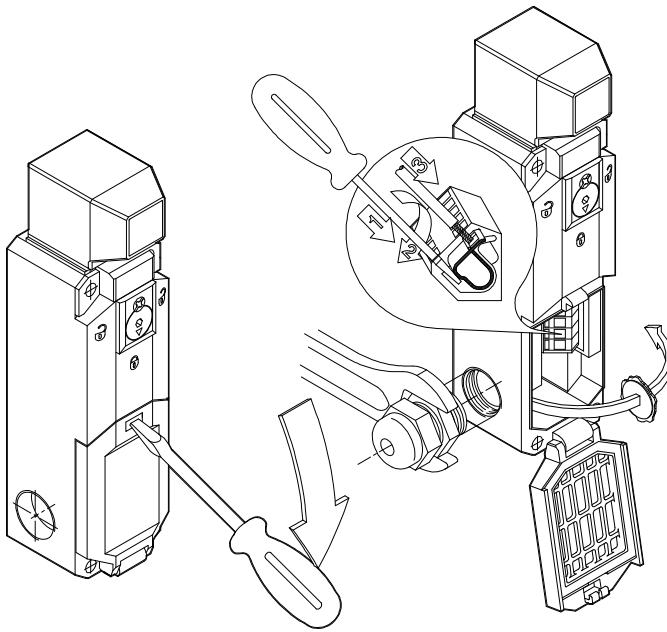
To prevent manipulation of the actuator head the pre-fitted torx/slot-head screw should be replaced with the supplied tamper-proof screw.

Exceeding the specified torque of 0.9 Nm or an actuator assembly which causes objectionable forces in the cross plane will result in damage to the actuating parts of the switch gear. This will lead to the loss of the safety function and thus can lead to severe or even fatal accidents to the operator.

Make sure that the head is properly attached to the switch body. A misaligned or loose head can lead to loss of the safety function.

Vibrations and other forces acting on the security screw might cause the screw to loosen over time, which will lead to the loss of the safety function. At regular intervals, make sure the security screw is tightened correctly.

Cable installation



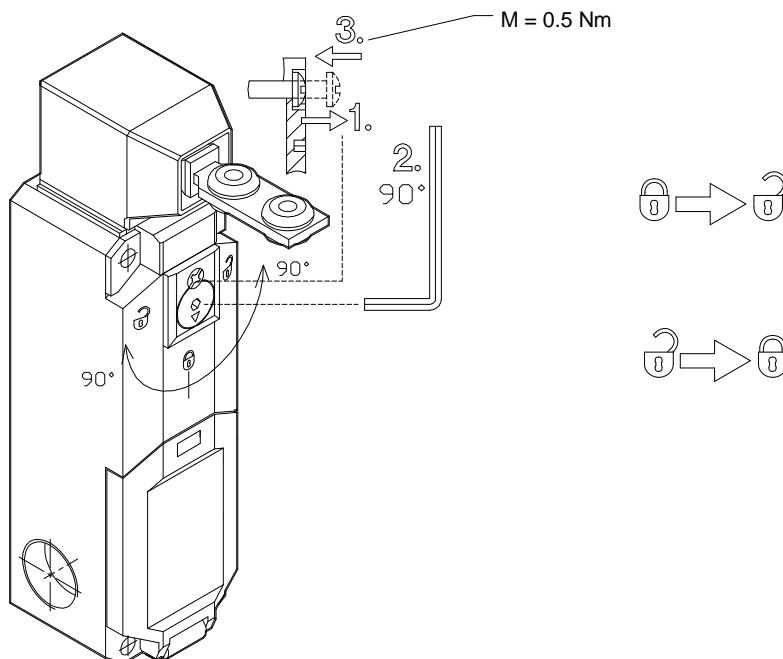
To install a cable gland in the M20 threaded connector:

Release the snap-shut terminal lid with a screwdriver and screw the cable gland into the chosen entry. This will “break-out” the blind hole; remove the plastic disk when detached.

To connect wires to the terminal block:

- 1) Insert screwdriver (blade width 2.5 mm) in lower opening.
- 2) Turn 45 degrees according to figure.
- 3) Insert wire (0.5 – 1.5 mm² cross-section) in upper opening. Release the screwdriver and pull the wire to make sure it is properly connected.

Auxiliary release (JSNY9S only)



- 1) Loosen the security screw.
- 2) To unlock, rotate internal hexagon screw 90°.

The actuator can now be pulled out.

To return to safe state, rotate the internal hexagon screw backwards.


- 3) Tighten the security screw and seal with lacquer.

Warning!

Auxiliary release shall only be operated during installation or in case of failure of the normal “Power to unlock”. Auxiliary release shall be sealed with lacquer after completed installation of the safety switch.

Installation precautions

- The safety switch may not be used as a mechanical stop!
- Make sure that the head is properly attached to the switch body. A misaligned or loose head can lead to loss of the safety function.
- The device must be mounted on a plane surface.
- Secure the screws against self-loosening.

 **Warning!** All the safety functions must be tested before starting up the system.

Maintenance

 **Warning!**

It is very important that the security screw holding the actuator head in place is checked regularly for self-loosening, and is retightened correctly if necessary. Do not over-tighten the screw as it will cause damage to the actuating parts of the switch gear.

The safety functions and the mechanics shall be tested regularly, at least once every year to confirm that all the safety functions are working properly (EN 62061:2005).

In order to maintain the safety level, regular inspections for tear and wear, as well as fixing and alignment of switch, actuator, brackets, doors etc should be carried out.

In case of breakdown or damage to the product, contact the nearest ABB/Jokab Safety Service Office or reseller. Do not try to repair the product yourself since it may accidentally cause permanent damage to the product, impairing the safety of the device which in turn could lead to serious injury to personnel.

5 Operation

JSNY9 S-types

Spring to lock

JSNY9 S-types “spring to lock”, i.e. the device is locked as soon as the actuator is inserted into the actuator head. By design, the locking cannot be activated unless the actuator is completely inserted into the actuator head.

Power to release

JSNY9 S-types require “power to release”, i.e. the device requires power supplied to E1-E2 in order to unlock the actuator when inserted into the actuator head.

Contact states

The internal contacts (2 pairs of 1 NC + 1 NC, “normal” state when machine is allowed to run) switch states when the actuator is inserted and when the device is locked. The first pair switches states as soon as the actuator is inserted into the actuator head, and the second pair switch states when the device is locked, i.e. when no power is supplied to E1-E2. Since the locking cannot be activated unless the actuator is completely inserted into the actuator head, the contacts used to monitor the locking can also be used to monitor the position of the movable guard.

JSNY9 M-types

Power to lock

JSNY9 M-types require “power to lock”, i.e. the device requires power supplied to E1-E2 in order to lock the device after the actuator has been inserted into the actuator head. By design, the locking cannot be activated unless the actuator is completely inserted into the actuator head.

Spring to release

JSNY9 M-types “spring to release”, i.e. the device unlocks as soon as the power to E1-E2 is cut off.

Contact states

The internal contacts (2 pairs of 1 NC + 1 NC, “normal” state when machine is allowed to run) switch states when the actuator is inserted and when the device is locked. The first pair switches states as soon as the actuator is inserted into the actuator head, and the second pair switch states when the device is locked, i.e. when power is supplied to E1-E2. Since the locking cannot be activated unless the actuator is completely inserted into the actuator head, the contacts used to monitor the locking can also be used to monitor the position of the movable guard.

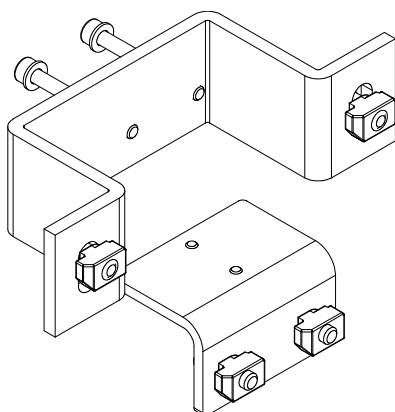
6 Model overview

Type	Article number	Description
JSNY9S 24 VUC	2TLJ020036R4400	JSNY9 safety switch with spring locking (power to lock). 24 V DC/AC.
JSNY9M 24 VUC	2TLJ020036R4500	JSNY9 safety switch with solenoid locking (power to unlock). 24 V DC/AC.

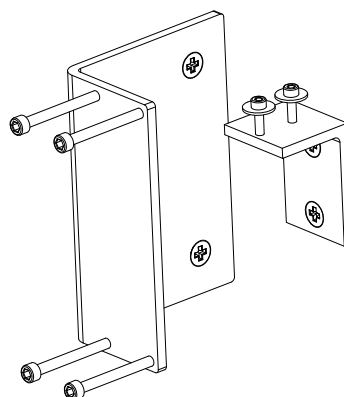
Accessories

Note that all brackets come with nuts and screws for use with ABB/Jokab Safety Quick-Guard fencing system. For further information, contact your local ABB/Jokab Safety sales office.

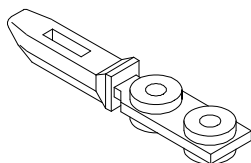
Type	Article number	Description
Spare part	2TLJ020033R0300	Lid packing for JSNY9.
Spare part	2TLJ020033R0400	Security screw for JSNY9 head. PTS 3x16 one-way screw.
JSM D4F	2TLJ040033R3000	Brackets for sliding door.
JSM D4C	2TLJ040033R1600	Brackets for hinged door.
JSNY8/9N1	2TLJ020032R0400	Standard actuator for JSNY8/9. Fixed, for actuating radius >400 mm.
JSNY8/9N2	2TLJ020032R0500	Universal actuator for JSNY8/9. Flexible, for actuating radius >150 mm.



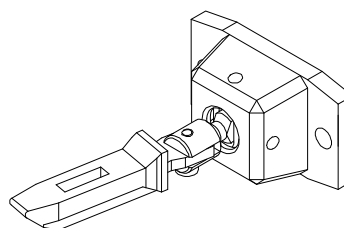
JSM D4C
Brackets for hinged door
Article number: 2TLJ040033R1600



JSM D4F
Brackets for sliding door
Article number: 2TLJ040033R3000



JSNY8/9N1
Standard actuator
Article number: 2TLJ020032R0400



JSNY8/9N2
Universal actuator
Article number: 2TLJ020032R0500

7 Technical data

Manufacturer	
Address	ABB AB / JOKAB SAFETY Varlabergsvägen 11 SE-434 39 Kungsbacka Sweden
Electrical characteristics	
Utilization category	AC15 230 V/2.5 A
Rated impulse withstand voltage (U_{imp})	2.5 kV
Rated insulation voltage (U_i)	250 V
Rated thermal current (I_{th})	5 A
Total current max (4 contacts)	4 x 2.5 A
Short circuit protection (fuse)	4 A slow-blow fuse
Solenoid	
Duty cycle	100 % ED (at E1;E2)
Temperature class	F (155°C)
Inrush power consumption	12 VA (0.2 s), UC-type
Permanent power consumption	4.4 VA, UC-type
Switch operation (permanent)	Max 600/h
Operating voltage	24 V DC or AC, UC-type
Switch-on delay	Max 250 ms
Mechanical data	
Material	Enclosure: PA 6 GV (UL94-VO) Cover (lid): PA 6 GV (UL94-VO) Actuating mechanism: PA 6 GV (UL94-VO)/Zn-GD Actuator: Steel/PA/Zn-GD
Colour	Black, yellow label
Ambient temperature	-25...+70°C
Holding force (max)	Locked: 1500 N (GS-ET 19, see note below) Unlocked: 27 N
Switching function/contact configuration	Locking: 1 NO + 1 NC Movable guard: 1 NO + 1 NC
Mechanical life	1 million operations (at max 600 operations/h)
Actuating radius (min)	Standard actuator: $R_{min} = 400$ mm Universal actuator: $R_{min} = 150$ mm
Actuating velocity (max)	$V_{max} = 0.5$ m/s
Size	See drawings below
Weight	Approx 0.3 kg
Mounting	4 x M5 screws ISO1207/DIN 84 Max. torque: $M = 2$ Nm ISO4762/DIN 912

Mechanical data

Cable size (max)	Max 1.5 mm ² stranded wire
Terminals	10 cage clamp elements
Cable entries	3 x M20x1.5
Protection class	IP67 according to IEC/EN 60529

NB: 1 holding force test cycle according to GS-ET 19:

- a) steady increase of holding force 200 N/s
- b) keep max holding force for 5 s.
- c) safety factor 1.3

Safety / Harmonized Standards

Conformity	European Machinery Directive 2006/42/EC CE EN ISO 12100-1:2003+A1:2009, EN ISO 12100-2:2003+A1:2009, EN 954-1:1996/EN ISO 13849-1:2008, EN 1088+A2:2008, EN 60204-1:2006+A1:2009 VDE 0660 T100, EN 60947-1, VDE 0660 T200, EN 60947-5-1, GS-ET 19
EN ISO 13849-1	Category 1 B10 _d : 2,000,000
Certificates	CSA

NB: A single JSNY9 can achieve performance level PL c according to EN ISO 13849 if used correctly with an ABB/Jokab Safety safety relay, Pluto safety-PLC or Vital safety module. If two JSNY9-switches are used for the same safety function, a performance level up to PL e can be achieved. Refer to EN ISO 13849 for details on how to achieve this if necessary.

8 EC Declaration of conformity



EC Declaration of conformity

(according to 2006/42/EC, Annex 2A)

We ABB AB
JOKAB Safety
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

declare that the safety components of ABB AB manufacture with type designations and safety functions as listed below, is in conformity with the Directive

2006/42/EC

Authorised to compile the technical file

ABB AB
JOKAB Safety
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

Product

Lockable safety interlock switch

JSNY8

JSNY9

Used harmonized standards

EN ISO 12100-1:2010, EN ISO 13849-1:2008, EN 1088+A2:2008,
EN 60204-1:2006+A1:2009

Jesper Kristensson
PRU Manager
Kungsbacka 2011-12-08

www.abb.com
www.jokabsafety.com

Original

ABB AB / JOKAB SAFETY Varlabergsvägen 11, SE-434 39 Kungsbacka, Sweden

www.jokabsafety.com