Detecting Devices

8

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[1)] See Catalog FS 10 "Sensor Technology"

Introduction

Overview




	3SE2, 3SE3, 3SF3	3SE3	3SE2, 3SE3, 3SF3	3SE2, 3SE3, 3SF3
	Position switches, standard	Position switches, open-type	Position switches with separate actuator	Position switches with tumbler
Enclosures				
Molded plastic	✔	✔	✔	✔
Metal	✔	--	✔	✔
Design				
EN 50041	✔	--	✔	--
EN 50047	✔	--	✔	--
Special design	✔	✔	✔	✔
Separate actuator	--	--	✔	✔
Tumbler for actuator	--	--	--	✔
Switch blocks				
Single-pole	--	--	✔	--
Two-pole	✔	✔	✔	--
Three-pole	✔	✔	✔	--
Four-pole	✔	--	✔	✔
Terminals				
Screw terminals	✔	✔	✔	✔
Molded cable	✔	--	--	--
Plug-in connector	✔	--	✔	❑
AS-Interface	✔	--	✔	✔

✔ Standard
-- Not available
❑ Optional (accessory)

	3SE2 Explosion-proof position switches	3SE2 Hinge switches	3SE6 Magnetically operated switches
Enclosures			
Molded plastic	--	✔	✔
Metal	✔	--	--
Design			
EN 50041	✔	--	--
EN 50047	--	✔	--
Special design	--	✔	✔
Separate actuator	--	--	--
Tumbler for actuator	--	--	--
Switch blocks			
Single-pole	--	--	--
Two-pole	✔	✔	✔
Three-pole	--	✔	--
Four-pole	--	--	--
Terminals			
Screw terminals	✔	✔	--
Molded cable	--	--	✔
Plug-in connector	--	❑	✔
AS-Interface	--	--	❑

3SE2, 3SE3 Position Switches

General data

Overview

With the SIRIUS standard position switches, mechanical positions of moved machine parts are converted into electrical signals. Through their modular and uniform design and large number of variants, the devices can meet practically all requirements in industry.

The standard series of SIRIUS position switches comprise:

- IP20 open-type position switches
- Position switches with IP66/IP67 molded-plastic enclosure with 31, 40 and 50 mm width
- Position switches with IP67 metal enclosure with 40 and 56 mm width
- Compact position switches with metal enclosure and molded cable

Safety circuits

The standards IEC 60947-5-1 and EN 60947-5-1 require positive opening. Hence for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to IEC 60947-5-1 with the symbol ➔.

Category 4 according to EN 954-1 can be attained with the standard position switches if the corresponding failsafe evaluation units are selected and correctly installed, e.g. the 3TK28 safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges.

Expansion range

Expansion range for position switches with molded-plastic enclosure:

- With M12 plug
- With high-grade steel roller or chlorinated rubber membrane

Expansion range for position switches with metal enclosure:

- With different plug variants
- With high-grade steel roller
- With increased corrosion protection
- With LED 24 V

Design

Enclosures

The 3SE2 position switches are in either a narrow or wide enclosure made of fiber-glass strengthened, flame-retardant molded plastic or cast aluminum.

The position switches in a narrow enclosure comply with the standards in terms of their enclosure and actuator as well as their fixing dimensions and switching points:

- EN 50047 for rounded plunger, roller plunger, roller lever and twist lever actuators
  - 3SE2 200 series with molded-plastic enclosure.
- EN 50041 for rounded plunger, roller plunger, twist lever and rod actuators
  - 3SE2 230 series with molded-plastic enclosure
  - 3SE2 120 series with metal enclosure

The narrow enclosures have one and the wide enclosures have two or three cable entries, suitable for looping through cables. The cable entry has a metric thread M20 × 1.5 for cable glands with 6 mm long threads (see Accessories).

To secure position switches with a safety function against changes in their position, keyed techniques must be employed on installation, such as:

- Fixing by means of round holes
- For longitudinal holes, guide pins and stops must also be used.

Actuators

All actuators can be retro-fitted or exchanged for another version. They can also be repositioned every 90° so that the switches can be operated from any of the four sides.

Note: The position switches must not be used as an end stop.

Standard, rounded and roller plungers

- Operation in direction of the plunger axis or with bar at right angles to the plunger axis.
- Rounded and roller plungers have an additional overtravel and hence a large operating distance.
- The roller plunger is recommended for lateral actuation and relatively long overtravel.

Roller and angular roller levers

- For a high starting speed of v_{max} = 2.5 m/s
- Depending on the direction of starting (left or right), various approach angles (α = 30°) and trailing angles (γ = 45°) are possible.
- For actuators made of finely ground steel in the form of cams, straight-edges or cam disks
- Very long mechanical endurance

Twist levers and rod actuators

- For a high starting speed of v_{max} = 3 m/s
- Variety of starting options
- Insensitive to oil, dirt, grinding dust, ice and coarse-grained material
- With the twist lever the maximum approach angle is always equal to the maximum trailing angle.
- The rod actuator must be used when no actuation with approach and trailing angle is possible.

Spring rods

- Can be used for undefined actuations and changing starting conditions
- Starting from any direction

Fork levers

- Switchable in two directions
- For reciprocating movements
- Latched actuator

Rounded plungers with short-stroke switch block

- Exact switching response
- Operating travel and hysteresis greatly reduced
- Optimized wear characteristics
- Suitable for the monitoring of doors and access flaps up to Category 4 according to EN 954-1

Rounded and roller plungers with central fixing

- Fast mounting with M18 × 1 thread
- Easy adjustment
- Same mounting type as the proximity switch BERO

Contacts

The position switches with molded-plastic enclosures are available with 2 contacts; the position switches with metal enclosures are available with 2, 3 or 4 contacts. The contacts can be snap-action contacts, slow-action contacts or slow-action make-before-break contacts. The contacts are designed for a thermal current of 10 A.

Contact reliability

The movable contacts are double-break contacts. This ensures an extremely high contact stability, even when the devices are switching low voltages and currents, e.g. 5 V DC/1 mA.

As the moving double-break contacts are electrically isolated from each other, the position switches can also switch, without any reservations, circuits up to 380 V with different potentials.

The switching point of the snap-action contacts is independent of the switching corrosion.

The contact chamber is covered to prevent ingress of foreign bodies.

Connection

- Metric thread M20 × 1.5 for mounting glands, connector sockets or adapters
- Expansion range with mounted connector socket
- With AS-Interface F-Adapter for direct connection to ASIsafe; usable up to Category 2 according to EN 954-1
- With AS-Interface F-Adapter for direct connection to ASIsafe; with additional M12 socket for connection of the second position switch, usable up to Category 4 according to EN 954-1.

Function

Positive opening

The NC contacts of the switch are forced open mechanically, positively-driven and reliably by the plunger. This is referred to as "positive opening".

In order to ensure this positive opening, the position switches must be actuated in such a way that the nominal values for the positive opening are substantially exceeded.

3SE2, 3SE3 Position Switches

General data

Technical specifications

Type		3SE2 1, 3SE2 2, 3SE2 3, 3SE2 4, 3SE3 0		Exception: 3SE2 1.0-8..00, 3SE2 2.0-8..00,	
Standards		IEC 60947-5-1, EN 60947-5-1 (VDE 0660 Part 200)			
Rated insulation voltage U_i	V	500			
Pollution severity acc. to EN 60664-1		Class 3			
Rated operational voltage U_e	V	500 AC; over 380 V AC only for equal potential		500 AC; over 300 V AC only for equal potential	
Continuous thermal current I_{th}	A	10			
Rated operational current I_e					
• For alternating current 40 to 60 Hz		I_e / AC-12	I_e / AC-15		
- at 24 V	A	10	10		
- at 125 V	A	10	10		
- at 230 V	A	10	6		
- at 400 V	A	10	4		
- at 500 V	A	10	3		
• For direct current		I_e / DC-12	I_e / DC-13	I_e / DC-12	I_e / DC-13
- at 24 V	A	10	10	10	10
- at 48 V	A	6	4	6	4
- at 110 V	A	4	1	4	1
- at 220 V	A	1	0.4	1	0.27
- at 440 V	A	0.5	0.2	0.5	0.1
Short-circuit protection[1], DIAZED fuse links					
• gL/gG operational class	A	6		6	
• Characteristic quick	A	10		--	
Mechanical endurance	Operating cycles	30×10^6		15×10^6	
Electrical endurance					
• With 3RH11, 3RT10 16 to 3RT10 26 contactors		10×10^6 operating cycles			
• For AC-15 utilization category		0.5×10^6 operating cycles when interrupting I_e / AC-15 at 230 V			
• For DC-13 utilization category		With direct current the contact endurance depends not only on the breaking current but also on the voltage, the circuit inductance and the speed of switching. No generally valid information can be given.			
Switching frequency With 3RH11, 3RT10 16 to 3RT10 26 contactors	Operating cycles/h	6×10^3		1.8×10^3	
Switching accuracy For repeated switching, measured at the plunger of the switch block	mm	0.05			
Switching point with snap-action contacts		Independent of contact wear, constant throughout the endurance of the switch			
cULus and CSA rated data					
• Rated voltage	V	600		600	
• Uninterrupted current	A	10		10	
• Switching capacity		Heavy duty, A 600/Q 600		Heavy duty, A 300/Q 600	

Type		3SE2 200	3SE2 230	3SE2 210	3SE2 120	3SE2 100, 3SE2 303, 3SE2 404	3SE3 0
Enclosures							
• Type acc. to EN		EN 50047	EN 50041	--	EN 50041	--	--
• Width	mm	31	40	50	40	56	--
• Material		Fiber-glass strengthened thermoplastic			Aluminum (GD – AlSi 12)		--
Degree of protection acc. to EN 60529		IP67	IP66	IP67	IP67		IP20
Ambient temperature							
• During operation		–30 ... +85 °C					
Mounting position		Any					
Cable entry		1 × (M20 × 1.5)		2 × (M20 × 1.5)	1 × (M20 × 1.5)	3 × (M20 × 1.5)	--
Conductor cross-sections							
• Solid	mm^2	2 × 2.5					
• Finely stranded with end sleeve	mm^2	2 × 1.5					
PE/ground terminal inside enclosure		--			M3.5		--

1) Without any welds according to EN 60947-5-1.

Configuration

Operation, operating speed and travel or angle of actuators

Bars, cams, stops, etc. are used as actuators. The shape of the actuator must provide the given angles for the leading and trailing edges.

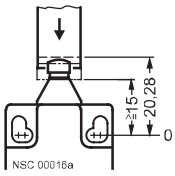
Actuating speed in the direction of the plunger axis

The actuating speed in the case of position switches with slow-action contacts is not permitted to go lower than 15 mm/s for DC and 1 mm/s for AC. Position switches with snap-action contacts should be used when the speeds are lower.

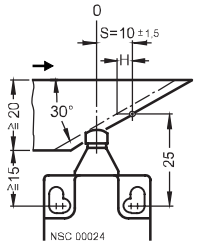
Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50047	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50047		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50047		
S	Operating travel acc. to EN 50047		▬	Contact closed		
H	Travel difference		▭	Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

Rounded plungers, type B

3SE2 200–.C,
3SE2 210–.C



v_{max} = 1 m/s



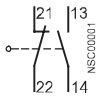
v_{max} = 0.5 m/s

Minimum force required in direction of operation 9 N

Along plunger axis | Lateral actuation | Along plunger axis

Slow-action contacts

1 NO + 1 NC



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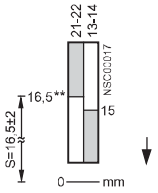

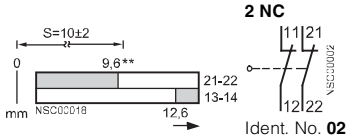

2 NC

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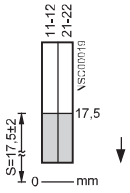
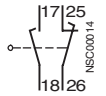


1 NO + 1 NC
with
make-before-break



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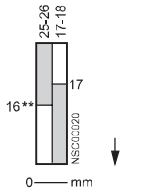

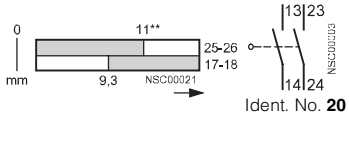

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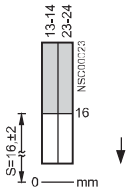
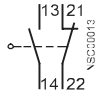


Snap-action contacts

1 NO + 1 NC



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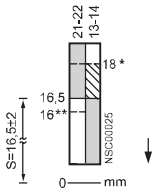

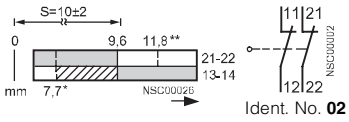

2 NC

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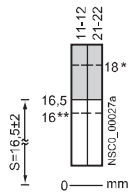
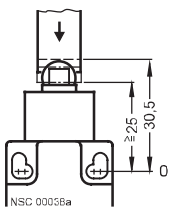
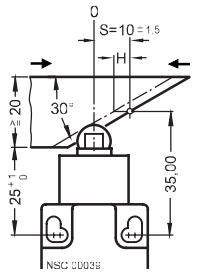


Roller plungers, type C

3SE2 200–.D,
3SE2 210–.D



v_{max} = 1 m/s



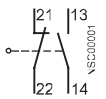
v_{max} = 1 m/s

Minimum force required in direction of operation 9 N

Along plunger axis | Lateral actuation | Along plunger axis

Slow-action contacts

1 NO + 1 NC



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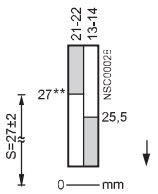

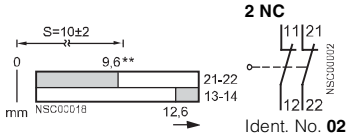

2 NC

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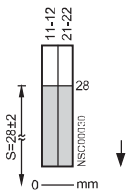
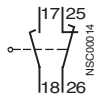


1 NO + 1 NC
with
make-before-break



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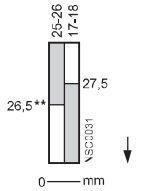

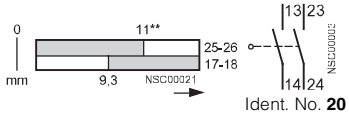

2 NO

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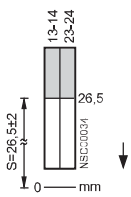
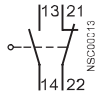


Snap-action contacts

1 NO + 1 NC



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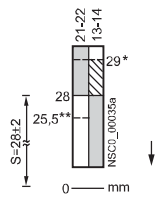

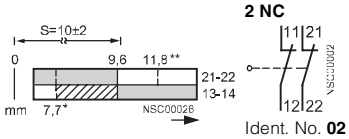

2 NC

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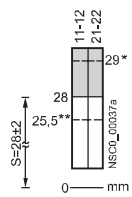


8

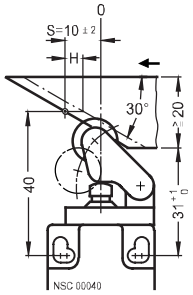
3SE2, 3SE3 Position Switches

Molded-plastic enclosures, 31 mm and 50 mm

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50047	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50047		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50047		
S	Operating travel acc. to EN 50047		▭	Contact closed		
H	Travel difference		▭	Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

Roller levers, type E

3SE2 200–.E,
3SE2 210–.E



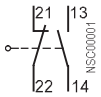
v_{max} = 1 m/s

Minimum force required in direction of operation 9 N

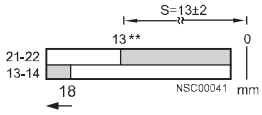
Lateral actuation

Slow-action contacts

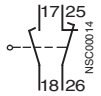
1 NO + 1 NC



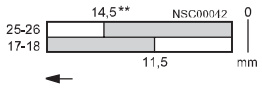
Ident. No. **11**



1 NO + 1 NC with make-before-break

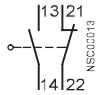


Ident. No. **11**

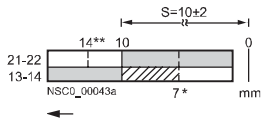


Snap-action contacts

1 NO + 1 NC

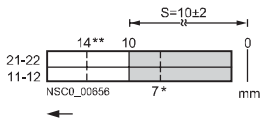


Ident. No. **11**



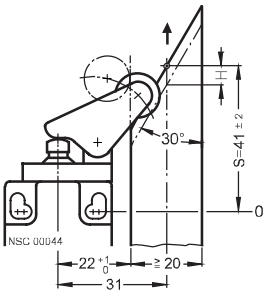
2 NC

Ident. No. **02**



Angular roller levers

3SE2 200–.F,
3SE2 210–.F



v_{max} = 1 m/s

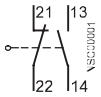
Minimum force required in direction of operation 9 N

The example for approach is only applicable to 3SE2 200.
It is not possible in this way for 3SE2 210.

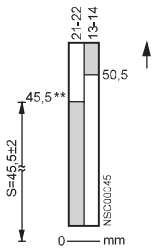
Along plunger axis

Slow-action contacts

1 NO + 1 NC

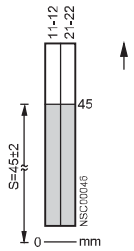


Ident. No. **11**

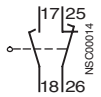


2 NC

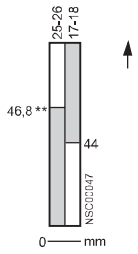
Ident. No. **02**



1 NO + 1 NC with make-before-break

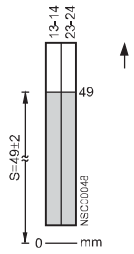


Ident. No. **11**



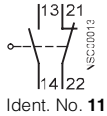
2 NO

Ident. No. **20**

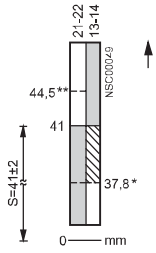


Snap-action contacts

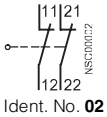
1 NO + 1 NC



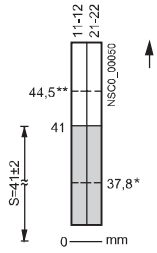
Ident. No. **11**



2 NC



Ident. No. **02**



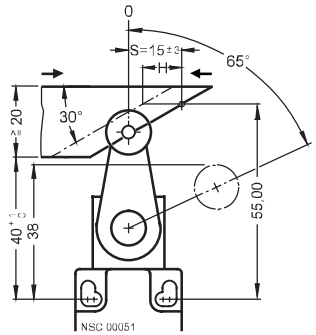
8

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
◡	Operating point acc. to EN 50047	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50047		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50047		
S	Operating travel acc. to EN 50047		▭	Contact closed		
H	Travel difference		▭	Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

Twist levers, type A

Finely adjustable from 10° to 10°

3SE2 200–.G[1)]



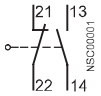
v_{max} = 1 m/s

Minimum force required in direction of operation 18 N

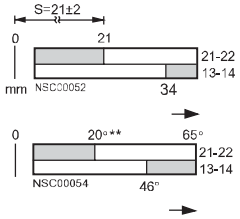
1) Not for hinge switches.

Slow-action contacts

1 NO + 1 NC

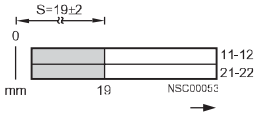


Ident. No. **11**

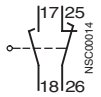


2 NC

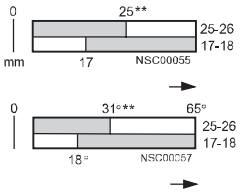
Ident. No. **02**



1 NO + 1 NC with make-before-break

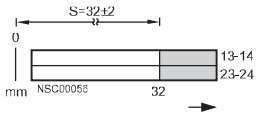


Ident. No. **11**



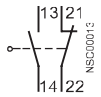
2 NO

Ident. No. **20**

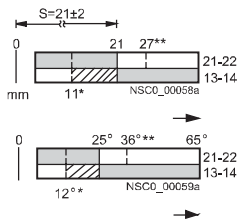


Snap-action contacts

1 NO + 1 NC

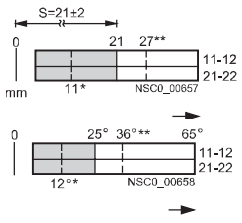


Ident. No. **11**



2 NC

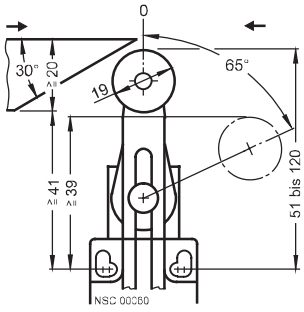
Ident. No. **02**



Twist levers

Adjustable length, finely adjustable from 10° to 10°

3SE2 200–.U, 3SE2 210–.U

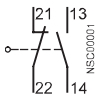


v_{max} = 1 m/s

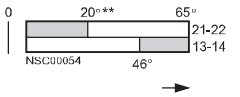
Minimum force required in direction of operation: 18 N

Slow-action contacts

1 NO + 1 NC

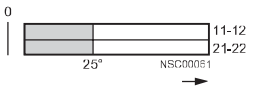


Ident. No. **11**

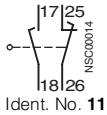


2 NC

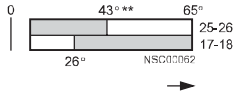
Ident. No. **02**



1 NO + 1 NC with make-before-break

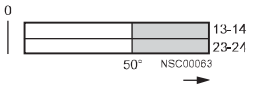


Ident. No. **11**



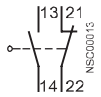
2 NO

Ident. No. **20**

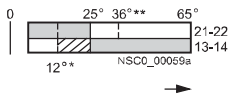


Snap-action contacts

1 NO + 1 NC

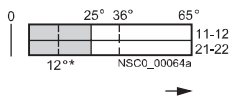


Ident. No. **11**



2 NC

Ident. No. **02**



8

3SE2, 3SE3 Position Switches

Molded-plastic enclosures, 31 mm and 50 mm

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50047	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50047		
v_{max}	Max. operating speed			Contact closed		
→	Direction of operation			Contact open		
			*	Operating point on return		

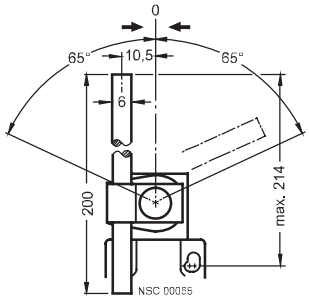
Rod actuators

Finely adjustable from 10° to 10°

3SE2 200–.W,
3SE2 210–.W

3SE2 200–.V,
3SE2 210–.V

3SE2 200–.S,
3SE2 210–.S



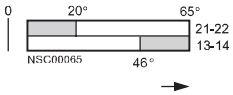
v_{max} = 1.5 m/s

Minimum force required in direction of operation: 18 N

in direction of rotation

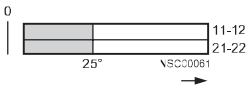
Slow-action contacts

1 NO + 1 NC



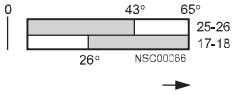
Ident. No. **11**

2 NC



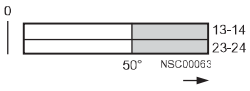
Ident. No. **02**

1 NO + 1 NC with make-before-break



Ident. No. **11**

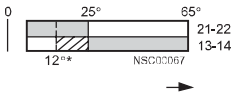
2 NO



Ident. No. **20**

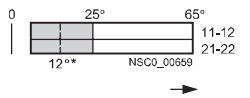
Snap-action contacts

1 NO + 1 NC



Ident. No. **11**

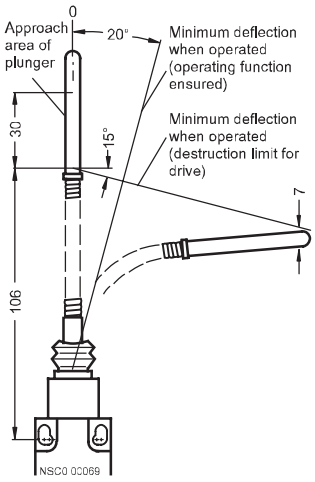
2 NC



Ident. No. **02**

Spring rods

3SE2 200–1R,
3SE2 210–1R



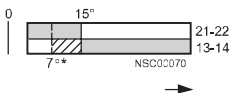
v_{max} = 1.5 m/s

Minimum force required in direction of operation: 18 N

Lateral actuation

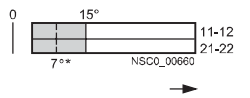
Snap-action contacts

1 NO + 1 NC



Ident. No. **11**

2 NC



Ident. No. **02**

8

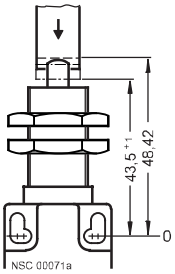
Molded-plastic enclosures, 31 mm and 50 mm

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⟳	Operating point acc. to EN 50047	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50047		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50047		
S	Operating travel acc. to EN 50047		▬	Contact closed		
H	Travel difference		▭	Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

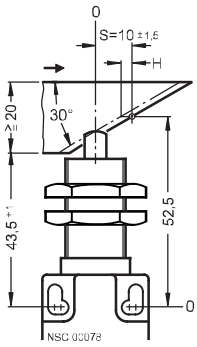
Rounded plungers

Central fixing with M18 thread

3SE2 200–.L,
3SE2 210–.L

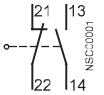
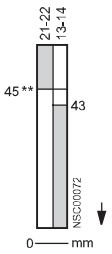
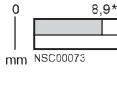
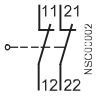
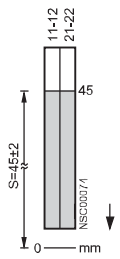
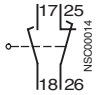
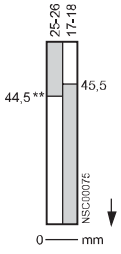
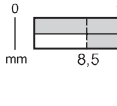
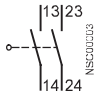
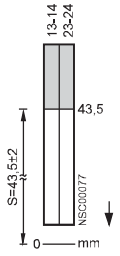
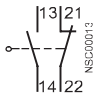
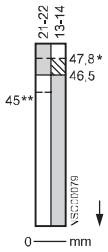
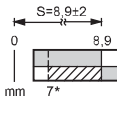
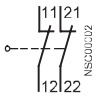
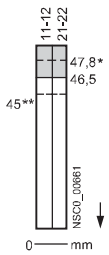


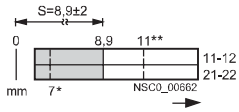
v_{max} = 1 m/s



v_{max} = 0.5 m/s

Minimum force required in direction of operation: 9 N

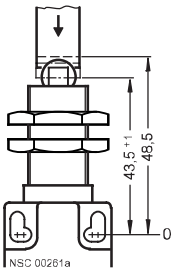
	Along plunger axis	Lateral actuation	Along plunger axis
Slow-action contacts			
1 NO + 1 NC	 Ident. No. **11**			**2 NC**  Ident. No. **02**	
1 NO + 1 NC with make-before-break	 Ident. No. **11**			**2 NO**  Ident. No. **20**	
Snap-action contacts					
1 NO + 1 NC	 Ident. No. **11**			**2 NC**  Ident. No. **02**	



Roller plungers

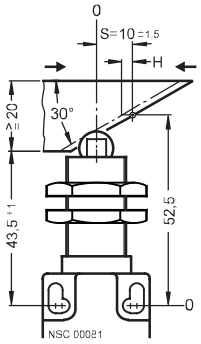
Central fixing with M18 thread

3SE2 200–.M,
3SE2 210–.M



v_{max} = 1 m/s

Minimum force required in direction of operation: 9 N



v_{max} = 1 m/s

Minimum force required in direction of operation: 9 N

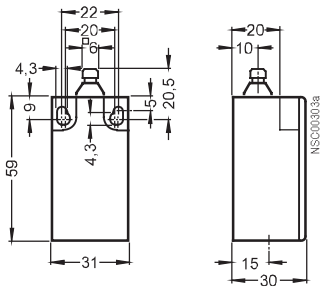
8

3SE2, 3SE3 Position Switches

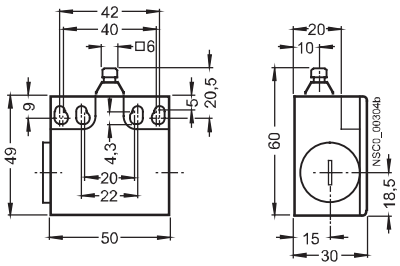
Molded-plastic enclosures, 31 mm and 50 mm

Dimensional drawings

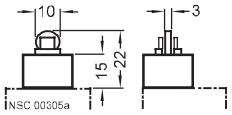
3SE2 200, narrow enclosure according to EN 50047, with rounded plunger, type B



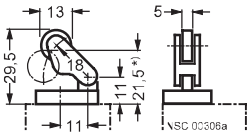
3SE2 210, wide enclosure, with rounded plunger



Roller plungers, type C

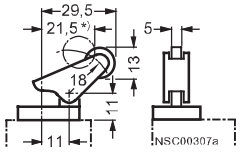


Roller levers, type E



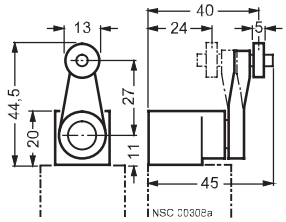
* Lever in final position

Angular roller levers

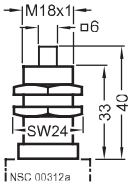


* Lever in final position

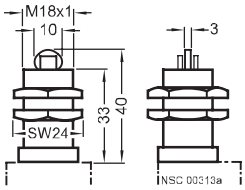
Twist levers, type A



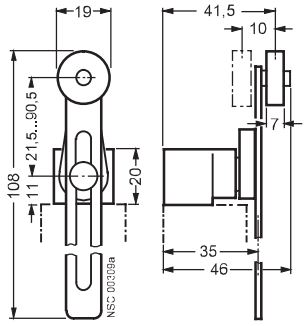
Rounded plunger, central fixing with M18 × 1 thread



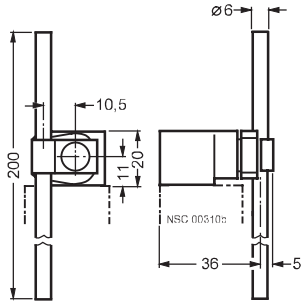
Roller plunger, central fixing with M18 × 1 thread



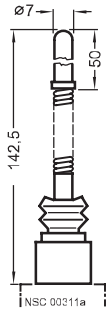
Twist levers, adjustable length



Rod actuator



Spring rods

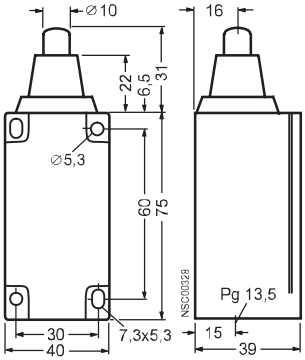


Configuration

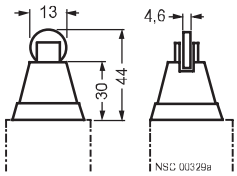
See Metal Enclosures, pages 8/15 to 8/19.

Dimensional drawings

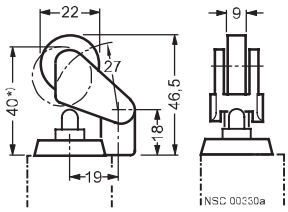
3SE2 230, enclosure according to EN 50041, with rounded plunger, type B



Roller plungers, type C

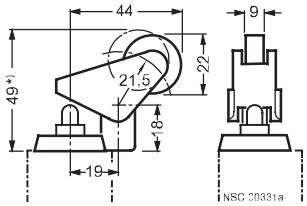


Roller levers



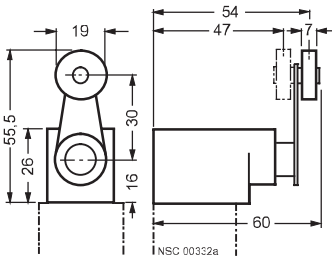
* Lever in final position

Angular roller levers

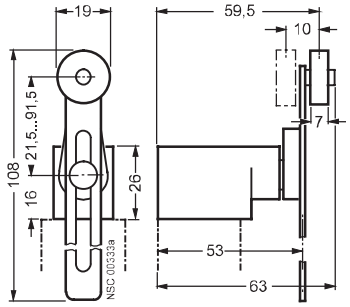


* Lever in final position

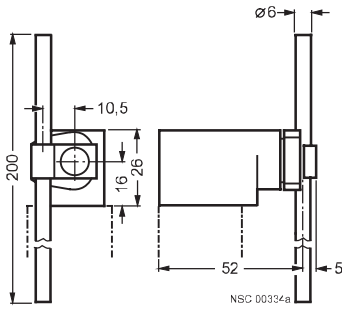
Twist levers, type A



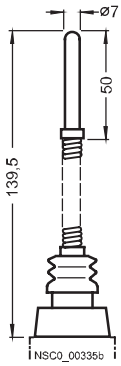
Twist levers, adjustable length



Rod actuator, type D



Spring rods



3SE2, 3SE3 Position Switches

Metal enclosures, 40 mm and 56 mm

Configuration

Operation, operating speed and travel or angle of actuators

Bars, cams, stops, etc. are used as actuators. The shape of the actuator must provide the given angles for the leading and trailing edges.

Actuating speed in the direction of the plunger axis

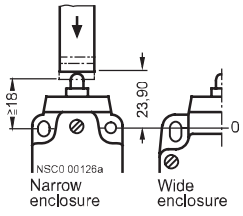
The actuating speed in the case of position switches with slow-action contacts is not permitted to go lower than 15 mm/s for DC and 1 mm/s for AC. Position switches with snap-action contacts should be used when the speeds are lower.

Position switches with 2 or 4 contacts

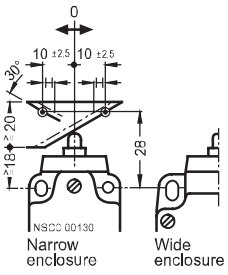
Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041		
0-line	Reference line acc. to EN 50041			Contact closed		
H	Travel difference			Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

Plungers — Along plunger axis | Lateral actuation | Along plunger axis

3SE2 100–.B,
3SE2 120–.B,
3SE2 404–.B



v_{max} = 1.5 m/s

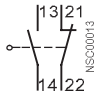


v_{max} = 0.5 m/s

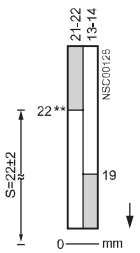
Minimum force required in direction of operation: 12 N

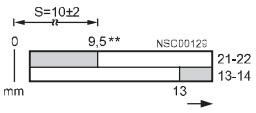
Slow-action contacts

1 NO + 1 NC



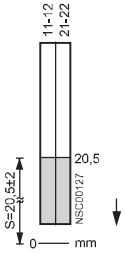
3SE3 000–0A,
3SE3 010–0A,
Ident. No.**11**



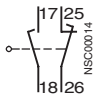


2 NC

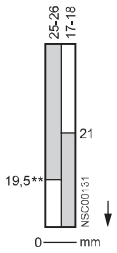
3SE3 000–6A,
Ident. No. **02**

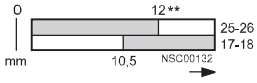


1 NO + 1 NC
with
make-before-break



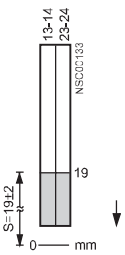
3SE3 000–3A,
3SE3 010–3A,
Ident. No. **11**





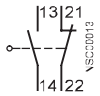
2 NO

3SE3 000–7A,
Ident. No. **20**

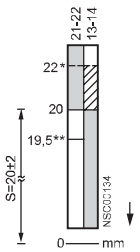


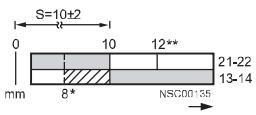
Snap-action contacts

1 NO + 1 NC



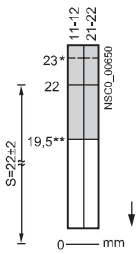
3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**





2 NC

3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**



8

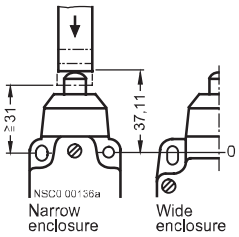
Position switches with 2 or 4 contacts

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
◌	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041		
0-line	Reference line acc. to EN 50041			Contact closed		
H	Travel difference			Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

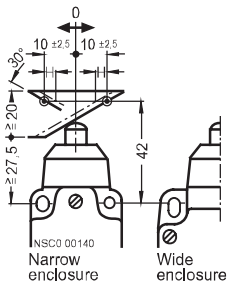
Rounded plungers, type B

Along plunger axis | Lateral actuation | Along plunger axis

3SE2 100–.C,
3SE2 120–.C,
3SE2 230–.C,
3SE2 404–.C



v_{max} = 1.5 m/s

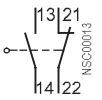


v_{max} = 0.5 m/s

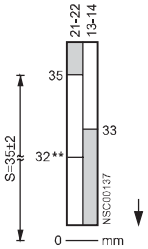
Minimum force required in direction of operation: 32 N

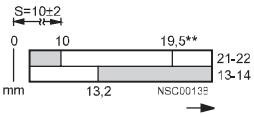
Slow-action contacts

1 NO + 1 NC

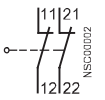


3SE3 000–0A,
3SE3 010–0A,
Ident. No.**11**

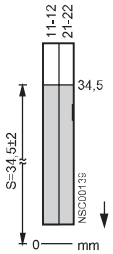




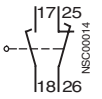
2 NC



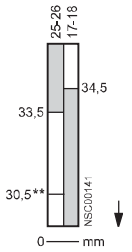
3SE3 000–6A,
Ident. No. **02**

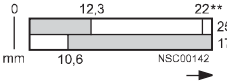


1 NO + 1 NC with make-before-break

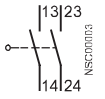


3SE3 000–3A,
3SE3 010–3A,
Ident. No. **11**

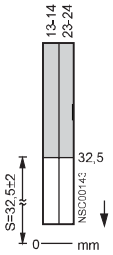




2 NO

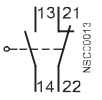


3SE3 000–7A,
Ident. No. **20**

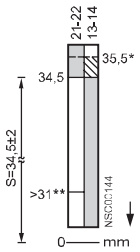


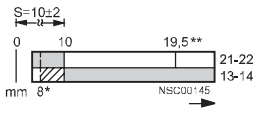
Snap-action contacts

1 NO + 1 NC

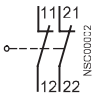


3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**

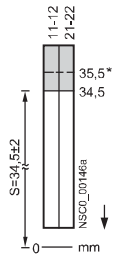




2 NC



3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**



8

3SE2, 3SE3 Position Switches

Metal enclosures, 40 mm and 56 mm

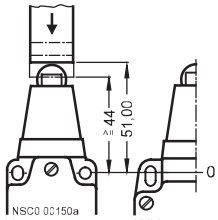
Position switches with 2 or 4 contacts

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041		
0-line	Reference line acc. to EN 50041			Contact closed		
H	Travel difference			Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

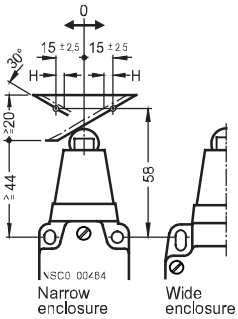
Roller plungers, type C

Along plunger axis | Lateral actuation | Along plunger axis

3SE2 100–.D,
3SE2 120–.D,
3SE2 230–.D,
3SE2 404–.D



v_{max} = 1.5 m/s

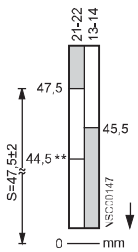


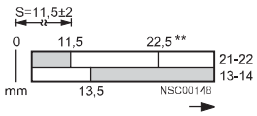
v_{max} = 1 m/s (3SE3 230–1D),
v_{max} = 0.5 m/s (3SE3 1.0–1D),
Minimum force required in direction of operation: 32 N

Slow-action contacts

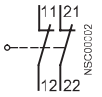
1 NO + 1 NC

3SE3 000–0A,
3SE3 010–0A,
Ident. No.**11**

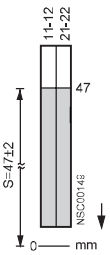




2 NC

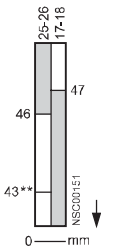


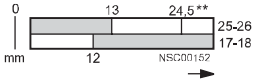
3SE3 000–6A,
Ident. No. **02**



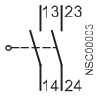
1 NO + 1 NC with make-before-break

3SE3 000–3A,
3SE3 010–3A,
Ident. No. **11**

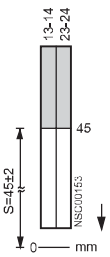




2 NO



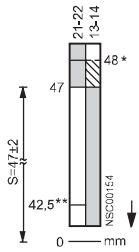
3SE3 000–7A,
Ident. No. **20**

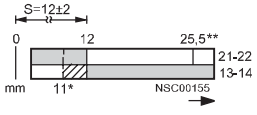


Snap-action contacts

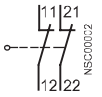
1 NO + 1 NC

3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**

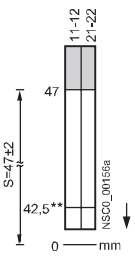




2 NC



3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**

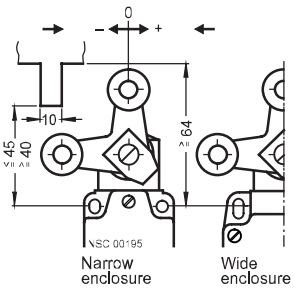


Fork levers

Deflection in direction of rotation

3SE2 100–1T,
3SE2 120–1T,
3SE2 404–1T

Lateral actuation

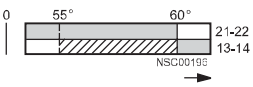


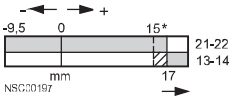
$v_{max.}$ = 2 m/s

Snap-action contacts

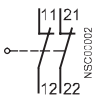
1 NO + 1 NC

3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**





2 NC



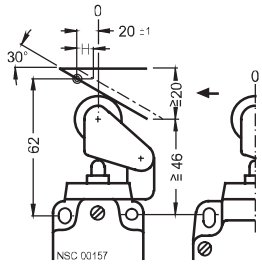
3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**

Position switches with 2 or 4 contacts

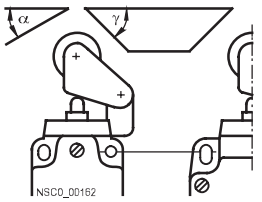
Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
◌	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
α, γ	Approach angle		S	Operating travel acc. to EN 50041		
v_{max}	Max. operating speed		▬	Contact closed		
0-line	Reference line acc. to EN 50041		▭	Contact open		
H	Travel difference		*	Operating point on return		
→	Direction of operation		**	Positive opening acc. to IEC 60947-5-1		

Roller levers

3SE2 100–.E, 3SE2 120–.E, 3SE2 230–.E, 3SE2 404–.E



v_{max} = 2.5 m/s



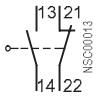
v_{max} = 1 m/s, α_{max} = 30°, γ_{max} = 45°

Minimum force required in direction of operation: 12 N

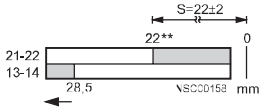
Lateral actuation

Slow-action contacts

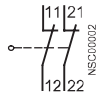
1 NO + 1 NC



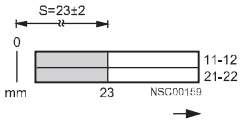
3SE3 000–0A, 3SE3 010–0A, Ident. No.**11**



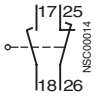
2 NC



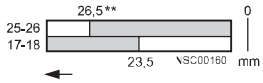
3SE3 000–6A, Ident. No. **02**



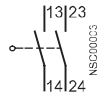
1 NO + 1 NC with make-before-break



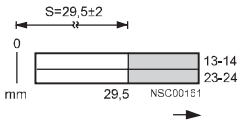
3SE3 000–3A, 3SE3 010–3A, Ident. No. **11**



2 NO

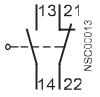


3SE3 000–7A, Ident. No. **20**

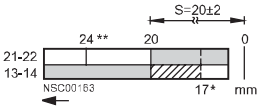


Snap-action contacts

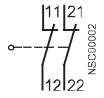
1 NO + 1 NC



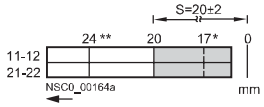
3SE3 000–1A, 3SE3 010–1A, Ident. No. **11**



2 NC

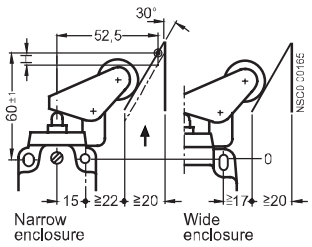


3SE3 000–1AV00, 3SE3 010–1AV00, Ident. No. **02**

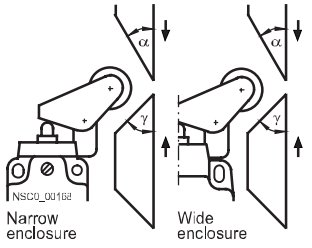


Angular roller levers

3SE2 100–.F, 3SE2 120–.F, 3SE2 230–.F, 3SE2 404–.F



$v_{max.}$ = 2.5 m/s



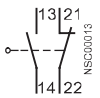
v_{max} = 1 m/s, α_{max} = 30°, γ_{max} = 45°

Minimum force required in direction of operation: 12 N

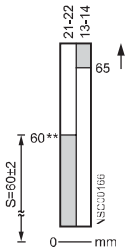
Along plunger axis

Slow-action contacts

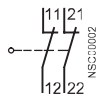
1 NO + 1 NC



3SE3 000–0A, 3SE3 010–0A, Ident. No.**11**

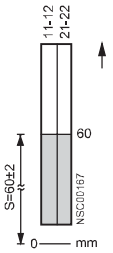


2 NC

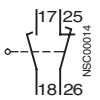


3SE3 000–6A, Ident. No. **02**

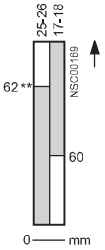
Along plunger axis



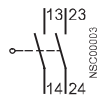
1 NO + 1 NC with make-before-break



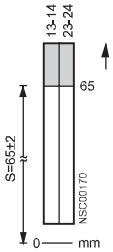
3SE3 000–3A, 3SE3 010–3A, Ident. No. **11**



2 NO

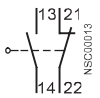


3SE3 000–7A, Ident. No. **20**

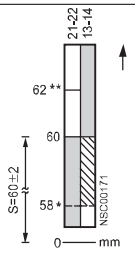


Snap-action contacts

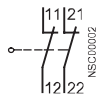
1 NO + 1 NC



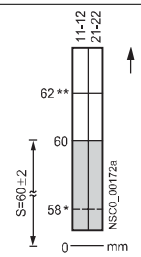
3SE3 000–1A, 3SE3 010–1A, Ident. No. **11**



2 NC



3SE3 000–1AV00, 3SE3 010–1AV00, Ident. No. **02**



8

3SE2, 3SE3 Position Switches

Metal enclosures, 40 mm and 56 mm

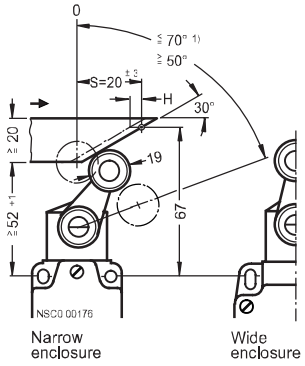
Position switches with 2 or 4 contacts

Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
α	Approach angle		S	Operating travel acc. to EN 50041		
β	Trailing angle		▩	Contact closed		
v_{max}	Max. operating speed		▭	Contact open		
0-line	Reference line acc. to EN 50041		*	Operating point on return		
S	Operating travel acc. to EN 50041		**	Positive opening acc. to IEC 60947-5-1		
H	Travel difference					
→	Direction of operation					

Twist levers, type A

Repositionable and finely adjustable from 10° to 10°

3SE2 100–.GW, 3SE2 120–.GW, 3SE2 230–.GW, 3SE2 404–.GW



v_{max} = 3 m/s

Minimum torque in direction of operation: 25 Ncm

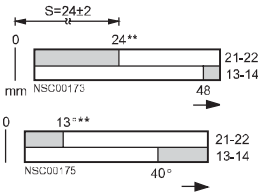
Contact operation either from right or left or from right and left.

Lateral actuation

Slow-action contacts

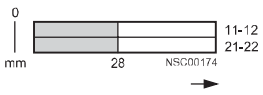
1 NO + 1 NC

3SE3 000–0A, 3SE3 010–0A, Ident. No.**11**



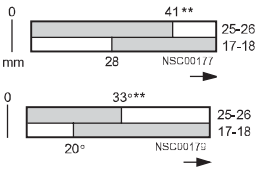
2 NC

3SE3 000–6A, Ident. No. **02**



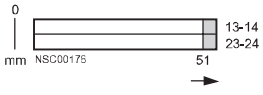
1 NO + 1 NC with make-before-break

3SE3 000–3A, 3SE3 010–3A, Ident. No. **11**



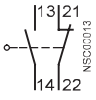
2 NO

3SE3 000–7A, Ident. No. **20**

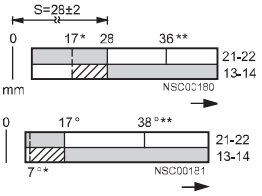


Snap-action contacts

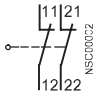
1 NO + 1 NC



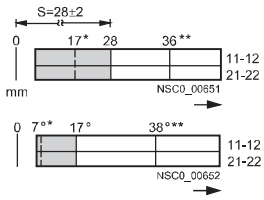
3SE3 000–1A, 3SE3 010–1A, Ident. No. **11**



2 NC



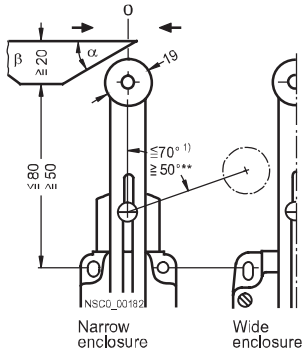
3SE3 000–1AV00, 3SE3 010–1AV00, Ident. No. **02**



Twist levers, adjustable length

Finely adjustable from 10° to 10°

3SE2 100–.UW, 3SE2 120–.UW, 3SE2 230–.U, 3SE2 404–.UW



v_{max} = 1 m/s, α_{max} = 30°, β_{max} = 30°

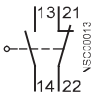
Minimum torque in direction of operation: 25 Ncm

Contact operation either from right or left or from right and left.

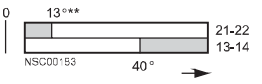
Deflection in direction of rotation

Slow-action contacts

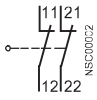
1 NO + 1 NC



3SE3 000–0A, 3SE3 010–0A, Ident. No.**11**



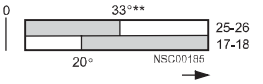
2 NC



3SE3 000–6A, Ident. No. **02**

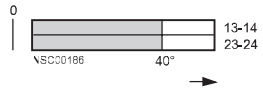
1 NO + 1 NC with make-before-break

3SE3 000–3A, 3SE3 010–3A, Ident. No. **11**



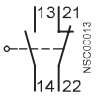
2 NO

3SE3 000–7A, Ident. No. **20**

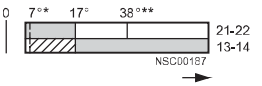


Snap-action contacts

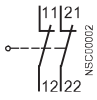
1 NO + 1 NC



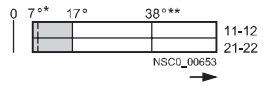
3SE3 000–1A, 3SE3 010–1A, Ident. No. **11**



2 NC



3SE3 000–1AV00, 3SE3 010–1AV00, Ident. No. **02**



1) Max. operating angle 70°.

Position switches with 2 or 4 contacts

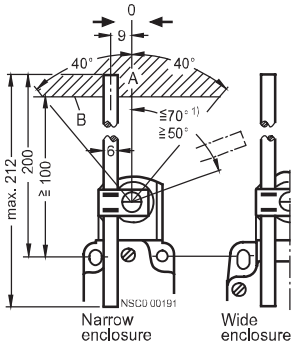
Operation by bar		Switch blocks	Nominal travel		Switch blocks	Nominal travel
◌	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041		
v_{max}	Max. operating speed			Contact closed		
0-line	Reference line acc. to EN 50041			Contact open		
→	Direction of operation		*	Operating point on return		
			**	Positive opening acc. to IEC 60947-5-1		

Rod actuator

Finely adjustable from 10° to 10°

3SE2 100–.WW, 3SE2 120–.WW, 3SE2 230–.W, 3SE2 404–.WW

3SE2 100–.VW, 3SE2 120–.VW, 3SE2 230–.V, 3SE2 404–.VW



A = Operating range
B = Lower edge of actuator

v_{max} = 3 m/s

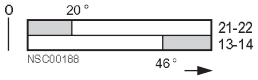
Minimum torque in direction of operation: 25 Ncm

Contact operation is possible from either right or left. By twisting the plunger from the right and left.

In direction of rotation

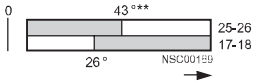
Slow-action contacts

1 NO + 1 NC



3SE3 000–0A,
3SE3 010–0A,
Ident. No.**11**

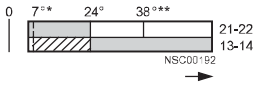
1 NO + 1 NC with make-before-break



3SE3 000–3A,
3SE3 010–3A,
Ident. No. **11**

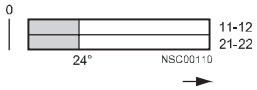
Snap-action contacts

1 NO + 1 NC



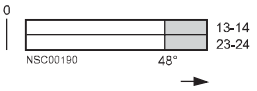
3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**

2 NC



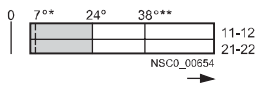
3SE3 000–6A,
Ident. No. **02**

2 NO



3SE3 000–7A,
Ident. No. **20**

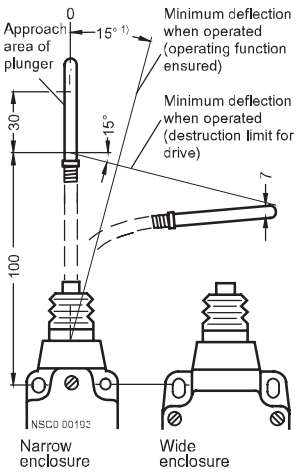
2 NC



3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**

Spring rods

3SE2 100–1R, 3SE2 120–1R, 3SE2 230–.R



v_{max} = 1 m/s, approachable from all sides

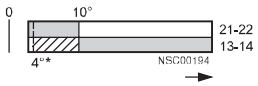
Minimum force required in direction of operation: 12 N

with lateral deflection at the tip: 2.5 N

Deflection of spring rod

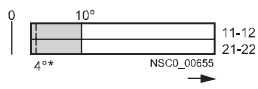
Snap-action contacts

1 NO + 1 NC



3SE3 000–1A,
3SE3 010–1A,
Ident. No. **11**

2 NC



3SE3 000–1AV00,
3SE3 010–1AV00,
Ident. No. **02**

1) Max. operating angle 70°.

3SE2, 3SE3 Position Switches

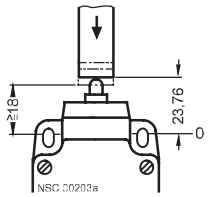
Metal enclosures, 40 mm and 56 mm

Position switches with 3 contacts

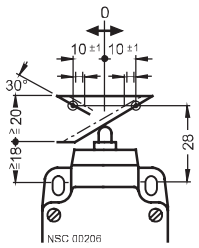
Operation by bar		Switch blocks	Nominal travel		Minimum force required in direction of operation
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041	
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041	
0-line	Reference line acc. to EN 50041			Contact closed	
H	Travel difference			Contact open	
→	Direction of operation		*	Operating point on return	
			**	Positive opening acc. to IEC 60947-5-1	

Plungers — *Slow-action contacts* — Along plunger axis — Lateral actuation

3SE2 303–.B

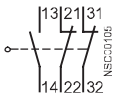


v_{max} = 1.5 m/s

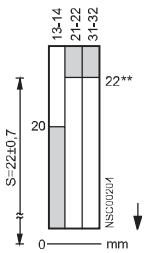


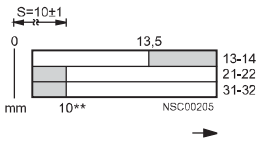
v_{max} = 0.5 m/s

1 NO + 2 NC — 16 N

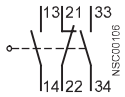


Ident. No. **12**

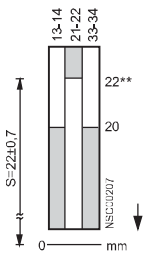


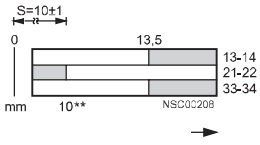


2 NO + 1 NC — 18 N

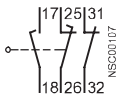


Ident. No. **21**

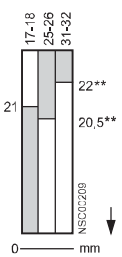


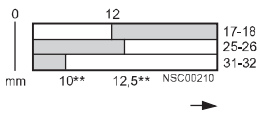


1 NO + 2 NC
with make-before-break — 16 N

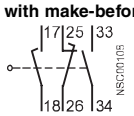


Ident. No. **12**





2 NO + 1 NC
with make-before-break — 18 N



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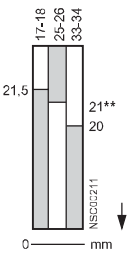
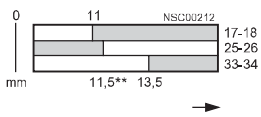




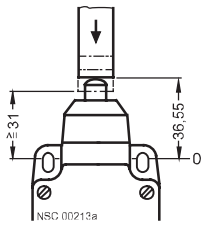
8

Position switches with 3 contacts

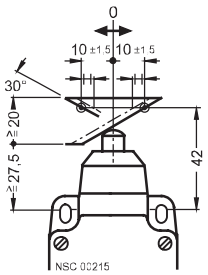
Operation by bar	Switch blocks	Nominal travel	Minimum force required in direction of operation
◌ Operating point acc. to EN 50041 v_{max} Max. operating speed 0-line Reference line acc. to EN 50041 H Travel difference → Direction of operation	Terminal designation acc. to EN 50013	0-line Reference line acc. to EN 50041 S Operating travel acc. to EN 50041 Contact closed Contact open * Operating point on return ** Positive opening acc. to IEC 60947-5-1	

Rounded plungers

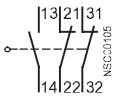
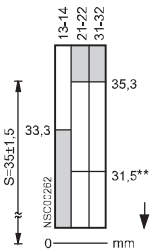
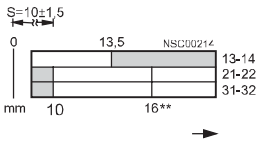
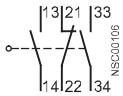
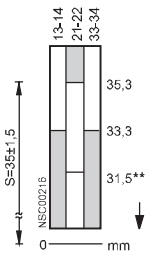
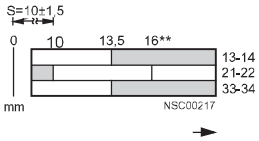
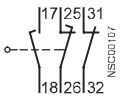
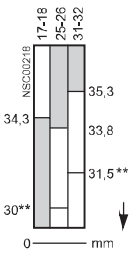
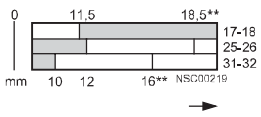
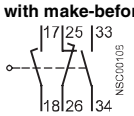
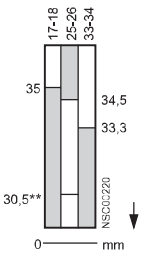
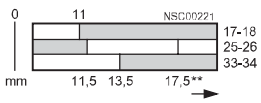
3SE2 303–.C



v_{max} = 1.5 m/s



v_{max} = 0.5 m/s

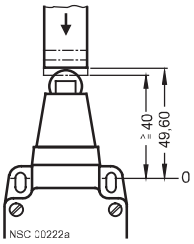
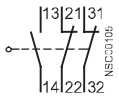
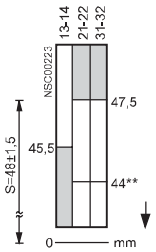
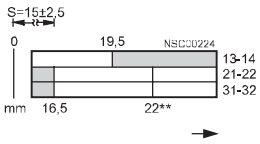
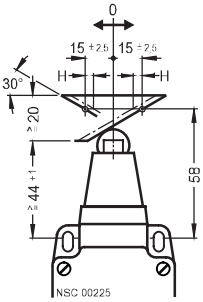
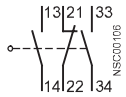
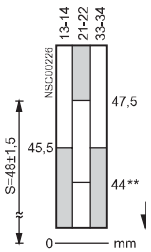
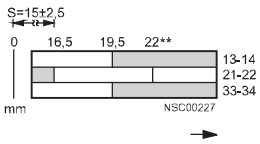
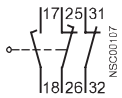
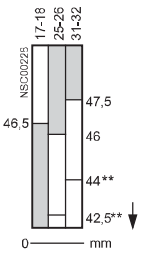
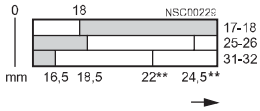
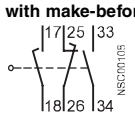
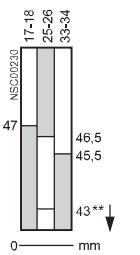
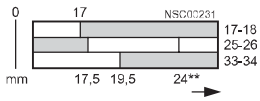
Slow-action contacts	Along plunger axis	Lateral actuation	
1 NO + 2 NC  Ident. No. **12**			35 N
2 NO + 1 NC  Ident. No. **21**			37 N
1 NO + 2 NC **with make-before-break**  Ident. No. **12**			35 N
2 NO + 1 NC **with make-before-break**  Ident. No. **21**			37 N

3SE2, 3SE3 Position Switches

Metal enclosures, 40 mm and 56 mm

Position switches with 3 contacts

Operation by bar		Switch blocks	Nominal travel		Minimum force required in direction of operation
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041	
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041	
0-line	Reference line acc. to EN 50041			Contact closed	
H	Travel difference			Contact open	
→	Direction of operation		*	Operating point on return	
			**	Positive opening acc. to IEC 60947-5-1	

Roller plungers	*Slow-action contacts*	Along plunger axis	Lateral actuation	
3SE2 303–.D	**1 NO + 2 NC**			35 N
				
v_{max} = 1.5 m/s	Ident. No. **12**			
	**2 NO + 1 NC**			37 N
				
v_{max} = 1 m/s	Ident. No. **21**			
	1 NO + 2 NC with make-before-break			35 N
				
	Ident. No. **12**			
	2 NO + 1 NC with make-before-break			37 N
				
	Ident. No. **21**			

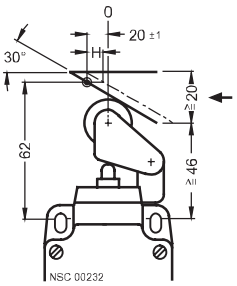
Position switches with 3 contacts

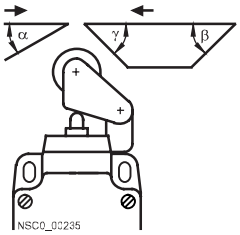
Operation by bar	Switch blocks	Nominal travel	Minimum force required in direction of operation
⊙ Operating point acc. to EN 50041 α Approach angle β Trailing angle γ Approach angle v_{max} Max. operating speed 0-line Reference line acc. to EN 50041 H Travel difference → Direction of operation	Terminal designation acc. to EN 50013	0-line Reference line acc. to EN 50041 S Operating travel acc. to EN 50041 Contact closed Contact open ** Positive opening acc. to IEC 60947-5-1	

Roller levers

Slow-action contacts — Lateral actuation

3SE2 303–.E

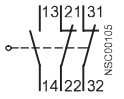




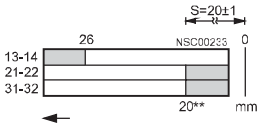
For lateral actuation:
v_{max} = 1 m/s at α_{max} = 30°
v_{max} = 2.5 m/s at γ_{max} = 45°
β_{max} = 45°

For operation along plunger axis: $v_{max.}$ = 1.5 m/s

1 NO + 2 NC

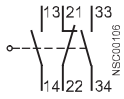


Ident. No. **12**

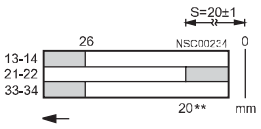


15 N

2 NO + 1 NC

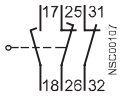


Ident. No. **21**

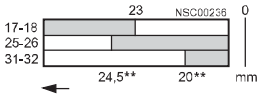


17 N

1 NO + 2 NC
with make-before-break

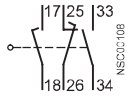


Ident. No. **12**



15 N

2 NO + 1 NC
with make-before-break



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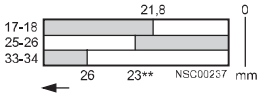
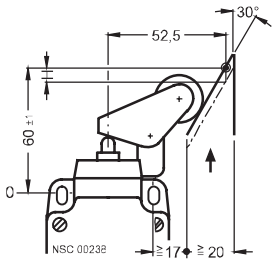


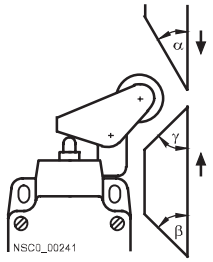
17 N

Angular roller levers

Slow-action contacts — Along plunger axis

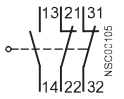
3SE2 303–.F



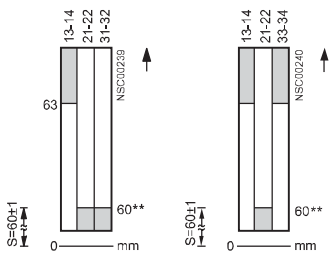


For operation along plunger axis:
v_{max} = 1 m/s at α_{max} = 30°
v_{max} = 2.5 m/s at γ_{max} = 45°
v_{max} = 2.5 m/s at β_{max} = 45°

1 NO + 2 NC

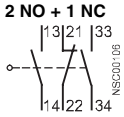


Ident. No. **12**



15 N

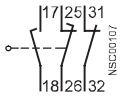
2 NO + 1 NC



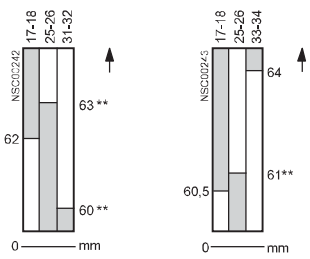
Ident. No. **21**

17 N

1 NO + 2 NC
with make-before-break

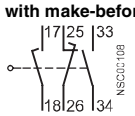


Ident. No. **12**



15 N

2 NO + 1 NC
with make-before-break



Ident. No. **21**

17 N

8

3SE2, 3SE3 Position Switches

Metal enclosures, 40 mm and 56 mm

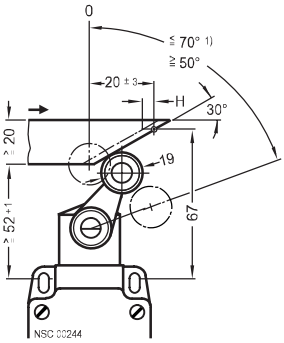
Position switches with 3 contacts

Operation by bar		Switch blocks	Nominal travel		Minimum torque in direction of rotation
⊙	Operating point acc. to EN 50041	Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50041	
v_{max}	Max. operating speed		S	Operating travel acc. to EN 50041	
0-line	Reference line acc. to EN 50041		▮	Contact closed	
H	Travel difference		▯	Contact open	
→	Direction of operation		**	Positive opening acc. to IEC 60947-5-1	

Twist levers | *Slow-action contacts* | Lateral actuation

Finely adjustable from 10° to 10°

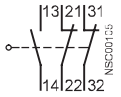
3SE2 303–.GW–Z
A31



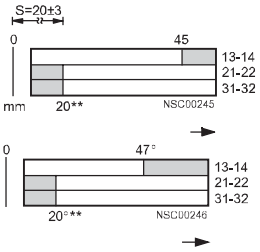
v_{max} = 3 m/s

Contact operation is possible from either right or left. By twisting the plunger from the right and left.

1 NO + 2 NC

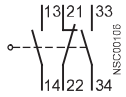


Ident. No. **12**

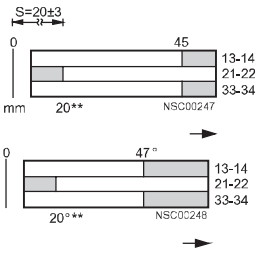


25 Ncm

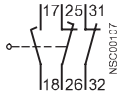
2 NO + 1 NC



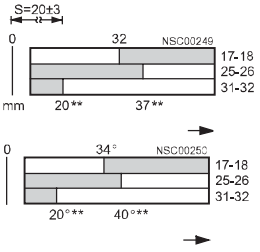
Ident. No. **21**



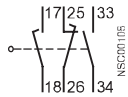
1 NO + 2 NC
with make-before-break



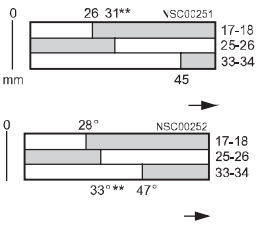
Ident. No. **12**



2 NO + 1 NC
with make-before-break



Ident. No. **21**



1) Max. operating angle 70°.
Max. deflection for adjustment purposes 90°.

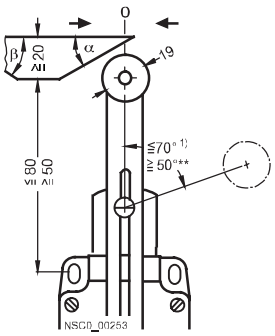
Position switches with 3 contacts

Operation by bar	Switch blocks	Nominal travel	Minimum torque in direction of rotation
⊙ Operating point acc. to EN 50041 α Approach angle β Trailing angle v_{max} Max. operating speed 0-line Reference line acc. to EN 50041 → Direction of operation	Terminal designation acc. to EN 50013	0-line Reference line acc. to EN 50041 S Operating travel acc. to EN 50041 ■ Contact closed □ Contact open ** Positive opening acc. to IEC 60947-5-1	

Twist levers, adjustable length

Finely adjustable from 10° to 10°

3SE2 303–.UW



v_{max} = 3 m/s,
α_{max} = 30°,
β_{max} = 30°

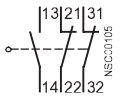
Contact operation is possible from either right or left. By twisting the plunger from the right and left.

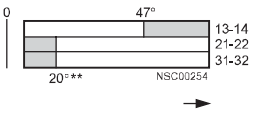
Slow-action contacts

Lateral actuation

25 Ncm

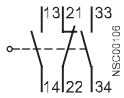
1 NO + 2 NC

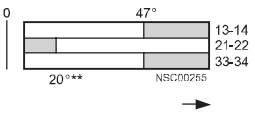




Ident. No. **12**

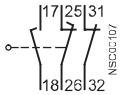
2 NO + 1 NC

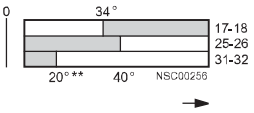




Ident. No. **21**

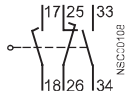
1 NO + 2 NC with make-before-break

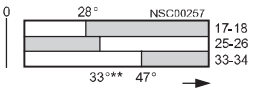




Ident. No. **12**

2 NO + 1 NC with make-before-break



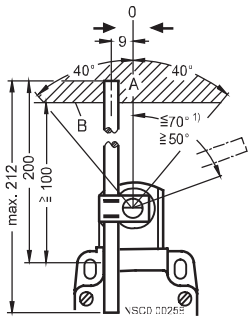


Ident. No. **21**

Rod actuator

Finely adjustable from 10° to 10°

3SE2 303–.WW,
3SE2 303–.VW



A = Operating range
B = Lower edge of actuator

v_{max} = 3 m/s

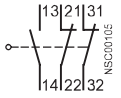
Contact operation is possible from either right or left. By twisting the plunger from the right and left.

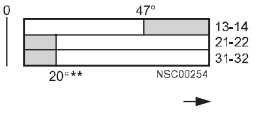
Slow-action contacts

Deflection in direction of rotation

25 Ncm

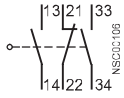
1 NO + 2 NC

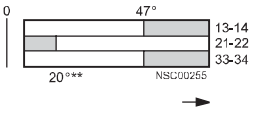




Ident. No. **12**

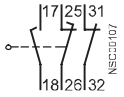
2 NO + 1 NC

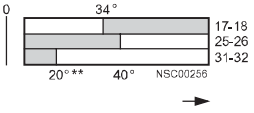




Ident. No. **21**

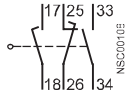
1 NO + 2 NC with make-before-break

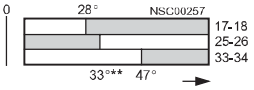




Ident. No. **12**

2 NO + 1 NC with make-before-break





Ident. No. **21**

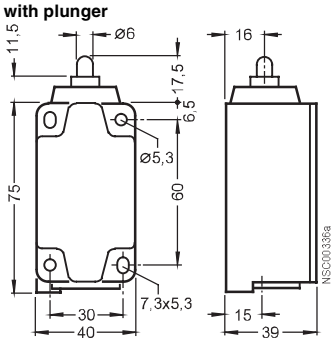
1) Max. operating angle 70°.
Max. deflection for adjustment purposes 90°.

3SE2, 3SE3 Position Switches

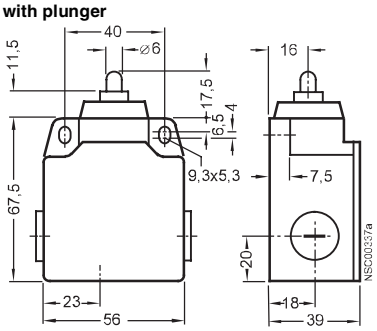
Metal enclosures, 40 mm and 56 mm

Dimensional drawings

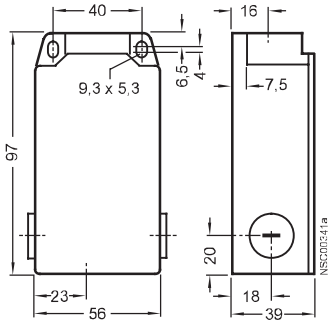
3SE2 120
narrow enclosure, 2 contacts, with plunger



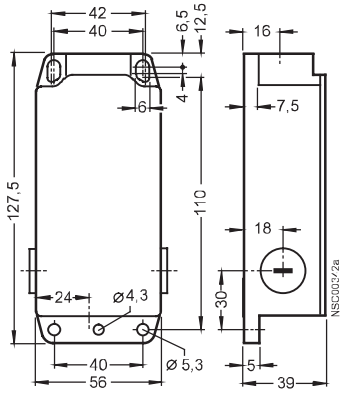
3SE2 100
wide enclosure, 2 contacts, with plunger



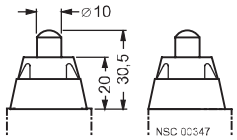
3SE2 303
wide enclosure, 3 contacts



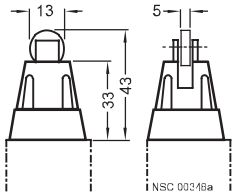
3SE2 404
wide enclosure, 4 contacts



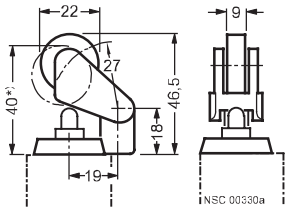
Rounded plungers, type B



Roller plungers, type C

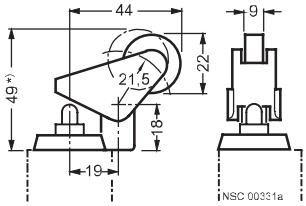


Roller levers



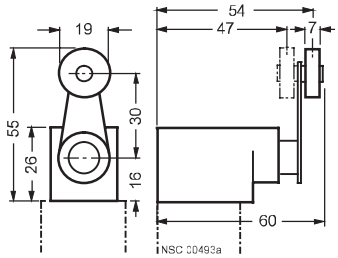
* Lever in final position

Angular roller levers

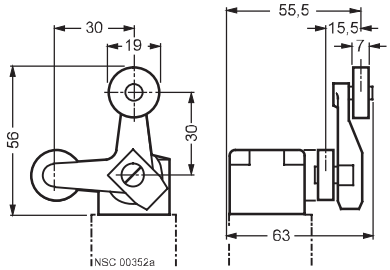


* Lever in final position

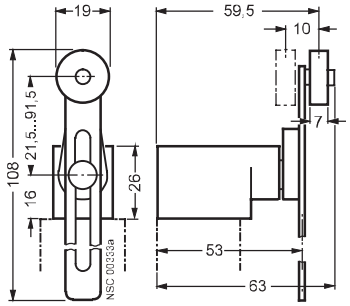
Twist levers, type A



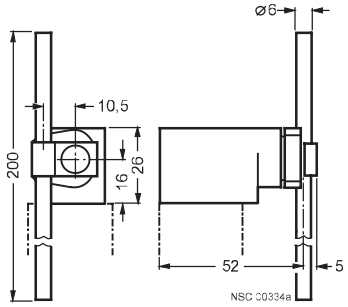
Fork levers



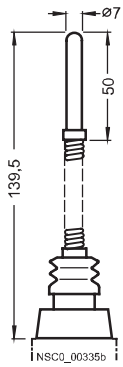
Twist levers, adjustable length



Rod actuator, adjustable length, type D



Spring rods



**Metal enclosures
compact design with molded cable**

Overview

In harsh industrial environments and in installations with limited space, the small 3SE3 160 and 3SE3 180 compact switches are ideal. The switches are already equipped with a molded cable of 2 m in length and can therefore be installed in the smallest spaces.

Both the enclosure and the actuator head are made of metal and comply with the high IP67 degree of protection. The roller plunger, rounded plunger and roller lever are available as actuator heads.

The switch block is designed with snap-action contacts 1 NO + 1 NC. The NC contact complies with the requirements for positive opening according to EN 60947-5-1.

The 3SE3 1 position switch with molded cable is available in different sizes:

- The 3SE3 180 series complies with the EU standard and features a 30 mm wide enclosure with drilled holes at a spacing of 20 mm.
- The 3SE3 160 series meets the requirements of the US market and features a 40 mm wide enclosure with drilled holes at a spacing of 25 mm.

Technical specifications

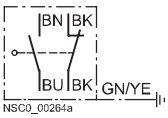
Switching frequency	30 operating cycles/min
Rated insulation voltage U_i	500 V
Pollution degree	Class 3
Continuous thermal current I_{th}	10 A
Mechanical endurance	10×10^6 operating cycles
Electrical endurance	500 000 operating cycles
Contact opening	2 × 1.25 mm
Connecting cable (2 m)	PVC-5 x 0.75 mm² (18 AWG); BN-BU: NO, BK-BK: NC, GN/YE: 0 V
Degree of protection	IP67
Ambient temperature	–30 ... +85°C
Stroke	5 mm
Operating speed up to 80 % operating distance	
• 3SE3 1.0-.C.	≤ 1 m/s
• 3SE3 1.0-.D.	Vertical ≤ 1 m/s
	Lateral ≤ 0.5 m/s
• 3SE3 1.0-.G.	≤ 1.5 m/s

Configuration

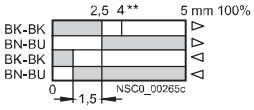
Switch blocks and operating travel or angle of actuators

Switch block	Nominal travel		
Terminal designation acc. to EN 50013	0-line	Reference line acc. to EN 50 041	Contact closed
	**	Positive opening acc. to IEC 60947-5-1	Contact open

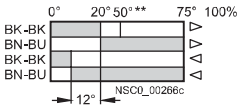
Snap-action contacts 1 NO + 1 NC



3SE3 1.0–1C., –1D.



3SE3 1.0–1G



Color codes:
BK = black
BN = brown
BU = blue
GN/YE = green/yellow

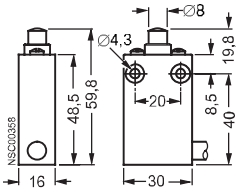
8

3SE2, 3SE3 Position Switches

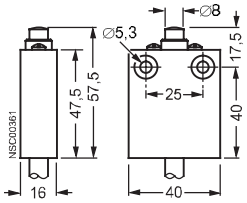
Metal enclosures
compact design with molded cable

Dimensional drawings

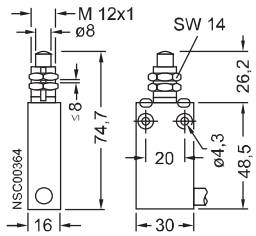
3SE3 180-1C



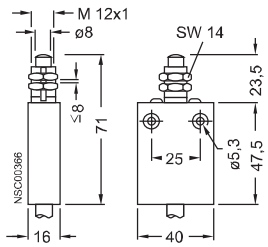
3SE3 160-1C



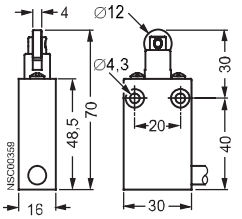
3SE3 180-1CJ



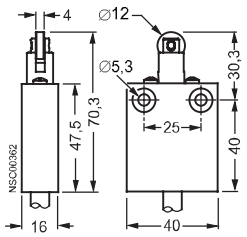
3SE3 160-1CJ



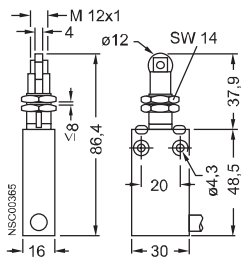
3SE3 180-1D



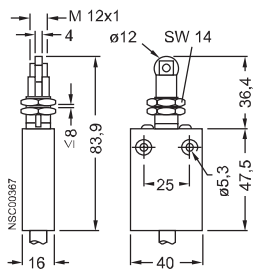
3SE3 160-1D



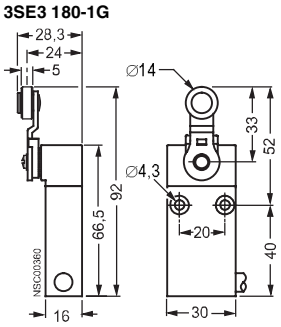
3SE3 180-1DJ



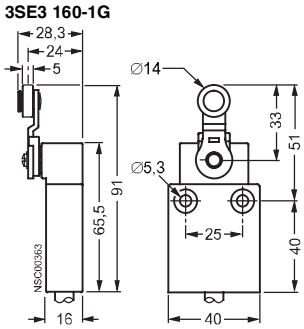
3SE3 160-1DJ



3SE3 180-1G



3SE3 160-1G



All devices complete with cable, 2 m long

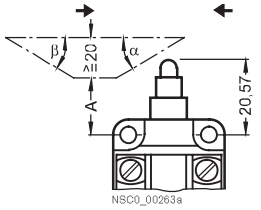
Configuration

Operation, operating speed and travel of actuators

	Operation	Switch blocks	Nominal travel		Minimum force required in direction of plunger axis
A	Actuating bar spacing = distance from center of the fixing hole up to lower edge of contact bar	Terminal designation acc. to EN 50013	0-line	Commencement of plunger travel	
A**	Actuating bar spacing for positive opening acc. to IEC 60204-1 (VDE 0113 Part 1) for snap-action contacts			Contact closed	
				Contact open	
			*	Operating point on return	
			**	Positive opening acc. to IEC 60947-5-1-3	

Rounded plungers

3SE3 02



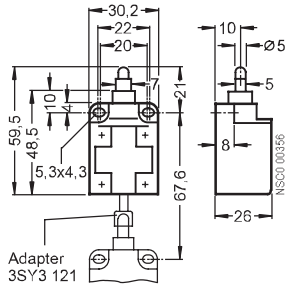
A ≥ 15 mm; A** ≥ 17.5 mm

Actuators can be in the form of a bar, cam, stop etc.

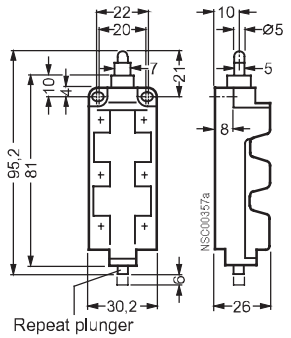
For lateral actuation:
α_{max} = 30°, β_{max} = 30°, v_{max} = 0.5 m/s

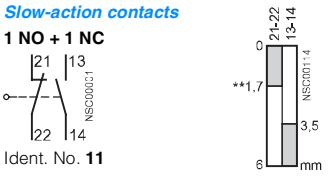
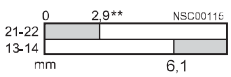
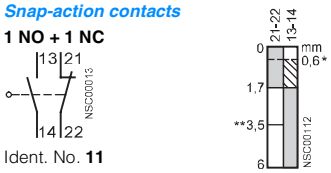
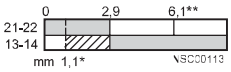
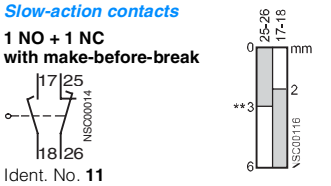
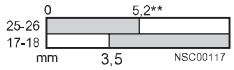
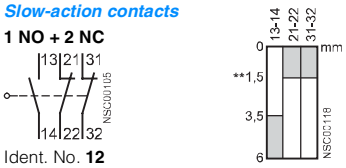
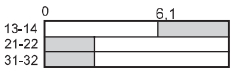
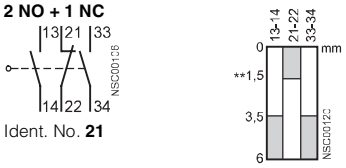
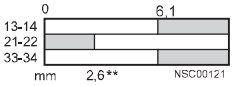
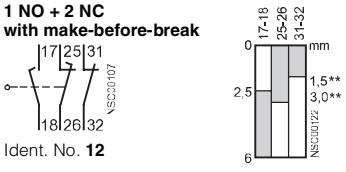
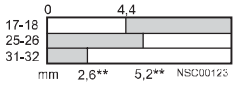
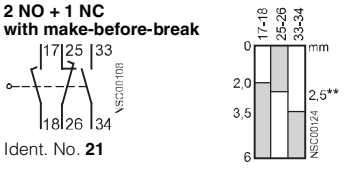
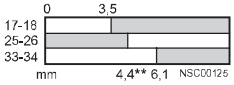
For operation along plunger axis:
v_{max} = 1.5 m/s

3SE3 020-.A



SE3 023-.A



	Along plunger axis	Lateral actuation α = 30°	
Slow-action contacts			8 N
1 NO + 1 NC			
Ident. No. **11**			
Snap-action contacts			6 N
1 NO + 1 NC			
Ident. No. **11**			
Slow-action contacts			8 N
1 NO + 1 NC with make-before-break			
Ident. No. **11**			
Slow-action contacts			11 N
1 NO + 2 NC			
Ident. No. **12**			
2 NO + 1 NC			13 N
Ident. No. **21**			
1 NO + 2 NC with make-before-break			11 N
Ident. No. **12**			
2 NO + 1 NC with make-before-break			13 N
Ident. No. **21**			

8

3SE2, 3SE3 Position Switches with Separate Actuator

General data

Overview

SIRIUS position switches with separate actuator are used where the position of doors, covers or safety screens must be monitored for safety reasons. For example, they are used together with 3TK28 safety combinations and the ASIsafe, SIMATIC or SINUMERIK systems in safety circuits up to Category 4.

Design

These compact position switches with separate actuator are available in three versions:

- With molded-plastic enclosure and fixing dimensions according to EN 50047, width 31 mm
- With metal enclosure and fixing dimensions according to EN 50041, width 40 mm
- With molded-plastic enclosure outside of the standards that has arisen in this form in accordance with general market requirements

When used as a safety position switch, mounting at a spacing of 20 mm (molded-plastic enclosure) or 30 mm (metal enclosure) is necessary. Or the switch must be fitted with a pin or with a stop.

Operation

The position switches can only be operated with the matching coded actuator. Simple overruling by hand or auxiliary devices is impossible.

The actuators are not included in the scope of supply of the switch and must be ordered separately.

The actuator with lateral actuation can be adjusted through 4 x 90°. It cannot be replaced with actuators of the standard type.

The actuator heads of the 3SE2 243 and 3SE2 257 switches with special enclosures cannot be changed.

Radius actuator

The position switches with radius actuators are particularly suitable for rotatable protection devices. The movable actuation key allows even small radii to be approached. Damage to the switch and the actuator due to inaccurate approach is prevented.

Positive opening

The switch can be used in safety circuits due to the positive opening of the NC and positive closing of the NO contacts by pulling the actuator. A position switch must not be used as an end stop.

Contact reliability

The movable contacts of the 3SE2 120 and 3SE2 200 switches are designed as double-break contacts. This ensures an extremely high contact stability, even when the devices are switching low voltages and currents, e.g. 5 V DC/1 mA.

Technical specifications

Type		3SE2 1, 3SE2 2, 3SE3 2		Exception: 3SE2 243	
Standards		IEC 60947-5-1, EN 60947-5-1			
Rated insulation voltage U_i	V	500			
Pollution degree acc. to EN 60664-1		Class 3			
Rated operational voltage U_e	V	500 AC; over 380 V AC only for equal potential			
Continuous thermal current I_{th}	A	10			
Rated operational current I_e					
• For alternating current 40 to 60 Hz		I_e / AC-12	I_e / AC-15	I_e / AC-12	I_e / AC-15
- at 24 V	A	10	10	10	10
- at 125 V	A	10	10	10	10
- at 230 V	A	10	6	10	4
- at 400 V	A	10	4	10	4
- at 500 V	A	10	3	10	3
• For direct current		I_e / DC-12	I_e / DC-13		
- at 24 V	A	10	10		
- at 48 V	A	6	4		
- at 110 V	A	4	1		
- at 220 V	A	1	0.4		
- at 440 V	A	0.5	0.2		
Short-circuit protection[1], DIAZED fuse links					
• gL/gG operational class	A	6			
• Characteristic quick	A	10			
Mechanical endurance		> 1 x 10^6 operating cycles			
Electrical endurance					
• With 3RH11, 3RT10 16 to 3RT10 26 contactors		> 1 x 10^6 operating cycles			
• For AC-15 utilization category		0.5 x 10^6 operating cycles when interrupting I_e / AC-15 at 230 V			
• For DC-13 utilization category		With direct current the contact endurance depends not only on the breaking current but also on the voltage, the circuit inductance and the speed of switching. No generally valid information can be given.			
Switching frequency With 3RH11, 3RT10 16 to 3RT10 26 contactors		6 x 10^3 operating cycles/h			

Type	3SE2 200, 3SE3 200	3SE2 243, 3SE2 257	3SE2 120
Enclosures	Fiber-glass strengthened thermoplastic		Aluminum (GD – AlSi 12)
Degree of protection acc. to EN 60529	IP65	IP67	IP67
Ambient temperature			
• During operation	–30 ... +85 °C		–35 ... +85 °C
• During storage, transport			
Mounting position	Any		
Cable entry	3SE2 200: 1 x (M20 x 1.5), 3SE3 200: Pg13.5	1 x (M20 x 1.5) or 1 x (M16 x 1.5)	1 x (M20 x 1.5)
Conductor cross-sections			
• Solid	2 x 2.5 mm²	1 x (0.5 ... 1.5 mm²), 2 x (0.5 ... 1 mm²)	2 x 2.5 mm²
• Finely stranded with end sleeve	2 x 1.5 mm²	1 x (0.5 ... 1.5 mm²), 2 x (0.5 ... 1 mm²)	2 x 1.5 mm²
PE/ground terminal inside enclosure	--		M 3.5

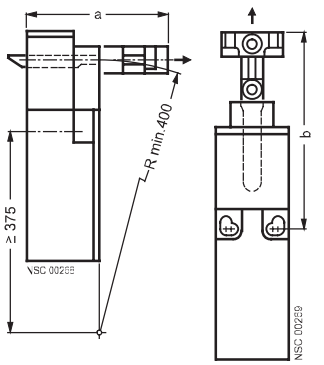
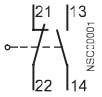
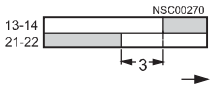
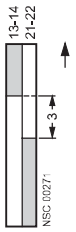
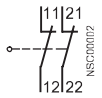
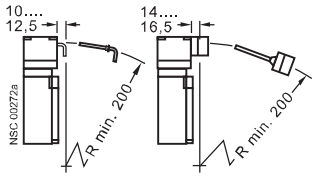
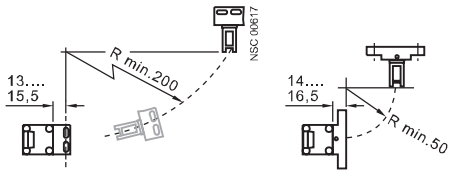
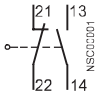
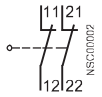
1) Without any welds according to IEC 60947-5-1.

3SE2, 3SE3 Position Switches with Separate Actuator

Molded-plastic enclosures, 31 mm

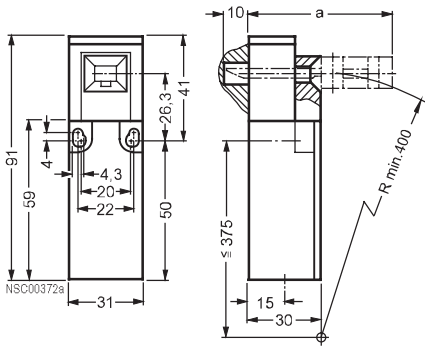
Configuration

Operation, operating speed and travel of actuators

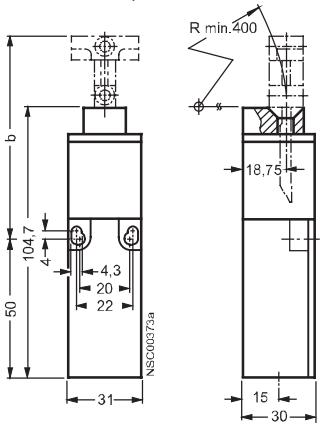
Actuator	Operation by a separate actuator	Switch blocks	Nominal travel		Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed		
Separate actuator	**3SE2 200–.XX03** **3SE2 200–.XX04**	***Slow-action contacts***	Lateral actuation	For front-end operation	
Lateral actuation v_{max} = 1.5 m/s		**1 NO + 1 NC**  Ident. No. **11**			10 N
Axial and front-end actuation v_{max} = 1 m/s		**2 NC**  Ident. No. **02**			
	Actuator | a | b Short | 42 ... 45 | 66.5 ... 69 Long | 62 ... 65 | 86.5 ... 89				
Axial and lateral actuation (4 × 90°)	**3SE3 200–.XX13** Vertical actuation  Horizontal actuation 	**1 NO + 1 NC**  Ident. No. **11** **2 NC**  Ident. No. **02**			10 N

Dimensional drawings

3SE2 200-.XX03, lateral actuation



3SE2 200-.XX04, front-end actuation

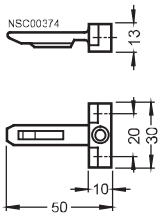


Permissible center offset of actuator to position switch: vertical and horizontal ±1 mm

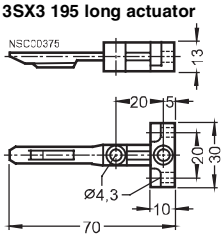
Actuator	a	b
Short	42 ... 45	66.5 ... 69
Long	62 ... 65	86.5 ... 89

Radius actuation:
For all radii ≥ 50 mm, lateral and front-end actuation

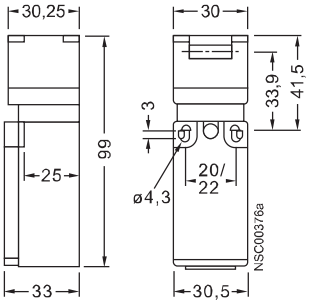
3SX3 196 short actuator



3SX3 195 long actuator

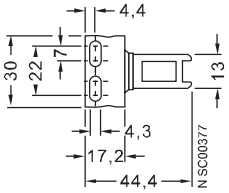


3SE3 200-.XX13, 5 directions of approach

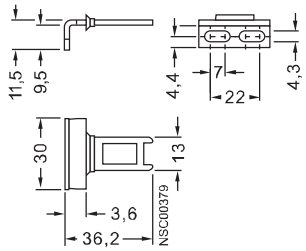


Radius actuation:
For all radii ≥ 50 mm, lateral and front-end actuation

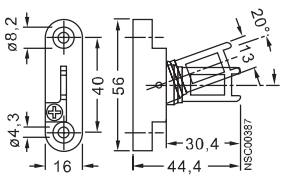
3SX3 220 standard actuator



3SX3 221 actuator for transverse fixing



3SX3 254 radius actuator



8

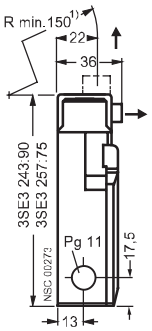
3SE2, 3SE3 Position Switches with Separate Actuator

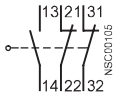
Molded-plastic enclosures, 52 mm

Configuration

Operation and operating travel of actuators

Actuator	Operation by a separate actuator	Switch blocks	Nominal travel	Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed	
Separate actuator		*Slow-action contacts*	Lateral actuation	
Lateral and front-end actuation	**3SE2 243–.XX.., 3SE2 257–.XX..**	**1 NO + 2 NC**	0 2,3 5,2 5,5 8 13-14 21-22 31-32 mm NSC00274	30 N or 5 N
		Ident. No. **12**		
		1 NC	0 2,3 5,5 8 11-12 mm NSC00275	
		Ident. No. **01**		

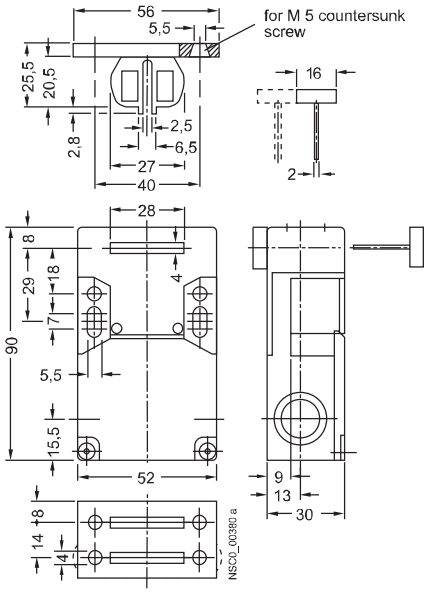




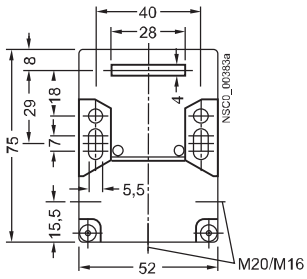
1) Radius actuator: R_{min} > 38 mm.

Dimensional drawings

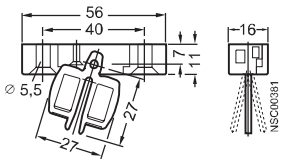
3SE2 243, lateral and front-end actuation, with 3SX3 218 standard actuator



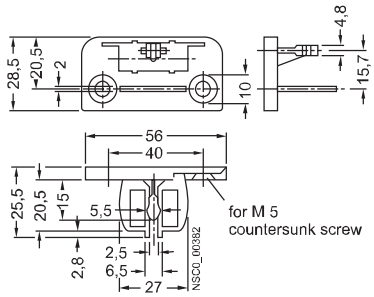
3SE2 257, lateral and front-end actuation



3SX3 228 universal radius actuator

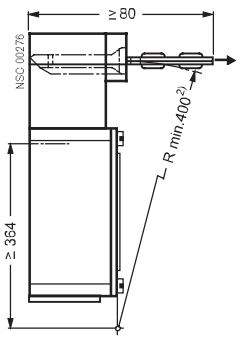
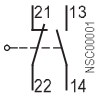
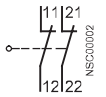
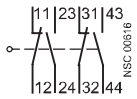
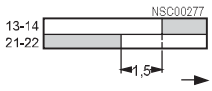


3SX3 217 ball locating



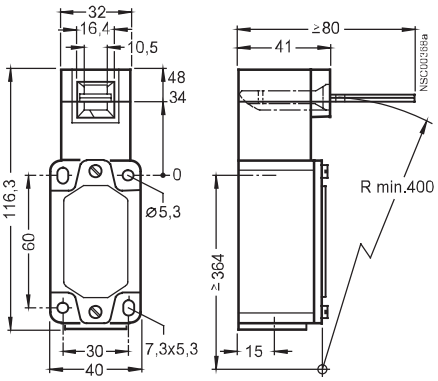
Configuration

Operation, operating speed and travel of actuators

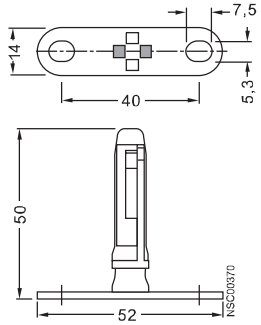
Actuator	Operation by a separate actuator	Switch blocks	Nominal travel	Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed	
Separate actuator		***Slow-action contacts***	Lateral actuation	
Lateral actuation v_{max} = 1 m/s	**3SE2 120–.XX** 	**1 NO + 1 NC**  Ident. No. **11** **2 NC**  Ident. No. **02** **2 NO + 2 NC**  Ident. No. **22**		10 N

Dimensional drawings

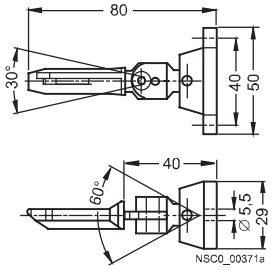
3SE2 120-.XX, lateral actuation



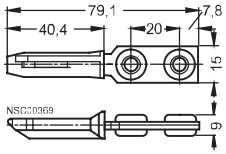
3SX3 206 actuator for transverse fixing



3SX3 203 universal radius actuator



3SX3 197 actuator for lengthwise fixing



3SE2, 3SE3 Position Switches with Tumbler

General data

Overview

The SIRIUS position switches with tumbler are exceptional, technically safe devices which restrict and prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (e.g. follow-on motion of the shutdown machine).

Design

The position switches with tumbler are offered in molded-plastic or metal enclosures.

Operation

The actuators are not included in the scope of supply of the switch and must be ordered separately.

The actuator with lateral actuation can be adjusted through 4 x 90°. The 3SE3 .5. and 3SE3 .6. switches can also be approached from above.

A radius actuator is available for small actuating radii.

Tumbler

The separate actuator operates in a similar way to the coding of a key and protects against manipulation. It transmits the locking force to the protection system and helps to monitor its position.

There are two versions of locking:

- In the standard version, the position switch locks by means of spring force and releases by means of electromagnetic force (closed-circuit principle). In the case of voltage failure, it reliably prevents the protective device from opening when machine parts are still moving.
  For emergency situations or in setup mode, the switch is equipped with an auxiliary release which is secured against unauthorized use either with a seal or lock. This means that release is still possible for authorized personnel when a power failure has occurred.
- The second version offers locking by means of electromagnetic force and release by means of spring force (open-circuit principle). This version has an advantage when it is necessary to quickly access the machine after a power failure occurs, or in the case of very short after-running times.

Contacts

Switch with 4 contacts: monitoring the actuator or position of the protective door as well as monitoring the position of the magnet.

The mechanical design of the switch corresponds to the requirements of the failsafe principle to EN 1088.

Function

Optical signaling device

The 3SE2 83 and 3SE2 84 position switches are also available with an optical signaling device.

The signaling device indicates the switching position of the lock and the protective device optically by means of 2 LEDs on the enclosure surface (only possible with contact arrangement of 1 NO/1 NC + 1 NO/1 NC). On the version with optical signaling equipment the contacts are not electrically isolated.

Protective device	Tumbler	Display	Meaning
Closed	Open	Yellow and green	Actuator to be pulled
Closed	Closed	Green	Actuator locked
Open	Open	Yellow	Actuator pulled

Technical specifications

Type		3SE3 7, 3SE3 8		3SE2 8
Standards		IEC 60947-5-1, EN 60947-5-1 (VDE 0660 Part 200)		
Rated insulation voltage U_i	V	250		
Pollution degree acc. to EN 60664-1		Class 3		
Rated operational voltage U_e				
• DC	V	24		
• AC 50 ... 60 Hz	V	110 ... 130	230	
Continuous thermal current I_{th}	A	10		
Rated operational current I_e				
• For alternating current 40 to 60 Hz		I_e / AC-12	I_e / AC-15	
- at 24 V	A	10	4	
- at 60 V	A	10	4	
- at 110 V	A	10	4	
- at 230 V	A	10	4	
• For direct current		I_e / DC-12	I_e / DC-13	
- at 24 V	A	10	3	
- at 60 V	A	5	1.5	
- at 110 V	A	2.5	0.7	
- at 220 V	A	1	0.3	
Power consumption of the magnet at U_c	W	5.5		5.2
Short-circuit protection[1], DIAZED fuse links				
• gL/gG operational class	A	6		
• Characteristic quick	A	10		
Mechanical endurance		1×10^6 operating cycles		
Electrical endurance				
• With 3RH11, 3RT10 16 to 3RT10 26 contactors		1×10^6 operating cycles		
• For AC-15 utilization category		0.5×10^6 operating cycles when interrupting I_e / AC-15 at 230 V		
• For DC-13 utilization category		With direct current the contact endurance depends not only on the breaking current but also on the voltage, the circuit inductance and the speed of switching. No generally valid information can be given.		
Switching frequency With 3RH11, 3RT10 16 to 3RT10 26 contactors		6×10^3 operating cycles/h		

Type	3SE3 75, 3SE3 76	3SE3 85, 3SE3 86	3SE2 83, 3SE3 84
Enclosure	Fiber-glass strengthened thermoplastic	Aluminum (GD – AlSi 12)	Aluminum (GD – AlSi 12)
Degree of protection acc. to EN 60529	IP66		IP67
Ambient temperature			
• During operation	–30 ... +70 °C		
• During storage, transport			
Mounting position	Any		
Cable entry	Pg 13.5		M 20 × 1.5
Conductor cross-sections			
• Solid	2 × 1.5 mm²		2 × 2.5 mm²
• Finely stranded with end sleeve	2 × 1.0 mm²		2 × 1.5 mm²
PE/ground terminal inside enclosure	--	M 3.5	M 3.5

1) Without any welds according to IEC 60947-5-1.

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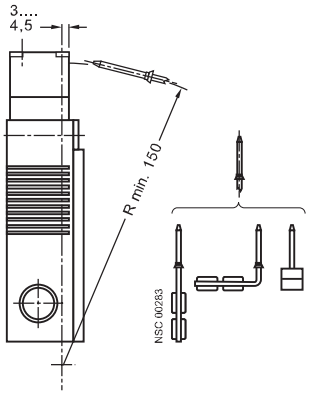
3SE2, 3SE3 Position Switches with Tumbler

Molded-plastic enclosures, 1200 N locking force

Configuration

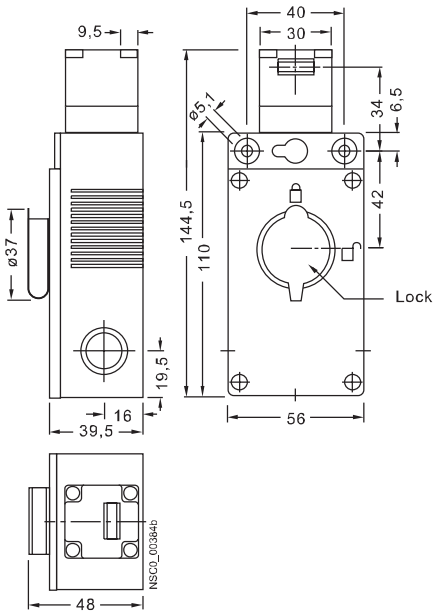
Operation and operating travel of actuators

Actuator	Operation by a separate actuator	Switch blocks	Nominal travel	Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed	
Separate actuator, with tumbler	***Slow-action contacts***		Lateral actuation	
Axial and lateral actuation (4 × 90°)	**3SE3 75.-.XX, 3SE3 76.-.XX**	**1 NO + 2 NC** 11 21 43 12 22 44 NSC00279 Ident. No. **12** **2 NC** 11 21 12 22 NSC00002 Ident. No. **02**	**1 NC** 31 32 NSC00280 Ident. No. **01** **2 NC** 31 41 32 42 NSC00281 Ident. No. **02**	20 N

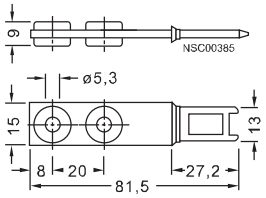


Dimensional drawings

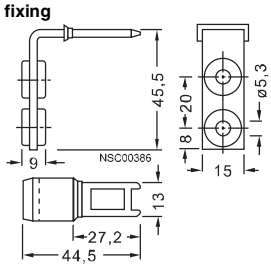
3SE3 75.-.XX, 3SE3 76.-.XX



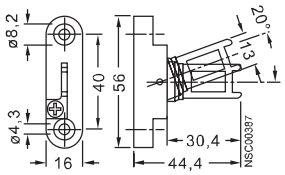
3SX3 252 standard actuator



3SX3 253 actuator for transverse fixing



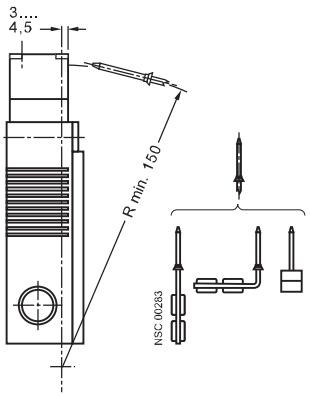
3SX3 254 radius actuator

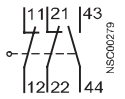


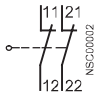
Configuration

Operation and operating travel of actuators

Actuator	Operation by a separate actuator	Switch blocks	Nominal travel	Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed	
Separate actuator, with tumbler	***Slow-action contacts***		Lateral actuation	
Axial and lateral actuation (4 × 90°)	**3SE3 85.-.XX, 3SE3 86.-.XX**	**1 NO + 2 NC** Ident. No. **12** **2 NC** Ident. No. **02**	**1 NC** Ident. No. **01** **2 NC** Ident. No. **02**	20 N

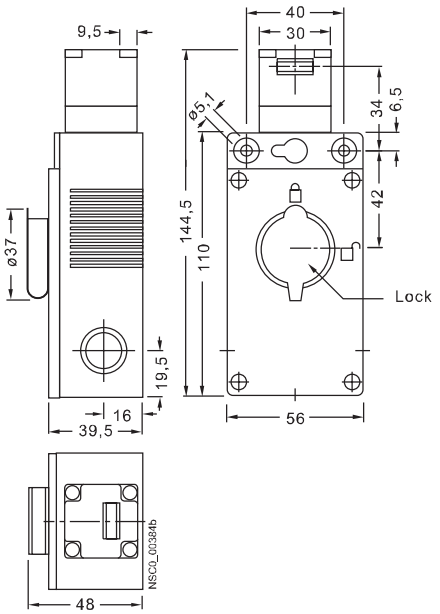




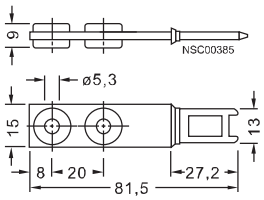


Dimensional drawings

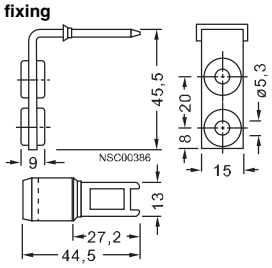
3SE3 85.-.XX, 3SE3 86.-.XX



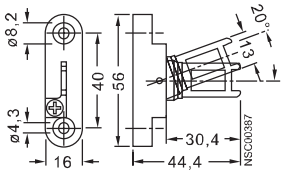
3SX3 252 standard actuator



3SX3 253 actuator for transverse fixing



3SX3 254 radius actuator



8

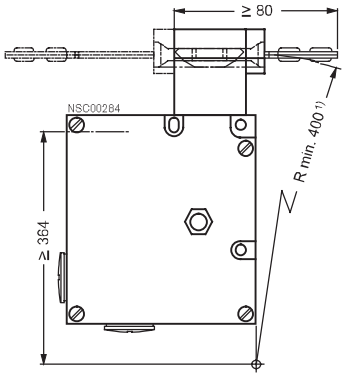
3SE2, 3SE3 Position Switches with Tumbler

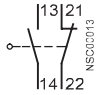
Metal enclosures, 2000 N locking force

Configuration

Operation, operating speed and travel of actuators

Actuator	Operation by a separate actuator	Switch blocks	Nominal travel	Minimum force required in operating direction on retraction
	v_{max} Max. operating speed → Direction of operation Radius actuation: for all directions of approach	Terminal designation according to EN 50013	Contact closed Contact open Actuator in actuator head; NC is closed	
Separate actuator, with tumbler	***Slow-action contacts***	Lateral actuation		
Lateral actuation (4 × 90°) v_{max} = 1.5 m/s	**3SE2 83.-.XX, 3SE2 84.-.XX**	**1 NO + 1 NC**	13-14 21-22 NSC00285 1	10 N Locking force: max. 2000 N, duration 5 s[2]





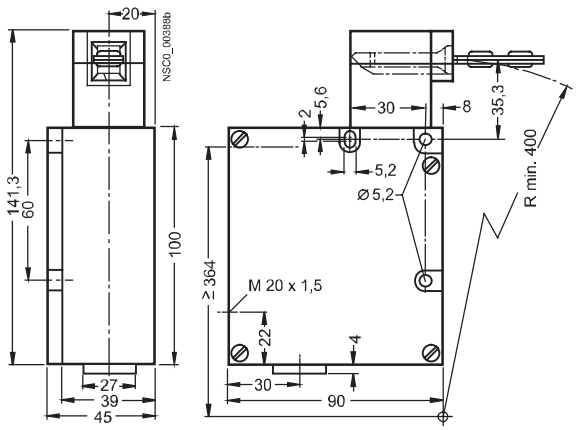
Ident. No. **11**

1) Universal radius actuator: R_{min} > 70 mm.

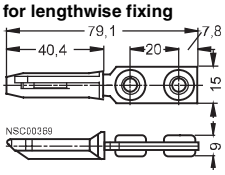
2) Destruction of internal parts will result if this value is exceeded.

Dimensional drawings

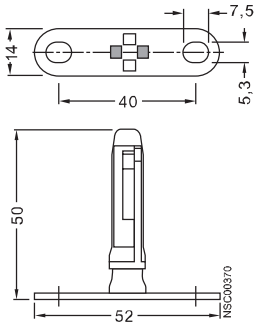
3SE2 83.-.XX, 3SE2 84.-.XX, lateral actuation



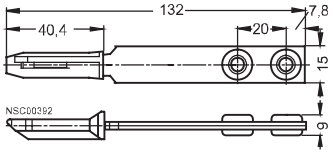
3SX3 197 actuator for lengthwise fixing



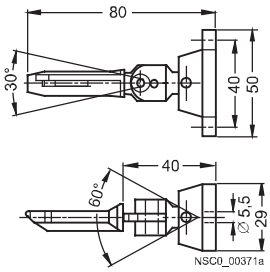
3SX3 206 actuator for transverse fixing



3SX3 207 actuator for direction of approach from the left side

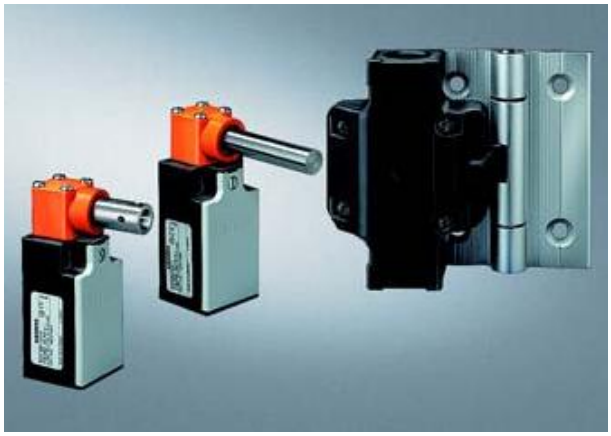


3SX3 203 universal radius actuator



Molded-plastic enclosures

Overview



The hinge switches are used for monitoring and protecting hinged protection equipment such as doors and flaps.

Characteristics

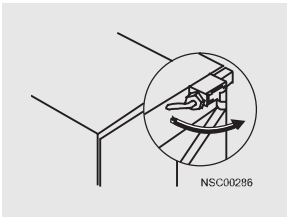
- Type 3SE2 200
  - Enclosures according to EN 50047, width 31 mm, with 1 × M20 × 1.5 connecting thread
  - 2 contacts with moving double-break contacts
  - Degree of protection IP66
- Type 3SE2 283
  - Special design, with two M20 × 1.5 connecting thread
  - 3 contacts
  - Degree of protection IP65

Design

3SE2 200

The hinge switches are offered in a molded-plastic enclosure according to EN 50047. The enclosures correspond to the enclosures of the standard position switches. The switches are fitted with 1 NO + 1 NC snap-action contacts. With an angle of operation of 5° or 15° they make "Switch-off" and "Signaling" possible for the first time without a time delay and with a small opening angle.

The switches designed for mounting on hinges must be attached directly to the hinge and guarantee ensured cut-off, with a high level of security against manipulation, even with very small opening angles. The actuator head can be rotated through 4 x 90° after the four screws are unscrewed.



Mounting on hinges

3SE2 283

The 3SE2 283 hinge switch has an integrated electromechanical switch block that is actuated when the hinged protective cover is opened. If the cover is only opened by 4°, the normally closed contact is positively opened by a direct (not spring-action) mechanism. These positively driven contacts guarantee interruption of the electric circuit and stopping of the machine. The normally open contact is closed when the cover is moved by 13.5°.

Technical specifications

Type	3SE2 200
Rated insulation voltage U_i	500 V
Pollution degree	Class 3
Continuous thermal current I_{th}	10 A
Mechanical endurance	1 × 10^6 operating cycles
Operating frequency	30 operating cycles/hour
Actuating force	15 Ncm
Actuating speed	Minimum of 0.5 m/s
Enclosure material	Molded plastic
Degree of protection	IP66
Ambient temperature	–25 ... +85 °C
Cable entry	M20 × 1.5
Conductor cross-sections	
• Solid	2 × 2.5 mm^2
• Finely stranded with end sleeve	2 × 1.5 mm^2

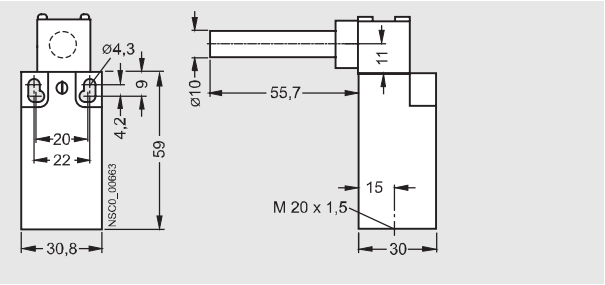
For further technical specifications, see Standard position switches.

Type	3SE2 283
Rated insulation voltage U_i	250 V
Continuous thermal current I_{th}	2.5 A
Rated operational current I_e	
• At AC-15, 120 V	4.2 A
• At AC-15, 250 V	2 A
• At DC-13, 24 V	1 A
Min. make-break capacity	> 5 V/1 mA
Short-circuit protection	2 A (gG operational class)
Mechanical endurance	> 1 × 10^6 operating cycles
Operating frequency	1200 operating cycles/hour
Positive opening	2 mm after opening point
Enclosure material	Molded plastic
Degree of protection	IP65
Ambient temperature	–25 ... +65 °C
Shock resistance	30 g/18 ms
Resistance to vibrations	20 g/10 ... 200 Hz
Cable entry	2 × (M20 × 1.5)
Screw terminals	0.5 ... 1.5 mm^2 / AWG 15

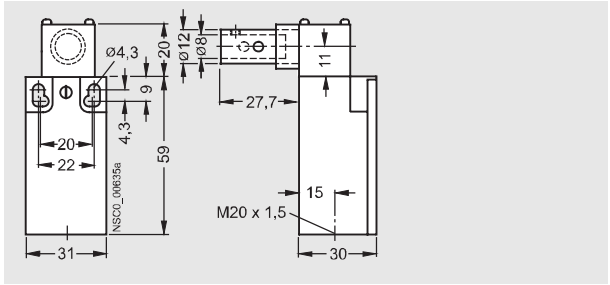
Molded-plastic enclosures

Dimensional drawings

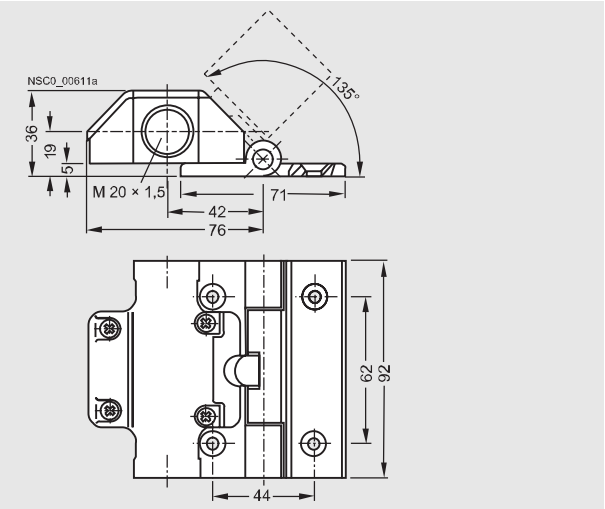
3SE2 200-1GA.1 hinge switches for mounting on hinges, solid shaft



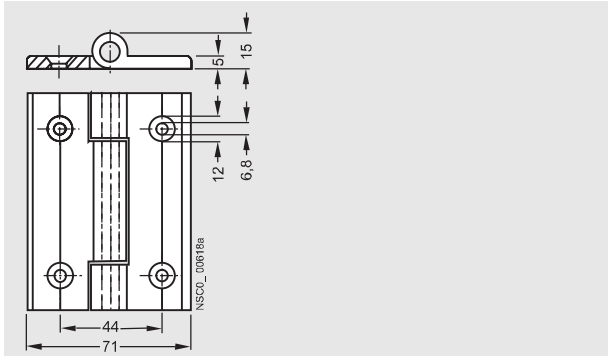
3SE2 200-1GA.0 hinge switches for mounting on hinges, hollow shaft



3SE2 283-.GA.3 hinge switches with hinge



3SX3 225 additional hinge

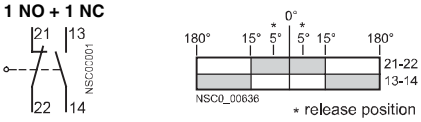


Schematics

Switch blocks and operating travel of actuators

3SE2 200

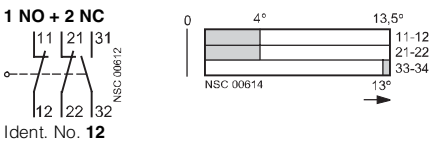
1 NO + 1 NC



Ident. No. **11**

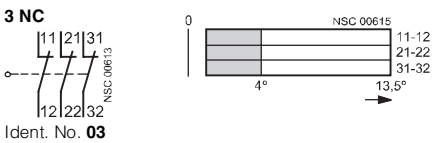
3SE2 283

1 NO + 2 NC



Ident. No. **12**

3 NC



Ident. No. **03**

Overview

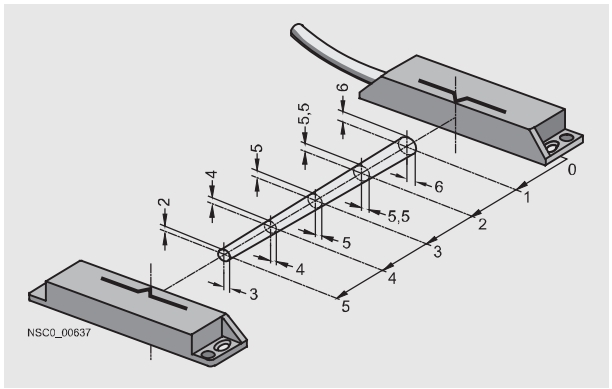
A magnetically operated switch is comprised of a coded switching magnet and a switch block (sensor unit). Evaluation requires a safety controlgear or connection to a bus system.

Design

A magnetically operated switch is comprised of a coded switching magnet, a switch block (sensor unit) and a monitoring device (see Function).

The switch block and switching magnet must not be installed on ferromagnetic materials because the switching response will be influenced. Spacers can be used to prevent this.

The switch blocks are available with either a connecting cable or connector.



Enabling range (example)

Function

3SE6 806 safety relay

The 3SE6 806 safety relay has two floating enabling circuits (safe circuits) as NO contact circuits and one floating signaling circuit as a NC circuit. The number of enabling circuits can be increased by adding one or more 3TK28 30 expansion modules.

Up to six protective devices (sensors) can be connected to the safety relay. The device has six current-sourcing semiconductor outputs (Y1 ... Y6), which report the state of the connected protective devices.

Crossovers between the sensor circuits as well as ground faults and wire breaks are detected by an internal monitor. The device is protected by an internal self-restoring PTC fuse (multifuse).

The green LED indicates the operating state:

- LED POWER on: Supply voltage available
- LED CHA 1 on: All NO contacts of the connected sensors are open
- LED CHA 2 on: All NC contacts of the connected sensors are closed

Combination of monitoring unit and magnetically operated switch

Monitoring unit	Magnetically operated switch (switch block)			
	1 NC +1 NO			2 NC
	3SE6 605 -1BA	3SE6 605 -2BA	3SE6 605 -3BA	3SE6 604 -1BA
Relay output[1]				
SIRIUS 3SE6 806 safety relay	✔	✔	✔	--
Solid-state output[2]				
SIRIUS 3TK28 4. safety relay	--	--	--	✔
SIRIUS 3TK28 5. safety relay with contactor relay	--	--	--	✔
SIRIUS 3RA7 safe load feeder	--	--	--	✔
ASIsafe 3RK1	--	--	--	✔
SIMATIC ET200 S, PROFIsafe 4/8 F-DI DC 24 V	✔	✔	✔	✔
SIMATIC ET 200M: SM 326, 24 DI, 24 V DC, SM 326, 8 DI, NAMUR; SIMATIC S7-31xF-2 DP: SM 326, 24 DI, 24 V DC	✔	✔	✔	✔

1) Up to Category 3 according to EN 954-1.

2) Up to Category 4 according to EN 954-1.

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Magnetic monitoring system

Technical specifications

Switch blocks (sensors)

Type	3SE6 60.-1BA, 3SE6 60.-2BA	3SE6 60.-3BA
Design	M30, 25 mm × 88 mm	25 mm × 33 mm
Standards	EN 50947-5-3 (in combination with monitoring unit or AS-Interface)	
Mode of operation	Magnetic	
Operational voltage	100 V AC/DC	24 V DC
Operational current	400 mA	100 mA
Rating	10 VA/W	1 W
Max. switching frequency	5 Hz	
Max. switching interval S_{on} ... S_{off}	5 ... 15 mm	4 ... 14 mm
Enclosures	Fiber-glass strengthened thermoplastic	
Degree of protection acc. to EN 60529	IP67	
Ambient temperature		
• During operation	–25 °C ... +70 °C	
• During storage, transport	–25 °C ... +70 °C	
Shock resistance	10 *g*/11 ms	
Vibration resistance	10 ... 55 Hz, amplitude 1 mm	
Connection	Cable LiYY 4 × 0.25 mm^2; length 3 m	
Connector socket	M12 or M8	--
Max. cable length (for connection to safety relay)	1000 m	100 m

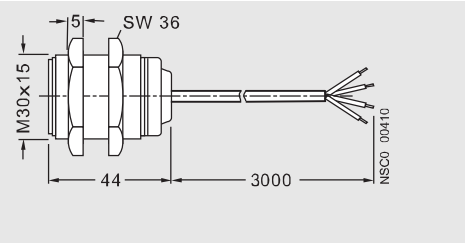
Safety relay

Type	3SE6 806-2CD00
Standards	EN 954-1, EN 1088,
Rated control supply voltage U_s	24 V DC
Operating range	0.85 ... 1.2 × U_S
Rated output (without signaling circuits Y1 ... Y6)	3 W
Max. load current	
• Signaling circuit Y1 ... Y6	20 mA
• Signaling circuit 31, 32	2 A
Inputs	6 sensors (1 NO or 1 NC)
Outputs	6 signal outputs, 1 relay output, 2 enabling circuits
Response time	
• Automatic start	typ. 150 ms
• Manual start	typ. 25 ms
Release time	max. 20 ms
Recovery time	350 ms
Degree of protection Acc. to EN 60529	IP20
Switching capacity Enabling circuits 13, 14, and 23, 24	
Continuous thermal current I_{th}	6 A
Rated operational current I_e at rated operational voltage U_e	
• AC-15 at 230 V	6 A
• DC-13	
- at 24 V	6 A
- at 115 V	0.2 A
- at 230 V	0.1 A
Short-circuit protection for enabling circuits	
DIAZED fuse links	
• gL (gG) operational class	6 A
• Quick	10 A
Ambient temperature	
• During operation	–25 °C ... +45 °C
• During storage, transport	–25 °C ... +70 °C
Connection	Screw terminals

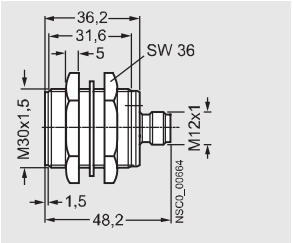
Dimensional drawings

Round magnetically operated switch

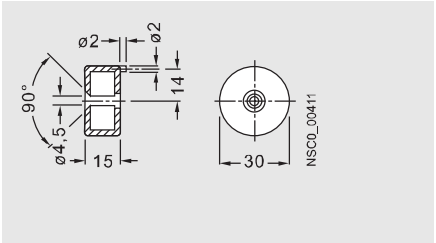
3SE6 605-1BA switch block



3SE6 605-1BA02 switch block

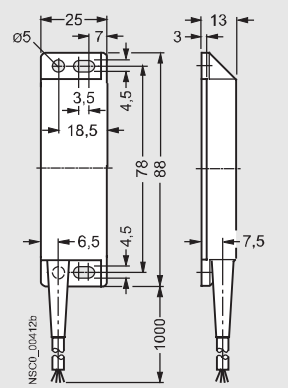


3SE6 704-1BA switching magnet

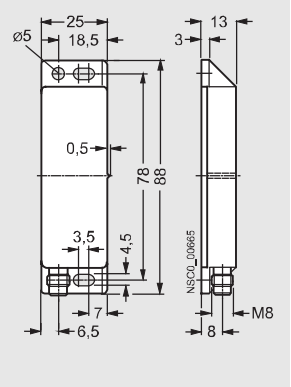


Square magnetically operated switch

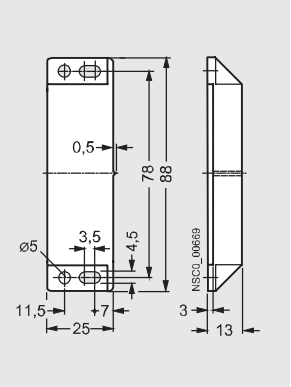
3SE6 60.-2BA switch block



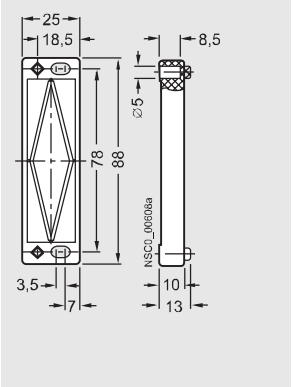
3SE6 60.-2BA0. switch block



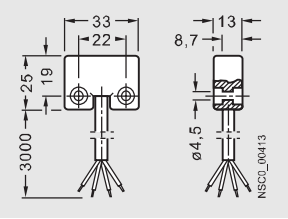
3SE6 704-2BA switching magnet



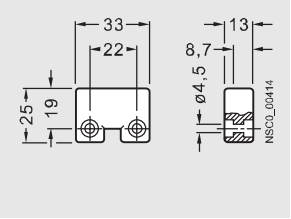
3SX3 260 spacer



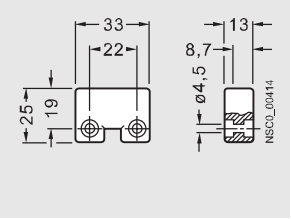
3SE6 60.-3BA switch block



3SE6 704-3BA switching magnet

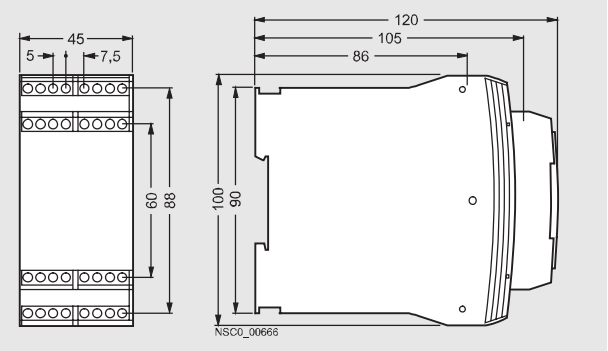


3SX3 261 spacer



Evaluation unit

3SE6 806-2CD00 safety relay



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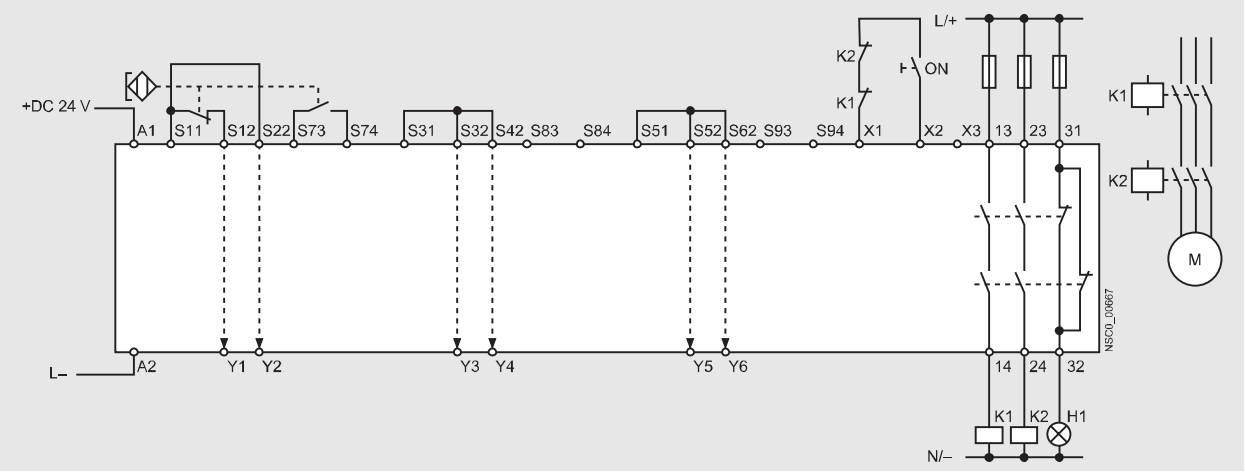
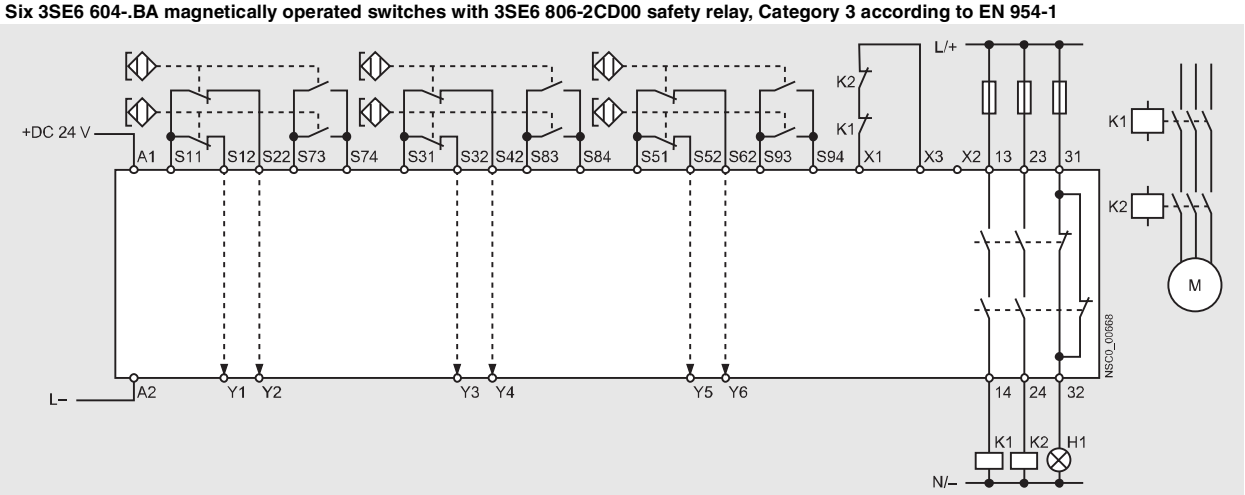
Magnetic monitoring system

Schematics

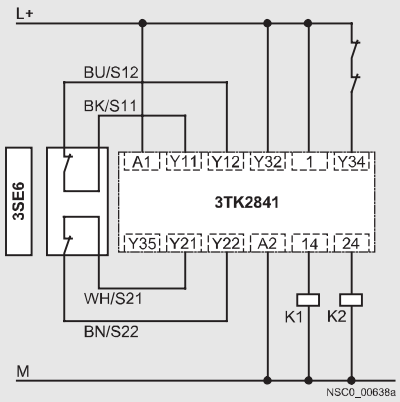
3SE6 604-.BA magnetically operated switch with 3SE6 806-2CD00 safety relay, Category 3 according to EN 954-1



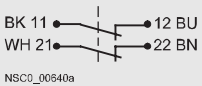
Six 3SE6 604-.BA magnetically operated switches with 3SE6 806-2CD00 safety relay, Category 3 according to EN 954-1



3SE6 604-.BA magnetically operated switch with 3TK28 40 solid-state safety combination, Category 4 according to EN 954-1

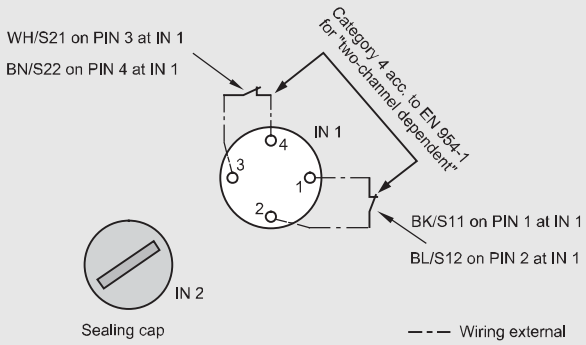


Switch block connection



The specified switching position refers to the basic position when the cover, flap etc. is closed.

3SE6 604-.BA magnetically operated switch on ASIsafe, K45F or K60F safe compact module, Category 4 according to EN 954-1



Color code abbreviations
for the connecting leads according to IEC 60757:

BK = black
BU = blue
BN = brown
WH = white