

SICONT Limit Switches

Type 3SE3

upto 500 VAC, 600 VDC, 10A

Introduction

The technical and descriptive information on the function, construction and selection of the new types of 3SE3 limit switches is presented here.

These limit switches are actuated by straight edges, cams, stops or plates etc. and give control commands for the further progress of the switching program or of the manufacturing/processing sequence. For the various control applications there are 2 ranges available, namely open type and metal enclosed limit switches with 3 different versions of contact configuration.

There is a wide range of actuators suitable for different operations/actuation conditions, enabling the user to select the most optimum one for the particular application. Specially designed compact housings also allow for optimum installation and convenient cable entry. The design, materials used and manufacturing processes ensure that 3SE3 limit switches guarantee the reliable functioning of control and auxiliary systems.

Standards

The 3SE3 limit switches conform to the following standards:

— Electro-mechanical control switches.

IS: 13947-5-13 and IEC: 947-5-1-3

— Stipulation of mounting dimensions, operating points,

housing form and actuator form.

DIN EN 50047 and DIN EN 50041 :

Applications

Limit switches are used in automatic control circuits where mechanical positions have to be converted into electrical signals for controlling remote starters, contactors etc. The 3SE3 limit switches are ideally suited for control of machine tools, elevators, cranes, conveyors, gates, doors and various other applications.

Construction

Open-Type

The open type limit switches have the degree of protection:

IP 20 for terminals.

* Protected against foreign bodies of 12 mm diameter/no particular protection against water ingress.

IP 40 for switching chamber.

** Protected against foreign bodies of 1 mm diameter/no particular protection against water ingress. (Fig. 2)

These are intended for use of auxiliary switches in cabinets, large enclosures or locations not affected by dust or moisture. The open type switches are available with 2 or 3 sets of contacts.

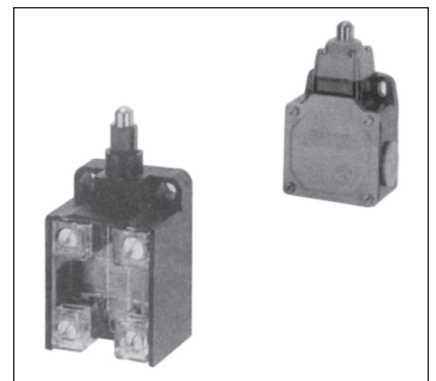


Fig. 1 Open and Metal enclosed type

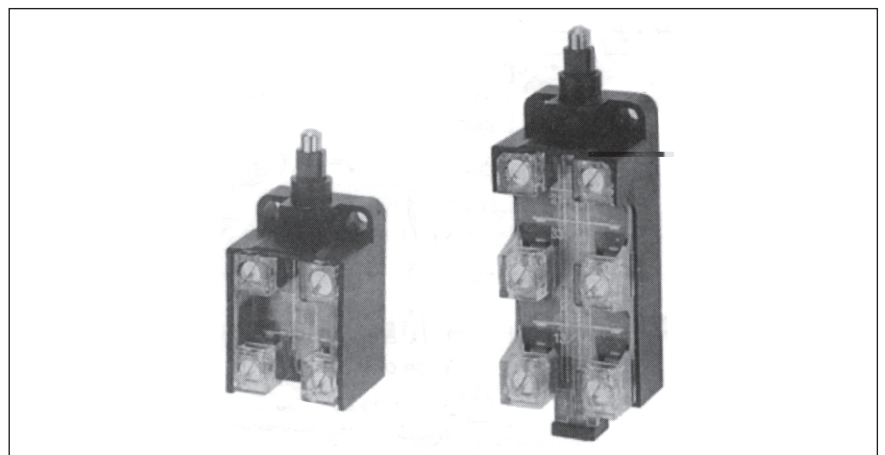


Fig. 2 Moving parallel contacts open design Terminals IP 20, chamber IP 40, 6 mm stroke

Metal-Enclosed

The metal-enclosed limit switch consists of the housing, contact block and actuator. The contact block is placed within the housing.

All contact blocks have a black moulded plastic housing, in which the fixed contacts and the SIGUT® terminals are accommodated.

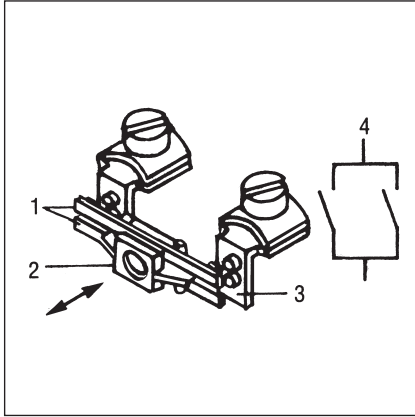


Fig. 3 Construction and connection of the moving contact pieces

- 1 Moving double contact pieces
- 2 Spring plate (carries the moving double contacts without rigid mechanical connection)
- 3 Terminals
- 4 Connection diagram

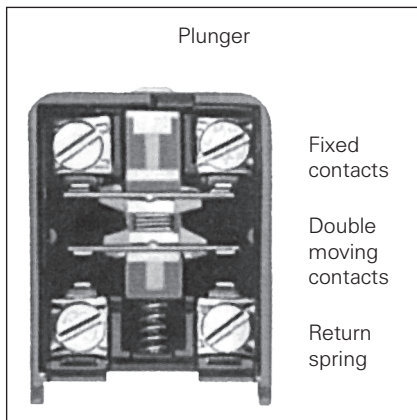


Fig. 4 Slow-action switch with 1 NO + 1NC

In the interior there is a plastic slide (spring-loaded) with moving contacts, which perform double contact interruption. The contact set and switching chamber are protected by means of a guard.

The standard metal housings along with the corresponding actuators conform to DIN 50041. These metal housings are corrosion-resistant and unaffected by shocks, impact and hot liquids.

The housings are in degree of protection. IP67 (complete safety from finger-touch/protection against hazardous effects of water, when immersed in it).

The wide housing has longitudinal holes to the left and the right of the actuator. This allows adjustment of operating point during installation, in case this adjustment cannot be performed via the actuating element, this housing has 3 threaded holes for contacts cable entry, which makes it more versatile with regard to connection possibilities, as the available space is also greater.

Interchangeability

In the 3SE3 range, it is possible to interchange the actuators and contact blocks, as required.

Changing the switching direction

The switching direction of limit switches with roller crank or adjustable length roller crank can be changed by re-positioning the internal plunger (see Fig. 6).

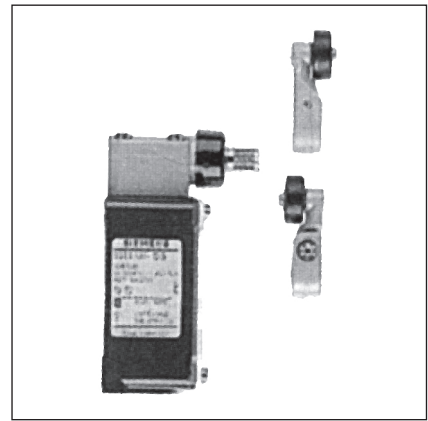
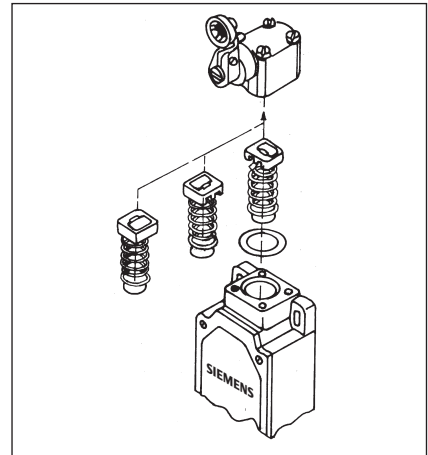


Fig. 5 Roller cranks turned through 180°



- a switching to the right
- b switching to the left
- c switching in both directions

Fig. 6 Repositioning the internal plunger

Undo the 4 screws, remove the actuator head and reposition the plunger. Refasten the actuator head.

Operation, operating speed and travel

Actuator. Plunger (made from Crnil)		Actuators can be in the form of an actuating bar, cam, stop etc. For operation perpendicular to plunger axis $a_{max} = 30^\circ, V_{max} = 0.5$ $b_{max} = 30^\circ$ For operation along plunger axis $V_{max} = 1.5$ A Actuating bar distance = Distance from the middle of the mounting holes to the lower edge of the actuating bar A** Actuating bar distance = Distance from the middle of the mounting holes to the lower edge of the actuating bar	Type	A > mm	A** < mm
			3SE3 020-0A	15	-
			3SE3 020-1A	15	17.5
			3SE3 020-3A	15	-
			3SE3 023-0A	15	-
			3SE3 023-1A	15	-
			3SE3 023-2A	15	-
			3SE3 023-3A	15	-

Selection of limit switches

Open type

The open-type limit switches (degree of protection IP20) can be used in dry, dust-free environments, such as switchboards and closed cubicles.

In-Housing

If moisture and mechanical/thermal stresses (like shocks, impact) occur, the metal enclosed position switch (IP67) must be used.

Actuators

A range of seven actuators cover a wide spectrum of duties and applications. They differ with respect to permissible actuation direction, actuation speed, form of actuating element and the advantageous combination of components.

All the switches function independently of their installation position.

Any of the 3SE3 limit switches must be actuated for at least 0.1

sec., to ensure that the control command is transmitted.

If the speed of the actuating element is given as V (in m/sec); the length l (in m) is calculated as $l > 0.1 V$

For the mechanical life and switching frequency in the actuators, the same values apply as for the contact block.

Under no circumstances may the limit switch be used as a mechanical stop on a moving section of a machine.

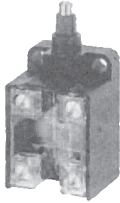
Technical Data

Open-type 3SE30 and s3SE31 metal enclosed types.


Rated insulation voltage	500 V AC; 600 VDC					
Rated thermal current	10A					
Rated operational current						
	AC 40-60 Hz			DC		
	V A	AC12 A	AC15 A	V	DC12 A	DC13 A
	24	10	10	24	10	10
	125	10	10	48	6	4
	230	10	6	110	4	1
	400	10	4	220	1	0.4
	500	10	3	440	0.5	0.2
Short circuit protection HRC fuses	10A					
Mechanical endurance	30 million switching operations					
Electrical endurance, utilisation category AC 15	30 million switching operations with 3TH/3TF contactors					
Switching frequency	6x10 ³ switching cycles per hour.					
Operating accuracy block	0.05 mm for repeated switching measured at plunger of contact					
Ambient temperature	-40°C to + 85°C					
Degree of Protection	Open type: Terminal IP 20 Switching Chamber IP 40					
	Metal-enclosed type: IP 67					
Terminal Cross Section	2x1.5 sq. mm. finely stranded with end sleeves					
(M 3.5 screws)	2x2.5 sq. mm solid					
Cable entry (housing)	M 20 tapped					
Earthing connection	M 3.5 inside housing					
Housing material	Aluminium die-cast					
Mounting	Any position					

Selection Table


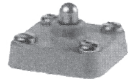
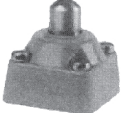
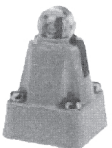
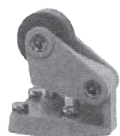
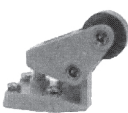
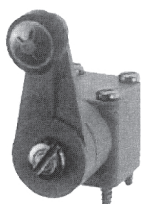
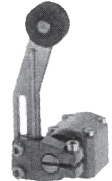
Limit Switches with 2 contacts - open type

	Arrangement of contacts	No. of contacts	Type
	Snap-action	1NO + 1NC	3SE3 020 - 1A
	Slow-action	1NO + 1NC	3SE3 020 - 0A
	Slow-action make before break	1NO + 1NC	3SE3 020 - 3A


Limit Switches with 3 contacts and extension plunger - open type

	Arrangements of contacts	No. of contacts	Type
	Slow-action	1NO + 2NC	3SE3 023 - 0A
	Slow-action	2NO + 1NC	3SE3 023 - 1A
	Slow-action make before break	1NO + 2NC	3SE3 023 - 2A
	Slow-action make before break	2NO + 1NC	3SE3 023 - 3A

Wide housing, 56 mm wide 2 contacts - closed type

	Plunger 3SX3 100	Overtravel plunger 3SX3 106	Roller plunger 3SX3 107	Roller lever 3SX3 102	Angular roller lever 3SX3 104	Roller crank, repositionable 3SX3 120 + 3SX3 110	Roller crank, adjustable length 3SX3 120 + 3SX3 114
							
Snap-action contacts 1NO + 1 NC	3SE3 100-1B	3SE3 100-1C	3SE3 100-1D	3SE3 100-1E	3SE3 100-1F	3SE3 100-1G	3SE3 100-1U
Slow-action contacts 1 NO + 1NC	3SE3 100-0B	3SE3 100-0C	3SE3 100-0D	3SE3 100-0E	3SE3 100-0F	3SE3 100-0G	3SE3 100-0U
Slow-action contacts, make before break 1 NO + 1 NC	3SE3 100-3B	3SE3 100-3C	3SE3 100-3D	3SE3 100-3E	3SE3 100-3F	3SE3 100-3G	3SE3 100-3U

Narrow housing, 40 mm wide 2 contacts - closed type

							
Snap-action contacts 1F 1 NO + 1 NC	3SE3 120-1B	3SE3 120-1C*	3SE3 120-1D*	3SE3 120-1E	3SE3 120-1F	3SE3 120-1G*	3SE3 120-1U
Slow-action contacts 0F 1 NO + 1 NC	3SE3 120-0B	3SE3 120-0C*	3SE3 120-0D*	3SE3 120-0E	3SE3 120-0F	3SE3 120-0G*	3SE3 120-0U
Slow-action contacts, make before break 1 NO + 1 NC	3SE3 120-3B	3SE3 120-3C	3SE 120-3D	3SE3 120-3E	3SE3 120-3F	3SE3 120-3G	3SE3 120-3U


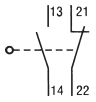

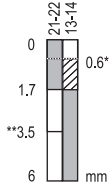
* 3SE 30/3SE 31 Open type and Metal Enclosed limit switches

Open Type Limit Switches


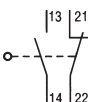

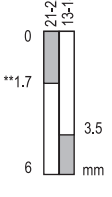
2 contacts: Moving double break contacts. Degree of protection: Terminals IP 20, switching chamber IP 40

Selection and ordering data					
Diagram Terminal Designation to DIN EN 50 013	Order No.	Weight approx.	Packing Units	Nominal travel related terminals 0-line commencement of plunger travel ■ contact closed □ contact open * operating point on return ** positive opening to IEC 947-5-1-3 along plunger perpendicular to plunger axis a = 30°	Minimum force required along plunger axis N


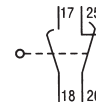

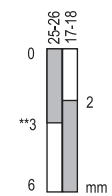
Snap-action contacts, 6 mm stroke

 3SE3 020-1A		with 21 mm long plunger 3SE3 020-1A  0.035		6
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Slow-action contacts, 6 mm stroke

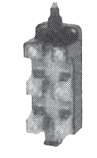
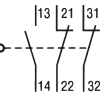
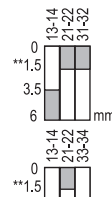
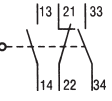
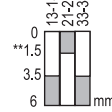
 3SE3 020-0A		with 21 mm long plunger 3SE3 020-0A  0.035		8
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Slow-action make-before-break contacts, 6 mm stroke

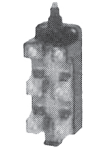
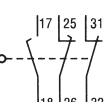
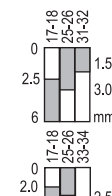

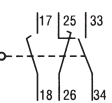
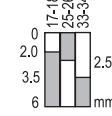
 3SE3 020-3A		with 21 mm long plunger 3SE3 020-3A  0.035		8
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3 contacts: Moving double break contacts. Degree of protection: Terminals IP 20, switching chamber IP 40

Slow-action contacts, 6mm stroke

 3SE3 023-0A		with 21 mm long plunger and repeat plunger for tandem arrangement 3SE3 023-0A 0.055		11
		3SE3 023-1A 0.055		13

Slow-action make-before-break contacts, 6 mm stroke

 3SE3 023-2A		with 21 mm long plunger and repeat plunger for tandem arrangement 3SE3 023-2A 0.055		11
 3SE3 023-1A		3SE3 023-3A 0.055		13

Metal-Enclosed Limit Switches

2 contacts: Narrow and wide housings

Operation, operating speed and travel or angle

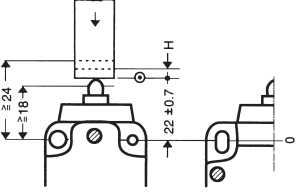

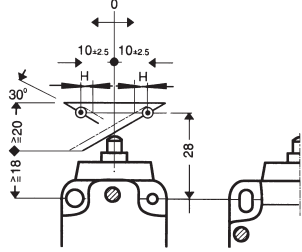


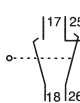
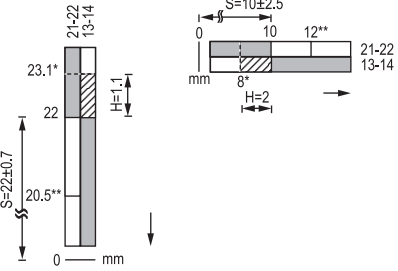
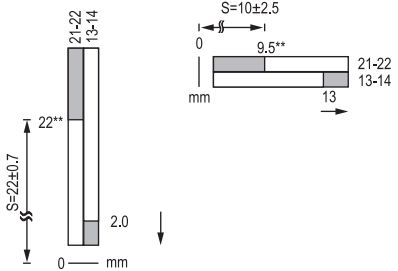
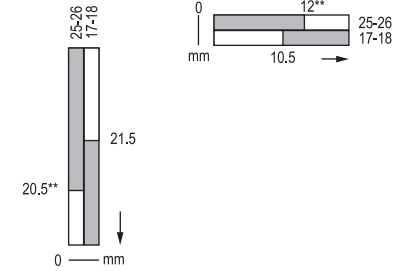
Bars, cams, stops etc., can be used to actuate the switches. The shape of the actuating device must provide the given angles for the leading and trailing edges. For operation from the side, sparingly greased steel, POM (polyoxymethylene or

polyacetal) or PA (polyamide) should be used as cam and bar material.

Operating speed along plunger axis

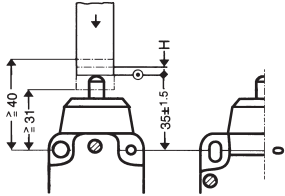
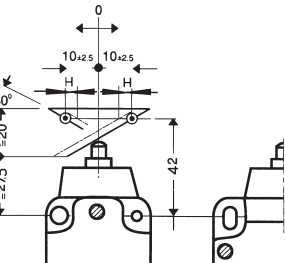



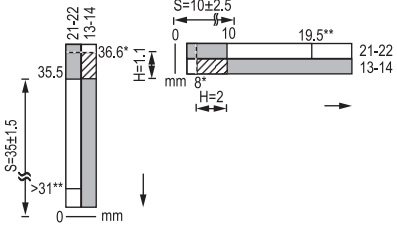
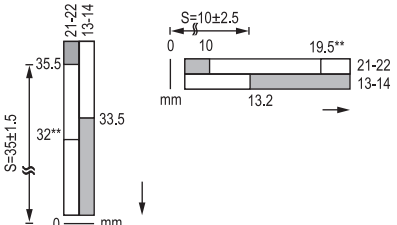
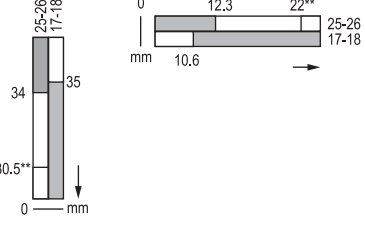
The operation speed must not be

less than 15 mm/s Limit Switches with slow-action contacts at DC voltage and 1 mm/s at AC voltage Limit Switches with snap-action contacts should be used when the speeds are lower.

Actuator o operating to DIN EN 50 041 V_{max} max. operating speed H travel difference ® direction of operation	Operation by a bar  narrow housing wide housing $V_{max} = 1.5m/s$	Contact block Diagram Terminal designation to DIN EN 50 013	Nominal travel and rated terminals o-Line reference line to DIN EN 50 041 S travel to DIN EN 50 041 H travel difference  * contact closed * contact open * operating point on return ** positive opening to IEC 947-5-13	Minimum force required along plunger axis N
Plunger (made from CrNi) 3SE3..0-.B	 narrow housing wide housing $V_{max} = 0.5m/s$	Snap-action contacts 6 mm stroke  Slow-action contacts 6 mm stroke  Slow-action make-before-break contacts 6 mm stroke 	along plunger axis with side operation   	12

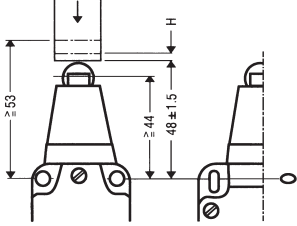
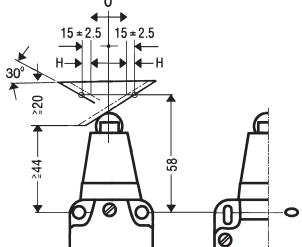
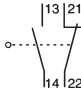

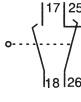
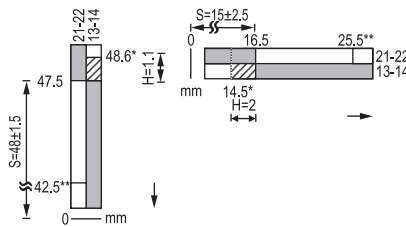
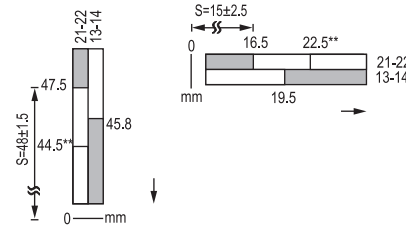
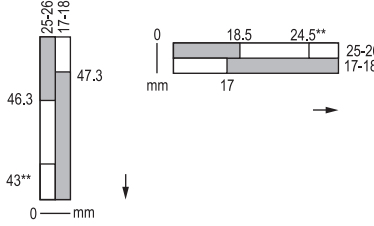
2 contacts: Narrow and wide housings

Operation, operating speed and travel or angle

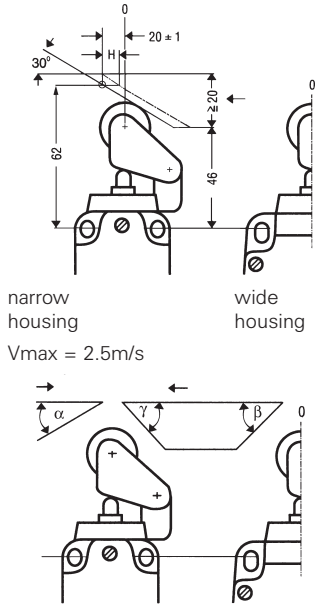



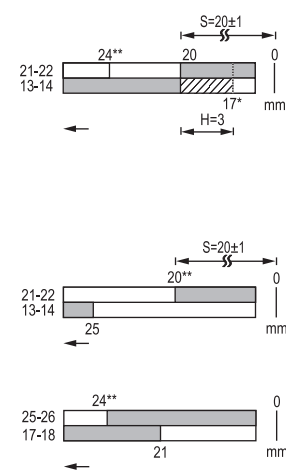
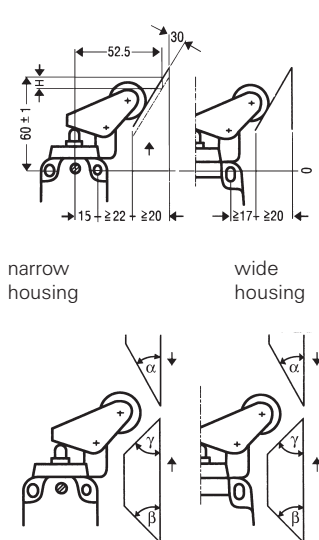



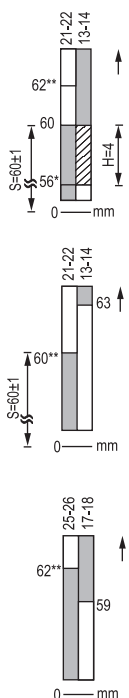
<p>Actuator</p>	<p>Operation by a bar</p> <ul style="list-style-type: none"> o operating to DIN EN 50 041 V_{max} max. operating speed H travel difference ® direction of operation 	<p>Contact block</p> <p>Diagram</p> <p>Terminal designation to DIN EN 50 013</p>	<p>Nominal travel and rated terminals</p> <p>o-Line reference line to DIN EN 50 041</p> <p>S travel to DIN EN 50 041</p> <p>H travel difference</p> <p>■ contact closed</p> <p>□ contact open</p> <p>* operating point on return</p> <p>** positive opening to IEC 947-5-13</p>	<p>Minimum force required along plunger axis</p> <p>N</p>
<p>Overtravel plunger (made from CrNi) 3SE3..0-C</p>	 <p>narrow housing wide housing</p> <p>V_{max} = 1.5m/s</p>  <p>narrow housing wide housing</p> <p>V_{max} = 0.5m/s</p>	<p>Snap-action contacts 6 mm stroke</p>  <p>Slow-action contacts 6 mm stroke</p>  <p>Slow-action make-before-break contacts 6 mm stroke</p> 	<p>along plunger axis with side operation</p>   	<p>32</p>

2 contacts: Narrow and wide housings

Operation, operating speed and travel or angle

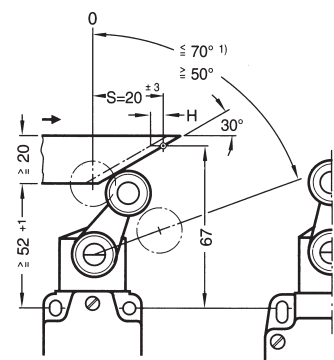



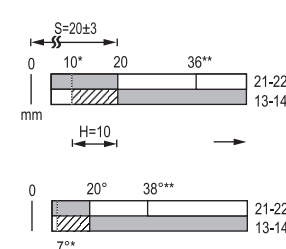
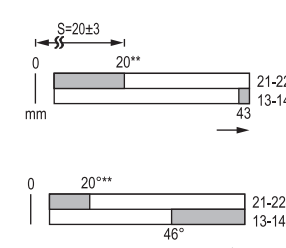
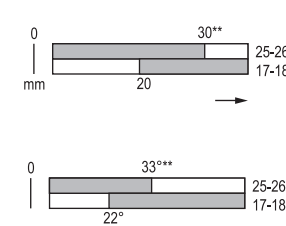
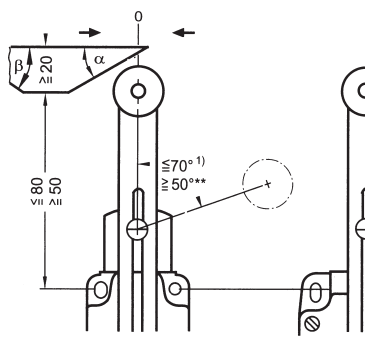



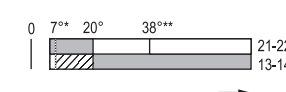
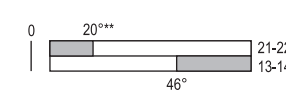
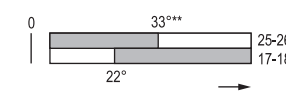
Actuator	Operation by a bar	Contact block	Nominal travel and rated terminals	Minimum force required along plunger
<p>Roller plunger (roller made from brass on a steel spindle) 3SE3..0-D</p>	<p>o operating to DIN EN 50 041 V_{max} max. operating speed H travel difference ® direction of operation</p>  <p>narrow housing wide housing</p> <p>$V_{max} = 0.5 \text{ m/s}$</p>  <p>narrow housing wide housing</p> <p>$V_{max} = 1 \text{ m/s}$</p>	<p>Snap-action contacts</p>  <p>Slow-action contacts 6 mm stroke</p>  <p>Slow-action make-before-break contacts 6 mm stroke</p> 	<p>along plunger axis with side operation</p>   	<p>N</p> <p>32</p>

2 contacts: Narrow and wide housings

Operation, operating speed and travel or angel				
Actuator	Operation by a bar	Contact block	Nominal travel and rated terminals	Minimum force required along plunger axis
	<p>a max approach angle g max approach angle b max trailing angle</p> <p>V_{max} max. operating speed H travel difference ⊙ direction of operation</p>	<p>Diagram</p> <p>Terminal designation to DIN EN 50 013</p>	<p>o-line reference line to DIN EN 50 041 S travel to DIN EN 50 041</p> <p>■ contact closed □ contact open * operating point on return ** positive opening to IEC 947-5-1-3</p>	N
<p>Roller lever (roller made from moulded plastic) 3SE3..0-.E</p>	 <p>narrow housing wide housing</p> <p>$V_{max} = 2.5m/s$</p> <p>narrow housing wide housing</p> <p>For operation perpendicular to plunger axis $a_{max} = 30^\circ, n_{max} = 1.0m/s, g_{max} = 45^\circ,$</p>	<p>Snap-action contacts 6 mm stroke</p>  <p>Slow-action contacts 6 mm stroke</p>  <p>Slow-action make-before-break contacts 6 mm stroke</p> 		12
<p>Angular roller lever (roller made from moulded plastic) 3SE3..0-.F</p>	 <p>narrow housing wide housing</p> <p>narrow housing wide housing</p> <p>For operation perpendicular to plunger axis $a_{max} = 30^\circ, n_{max} = 1.0m/s, g_{max} = 45^\circ,$ $n_{max} = 2.5m/s, b_{max} = 45^\circ, n_{max} = 2.5m/s$</p>	<p>Snap-action contacts 6 mm stroke</p>  <p>Slow-action contacts 6 mm stroke</p>  <p>Slow-action make-before-break contacts 6 mm stroke</p> 		12

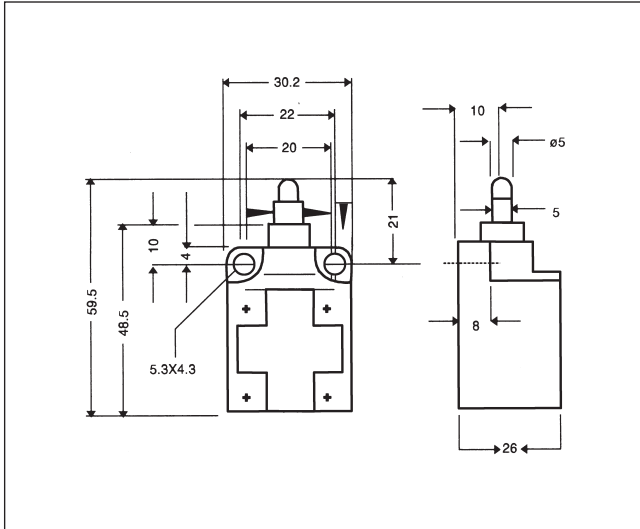
2 contacts: Narrow and wide housings

Operation, operating speed and travel or angle

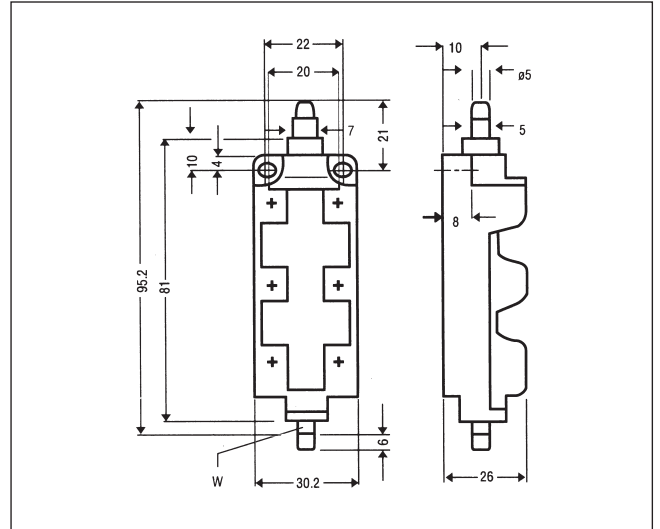
Actuator	Operation by a bar	Contact block	Nominal travel and rated terminals	Minimum force required in direction of rotation
<p>Roller crank repositionable and finely adjustable (roller made from moulded plastic) 3SE3..0-.G</p>	<p>o operating to DIN EN 50 041 V_{max} max. operating speed H travel difference ® direction of operation</p>  <p>narrow housing wide housing</p> <p>$V_{max} = 3m/s$</p> <p>Contact operation either from right or left or from right and left</p>	<p>Snap-action contacts 6 mm stroke</p>  <p>Slow-action contacts 6 mm stroke</p>  <p>Slow-action make-before-break contacts 6 mm stroke</p> 	<p>o-Line reference line to DIN EN 50 041 S travel to DIN EN 50 041 H travel difference</p> <p>■ contact closed □ contact open * operating point on return ** positive opening to IEC 947-5-1-3</p>   	<p>Ncm</p> <p>25</p>
<p>Roller crank adjustable length (roller made from moulded plastic) 3SE3..0-.U</p>	<p>Contact operation either from right or left or from right and left</p>  <p>narrow housing wide housing</p> <p>$a_{max} = 30^\circ$, $n_{max} = 3m/s$ $b_{max} = 30^\circ$</p>	<p>Snap-action contacts 6 mm stroke</p>  <p>Slow-action 6 mm stroke</p>  <p>Slow-action contacts make-before-break contacts 6 mm stroke</p> 	<p>Deflection of roller crank or rod actuator in direction of rotation</p>   	<p>25</p>

Dimensions

Open Type

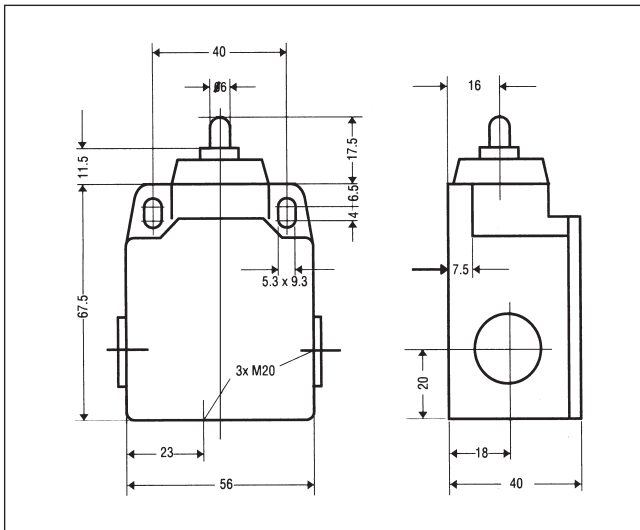


Two Contacts 3SE3 020-..

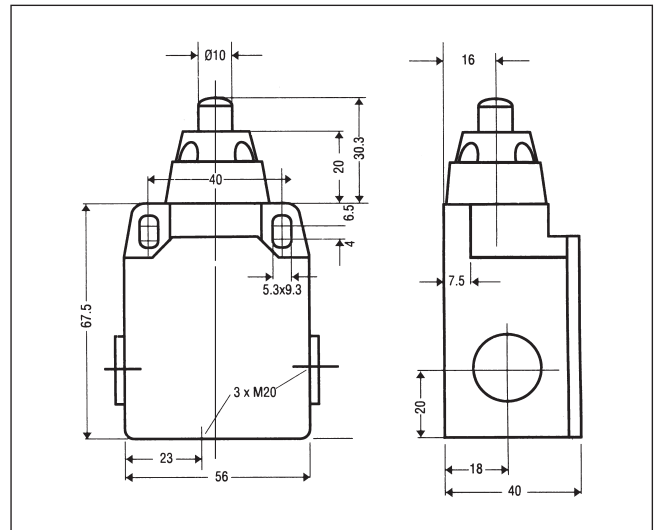


Three Contacts 3SE3 023-..

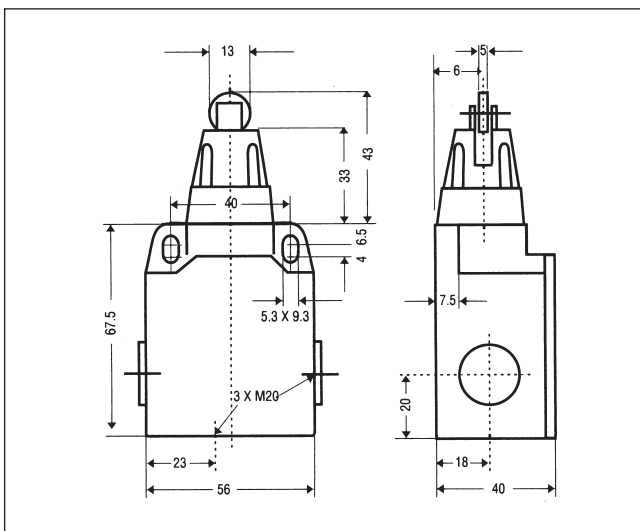
Metal-enclosed types for 2 contacts Wide Housing, 56mm



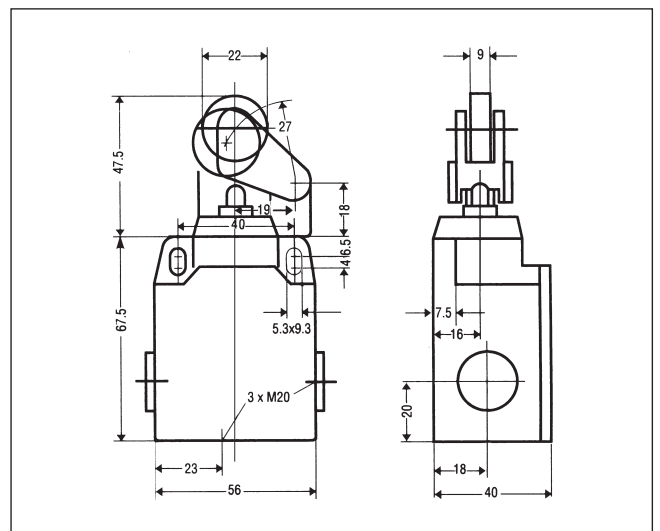
Limit Switch with Plunger 3SE3 100-0B



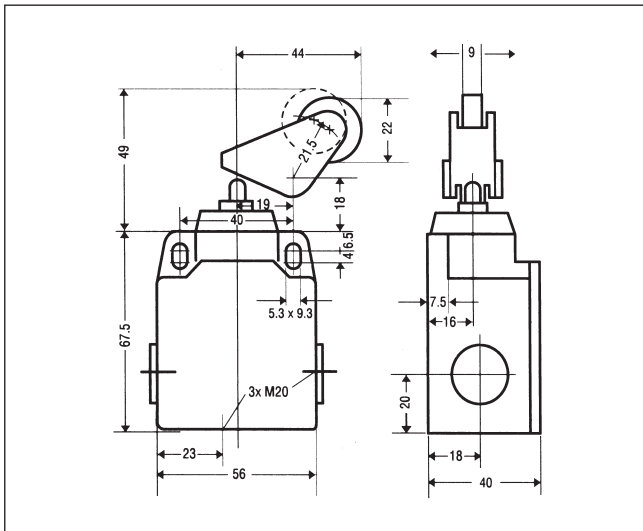
Limit Switch with Overtravel plunger 3SE3 100-0C



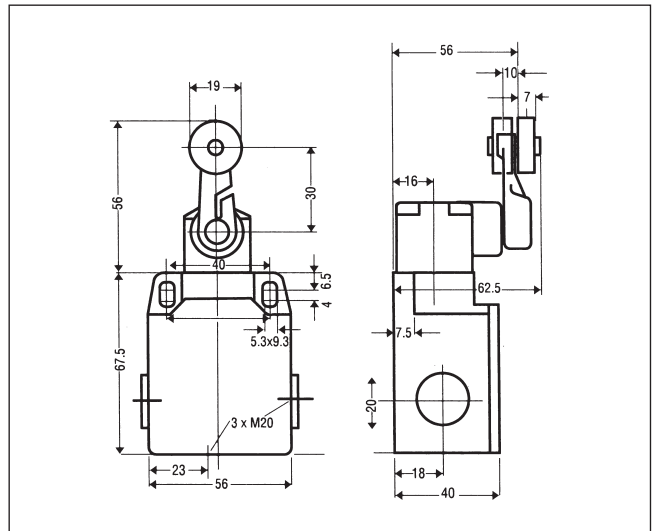
Limit Switch with Roller Plunger 3SE3 100-0D



Limit Switch with Roller Lever 3SE3 100-0E

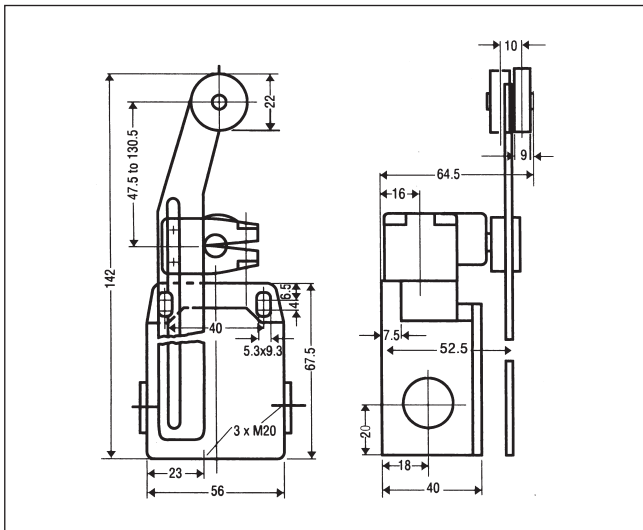


Limit Switch with angular Roller Lever 3SE3 100-0F

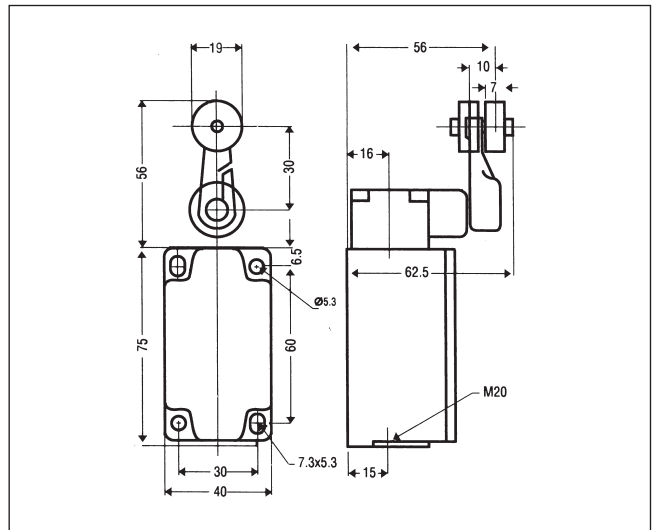


Limit Switch with Roller Crank 3SE3 100-0G

Narrow Housing, 40 mm wide



Limit Switch with Roller Crank 3SE3 100-0U



Limit Switch with Crank Lever 3SE3 120-0G

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Siemens Ltd.
 SGR-01-106-007
 This replaces SGR-01-106-004

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