

6.3 Limit switches

6.3.1. Limit switch versions

For the various position detection requirements mechanical switches are available of different IP protection classes as well as inductive proximity switches with standard output circuits.

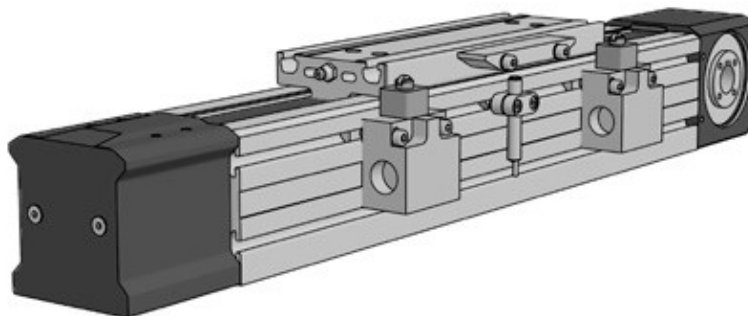


Figure 6.33 Linear axis with a set of mechanical limit switches and inductive proximity switch

For emergency shutdown of the drives before the mechanical end position dampers can be reached, usually mechanically actuated switches are employed. A combination with externally positioned inductive proximity switches is possible in order to provide additional switching points, e.g. for reference movements. A mechanical limit switch set consists of one switch with fastening elements.

An extremely compact version for linear axes from the AXE series is the inductive proximity switches for installation in the profile grooves (Figure 6.34), since they are flush with the surface of the aluminum profile of the axis and create almost no interference contour. In this case, a groove inserts (Chapter 6.5) should also be mounted to ensure correct positioning of the cable inside the groove.

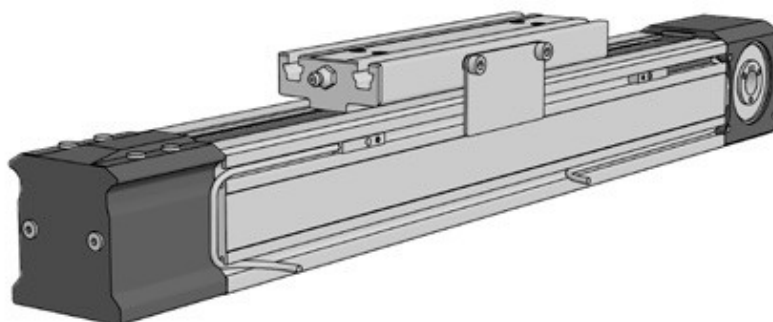


Figure 6.34 Inductive proximity switches for groove installation

The inductive proximity switches are available in the versions PNP-NC (opener), PNP-NO (closer) and NPN-NC (opener). An inductive proximity switches set consists of one switch with fasteners and the actuating element.

6.3.2. Cable guiding

The cables of the inductive proximity switches for the AXE series are laid in a tightening groove guiding to the drive (AXE80 and 100) or deflection pulley (AXE160), respectively.

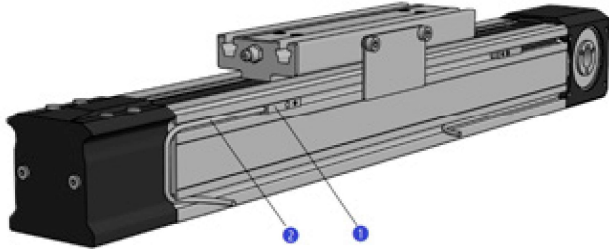
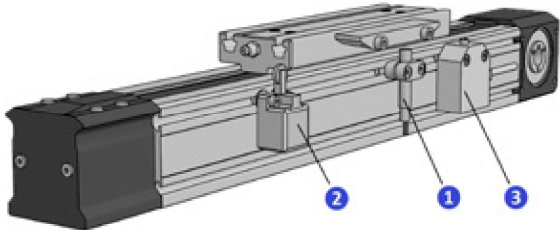
For type AXE60, only two inductive proximity switches per side can be used for cable guiding to the respective profile ends.

For linear axis AXE110Z, the cable guiding of two proximity switches (at a maximum) is positioned on top of the profile in two grooves (Chapter 3.12.3) to a hole in the deflection head for each proximity switch separately.

6.3.3. Mounting versions

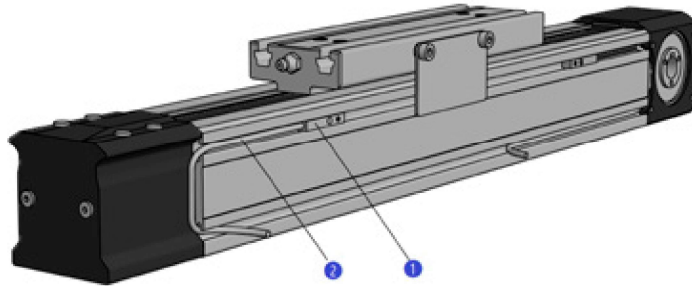
Depending on size and drive type, there is a variety of combination and assembly options of limit switches, which are summarized in Table 6.22. An overview of possible combinations is given in Table 6.26, Chapter 6.3.5.

Table 6.22 Limit switch mounting on SNR linear axes AXE

Axe	
AXE60Z	<p>Inductive proximity switches</p>  <p> 1 Inductive proximity switches (groove installation) 2 Cable guiding </p>
	<p>Mechanical (IP30, IP67) and inductive proximity switches</p>  <p> 1 Inductive proximity switches 2 Mechanical limit switch IP30 3 Mechanical limit switch IP67 </p>

Axe

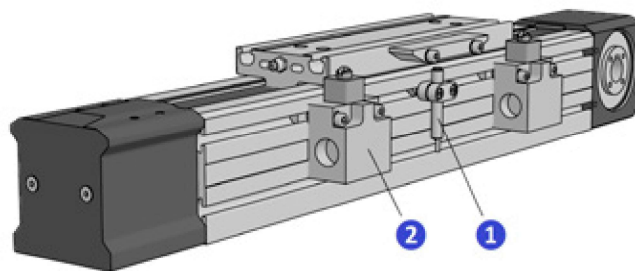
Inductive proximity switches



- 1 Inductive proximity switches (groove installation)
- 2 Cable guiding

AXE80Z
AXE100Z

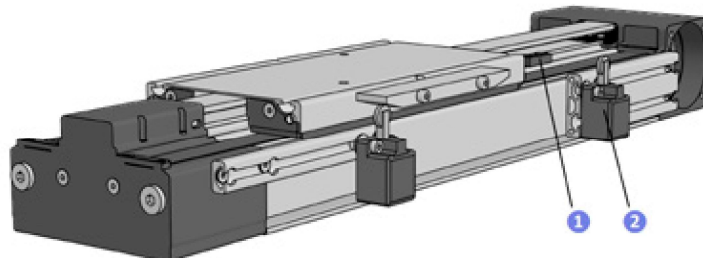
Mechanical (IP67) and inductive proximity switches



- 1 Inductive proximity switches
- 2 Mechanical limit switch IP67

AXE110Z

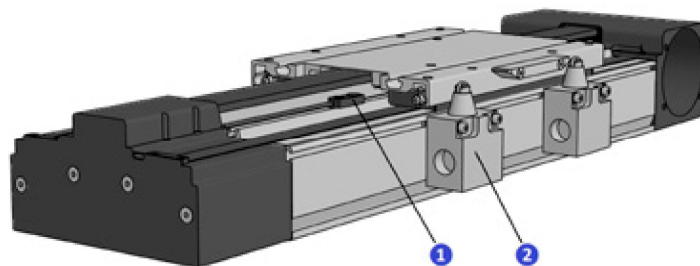
Mechanical (IP30) and inductive proximity switches



- 1 Inductive proximity switches
- 2 Mechanical limit switch IP30

AXE160Z

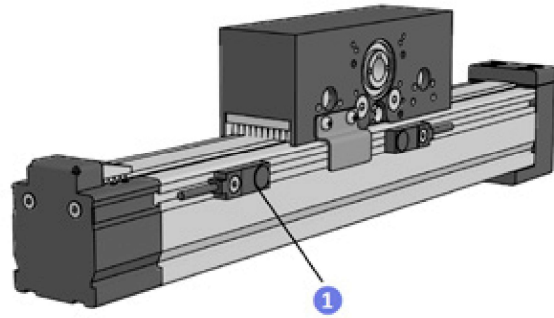
Mechanical (IP67) and inductive proximity switches



- 1 Inductive proximity switches
- 2 Mechanical limit switch IP67

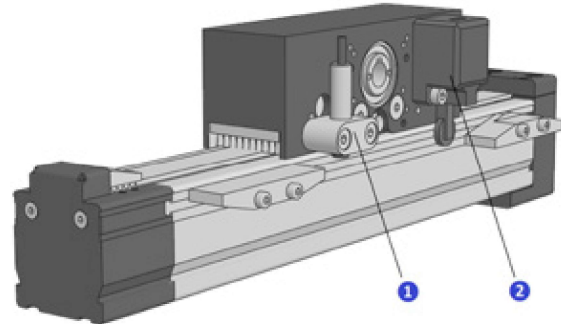
AXE40A

Slider moved
Inductive proximity switches



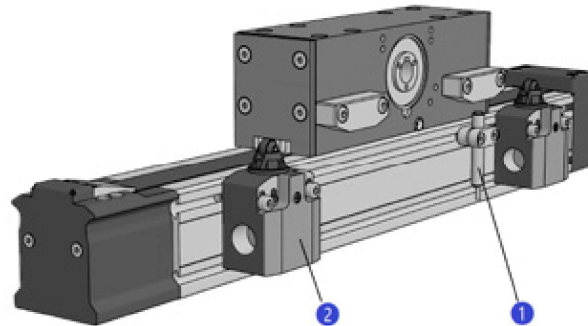
- 1 Inductive proximity switches

Profile moved
Mechanical (IP30) and inductive proximity switches



- 1 Inductive proximity switches
- 2 Mechanical limit switch IP30

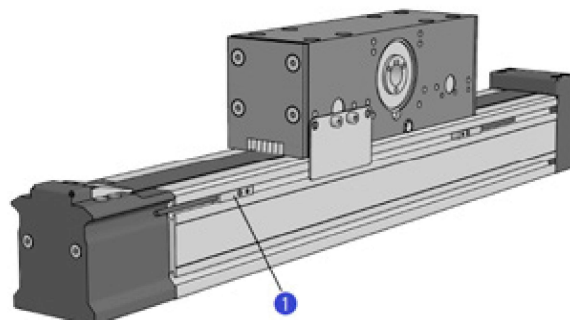
Slider moved
Mechanical (IP67) and inductive proximity switches



- 1 Inductive proximity switches
- 2 Mechanical limit switch IP67

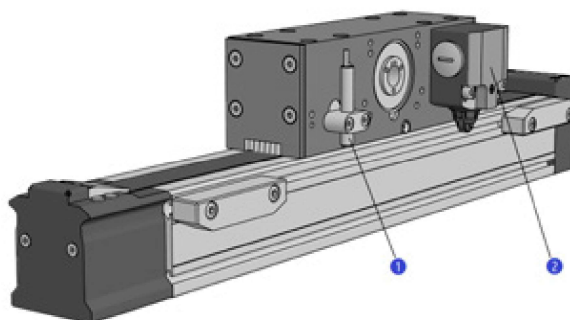
AXE60A

Slider moved
Inductive proximity switches



- 1 Inductive proximity switches

Profile moved
Mechanical (IP67) and inductive proximity switches

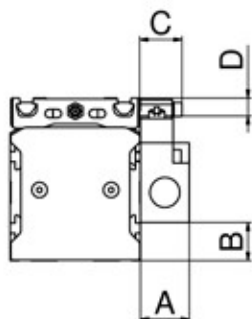


- 1 Inductive proximity switches
- 2 Mechanical limit switch IP67

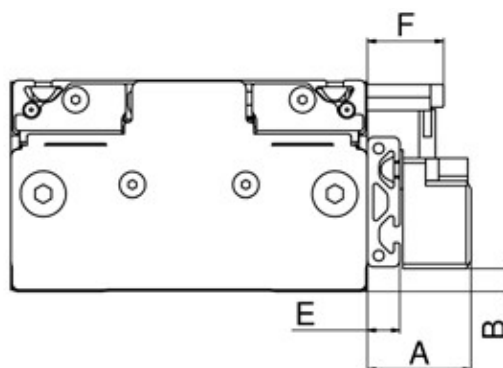
Dimensions

For the assembly of limit switches for linear axis from the AXE series there are different size dependent mounting versions (Figure 6.35) and interference contours created hereby.

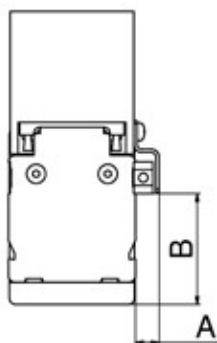
Mounting version 1



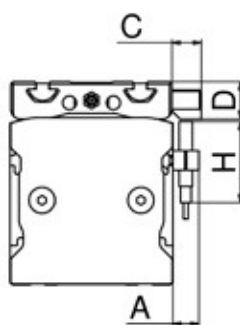
Mounting version 2



Mounting version 3



Mounting version 4



Mounting version 5

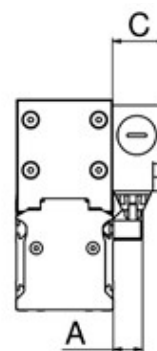


Figure 6.35 Mounting version of limit switches

The dimensions are specified in Table 6.23.

Table 6.23 Dimension limit switch mounting

Type	Switch	Mounting version	A	B	C	D	E	F	G	H	L ¹
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
AXE60Z	AX-AC-60-SUN-M2	1	22.0	19.5	25	11.5					95
	AX-AC-60-SUN-M3	1	20.0	12.5	18	19.0					80
	AX-AC-60Z-SUN-I2-...	4	16.0		18	19.0				50	
AXE80Z	AX-AC-80-SUN-M1	1	30.0	25.5	26	11.0				50	95
	AX-AC-80Z-SUN-I2-...	4	16.0		26	11.0				50	95
AXE100Z	AX-AC-100-SUN-M1	1	30.0	22.5	15	23.5					80
	AX-AC-100Z-SUN-I2-...	4	16.0		15	23.5				50	80
AXE110Z	AX-AC-110_-SUN-M2	2	31.0	7.0	24	9.3	10	27.5	20		120
AXE160Z	AX-AC-160-SUN-M1	1	30.0	9.5	15	8.5					85
AXE40A	Slider moved AX-AC-40-SUN-I1-...	3	8	28							30
	Profile moved AX-AC-40A-SUN-M2	5	18.0		21						58
	Profile moved AX-AC-40A-SUN-I2-...	5	18.0		16						58
AXE60A	Slider moved AX-AC-60A-SUN-M1-P	1	30.0	9.5	18	55.0					80
	Profile moved AX-AC-60Z-SUN-I2-...	4	16.0		15	50.0					55
	Profile moved AX-AC-80A-SUN-M1-H	5	18.0		30						80
	Profile moved AX-AC-80A-SUN-I2-...	5	18.0		16						80

¹- Length of the actuating element

6.3.4. Technical data

The technical data of the available switches are contained in the Tables 6.24 and 6.25.

Table 6.24 Mechanical limit switches

ID Number Switch mounting set	Life time	Housing material	Cable gland	Conductor cross-section	Protection class
151312	30 x 10 ⁶ switching operations	Plastic	M20 x 1.5	0.5...2.5 mm ²	IP67
156331					
157296					
163876					
353357					
156335	30 x 10 ⁶ switching operations	Plastic	Screwed connection 4 x M3.5	0.5...1.5 mm ²	IP30
164451					
405675					
156336	10 x 10 ⁶ switching operations	Metal	Screwed connection	max. 1.5 mm ²	IP67

Switching segment: Snap-action switch (forced disconnection) each case 1 x opener and 1 x closer each

Table 6.25 Inductive proximity switches

ID - Number Switch mounting set			Connection voltage	Max. load current	Switching accuracy	Cable length	Protection class
PNP-NC	PNP-NO	NPN-NO					
162170	162717	162173	10...30 V DC	100 mA	≤ 2% of the reacting distance	10 m	IP67
161445	154708	161447	10...30 V DC	100 mA	≤ 10% of the reacting distance	5 m	IP67
187110	156345	187109					
162684	156342	152349	12...30 V DC	100 mA	≤ 5% of the reacting distance	2 m	IP67
163249	162687	163250					
166852	163252	166836					
353806	353810	353808					
405715	405716	405717					

6.3.5. Possible switch combinations

The linear axes of the AXE series can be equipped with different limit switches or combinations of different limit switches depending on size. Table 6.26 contains the ID numbers and type codes of the actuating element and the possible limit switch sets, each consisting of one limit switch as well as the fasteners and screws required.

Table 6.26 Possible combination for the switch mounting

Switch version	Type	AXE_Z					AXE_A			
		AXE60Z	AXE80Z	AXE100Z	AXE110Z	AXE160Z	AXE40A Profile moves	AXE40A Slider moves	AXE60A Profile moves	AXE60A Slider moves
Mechanical switches*	IP 67	AX-AC-60-SUN-M3 ID 156336	AX-AC-80-SUN-M1 ID 151312	AX-AC-100-SUN-M1 ID 353357		AX-AC-160-SUN-M1 ID ID 163876			AX-AC-uniA-SUN-M1-H ID 157296	AX-AC-240+60A-SUN-M1-P ID 162588
	Actuating element	AX-AC-60-CSW-M3 ID 156339	AX-AC-80-CSW-M1 ID 152199	AX-AC-100-CSW-M1 ID 406342		AX-AC-160-CSW-M1 ID ID 163869			AX-AC-60A-CSW-P ID 245820	AX-AC-uniA-CSW-H ID 188260
	IP30	AX-AC-60-SUN-M2 ID 156335			AX-AC-110Z-SUN-M2 ID 164451 ¹ AX-AC-110-SUN-M2 ID 164469 ²		AX-AC-40A-SUN-M2 ID 405675			
	Actuating element	AX-AC-60-CSW-M2 ID 158669			AX-AC-110-CSW-M2 ID 164457		AX-AC-40A-CSW-M2 ID 405731			
Inductive proximity switches*	PNP-NC	AX-AC-60Z-SUN-I2-PNP-NC-2m ID 166852	AX-AC-80Z-SUN-I2-PNP-NC-2m ID 162684	AX-AC-100Z-SUN-I2-PNP-NC-2m ID 353806	AX-AC-uni-SUN-I1-PNP-NC-5m ID 161445		AX-AC-40A-SUN-I2-PNP-NC-2m ID 405715	AX-AC-40-SUN-I1-PNP-NC-5m ID 187110	AX-AC-uniA-SUN-I2-PNP-NC-2m ID 163249	AX-AC-60Z-SUN-I2-PNP-NC-2m ID 166852
	PNP-NO	AX-AC-60Z-SUN-I2-PNP-NO-2m ID 156342	AX-AC-80Z-SUN-I2-PNP-NO-2m ID 162687	AX-AC-100Z-SUN-I2-PNP-NO-2m ID 353810	AX-AC-uni-SUN-I1-PNP-NO-5m ID 154708		AX-AC-40A-SUN-I2-PNP-NO-2m ID 405716	AX-AC-40-SUN-I1-PNP-NO-5m ID 156345	AX-AC-uniA-SUN-I2-PNP-NO-2m ID 163252	AX-AC-60Z-SUN-I2-PNP-NO-2m ID 156342
	NPN-NO	AX-AC-60Z-SUN-I2-NPN-NO-2m ID 166836	AX-AC-80Z-SUN-I2-NPN-NO-2m ID 152349	AX-AC-100Z-SUN-I2-NPN-NO-2m ID 353808	AX-AC-uni-SUN-I1-NPN-NO-5m ID 161447		AX-AC-40A-SUN-I2-NPN-NO-2m ID 405717	AX-AC-40-SUN-I1-NPN-NO-5m ID 187109	AX-AC-uniA-SUN-I2-NPN-NO-2m ID 163250	AX-AC-60Z-SUN-I2-NPN-NO-2m ID 166836
	Actuating element	AX-AC-60-CSW-I ID 156339	AX-AC-80-CSW-I ID 152199	AX-AC-100-CSW-I ID 406342			AX-AC-40A-CSW-M2 ID 405731	AX-AC-40-CSW-I ID 156344	AX-AC-60A-CSW-P ID 245820	AX-AC-uniA-CSW-H ID 188260
Inductive proximity switches (groove installation)	PNP-NC	AX-AC-SUN-GRO-PNP-NC-10m ID 162170								AX-AC-SUN-GRO-PNP-NC-10m ID 162170
	PNP-NO	AX-AC-SUN-GRO-PNP-NO-10m ID 162717								AX-AC-SUN-GRO-PNP-NO-10m ID 162717
	NPN-NC	AX-AC-SUN-GRO-NPN-NC-3m ID 162173								AX-AC-SUN-GRO-NPN-NC-3m ID 162173
	Actuating element	AX-AC-60-CSW-I ID 156338	AX-AC-80-CSW-I ID 152348	AX-AC-100-CSW-I ID 351638						AX-AC-uniA-CSW-I ID 188300

* When mounting inductive and mechanical switches in combination with each other on one side, only one actuating element is needed.

¹ Mounting on the drive head

² Mounting on the deflection head