

Application

Limit switch with inductive or electric limit contacts in type of protection Ex d (flameproof enclosure) or Ex ia (intrinsic safety) for attachment to pneumatic linear and rotary actuators according to VDI/VDE 3845

Ex certified 

General

The Type 4747 Limit Switch issues an electric signal when the valve travel exceeds or falls below an adjusted limit. The signal is suitable for switching control signals, issuing visual and audible alarms, or for connection to central control or alarm systems.

Versions

Continuously adjustable limit contacts, switching functions, and mounting kits allow the Type 4747 Limit Switch to be optimally adapted for the specific task:

General

- Electrical connection using M20x1.5 or 1/2 NPT cable gland to terminals
- Corrosion-resistant, rugged enclosure with degree of protection IP 66 for adverse environmental conditions
- Maximum permissible ambient temperature -40 to +80 °C
- Mounting kits for linear actuators according to IEC 60534-6-1, rotary actuators with interface according to VDI/VDE 3845 or SAMSON direct attachment

Limit contacts:

- Maximum two limit contacts, continuous and easy adjustment
- Inductive proximity sensors or electric microswitches

Type of protection:

- Flameproof enclosure
II 2G Ex d IIC T6 and II 2D Ex tD A21 IP66 T 80°C
- Intrinsic safety
II 2G Ex ia IIC T6 Gb and II 2D Ex tb IIIC T85°C Db IP66

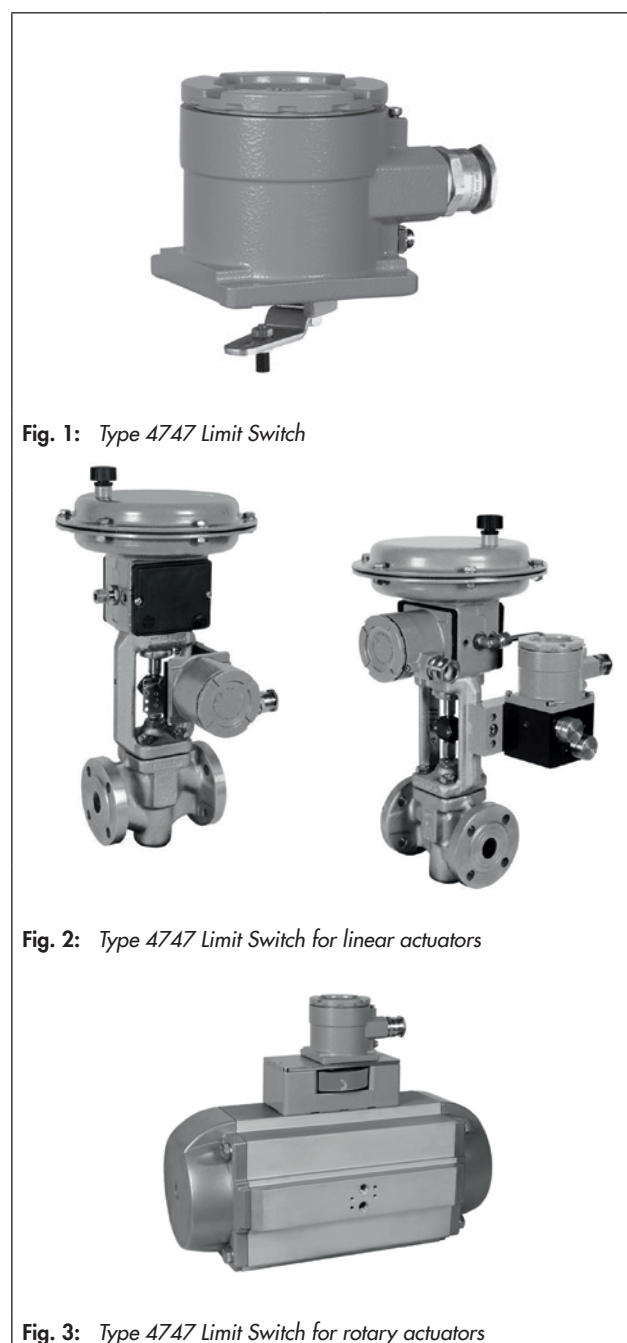


Fig. 1: Type 4747 Limit Switch

Fig. 2: Type 4747 Limit Switch for linear actuators

Fig. 3: Type 4747 Limit Switch for rotary actuators

Function

General

The limit switch is equipped with a maximum of two inductive proximity switches or two electric microswitches. For most applications the contacts are adjusted to issue a signal when the actuator has reached one of its end positions. The switching point can be adjusted to any position within the rotational angle or travel range to signalize intermediate positions (see EB 4747).

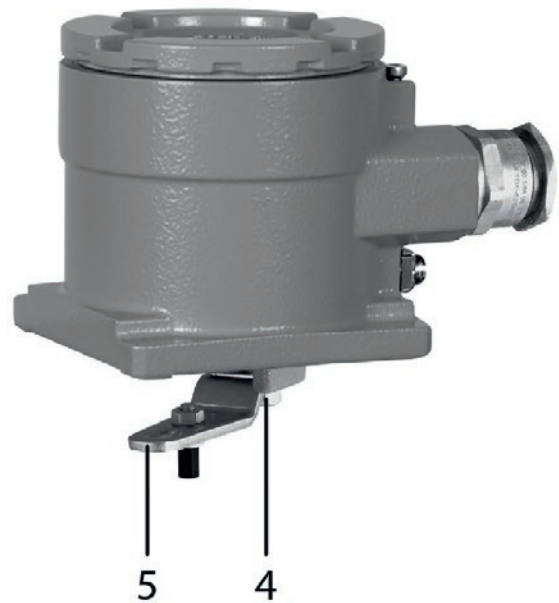
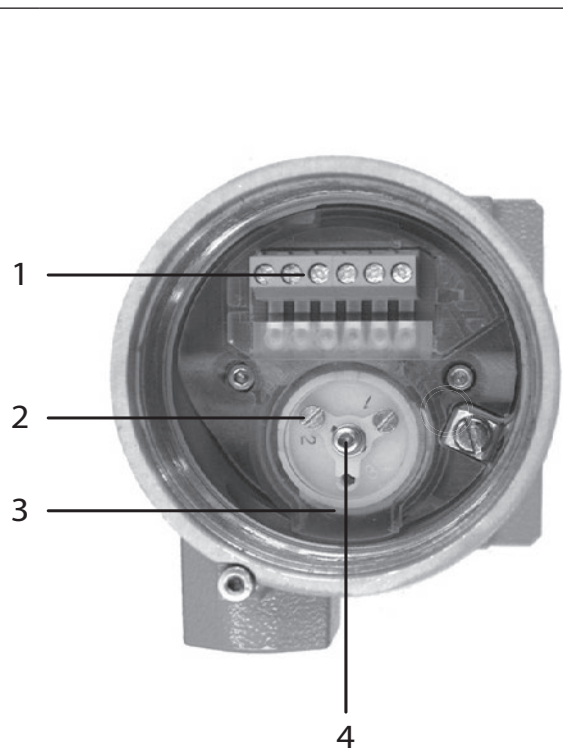
The shaft (4) of the limit switch is connected to the actuator by a follower pin (5). The shaft has a maximum of two metal tags or cam disks (3).

Limit switch with inductive proximity switches

The limit switch has adjustable metal tags (3) on the shaft (4). When the tag (3) is inside the magnetic field of the proximity switch, the proximity switch is attenuated and the output has a high impedance (switching function "Contact open"). When the tag (3) leaves the magnetic field, the proximity switch is unattenuated and the output has a low impedance (switching function "Contact closed"). The tag (3) can be adjusted to a switching point between 0 and 100° at the adjustment screw (2).

Limit switch with electric microswitches


The limit switch has a maximum of two adjustable metal cam disks (3) on the shaft (4). The cam disk (3) activates the electric microswitch by the roll on the switch lever. The cam disks (3) can be adjusted to a switching point between 0 and 100° at the adjustment screws (2).



- 1 Terminal block
- 2 Adjustment screw
- 3 Cam disk or metal tag
- 4 Shaft
- 5 Follower pin

Fig. 4: Type 4747 Limit Switch

Technical data

Type 4747 Inductive Limit Switch		
Control circuit	Switching amplifier according to EN 60947-5-6: 2000	5 to 60 V DC ($P_{max} \leq 4 \text{ W}$)
Inductive proximity sensor	NCB2-V3-NO	NBB3-V3-Z5
Switching element	NAMUR NC contact	
Contacts	1 or 2	
Permissible ambient temperature ¹⁾	-25 to +80 °C	-25 to +70 °C
Electrical connection	M20x1.5 or ½ NPT	
Degree of protection	IP 66	
Weight	Approx. 0.65 kg	
Type 4747-xxx1 Electric Limit Switch - Specifications apply to silver and gold-plated contacts		
Switching element	Electric limit switch: changeover contact/SPDT (single-pole/double-throw type)	
Permissible load	AC voltage	DC voltage
	250 V/10 A	125 V/0.5 A 24 V/10 A
Contacts	2	
Permissible ambient temperature ¹⁾	-40 to +80 °C	
Electrical connection	M20x1.5 or ½ NPT	
Degree of protection	IP 66	
Weight	Approx. 0.65 kg	
Materials		
Housing and cover	Aluminum, powder coated, gray beige RAL 1019, or stainless steel 1.4409	
External parts	Stainless steel 1.4301/1.4310/1.4409	
Compliance		

¹⁾ The maximum permissible ambient temperature of the limit switch depends on the permissible ambient temperature of the components, type of protection, and temperature class.

Electric data for connection to intrinsically safe current circuits (Ex ia)			
Limit switch	Type 4747-11x01		
Limit contacts	Inductive		
Output voltage ²⁾	Ui	16 V	16 V
Output current ²⁾	Ii	25 mA	52 mA
Power dissipation ²⁾	Pi	64 mW	169 mW
Outer capacitance ²⁾	Ci	100 nF	
Outer inductance ²⁾	Li	100 µH	
Permissible ambient temperature		-25 to +80 °C (temperature class T4) -25 to +80 °C (temperature class T5) -25 to +65 °C (temperature class T6)	-25 to +80 °C (temperature class T4) -25 to +60 °C (temperature class T5) -25 to +45 °C (temperature class T6)

²⁾ Permissible maximum values when connected to a certified intrinsically safe circuit.

Dimensions in mm

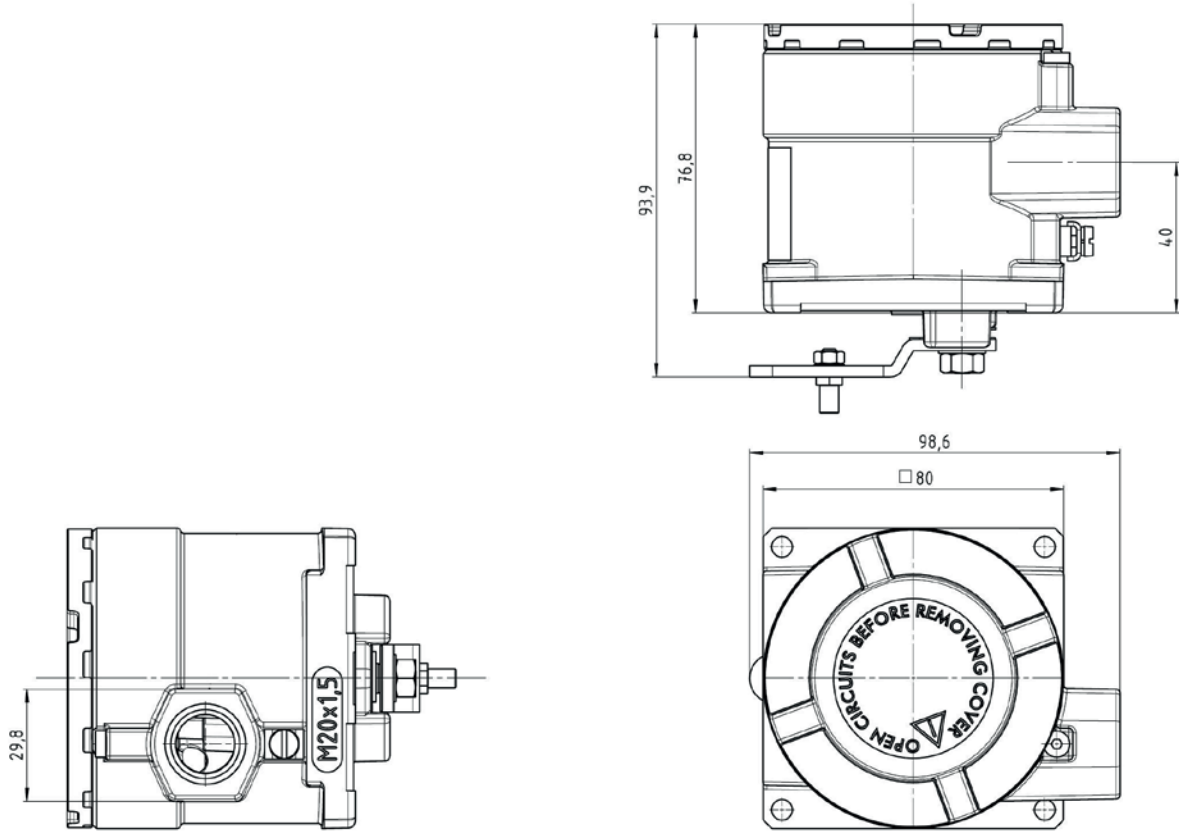


Fig. 5: Type 4747 Limit Switch

Dimensions in mm

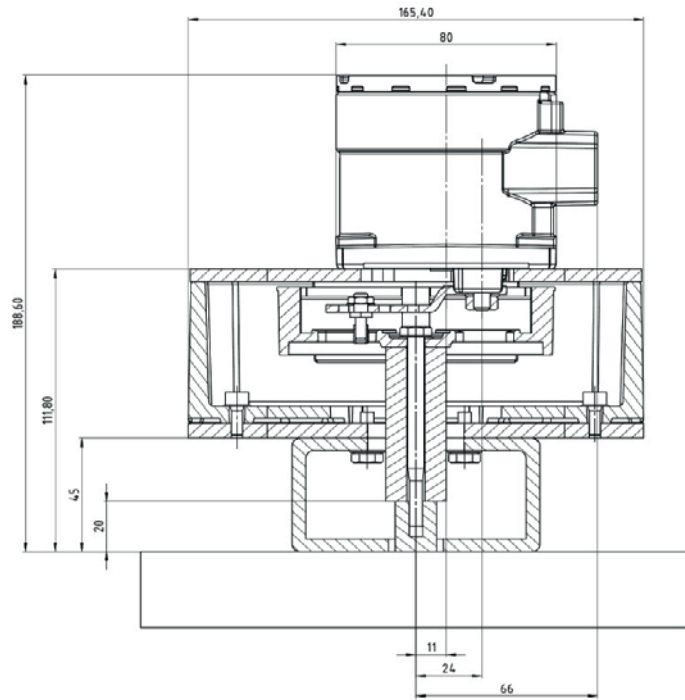


Fig. 6: Attachment to rotary actuators according to VDI/VDE 3845 (09-2010), fixing level 2 (heavy-duty version)

Dimensions in mm

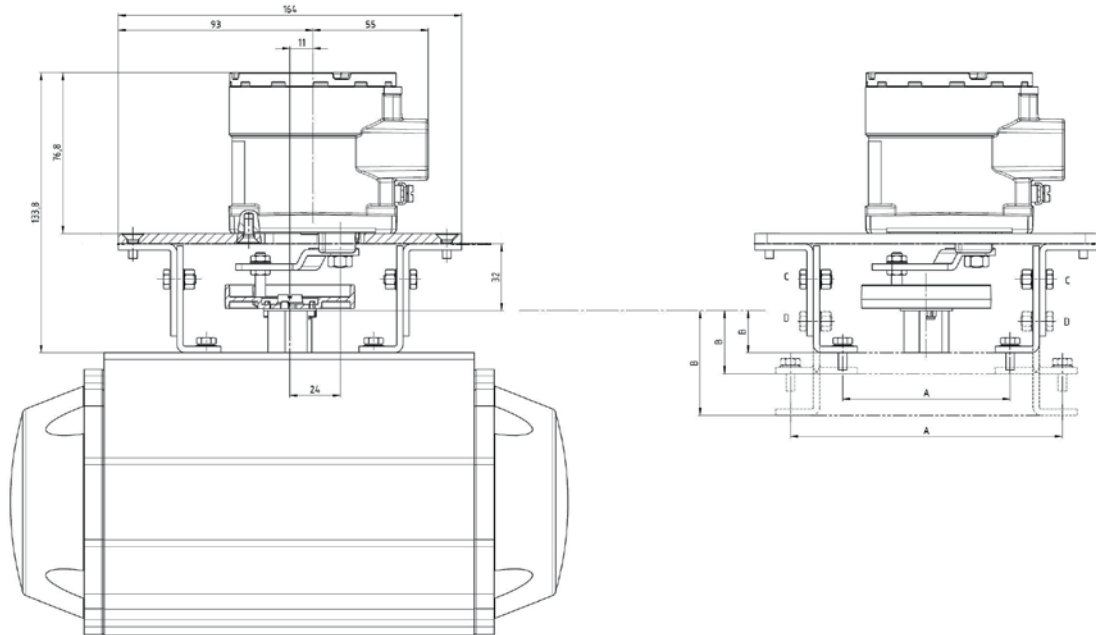


Fig. 7: Attachment to rotary actuators according to VDI/VDE 3845 (09-2010), fixing level 1 (light version)

Dimensions in mm

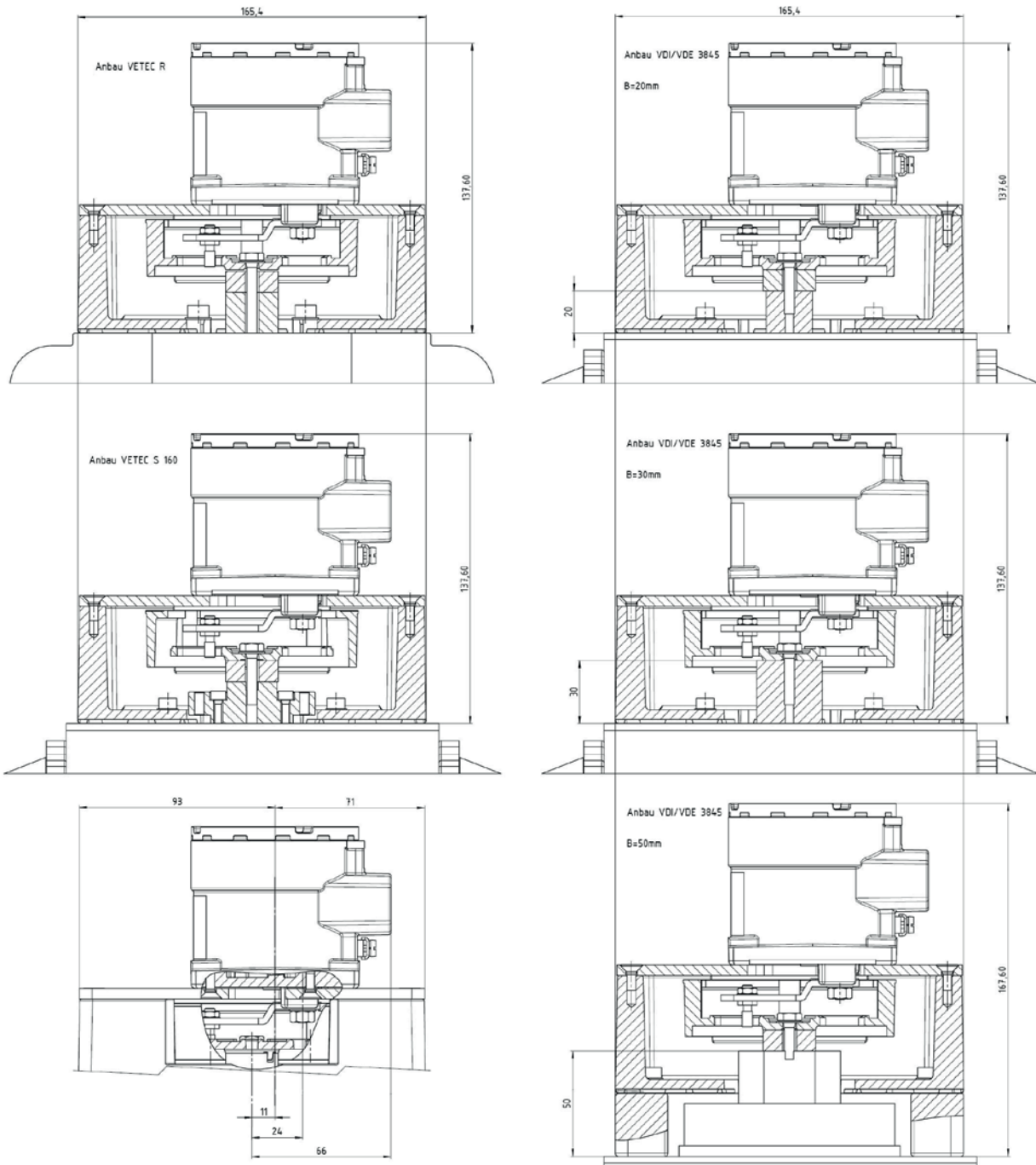


Fig. 8: Attachment to rotary actuators according to VDI/VDE 3845 (09-2010), fixing level 1 (heavy-duty version)

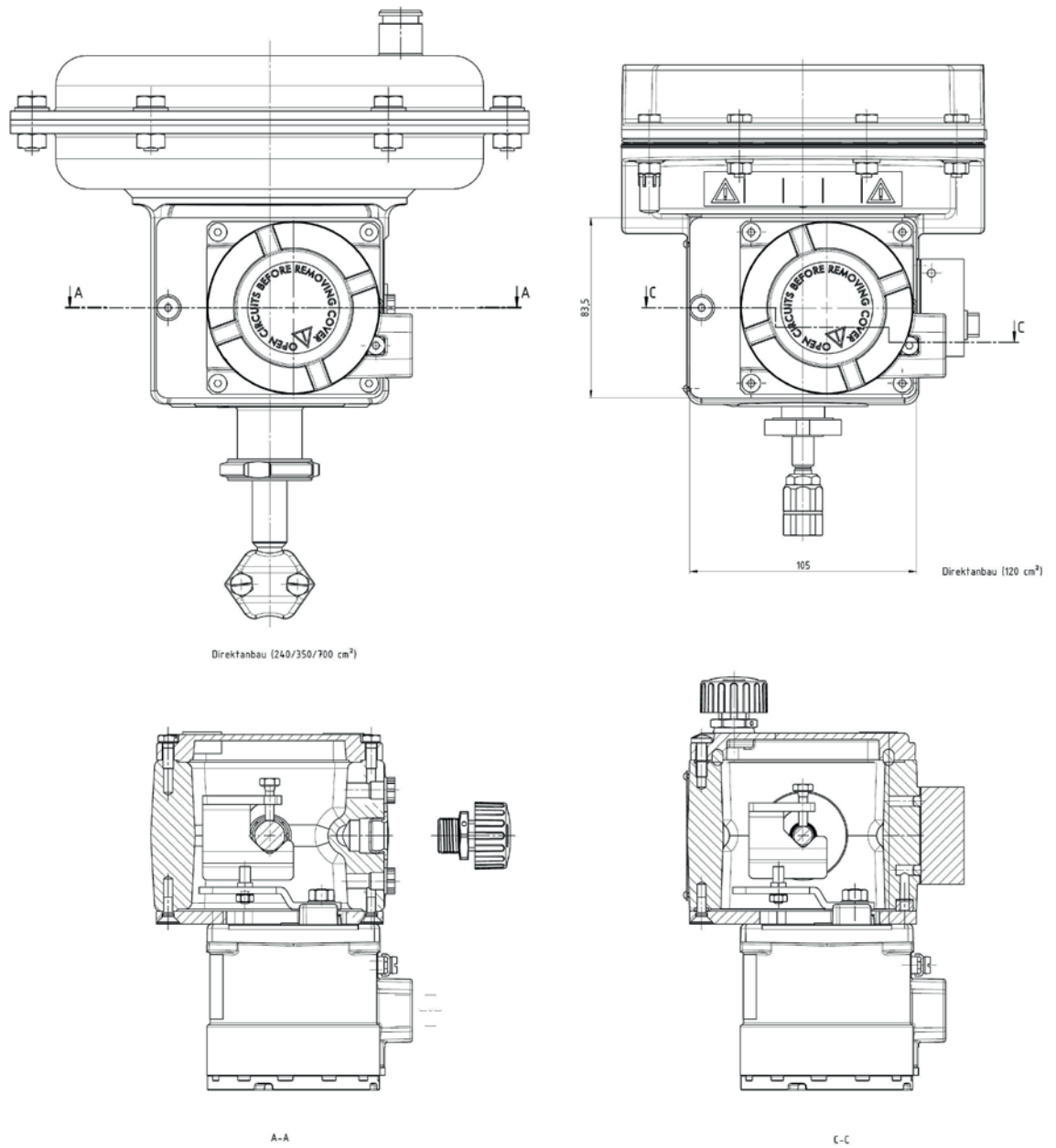


Fig. 9: Direct attachment to linear actuators

Dimensions in mm

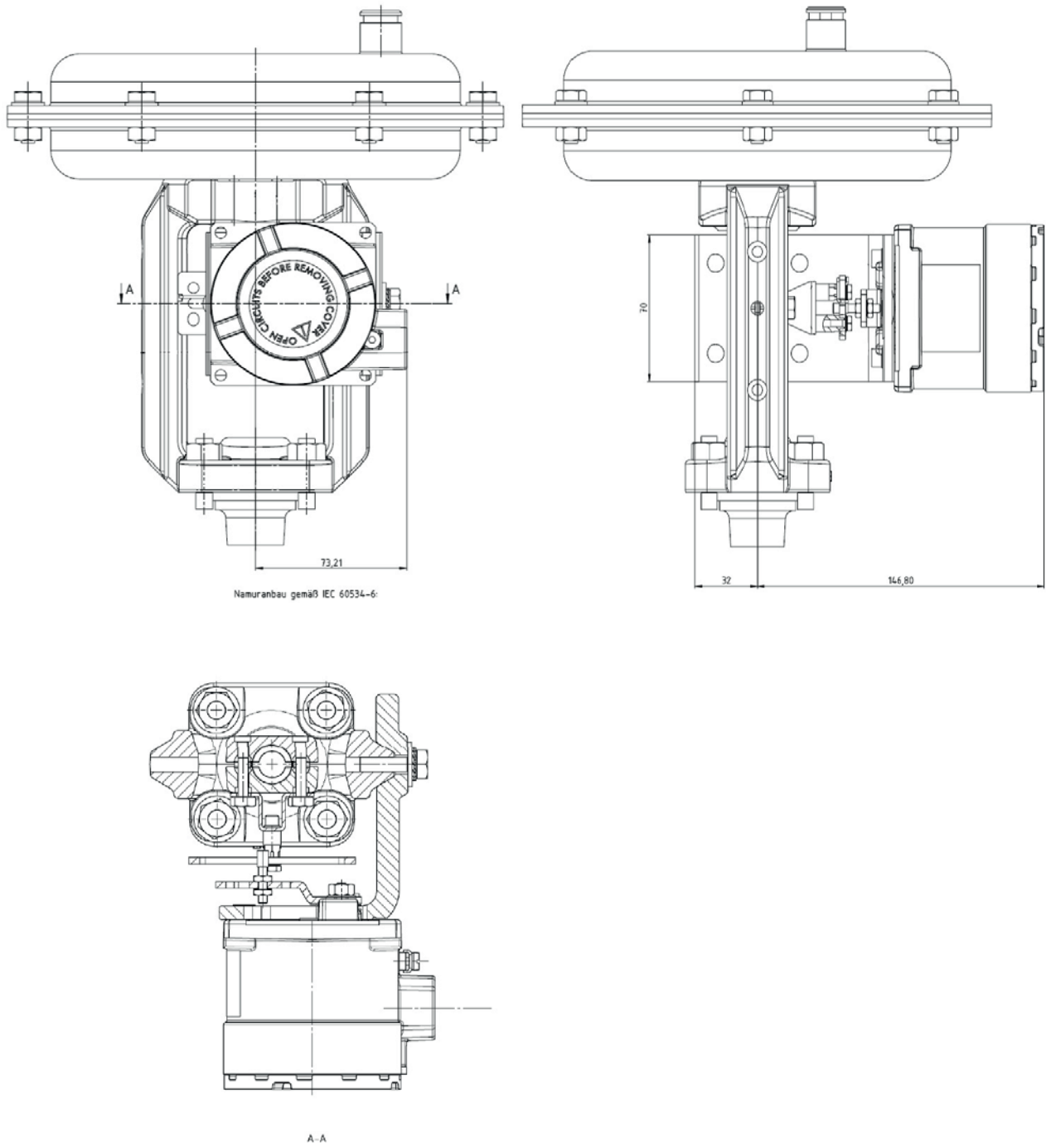


Fig. 10: Attachment to linear actuators with NAMUR rib (IEC 60534-6)

Versions and ordering data

Limit switch	Type 4747-	x	x	x	x	x	x	x	x	x	x	0	x	x	x	x	x
Type of protection																	
Without		0	0	0													
II 2G Ex ia IIC T6 Gb / II 2D Ex tb IIIC T85°C Db IP 66, ATEX		1	1	0													
1Ex ia IIC T6/T5/T4 Gb / Ex tb IIIC T85°C Db, EAC (GOST)		1	1	3													
II 2G Ex d IIC T6/T5/T4 / II 2D Ex tD A21 IP66 T80°C, ATEX		2	1	0													
Ex d IIC T6, T5, T4 / Ex tD A21 IP66 T80°C, IECEx		2	1	1													
Ex d IIC T4~T6 Gb / DIP A21 Ta, T4~T6, NEPSI		2	1	2													
1Ex d IIC T6/T5/T4 Gb X / Ex tb IIIC T80°C Db X, EAC (GOST)		2	1	3													
AEx d II C T6, FM		2	3	0													
II 3G Ex nAc II T6 Gc / II 3D Ex tc IIIC T85°C Dc IP66, ATEX		8	1	0													
2Ex nA IIC T6/T5/T4 Gc / Ex tc IIIC T85°C Dc, EAC (GOST)		8	1	3													
Limit contact																	
Inductive proximity sensor NCB2-V3-NO	(-25 to +80 °C)	0	1														
Inductive proximity sensor NBB3-V3-Z5	(-25 to +70 °C)	1	0														
Microswitches with silver contacts	(-40 to +80 °C)	1	1														
Microswitches with gold contacts	(-40 to +80 °C)	1	2														
Number of contacts																	
1									1								
2									2								
Switching angle																	
< 100° adjustable									0								
Electrical connection																	
M20x1.5									1								
½ NPT									2								
Degree of protection																	
IP 66									0								
Ambient temperature ¹⁾																	
-25 to +80 °C (+65 °C in T6)									0								
-40 to +80 °C (+65 °C in T6)									1								
-25 to +70 °C (+65 °C in T6)									2								
Material																	
Aluminum													0				
Stainless steel													1				
Safety approval																	
Without														0			
SIL														1			
Special version																	
Without															0	0	0

¹⁾ The maximum permissible ambient temperature of the limit switch depends on the permissible ambient temperature of the components, type of protection, and temperature class.

Summary of explosion protection approvals

Type	Certification		Type of protection/comments
4747-xxx01	SIL	Number P+F 02/4-13 R008 Date 2002-12-09	Certification for safety-instrumented systems according to IEC 61508
4747 - 110	ATEX EU type examination certificate	Number PTB 12 ATEX 2020 Date 2013-04-26	II 2G Ex ia IIC T6 Gb II 2D Ex tb IIIC T85°C Db IP66
4747 - 113	EAC Ex	Number RU C-DE.08.B.00117 Date 2013-11-15	1Ex ia IIC T6/T5/T4 Gb Ex tb IIIC T85°C Db
4747 - 210	ATEX EU type examination certificate	Number PTB 09 ATEX 1113 X Date 2009-11-20	II 2G Ex d IIC T6/T5/T4 II 2D Ex tD A21 IP66 T80°C
4747 - 211	IECEX	Number IECEX PTB 09.0060X Date 2009-11-25	Ex d IIC T6, T5, T4 Ex tD A21 IP66 T80°C
4747 - 212	NEPSI	Number GYJ14.1065X Date 2014-02-24	Ex d IIC T4~T6 Gb DIP A21 Ta, T4~T6
4747 - 213	EAC Ex	Number RU C-DE.08.B.00117 Date 2013-11-15	1Ex d IIC T6/T5/T4 Gb X Ex tb IIIC T85°C Db X
4747 - 230	FM	Number 3037212 Date 2011-03-08	XP/I/1/ABCD/T6 DIP/II,III/EFG/T6 I/1/AEx d/IIC/T6 Type 4X, IP66
4747 - 810	ATEX EU type examination certificate	Number PTB 12 ATEX 2020 Date 2013-04-26	II 3G Ex nAc II T6 Gc II 3D Ex tc IIIC T85°C Dc IP66
4747 - 813	EAC Ex	Number RU C-DE.08.B.00117 Date 2013-11-15	2Ex nA IIC T6/T5/T4 Gc Ex tc IIIC T85°C Dc

Spare parts and accessories

Spare parts	
Order no.	Designation
1380-1877	Follower clamp
0500-1208	M lever (including follower pin)
8392-0683	Retaining plate for shaft
8350-0084	Disk spring DIN 2039 - B 12.5
	Hexagon nut A4-70
	Grounding terminal
8804-0322	Clamp
8392-0654	Spring washer
8330-0688	Pan head screw M4x8
	Cover
0520-1494	O-ring 66 x 2
8333-0774	Cap screw M4 x 10 (to fasten the cover)

Accessories	
Order no.	Designation
8808-0200	M20x1.5 Ex d cable gland, made of brass, with O-ring, for non-armored cable (6.5 to 14 mm cable diameter)
8808-2010	½ NPT Ex d cable gland, made of brass, with O-ring, for non-armored cable (6.5 to 14 mm cable diameter)
8808-0178 ¹⁾	M20x1.5 Ex e cable gland, made of polyamide (black), with O-ring
1890-4875 ¹⁾	M20x1.5 cable gland, made of brass, with O-ring
1890-4876 ¹⁾	M20x1.5 cable gland, made of brass (blue), with O-ring
8808-1011 ¹⁾	M20x1.5 cable gland, made of polyamide (black), without O-ring
8808-1012 ¹⁾	M20x1.5 cable gland, made of polyamide (blue), without O-ring
8421-0067	O-ring 18 x 2

¹⁾ The cable gland is not suitable for Ex d instrumentation.

Mounting kits	
Order no.	Designation
1400-9974	Attachment according to VDI/VDE 3845, level 2, heavy-duty version
1400-7473	Attachment according to VDI/VDE 3845, level 1, light version (AA1 to AA4 size)
1400-9384	Attachment according to VDI/VDE 3845, level 1, heavy-duty version (AA1 to AA4 size)
1400-9992	Attachment according to VDI/VDE 3845, level 1, heavy-duty version (AA5 size)
1400-9385	Attachment for VETEC S 160/R, heavy-duty version
1400-7471	Mounting kit for Type 3277 Linear Actuators (240, 350, 700 cm ²)
1400-7472	Mounting kit for Type 3271 Linear Actuators (120 cm ²)
1402-1093	Mounting kit for SED diaphragm valves (both mounting kits are required)
1400-7468	Mounting kit for control valves with NAMUR rib or attachment to valves with rod-type yokes according to IEC 60534-6 (20 to 35 mm rod diameter)
1400-7469	Mounting kit for Type 3510 Micro-flow Valve with 60 or 120 cm ² actuator area

Specifications subject to change without notice.



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