

# Inductive Limit Switch for Pneumatic Control Valves

## Type 3768



### Application

Limit switch with two incorporated inductive switches and optionally one 3/2-way solenoid valve for attachment to pneumatic control valves

For rated travels from 7.5 to 120 mm



The limit switch is equipped with two inductive proximity switches which issue a signal when an adjustable limit is exceeded in either direction.

Optionally, the limit switch is also available with an integral 3/2-way solenoid valve which registers a binary signal issued by a control device and converts it into a binary signal pressure. When the solenoid valve is in de-energized state, the actuator moves the valve to the fail-safe position.

- All limit switches can be overridden and can be optionally used as normally closed or normally open contacts
- Versions for use in hazardous areas in type of protection intrinsically safe EEx ia II C T6 are available (refer to the summary of explosion protection certificates)
- Direct attachment to Type 3277 Pneumatic Actuator
- Attachment to actuators according to IEC 60534 and NAMUR recommendations
- Attachment to rotary actuators with an interface according to VDI/VDE 3845

Refer to the Information Sheet T 8350 EN on selection and application of positioners and limit switches.

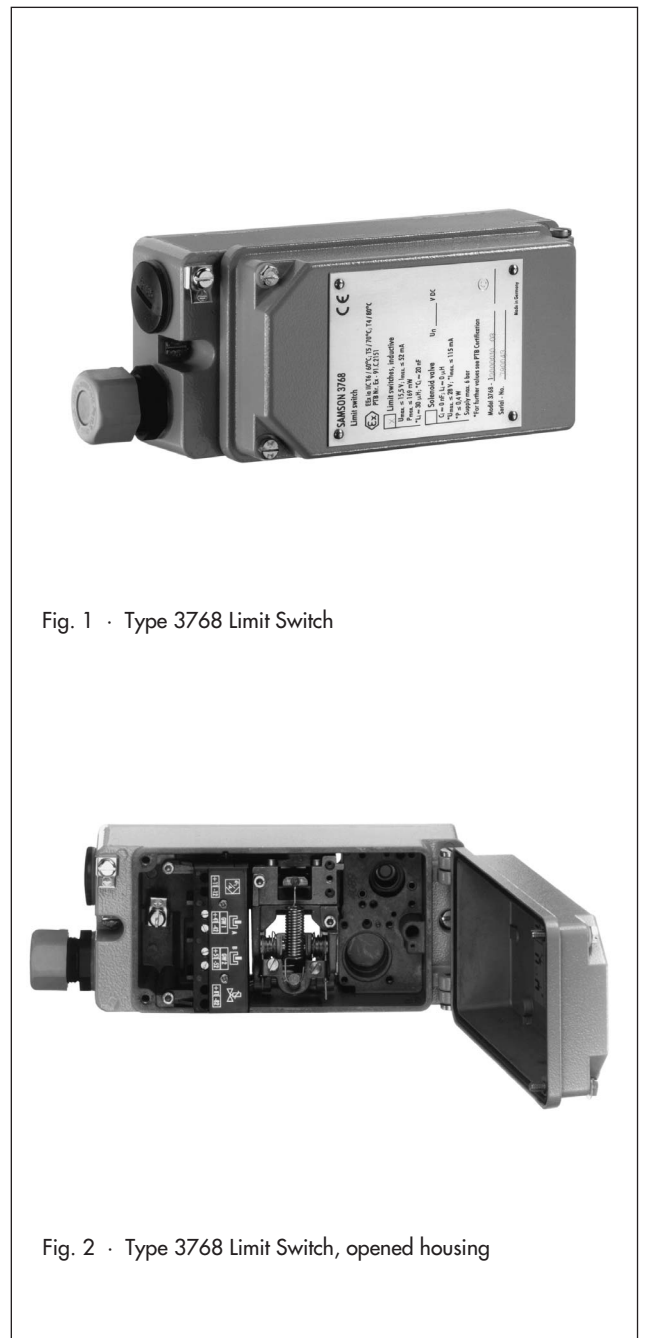


Fig. 1 · Type 3768 Limit Switch

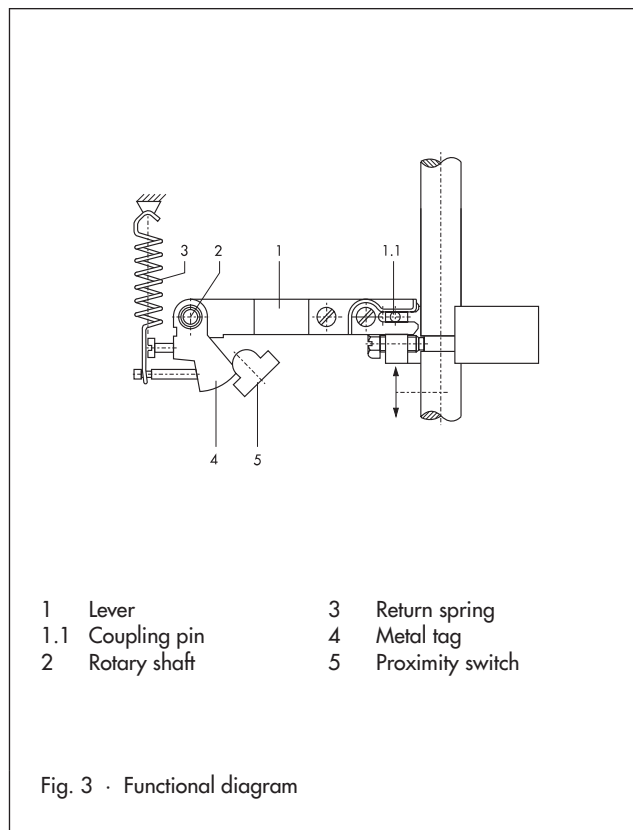
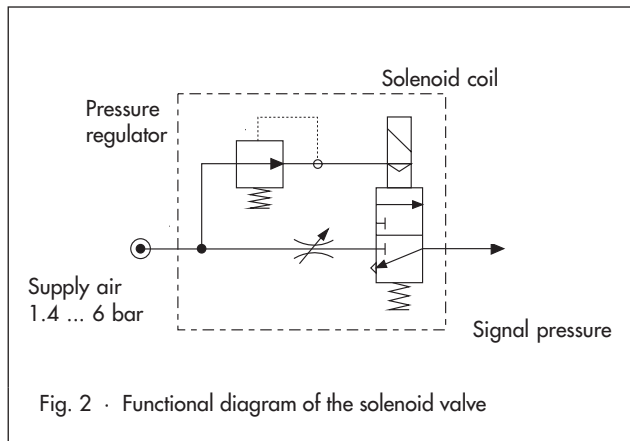
Fig. 2 · Type 3768 Limit Switch, opened housing

### Principle of operation (Figs. 3 and 4)

When the limit switch is attached to the control valve, the valve travel is transmitted via the pin (1.1) to the lever (1) of the actuator. Any change in travel is converted into a rotary motion of the shaft (2). The shaft (2) is fitted with two adjustable metal tags (4) which operate the associated proximity switches (5).

For operation of these inductive limit switches, appropriate transistor relays must be connected in the output circuit. The proximity switch assumes high impedance when the metal tag (4) is within the inductive field, whereas the sensor assumes low impedance when the metal tag is outside the field.

When the incorporated solenoid valve is energized, a supply air pressure is applied to the actuator. The speed of air supply is adjustable at a restriction. When the solenoid valve is de-energized, the actuator is vented and the control valve moves to its fail-safe position.



**Table 1 · Technical data · Pressure in bar (gauge)**

Travel range	Direct attachment to Type 3277 Actuator: 7.5 ... 30 mm		
	Attachment to IEC 60534 (NAMUR): 7.5 ... 120 mm		
Inductive proximity switches	2 x Type SJ2 SN		
Control circuit	Specifications corresponding to connected transistor relay		
Hysteresis at rated travel	≤ 1 %		
Permissible ambient temperature	-20 °C ... 80 °C with plastic cable gland -40 ... 80 °C with metal cable gland · Special version down to -45 °C The limits of the EC Type Examination Certificate apply additionally for explosion-protected versions.		
<b>Solenoid valve</b>			
Supply air	1.4 ... 6 bar (20 ... 90 psi)		
Input	Binary DC voltage signal		
Nominal signal	6 V DC	12 V DC	24 V DC
Signal "0" (no pick-up) <sup>1)</sup>	≤ 1.2 V	≤ 2.4 V	≤ 4.7 V
Signal "1" (safe pick-up) <sup>2)</sup>	≥ 5.4 V	≥ 9.6 V	≥ 18.0 V
Internal resistance R <sub>i</sub> at 20 °C	2909 Ω	5832 Ω	11714 Ω
K <sub>v</sub>	0.14 m <sup>3</sup> /h		
Air consumption	"Off" ≤ 60 l <sub>n</sub> /h · "On" ≤ 10 l <sub>n</sub> /h		
Closing time with Type 3277 Actuator	240 cm <sup>2</sup>	350 cm <sup>2</sup>	700 cm <sup>2</sup>
	For rated travel		
	with bench range		
0.2 ... 1 bar	≤ 1 s	≤ 1.5 s	≤ 4 s
0.4 ... 2 bar	≤ 2 s	≤ 2.5 s	≤ 8 s
0.6 ... 3 bar	≤ 1 s	≤ 1.5 s	≤ 5 s
Degree protection without/with solenoid valve	Without	IP 65	
	With	IP 54 · IP 65 on request	

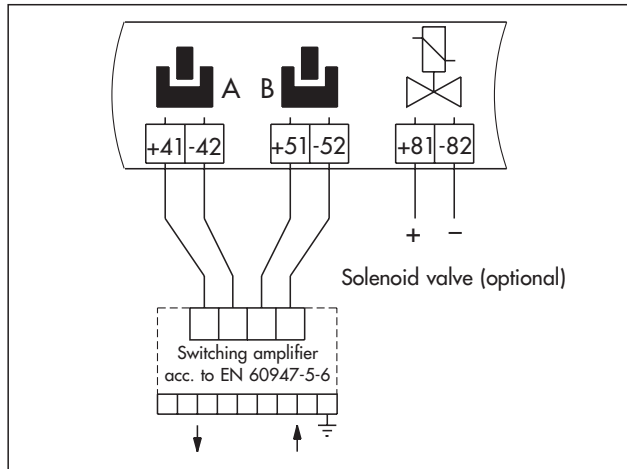
<sup>1)</sup> DC voltage signal at -20 °C

<sup>2)</sup> DC voltage signal at +80 °C

**Table 2 · Materials**

Housing	Die-cast aluminum chromated and plastic coated
External parts	Stainless steel 1.4571 and 1.4104

**Electrical connections**



**Ordering text**

Inductive Limit Switch Type 3768- ...  
(refer to article code on next page)

**Additional specifications**

- Direct attachment to Type 3277 Actuator (120 to 700 cm<sup>2</sup>)
- Attachment according to IEC 60534 (NAMUR)  
Travel: ... mm, if applicable, rod diameter: ... mm
- Attachment to rotary actuators  
Opening angle: ...  
Single-acting or double-acting actuators

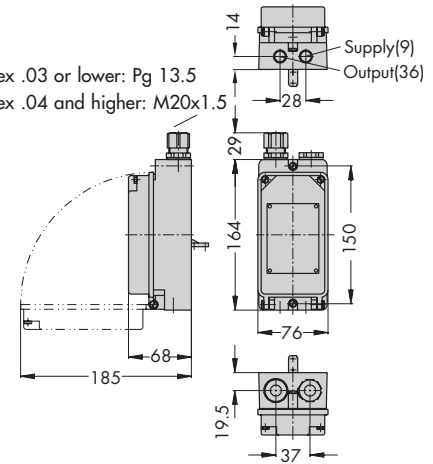
**Accessories**

Adapter 1/2 NPT for electrical connections

**Dimensions in mm**

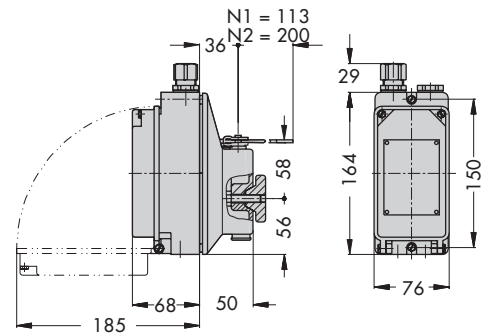
Direct attachment to Type 3277 Actuator

Model index .03 or lower: Pg 13.5  
Model index .04 and higher: M20x1.5

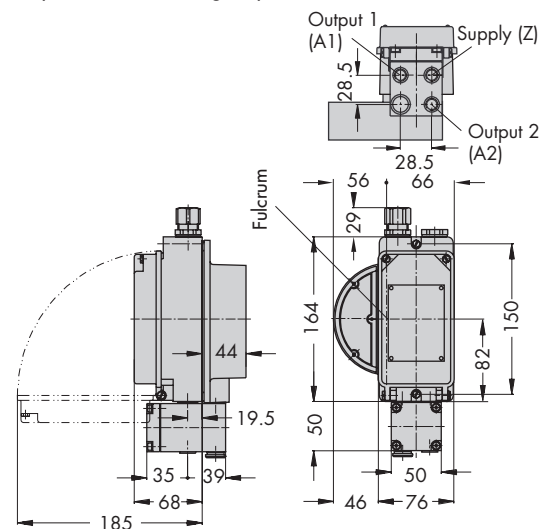


Pneumatic connections 1/4 NPT or G 1/4

Attachment acc. to IEC 60534 and NAMUR



Attachment to rotary actuators  
(with pneumatic reversing amplifier)



## Summary of explosion protection approvals

Type of approval	Certificate number	Date	Type of protection/Comments
EC Type Examination Certificate	PTB 02 ATEX 2077	2002-07-19	⊕ II 2 G EEx ia IIC T6; Type 3768-1
Statement of Conformity	PTB 03 ATEX 2182 X	2003-09-30	⊕ II 3 G EEx nA II T6; Zone 2; Type 3768-8
CSA approval	LR 54227-14	1992-04-21	Class I, Div. 1, Groups A, B, C, D; Type 3 Enclosure Type 3768-3
FMRC approval	J.I.3020228	2005-02-28	Class I, II, III; Div. 1, Groups A, B, C, D, E, F, G Class I, Zone 0 AEx ia IIC T6 Class I, Div. 2, Groups A, B, C, D Class II, Div. 2, Groups F, G; Class III NEMA 4X; with inductive limit switches and solenoid valve; Type 3768-3
NEPSI approval	GYJ04218X	2004-12-22	Ex ia IIC T4 ... T6; valid until 2009-12-21; Type 3768-1
	GYJ04219X		Ex nL IIC T4 ... T6; valid until 2009-12-21; Type 3768-8

### Article code

Limit Switch	Type 3768	x	2	x	0	0	x	x	x	x	0	x	x	0
<b>Explosion protection</b>														
Without		0							2/7					
⊕ II 2 G EEx ia IIC T6 acc. to ATEX		1												
CSA/FM intrinsically safe/non incendive		3												
⊕ II 3 G EEx nA II T6 acc. toATEX		8							2/7					
<b>Solenoid valve</b>														
Without			0											
6 V DC			2											
12 V DC			3											
24 V DC			4											
<b>Pneumatic connections</b>														
Without			0		0									
¼-18 NPT					1									
ISO 221/1 - G ¼					2									
<b>Electrical connection</b>														
Cable gland M20 x 1.5, blue (plastic)							1	0						
Cable gland M20 x 1.5, black (plastic)							2	0						
Cable gland M20 x 1.5, nickel-plated brass							7	2						
<b>Housing version</b>														
Aluminum								0						
CrNiMo steel								2						
<b>Temperature range</b>														
Standard								0						
-45 ... 80 °C								2						
<b>Special versions</b>														
None											0	0	0	
NEPSI approval Ex ia		1									0	0	9	
NEPSI approval Ex nL		8									0	1	0	

Specifications subject to change without notice

