Limit Switch Type 3776

with inductive or electric contacts and solenoid valve for linear actuators or rotary actuators according to VDI/VDE 3845

General

The Type 3776 Limit Switch issues an electrical signal when an adjusted limit value is exceeded or not reached. The signal is suitable for reversing control signals, generating visual and audible alarms or for connection to central control and alarm systems. The limit switch can be equipped with a solenoid valve for controlling the monitored actuator.

Versions

The Type 3776 Limit Switch offers a variety of different contacts, switching functions, connections, and mounting kits for all desired applications:

General

- Electrical connection via cable gland M 20 × 1.5 to terminals or via a plug-type connector
- Internal AS-Interface with bus connection (optionally)
- Corrosion-resistant, sturdy enclosure with degree of protection IP 54 or IP 65 for applications in aggressive environments
- Maximum permissible ambient temperature −45 to +80 °C, depending on the components and the type of protection
- Mounting kits for linear actuators or rotary actuators with interface according to VDI/VDE 3845

Contacts

- Maximum 3 easy and accurately adjustable contacts
- Inductive pick-ups, inductive double proximity switch or electric microswitches

Solenoid valve

- 1 or 2 integral pilot valves for single or double actuation of a booster valve
- E/P binary converter with flapper/nozzle assembly proven already a million times in practice
- Type of protection II 2 G EEx ia IIC T6 or II 3 G EEx nA II T6 (optionally)
- Nominal signals 6/12/24 V DC or 24/115/230 V AC
- Power consumption 6 to 27 mW or 0.04 to 0.46 VA, depending on the nominal signal
- Manual override (optionally)
- Air supply 2.2 to 6.0 bar

- Flanged Type 3777 Booster Valve with diaphragm or piston
- 3/2, 5/2 or 5/3-way function
- K_{vs} value 0.2 to 0.3
- Restrictors for adjusting different closing and opening times (optionally)
- Threaded connection G (NPT) $^1/_4$

- Flanged Type 3777 Connection Block for actuation of an external Type 3756 Booster Valve G (NPT) $^1/_4$
- Threaded connection G (NPT) $^1/_4$

Fig. 1 · Type 3776 Limit Switch

Fig. 2 · Type 3776 Limit Switch for linear actuators or rotary actuators according to VDI/VDE 3845

Examples of application

SAMSON Type 3278 Rotary Actuator

Fig. 3

Type 3776-0323203221 Limit Switch
- Without explosion protection
- 2 Type SB 3,5-E2 Inductive Pick-ups
- 1 pilot valve 24 V DC
- Manual override
- Plug-type connection
- Degree of protection IP 65

Type 3777-3030 Booster Valve
- Connection G $^1/_4$
- 3/2-way function
- Spring-returned
- K_{vs} value 0.20
- Without restrictors

Mounting kit (Order No. 1400-XXXX)

Rotary actuators according to VDI/VDE 3845 – fixing level 1

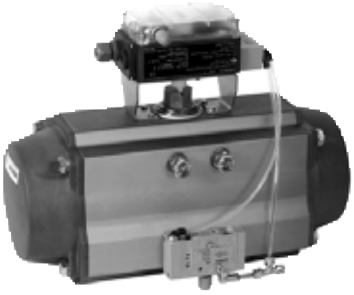


Fig. 4

Type 3776-1223201211 Limit Switch
- Type of protection II 2 G EEx ia IIC T6
- 2 Type SJ 3,5-SN Inductive Pick-ups
- 2 pilot valves 24 V DC
- Manual override
- Terminal connection
- Degree of protection IP 54

Type 3777-3020 Connection Block
- Connection G $^1/_4$
- Double
- Without restrictors

External Type 3756-3025 Booster Valve
- Connection G $^1/_4$
- 5/2-way function
- Detented (2 positions)
- K_{vs} value 1,4

Mounting kit (Order No. 1400-XXXX)

Rotary actuators according to VDI/VDE 3845 – fixing level 2

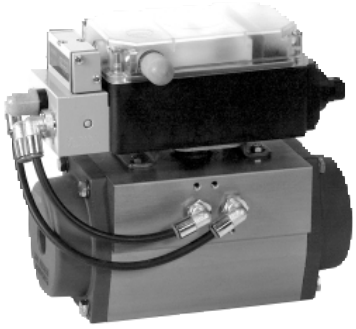


Fig. 5

Type 3776-0123105011 Limit Switch
- Without explosion protection
- 2 Type SC 3,5-N0 Inductive Pick-ups
- 1 pilot valve 24 V DC
- Without manual override
- Bus connection with internal AS-Interface
- Degree of protection IP 54

Type 3777-3650 Booster Valve
- Connection G $^1/_4$
- 5/2-way function
- Spring-returned
- K_{vs} value 0.30
- Without restrictors

Mounting kit (Order No. 1400-XXXX)

SAMSON Type 3241 Linear Actuator with rib according to DIN EN 60534-6-1

Fig. 6

Type 3776-1223201221 Limit Switch
- Type of protection II 2 G EEx ia IIC T6
- 2 Type SJ 3,5-SN Inductive Pick-ups
- 1 pilot valve 24 V DC
- Manual override
- Terminal connection
- Degree of protection IP 65

Type 3777-3030 Booster Valve
- Connection G $^1/_4$
- 3/2-way function
- Spring-returned
- K_{vs} value 0.20
- Without restrictors

Mounting kit (Order No. 1400-XXXX)

SAMSON Type 3277 Linear Actuator

Fig. 7

Type 3776-022311221 Limit Switch
- Without explosion protection
- 2 Type SJ 3,5-SN Inductive Pick-ups
- 1 pilot valve 24 V DC
- Manual override
- Terminal connection
- Degree of protection IP 65

Type 3777-3030 Booster Valve
- Connection G $^1/_4$
- 3/2-way function
- Spring-returned
- K_{vs} value 0.20
- Without restrictors

Mounting kit (Order No. 1400-XXXX)

SAMSON Type 3277-5 with internal routing of the signal pressure

Fig. 8

Type 3776-1223201211 Limit Switch
- Type of protection II 2 G EEx ia IIC T6
- 2 Type SJ 3,5-SN Inductive Pick-ups
- 1 pilot valve 24 V DC
- Manual override
- Terminal connection
- Degree of protection IP 54

Type 3777-3030 Booster Valve
- Connection G $^1/_4$
- 3/2-way function
- Spring-returned
- K_{vs} value 0.20
- Without restrictors

Mounting kit (Order No. 1400-XXXX)

Function

Contacts

The limit switch is equipped with a maximum of three inductive pick-ups, one inductive double proximity switch or three electric microswitches.

For most applications, the contacts are adjusted to provide a signal when the actuator has reached one of its end positions. The switching point can also be adjusted to any position within the rotary range or travel range to signalize an intermediate position (see Mounting and Operating Instructions EB 3776 EN).

The shaft of the limit switch is placed onto the stub of the rotary actuator or connected to the linear actuator via a coupling lever. The shaft is equipped with a maximum of three metal tags or cam disks and an indicating cap to indicate the valve position on the rotary actuator. On linear actuators, there is no indicating cap because the valve position is indicated by the actuator stem.

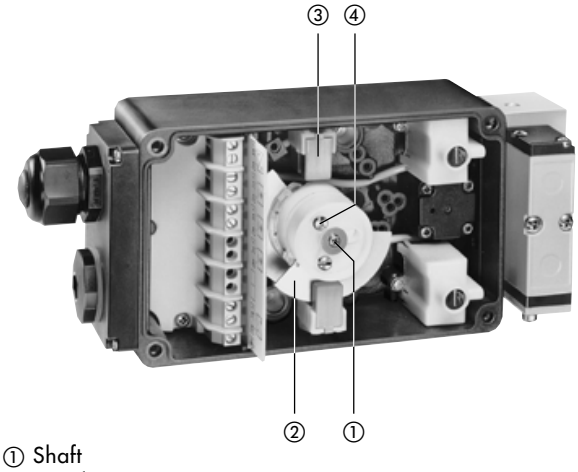
The shaft ① of the **limit switch with inductive pick-ups** (Fig. 9) is equipped with a maximum of three adjustable metal tags ②. When the metal tag ② enters the electromagnetic field of the pick-up ③, the initiator becomes attenuated and the output high-resistant (switching function "contact open"). When the metal tag ② leaves the electromagnetic field, the pick-up ③ is unattenuated and the output low-resistant (switching function "contact closed"). The metal tags ② can be adjusted to a switching point between 0° and 100° using the adjusting screws ④.

The **limit switch with inductive double proximity switch** (Fig. 10) is a low-cost version which can be used only on rotary actuators.

The shaft ① of the limit switch is equipped with an adjustable metal tag ②. When the metal tag ② enters the electromagnetic field of the proximity switch ③, the initiator becomes attenuated and the output high-resistant (switching function "contact open"). When the metal tag ② leaves the electromagnetic field of the proximity switch, the initiator ③ is unattenuated and the output low-resistant (switching function "contact closed"). The metal tag ② can be adjusted to a switching point of 70° or 90° by means of the adjusting screw ④.

The shaft ① of the **limit switch with electric microswitches** (Fig. 11) is equipped with a maximum of three adjustable cam disks ②. The cam disk ② actuates an electric microswitch ③ by means of the roller mounted to the switch lever ⑤. The cam disks ② can be adjusted to a switching point between 0° and 100° using the adjusting screws ④.

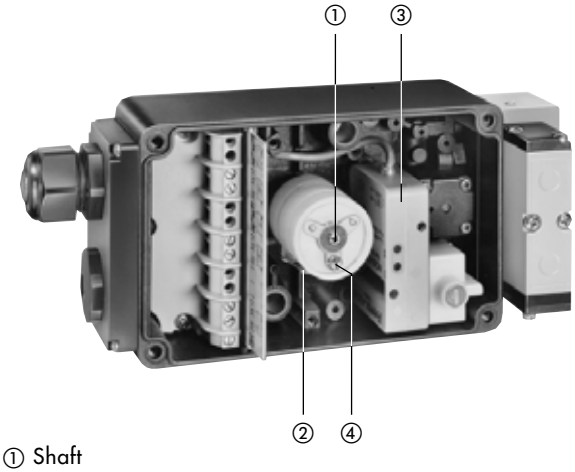
Inductive pick-ups



① Shaft
② Metal tag
③ Inductive pick-up
④ Adjusting screw

Fig. 9

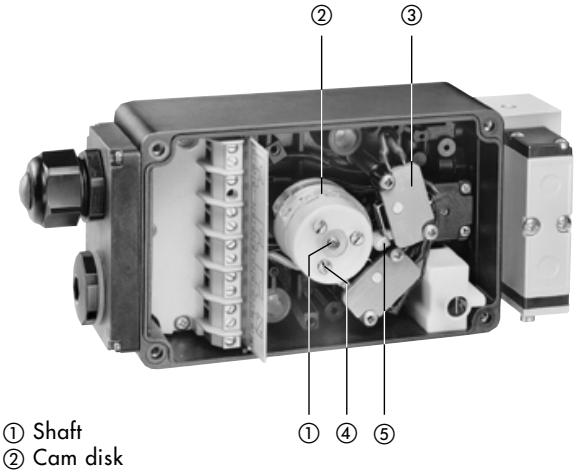
Inductive double proximity switch



① Shaft
② Metal tag
③ Inductive double proximity switch
④ Adjusting screw

Fig. 10

Electric microswitches



① Shaft
② Cam disk
③ Electric microswitch
④ Adjusting screw
⑤ Switch lever

Fig. 11

Function (continued from page 3)

Solenoid valve

The limit switch can be equipped with an optional solenoid valve for controlling the monitored actuator. The binary signals issued by an electric control unit are converted into binary pressure signals, which open or close the actuator (Figs. 12 and 13).

The solenoid valve consists of one or two pilot valves and a single-actuated or double-actuated booster valve. The pilot valves are integrated and the Type 3777 Booster Valve is flanged to the enclosure. Alternatively, an external Type 3756 Booster Valve G (NPT) $^1/_4$ can be attached to the actuator, which is pneumatically actuated via a Type 3777 Connection Block flanged to the enclosure (see "Examples of application", page 2, Fig. 4).

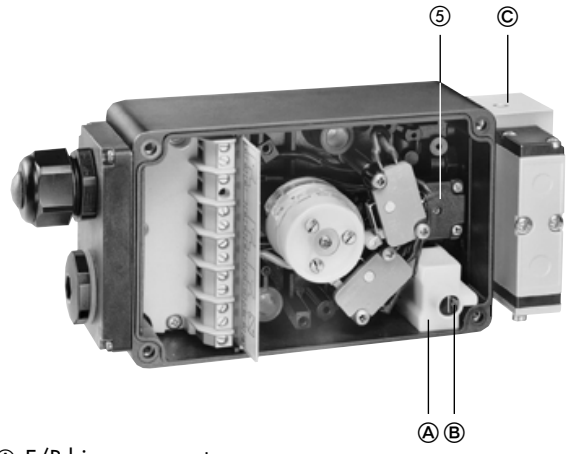
The **limit switch with one pilot valve** consists of an E/P binary converter Ⓐ with manual override Ⓑ and a single-actuated 3/2 or 5/2-way booster valve © with return spring. The air is fed to the E/P binary converter Ⓐ from connection 9 via the pressure reducer ⑤ and the restrictor ⑥.

In the normal position, the flapper ② is lifted off the outlet nozzle ① by the spring ③. As a result, a pressure lower than the switch-off pressure of the booster valve © builds up in the pressure devider that consists of a restrictor ⑥ and an outlet nozzle ①. When the solenoid ④ is energized by an electrical binary signal, the outlet nozzle ① is closed by the flapper ② against the force of the spring ③. As a result, the pressure in the pressure devider rises above the switch-on pressure of the booster valve ©, thus switching it to the operating position. When the electrical binary signal is deactivated and thus the solenoid de-energized, the booster valve © will be switched to the normal position by a return spring.

The **limit switch with two pilot valves** consists of two E/P binary converters Ⓐ with manual override Ⓑ and a double-actuated detented 5/2-way booster valve © or spring-centered 5/3-way booster valve ©. The air is fed to the E/P binary converters Ⓐ from the connections 9 via the pressure reducers ⑤ and the restrictors ⑥.

In the normal position, the flapper ② is lifted off the outlet nozzle ① by the spring ③. As a result, a pressure lower than the switch-off pressure of the booster valve © builds up in the pressure devider that consists of a restrictor ⑥ and an outlet nozzle ①. When the solenoid ④ is energized by an electrical binary signal, the outlet nozzle ① is closed by the flapper ② against the force of the spring ③. As a result, the pressure in the pressure devider rises above the switch-on pressure of the booster valve ©, thus switching it to the operating position. When the electrical binary signal is deactivated and thus the solenoid de-energized, the operating position of the detented booster valve © will be retained until a reverse signal is received. The spring-centered booster valve © will be switched to the mid-position by return springs.

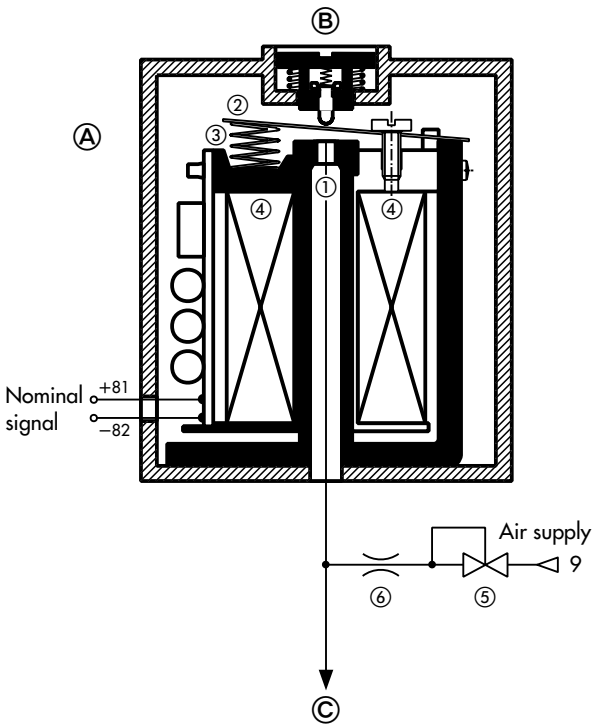
Solenoid valve



Ⓐ E/P binary converter
⑤ Pressure reducer
Ⓑ Manual override (optionally)
© Type 3777 Booster Valve

Fig. 12

Functional diagram of the solenoid valve



Ⓐ E/P binary converter
① Outlet nozzle
② Flapper
③ Spring
④ Solenoid
⑤ Pressure reducer
⑥ Restrictor
Ⓑ Manual override (optionally)
© Type 3777 Booster Valve

Fig. 13

Technical data

Type 3776 Limit Switch		
General data		
Rotating range	0° ... 100°, 0° ... 180° on request	
Travel range	7.5 ... 120 mm for attachment to linear actuators (e. g. SAMSON Type 327X)	
Material Enclosure	Polyamide PA6-3-T, black	
Enclosure cover	Polycarbonate 2807, transparent	
Driver shaft	Polyoxymethylene	
Filter	Filter, made of polyethylene, Filter check valve, made of polyamide or stainless steel 1.4305	
Screws	Stainless steel 1.4301	
Degree of protection	IP 54 with filter, IP 65 with filter check valve	
Mounting position	Special mounting position (see Mounting and Operating Instructions EB 3776 EN)	
Ambient temperature, depending on the components and the type of protection	**Without explosion protection**	Permissible components
	−20 ... +80 °C	All components Type SB 3,5-E2 Inductive Pick-up (max. +70 °C)
	−40 ... +80 °C	Type SC 3,5-N0 Inductive Pick-up Type SJ 3,5-SN Inductive Pick-up Electric microswitch Pilot valve AC/DC Cable gland, made of brass Male connector (manufactured by Harting), made of aluminum Filter check valve, made of stainless steel 1.4305
	−45 ... +80 °C	Type SJ 3,5-SN Inductive Pick-up Pilot valve AC/DC Cable gland, made of brass Male connector (manufactured by Harting), made of aluminum Filter check valve, made of stainless steel 1.4305
	Type of protection EEx ia IIC [1])	Permissible components
	−20 ... +60 °C (temperature class T6) −20 ... +70 °C (temperature class T5) −20 ... +80 °C (temperature class T4)	Type SC 3,5-N0 Inductive Pick-up Type SJ 3,5 SN Inductive Pick-up Type NCN3-F24R-N4 Inductive Double Proximity Switch Electric microswitch Pilot valve DC All electrical connection options All filter options
	−45 ... +60 °C (temperature class T6) −45 ... +70 °C (temperature class T5) −45 ... +80 °C (temperature class T4)	Type SC 3,5-N0 Inductive Pick-up Type SJ 3,5 SN Inductive Pick-up Type NCN3-F24R-N4 Inductive Double Proximity Switch Pilot valve DC Cable gland, made of brass Male connector (manufactured by Harting), made of aluminum Filter check valve, made of stainless steel 1.4305
	Type of protection EEx nA II [2])	Permissible components
	−45 ... +60 °C (temperature class T6) −45 ... +70 °C (temperature class T5) −45 ... +80 °C (temperature class T4)	Type SC 3,5-N0 Inductive Pick-up Type SJ 3,5 SN Inductive Pick-up Type NCN3-F24R-N4 Inductive Double Proximity Switch Electric microswitch Pilot valve DC Cable gland, made of brass Male connector (manufactured by Harting), made of aluminum Filter check valve, made of stainless steel 1.4305
Electrical connection	Terminal connection, plug-type connection or internal AS-Interface with bus connection (see "Versions and ordering data", page 13)	
Weight approx.	450 g (without Type 3777 Connection Block/Booster Valve)	

[1]) II 2 G EEx ia IIC T6 according to EC Type Examination Certificate PTB 98 ATEX 2072
[2]) II 3 G EEx nA II T6 according to Statement of Conformity PTB 02 ATEX 2007 X

Technical data (continued from page 5)

Contact								
Type 3776	**-X1**	**-X2**	**-03**	**-07**	**-X5**	**-X6**
Version	Inductive pick-up			Inductive double proximity switch	Electric microswitch	
	SC 3,5-N0 with LED, yellow	SJ 3,5-SN	SB 3,5-E2 with LED, yellow	NCN3-F24R-N4 with LED, yellow	Silver contact	Gold contact
Switching function	Break contact	Break contact	Make contact (PNP)	2 break contacts	Switch-over contact	
Switching hysteresis	0.03 ... 0.2 mm	≤ 0.03 mm	0.4 ... 0.6 mm	0.3 ... 1.2 mm	Approx. 0.3 mm	
Angle of rotation	≤ 4.0°	≤ 1.1°	≤ 1.7°	≤ 4.0°	≤ 2.0°	
Travel	≤ 1.8 mm	≤ 0.5 mm	≤ 0.75 mm	≤ 1.8 mm	≤ 0.9 mm	
Switching point drift Angle of rotation$_{\Delta 50\ K}$	≤ 2.5°	≤ 0.5°	≤ 1.0°	≤ 2.5°	≤ 0.5°	
Travel$_{\Delta 50\ K}$	≤ 1.0 mm	≤ 0.2 mm	≤ 0.4 mm	≤ 1.0 mm	≤ 0.2 mm	
Nominal voltage U_0 Operating voltage U_B Loading capacity max.	8 V DC	8 V DC	10 ... 30 V DC	8 V DC	42 V AC/5.5 A, 42 V DC/0.25 A, 20 V DC/5.5 A	
Current consumption Metal tag undetected	3 mA (LED on)	3 mA	3 mA (LED off)	3 mA (LED on)		
Metal tag detected	1 mA (LED off)	1 mA	1 mA (LED on)	1 mA (LED off)		
Ambient temperature	−40 ... +80 °C	−45 ... +80 °C	−25 ... +70 °C	−20 ... +80 °C	−40 ... +80 °C	

Contact with type of protection EEx ia IIC [1]) for use in hazardous areas (zone 1, zone 21 is pending)										
Type 3776		**-11**		**-12**			**-17**		**-15**	**-16**
Permissible maximum values when connected to a certified intrinsically safe circuit										
Input voltage	U_i	16 V		16 V			15 V		45 V	
Input current	I_i	25 mA	52 mA	25 mA	52 mA		25 mA	52 mA	–	
Power dissipation	P_i	64 mW	169 mW	64 mW	169 mW		64 mW	169 mW	2 W	
Internal capacitance	C_i	150 nF		30 nF			100 nF		≈ 0	
Internal inductance	L_i	150 µH		100 µH			100 µH		≈ 0	
Ambient temperature in temperature class										
I_i = 52 mA [3]) P_i = 169 mW [3])	T6	−45 ... + 45 °C		−45 ... + 45 °C			−45 ... + 55 °C		T6	−20 ... +60 °C
	T5	−45 ... + 60 °C		−45 ... + 60 °C			−45 ... + 70 °C			
	T4	−45 ... + 80 °C		−45 ... + 80 °C			−45 ... + 85 °C		T5	−20 ... +70 °C
I_i = 25 mA [3]) P_i = 64 mW [3])	T6	−45 ... + 65 °C		−45 ... + 65 °C			−45 ... + 70 °C			
	T5	−45 ... + 80 °C		−45 ... + 80 °C			−45 ... + 80 °C		T4	−20 ... +80 °C
	T4	−45 ... +100 °C		−45 ... +100 °C			−45 ... +100 °C			

Contact with type of protection EEx nA II [2]) for use in hazardous areas (zone 2 or 22)						
Type 3776	**-81**	**-82**		**-87**	**-85**	**-86**
Ambient temperature in temperature class						
T6	−45 ... +60 °C	−45 ... +60 °C		−45 ... +60 °C	−45 ... +60 °C	
T5	−45 ... +70 °C	−45 ... +70 °C		−45 ... +70 °C	−45 ... +70 °C	
T4	−45 ... +80 °C	−45 ... +80 °C		−45 ... +80 °C	−45 ... +80 °C	

[1]) II 2 G EEx ia IIC T6 according to EC Type Examination Certificate PTB 98 ATEX 2072
[2]) II 3 G EEx nA II T6 according to Statement of Conformity PTB 02 ATEX 2007 X
[3]) Permissible maximum values of upstream isolating amplifiers

Technical data (continued from page 6)

Pilot valve							
Electrical data							
Type 3776		**-XXX1**	**-XXX2**	**-XXX3**	**-0XX8**	**-0XX6**	**-0XX5**
Nominal signal	U_N	6 V DC max. 27 V [1])	12 V DC max. 25 V [1])	24 V DC max. 32 V [1])	24 V AC max. 36 V [1])	115 V AC max. 130 V [1])	230 V AC max. 255 V [1])
	f_N				48 … 62 Hz		
Switching point "On"	$U_{+80\,°C}$	≥ 4.8 V	≥ 9.6 V	≥ 18 V	19 … 36 V	82 … 130 V	183 … 255 V
	$I_{+20\,°C}$	≥ 1.41 mA	≥ 1.52 mA	≥ 1.57 mA	≥ 1.9 mA	≥ 2.2 mA	≥ 2.6 mA
	$P_{+20\,°C}$	≥ 5.47 mW	≥ 13.05 mW	≥ 26.71 mW	≥ 0.04 VA	≥ 0.17 VA	≥ 0.46 VA
"Off"	$U_{-25\,°C}$	≤ 1.0 V	≤ 2.4 V	≤ 4.7 V	≤ 4.5 V	≤ 18 V	≤ 36 V
Impedance	$R_{+20\,°C}$	2.6 kΩ	5.5 kΩ	10.7 kΩ	approx. 10 kΩ	approx. 40 kΩ	approx. 80 kΩ
Temperature effect		0.4 %/°C	0.2 %/°C	0.1 %/°C	0.1 %/°C	0.05 %/°C	0.03 %/°C
Ambient temperature		−45 … +80 °C					
Pilot valve with type of protection EEx ia IIC [2]) for use in hazardous areas (zone 1, zone 21 is pending)							
Type 3776		**-1XX1**	**-1XX2**	**-1XX3**			
Permissible maximum values for connection to an intrinsically safe circuit							
Output voltage [4])	U_i	25 V / 27 V / 28 V / 30 V / 32 V					
Output current [4])	I_i	150 mA / 125 mA / 115 mA / 100 mA / 85 mA					
Power dissipation	P_i	250 mW	No limitation				
External capacitance	C_i	≈ 0					
External inductance	L_i	≈ 0					
Ambient temperature in temperature class							
	T6	−45 … +60 °C					
	T5	−45 … +70 °C					
	T4	−45 … +80 °C					
Pilot valve with type of protection EEx nA II [3]) for use in hazardous areas (zone 2 or 22)							
Type 3776		**-8XX1**	**-8XX2**	**-8XX3**			
Ambient temperature in temperature class							
	T6	−45 … +60 °C					
	T5	−45 … +70 °C					
	T4	−45 … +80 °C					
Pneumatic data							
Type 3776		**-XXX1**	**-XXX2**	**-XXX3**	**-0XX8**	**-0XX6**	**-0XX5**
K_{vs} value [5])		0.01					
Air supply	Medium	Instrument air, free of corrosive particles					
	Pressure	2.2 … 6.0 bar					
Output signal		1.5 … 2.5 bar					
Air consumption	"On"	≤ 10 l/h at 1.4 bar air supply					
	"Off"	≤ 60 l/h at 1.4 bar air supply					
Switching time		≤ 50 ms					
Temperature effect		0.4 %/°C					
Switching cycles		≥ 2×10^7					

[1]) Permissible maximum value at 100 % continued on-time. For Ex versions, the permissible maximum value U_i applies
[2]) II 2 G EEx ia IIC T6 according to EC Type Examination Certificate PTB 98 ATEX 2072
[3]) II 3 G EEx nA II T6 according to Statement of Conformity PTB 02 ATEX 2007 X
[4]) The U_i/I_i values apply to nominal signals 6/12/24 V DC
[5]) Air flow at $p_1 = 2.4$ bar and $p_2 = 1.0$ bar can be calculated according to the following equation: $Q = K_{vs} \times 36.22$, expressed in m^3/h

Technical data (continued from page 7)

Type 3776-0XXXX05XXX AS-Interface	
Version [1])	Internal AS-Interface for use in non-hazardous areas (see Mounting and Operating Instructions EB 3776-1 EN) Transmission of power supply and binary signals via a common two-wire cable Connection of maximum two Type SC 3,5-N0 or SJ 3,5-SN Inductive Pick-ups/ one Type NCN3-F24R-N4 Inductive Double Proximity Switch and two pilot valves Watchdog function "On"/"Off" Cable break and short circuit monitoring
Status indicators AS-Interface	 LED green "Power supply on" LED red "Cable break, short circuit or interruption of communication"
Initiators	LED yellow "Unattenuated"
Pilot valves	LED yellow "Actuated"
Power supply	24 V DC
Ambient temperature	−25 … +80 °C
Connection	Cable adapter M 20 × 1.5 for flat cable, 2 wires, or round plug connector M 12 × 1, 4 poles, made of brass, nickel-plated [2])

[1]) According to Certification Document No. 28001 of the AS-International Association
[2]) The female connector is not included in the delivery (see „Spare parts and accessories", page 14)

Technical data (continued from page 8)

Booster valve							
Type 3777	**-X030**	**-X632**	**-X65X**	**-X25X**	**-X35X**	**-X45X**	**-X55X**
Version	3/2-way function, spring-returned	spring-returned	5/2-way function, spring-returned	detented (2 positions)	5/3-way function, spring-centered, connections 2 and 4 closed	connections 2 and 4 vented	connections 2 and 4 to air supply
K_{vs} value [1]) without restrictors	0.20	–	0.30				
with restrictors	–	0.01 ... 0.18	0.01 ... 0.23				
Construction	Seat valve, soft-seated type	Piston valve, metal-to-metal seating, without overlap					
Material							
Enclosure	GD AlSi12, powder-coated, grayish beige RAL 1019						
Gaskets	Silicone rubber	Perbunan, nitrile butadiene rubber					
Filter	Polyethylene						
Screws	Stainless steel 1.4571						
Actuation [2])	Single-actuated			Double-actuated			
Operating medium	Instrument air, free of corrosive particles, or nitrogen						
Operating pressure	2.2 ... 6.0 bar						
Switching cycles	$\geq 10^7$	$\geq 2 \times 10^7$					
Ambient temperature	−45 ... +80 °C						
Connection	G (NPT) $^1/_4$						
Weight approx.	150 g	175 g					

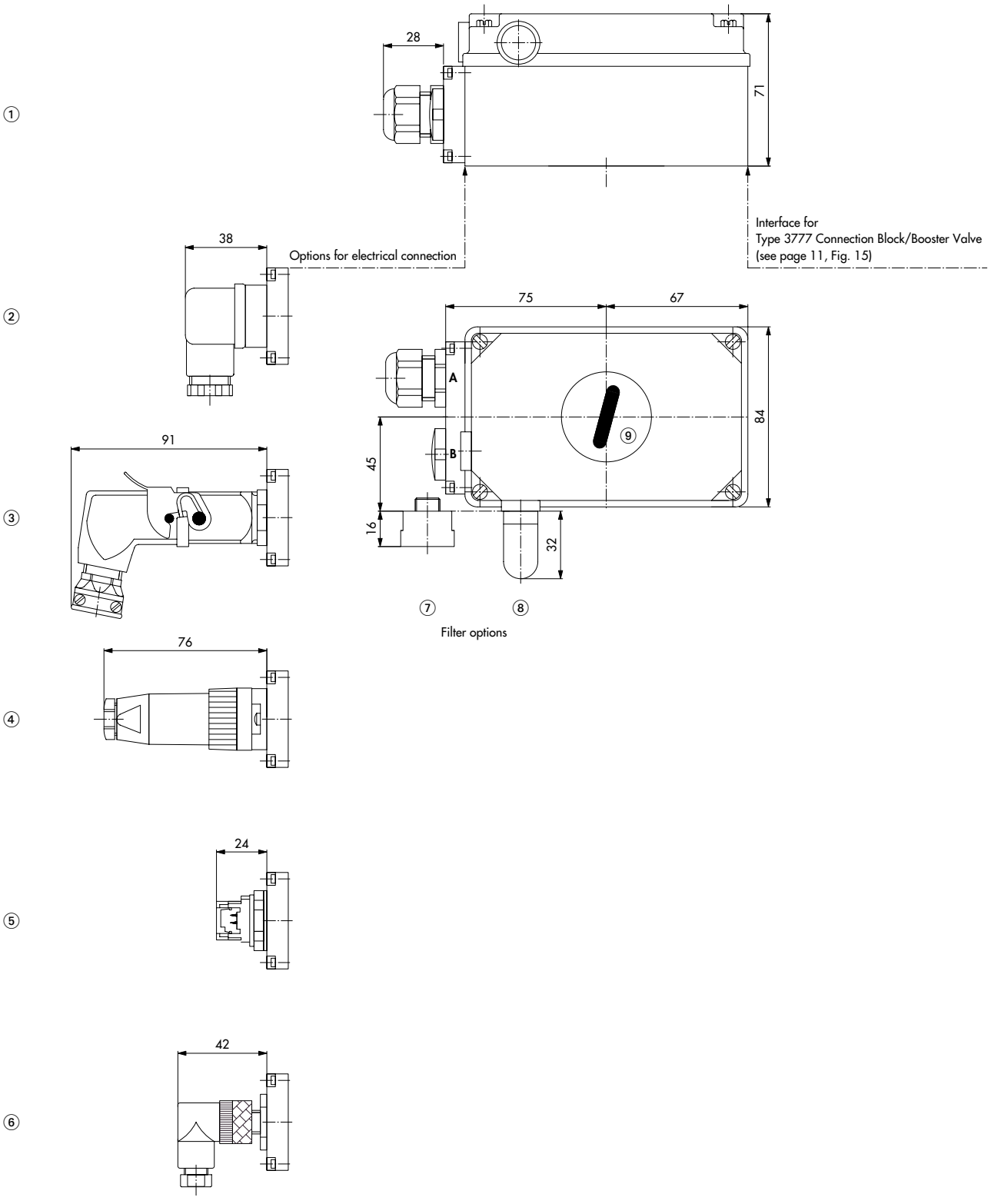
[1]) Air flow at $p_1 = 2.4$ bar and $p_2 = 1.0$ bar can be calculated according to the following equation: $Q = K_{vs} \times 36.22$, expressed in m^3/h
[2]) Actuation by one or two pilot valves

Connection block		
Type 3777	**-X010**	**-X020**
Version	Single [1])	Double [2])
K_{vs} value [3])	0.01	
Material		
Enclosure	GD AlSi 12, powder-coated, grayish beige RAL 1019	
Gaskets	Perbunan	
Screws	Stainless steel 1.4571	
Ambient temperature	−45 ... +80 °C	
Connection	G (NPT) $^1/_4$	
Weight approx.	150 g	

[1]) For single pneumatic actuation of an external Type 3756 3/2 or 5/2-way Booster Valve G (NPT) $^1/_4$
[2]) For double pneumatic actuation of an external Type 3756 5/2 or 5/3-way Booster Valve G (NPT) $^1/_4$
[3]) Air flow at $p_1 = 2.4$ bar and $p_2 = 1.0$ bar can be calculated according to the following equation: $Q = K_{vs} \times 36.22$, expressed in m^3/h

Dimensions

Type 3776 Limit Switch

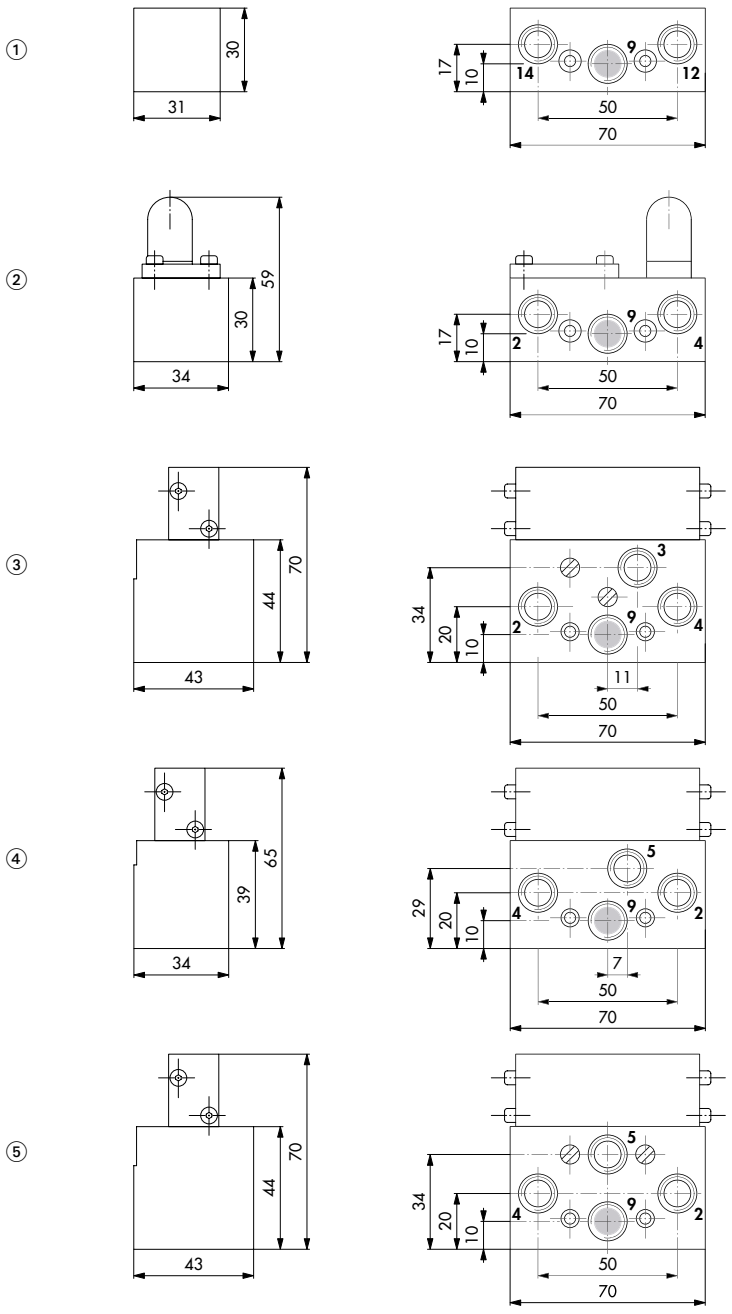


① Cable gland M 20 × 1.5
② Plug-type connector according to EN 175301-803
③ Plug-type connector (manufactured by Harting)
④ Plug-type connector (manufactured by Binder)
⑤ Cable adapter M 20 × 1.5 for flat cable (AS-Interface)
⑥ Round plug connector M 12 × 1 (AS-Interface)
⑦ Filter check valve
⑧ Filter
⑨ Indicating cap (not used on linear actuators)

Fig. 14 · Dimensions in mm

Dimensions

Type 3777 Connection Block/Booster Valve



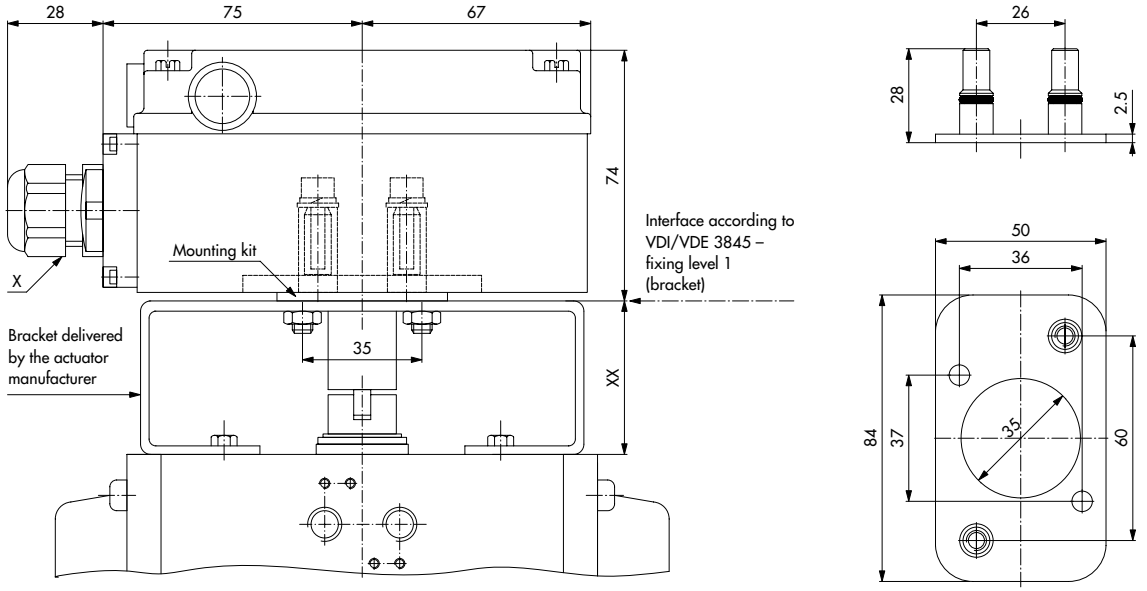
All connections with tapped holes G (NPT) $^1/_4$

Type 3777 Connection Block	**Order No.**
① Connection block, single	**3777-X010**
Connection block, double	**3777-X020**
Type 3777 Booster Valve	**Order No.**
② 3/2-way function, spring-returned	**3777-X030**
③ 3/2-way function, spring-returned, 1 supply air/1 exhaust air restrictor	**3777-X632**
④ 5/2-way function, spring-returned	**3777-X650**
5/2-way function, detented (2 positions)	**3777-X250**
5/3-way function, spring-centered (connections 2 and 4 closed)	**3777-X350**
5/3-way function, spring-centered (connections 2 and 4 vented)	**3777-X450**
5/3-way function, spring-centered (connections 2 and 4 to air supply)	**3777-X550**
⑤ 5/2-way function, spring-returned, 2 exhaust air restrictors	**3777-X653**
5/2-way function, detented (2 positions), 2 exhaust air restrictors	**3777-X253**
5/3-way function, spring-centered (connections 2 and 4 closed), 2 exhaust air restrictors	**3777-X353**
5/3-way function, spring-centered (connections 2 and 4 vented), 2 exhaust air restrictors	**3777-X453**
5/3-way function, spring-centered (connections 2 and 4 to air supply), 2 exhaust air restrictors	**3777-X553**

Fig. 15 · Dimensions in mm

Dimensions

Attachment to rotary actuators according to VDI/VDE 3845 – fixing level 1



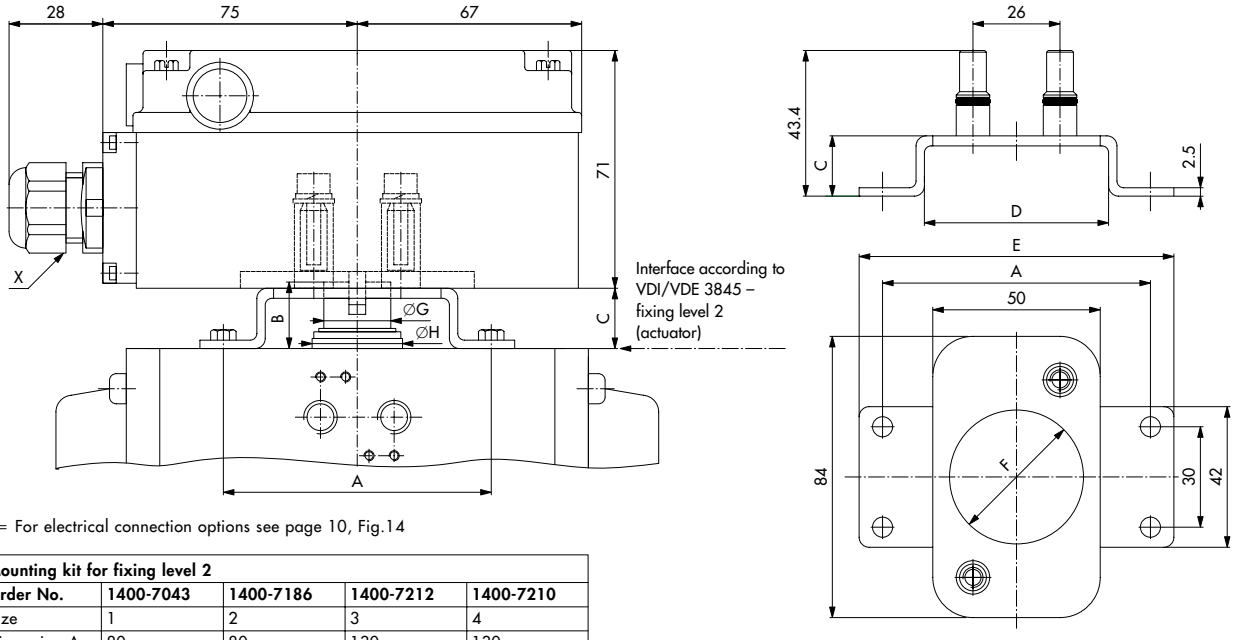
X = For electrical connection options see page 10, Fig.14
XX = Dimension depends on manufacturer

Mounting kit for fixing level 1
Order No. 1400-7041

Fig. 16 · Dimensions in mm

Dimensions

Attachment to rotary actuators according to VDI/VDE 3845 – fixing level 2



X = For electrical connection options see page 10, Fig.14

Mounting kit for fixing level 2				
Order No.	**1400-7043**	**1400-7186**	**1400-7212**	**1400-7210**
Size	1	2	3	4
Dimension A	80	80	130	130
Dimension B	20	30	30	50
Dimension C	18	28	28	48
Dimension D	55	55	105	105
Dimension E	94	94	144	144
Dimension F	40	40	48	48
Dimension G	≤ (F−1)			
Dimension H	≤ (D−1)			

Fig. 17 · Dimensions in mm

Versions and ordering data

Type 3776 Limit Switch with Type 3777 Connection Block/Booster Valve	**Order No. 3776-**	. . . . **3777-** . . . .
Type 3776 Limit Switch	**Order No. 3776-**	. . . .
Type of protection	Without explosion protection (max. +80 °C)	0
	II 2 G EEx ia IIC T6/T5/T4 [1]) (max. +60/+70/+80 °C)	1
	II 3 G EEx nA II T6/T5/T4 [2]) (max. +60/+70/+80 °C)	8
Contact Versions	Inductive pick-up Type SC 3,5-N0 with LED, 2 wires (min. −40 °C)	1
	Type SJ 3,5-SN, 2 wires (min. −45 °C)	2
	Type SB 3,5-E2 with LED, 3 wires [3]) (−25 … +70 °C)	0 3
	Inductive Double Proximity Switch Type NCN3-F24R-N4 with LED, 2 × 2 wires (min. −20 °C)	7
	Electric microswitch, 3 wires [3]) [4]), with switch-over contact, made of silver (min. −40 °C)	5
	with switch-over contact, made of gold (min. −40 °C)	6
Quantity	1 inductive or electric limit switch, angle of rotation 0° … 100°, adjustable [5])	1
	2 inductive or electric limit switches, angle of rotation 0° … 100°, adjustable [5])	2
	3 inductive or electric limit switches, angle of rotation 0° … 100°, adjustable [5])	3
	1 inductive double proximity switch, angle of rotation 70°	5
	angle of rotation 90°	6
Pilot valve Nominal signal	Without pilot valve	0 0
	6 V DC, power consumption 5.47 mW	1
	12 V DC, power consumption 13.05 mW	2
	24 V DC, power consumption 26.71 mW	3
	230 V AC, power consumption 0.86 VA	0 . . 5
	115 V AC, power consumption 0.42 VA	0 . . 6
	24 V AC, power consumption 0.10 VA	0 . . 8
	Special voltage	9
Quantity/ manual override	Without pilot valve	0 0
	1 pilot valve without manual override	1
	with pushbutton underneath enclosure cover	2
	with pushbutton switch underneath enclosure cover	3
	2 pilot valves [3]) without manual override	5
	with pushbutton underneath enclosure cover	6
	with pushbutton switch underneath enclosure cover	7
Electrical connection Terminal connection	Via terminal, 12 poles, and flange plate with 2 tapped holes M 20 × 1.5	
	without cable gland	0 0 0
	with 1 cable gland made of polyamide, black (min. −20 °C)	0 1 0
	with 2 cable glands made of polyamide, black (min. −20 °C)	0 1 1
	with 1 cable gland made of polyamide, blue (min. −20 °C)	0 1 2
	with 2 cable glands made of polyamide, blue (min. −20 °C)	0 1 3
	with 1 cable gland made of brass, nickel-plated, colorless (min. −45 °C)	0 1 4
	with 2 cable glands made of brass, nickel-plated, colorless (min. −45 °C)	0 1 5
	with 1 EExe cable gland (manufactured by CEAG) made of polyamide, black (min. −20 °C)	0 1 7
	with 2 EExe cable glands (manufactured by CEAG) made of polyamide, black (min. −20 °C)	0 1 8
Plug-type connection	1 male connector according to EN 175301-803, 4 poles, made of polyamide, black [5]) [7]) (min. −20 °C)	0 2 0
	2 plug-type connectors according to EN 175301-803, 4 poles, made of polyamide, black [5]) [8]) (min. −20 °C)	0 2 1
	1 male connector (manufactured by Harting), 7 poles, made of aluminum, silvery gray [5]) [7]) (min. −45 °C)	0 3 0
	2 male connectors (manufactured by Harting), 7 poles, made of aluminum, silvery gray [5]) [7]) (min. −45 °C)	0 3 1
	1 round plug connector (manufactured by Binder), 7 poles, made of polyamide, black [6]) [7]) (min. −20 °C)	0 3 2
	2 round plug connectors (manufactured by Binder), 7 poles, made of polyamide, black [6]) [8]) (min. −20 °C)	0 3 3
AS-Interface [9]) with bus connection	Cable adapter M 20 × 1.5 for flat cable, 2 wires (min. −25 °C)	0 . . . . . 0 5 0
	Round plug connector M 12 × 1, 4 poles, made of brass, nickel-plated [7]) (min. −25 °C)	0 . . . . . 0 5 1
Degree of protection IP 54	Filter, made of polyethylene (at K_{vs} value 0.20) (min. −20 °C)	1 1
IP 65	Filter check valve, made of polyamide (at K_{vs} value 0.01) (min. −20 °C)	2 1
	Filter check valve, made of stainless steel (at K_{vs} value 0.01) (min. −45 °C)	3 1
Type 3777 Connection Block/Booster Valve	**Order No.**	**3777-** . . . .
Connection	G 1/4	3
	NPT 1/4	8
Version Connection block	Single, K_{vs} value 0.01 [10])	0 1 0
	Double, K_{vs} value 0.01 [11])	0 2 0
Booster valve	3/2-way function, spring-returned, K_{vs} value 0.20	0 3 0
	3/2-way function, spring-returned, 1 supply air/1 exhaust air restrictor, K_{vs} value 0.01 … 0.18, adjustable	6 3 2
	5/2-way function, spring-returned, K_{vs} value 0.30	6 5
	5/2-way function, detented (2 positions), K_{vs} value 0.30	2 5
	5/3-way function, spring-centered (connections 2 and 4 closed), K_{vs} value 0.30	3 5
	5/3-way function, spring-centered (connections 2 and 4 vented), K_{vs} value 0.30	4 5
	5/3-way function, spring-centered (connections 2 and 4 to air supply), K_{vs} value 0.30	5 5
Restrictors	Without restrictors	0
	1 supply air/1 exhaust air restrictor, K_{vs} value 0.01 … 0.18, adjustable	6 3 2
	2 exhaust air restrictors, K_{vs} value 0.01 … 0.23, adjustable	. 5 3

1) According to EC Type Examination Certificate PTB 98 ATEX 2072 and GOST Certificate 2002.C312 (1 Ex ia IIC T6 X)
2) According to Statement of Conformity PTB 02 ATEX 2007 X
3) With two pilot valves, a maximum of two 3-wire contacts can be used
4) Maximum permissible operating voltage 50 V
5) Angle of rotation 0° to 180° on request
6) Maximum permissible operating voltage 230 V
7) The female connector is not included in the delivery (see „Spare parts and accessories", page 14)
8) The female connectors are included in the delivery
9) According to Certification Document No. 28001 of the AS-International Association
10) For pneumatic single actuation of an external Type 3756 3/2 or 5/2-way Booster Valve G (NPT) 1/4
11) For pneumatic double actuation of an external Type 3756 5/2 or 5/3-way Booster Valve G (NPT) 1/4

Spare parts and accessories

Order No.	Designation
0790-6658	Female connector according to EN 175301-803, type A, made of polyamide, black, IP 65
1400-8298	Female connector (manufactured by Harting), 7 poles, made of aluminum, silvery gray, IP 65
8801-2810	Sensor connecting cable, 2 wires, length 3 m, blue, with angle connector M 12 × 1, 4 poles, IP 68
8831-0716	Female connector (manufactured by Binder), 7 poles, made of PBT GV, black, IP 67
8831-0865	Female connector M 12 × 1, 4 poles, angle type, made of polyamide, black, IP 67
8808-0138	Cable gland M 20 × 1.5 made of brass, nickel-plated
8808-0178	EExe cable gland M 20 × 1.5 (manufactured by CEAG) made of polyamide, black
8808-1011	Cable gland M 20 × 1.5 made of polyamide, black
8808-1012	Cable gland M 20 × 1.5 made of polyamide, blue
0310-2149	Adapter M 20 × 1.5 / NPT $^1/_2$i made of aluminum, powder-coated, grayish-beige RAL 1019
1089-1159	Enclosure cover made of polycarbonate, transparent, connection G $^1/_4$ for filter/filter check valve
1890-4663	Platine for AS-Interface
3994-0158	Cable break protection device with enclosure for top hat rail 35, IP 20 (for Type 3776-XXX1 with 6 V DC pilot valve)
1790-7253	Filter check valve made of stainless steel, connection G $^1/_4$, IP 65
1790-7408	Filter check valve made of polyamide, connection G $^1/_4$, IP 65
8504-0066	Filter made of polyethylene, connection G $^1/_4$, IP 54
	Mounting kits
1400-7216	Mounting kit made of stainless steel for Type 3278 Rotary Actuators, actuator size 160 cm^2
1400-7217	Mounting kit made of stainless steel for Type 3278 Rotary Actuators, actuator size 320 cm^2
1400-7041	Mounting kit for rotary actuators according to VDI/VDE 3845 – fixing level 1
0469-0017	Driver for mounting kit with fixing level 1
	Mounting kit made of stainless steel for rotary actuators according to VDI/VDE 3845 – fixing level 2
1400-7043	Size 1, hole spacing A = 80 mm, shaft stub length B = 20 mm
1400-7186	Size 2, hole spacing A = 80 mm, shaft stub length B = 30 mm
1400-7212	Size 3, hole spacing A = 130 mm, shaft stub length B = 30 mm
1400-7210	Size 4, hole spacing A = 130 mm, shaft stub length B = 50 mm
1400-7220	Mounting kit made of stainless steel for Type 3277 Linear Actuators, actuator size 240/350 cm^2
1400-7221	Mounting kit made of stainless steel for Type 3277 Linear Actuators, actuator size 700 cm^2
1400-7219	Mounting kit made of stainless steel for Type 3277-5 Linear Actuators (external)
1400-7222	Mounting kit made of stainless steel for Type 3277-5 Linear Actuators (internal), connection G $^1/_4$
1400-7223	Mounting kit made of stainless steel for Type 3277-5 Linear Actuators (internal), connection NPT $^1/_4$
0430-1544	Seal hose for attachment to Type 3277-5 Linear Actuators (internal)
1400-7730	Mounting kit made of stainless steel for Type 3241 Control Valve, nominal size DN 15 … 100
1400-7735	Mounting kit made of stainless steel for Type 3351 Valve, nominal size DN 15 … 50
1400-7736	Mounting kit made of stainless steel for Type 3351 Valve, nominal size DN 65 … 80
1400-7737	Mounting kit made of stainless steel for Type 3351 Valve, nominal size DN 100
1400-XXXX	Mounting kit made of stainless steel for stem valves, nominal size DN 15 … 150 (on request)
1400-XXXX	Mounting kit made of stainless steel for Series 250 and 280, nominal size DN 15 … 400 (on request)
1400-XXXX	Mounting kit made of stainless steel for Types 324X Control Valves, nominal size DN 200 … 300, and Types 325X/328X Control Valves, nominal size DN 15 … 400 (on request)

(Specifications subject to change without notice.)

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