

MOUNTING AND OPERATING INSTRUCTIONS



EB 8365 EN

Translation of original instructions



Type 4746 Electric or Pneumatic Limit Switch

Edition January 2025

CE Ex
certified

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersaleservice@samsongroup.com).



Documents relating to the device, such as the mounting and operating instructions, are available on our website at www.samsongroup.com > **Downloads > Documentation.**

Definition of signal words

DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

1	Safety instructions and measures	1-1
1.1	Notes on possible severe personal injury	1-4
1.2	Notes on possible personal injury	1-4
1.3	Warnings on the device.....	1-5
2	Markings on the device	2-1
2.1	Nameplate	2-1
2.1	Article code.....	2-2
3	Design and principle of operation	3-1
3.1	Type 4746-x2 Inductive Limit Switch	3-1
3.1	Type 4746-x3 Electric Limit Switch.....	3-1
3.2	Type 4746-04 Pneumatic Limit Switch.....	3-1
3.1	Technical data	3-3
3.1	Dimensions in mm.....	3-7
4	Shipment and on-site transport	4-1
4.1	Accepting the delivered goods	4-1
4.2	Removing the packaging from the limit switch	4-1
4.3	Transporting the limit switch	4-1
4.4	Storing the limit switch.....	4-1
5	Installation	5-1
5.1	Installation conditions	5-1
5.2	Preparation for installation.....	5-1
5.3	Mounting the limit switch	5-2
5.3.1	Attachment to valve with cast yoke	5-2
5.3.2	Attachment to valve with rod-type yoke.....	5-2
5.3.3	Attachment to Type 3591 Valve.....	5-4
5.3.4	Attachment on positioners.....	5-6
5.4	Electrical connections	5-7
5.4.1	Switching amplifier for Type 4746-x2	5-8
5.5	Pneumatic connection for Type 4746-04	5-8
5.6	Mounting accessories	5-9
6	Start-up	6-1
6.1	Adjusting the switching point	6-1
6.1.1	Type 4746-x2.....	6-1
6.1.2	Type 4746-x3 and Type 4746-04	6-3
7	Operation	7-1

Contents

8	Malfunction	8-1
8.1	Emergency action	8-1
9	Servicing	9-1
9.1	Servicing explosion-protected devices	9-2
9.2	Maintenance and calibration	9-2
9.3	Periodic inspection and testing of the limit switch	9-2
10	Decommissioning	10-1
11	Removal	11-1
12	Repairs	12-1
12.1	Returning devices to SAMSON	12-1
13	Disposal	13-1
14	Certificates	14-1
14.1	Certificates	14-1
15	Appendix	15-1
15.1	After-sales service	15-1

1 Safety instructions and measures

Intended use

The SAMSON Type 4746 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. The device is designed to operate under exactly defined conditions (e.g. temperature). Therefore, operators must ensure that the limit switch is only used in applications where the operating conditions correspond to the technical data. In case operators intend to use the limit switch in applications or conditions other than those specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

➔ Refer to the technical data for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The Type 4746 Limit Switch is **not** suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing maintenance activities not described in these instructions

Qualifications of operating personnel

The limit switch must be mounted, started up and serviced by fully trained and qualified personnel only; the accepted industry codes and practices must be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Explosion-protected versions of this device must be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Safety instructions and measures

Personal protective equipment

No personal protective equipment is required for the direct handling of the limit switch. Work on the control valve may be necessary when mounting or removing the device.

- Observe the requirements for personal protective equipment specified in the valve documentation.
- Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Warning against residual hazards

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the control valve by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warnings and caution notes in these mounting and operating instructions, especially for installation, start-up and service work.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the specified hazard statements, warnings and caution notes. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

Devices with a CE marking fulfill the following requirements:

- Type 4746: 2011/65/EU, 2015/863/EU, 2014/30/EU
- Type 4746-12: 2011/65/EU, 2014/30/EU, 2014/34/EU
- Type 4746-13: 2011/65/EU, 2014/30/EU, 2014/34/EU
- Type 4746-82: 2011/65/EU, 2014/30/EU, 2014/34/EU
- Type 4746-83: 2011/65/EU, 2014/30/EU, 2014/34/EU

The declarations of conformity are included at the back of the mounting and operating instructions.

Referenced documents

The following documents apply in addition to these mounting and operating instructions:

- The mounting and operating instructions of the components on which the limit switch is mounted (valve, actuator, valve accessories etc.).

1.1 Notes on possible severe personal injury

DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

Incorrect installation, operation or maintenance of the limit switch in potentially explosive atmospheres may lead to ignition of the atmosphere and ultimately to death.

- For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection
- Installation, operation or maintenance of the limit switch is to be performed only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

1.2 Notes on possible personal injury

WARNING

Incorrect electrical connection will render the explosion protection unsafe.

- Adhere to the terminal assignment and observe correct polarity.
- Do not undo the enameled screws.
- Do not exceed the maximum permissible values (U_i , I_i , P_i , C_i , L_i) specified in the EC type examination certificates when interconnecting intrinsically safe electrical equipment.

Sudden loud noise when the limit contact switches.

The pneumatic limit switch may create a loud noise when the limit contact switches. This can cause hearing damage.


- Wear hearing protection when working near the valve.

Risk of personal injury due to incorrect operation, use or installation as a result of information on the limit switch being illegible.

Over time, markings, labels and nameplates on the limit switch may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- Keep all relevant markings and inscriptions on the device in a constantly legible state.
- Contact SAMSON when nameplates or labels are damaged, missing or incorrect to renew them.

1.3 Warnings on the device

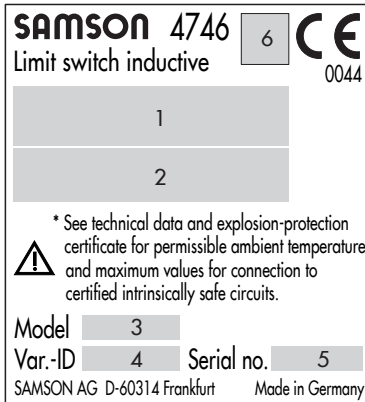
Warning symbols	Meaning of the warning
	<p>Warning against sudden loud noise A loud noise may occur when the pneumatic limit contact switches. This can cause hearing damage.</p>

2 Markings on the device

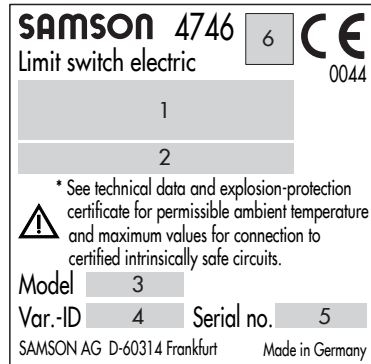
2.1 Nameplate

Examples

Explosion-protected version with inductive limit contacts



Explosion-protected version with electric limit contacts



- 1 Degree of protection
- 2 Maximum values of electric data
 - U_i Input voltage
 - I_i Input current
 - P_i Input power
 - C_i Internal capacitance
 - L_i Internal inductance
- 3 Model number
- 4 Configuration ID
- 5 Serial number
- 6 DataMatrix code (if applicable)

Markings on the device

2.1 Article code

Limit switch (device index .07 or higher)	Type 4746-	x	x	x	x	x	x	x	0	x	x	x	x
Explosion protection													
Without	0												
ATEX II 2G Ex ia IIC T6 Gb	1												
CSA Ex ia IIC T6 or T5; Class I, Zone 0; Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III Class I, Div. 2, Groups A,B,C,D T6/T5/T4; Class II, Div. 2, Groups E,F,G; Class III	3												
FM IS Class I,II,III, Div.1, GP A,B,C,D,E,F,G, T* Type 3R IS Class I, Zn 0, AEx ia IIC, T* NI Class I, Div.2, GP A,B,C,D,F,G T*													
ATEX II 3G Ex nA II T6	8												
Design													
Inductive		2				1/2							
Electric		3				2							
Pneumatic	0	4				2							
Contacts													
Proximity switch SC3,5-NO-YE (NAMUR NC contact) ¹⁾		2	0	0		1	0						
Proximity switch SC3,5-NO-WH (NAMUR NC contact), larger hysteresis		2	0	1		1	0						
Proximity switch SJ3,5-SN (NAMUR NC contact in safety circuit)		2	1	0		1	0						
Proximity switch SJ3,5-S1N (NAMUR NO contact in safety circuit)		2	1	1		1	0						
SAIA, electric microswitch XGK 3 (silver contacts)		3	2	0	2	1	0						
SAIA, electric microswitch XGK3-81 (gold-plated contacts)		3	2	1	2	1	0						
Pneumatic microswitch	0	4	4	0	2	0							
Proximity switch SB3,5-E2 (three-wire switch, NO contact)	0	2	8	1	2	1	0						
Switching elements													
With one switching element						1							
With two switching elements						2							
Electrical connection													
Without	0	4	4	0		0							
Plastic cable gland M20x1.5, black						1	0						
Pneumatic connections													
Without							0						
ISO 221/1-G 1/8	0	4	4	0		0	1						
1/8 -27 NPT	0	4	4	0		0	2						

Limit switch (device index .07 or higher)		Type 4746-												
		x	x	x	x	x	x	x	x	0	x	x	x	x
Special versions														
Without											0	0	0	
CCC Ex/NEPSI	Ex ia IIC T4...T6 Gb	1	2								0	0	9	
CCC Ex/NEPSI	Ex ec IIC T4...T6 Gc	8	2								0	1	0	
EAC	1Ex ia IIC T6...T4 Gb X	1	2/3								0	1	3	
KCS	Ex ia IIC T6/T5/T4	1	2								0	1	5	
Compatibility with paint														
Without														0
Free of substances that impair paint adhesion														1

Limit switch (device index .06 or lower)		Type 4746-			
		x	x	x	x
Design					
Inductive, without explosion protection		1			
Inductive, Ex ib IIC T6		2			
Electric		3			
Pneumatic		4			
Electrical connection/lever					
Without			0		
Cable gland, lever I (device index .04 or higher without lever)			1		
Cable gland, lever for positioner attachment			2		
½" USA cable gland, lever I			3		
½" USA cable gland, lever for positioner attachment			4		
Contacts					
SJ3,5-N ²⁾				0	
SJ3,5-SN				1	
SAIA - electric microswitch XGK 3				2	
Pneumatic microswitch with ISO 228/1-G ½ connecting thread				3	
Pneumatic microswitch with ½-27 NPT connecting thread				4	
SJ3,5-N ¹⁾ (white dot of paint), max. hysteresis with 100 mm lever = 0.6 mm				5	
Microswitch (gold contacts)				6	
SJ3,5-E2 with LED (three-wire switch) without explosion protection, NO contact		1		8	
SB3,5-E2 (three-wire switch) without explosion protection, NO contact		1		9	

Switching elements	
With one switching element	1
With two switching elements	2

¹⁾ Type 4746-3200/3201 only with FM certification

²⁾ SJ3,5-N replaced by SC3,5-N0-YE and SC3,5-N0-WH since 2007

i Note

When replacing devices with index .00 to .03, a mounting kit with lever must also be ordered (see the 'Installation' chapter).

3 Design and principle of operation

The limit switches are attached to pneumatic control valves as well as to Type 4765 and Type 4763 Positioners.

These limit switches have either inductive, electric or pneumatic contacts. They issue a signal when the valve travel exceeds or falls below a limit, especially when a control valve has reached its final position. This signal is transmitted, e.g. to an alarm or indicating system.

The valve travel is transmitted either directly to the pin (1.1) and lever (1) of the limit switch by the plate (10) or by a coupling pin when a positioner is attached. The linear travel is converted into a rotary motion by the shaft (2).

3.1 Type 4746-x2 Inductive Limit Switch

In this version, the shaft (2) carries two switch cases (3) with adjustable metal tags (4.1) for non-contact activation of the integrated proximity switches (5). For the operation of inductive limit contacts (except for Type 4746-0281), appropriate switch amplifiers must be integrated into the output circuit.

The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

3.1 Type 4746-x3 Electric Limit Switch

In this version, the shaft (2) carries two switch cases (3) with adjustable cam disks (4.2). Each cam disk activates an electric double-throw switch (7) over the roller (6.1), which is attached to the switch lever (6). The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

3.2 Type 4746-04 Pneumatic Limit Switch

In this version, the shaft (2) carries two switch cases (3) with adjustable cam disks (4.2). Each cam disk activates a nozzle/flapper system in the pneumatic switch (8).

Whenever the cam disk (4.2) activates the switch lever (6) over the roller (6.1), the nozzle in the pneumatic switch (8) is opened and the supply air is switched from the microswitch (9) through to port A₁ or A₂.

The nozzle is closed in the pneumatic switch (8) and the supply air applied to the microswitch is cut off first when the cam disk has released the switch lever (6). As a result, pressure is no longer applied to port A₁ or A₂.

The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

Design and principle of operation

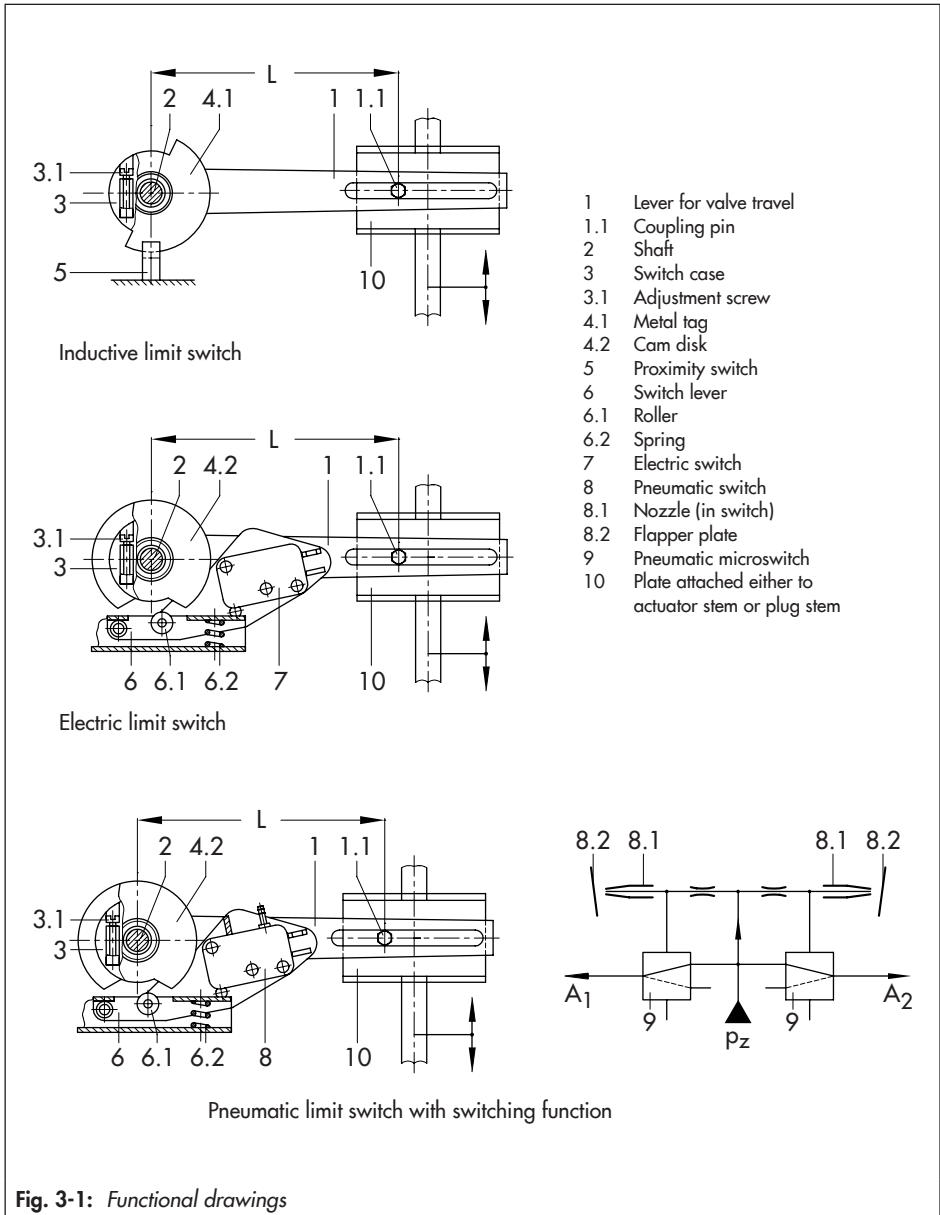


Fig. 3-1: Functional drawings

3.1 Technical data

Table 3-1: General data

Inductive limit switch	Type 4746-x2			Type 4746-0281
Control circuit	Switching amplifier according to EN 60947-5-6			Three-wire switch, operating voltage 10 to 30 V
Proximity switch	SC3,5-N0-YE ²⁾ SC3,5-N0-WH ²⁾	SJ3,5-SN	SJ3,5-S1N	SB3,5-E2
Permissible ambient temperature ¹⁾	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
With metal cable gland	-40 to +100 °C	-50 to +100 °C	-40 to +100 °C	-25 to +70 °C
Switching function	NC contact	NC contact	NO contact	NO contact
Electrical connections	One M20x1.5 cable gland for 5.5 to 13 mm clamping range, screw terminals for 0.2 to 2.5 mm ² wire cross-sections			
Degree of protection	IP 65			
Weight	Approx. 0.7 kg			
Type 4746-x3 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: 220 V, 6.9 A, DC voltage: 220 V, 0.25 A × 20 V, 6.9 A			
Permissible ambient temperature ¹⁾	-20 to +85 °C			
With metal cable gland	-40 to +85 °C			
Electrical connections	One M20x1.5 cable gland for 5.5 to 13 mm clamping range, screw terminals for 0.2 to 2.5 mm ² wire cross-sections			
Degree of protection	IP 65			
Weight	Approx. 0.7 kg			
Type 4746-04 Pneumatic Limit Switch				
Switching element	Pneumatic limit contact with downstream pneumatic microswitch			
Supply	Supply air 1.4 bar (20 psi), can be briefly overloaded up to 4 bar (60 psi)			
Air consumption	0.04 m _n ³ /h			
Output	0 or 1.4 bar (20 psi)			
Air capacity	One switch closed: 0.7 m _n ³ /h · Two switches closed: 1.0 m _n ³ /h			
Permissible ambient temperature	-20 to +60 °C			
Degree of protection	IP 54			
Weight	Approx. 0.75 kg			

Design and principle of operation

Materials	
Housing and cover	Powder-coated aluminum
Lever and shaft	1.4571
Cable gland	M20x1.5, black polyamide
Attachment	
Travel range	
According to IEC 60534-6	Lever I: 7.5 to 60 mm · Lever II: 60 to 180 mm
Attachment to Type 4763/4765 Positioner	Travel same as positioner
Conformity	
CE	

1) Observe the limits specified in the EC-type examination certificate.

2) SJ3,5-N replaced by SC3,5-N0-YE and SC3,5-N0-WH since 2007

Table 3-2: Hysteresis (dead band)

Type 4746	-x2	-x3	-04
Lever length L	Hysteresis		
50 mm	0.15 (0.25 ¹⁾) mm	0.6 mm	0.75 mm
120 mm	0.30 (0.55 ¹⁾) mm	1.0 mm	1.5 mm

1) Special version

Table 3-3: Type 4746-1 with type of protection Ex ia (ATEX)

Maximum values for connection to certified intrinsically safe circuits


Limit Switch	Type 4746-12								Type 4746-13	
	Inductive								Electric	
Limit contacts	SC3,5-N0-YE 4746-1200		SJ3,5-N 4746-1200 (old)		SC3,5-N0-WH 4746-1201		SJ3,5-SN 4746-1210 SJ3,5-S1N 4746-1211		Microswitch SPDT	
U _i	V	16		16		16		16		45
I _i	mA	25	52	25	52	25	52	25	52	–
P _i	mW	64	169	64	169	64	169	64	169	2000
C _i ¹⁾	nF	150		50		150		30		Negligibly small
L _i ²⁾	µH	150		250		150		100		

Limit Switch	Type 4746-12								Type 4746-13	
	Inductive								Electric	
Limit contacts	SC3,5-N0-YE 4746-1200	SJ3,5-N 4746-1200 (old)		SC3,5-N0-WH 4746-1201		SJ3,5-SN 4746-1210 SJ3,5-S1N 4746-1211		Microswitch SPDT		
Temperature classes	Ambient temperature range according to EC-type examination certificate (technical data specified in above table additionally apply)									
T4	°C	≤100	≤75	≤100	≤89	≤100	≤89	≤100	≤89	-45 to +80
T5	°C	≤80	≤55	≤81	≤60	≤81	≤60	≤81	≤60	-45 to +70
T6	°C	≤65	≤40	≤66	≤45	≤66	≤45	≤66	≤45	-45 to +60


1) Effective internal capacitance

2) Effective internal inductance

Table 3-4: Summary of explosion protection approvals

Type	Certification	Type of protection/description
4746-1	 1) Number PTB 98 ATEX 2114 Date 2020-04-02	II 2G Ex ia IIC T6 Gb
	CCC Ex Number 2021322307003671 Date 2023-04-29 Valid until 2026-01-25	Ex ia IIC T4...T6 Gb
	ERC Number RU C-DE. HA65.B.00615/20 Date 2020-06-08 Valid until 2025-05-13	IEx ia IIC T6...T4 Gb X
	KCS Number 13-KB4BO-0038 Date 2013-01-31 Valid until 2026-01-31	Ex ia IIC T6/T5/T4
	NEPSI Number GYJ23.1090X Date 2023-04-29 Valid until 2028-04-28	Ex ia IIC T4...T6 Gb
	TR CMU 1055 Number ZETC/36/2021 Date 2021-07-26	Module B II 2G Ex ia IIC T6 Gb

Design and principle of operation

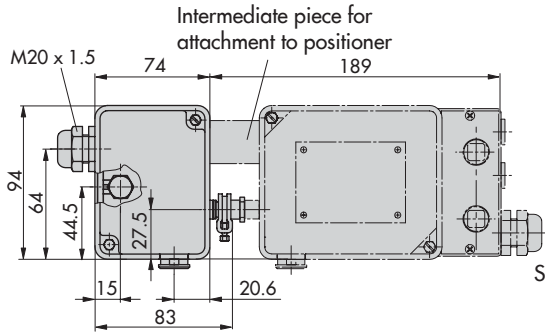
Type	Certification	Type of protection/description
4746-1	Number ZETC/027/2024	Module D
	Date 2024-04-22	
	Valid until 2027-08-24	
4746-3	CSA Number 1607226 Date 2024-08-16	Ex ia IIC T6 or T5; Class I, Zone 0 Class I, Div. 1, Groups A,B,C,D Class II, Div. 1, Groups E,F,G Class III Class I, Div. 2, Groups A,B,C,D T6/T5/T4 Class II, Div. 2, Groups E,F,G Class III
	FM Number FM24US0232 Date 2025-01-02	IS Class I,II,III, Div.1, GP A,B,C,D,E,F,G, T* Type 3R IS Class I, Zn 0, AEx ia IIC, T* NI Class I, Div.2, GP A,B,C,D,F,G T* * See Addendum
4746-8	 2) Number PTB 02 ATEX 2012 X Date 2002-04-05	II 3G Ex nA II T6
	CCC Ex Number 2021322307003671 Date 2023-04-29 Valid until 2026-01-25	Ex ec IIC T4...T6 Gc
	NEPSI Number GYJ23.1090X Date 2023-04-29 Valid until 2028-04-28	Ex ec IIC T4...T6 Gc
	TR CMU 1055 Number ZETC/36/2021 Date 2021-07-26	Module B II 3G Ex nA II T6
	TR CMU 1055 Number ZETC/111/2021 Date 2021-08-25 Valid until 2024-08-24	Module D

1) EC type examination certificate

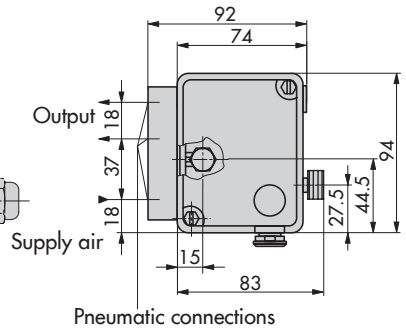
2) Statement of conformity

3.1 Dimensions in mm

Type 4746-x2 and Type 4746-x3
 Pneumatic connection for separate air supply
 Tapped hole G 1/8

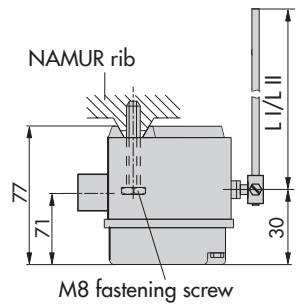
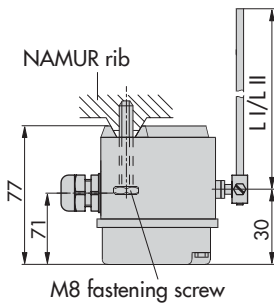


Type 4746-04
 Pneumatic connections, tapped hole G 1/8
 or 1/8 NPT



Lever length L I/L II

Lever I: 149 mm
 Lever II: 202 mm



4 Shipment and on-site transport

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the nameplate of the limit switch match the specifications in the delivery note. See the 'Markings on the device' chapter for nameplate details.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.2 Removing the packaging from the limit switch

Observe the following sequence:

- Do not remove the packaging until immediately before installation of the limit switch.
- Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting the limit switch

- Pack the limit switch to protect it properly from the prevailing transport conditions.

Transport instructions

- Protect the limit switch against external influences (e.g. impact).
- Protect the limit switch against moisture and dirt.
- Observe transport temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' chapter).

4.4 Storing the limit switch

NOTICE

Risk of damage to the limit switch due to improper storage.

- *Observe the storage instructions.*
 - *Avoid long storage times.*
 - *Contact SAMSON in case of different storage conditions.*
-

Note

We recommend regularly checking the prevailing storage conditions during long storage periods.

Shipment and on-site transport

Storage instructions

- Protect the limit switch against external influences (e.g. impact, shocks, vibration).
- Do not damage the corrosion protection (coating).
- Protect the limit switch against moisture and dirt. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Observe storage temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' chapter).
- Do not place any objects on the limit switch.

5 Installation

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

The work position for the limit switch is the front view onto the device cover seen from the position of operating personnel.

Plant operators must ensure that, after installation of the limit switch, the operating personnel can perform all necessary work safely and easily access the device from the work position.

Mounting orientation

The limit switch may be installed in any position.

5.2 Preparation for installation

Before mounting, make sure the following conditions are met:

- The limit switch is not damaged.

Proceed as follows:

- Lay out the necessary material and tools to have them ready during mounting.
- The required lever I or II (see Table 5-2) must be installed before the limit switch is mounted onto the control valve. To do so, slide the clamping plate (1.1) over the lever (1) and slip them onto the shaft (2) together. Tighten the fastening screw (1.2).
- Observe the hysteresis (see Table 5-1).

Table 5-1: *Hysteresis (dead band)*

Type 4746	-x2	-x3	-04
Lever length L	Hysteresis		
50 mm	0.15 (0.25 ¹⁾) mm	0.6 mm	0.75 mm
120 mm	0.30 (0.55 ¹⁾) mm	1.0 mm	1.5 mm

¹⁾ Special version

5.3 Mounting the limit switch

5.3.1 Attachment to valve with cast yoke

1. Attach the plate (10) to the valve's stem connector using two screws (10.1).
2. Attach the pin (11) to the plate (10) using two nuts (11.1).
→ Mount the pin (11) in such a way that the shortest possible lever length can be used.
3. Unscrew the cover of the limit switch. Attach the limit switch to the valve yoke using the mounting screw (12), washer (13) and O-ring (14).
Make sure that the pin (11) is inserted through the wire strap (1.3) of the lever (1).

5.3.2 Attachment to valve with rod-type yoke

1. Attach the plate (10) to the valve's stem connector using two screws (10.1).
2. Attach the pin (11) to the plate (10) using two nuts (11.1).
→ Mount the pin (11) in such a way that the shortest possible lever length can be used.
3. Fasten the support (15) and the rod clamping plate (16) loosely to the rod.
In the valve travel mid-position, move the support until the center of the plate (10) and the support (15) are aligned.
4. Fasten the rod clamping plate.

5. Attach the limit switch to the support using the mounting screw (12), washer (13) and O-ring (14). Make sure that the pin (11) is inserted through the wire strap (1.3) of the lever (1).
→ After attaching the limit switch, make sure that the vent plug of the housing cover faces downward when the valve is installed.

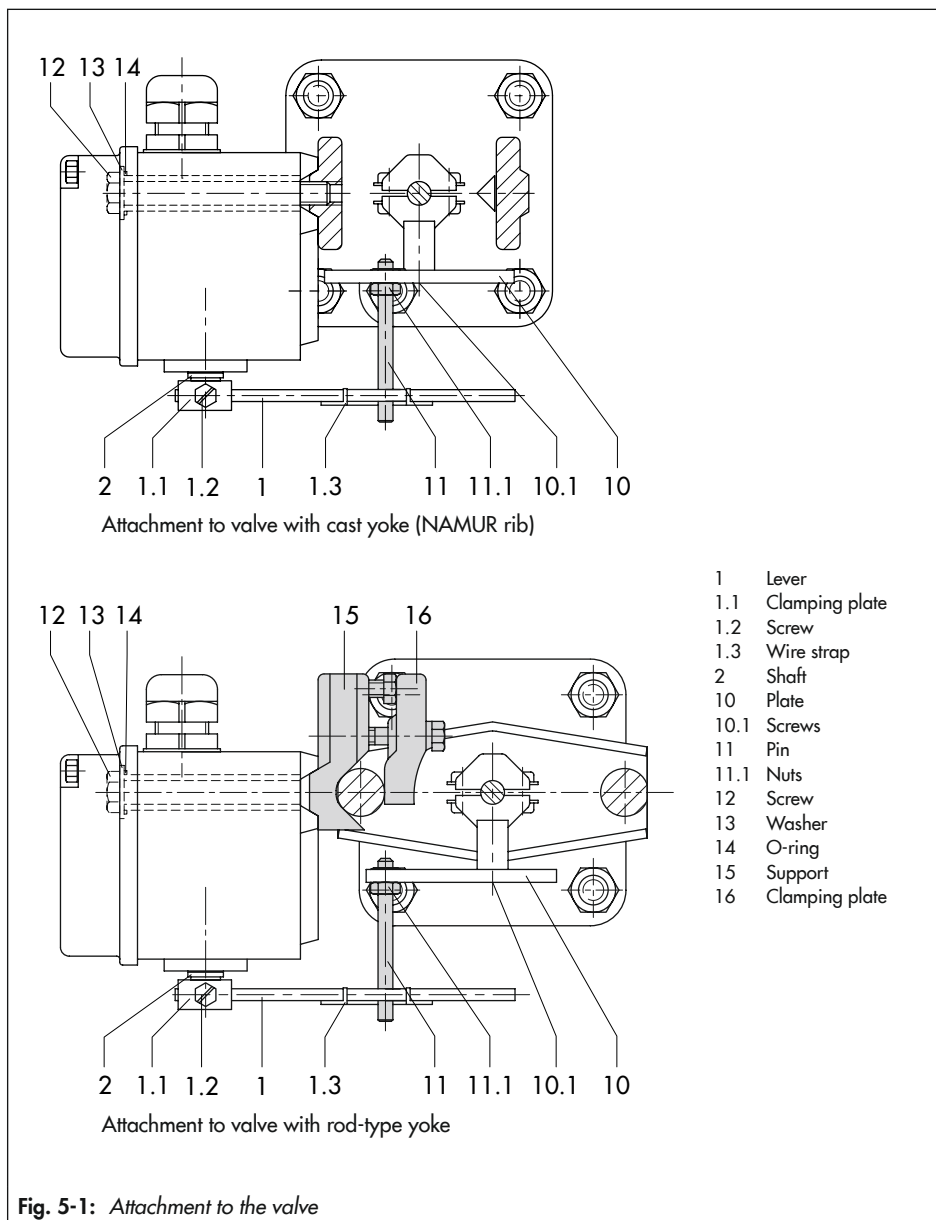


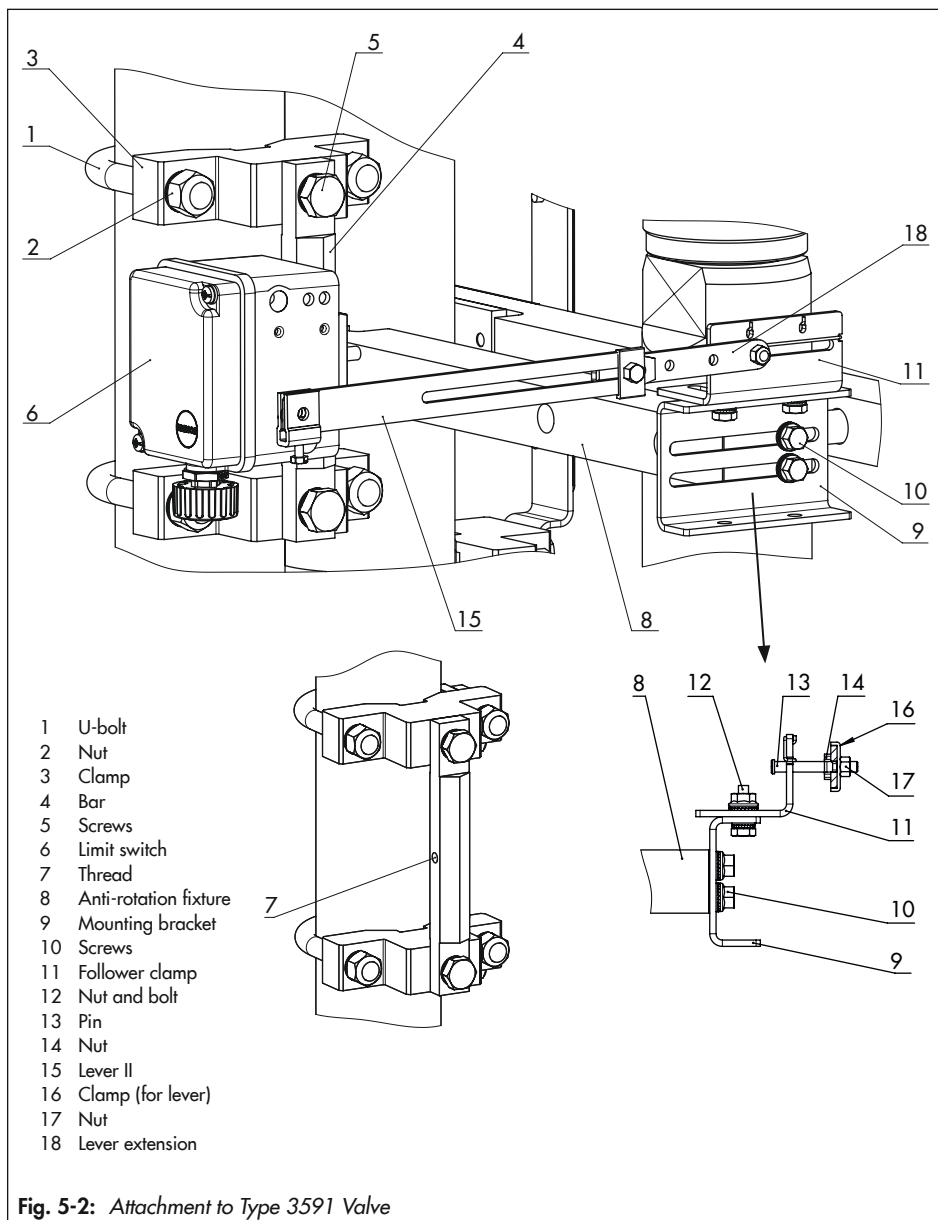
Fig. 5-1: Attachment to the valve

5.3.3 Attachment to Type 3591 Valve

- Use the supplied washers for all screw connections.
- 1. Fasten the U-bolt (1) using the clamp (3) and nuts (2) lightly onto the valve yoke.
- 2. Screw tight the bar (4) using the screws (5) onto the clamps (3).
- 3. Fasten the limit switch (6) onto the bar (4) as described in step 3 of Chapter 5.3.1. Use the thread (7) in the bar.
- 4. Fasten the mounting bracket (9) using the screws (10) to the anti-rotation fixture (8) of the valve.
- 5. Screw the follower clamp (11) to the mounting bracket (9) using the nut and bolt (12).
- 6. Insert the pin (13) into the oblong hole of the follower clamp (11). Make sure that the pin is inserted through the wire strap of the follower clamp.
- 7. Screw the nut (14) onto the pin (13). Place the clamp (16) over the lever (15) of the limit switch (6).
- 8. Use the nut (17) to fasten the lever onto the lever extension (18).
- 9. Fasten the other end of the lever extension (18) to the follower clamp (11).
- 10. Perform alignment.

Additional points that apply concerning mounting:

- Perform the alignment in such a way that the lever (15), lever extension (18) and oblong hole of the follower clamp (11) are in line at half of the valve travel.
- After attaching the limit switch, make sure that the vent plug of the housing cover faces downward when the valve is installed.



5.3.4 Attachment on positioners

For attachment of the limit switch to the Type 4763 or Type 4765 Positioner according to Fig. 5-3, a short lever (1) and an intermediate piece (31) are required as accessories (order no. 1400-6710).

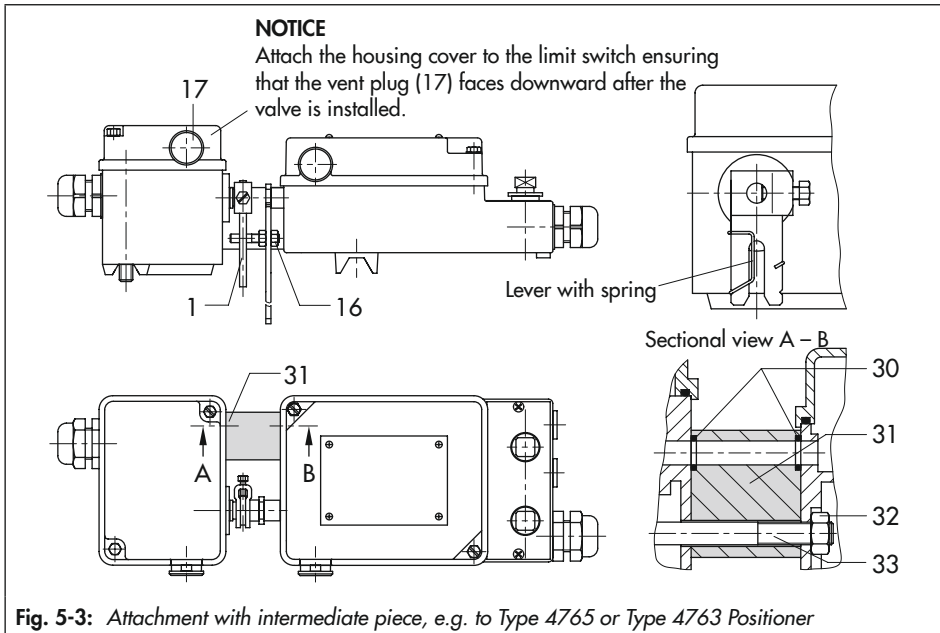
1. Insert one O-ring (30) into both the left and the right side of the intermediate piece (31).
2. Insert the two cap screws (33) through the limit switch and intermediate piece and place it onto the positioner.
3. Insert the nuts (32) into the positioner housing and screw tight the two cap screws (33).

Make sure that the short lever (1) slides over the pin (16) of the positioner.

4. Replace the vent plug (17) in the positioner housing with the screw plug included in the accessories (order no. 1400-6710).

In exchange, insert the vent plug into the housing of the limit switch. This ensures that the degree of protection of the limit switch corresponds to that of the positioner.

- ➔ To achieve degree of protection IP 65, a check valve (order no. 1790-7408) needs to be installed in the housing of the limit switch.



5.4 Electrical connections

⚠ DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection
- Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

⚠ WARNING

Incorrect electrical connection will render the explosion protection unsafe.

- Adhere to the terminal assignment and observe correct polarity.
- Do not undo the enameled screws.
- Do not exceed the maximum permissible values (U_v , I_v , P_v , C_v , L_v) specified in the EC type examination certificates when interconnecting intrinsically safe electrical equipment.

Selecting cables and wires

- Observe the relevant clauses of EN 60079-14 for installation of intrinsically safe circuits. Clause 12.2.2.7

applies when running multi-core cables and wires with more than one intrinsically safe circuit.

- Only use cables and wires which have a radial thickness of the insulation of a conductor for common insulating materials (e.g. polyethylene) smaller than 0.2 mm. The diameter of an individual wire in a fine-stranded conductor must not be smaller than 0.1 mm. Protect the conductor ends against splicing, e.g. by using wire-end ferrules.
- When two separate cables are used for connection, an additional cable gland can be installed.
- Seal cable entries left unused with screw plugs.
- Use metal cable glands when the limit switch is used at ambient temperatures below $-20\text{ }^{\circ}\text{C}$.

Note concerning equipment for use in zone 2:

In equipment operated according to type of protection Ex nA II (non-sparking equipment) according to EN 60079-15, circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

Equipment connected to energy-limited circuits with type of protection Ex nL (energy-limited equipment) according to EN 60079-15 may be switched under normal operating conditions. The maximum permissible values specified in the statement of conformity or its addenda apply when interconnecting the

Installation

equipment with energy-limited circuits in type of protection Ex nL IIC.

Cable entry

→ The wires for the limit contacts must be routed through the cable gland on the housing and connected to the input terminals marked + and – as illustrated in Fig. 5-4 or according to the adhesive label on the inside of the cover.

5.4.1 Switching amplifier for Type 4746-x2

For operation of the inductive limit contacts, switching amplifiers in accordance with EN 60947-5-6 must be connected in the output circuit (not for Type 4746-0281). Observe the relevant regulations for installation in hazardous areas.

5.5 Pneumatic connection for Type 4746-04

⚠ DANGER

Sudden loud noise when the pneumatic limit contact switches.

→ *Wear hearing protection when working near the valve.*

The air connections are tapped holes with G 1/8 ISO 228 or 1/8-27 NPT thread. Customary fittings for metal tubing or plastic hoses can be used.

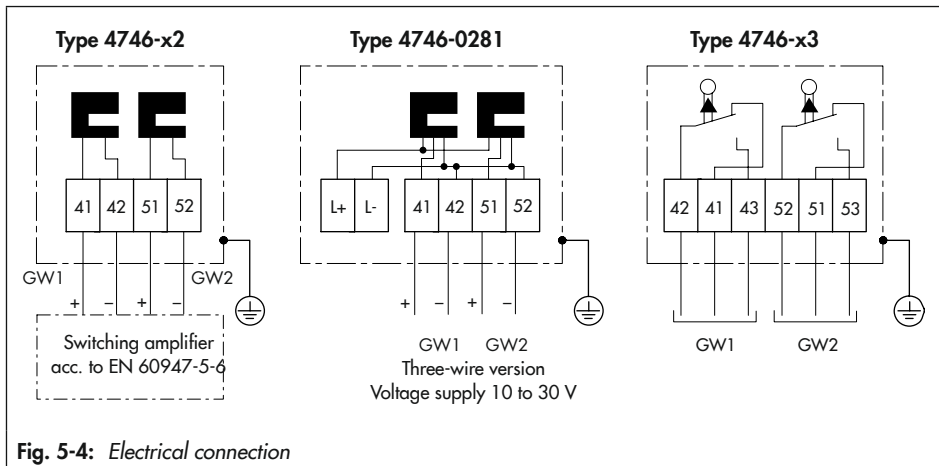


Fig. 5-4: Electrical connection

5.6 Mounting accessories

Table 5-2: Accessories for attachment according to IEC 60534-6

Valve	Cast yoke (NAMUR rib)		Rod-type yoke (18 to 32 mm rod diameter)	
	Up to 60 mm	Up to 180 mm	Up to 60 mm	Up to 180 mm
Travel	Up to 60 mm	Up to 180 mm	Up to 60 mm	Up to 180 mm
Mounting kit order no.	1400-6713 (lever I)	1400-6714 (lever II)	1400-6713 (lever I) plus 1400-5342	1400-6714 (lever II) plus 1400-5342
Accessories for attachment to Types 4763 and 4765 Positioners				
Mounting kit order no.		1400-6710		
Accessories for attachment to Type 3351 Valve				
Valve size	DN 15 to 50		DN 65 to 100	
Mounting kit order no.	1400-6585		1400-6586	
Accessories for attachment to Type 3591 Valve with lever II				
Mounting kit order no.		1402-0662		
Vent plug				
Technical data	G ¼ connection, -50 to +80 °C, material 1.4404, degree of protection IP 65			
Order no.	1991-2110			

Table 5-3: Accessories for electrical connection for device index ≥ 0.6

		Order no.
M20x1.5 cable gland	Black plastic, with washer	8808-0180
	Blue plastic, with washer	8808-0181
	Nickel-plated brass	1890-4875
Adapter M20x1.5 to NPT	Powder-coated aluminum	0310-2149

Table 5-4: Accessories for electrical connection for device index < 0.6

		Order no.
M20x1.5 cable gland	Black plastic	8808-0178
	Blue plastic	8808-0179

6 Start-up

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection
- Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

⚠ DANGER

Sudden loud noise when the pneumatic limit contact switches.

- Wear hearing protection when working near the valve.

6.1 Adjusting the switching point

The limit switches attached to control valves are usually adjusted in such a way that a signal is issued when the final travel positions are reached. Optionally, the switching point can also be adjusted to any position within the travel range, e.g. if an intermediate position is to be indicated.

The adjusted switch positions can be recorded on the supplied adhesive labels marked A, B and C and assigned to the corresponding switching elements.

6.1.1 Type 4746-x2

- Move the valve to the switching position and turn the adjustment screw (3.1, Fig. 6-1) until the metal tag (4.1, Fig. 6-1) reaches the switching point.
- Always move the valve to the end positions from the mid-position (50 %) on adjusting or checking the switching points.

i Note

The switching elements and the levers required to activate them react to temperature fluctuations. To ensure reliable switching, the switching hysteresis between the mechanical stop (e.g. plug in the seat) and the switching point of the limit switch must be larger than the shift of the switching point caused by a temperature change.

Start-up

Distance between switching points for 100 mm lever:

Contact SC3,5-N0-YE ≥ 2 mm,

Contact SJ3.5-SN ≥ 0.75 mm.

With other lever lengths, adjust the switching point to the changed lever length.

For example, if the lever length changes from 100 mm to 160 mm, the distance between the switching points is increased from 2.0 to 3.2 mm correspondingly.

Simplified adjustment of the inductive limit contacts:

Valve CLOSED:

Close the valve until the plug sits in the seat.

Valve OPEN:

Move the valve to the desired travel position, e.g. final position.

- Turn the adjustment screw (3.1) to slowly move the metal tag (4.1) towards the contact until the switching point is reached.
- Turn the adjustment screw in the opposite direction to achieve that the switching point reaches the stop:
contact SC3,5-N0-YE $\geq \frac{1}{6}$ turn and
contact SJ3,5-SN $\geq \frac{1}{16}$ to $\frac{1}{10}$ turn.

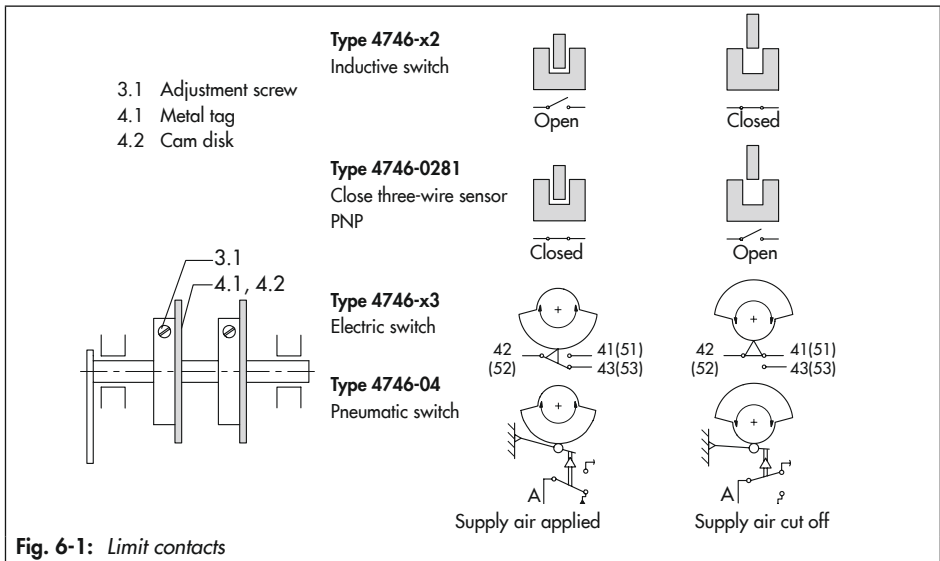


Fig. 6-1: Limit contacts

6.1.2 Type 4746-x3 and Type 4746-04

- For adjustment, the cam disk (4.2) must be positioned in such a way that its cam moves towards the roller (6.1, see the 'Design and principle of operation' chapter) in accordance with the direction of travel.
1. Move the valve to the desired switching position (e.g. final travel position "valve OPEN" or "valve CLOSED").
 2. Adjust the switch which is assigned to the upper or lower switching point.
 3. Turn the adjustment screw (3.1) until the cam of the cam disk (4.2) reaches the roller (6.1, see the 'Design and principle of operation' chapter) and the switch switches.
 4. To accurately check the switching point, move the valve slightly back and then move it to the switching position again.

7 Operation

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- *Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.*
-

DANGER

Sudden loud noise when the pneumatic limit contact switches.

- *Wear hearing protection when working near the valve.*
-

The limit switch issues a signal when an adjusted limit is exceeded or not reached as soon as it is connected to the power supply.

8 Malfunction

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- *For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection*
- *Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.*

DANGER

Sudden loud noise when the pneumatic limit contact switches.

- *Wear hearing protection when working near the valve.*

Proceed as follows in the event of a malfunction:

- Check attachment.
- Check the configuration of the mounting parts.
- Check power supply/electrical signal.
- Check the control valve to ensure it functions properly.

8.1 Emergency action

Plant operators are responsible for emergency action to be taken in the plant.

Tip

Emergency action in the event of valve failure is described in the associated valve documentation.

9 Servicing

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection
- Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

⚠ DANGER

Sudden loud noise when the pneumatic limit contact switches.

- Wear hearing protection when working near the valve.

⚠ WARNING

Incorrect electrical connection will render the explosion protection unsafe.

- Adhere to the terminal assignment and observe correct polarity.

- Do not undo the enameled screws.
- Do not exceed the maximum permissible values (U_i , I_i , P_i , C_i , L_i) specified in the EC type examination certificates when interconnecting intrinsically safe electrical equipment.

ⓘ NOTICE

Process disruption.

- Do not mount or service the limit switch while the process is running and only after isolating the plant by closing the shut-off valves.

ⓘ NOTICE

Malfunction due to the use of unapproved accessories.

- Only use the accessories listed in the 'Installation' chapter to mount the limit switch.

i Note

The limit switch was checked by SAMSON before it left the factory.

- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.
- Only use original spare parts by SAMSON, which comply with the original specifications.

9.1 Servicing explosion-protected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate or given the device a mark of conformity.

Inspection by a qualified inspector is not required if the manufacturer performs a routine test on the device before putting it back into operation and the passing of the routine test is documented by attaching a mark of conformity to the device.

Replace explosion-protected components only with original, routine-tested components by the manufacturer.

Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

9.2 Maintenance and calibration

Interconnection with intrinsically safe circuits to check or calibrate the equipment inside or outside hazardous areas is to be performed only with intrinsically safe current/voltage calibrators and measuring instruments to rule out any damage to components relevant to explosion protection.

→ Observe the maximum permissible values specified in the certificates for intrinsically safe circuits.

9.3 Periodic inspection and testing of the limit switch

We recommend inspection and testing according to Table 9-1 at the minimum.

Table 9-1: *Recommended inspection and testing*

Inspection and testing	Action to be taken in the event of a negative result
Check the markings, labels and nameplates on the limit switch for their readability and completeness.	Contact SAMSON when nameplates or labels are damaged, missing or incorrect to renew them.
	Clean any inscriptions that are covered with dirt and are illegible.
Check the limit switch to ensure it is mounted properly.	Tighten the any loose mounting screws.
Check the power lines.	Check electrical connection as described in the 'Installation' chapter.
	Tighten any loose cable glands.
	Make sure that the stranded wires are pushed into the terminals and tighten any loose screws on the the terminals.
	Renew damaged lines.
Check the pneumatic connection for Type 4746-04.	Tighten the male connectors of the screw fittings.
	Renew damaged hoses and pipes.

10 Decommissioning

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- *For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection*
 - *Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.*
-

DANGER

Sudden loud noise when the pneumatic limit contact switches.

- *Wear hearing protection when working near the valve.*
-

To decommission the limit switch, proceed as follows:

1. Disconnect and lock the air supply and power supply.
2. Unscrew the limit switch cover and disconnect the wires for the power supply.

11 Removal

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

DANGER

Risk of fatal injury due to the ignition of an explosive atmosphere.

- *For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe: Electrical installations design, selection and erection*
 - *Installation, operation or maintenance of the limit switch must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.*
-

1. Put the limit switch out of operation (see the 'Decommissioning' chapter).
2. Disconnect the wires for the power supply from the limit switch.
3. To remove the limit switch, loosen the fastening screw on the limit switch.

12 Repairs

A defective limit switch must be repaired or replaced.

! NOTICE

Risk of damage to the limit switch due to incorrect service or repair work.

- Do not perform any repair work on your own.
 - Contact SAMSON's After-sales Service for repair work.
-

12.1 Returning devices to SAMSON

Defective limit switches can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

1. Put the limit switch out of operation (see the 'Decommissioning' chapter).
2. Remove the limit switch (see the 'Removal' chapter).
3. Proceed as described on the Returning goods page of our website
 - ▶ www.samsongroup.com > Service > After-sales Service > Returning goods

13 Disposal



We are registered with the German national register for waste electric equipment (stiftung ear) as a producer of electrical and electronic equipment, WEEE reg. no.: DE 62194439

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your other household waste.



Tip

On request, we can appoint a service provider to dismantle and recycle the product.

14 Certificates

14.1 Certificates

The following certificates are included on the next pages:

- EU declarations of conformity for Type 4746, Type 4746-0, Type 4746-12, Type 4746-13, Type 4746-82 and Type 4746-83
- EC type examination certificate (ATEX) for Type 4746-1
- Statement of conformity (ATEX) for Type 4746-82 and Type 4746-83

The certificates shown were up to date at the time of publishing. The latest certificates can be found on our website:

▶ www.samsongroup.com > Products > Valve accessories > Type 4746



1/1

DC008
2019-11

DECLARATION UE DE CONFORMITE
EU DECLARATION OF CONFORMITY
EU KONFORMITÄTSERKLÄRUNG

La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
This declaration of conformity is issued under the sole responsibility of the manufacturer.
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

Nous certifions pour les produits suivants en exécution standard :
For the following products in standard execution:
Für die folgenden Produkte in Standard-Ausführung:

Type / type / Typ : 2371, 3249, 3252, 3310, 3331, 3347, 3349, 3351, 3710, 3711, 3776, 3777, 3812,
3963, 3964, 3967, 4708, 4746, 5090, Samstation

sont conformes à la législation applicable harmonisée de l'Union :
the conformity with the relevant Union harmonization legislation is declared with:
wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt:

RoHS 2011/65/EU, 2015/863/EU

EN50581:2012-09

Fabricant : SAMSON REGULATION S.A.S.
Manufacturer: 1, rue Jean Corona
Hersteller: 69520 Vaulx-en-Velin
France

Vaulx-en-Velin, le 26/11/19

Au nom du fabricant,
On behalf of the Manufacturer,
Im Namen des Herstellers,

SAMSON REGULATION S.A.S.

Joséphine SIGNOLES-FONTAINE
Responsable QSE



SAMSON

EU Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/
This declaration of conformity is issued under the sole responsibility of the manufacturer/
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
Für das folgende Produkt / For the following product / Nous certifions que le produit

Elektrischer oder pneumatischer Grenzsignalgeber / Electric or Pneumatic Limit Switch / Contacts de position électriques ou pneumatiques Typ/Type/Type 4746

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /
the conformity with the relevant Union harmonisation legislation is declared with/
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3
D-60314 Frankfurt am Main
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

Hanno Zager
Leiter Qualitätssicherung/Head of Quality Management/
Responsable de l'assurance de la qualité

Dirk Hoffmann
Zentralabteilungsleiter/Head of Department/Chef de département
Entwicklungsorganisation/Development Organization



EU Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/
This declaration of conformity is issued under the sole responsibility of the manufacturer/
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
Für das folgende Produkt / For the following product / Nous certifions que le produit

Elektrischer oder pneumatischer Grenzsignalgeber / Electric or Pneumatic Limit Switch / Contacts de position électriques ou pneumatiques Typ/Type/Type 4746-12, -13, -82, -83

entsprechend der EU-Baumusterprüfbescheinigung PTB 98 ATEX 2114 u. PTB 02 ATEX 2012 X
ausgestellt von der/ according to the EU Type Examination PTB 98 ATEX 2114 and PTB 02 ATEX
2012 X issued by/ établi selon le certificat CE d'essais sur échantillons PTB 98 ATEX 2114 et PTB 02
ATEX 2012 X émis par:

Physikalisch Technische Bundesanstalt
Bundesallee 100
D-38116 Braunschweig

Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /
the conformity with the relevant Union harmonisation legislation is declared with/
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2019, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
Explosion Protection 2014/34/EU	EN 60079-0:2018, EN 60079-11:2012, EN 60079-15:2010
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3
D-60314 Frankfurt am Main
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2020-07-31

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

Dipl.-Ing. Gert Nahler
Zentralabteilungsleiter/Head of Department/Chef du département
Entwicklung Automation und Integrationstechnologien/
Development Automation and Integration Technologies

Dipl.-Ing. Silke Bianca Schäfer
Total Quality Management/
Management par la qualité totale

es_4746-12_-13_-82_-83_de_en_fr_a_rev05.pdf



(1) **EU-TYPE EXAMINATION CERTIFICATE**
(Translation)

- (2) Equipment or Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 2014/34/EU**
- (3) EU-Type Examination Certificate Number:

PTB 98 ATEX 2114

Issue: 1

- (4) Product: Limit transducer, type 4746-12 and 4746-13
- (5) Manufacturer: Samson AG
- (6) Address: Weismüllerstraße 3, 60314 Frankfurt am Main, Germany
- (7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
- The examination and test results are recorded in the confidential Test Report PTB Ex 19-29116.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN IEC 60079-0:2018 **EN 60079-11:2012**
- (10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.
- (11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
- (12) The marking of the product shall include the following:



II 2 G Ex ia IIC T6 Gb

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, February 4, 2020
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor



Z5EX001e c

sheet 1/3

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

(13)

SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 98 ATEX 2114, Issue: 1**

(15) Description of Product

The limit transducers of types 4746-12 and 4746-13 are used to convert mechanical actuating variables into electrical signals. Depending on the variant they are provided with limit contacts of different designs. The limit transducers are mounted onto pneumatic, electrical or hydraulic positioners which are applied inside and outside of the hazardous area.

The limit transducers of types 4746-12 and 4746-13 are passive two-terminal elements which may be connected to certified intrinsically safe circuits, unless the permissible maximum values U_i , I_i and P_i are exceeded.

Electrical data

Inductive limit contact
Type 4746-12...
(terminals 41/42 or 51/52)

type of protection Intrinsic Safety Ex ia IIC
only for connection to a certified intrinsically
safe circuit

Maximum values per contact:

	SC3,5-N0-YE		SC3,5-N0-WH		SJ3,5-SN		SJ3,5-S1N	
U_i in V	16		16		16		16	
I_i in mA	25	52	25	52	25	52	25	52
P_i in mW	64	169	64	169	64	169	64	169
C_i in nF	150		150		30		30	
L_i in μ H	150		150		100		100	
Permissible ambient temperature range depending on temperature class								
T4 in °C	≤100	≤75	≤100	≤89	≤100	≤89	≤100	≤89
T5 in °C	≤80	≤55	≤81	≤60	≤81	≤60	≤81	≤60
T6 in °C	≤65	≤40	≤66	≤45	≤66	≤45	≤66	≤45

sheet 2/3

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 98 ATEX 2114, Issue: 1

Electrical micro-switch
Type 4746-13...
(terminals 41/42/43 or 51/52/53)

type of protection Intrinsic Safety Ex ia IIC
only for connection to a certified intrinsically
safe circuit

Maximum values per switch:

$$U_i = 45 \text{ V}$$

$$P_i = 2 \text{ W}$$

The effective internal capacitances and
inductances are negligibly low.

Permissible ambient temperature range
depending on temperature class:

$$T_6 = -45 \text{ °C} \dots 60 \text{ °C}$$

$$T_5 = -45 \text{ °C} \dots 70 \text{ °C}$$

$$T_4 = -45 \text{ °C} \dots 80 \text{ °C}$$

Changes with respect to previous editions

- Adaption of the test specification to the currently applicable state of standards
- Update of the type labels and the marking
- Replacement of the DIN rail terminals from Weidmüller by print terminals from Phoenix
- Update of the list of currently applicable documents
- Adaption of the operating instructions manual respecting the changes carried out

(16) Test Report PTB Ex19-29116

(17) Specific conditions of use

(18) Essential health and safety requirements

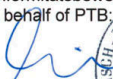
Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, February 4, 2020

On behalf of PTB:


Dr.-Ing. F. Lieneisch
Direktor und Professor



sheet 3/3


EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

T R A N S L A T I O N
A D D E N D U M No.: 1

in compliance with Directive 94/9/EC Annex III Clause 6
to the EC Type Examination Certificate PTB 98 ATEX 2114

Equipment: **Model 4746-12.. and 4746-13.. Limit Switches**

Marking:  **II 2 G EEx ia IIC T6**

Manufacturer: **SAMSON AG**

Address: **Weismüllerstr. 3, D-60314 Frankfurt, Germany**

Description of the additions and modifications

The model description code has been changed. The old and the new designation code numbers are shown in the table below:

Old	New
4746-2...	4746-12...
4746-3...	4746-13...

In future, also the Model SJ-3.5 Slot-type Proximity Switches manufactured by Pepperl & Fuchs approved under the Ex Type Examination Certificate PTB 99 ATEX 2219 X may be used.

The preceding models of the same name approved under the Certificate of Conformity PTB No. Ex-95.D-2195 X are permitted to be used until 20 June 2002.

The results laid down in this test report refer exclusively to the test object and the technical documentation submitted. Test reports without signature and seal are invalid. This test report may be reproduced unaltered only. Extracts or amendments shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt – Bundesallee 100 - D 38116 Braunschweig

Ptb08-4746.doc

Addendum No. 1 to the Ex Type Examination Certificate PTB 98 ATEX 2114

Electrical data

Models 4746-12...1/..2 with inductive proximity switch

Inductive proximity switch
(terminals 41/42 and 51/52)

Type of Protection: Intrinsic Safety EEx ia IIC
only for connection to a certified intrinsically safe circuit

Maximum values

U_i = 16 V
 I_i = 52 mA
 P_i = 169 mW
 or
 U_i = 16 V
 I_i = 25 mA
 P_i = 64 mW

 C_i = 50 nF
 L_i = 250 μ H

The correlation between temperature classification, permissible ambient temperature ranges, maximum short-circuit currents and power for evaluating instruments is shown in the table below:

Temperature class	Permissible ambient temperature range	I_o / P_o
T6	-45 °C ... 45 °C	52 mA/169 mW
T5	-45 °C ... 60 °C	
T4	-45 °C ... 80 °C	
T6	-45 °C ... 60 °C	25 mA/64 mW
T5	-45 °C ... 80 °C	
T4	-45 °C ... 100 °C	

All the other electrical data and other data apply also to this Addendum No. 1.

Test report: **PTB EX 03-23049**

Zertifizierungsstelle Explosionsschutz

Braunschweig, 7 March 2003

By order

(Signature) (Seal)
Dr. Ing. U. Johannmeyer
Regierungsdirektor

The results laid down in this test report refer exclusively to the test object and the technical documentation submitted. Test reports without signature and seal are invalid. This test report may be reproduced unaltered only. Extracts or amendments shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt – Bundesallee 100 - D 38116 Braunschweig

Ptb08-4746.doc

[Federal logo]

TRANSLATION

(1) EC TYPE EXAMINATION CERTIFICATE

- (2) Equipment and Protective Systems Intended for Use
in Potentially Explosive Atmospheres – **Directive 94/9/EC**



- (3) EC Type Examination Certificate Number

PTB 98 ATEX 2114

- (4) Equipment: Model 4746-2 and 4746-3 Limit Switches
- (5) Manufacturer: SAMSON AG
- (6) Address: Weismüllerstr. 3, D-60314 Frankfurt
- (7) This equipment and any acceptable variations thereof is specified in the schedule to this certificate and the documents referred to therein.
- (8) The Physikalisch-Technische Bundesanstalt, certified body number 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 98-28184**.

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with
EN 50014: 1997 **EN 50020: 1994**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) According to the Directive 94/9/EX, this EX TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.
- (12) The marking of the equipment shall include the following:



II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 03.09.1998

(Signature)

(Seal)

The results laid down in this test report refer exclusively to the test object and the technical documentation submitted. Test reports without signature and seal are invalid. This test report may be reproduced unaltered only. Extracts or amendments shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt – Bundesallee 100 - D 38116 Braunschweig

Ptb08-4746.doc

Maximum values:

$$\begin{aligned}U_i &= 45 \text{ V} \\P_i &= 2 \text{ W}\end{aligned}$$

The effective internal capacitances and inductances are negligible.

(16) **Report PTB Ex 98-28184**

(17) **Special conditions for safe use**

Not applicable

(18) **Essential Health and Safety Requirements**

In compliance with standards

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 03.09.98

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

The results laid down in this test report refer exclusively to the test object and the technical documentation submitted. Test reports without signature and seal are invalid. This test report may be reproduced unaltered only. Extracts or amendments shall require the prior approval of the Physikalisch-Technische Bundesanstalt.



TRANSLATION

Statement of Conformity



- (1)
- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**
- (3) EC Type Examination Certificate Number
PTB 02 ATEX 2012 X
- (4) Equipment: Model 4746-8 . . . Limit Switch
- (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
- (6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany
- (7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.
- (8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/ of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 02-21299**
- (9) The essential health and safety requirements are satisfied by compliance with
EN 50021: 1999
- (10) If the sign “X” is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.
- (11) In compliance with the Directive 94/9/EC this Statement of Conformity relates only to the design and construction of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.
- (12) The marking of the equipment shall include the following:

 **II 3 G EEx nA II T6**

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 05.April 2002

(Signature) (Seal)
Dr. Ing. U. Klausmeyer
Regierungsdirektor

Statements of conformity without signature and seal are invalid.
This Statement of conformity may be reproduced only in its entirety and without any changes, schedule.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt., Bundesallee 100, D-38116 Braunschweig

Ptb08Ex n.doc

Installation Manual for apparatus certified by CSA for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values of limit switches circuit

	U _i or V _{max}	I _i or I _{max}	P _i or P _{max}	C _i	L _i
inductive SJ3,5-N	16 V	25/52 mA	64/169 mW	50 nF	250 µH
inductive SJ3,5-SN, SJ3,5-S1N	16 V	25/52 mA	64/169 mW	30 nF	100 µH
electrical	28 V	115 mA	2 W	0 nF	0 µH

$$U_0 \text{ or } V_{0c} \leq U_i \text{ or } V_{max} / I_0 \text{ or } I_{0c} \leq I_i \text{ or } I_{max} / P_0 \leq P_i \text{ or } P_{max}; C_a \geq C_i \text{ and } L_a \geq L_i$$

Table 2: CSA - certified barrier parameters of electrical limit switch circuits

Barrier	Supply barrier		Evaluation barrier	
	V _{max}	R _{min}	V _{max}	
electrical	≤ 28 V	≥ 280 Ω	≤ 28 V	Diode Return

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
T6	- 45°C ... 60°C
T5	- 45°C ... 70°C
T4	- 45°C ... 80°C

Table 4: For the Model 4746 – 3 Limit Switch the correlation between temperature classification, permissible ambient temperature ranges and maximum short- circuit current is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	- 45°C ... 45°C	52 mA
T5	- 45°C ... 60°C	
T4	- 45°C ... 89°C	
T6	- 45°C ... 66°C	25 mA
T5	- 45°C ... 81°C	
T4	- 45°C ... 100°C	

Intrinsically safe if installed as specified in manufacturer’s installation manual EB 8365 EN.

Revisions Control Number: 2 - July 2024

CSA Addendum to EB 8365 EN

CSA - certified for hazardous locations

Ex ia IIC T6; Class I, Zone 0

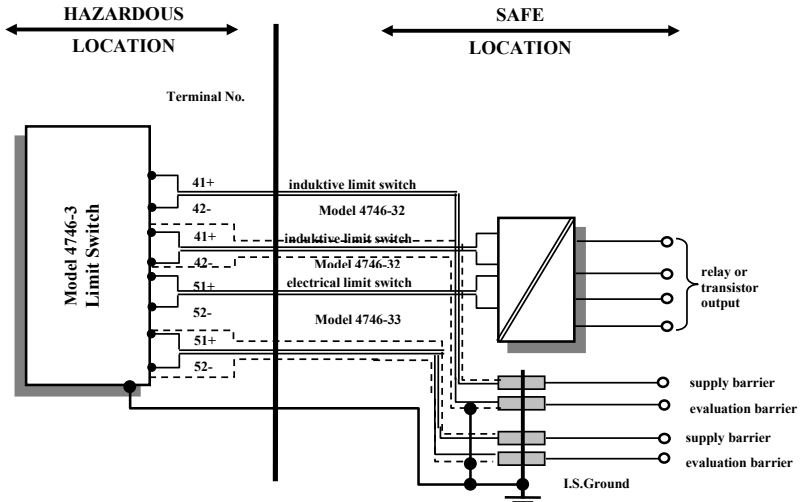
Class I; Groups A, B, C, D

Class II; Groups E, F + G; Class III

Type 3 or 4 Enclosure

Notes:

- 1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the CSA certified apparatus. For maximum values of U_i or V_{max} ; I_i or I_{max} ; P_i or P_{max} ; C_i and L_i of the various apparatus see Table 1.
- 2.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the CSA certified intrinsically safe barrier. For barrier selection see Table 2.
- 3.) The installation shall be in accordance with the C. E. C. Part 1.
- 4.) Each pair of I.S. wires shall be protected by a shield that is grounded at the I.S. Ground. The shield shall extend as close to the terminals as possible.
- 5.) Use only supply wires suitable for 5°C above ambient temperature.



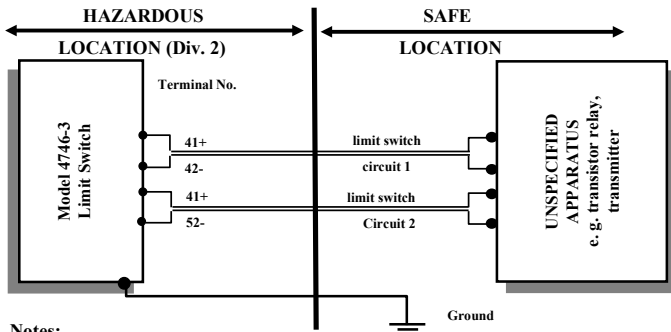
Version: Model 4746-33 Electrical Limit Switch. Supply and evaluation barrier CSA- certified.

CSA- certified for hazardous locations

Class I; Div. 2, Groups A, B, C, D

Class II; Div. 2, Groups E, F + G; Class III

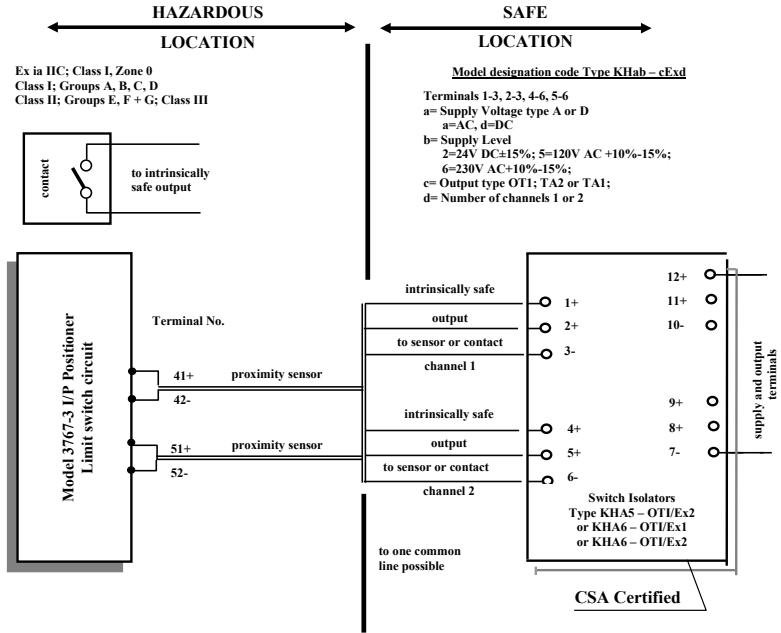
Type 3 Enclosure



Notes:

- 1.) For the maximum values for the individual circuits see Table 1 and 2.
- 2.) Cable entry M 20 x 1.5 metal conduit according to drawing No. 1050-0539 T and 1050-0540 T

Installation drawing Control Relay KHA5-OTI/Ex2, KHA6-OTI/Ex1 or KHA6-OTI/Ex2 with Model SJ-b-N Proximity Sensors



The total series inductance and shunt capacitance of shield wiring shall be restricted to the following maximum values

maximum capacitance of each inductive sensor 30nF
 maximum inductance of each inductive sensor 100µH

System parameters

Control Relay Terminal No.	Groups	L [mH]	C [µF]	V _{0C} [V]	I _{SC} [mA]	V _{max} [V]	R _{min} [Ω]
1-3; 2-3 4-6; 5-6	A + B	84.88	1.273	↑	↑	↑	↑
	C + D	298.7	3.82	12.6	19.8	12.6	650
	E, F, G	744.4	10.18	↓	↓	↓	↓

Division 2 wiring method shall be in accordance to the Canadian Electrical Code Part 1.

Installation Manual for apparatus approved by FM for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values

	U_i or V_{max}	I_i or I_{max}	P_i or P_{max}	C_i	L_i
Limit switches (inductive) Type SJ3,5...	16 V	25/52 mA	64/169 mW	60 nF	250 µH
Limit switches (inductive) Type SC3,5...	16 V	25 mA	34 mW	150 nF	150 µH
Limit switches (electrical)	28 V	115 mA	2 W	0 nF	0 µH

Notes: U_0 or V_{0c} or $V_t \leq U_i$ or V_{max} / I_0 or I_{0c} or $I_t \leq I_i$ or I_{max}
 P_0 or $P_{max} \leq P_i$ or P_{max}

Table 2: FM - approved barrier parameters of electrical limit switch circuits

Barrier	Supply barrier				Evaluation barrier		
	V_{0c}	R_{min}	I_{0c}	P_{max}	V_{0c}	R_{min}	I_{0c}
Limit switches (electrical)	≤ 28 V	≥ 98 Ω	≤ 115 mA	≤ 2 W	≤ 28 V	#	0 mA

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
T6	- 45 °C ... 60 °C
T5	- 45 °C ... 70 °C
T4	- 45 °C ... 80 °C

Table 4: For the Model 4746 – 32 Limit Switch with type SJ3,5... sensors the correlation between temperature classification, permissible ambient temperature ranges and maximum short- circuit current is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	- 45 °C ... 45 °C	52mA
T5	- 45 °C ... 60 °C	
T4	- 45 °C ... 75 °C	
T6	- 45 °C ... 60 °C	25mA
T5	- 45 °C ... 80 °C	
T4	- 45 °C ... 80 °C	

Table 4: For the Model 4746 – 32 Limit Switch with type SC3,5... sensors the correlation between temperature classification, permissible ambient temperature ranges and maximum short- circuit current is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	- 45 °C ... 55 °C	25mA
T5	- 45 °C ... 67 °C	
T4	- 45 °C ... 80 °C	

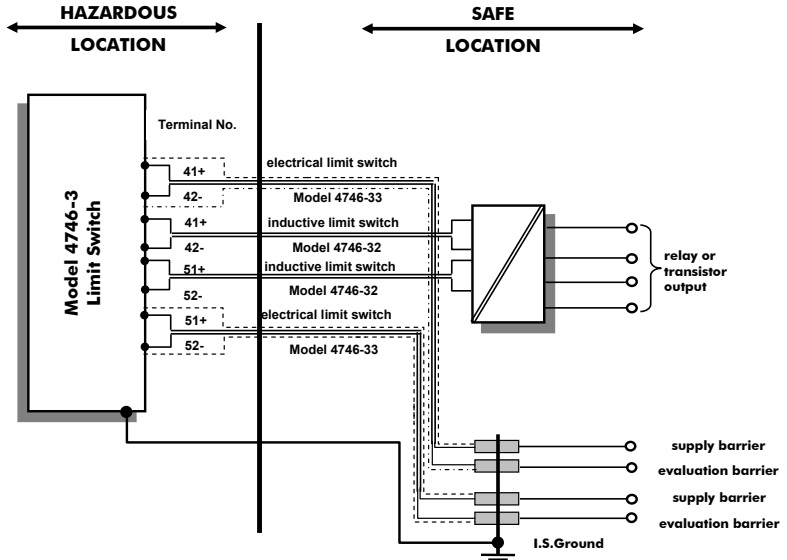
**Intrinsically safe if installed as specified in manufacturer’s installation manual.
FM - approved for hazardous locations**

**Class I, Zone 0 A Ex ia IIC T6,
Class I, II, III, Division 1, Groups A, B, C, D, E, F + G**

NEMA 3R

Notes:

- 1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved apparatus.
For maximum values of U_i or V_{max} ; I_i or I_{max} ; P_i or P_{max} ; C_i and L_i of the various apparatus see Table 1.
- 2.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved intrinsically safe barrier.
For barrier selection see Table 2.
- 3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/ISA RP 12.06.01.
- 4.) Safety Barrier shall be FM-Approved. Each pair of I.S. wires shall be protected by a shield that is grounded at the I.S. Ground. The shield shall extend as close to the terminals as possible.
- 5.) Use only supply wires suitable for 5°C above ambient temperature.



Version: Model 4746-33 Electrical Limit Switch. Supply and evaluation barrier FM approved.

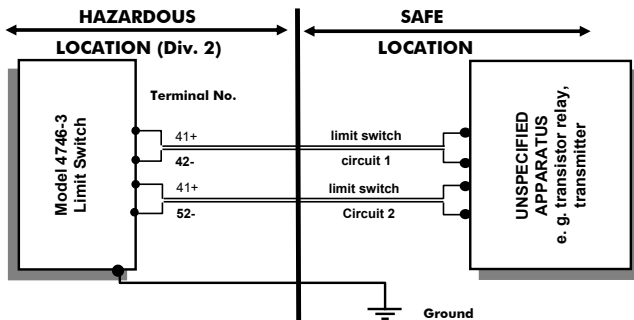
Cable entry M 20 x 1.5 or metal conduit according to drawing
No. 1050 – 0539 T or 1050 – 0540 T

FM- approved for hazardous locations

Class I, Division 2, Groups A, B, C, D

Class II Division 2, Groups F + G, Class III

NEMA 3R



Revisions Control Number: 2 September 2015

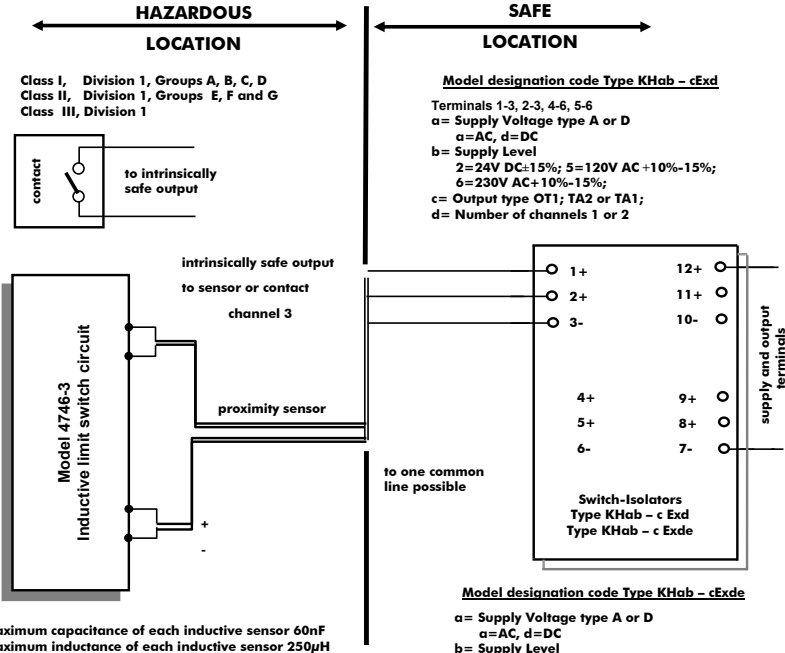
Addendum to EB 8365 EN

Notes:

- 1.) For the maximum values for the individual circuits see Table 1 and 2.
- 2.) Cable entry M 20 x 1.5 metal conduit according to drawing No. 1050-0539 T and 1050-0540 T
- 3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70

Installation drawing Control Relay Hab – cEx de with Model SJ-b-N

Proximity Sensors



maximum capacitance of each inductive sensor 60nF
maximum inductance of each inductive sensor 250µH

The total series inductance and shunt capacitance of shield wiring shall be restricted to the following maximum values

Control Relay Terminal No.	Groups	L [mH]	C [µF]	VOC [V]	ISC [mA]
1-3; 2-3 4-6; 5-6	A + B	84,8	1,27	↑ 12,9 ↓	↑ 19,8 ↓
	C + E	299	3,82		
	D, F, G	744	10,2		

Revisions Control Number: 2 September 2015

Addendum to EB 8365 EN

15 Appendix

15.1 After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

You can reach our after-sales service at aftersalesservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on our website (www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Model number, configuration ID, serial number

EB 8365 EN



SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samsongroup.com · www.samsongroup.com