

## SWITCHES

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**Insert switch with connection cores**

This switching element can be universally used for switching, controlling and regulating operations within Ex-areas. The insert switch is audited to the latest EC guideline 94/9/EC. Devices equipped with these insert switches have to be approved by a testing authority, the switch itself needs not be retested. The cable cores are cast-in at the back of the switch. Their standard length is 500 mm; other lengths are available on request. To connect the cores we recommend the miniterminals from BARTEC.

**Limit switch with connection cable**

The limit switches have been developed for Ex-areas where safe and reliable signalling is required, for example on pumps, petrol pumps, as well as in mechanical and high-tech engineering. The switches must be mounted into the respective devices or systems in such a way as to guarantee mechanical protection. No further tests are required. The connection cable is cast-in on the back of the switch. For the connection in Ex-areas BARTEC provides a large variety of terminals and terminal boxes.

**Explosion protection**

**Limit switch**

ATEX	II 2G Ex d IIC T6, T5 Gb II 2D Ex tb IIIC T80°C, T95°C Db
Certification	EPS 14 ATEX 1 766 X
IECEX	Ex d IIC T6, T5 Gb Ex tb IIIC T80°C, T95°C Db
Certification	IECEX EPS 14.0092 X
Other approvals and certificates, see <a href="http://www.bartec.de">www.bartec.de</a>	

**Insert switch**

ATEX	II 2G Ex d IIC Gb I M2 Ex d I Mb
Certification	EPS 14 ATEX 1 765 U
IECEX	Ex db IIC Gb Ex db I Mb
Certification	IECEX EPS 14.0091 U
Other approvals and certificates, see <a href="http://www.bartec.de">www.bartec.de</a>	

Ambient temperature	-60 °C to +100 °C depending on the type and materials used
Ambient temperature limit switches	T6 to max. +75 °C depending on the rated current
Protection class	IP 66 (IEC/EN 60529)

**Technical data**

Ex d **insert switch/limit switch** DIN EN 60947-5-1/DIN EN 60947-1

Electrical data for control switch in accordance with DIN EN 60947-5-1	Rated operating voltage	AC 400 V
	Utilization category	
	AC-15	4 A 250 V
	AC-15	2 A 400 V
	DC-13	0.15 A 250 V
	Isolation voltage	400 V

Ambient temperature +40 °C

**AC switching capacity**

	ohmic load	inductive load cos φ = 0.6
400 V	3 A	2 A
250 V	5 A	3 A
30 V	7 A	5 A

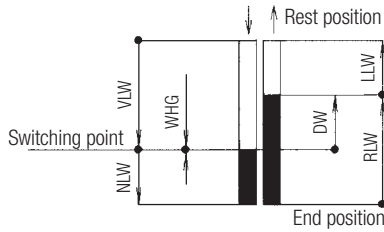
**DC switching capacity**

	ohmic load	inductive load L/R = 3 μs
250 V	0.4 A	0.03 A
30 V	7 A	5 A

(further electrical data on request)

Tightening torque of fixing screws	0.6 Nm
Rating of gold-coated contacts	Voltage: min. 5 V/max. 30 V Current: min. 4 mA/max. 400 mA  the product of voltage and current should not exceed 0.12 VA  for alternating current these values have to be interpreted as peak values

Contact Travels



Contact travels (in mm)

Pretravel	VLW	max. 0.9
Overtravel	NLW	min. 0.5
Differential val	DW	max. 0.45
Reset travel	RLW	0.9
No-load travel	LLW	0.1 bis 0.45
Repeat accuracy WHG (for repetitive actuation)		± 0.02

Service life

mechanical	>2 x 10 <sup>6</sup>
electrical	dependent on load
max. switching rate	1000 operations/h

Switching actuation force

Single-break switch	max. 2.0 N
Double-break switch	max. 3.6 N

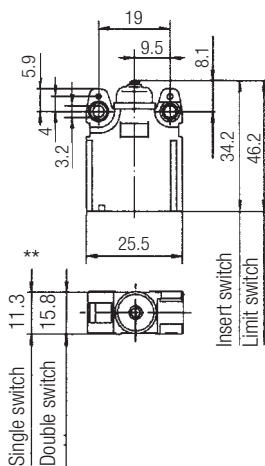
Reset force

Single-break switch	min. 0.4 N
Double-break switch	min. 0.8 N

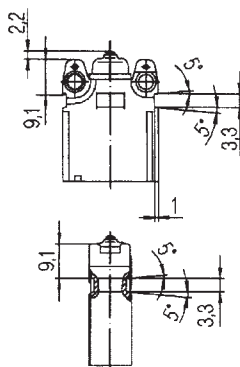
Operating rate	≥ 10 μm/sec.
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Contact break distance	2 x ≥ 0.3 mm	
Electrical connection	Insert switch cores 0.75 mm <sup>2</sup>	L07G-K/Radox
	Limit switch cable 0.75 mm <sup>2</sup>	H05VV-F/A05VV-F/ BETAflam
	other cores and cables on request	
Conductor diameter	2-wire 6.1 ± 0.3 mm	
	3-wire 6.6 ± 0.3 mm	
	4-wire 6.7 ± 0.3 mm	
	6-wire 8.9 ± 0.3 mm	
Contact element	snap-action contact element (double-break) as, normally-open, normally-closed, changeover contact as well as N/O + N/C contacts for circuits with equal potentials.	
Contact material	Silver or gold-coated contacts (all contact elements have a standard protective gold-coating as standard)	
Double-break switch (switch options)	simultaneous switch sequence: chamber I and II almost simultaneous	
	defined switch sequence: chamber I switches mechanically safe 0.03 up to 0.3 mm before chamber II	
Weight	Insert switch with 500 mm cores: single-break switch 35 g, double-break switch 70 g	
	Limit switch with 3 m cable: single-break switch 210 g, double-break switch 415 g	
Housing material	plastic (thermoplastics)	
Plunger/additional actuator	stainless steel	

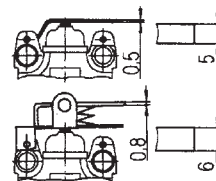
Dimensions in mm



Clip-on pockets



Lever widths



\*\* When packing several switches, these dimensions are reduced to 11 mm resp. 15.5 mm

Technical data subject to change without notice.



Selection chart Single-break switch

Type of contact	Code no.	Additional actuator*			
		Options	Code no.	Options	Code no.
	10	without additional actuator	00		44
			01		45
			02		46
	20		03	  	47
			04		48
			21		49
	30		22	   	61
			23		62
			24		63
	40		41	 	66
			42		73
			43		

**Complete order no.\*\***  
Please enter code number.

Technical data subject to change without notice.



Length of connection cores  
5 = 500 mm  
Length of connection cable  
3 = 3 m  
Please specify greater lengths in plain text, code no. 0

( ) Code for connection cable

\* Dimensions for additional actuator are reference values

\*\* Standard product printing: ATEX and IECEx marking. Other international imprints obtainable on request. Please specify in plain text.

Insert switch with connection cores	1
Limit switch with connection cable	2

	Contact material	Ambient temperature (T <sub>a</sub> )
1	Silver	-20 °C to +60 °C
3	Gold	-20 °C to +60 °C
5	Silver	-55 °C to +60 °C
6	Gold	-55 °C to +60 °C
7	Silver	-60 °C to +75 °C
8	Gold	-60 °C to +75 °C

Selection chart Double-break switch

Type of contact			Additional actuator*				
Switch chamber 1	Switch chamber 2	Code no.	Options	Code no.	Options	Code no.	
not defined switch sequence		11	without additional actuator	00		44	
				01		45	
		21		02		46	
				03		47	
		22		04		48	
				21		49	
	defined switch sequence		33		22		61
					23		62
			1A		24		63
					41		64
			2A		42		66
					43		73
	2B		515				
			715				
	3C						

**Complete order no.\*\***  
Please enter code number.

Technical data subject to change without notice.

07- 511- /

Length of connection cores  
5 = 500 mm  
Length of connection cable  
3 = 3 m  
Please specify greater lengths in plain text, code no. 0

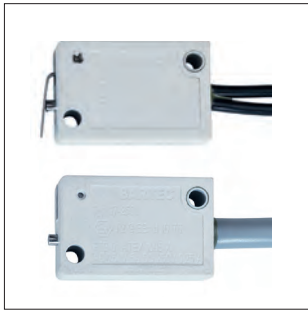
( ) Code for connection cable

\* Dimensions for additional actuator are reference values

\*\* Standard product printing: ATEX and IECEx marking. Other international imprints obtainable on request. Please specify in plain text.

Insert switch with connection cores	1
Limit switch with connection cable	2

	Contact material	Ambient temperature (T <sub>a</sub> )
1	Silver	-20 °C to +60 °C
3	Gold	-20 °C to +60 °C
5	Silver	-55 °C to +60 °C
6	Gold	-55 °C to +60 °C
7	Silver	-60 °C to +75 °C
8	Gold	-60 °C to +75 °C



- World's smallest Ex d miniature switch

BARTEC miniature switches are used in areas with of limited space for a flame-proof switching element. They are especially suitable for applications in valves, thermostats, push switches, servo components, level metres and switching gears. The world's smallest Ex d miniature switch is encapsulated in a plastic enclosure. The leads or cable tail are potted in at the base. The standard version of the BARTEC miniature switches contains fine silver contacts. Other use with low currents and voltages gold plated silver contacts are available optionally.

**Limit switch with connection cable**

Switches with connector cables have been approved by PTB with EC model test certification. The switches can therefore be mounted at any time into devices and systems which offer mechanical protection – no further testing is required. The connector cable is cast into the back of the switch. The wires are colour-coded. The (standard) cable length is 3 m; other lengths are available on request.

**Insert switch with connection cores**

The insert switch with wires is available as a building block for your explosion-proofing solution. These insert switches are tested and approved by PTB (the Federal Physical-Technical Institute) according to Ex Guideline 94/9/EC. After installation, the complete device is tested by an authorized institution. Thanks to its PTB approval, the microswitch itself needs not be individually tested. The leads are individually marked. The length of the cable is 50 cm (standard). Other lengths can be supplied on request. For the connection of the cores we recommend our BARTEC Ex Mini-terminals.

**Explosion protection**

**Limit switch**

ATEX	⊕ II 2G Ex db IIC T6, T5 Gb
Certification	EPS 14 ATEX 1689 X
IECEX	Ex db IIC Gb T6, T5
Certification	IECEX EPS 14.0039 X
Other approvals and certificates, see <a href="http://www.bartec.de">www.bartec.de</a>	

**Insert switch**

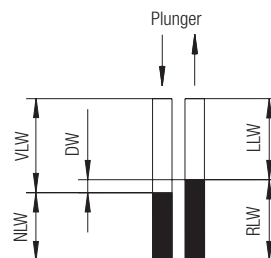
ATEX	⊕ II 2G Ex d IIC Gb ⊕ I M2 Ex d I Mb
Certification	EPS 14 ATEX 1688 U
IECEX	Ex d IIC Gb Ex d I Mb
Certification	IECEX EPS 14.0038 U
Other approvals and certificates, see <a href="http://www.bartec.de">www.bartec.de</a>	

Working temperature	-60 °C to +100 °C depending on the type and the materials used
Ambient temperature limit switches	T5 to max. +90 °C T6 to max. +75 °C depending on the rated current
Schutzart	IP 54 (IEC/EN 60529)

**Technical data**

Rated voltage	AC 250 V	
Rated current		
Switching capacity with AC		
	ohmic load	inductive load
250 V	5 A	5 A
30 V	5 A	5 A
Switching capacity with DC		
	ohmic load	inductive load L/R = 3 μs
250 V	0.25 A	0.03 A
125 V	0.5 A	0.06 A
75 V	1 A	1 A
30 V	5 A	5 A
(Further electrical data on request)		

Contact elements	see table
Tightening torque of fixing screws	max. 0.6 Nm
Operating force	max. 1.4 N
Release force	min. 0.25 N
Switching frequency	max. 1 000/h
Contact travels	



# Miniature insert switch/limit switch



Contact travels (in mm)		
Pretravel	VLW	0.5 bis 1.0
Overtravel	NLW	min. 0.2
Differential value	DW	max. 0.13
Reset travel	RLW	~0.55
No-load travel	LLW	~0.5
Mechanical life	>2 x 10 <sup>6</sup> switching cycles	
Electrical life	dependent on load	

Electrical connection	Insert switch Cores 0.75 mm <sup>2</sup> 4 GAF/Radox/HO5V2-K Limit switches Lead 0.75 mm <sup>2</sup> LSYY/BETAflam® other cores and leads on request
Enclosure	Duroplast
Plunger/additional actuator	stainless steel
Weight	with 0.5 m cores approx. 25 g with 1 m cable approx. 50 g

### Dimensions in mm

### Ordering information

Type of contact	Code no.	Options	Code no.
	10	without additional actuator	00
			01
	20		02
	30		03
			63

### Additional actuator\*

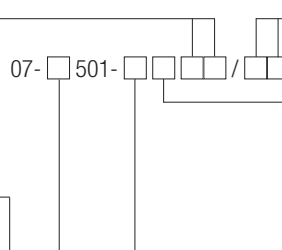
( ) specification for connection cable

\* Dimensions for a additional actuator are reference values

\*\* Standard product printing: ATEX and IECEx marking. Other international imprints obtainable on request. Please specify in plain text.

**Complete order no. \*\***  
Please enter code number.

Insert switch with connection cores	1
Limit switch with connection cable	2



Length of connection cores	5 = 500 mm
Length of connection cable	3 = 3 m
Please specify other lengths in plain text, code no. = 0	

	Contact material
6	Gold
7	Silver

Special versions, please specify in text  
 - precision switch with differential value 0.04 ± 0.02 (switching capacity 1 A), Type 07-501-5.../  
 - different ambient temperature

Technical data subject to change without notice.



- Positive break contacts
- Very robust construction
- IP 65 protection class
- 13 different actuator versions
- Operator protection in accordance with GS-ET 15

Besides the metal-enclosed precision switch of the RET series, BARTEC also offers a series of limit switches with plastic bodies. The enclosure is made of shock proof plastic providing an IP 65 protection class according to IEC/EN 60529. Due to its format several limit switches can be mounted in tandem formation requiring very little space. This allows a multiple triggering of switching operations. The connection cable is equipped with a strain relief device, prewired and safely cast into the enclosure by means of epoxy resin. We supply this robust limit switch with a standard length of 3 m; special lengths are available on request. The integrated switching element changes over via NC contact with positive break operation. Operator protection corresponds the the GS-ET 15 requirements. Its high vibration resistance and long life are the result of a most extensive laboratory research. The certification for hazardous areas and the high protection class is granted thanks to its structural characteristics are the ideal prerequisites for its use in almost all fields of automation, mechanical and apparatus engineering.

**Explosion protection**

Marking ATEX	Ⓜ II 2G Ex d IIC T6, T5 Gb Ⓜ II 2D Ex tb IIIC T80 °C, T95 °C Db
Certification	PTB 03 ATEX 1143 X
Marking IECEx	Ex d IIC T6, T5 Gb Ex tb IIIC T80 °C, T95 °C Db
Certification	IECEx EPS 12.0036 X
Other approvals and certificates, see www.bartec.de	
Working temperature	-20 °C up to +100 °C depending on type and material used
Ambient temperature	T5 for max. +90 °C
Limit switch	T6 for max. +65 °C depending on rated current
Protection class	IP 65 (IEC/EN 60529)

Switching capacity	with AC 15		with DC 13
	250 V	6 A	-
	230 V	-	0.25 A
	24 V	-	4 A
Short circuit protection	6 AgL/gG DIAZED fuse		

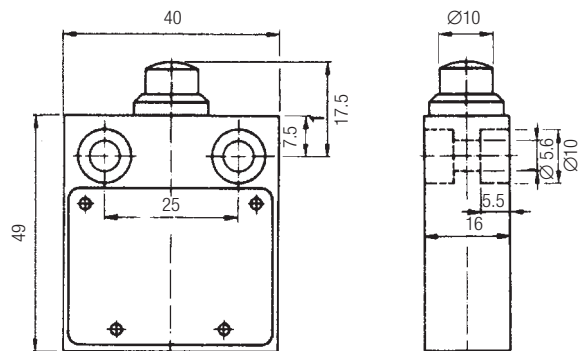
**Technical data**

Enclosure	shock-resistant thermoplastic material, self-extinguishing UL 94-V0	
Switching element	1 NO/1 NC contact both galvanically isolated NC contact with pos. break (VDE 0113, Part 1)	
Connection	4 core cable H05VV-F cross section: 0.75 mm <sup>2</sup> cable length: 3 m, 5 m, 10 m	
Colour coding of the flexible leads	11 = BN 12 = BU 23 = BK 24 = BK	
Electrical structure	EN 60947-5-1 EN 60947-1	
Nominal voltage	AC 250 V/DC 230 V	
Nominal current	AC 6 A DC 0.25 A	

**Mechanical data**

Switching point tolerance	± 0.5 mm depending on the actuator
Switching force tolerance	± 1 N
Repeat accuracy	± 0.1 mm
Mechanical service life	> 1 million operating cycles
Max. frequency of operation	1,800 operating cycles/h
Vibration resistance	10 g at 10 to 2,000 Hz
Impact resistance/shock resistance	50 g at a shock duration of 6 ms

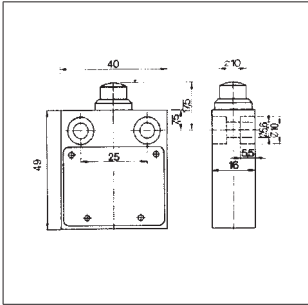
**Dimensions in mm**



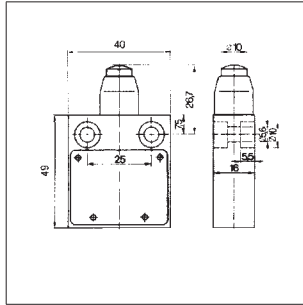


**Ordering information** Limit switch

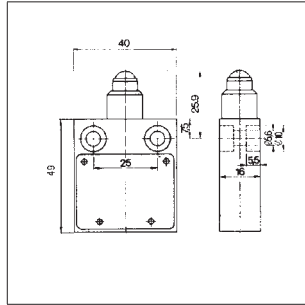
Plunger  
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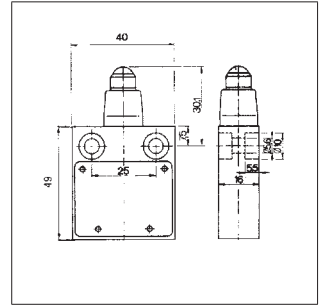
Membrane plunger  
07-2961-1.62/02



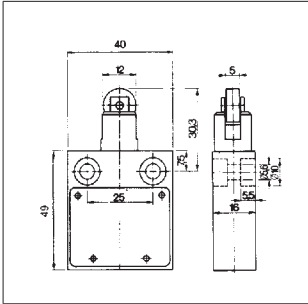
Spherical plunger  
07-2961-1.62/03



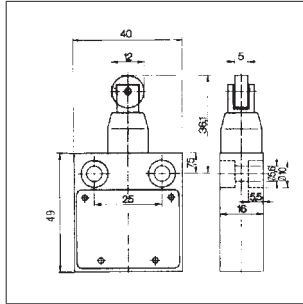
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07-2961-1.62/04



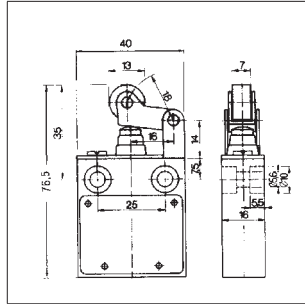
Roller plunger  
07-2961-1.62/09



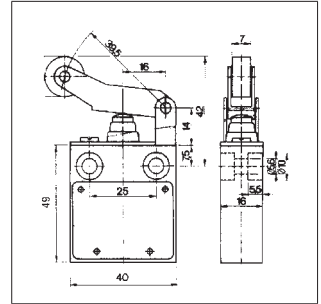
Membrane roller plunger  
07-2961-1.62/10



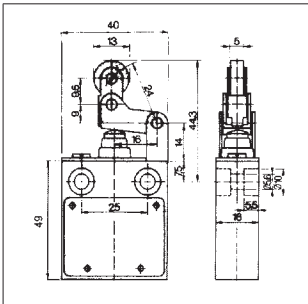
Membrane roller lever  
07-2961-1.62/14



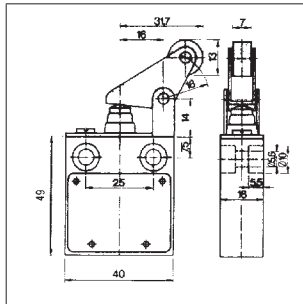
Membrane roller lever, long  
07-2961-1.62/16



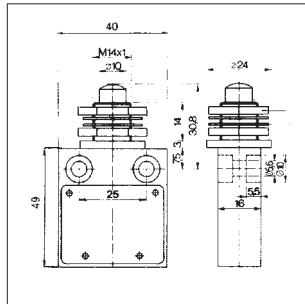
Membrane roller toggle lever  
07-2961-1.62/18



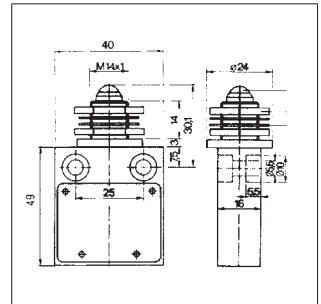
Parallel roller lever  
07-2961-1.62/20



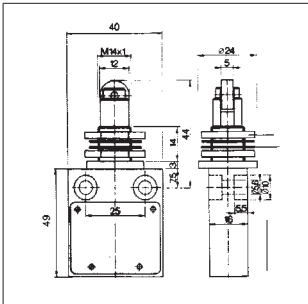
Front mounting/dome plunger  
Kuppelstößel 07-2961-1.62/47



Front mounting/spherical plunger  
07-2961-1.62/49



Front mounting/roller lever  
07-2961-1.62/51



**Complete order no.**

Please enter code number.

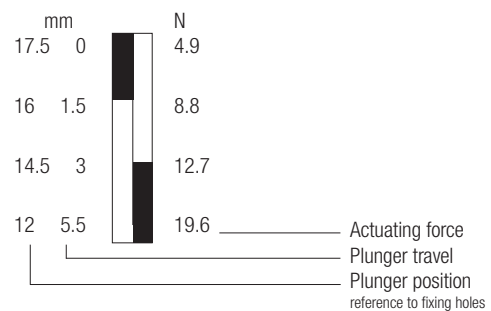
Technical data subject to change without notice.

07-2961-1  62/

Cable length	
3 m	3
5 m	5
10 m	0



**Contact travel diagram**





- Very robust construction
- IP 65 type of protection
- A choice of cable exit positions
- 16 different actuator versions

Limit switches of the RET range are metal-encapsulated precision switches with a robust and compact explosion-proof structure. Our connection cable comes prewired, is equipped with a strain-relief device and safely cast into the enclosure. We supply this robust limit switch with a standard cable length of three meter. Special cable lengths and switches with lateral cable outlets are available on request. The integrated basic switch has a single-pole changeover contact with high switching accuracy and a precise repeatability of the switching point. Its high vibration resistance and long mechanical life are the result of extensive laboratory tests. The high protection class, IP 67, allows the switch to be used in nearly all fields of automation, mechanical and apparatus engineering.

**Explosion protection**

Marking ATEX	Ⓜ II 2G Ex d IIC T6 Gb Ⓜ II 2D Ex tb IIIC T80 °C Db
Certification	PTB 03 ATEX 1142 X
Marking IECEx	Ex d IIC T6 Gb Ex tb IIIC T80 °C Db
Certification	IECEx EPS 12.0037 X
Other approvals and certificates, see www.bartec.de	
Operating temperature	-20 °C to +90 °C depending on the model and the materials used
Limit switch ambient temperature	T6 to max. +60 °C depending on the rated current
Protection class	IP 65 (IEC/EN 60529)

Switching capacity	AC	DC inductive	DC ohmic
	250 V	6.5 A	-
	220 V	-	0.16 A
	110 V	-	0.2 A
	60 V	-	0.5 A
	24 V	-	4.0 A
	12 V	-	6.5 A

**Technical data**

Enclosure	aluminium-alloy, hard-coated
Switching element	integrated micro-switch
Connection	4 core cable (H05VV-F) cross section: 0.75 mm <sup>2</sup> cable length: 3 m, 5 m, 10 m
Coloured flexible leads	1 = GY 2 = BN 4 = BK PE = GN/YE
Equipotential bonding	EN 60947-5-1 EN 60947-1
Utilization category	AC-15 5 A 250 V DC-13 0.16 A 230 V max. 25 VA for gold contacts

**Electrical data**

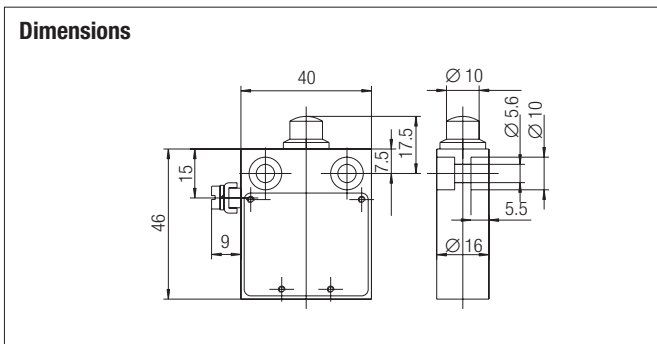
Type of contact	single-pole changeover contact
Contact resistance	60 mΩ, measure at the end of the cable a cable length of 1 metre
Short circuit protection	5 AgL/gG DIAZED fuse

**Mechanical data**

Switching point tolerance	± 0.5 mm depending on the actuator
Switching force tolerance	± 1 N
Repeat accuracy	± 0.1 mm
Mechanical service life	> 1 million operating cycles
Max. frequency of operation	1,800 operating cycles/h
Vibration resistance	10 g at 10 to 2 000 Hz
Shock resistance/shock stability	50 g at a shock duration of 6 ms
Cable outlet	- bottom - side - with bottom screw socket - with lateral screw socket

**Ordering information**

Contact material	Code no.	Cable outlet	Code no.	Cable length	Code no.
Ag	1	bottom	1	3 m	3
		side	2		
Ag Au 0.1 A	3	with bottom screw socket	3	5 m	5
Au 0.1 A	4	with lateral screw socket	4	10 m	0



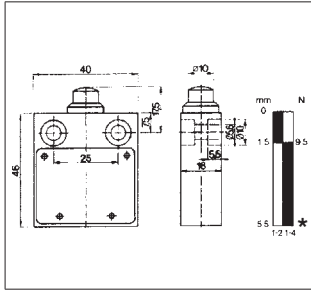
**Complete order no.** 07-295  -   30/

Please enter code number. Actuator

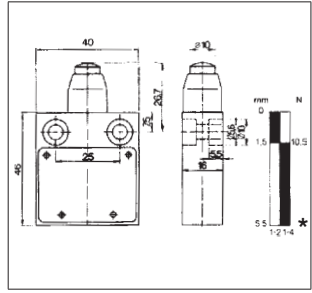


Dimensional drawings and contact travel diagrams

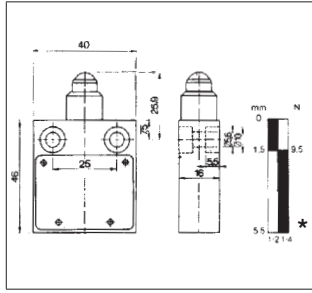
Plunger  
07-2951-..30/01



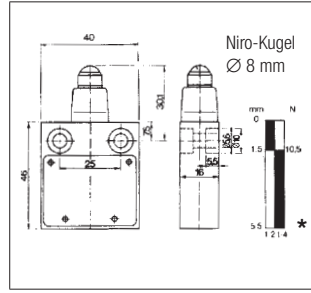
Membrane plunger  
07-2951-..30/02



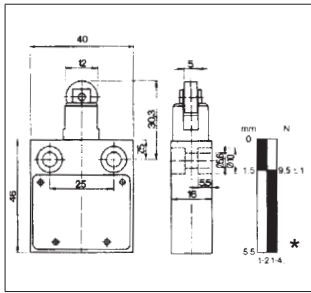
Spherical plunger  
07-2951-..30/03



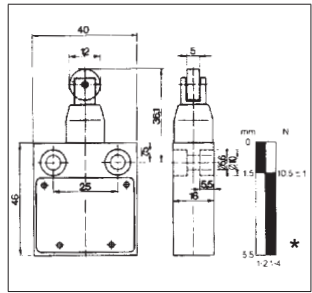
Spherical membrane plunger  
07-2951-..30/04



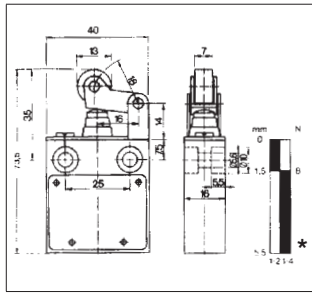
Roller plunger  
07-2951-..30/09



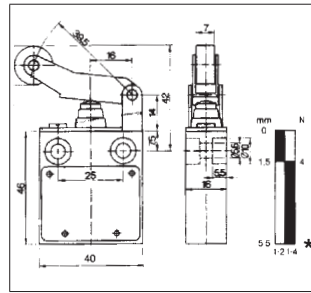
Membrane roller plunger  
07-2951-..30/10



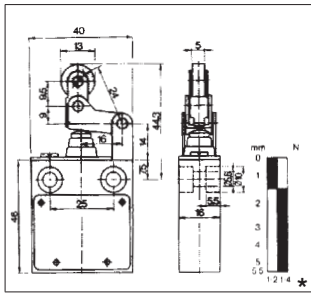
Membrane roller lever  
07-2951-..30/14



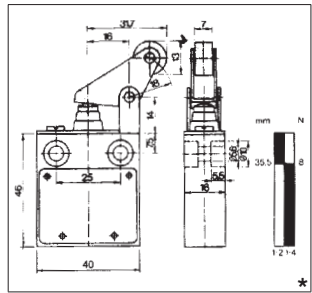
Membrane roller lever, long  
07-2951-..30/16



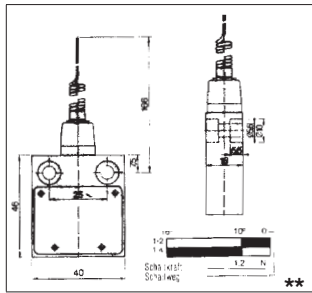
Membrane toggle roller lever  
07-2951-..30/18



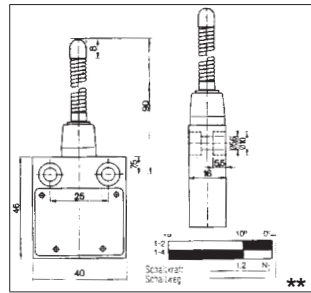
Parallel roller lever  
07-2951-..30/20



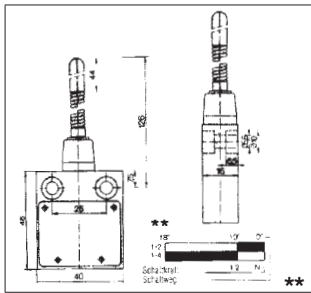
Feeler lever  
07-2951-..30/32



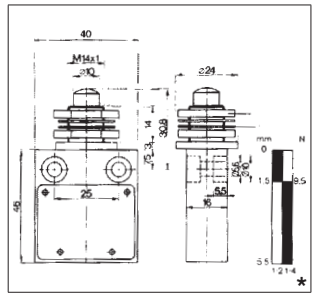
Feeler-butt lever  
07-2951-..30/34



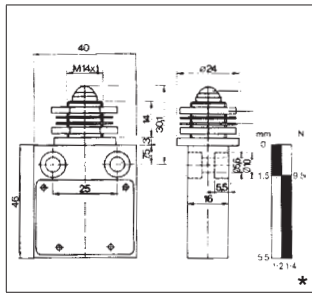
Feeler plastic lever  
07-2951-..30/36



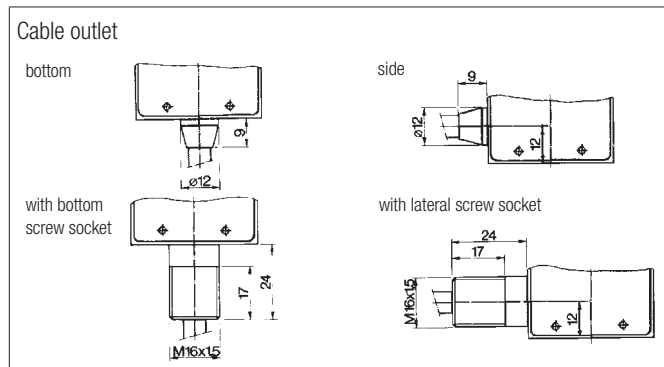
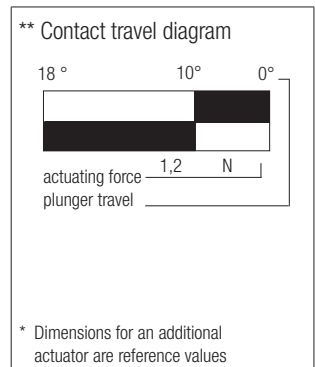
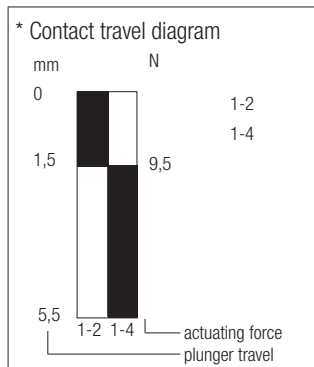
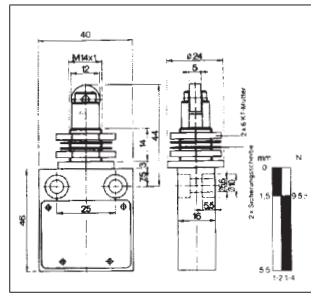
Front-mounting dome plunger  
07-2951-..30/47

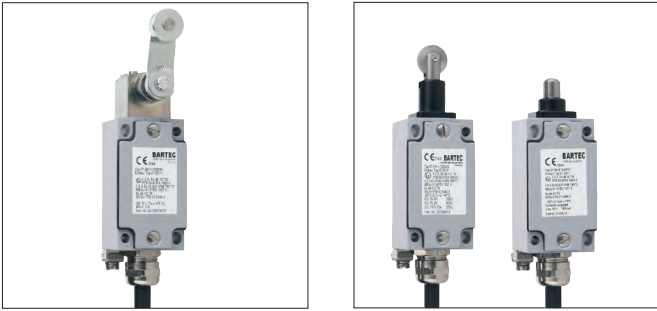


Front-mounting spherical plunger  
07-2951-..30/49



Front-mounting-roller lever  
07-2951-..30/51





- Dimensions and mounting dimensions according to DIN EN 50041
- Compatible with non-Ex DIN limit switches
- Different switching elements

All dimensions and actuating elements of the Ex d position switch correspond to the DIN EN 50041 standard. Its 30 x 60 mm mounting dimensions make the switch directly compatible to the position switch corresponding to the same DIN standard. The switch is equipped with snap-action contacts with several switching element versions. A microswitch with connection cable Type 07-2511 is mounted as switching element. Different actuators are available for the variety of actuating possibilities. After the removal of four screws these knobs can be rotated by 90 °C allowing four different directions of actuation. Gold-plated contacts are available for the switching of low currents of voltages. Standard length of the connection cables are 3 m. BARTEC has designed a very extensive range of Ex e terminal boxes of polyester and aluminium for the connection of the position switch within the Ex area.

**Explosion protection**

Marking Position switch type 07-2511

ATEX	II 2G Ex d IIC T6 Gb II 2D Ex tD A21 IP 66 T80 °C
Certification	EPS 14 ATEX 1766 X
IECEX	Ex d IIC T6 Gb
Certification	IECEX EPS 14.0092 X
Other approvals and certificates, see <a href="http://www.bartec.de">www.bartec.de</a>	
Operating temperature	-50 °C to +100 °C depending on the model and the materials used
Ambient temperature	T6 to max. +75 °C depending on the rated current

**Technical data**

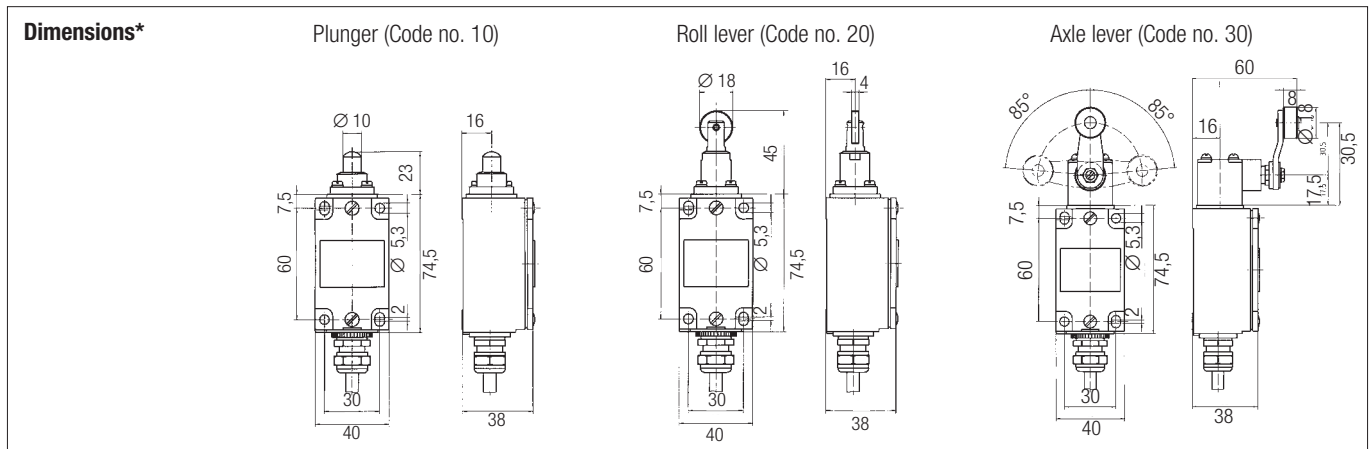
Electrical data according to DIN EN 60947-5-1	Rated operating voltage AC 400 V
	Utilisation category
	AC-15                    4 A                    250 V
	AC-15                    2 A                    400 V
	DC-13                    0.15 A                250 V
	Isolation voltage                    400 V

Ambient temperature +40 °C

AC switching capacity		
	ohmic load	inductive load cos φ = 0.6
400 V	3 A	2 A
250 V	5 A	3 A
30 V	7 A	5 A
DC switching capacity		
	ohmic load	inductive load L/R = 3 μs
250 V	0.4 A	0,03 A
30 V	7 A	5 A

(Further electrical data on request)

Switching elements	see table
Max. switching frequency	1 000 h
Mechanical life	>2 x 10 <sup>6</sup> switching cycles depending on plunger operating speed and angle
Electrical life	dependent on load
Electrical connection	Lead 0.75 mm <sup>2</sup> H05VV-F/A05VV-F/ BETAflam other cores and leads on request
Enclosure material	aluminium



Ordering information

Type of contact			Actuators					
Interrupter chamber 1	Interrupter chamber 2	Code no.	Max. operating force	Pretravel	Overtravel	Differential approx.	Max. plunger operating speed	Code no.
1 (BN)	-	10	17 N	1 mm	5 mm	0,4 mm	5 m/s	10
2 (BU)								
3 (BN)	-	20						
4 (BU)								
2 (GY) 4 (BN)	-	30	17 N	1 mm	5 mm	0,4 mm	5 m/s	20
1 (BK)								
11 (BK) 21 (BU)		11						
12 (GY) 22 (BN)								
13 (BK) 23 (BU)		22	6 N	10°	70°	4°	5 m/s	30
14 (GY) 24 (BN)								
13 (BK) 21 (BU)		21						
14 (GY) 22 (BN)								
12 14 (2) (3) 22 24 (5) (6)		33	other actuators on request					
11 (1) 21 (4)								

( ) specification for cable tail  
 \* Dimensions for actuator are reference values  
 \*\* Standard product printing: ATEX and IECEx marking. Other international imprints obtainable on request. Please specify in plain text.

	Contact material	Ambient temperature (T <sub>a</sub> )
1	Silber	-20 °C to +60 °C
3	Gold	-20 °C to +60 °C
5	Silber	-55 °C to +60 °C
7	Silber	-60 °C to +75 °C
8	Gold	-60 °C to +75 °C

Complete order no.\*\* 07-291  -1    /

Please enter code number.  
 Special versions: Please specify in the plain text  
 Technical data subject to change without notice.

Length of connection cable 3 = 3 m  
 please specify other length in plain text, code no. 0

