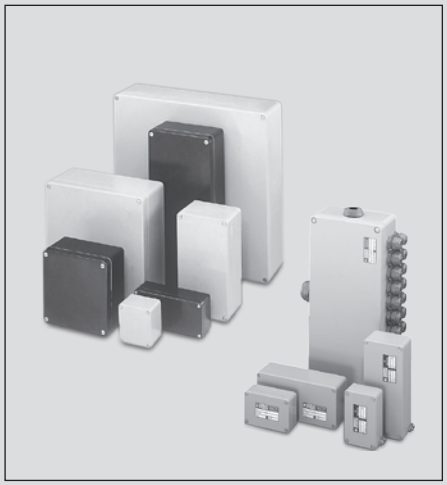
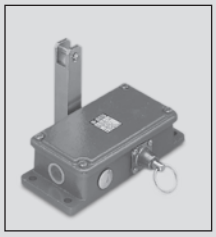
EX

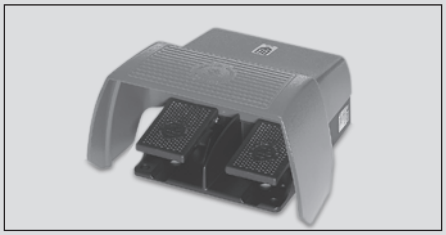
EX-approved products for potentially explosive atmospheres

- Ex e, Ex ia and Ex e/ia terminal boxes made from polyester and aluminium
- Ex d / Ex tb limit switches, rope pull switches and foot switches
- Ex mb / Ex tb magnetic switches
- Ex ib inductive Namur sensors

Services, training, system solutions, project- and customer-specific solutions.







Terminal enclosures and empty enclosures

Only materials that correspond to the temperature range required for Ex enclosures are used in these enclosures and components.

The minimum type of protection rating of all enclosures and screw connections is IP 64, other protection classes available on request.

The latching devices on the enclosures are optionally available as captive screw connections or quick-release fasteners.

Various CA versions are available with flange plates.

All built-in components must conform to the relevant approvals.

Momentary contact, cable pull and foot switches

An Ex d-certified switching element lies at the core of these Ex-approved switches.

It is mounted in the corresponding switch enclosures. The mechanical actuator and its installation are certified separately.

The approval of additional actuators and switch enclosures from other series is possible on request.

All switches and momentary contact switches feature one NO contact and one NC contact.

Magnetic switches, inductive Namur sensors

For magnetic switches, protection against ignition energy is achieved by encapsulation. For Inductive Namur sensors, protection is achieved by the principle of intrinsic safety.

Magnetic switches and Namur sensors have a Factory fitted connection cable.

This cable is permanently attached to the body and forms part of the approval.

All sensors are certified for a surface temperature of + 80 °C.

Services offered by the BERNSTEIN-EX experts:

- Approval of a stainless steel enclosure with freely definable dimensions
- Approvals assistance for plant operators
- Approval of switching and control elements in all enclosures
- Approval of plug-in devices in all enclosures
- Component mounting and wiring of enclosures according to customer specifications
- Training courses for planners and plant operators
- Cross-product system solutions
- Customer-specific development and project management on request
- TR (EAC) and NEC (North America) approvals on request
- Approval according to IEC Ex

Explosion protection at a glance

Ex	II2G	Ex	ia	IIC	T6	TÜV	2008	ATEX	1234	–
Type approval to directive RL 2014/34/EU	Application	Explosion protection	Type of protection	Device group	Temperature class	Inspection authority	Year	As per directive 2014/34/EU	Consecutive number	Additional conditions

Protection Concept

Symbol		Type of protection	Standards
	Ex “d”	Flameproof encapsulation Switching devices, motors, transformers etc. IEC60079-1	IEC / EN 60079-1
	Ex “p”	Pressurised encapsulation Control cabinets px = Use in Zone 1, 2 py = Use in Zone 1, 2 pb = Use in Zone 21, 22 pz = Use in Zone 2 pc = Use in Zone 22	IEC / EN 60079-2 (Gas) IEC / EN 61241-4 (Dust)
	Ex “q”	Powder-filled encapsulation Transformers, capacitors	IEC / EN 60079-5
	Ex “o”	Oil immersion encapsulation Transformers, load resistors	IEC / EN 60079-6
	Ex “e”	Increased safety Terminal boxes, control cabinets, enclosures for installing devices of other protection class	IEC / EN 60079-7
	Ex “i”	Intrinsically safe Terminal boxes, control cabinets, sensors, measurement and control equipment ia = Use in Zone 0, 1, 2, 20, 21, 22 ib = Use in Zone 1, 2, 21, 22	IEC / EN 60079-11
		Intrinsically safe systems	IEC / EN 60079-25
	Ex “n”	Non sparking Systems that, due to their design, cannot spark	IEC / EN 60079-15
	Ex “m”	Encapsulation Command and signalling devices, sensors, display/indicator devices ma = Use in Zone 0, 1, 2, 20, 21, 22 mb = Use in Zone 1, 2, 21, 22	IEC / EN 60079-18
	Ex “op”	Optical radiation op is = Intrinsically safe optical radiation op pr = Protected optical radiation op sh = Shutdown optical radiation	IEC / EN 60079-28
	Ex „t“	Protection by enclosure Switching devices, Terminal boxes, control cabinets ta = Use in Zone 20, 21, 22 tb = Use in Zone 21, 22 tc = Use in Zone 22	IEC / EN 60079-31

IP Protection Classes

IP 1st digit	Contact	Foreign bodies	IP 2nd digit	Water
0	No protection	No protection	0	No protection
1	Large body parts	Solid object > 50 mm	1	Water dripping vertically
2	Finger	Solid object > 12.5 mm	2	Water dripping at angle up to 15°
3	Tool > 2.5 mm	Solid object > 2.5 mm	3	Water sprayed at an angle up to 60°
4	Tool > 1 mm	Solid object > 1 mm	4	Spayed water 360°
5	Complete protection	Dust accumulation	5	Hose water 360°
6	Complete protection	Dust infiltration	6	Strong hose water 360°
			7	Temporary submersion
			8	Submersion

Max. permissible surface temperature	Temperature classes for gases
450°	T1
300°	T2
200°	T3
135°	T4
100°	T5
85°	T6

Explosion groups for gases

Group	Typical gas	Ignition energy
I	Methane	280 µJ
IIA	Propane	> 180 µJ
IIB	Ethylene	60...180 µJ
IIC	Hydrogen	< 60 µJ

Device group I Mining

I M1	Safety provided by 2 safety measures, 2 faults
I M2	Shutdown on occurrence of explosive atmosphere

Device group II All potentially explosive atmospheres except mining

II 1	Zone 0	Zone 20	Safety provided by 2 safety measures, 2 faults
II 2	Zone 1	Zone 21	Safety in the event of frequent equipment malfunctions, 1 fault
II 3	Zone 2	Zone 22	Safety in trouble-free operation

Explosion groups for dusts

Group	Dust
IIIA	combustible flyings
IIIB	non-conductive dust
IIIC	conductive dust

Zone categories, device group II

Hazard	Gas as per IEC / EN	Dust as per IEC / EN
permanent or frequent	Zone 0	Zone 20
occasional	Zone 1	Zone 21
rare, temporary no longer than 30 min per year	Zone 2	Zone 22

Additional conditions

–	No restriction
X	Special conditions
U	Component certification Parts certification

EX Products

EX versions of BERNSTEIN switches with EX approval are available for applications involving potentially gas and dust explosive atmospheres.

Approvals for gas "ii G" and dust "ii D" in accordance with DIN EN 60079-XX

Make use of our Ex protection expertise for your applications.

What is ATEX?

ATEX = Explosive atmosphere (Atmosphère explosible)
The European Directive 2014/34/EU governs the production and the circulation of devices and components for explosive atmospheres in the European Union.
The EN Standards harmonised throughout the EU stipulate that ATEX products approved by a certification authority can be used anywhere throughout the EU.

In most aspects the certification authorities of non-European countries such as North America, Russia etc. closely follow ATEX-relevant standards so that various approvals can be acquired worldwide based on an ATEX approval. Corresponding national approvals are available on request.

Where are devices with EX approval used?

The fields of application for Ex-protected switches include mixing and processing machines in bakeries (flour dust explosion), processing machines in the food industry where spices are mixed (spice dust explosion), sewer manholes, pump stations and sewage treatment plant (explosive gases "fermentation/digester gas"), waste disposal and recycling industry (various sources of dust and gas explosion), automotive industry and wherever paints and lacquers are used (painting booth) in addition to the classic explosion-hazard branches of industry such as the chemical, petrochemical, pharmaceutical industries as well as the coal, gas and oil-producing and processing industries. Mobile equipment and systems such as vacuum cleaners, stacker lift trucks, fans etc. that are used in the above fields of application must exhibit a corresponding EX approval. EX products are therefore a part of our everyday lives.

Who is responsible for what in Ex applications?

The device or component manufacturer must obtain a type approval certificate (ATEX approval) for these devices and components. The machine manufacturer can acquire his system approval based on these approvals and the declaration of conformity.

The manufacturer of a machine or system that is used in Ex applications must obtain a corresponding system approval for the machines it markets. The entire system must be taken into consideration both from a mechanical as well as from an electrical aspect.

In accordance with the ATEX Operator Directive 1999/92/EC (ATEX137), the operator of technical facilities shall be responsible for avoiding or restricting the formation of explosive atmospheres (primary explosion protection), avoiding effective ignition sources (secondary or design explosion protection) and restricting the effect of an explosion to a safe level (tertiary explosion protection).An explosion protection document describing the implemented measures and hazard assessments is to be compiled.

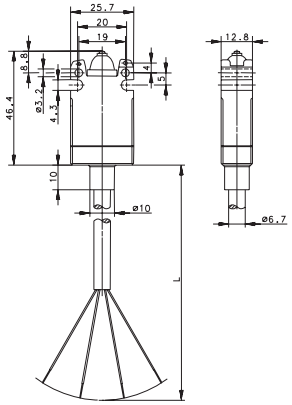
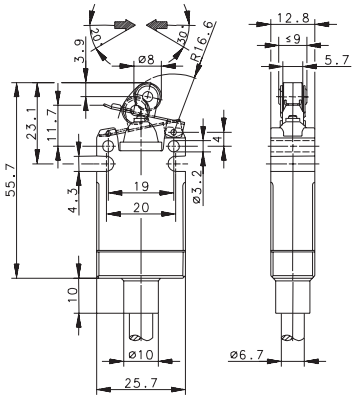
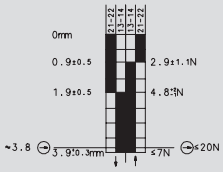
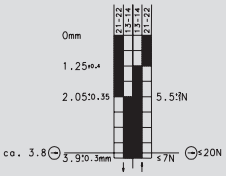
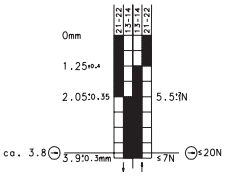
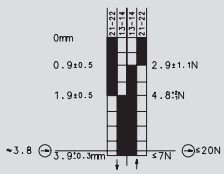
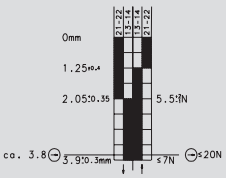
In addition to foot switches and rope pull switches, our current EX-certified product range also includes various standard limit switches, limit switches and miniature limit switches.

Customer-specific individual approvals or approvals for switches and components from the BERNSTEIN range not yet certified are available on request.

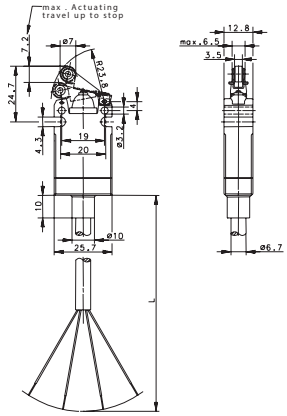
Technical data	EEX	GC, ENM2	SD	F
Electrical data				
Rated insulation voltage U_i max.	250 V	250 V	250 V	250 V
Rated operating voltage U_e max.	230 V AC	230 V AC	230 V AC	230 V AC
Conventional thermal current I_{the}	5 A	5 A	5 A	5 A
Utilisation category: switching capacity	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Mechanical data				
Mechanical switching frequency	max. 120/min.	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical service life	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles
Contact type	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	2 NC /2 NO contact (Zb)
B10d	4 mill.	4 mill.	4 mill.	4 mill.
Short-circuit protection	Fuse 4 A gG (Human protection function)	Fuse 4 A gG (Human protection function)	Fuse 6 A gG	Fuse 4 A gG (Human protection function)
Protection class	II, Insulated	II, Insulated	II, Insulated	II, Insulated
Field of application	II 2G (GAS) / II 2D (DUST)	II 2G (GAS) / II 2D (DUST)	II 2G (GAS) / II 2D (DUST)	II 2G (GAS) / II 2D (DUST)
Admissible ambient temperature	– 20 °C to + 60 °C	– 20 °C to + 60 °C	– 20 °C to + 60 °C	– 20 °C to + 60 °C
Protection class of built-in snap-action switch	IP 66 / IP 67 conforming to IEC/EN 60529	IP 66 / IP 67 conforming to IEC/EN 60529	IP 66 / IP 67 conforming to IEC/EN 60529	IP 66 / IP 67 conforming to IEC/EN 60529
Type of connection	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)
Conductor cross sections	4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²
Enclosure	PEI	Aluminium pressure die-casting	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry	Cast	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5

Technical data	SN2	SI2 U2Z AW	SI2 U2Z AK	
Electrical data				
Rated insulation voltage U_i max.	400 V AC	400 V AC	400 V AC	
Rated operating voltage U_e max.	240 V	240 V	240 V	
Conventional thermal current I_{the}	10 A	10 A	10 A	
Utilisation category: Switching capacity	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	
Mechanical data				
Mechanical Switching frequency	≤ 60/min.	≤ 10/min.	≤ 10/min.	
Mechanical service life	10 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	
Actuation	Spindle-mounted lever (Zn-Al), Roller (thermoplastic)	Roller lever (St)	Lever (St)	
Ambient temperature	– 20 °C to + 80 °C	– 20 °C to + 60 °C	– 20 °C to + 60 °C	
Contact type	1 NC /1 NO contact	2 NC /2 NO contact (Zb)	2 NC /2 NO contact (Zb)	
B10d	20 mill.	4 mill.	4 mill.	
Short-circuit protection	Fuse 2 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	
Protection class	I	I	I	
Field of application	II 2D (DUST)	II 2D (DUST)	II 2D (DUST)	
Surface temperature T	85 °C	80 °C	80 °C	
Protection class	IP 65 conforming to IEC/EN 60529	IP 65 conforming to IEC/EN 60529	IP 65 conforming to IEC/EN 60529	
Type of connection	Contact screws	Screw connections	Screw connections	
Conductor cross sections	Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	
Enclosure	Aluminium pressure die-casting	Cast iron	Cast iron	
Cable entry	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	
Standards				

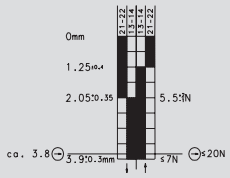
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1
EN 60079-0, DIN EN 60079-0
EN 60079-1, DIN EN 60079-1
EN 60079-31, DIN EN 60079-31
Directive 2014/34/EU

	EEX W	EEX RH
		
2 meter connection cable	**6090153002** EEX-SU1Z W -2M- 	**6090148022** EEX-SU1Z RH -2M- 
5 meter connection cable		**6090148024** EEX-SU1Z RH -5M- 
9 meter connection cable	**6090153005** EEX-SU1Z W -9M- 	**6090148025** EEX-SU1Z RH -9M- 
EX certification	II 2G Ex db IIC T6 Gb II 2D Ex tb IIIC T80°C Db	II 2G Ex db IIC T6 Gb II 2D Ex tb IIIC T80°C Db
Certificates	TÜV 03 ATEX 2021X	TÜV 03 ATEX 2021X

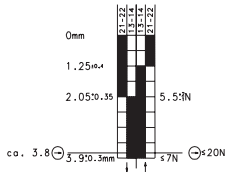
EEX RHL



6090149027
EEX-SU1Z RHL -2M-



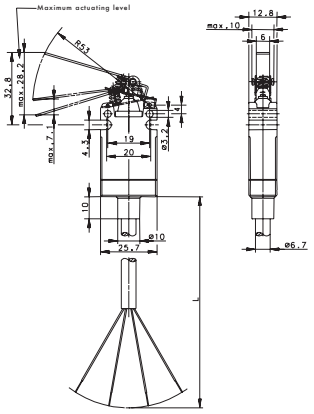
6090149029
EEX-SU1Z RHL -5M-



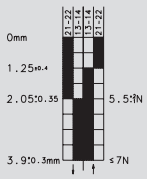
II 2G Ex db IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2021X

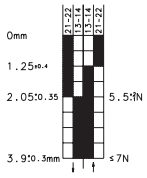
EEX UH



6090146012
EEX-SU1 UH -2M-



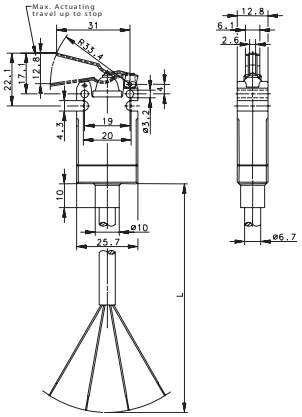
6090146014
EEX-SU1 UH -5M-



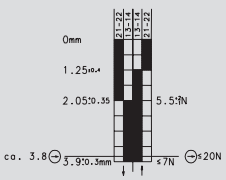
II 2G Ex db IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2021X

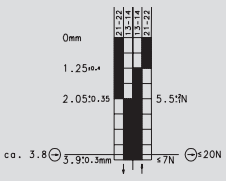
EEX FH



6090145007
EEX-SU1Z FH -2M-

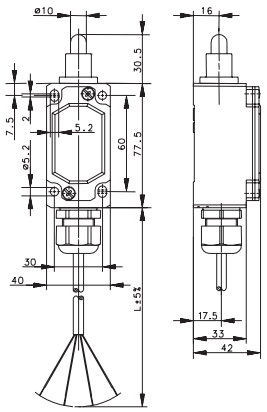
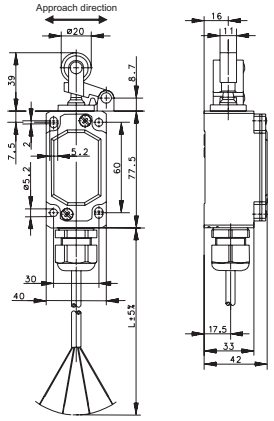
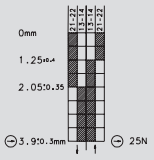
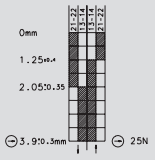
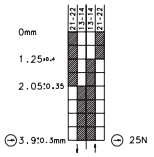
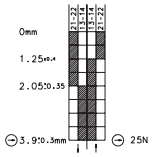
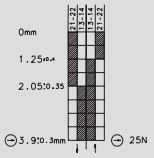
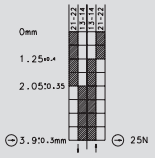


6090145010
EEX-SU1Z FH -9M-

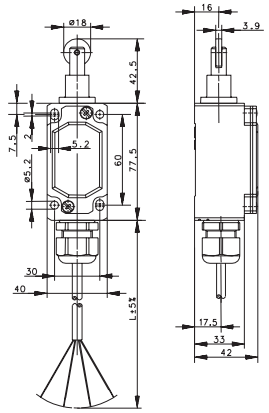


II 2G Ex db IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

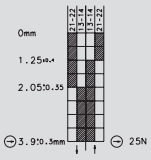
TÜV 03 ATEX 2021X

	ENM2 IW	ENM2 HW
		
2 meter connection cable	**6097152052** ENM2-SU1Z EX IW -2M- 	**6097171072** ENM2-SU1Z EX HW -2M- 
5 meter connection cable	**6097152054** ENM2-SU1Z EX IW -5M- 	**6097171074** ENM2-SU1Z EX HW -5M- 
9 meter connection cable	**6097152055** ENM2-SU1Z EX IW -9M- 	**6097171075** ENM2-SU1Z EX HW -9M- 
EX certification	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db
Certificates	TÜV 03 ATEX 2043X	TÜV 03 ATEX 2043X

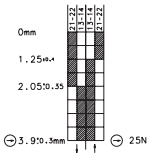
ENM2 RIW



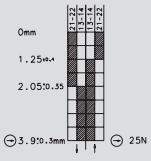
6097167062
ENM2-SU1Z EX RIW -2M-



6097167064
ENM2-SU1Z EX RIW -5M-



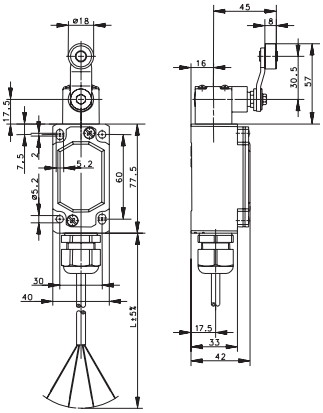
6097167065
ENM2-SU1Z EX RIW -9M-



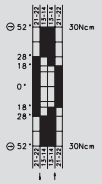
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

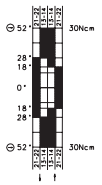
ENM2 AHT



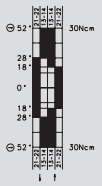
6097185082
ENM2-SU1Z EX AHT -2M-



6097185084
ENM2-SU1Z EX AHT -5M-



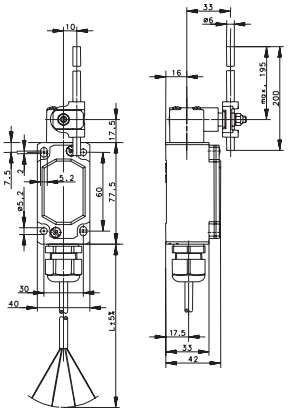
6097185085
ENM2-SU1Z EX AHT -9M-



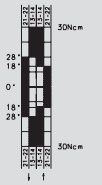
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

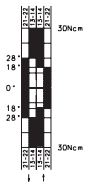
ENM2 AD



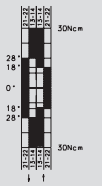
6097187092
ENM2-SU1 EX AD -2M-



6097187094
ENM2-SU1 EX AD -5M-

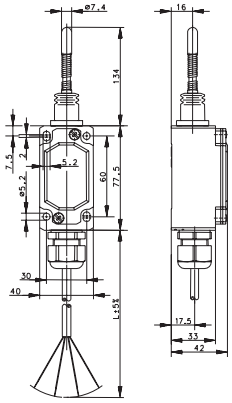
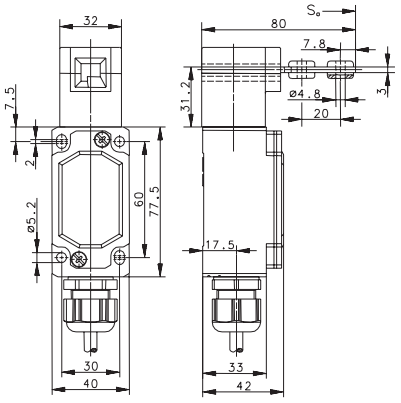
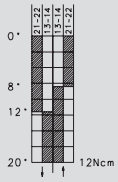
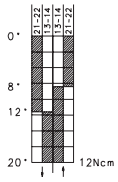
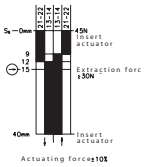
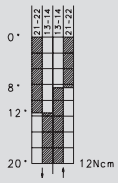


6097187095
ENM2-SU1 EX AD -9M-

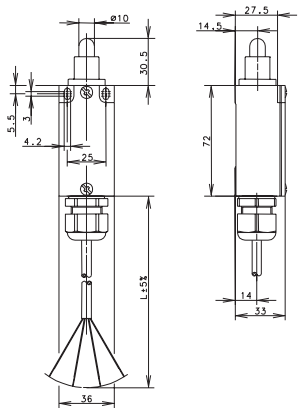


II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

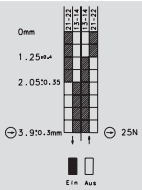
TÜV 03 ATEX 2043X

	ENM2 FF	ENM2 VTW
		
2 meter connection cable	**6097190097** ENM2-SU1 EX FF -2M- 	
5 meter connection cable	**6097190099** ENM2-SU1 EX FF -5M- 	**6197100010** ENM2-SU1Z EX VTW -5M- 
9 meter connection cable	**6097190100** ENM2-SU1 EX FF -9M- 	
EX certification	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db
Certificates	TÜV 03 ATEX 2043X	TÜV 03 ATEX 2043X

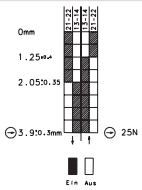
GC IW



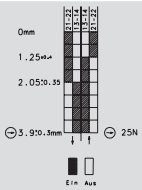
6092152002
GC-SU1Z EX IW -2M-



6092152004
GC-SU1Z EX IW -5M-



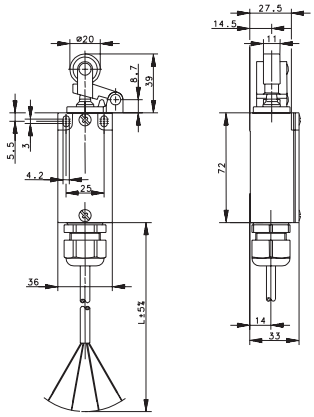
6092152005
GC-SU1Z EX IW -9M-



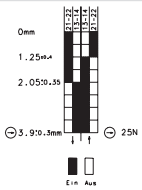
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

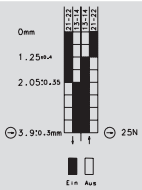
GC HW



6092171024
GC-SU1Z EX HW -5M-



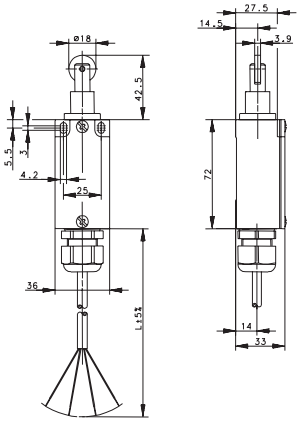
6092171025
GC-SU1Z EX HW -9M-



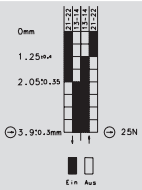
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

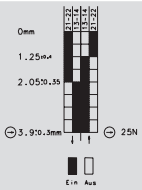
GC RIW



6092167012
GC-SU1Z EX RIW -2M-



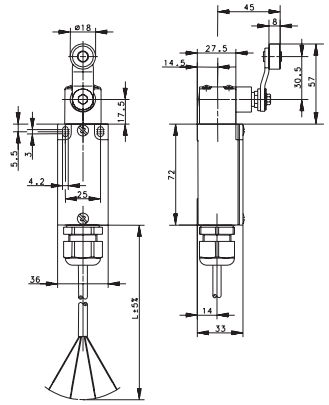
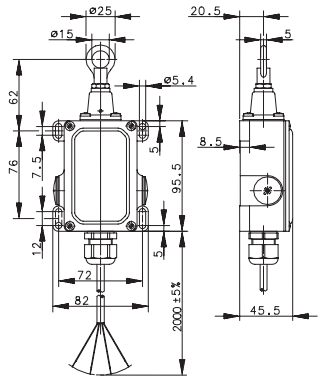
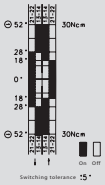
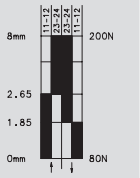
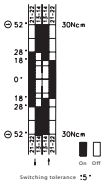
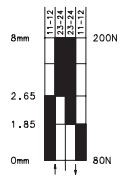
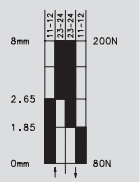
6092167015
GC-SU1Z EX RIW -9M-



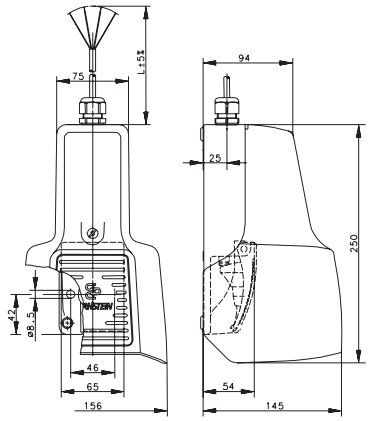
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

EX Products

	GC AHT	SD
		
2 meter connection cable	**6092185032** GC-SU1Z EX AHT -2M- 	**6091100002** SD-SU1 EX -2M- 
5 meter connection cable	**6092185034** GC-SU1Z EX AHT -5M- 	**6091100004** SD-SU1 EX -5M- 
9 meter connection cable	**6092185035** GC-SU1Z EX AHT -9M- 	**6091100005** SD-SU1 EX -9M- 
EX certification	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db
Certificates	TÜV 03 ATEX 2043X	TÜV 03 ATEX 2043X

F1 UN



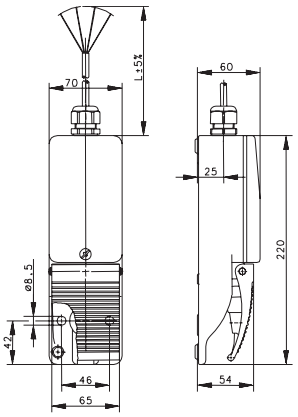
6096197017
F1-SU1Z EX UN -2M-

6096197019
F1-SU1Z EX UN -5M-

II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

F1

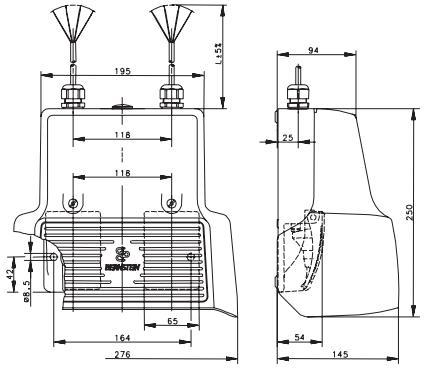
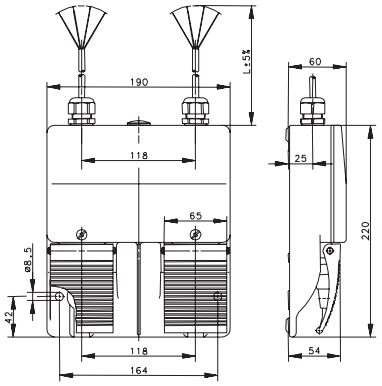


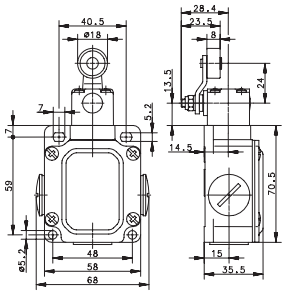
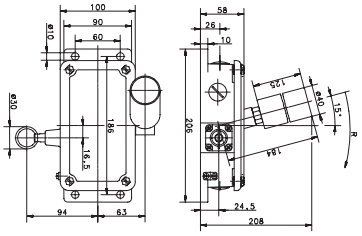
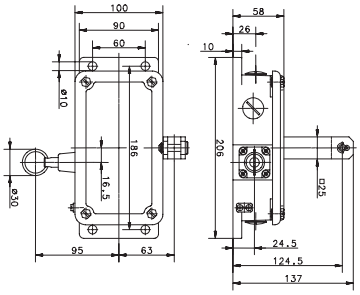
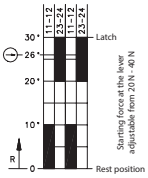
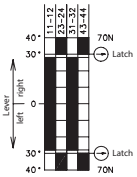
6096198014
F1-SU1Z EX -5M-

II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

TÜV 03 ATEX 2043X

EX Products

	F2 UN	F2
		
2 meter connection cable		**6096198022** F2-SU1Z/SU1Z EX -2M-
5 meter connection cable	**6096197029** F2-SU1Z/SU1Z EX UN -5M-	
9 meter connection cable		
EX certification	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T80°C Db
Certificates	TÜV 03 ATEX 2043X	TÜV 03 ATEX 2043X

	Explosion-protected metal-enclosed switch SN2	Series SI2	Series SI2
			
1 NC /1 NO contact	**6193285001** SN2-SU1Z AH EXD 180 Gr. 		
2 NC /2 NO contacts		**6091295025** SI2-U2Z AW EXD 	**6091288024** SI2-U2Z AK EXD 
EX certification	II 2 D Ex tb IIIC T85 °C	II 2 D Ex tb IIIC T80°C Db	II 2 D Ex tb IIIC T80°C Db
Certificates	IBExU 10 ATEX 1024	IBExU 13 ATEX 1115	IBExU 13 ATEX 1115