



**EN** Operating instructions. . . . .pages 1 to 8  
Original

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**1. About this document**

**1.1 Function**

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

**1.2 Target group: authorised qualified personnel**

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

**1.3 Explanation of the symbols used**



**Information, hint, note:**

This symbol indicates useful additional information.



**Caution:** Failure to comply with this warning notice could lead to failures or malfunctions.

**Warning:** Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

**1.4 Appropriate use**

The Schmersal range of products is not intended for private consumers.

It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The product must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

**1.5 General safety instructions**

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: [products.schmersal.com](http://products.schmersal.com).

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

**1.6 Warning against improper use**



In case of inadequate or improper use or manipulations of the component, personal hazards or damage to machinery or plant components cannot be excluded. The requirements of the relevant standards must be observed.

### 1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden, the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

## 2. Product description

### 2.1 Ordering code

This operating instructions manual applies to the following types:

#### EX-① 441-11Y-②-③-④ Belt alignment- and slack-wire switches

No.	Option	Description
①	M.	Snap action
	T.	Slow action
②	UE	Slow action with overlapping contacts
③	243	Belt alignment lever, roll 50 x Ø 25 mm
	966	Belt alignment lever, roll 65 x Ø 32 mm
	1224	Belt alignment lever, roll 100 x Ø 32 mm
	14	Slack wire lever
④	1276-2	Gold-plated contacts 0.3 µm

#### EX-① 441-11Y-②-③-④ Position switches

No.	Option	Description
①	M.	Snap action
	T.	Slow action
②	UE	Slow action with overlapping contacts
③	1276-2	Gold-plated contacts 0.3 µm
④		Smooth shaft (standard)
	1801	Serrated shaft (10° steps)

The position switches have a modular design and are delivered without an actuating element. By combining them with a specific actuating element, different functions can be mapped. For levers and dimensions see 3.2.



Only if the information described in this operating instructions manual are realised correctly, the compliance with the Explosion Protection Directive is maintained.

### 2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

### 2.3 Purpose

Belt alignment switches and slack-wire switches are suitable for use on material handling equipment. Belt-alignment switches monitor straight running on conveyors and are arranged in pairs on both sides of the conveyor belt near the drive and deflection rollers. In case of deviations of the conveyor belt, a staggered signal is generated to warn or switch off the conveyor belt (see switching angle diagrams). The unit is suitable for harsh environmental conditions.

The slack-wire switch monitor the wire tension. If the wire is properly tensioned, the switch is actuated.

Position switches are used wherever moving parts on machinery and plants need to be positioned, controlled and monitored.

### 2.4 Purpose for explosion protection

The components can be used in explosion-endangered areas of Zone 21 and 22 equipment category 2D and 3D. The installation and maintenance requirements to the standard series 60079 must be met.

### 2.5 Technical data

Marking in accordance with ATEX Directive:	Ⓢ II 2D
Marking in accordance with standards:	Ex tb IIIC T90°C Db
Applied standards:	EN 60947-5-1
- ATEX:	EN IEC 60079-0, EN 60079-31
- IECEX:	IEC 60079-0, IEC 60079-31
- INMETRO:	ABNT NBR IEC 60079-0, ABNT NBR IEC 60079-31
Certificate number:	
- ATEX:	BVS 08 ATEX E 157
- IECEX:	IECEX BVS 09.0004
- INMETRO:	TÜV 23.0855
Enclosure:	Grey cast iron, galvanized and painted
Actuating speed:	max. 1 m/s
Max. impact energy:	7 J
Max. surface temperature:	+90 °C
Degree of protection:	IP65, IP66 and IP67 to EN 60529 IP66 to the standard series 60079
Contact material:	silver, gold-flashed
Switching system:	snap and slow action with double break
Contact type:	Snap action: change-over contact, Slow action: positive break NC contact ⊖; double break of 2 separated contact bridges
Cable entry:	M20 × 1.5
Connection:	Screw terminals M4
Conductor type:	rigid, single-wire or flexible
Max. cable section:	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Rated impulse withstand voltage U <sub>imp</sub> :	
- Snap action:	4 kV
- Slow action:	6 kV
Overvoltage category:	III
Degree of contamination:	2
Rated insulation voltage U <sub>i</sub> :	
- Snap action:	250 V
- Slow action:	400 V
Thermal test current I <sub>the</sub> :	16 A
Utilisation category:	AC-15
Rated operating current/voltage I <sub>g</sub> /U <sub>g</sub> :	Snap action: 4 A / 230 V Slow action: 4 A / 400 V
Max. fuse rating:	16 A gG D-fuse
Required short-circuit current:	1,000 A
Contact break:	Snap action: max. 2 × 6.0 mm
Switchover time:	Snap action: 35 ms
Bounce duration:	Snap action: 5 ms
Ambient temperature:	-20 °C ... +60 °C
Mechanical life:	1,000,000 operations
Switching frequency:	max. 500/h
Belt speed:	max. 30 km / h
Max. operating hours belt alignment switch lever:	25,000 h
Tightening force:	Cover screws: 1 Nm Earth screws: PE 1 Nm, PA 1.2 Nm

### 3. Mounting

#### 3.1 General mounting instructions



The installation may only be carried out with the system de-energised and by authorised personnel.

Two mounting holes are available. The use of a protective ground wire is imperative.

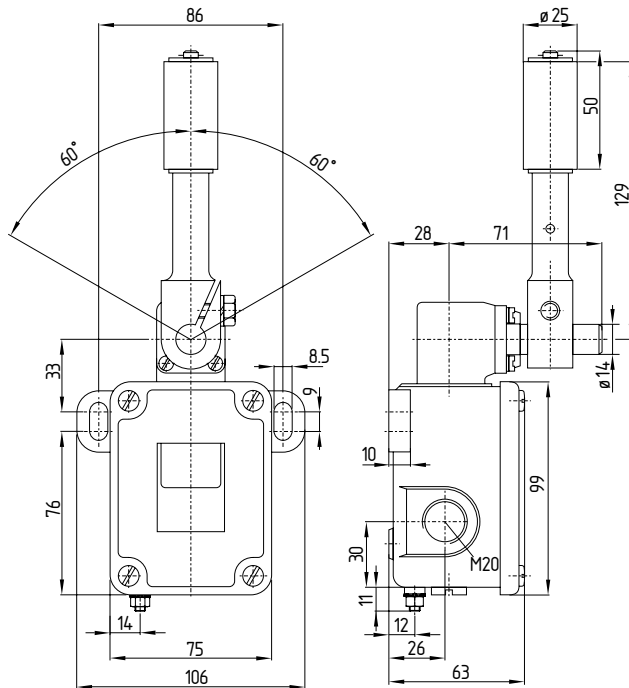


Please observe the recommendations regarding maximum belt speed, operating hours, operating speed and tightening torque in the technical data.

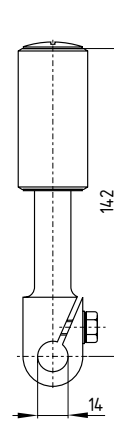
#### 3.2 Dimensions

All measurements in mm.

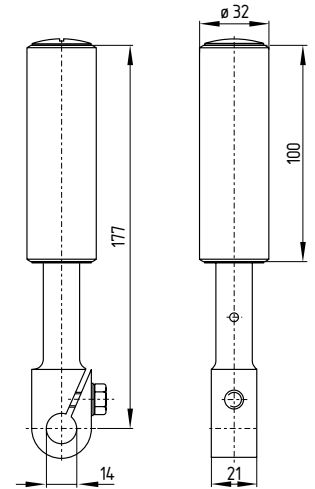
Belt alignment switch EX-T/M. 441-11Y-.243 with lever -243



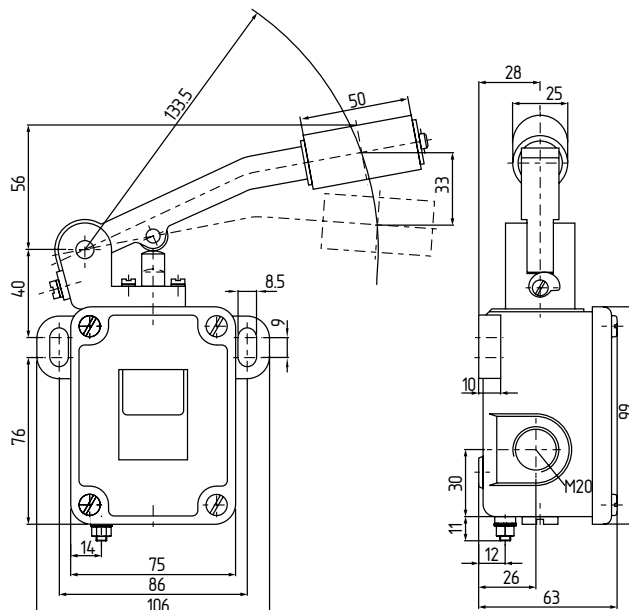
Lever -966



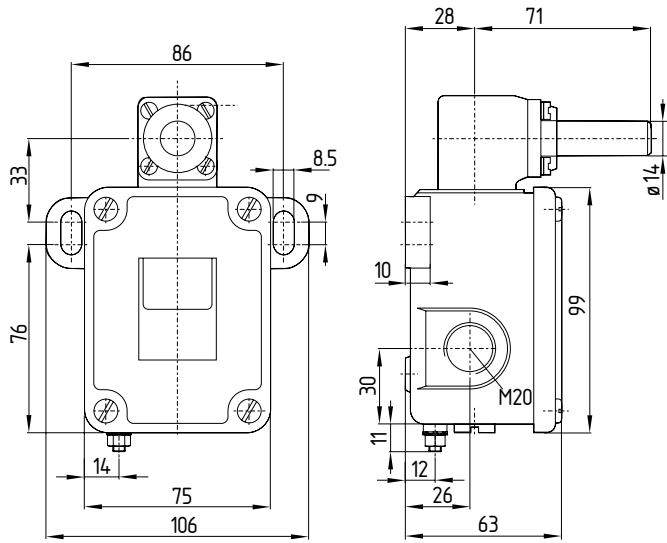
Lever -1224



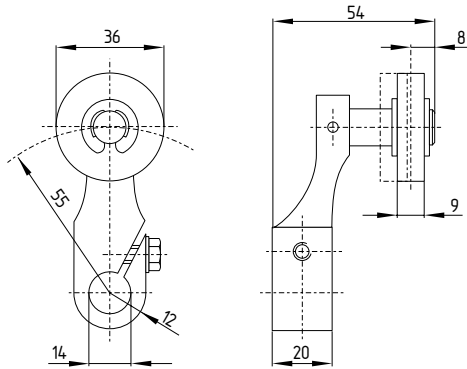
Slack-wire switch EX-T/M. 441-11Y-.14



Position switch EX-T/M. 441-...

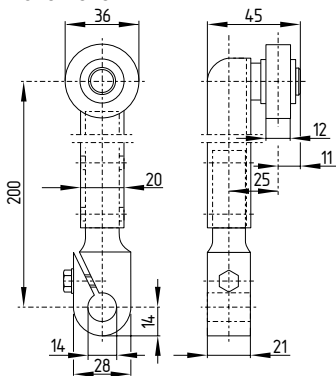


Roller lever L



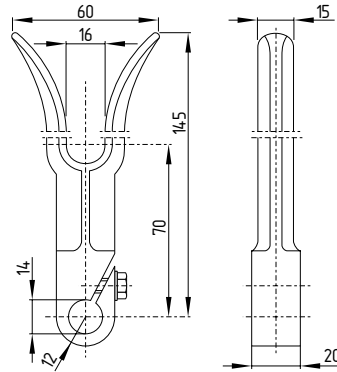
- Actuating speed max. 3 m/s, min. 0.05 m/s with an actuating angle of  $\alpha$  and  $\beta = 30^\circ$
- Continuous adjustment of lever position  $360^\circ$
- Splined shaft and lever available with  $10^\circ$  tothing

Roller lever V



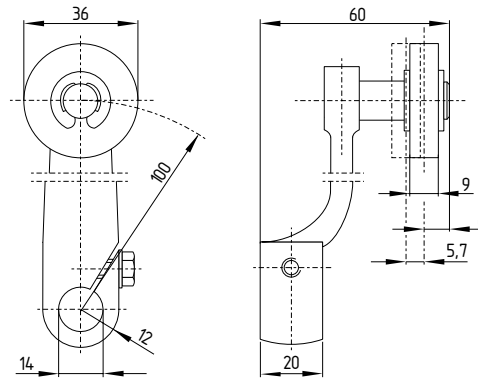
- Actuating speed max. 3 m/s, min. 0.05 m/s with an actuating angle of  $\alpha$  and  $\beta = 30^\circ$
- Continuous adjustment of lever position  $360^\circ$
- Splined shaft and lever available with  $10^\circ$  tothing

Fork lever C



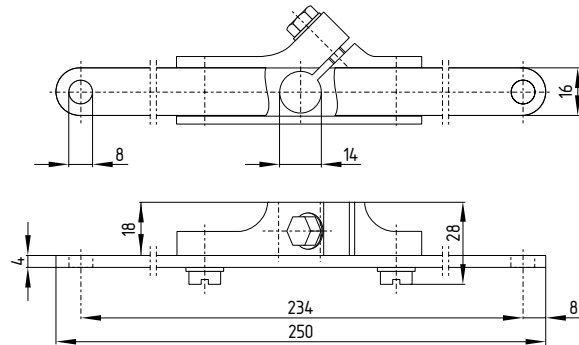
- Continuous adjustment of lever position  $360^\circ$
- Splined shaft and lever available with  $10^\circ$  tothing

Roller lever A



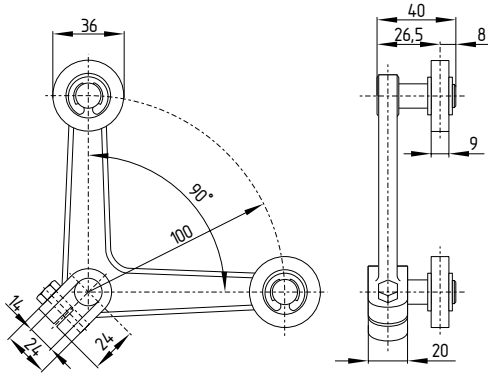
- Actuating speed max. 3 m/s, min. 0.05 m/s with an actuating angle of  $\alpha$  and  $\beta = 30^\circ$
- Continuous adjustment of lever position  $360^\circ$
- Splined shaft and lever available with  $10^\circ$  tothing

Pull lever Z



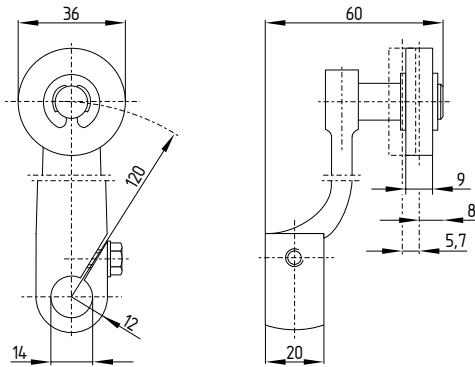
- Continuous adjustment of lever position  $360^\circ$
- Splined shaft and lever available with  $10^\circ$  tothing

Offset roller lever 4D



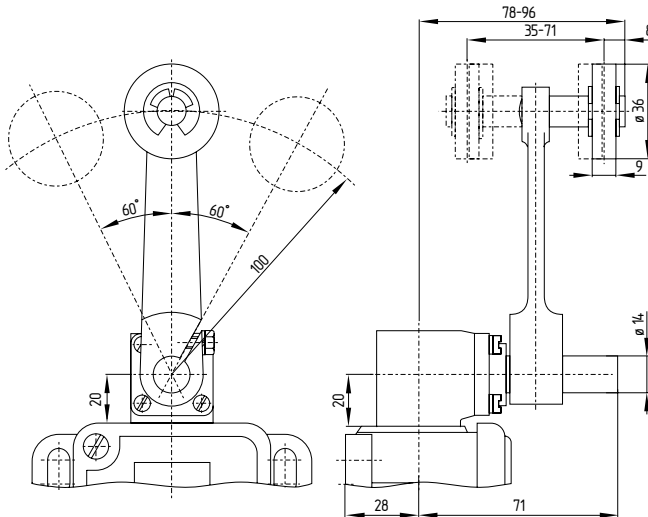
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° tothing

Roller lever 2A



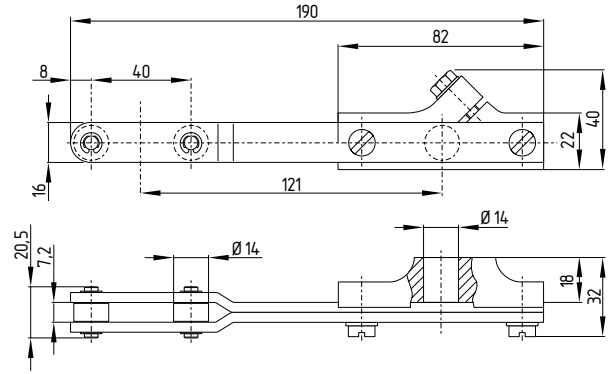
- Actuating speed max. 3 m/s, min. 0.05 m/s with an actuating angle of  $\alpha$  and  $\beta = 30^\circ$
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° tothing

Roller lever D



- Actuating speed max. 3 m/s with an actuating angle of  $\alpha$  and  $\beta = 30^\circ$
- in the temperature-resistant version, the roller can be fitted onto the shaft in 2 different positions
- Continuous adjustment of lever position 360°
- 180° repositioning of the actuator head on the shaft
- Actuator head can be repositioned in steps 4 x 90°
- With metal roller available on request
- Splined shaft and lever available with tothing

Pull lever 2Z



- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° tothing

Key

$\alpha$  = Actuating angle from right of switch axis  
 $\beta$  = Actuating angle from left of switch axis

4. Electrical connection

4.1 General information for electrical connection



The electrical connection may only be carried out by authorised personnel in a de-energised condition.

Settle length  $x$  of the conductor: 8 mm



EX cable glands and EX locking screws are not included in the delivery. Only use EX cable glands and EX locking screws with integrated or associated seals which are authorised for the corresponding field of application. The EX cable glands must be fitted in accordance with the applicable operating instructions manual. EX cable glands are only authorised for permanent cables. The constructor must provide for the necessary strain relief. Unused cable entries must be sealed by means of approved EX locking screws.

After wiring, the cover screws must be tightened uniformly. Tightening torque cover screws: 1 Nm



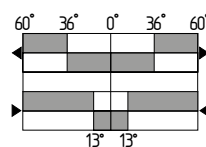
The external protective conductor terminal is to be connected in accordance with EN 60079-14 section 6.3. A ring tongue size M5 must be used to connect the protective conductor.

4.2 Switch travel diagrams

All NC contacts of the slow action have positive break  $\ominus$ .

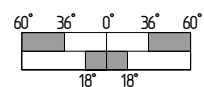
Snap action

1 NO / 1 NC



Slow action

1 NO / 1 NC



Key:

- Contact closed
- Contact open

**5. Set-up and maintenance**

**5.1 Functional testing**

The function of the component must be tested. The following conditions must be previously checked and met:

1. The installation is executed according to the instructions
2. The connection is executed correctly
3. The cable is correctly executed and connected.
4. The component is not damaged
5. Check for free movement of the actuating element
6. Remove particles of dust and soiling
7. Check cable entry and connections in a de-energised condition

**5.2 Maintenance**

In case of correct installation in accordance with the above-described instructions, the component requires little maintenance. For use in extreme conditions, we recommend routine maintenance including the following steps:

1. Check the free movement of the actuating element
2. Remove particles of dust and soiling
3. Check the correct fixing of the cover screws
4. Check for damages and correct fixing
5. Check cable entry and connections in a de-energised condition
6. Lubricate the shaft or plunger (if necessary)
7. Check the pulley of the belt shift lever for ease of movement every 6 months.



Do not open the device when live.

**For explosion protection reasons, the component must be exchanged after max. 1 million operations.**

**Damaged or defective components must be replaced.**

**6. Disassembly and disposal**

**6.1 Disassembly**

The product must be disassembled in a de-energised condition only.

**6.2 Disposal**

The product must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. EU Declaration of conformity

EU Declaration of conformity



Original  
K.A. Schmersal GmbH & Co. KG  
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42279 Wuppertal  
Germany  
Internet: www.schmersal.com

We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

**Name of the component:** EX-T/M 441

**Type:** see ordering code

**Marking:** II 2D Ex tb IIIC T90°C Db

**Description of the component:** Belt alignment switch / Slack-wire switch / Position switch

**Relevant Directives:** 2014/34/EU Explosion Protection Directive (ATEX)  
2011/65/EU RoHS-Directive

**Applied standards:** EN 60947-5-1:2017 + AC:2020  
EN IEC 60079-0:2018  
EN 60079-31:2014

**Notified body, which approved the full quality assurance system, referred to in Appendix IV, 2014/34/EU:** TÜV Rheinland Industrie Service GmbH  
Am Grauen Stein  
51105 Köln  
ID n°: 0035

**Notified body:** DEKRA Testing and Certification GmbH  
Dinnendahlstraße 9  
44809 Bochum  
ID n°: 0158

**EU-type examination certificate:** BVS 08 ATEX E 157

**Person authorised for the compilation of the technical documentation:** Oliver Wacker  
Möddinghofe 30  
42279 Wuppertal

**Place and date of issue:** Wuppertal, November 24, 2022

EX-TM441-H-EN

Authorised signature  
**Philip Schmersal**  
Managing Director



The currently valid declaration of conformity can be downloaded from the internet at [products.schmersal.com](http://products.schmersal.com).



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