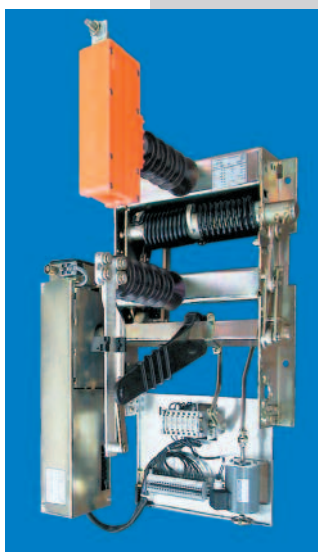
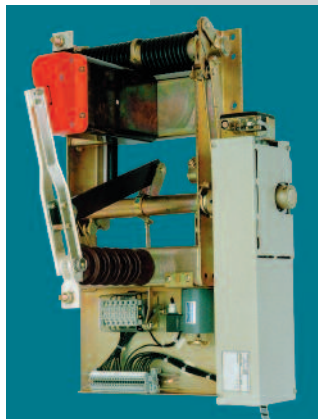


Operating, Assembly and Maintenance Instructions for

DRIESCHER - Indoor switch-disconnectors for railway applications

- single-pole
- Rated voltage up to 27.5 kV
- Rated current up to 630 A



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DRIESCHER - Indoor switch disconnecter for railways

Acc. to EN 50152-2

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Warning

During the operation of these electrical switches certain parts are inevitably exposed to dangerous voltage and mechanical parts may move very quickly, also under remote control.

There is a risk of serious injury to the body or to property if the warning notes are not correctly observed. Only appropriately trained personnel as defined in VDE 0105 regulations are to work on this equipment or in the vicinity thereof.

These persons are to be completely familiar with all general regulations; VDE/IEC regulations, 5 safety regulations according to VDE, safety regulations, accident prevention regulations as well as all warnings and maintenance measures as specified in these operating instructions. Correct transport, appropriate storage, mounting and assembly as well as the correct operation and maintenance are prerequisites for the satisfactory and safe operation of this equipment.

General technical description

These Driescher indoor switches are specifically designed for railway applications and comply with the specifications in compliance with EN 50152-2. The single-pole switches can be used for a rated voltage of Un 15 kV or 27.5 kV depending on the design and a rated current range of In 400 A or 630 A.

Switch design:

The switch disconnectors are generally fitted with an energy storage mechanism for fast on and off switching.

The baseframe as well as all steel parts are provided with a galvanized surface protection corresponding to QTL 0200, which offers excellent resistance to corrosion.

For insulation to earth the insulators of cycloaliphatic cast resin are used, which have proved their worth for decades.

The live components are of electrolyte copper with electro silver plating, in compliance with QTL 0200.

Transport and Storage

Unpack the switches carefully after delivery and look out for any damage caused during transportation. If you discover any damage please report this immediately and contact the shipping company. After unpacking, clean all switchgear equipment and accessories and remove any soiling through packing material, make sure to protect all equipment from damage, moisture and contamination prior to installation.

Caution! The switch **may switch off immediately** if handled incorrectly. When transporting the switches only hold at the frame, **never** pick them up at the current paths (contact blades etc.) or at the switching mechanisms (e.g. latching mechanism. Fig. 7,8). Carefully clean switches and elements of the operating mechanism to remove dust and assembly swarf and clean all insulating parts with a clean dry cloth.

Operation conditions

The use of switchgears under normal operating conditions is specified in the EN 62271-1 as follows:

- The maximum ambient temperature is 40 °C, the average value over a period of 24 h is max. 35 °C. The minimum ambient temperature is –5 °C. For our indoor switches the class "Minus 5 indoors" is specified.
- Solar radiation has no significant impact.
- The altitude at the place of installation is max. 1000 m above sea level.
- The ambient air is to have no significant contamination through dust, smoke, corrosive and/or flammable gasses, fumes or salts.
- The following conditions apply with regard to humidity:
 - average value of relative air moisture measured over 24 h is max. 95 %,
 - average value of water vapour pressure over 24 h is max. 2.2 kPa;
 - average value of the relative air moisture over a period of one month is max. 90%
 - average value of the water vapour pressure over one month is max. 1.8 kPa;

Maintenance

General:

The indoor switches for railways manufactured by DRIESCHER comply with the EN specification EN 50152-2 valid at the time of the type tests.

This specification refers, among other things, to the individual switchgear standards of the switch disconnectors EN 62271-103.

The switch disconnectors are classified as switches for general requirements in compliance with the mechanical endurance test for Class 1 (corresponding to 1000 switching operations).

Visual check, inspection

To carry out the annual visual inspection the switch does not have to be safety isolated.

For indoor switch disconnectors check the following points to assess the general condition of the switch:

- Is there any external damage, wear (e.g. contact erosion etc.) or extreme contamination to be seen ?
- Does the switch attain the specified switching positions (ON and OFF) ?
- Are there any visible or audible discharge phenomena across isolating distances (e.g. sparking)?

Maintenance



Prior to commencing work, the working area must be isolated and safeguarded observing the 5 safety regulations in compliance with DGUV V3 (regulations of the statutory insurance institute of the industry). Always observe the local safety regulations.

Repair work



Worn or damaged switch components are not to be repaired or reworked, but must be replaced with original DRIESCHER - accessories.

Maintenance and repair measures as well as any subsequent conversion work is only to be carried out by the DRIESCHER-Service or by trained personnel authorised by us, this being due to the required skilled adjustment.

Maintenance category	Maintenance interval
Inspection	Once a year (recommended)
Maintenance	As necessary, at the latest 10 years after delivery
Corrective maintenance	As necessary, at the latest 20 years after delivery or 1000 switching operations

Mounting:

Unless specified otherwise, the switches are designed for vertical assembly on frames or walls. Switches for horizontal installation or for assembly on ceilings are already appropriately adjusted at the factory and marked. Always observe the following when mounting the switches:

- It is recommended to mount the switches on accurately aligned cross rails.
- Do not distort the baseframe of the switch when tightening the fastening bolts (min. M10) (use shims if necessary).
- When connecting the connecting rails or cable end fittings there must be no thrust, pulling or twisting forces acting on the switch connections (hold in place with a second wrench!) Tighten connecting bolts M12 to a torque of 70 Nm.
- After completing the mounting carry out several test switching operations in de-energized condition. In order to do so, check whether the contact blades (6) are centred when they enter the impact contact jaw (19).

Providing earthing connections

There are appropriate bores provided in the baseframe for taking up the earthing screw M12.

The minimum cross section of the connection wires for equipotential bonding should be 50 mm².

When mounting on an earthed frame the required connection to earth can already be carried out using corresponding contact washers when fastening the switch.

Secondary connections

Provide the auxiliary switch connections as shown in the enclosed wiring diagram.

Secondary wires are to be shielded against the high voltage area.

Commissioning:

The function test must be carried out in off-load condition. In doing so, make sure that during the On and Off switching the end stop positions (15) of the operating shaft (17) are reliably attained.

Testing the motor-operated mechanism

At 85 % and 110 % of the rated supply voltage the motor-operated mechanism (13) must move the operating shaft (17) of the switch into the two end stop positions (15) (switching angle 90°) without impairment of function. In the course of this, check the correct make and break function of the switch.

The switch can be operated when de-energized using the emergency crank lever (see page 12, manually operated emergency crank).

Testing the auxiliary switch: (optional)

The auxiliary switches (11) are factory set and tested on all functions. A function check is to be done after the assembly works. Supposed that an auxiliary switch is mistakenly adjusted during transport or assembly works, it is to be checked and if necessary readjusted. Please contact DRIESCHER-Service.

Testing the tripping solenoid:

The tripping solenoid (10) must operate satisfactorily at supply voltages of between 70 % with DC or 85 % with AC and 110 % of the rated supply voltage of the drive.

Visual check / inspection:

The required measures are specified on Page 3. In addition to this, these indoor switch disconnectors are to be inspected after every switching-on operation under short circuit conditions.

The possible requirement of maintenance or repair cannot be ruled out due to the exceptional load.

Maintenance:

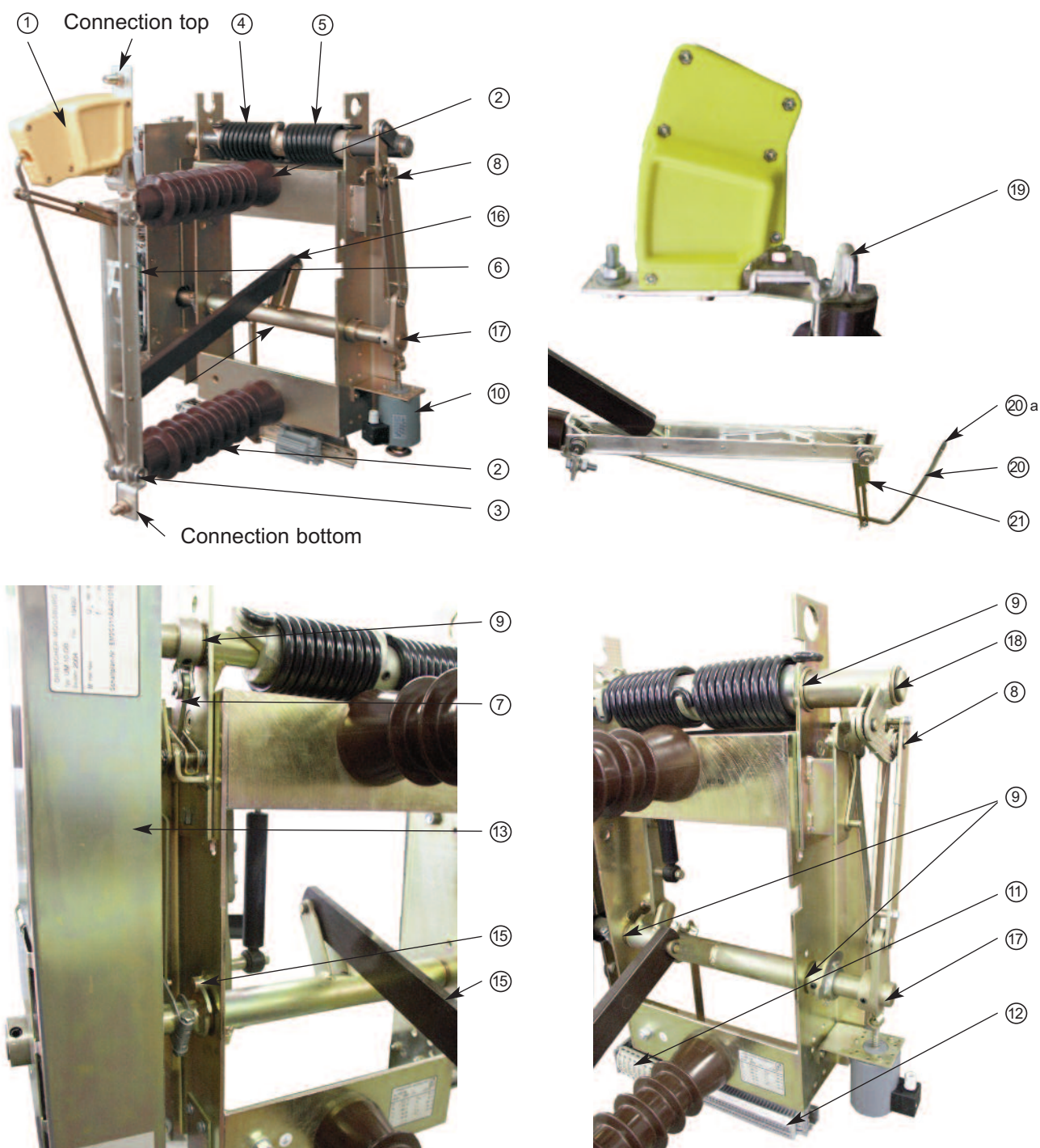
- Check all screw connections of the connecting rails and the switch mounting.
- Lubricate all friction bearings (9) of the operating shaft (17) and energy storage mechanism shaft (18) and joints of the switching mechanism as well as the latching mechanism (7,8) with Rivolta S.K.D. 16 N.
- Clean connecting rails, insulators (2), actuating rods (16) as well as arcing chambers (1) with Rivolta M.T.X 60 forte (of Bremer & Leguil) and then dry them with a cloth.
- Check that the contact blades (6) strike correctly in the centre of the contact jaw (19).
- Check wear of contact surfaces on the contact blades (6) and at the contact jaw (19), replace contact blade if necessary.¹⁾
- Check wear at contact erosion tip (20a) on the lagging contact (20). Max. 2 mm erosion at the tip (20a).
- Clean contact blades (6) with a cloth soaked in Rivolta S.K.D. 16 N and then lubricate with Rivolta S.K.D 4002 (of Bremer & Leguil).
- If there is excessive wear of the silver plating (copper is visible) replace the contact parts (3, 6 and 19).¹⁾
- Check lagging contact (20) for ease of movement in elongated hole of disconnecting linkage (21).
- Carry out several test switching operations and check satisfactory function.

CAUTION!

Do not lubricate the contact erosion tip (20a) of the lagging contact.

¹⁾ Always consult DRIESCHER-Service.

Mounting, commissioning, maintenance of switch-disconnector H22-1B; Un 27.5 kV



① Arcing chamber

② Insulators

③ Pivot contact

④ Energy storage mechanism, ON spring actuator

⑤ Energy storage mechanism, OFF spring actuator

⑥ Disconnecting blade set

⑦ Latching mechanism ON

⑧ Latching mechanism OFF

⑨ Bearing points of energy storage mechanism and operating shaft

⑩ Tripping solenoid

⑪ Auxiliary switch

⑫ Terminal strip

⑬ Motor-operated mechanism

⑮ Stop of operating shaft

⑮ Actuating rod

⑰ Operating shaft

⑱ Energy storage mechanism shaft

⑲ Contact jaw

⑳ Lagging contact

⑳^a Contact erosion tip

㉑ Disconnecting linkage

Mounting:

Unless specified otherwise, the switches are designed for vertical assembly on frames or walls. Switches for horizontal installation or for assembly on ceilings are already appropriately adjusted at the factory and marked. Always observe the following when mounting the switches:

- It is recommended to mount the switches on accurately aligned cross rails.
- Do not distort the baseframe of the switch when tightening the fastening bolts (min. M10) (use shims if necessary).
- When connecting the connecting rails or cable end fittings there must be no thrust, pulling or twisting forces acting on the switch connections (hold in place with a second wrench!) Tighten connecting bolts M12 to a torque of 70 Nm.
- After completing the mounting carry out several test switching operations in de-energized condition. In order to do so, check whether the disconnecting blade (6) strike correctly in the centre of the arcing chamber (1).

Providing earthing connections

There are appropriate bores provided in the baseframe for taking up the earthing screw M12. The minimum cross section of the connection wires for equipotential bonding should be 50 mm². When mounting on an earthed frame the required connection to earth can already be carried out using corresponding contact washers when fastening the switch.

Secondary connections

Provide the auxiliary switch connections as shown in the enclosed wiring diagram. Secondary wires are to be shielded against the high voltage area.

Commissioning:

The function test must be carried out in off-load condition. In doing so, make sure that during the On and Off switching the end stop positions (15) of the operating shaft (17) are reliably attained.

Testing the motor-operated mechanism

At 85 % and 110 % of the rated supply voltage the motor-operated mechanism (13) must move the operating shaft (17) of the switch into the two end stop positions (15) (switching angle 90°) without impairment of function. In the course of this, check the correct make and break function of the switch. The switch can be operated when de-energized using the emergency crank lever (see page 12, manually operated emergency crank).

Testing the auxiliary switch: (optional)

The auxiliary switches (11) are factory set and tested on all functions. A function check is to be done after the assembly works. Supposed that an auxiliary switch is mistakenly adjusted during transport or assembly works, it is to be checked and if necessary readjusted. Please contact DRIESCHER-Service.

Testing the tripping solenoid:

The tripping solenoid (10) must operate satisfactorily at supply voltages of between 70 % with DC or 85 % with AC and 110 % of the rated supply voltage of the drive.

Visual check / inspection:

The required measures are specified on Page 3. In addition to this, these indoor switch disconnectors are to be inspected after every switching-on operation under short circuit conditions.

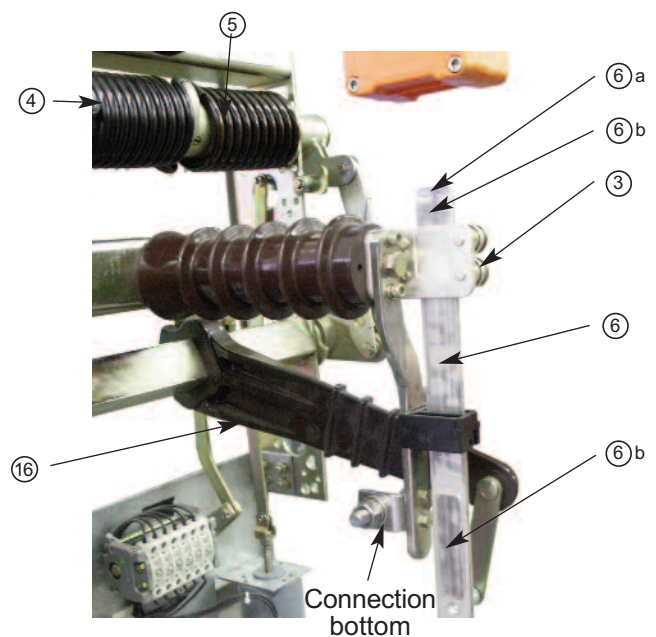
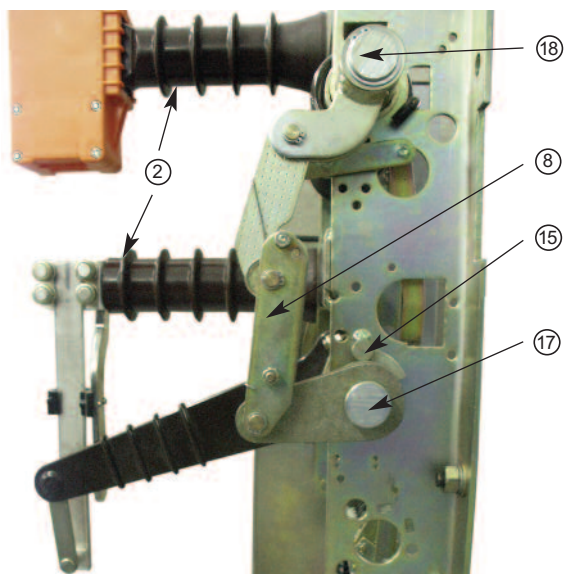
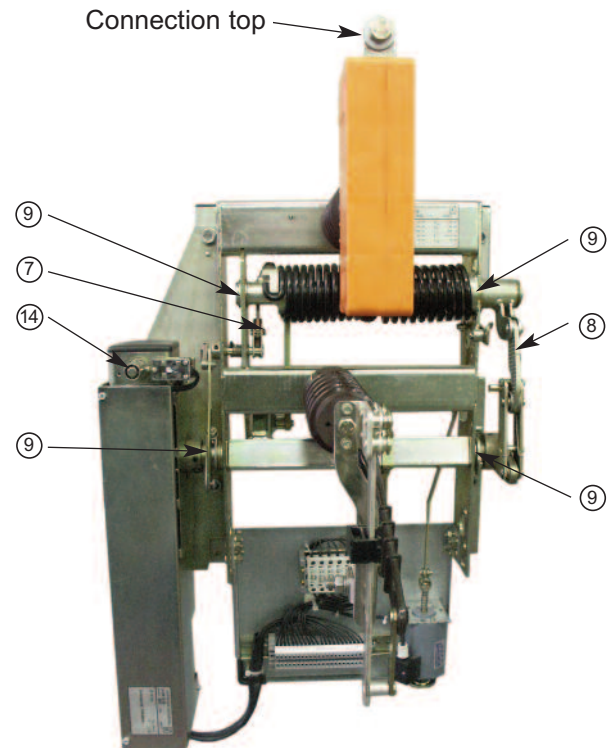
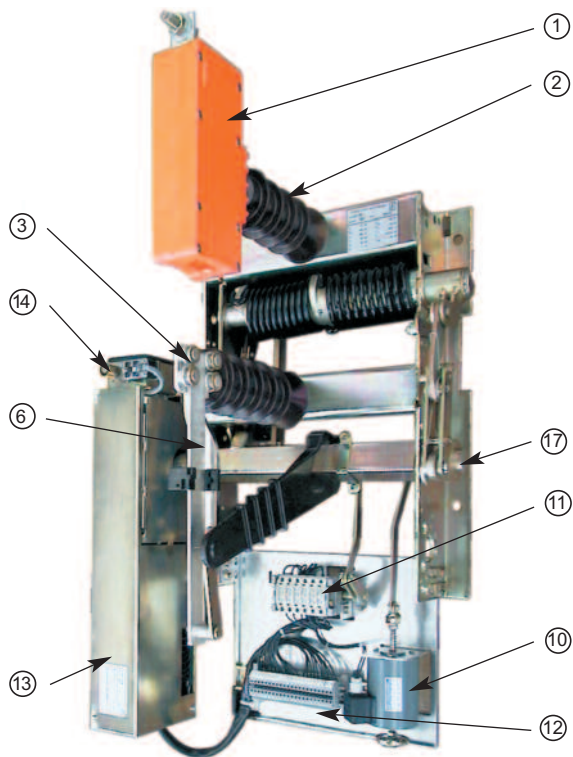
The possible requirement of maintenance or repair cannot be ruled out due to the exceptional load.

Maintenance:

- Check all screw connections of the connecting rails and the switch mounting.
- Lubricate all friction bearings (9) of the operating shaft (17) and energy storage mechanism shaft (18) and joints of the switching mechanism as well as the latching mechanism (7, 8) with Rivolta S.K.D. 16 N.
- Clean connecting rails, insulators (2), actuating rods (16) as well as arcing chambers (1) with Rivolta M.T.X 60 forte (of Bremer & Leguil) and then dry them with a cloth.
- Check that the disconnecting blade (6) strike correctly in the centre of the arcing chamber (1).
- Check wear of contact erosion tip (6a) of the disconnecting blade (6) (max. erosion 2 mm of the contact erosion tip), replace contact blade if necessary.¹⁾
- Clean disconnecting blade (6) with a cloth soaked in Rivolta S.K.D. 16 N and rub down.
- If there is excessive wear of the silver plating (copper is visible) replace the contact parts (3, 6).¹⁾
- Carry out several test switching operations and check satisfactory function.

¹⁾ Always consult DRIESCHER-Service.

Mounting, commissioning, maintenance of switch-disconnector H27-1B; Un 15 kV



- | | | |
|---|--|--|
| ① Arcing chamber | ⑥ ^b Contact surfaces | ⑬ Motor-operated mechanism |
| ② Insulator | ⑦ Latching mechanism ON | ⑭ Hand-emergency operation of motordrive |
| ③ Roller contact | ⑧ Latching mechanism OFF | ⑮ Stop of operating shaft |
| ④ Energy storage mechanism, ON spring actuator | ⑨ Bearing points of energy storage mechanism and operating shaft | ⑯ Actuating rod |
| ⑤ Energy storage mechanism, OFF spring actuator | ⑩ Tripping solenoid | ⑰ Operating shaft |
| ⑥ Disconnecting blade | ⑪ Auxiliary switch | ⑱ Energy storage mechanism shaft |
| ⑥ ^a Contact erosion tip | ⑫ Terminal strip | |

Mounting:

Unless specified otherwise, the switches are designed for vertical assembly on frames or walls. Switches for horizontal installation or for assembly on ceilings are already appropriately adjusted at the factory and marked. Always observe the following when mounting the switches:

- It is recommended to mount the switches on accurately aligned cross rails.
- Do not distort the baseframe of the switch when tightening the fastening bolts (min. M10) (use shims if necessary).
- When connecting the connecting rails or cable end fittings there must be no thrust, pulling or twisting forces acting on the switch connections (hold in place with a second wrench!) Tighten connecting bolts M12 to a torque of 70 Nm.
- After completing the mounting carry out several test switching operations in de-energized condition. Check that the disconnecting blade set (6) strike correctly in the centre of the arcing chamber (1).

Providing earthing connections

There are appropriate bores provided in the baseframe for taking up the earthing screw M12.

The minimum cross section of the connection wires for equipotential bonding should be 50 mm².

When mounting on an earthed frame the required connection to earth can already be carried out using corresponding contact washers when fastening the switch.

Secondary connections

Provide the auxiliary switch connections as shown in the enclosed wiring diagram.

Secondary wires are to be shielded against the high voltage area.

Commissioning:

The function test must be carried out in off-load condition. In doing so, make sure that during the On and Off switching the end stop positions (15) of the operating shaft (17) are reliably attained.

Testing the motor-operated mechanism

At 85 % and 110 % of the rated supply voltage the motor-operated mechanism (13) must move the operating shaft (17) of the switch into the two end stop positions (15) (switching angle 90°) without impairment of function. In the course of this, check the correct make and break function of the switch.

The switch can be operated when de-energized using the emergency crank lever (see page 12, manually operated emergency crank).

Testing the auxiliary switch: (optional)

The auxiliary switches (11) are factory set and tested on all functions. A function check is to be done after the assembly works. Supposed that an auxiliary switch is mistakenly adjusted during transport or assembly works, it is to be checked and if necessary readjusted. Please contact DRIESCHER-Service.

Testing the tripping solenoid:

The tripping solenoid (10) must operate satisfactorily at supply voltages of between 70 % with DC or 85 % with AC and 110 % of the rated supply voltage of the drive.

Visual check / inspection:

The required measures are specified on Page 3. In addition to this, these indoor switch disconnectors are to be inspected after every switching-on operation under short circuit conditions.

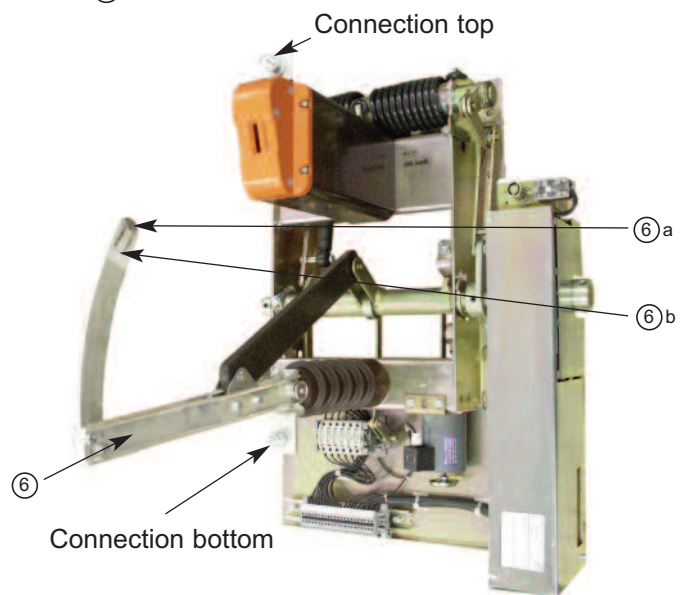
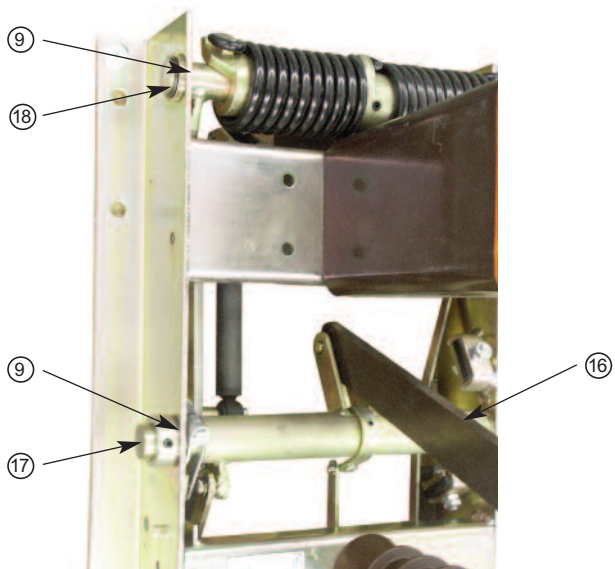
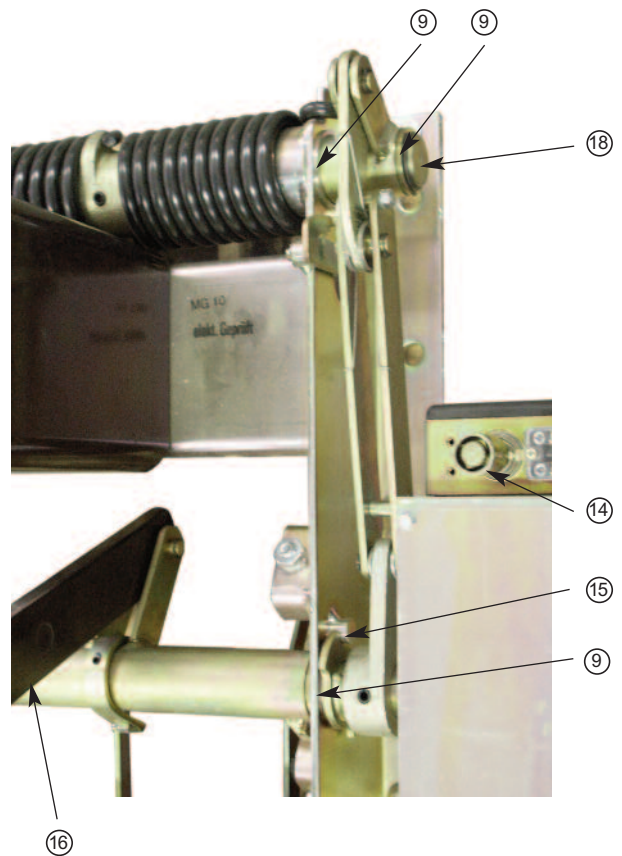
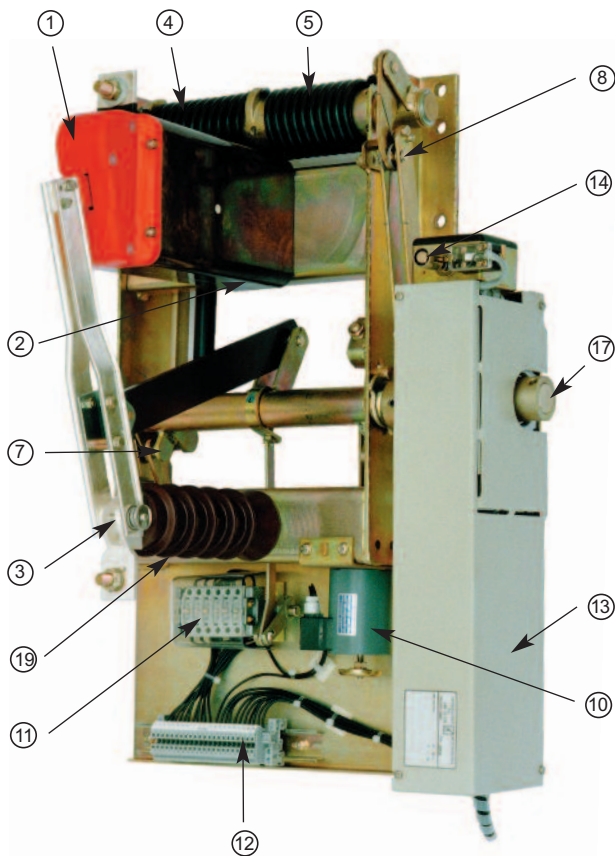
The possible requirement of maintenance or repair cannot be ruled out due to the exceptional load.

Maintenance:

- Check all screw connections of the connecting rails and the switch mounting.
- Lubricate all friction bearings (9) of the operating shaft (17) and energy storage mechanism shaft (18) and joints of the switching mechanism as well as the latching mechanism (7, 8) with Rivolta S.K.D. 16 N.
- Clean connecting rails, hollow insulator (2), actuating rods (16) as well as arcing chamber (1) with Rivolta M.T.X 60 forte (of Bremer & Leguil) and then dry them with a cloth.
- Check that the disconnecting blade set (6) strike correctly in the centre of the arcing chamber (1).
- Check wear of contact surfaces (6b) on the disconnecting blade set (6) (max. erosion 2 mm of the contact erosion tip, (6a)), replace contact blade if necessary.¹⁾
- Clean disconnecting blade set (6) with a cloth soaked in Rivolta S.K.D. 16 N and rub down.
- If there is excessive wear of the silver plating (copper is visible) replace the contact parts (3 and 6).¹⁾
- Carry out several test switching operations and check satisfactory function.

¹⁾ Always consult DRIESCHER-Service.

Mounting, commissioning, maintenance of switch-disconnector H29-1B; Un 15 kV



- | | | |
|---|--|--|
| ① Arcing chamber | ⑥ ^b Contact surfaces | ⑭ Hand-emergency operation on motordrive |
| ② Hollow Insulator | ⑦ Latching mechanism ON | ⑮ Stop of operating shaft |
| ③ Pivot contact | ⑧ Latching mechanism OFF | ⑯ Actuating rod |
| ④ Energy storage mechanism, ON spring actuator | ⑨ Bearing points of energy storage mechanism and operating shaft | ⑰ Operating shaft |
| ⑤ Energy storage mechanism, OFF spring actuator | ⑩ Tripping solenoid | ⑱ Energy storage mechanism shaft |
| ⑥ disconnecting blade | ⑪ Auxiliary switch | ⑲ Insulator |
| ⑥ ^a Contact erosion tip | ⑫ Terminal strip | |
| | ⑬ Motor drive | |

Measures for maintenance on the indoor motor drive, Type UM 10

1. Visual check, inspection

The mounted motor-operated mechanisms are designed for a service life of 10000 switching operations. In the annual visual inspection you should inspect and assess the general condition of the motor-operated mechanism on the inside and outside. When doing so, pay attention to the following points:

- General inspection for traces of external damage
- Does the operating shaft extend right into both end stop positions ?

If any deviations are ascertained within the scope of the visual inspection, appropriate further measures must be taken.

2. Maintenance

Under normal ambient conditions, the motor drive is maintenance-free up to 10000 switching operations. At unfavorable conditions and/or increased mechanical loads, a maintenance service is recommended after 5000 switching operations.

This includes the following work in addition to the visual inspection.

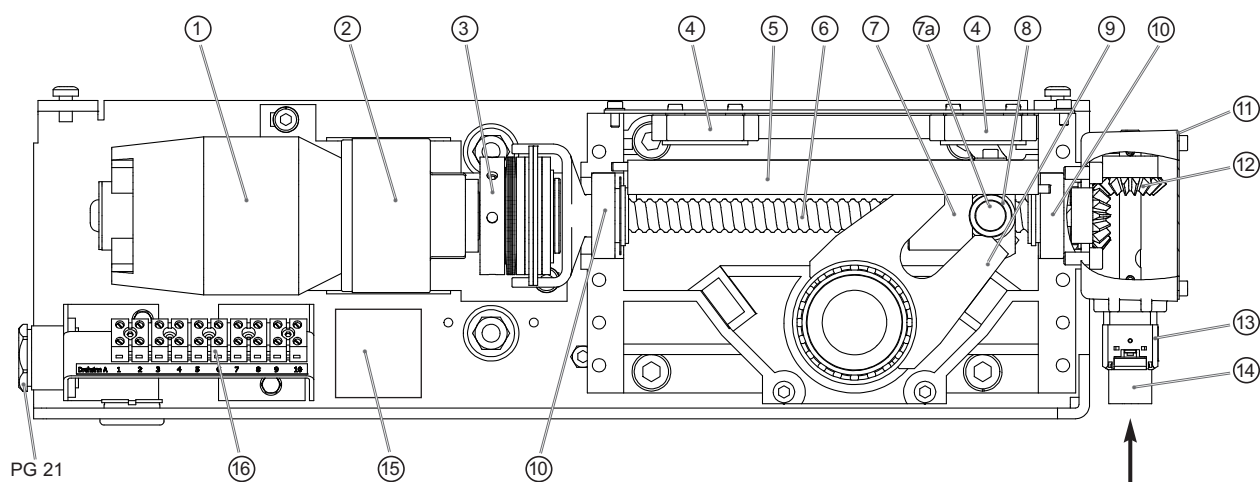
Lubricate the following components with the lubricant Isoflex NBU 15 (of Klüber Lubrication):

- Guide rollers (8) on both sides on the driver pin (7a), as well as the guide rails (5) and forked link (9) interacting with the guide rollers.
- Ball-and-screw spindle drive (6), as well as both roller bearings (10).
- Bevel gearing (12) and sliding sleeve (14) on the manual emergency operating mechanism (for this purpose the cover (11) first has to be removed.

Caution!

To ensure satisfactory operation of the friction clutch (3) it **is not to come into contact with lubricant**.

- The series motor (1) incl. gearing (2) has life time lubrication.
- Function check of the limit switch (4) and the interrupt contact (13).

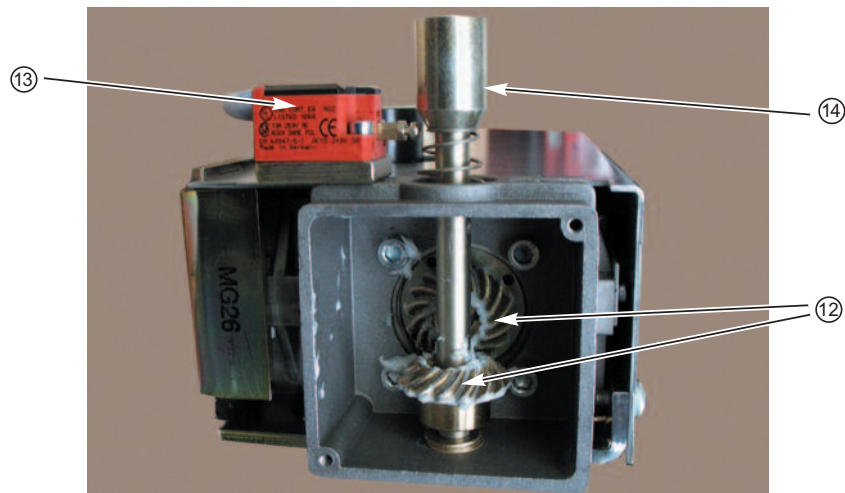
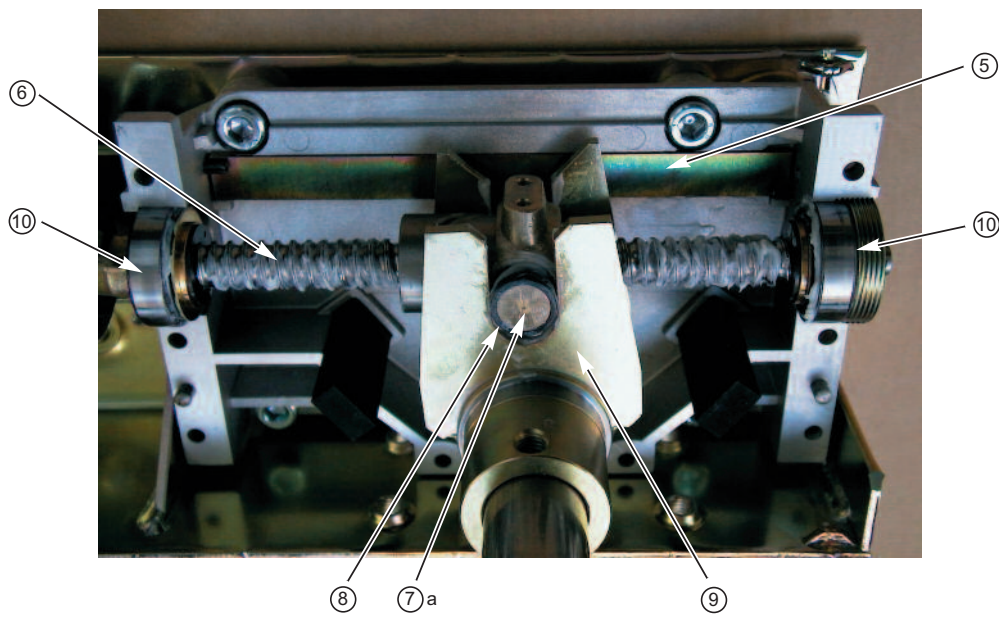
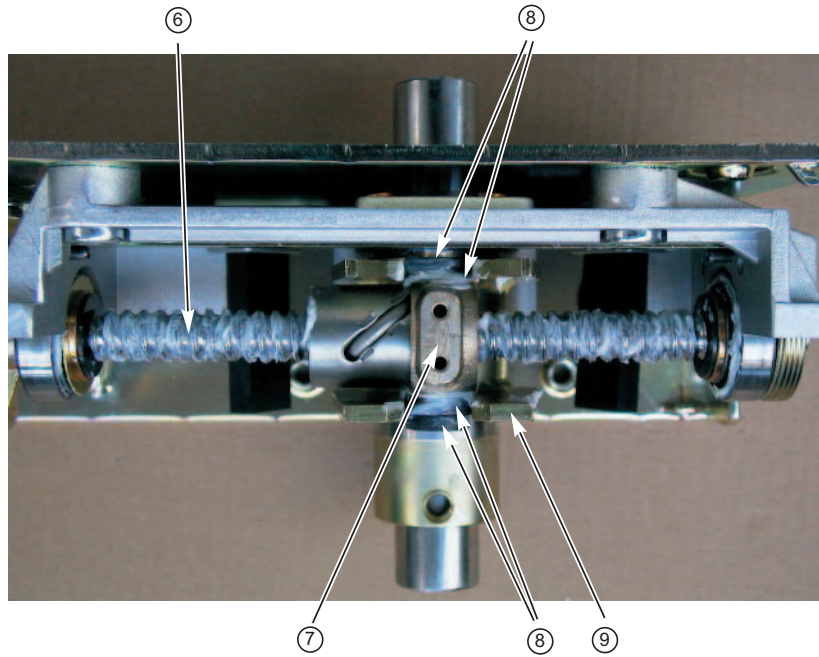


- | | |
|--------------------------------|--|
| ① Series motor | ⑨ Forked link |
| ② Gearing | ⑩ Roller bearing |
| ③ Friction clutch | ⑪ Cover |
| ④ Limit switch | ⑫ Bevel bearing |
| ⑤ Guide rails | ⑬ Interrupt contact of motor voltage with manual emergency operation |
| ⑥ Ball-and-screw spindle drive | ⑭ Sliding sleeve |
| ⑦ Driver | ⑮ Control elements (Relays) |
| ⑦ ^a Driver pin | ⑯ Terminal connection |
| ⑧ Guide rollers | |



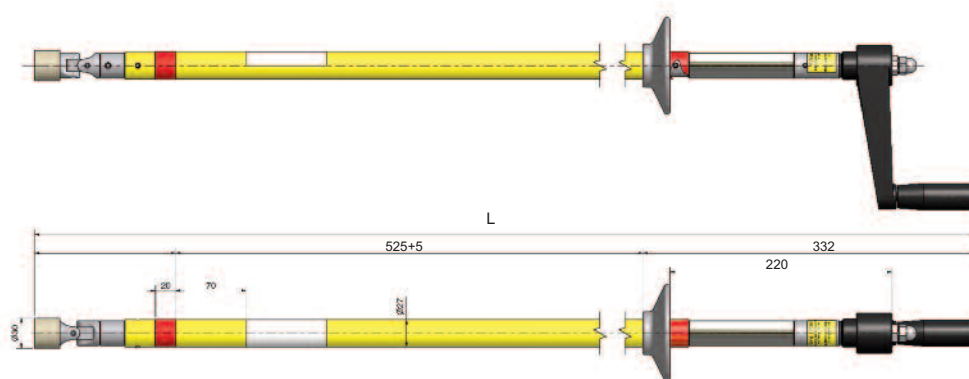
Emergency Hand-crank
Only für indoor application !

Measures for maintenance on the indoor motor drive, Type UM 10



Overview of used hand emergency cranks for motor-operated mechanism

Only for indoor application !



L: Length	Part-no.:	Drawing-no.:
182 mm	2-77601001	036348-001-01
1000 mm	2-77060125	108317-001-02
1200 mm	2-77060134	108317-002-02
1630 mm	2-77060123	111071-001-01
1875 mm	2-77060121	104809-001-01
2375 mm	2-77060126	111076-001-02

Overview of used lubricants

Part-no.:	Lubricant designation/Type	Manufacturer
1-49007110	Rivolta S.K.D. 16 N	Fa. Bremer & Leguil
1-49007100	Rivolta S.K.D. 4002	Fa. Bremer & Leguil
1-49007015	Isoflex NBU 15	Fa. Klüber Lubrication
1-49009100	Rivolta M.T.X. 60 forte	Fa. Bremer & Leguil

Service

Our specialist staff are ready to assist you on the phone, also out of office hours, should any malfunctions occur or if you have queries regarding compatibility, assembly or maintenance.

Please always specify the data on the type plates.

Tel. +49 (0) 87 61 6 81-0 Email: service@driescher.de www.driescher.de

Dimensions, weights, diagrams and descriptions in this brochure are non-binding. Subject to change without notice.

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