For your safety

Signal terms and definitions

Hazards are classified in accordance with ISO 3864-2 using the following keywords:

- **DANGER**, **WARNING** or **CAUTION**, where there is a risk of personal injury
- **NOTE**, where there is a risk of material damage.

Hazards are classified and indicated in the operating instructions and on the vacuum circuit-breaker module as follows:

- **DANGER**
  - signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.

- **WARNING**
  - signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

- **CAUTION**
  - signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

- **Note**
  - indicates a potentially damaging situation.
  - If the damaging situation is not avoided, the product or something in its vicinity may sustain damage.

Qualified personnel

are, for the purposes of this manual or the warning notices on the vacuum circuit-breaker module, persons who are familiar with the transport, storage, placement, assembly, commissioning, operation and maintenance of the product and have the qualifications corresponding to their activity, such as:

- training and authorization to energise, de-energise, clear, earth and tag circuits and equipment in accordance with established safety practices.
- training in the proper care and use of protective equipment in accordance with established safety practices;
- training in providing first aid.

Product liability

- **Note**
  - Product liability claims are upheld only if the replacement of the purchased spare parts is performed by personnel that have been trained and certified by Siemens.
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Transport, storage and packing

Transport

**WARNING**

Heavy transport weight
Transport unit may fall and fail and sling gear may break.
Use lifting gear, transporting and sling gear suited to the requirements and load-carrying capacity. Observe transport symbols.

Transport weight
Refer to the delivery slip for the weight of the transport unit.

**Note**

Observe stacking height
For transport, no more than three constructionally identical transport units must be piled on top of each other.
Observe the loads specified on the transport unit.

**Note**

Secure load
For transport, secure the load in such a way that the transport unit is not at risk.

Place the transport unit on a level, non-slip and pressure-resistant surface for intermediate storage.
Transport vacuum circuit-breaker in the original transport unit up to the installation site or storage location.

**Transporting with crane or fork lift**

![Fig. 1 Transporting the pallet with carton](image-url)
Transport, storage and packing

Transporting with packing
Transport the transport unit to the installation site or storage location
- with a fork lift or
- with sling gear suspended from a crane
  - at an angle of twist of approx. 60° or
  - with a spreader bar.

After receipt of delivery:
• Check transport unit for damage.
• Major damage must be documented photographically.
• Ensure that any damage to the transport unit is confirmed by the transport company.

Checking the transport unit

Unpacking
Working equipment
Required tools:
- Knife/scissors
- Lifting equipment with lifting gear
- Pliers or lever.

⚠️ CAUTION

Risk of injury from sharp edges!
Fasteners may break, leaving sharp edges.
Always use a suitable tool to lever out fasteners.

>Note

Do not cut open or damage the carton, since it is designed to be reused and because of the belt straps located underneath.
Belt straps could be severed on the pallet floor when cutting open the carton.
The vacuum circuit-breaker module is attached to the pallet with belt straps. It is not possible to transport the vacuum circuit-breaker module on the pallet without using belt straps (see Fig. 4).

Fig. 2 Removing the carton
Opening the transport unit

- Place the transport unit on a level, non-slip and pressure-resistant surface.
- Remove lifting gear or transport means.
- Remove plastic wrap.
- Lever out fasteners from the carton and lift off carton.

**Note**

Do not use the vacuum circuit-breaker if parts are broken, i.e. if you find cracks, flaking, bent metal parts, damaged plug-in contacts, tears or bare cables. Send it back in its original transport unit (see “Reusing the transport unit”, page 8).

**Note**

Carrying straps may scrape along the vacuum circuit-breaker module and damage it.

If necessary, cover carrying straps with edge protection.

**Transporting with pallet, without carton**

The vacuum circuit-breaker module can be transported with the pallet, without the carton.
- Thread carrying straps under the pallet or
- transport with fork lift.
Transporting without pallet

- Removing tensioning belts.
- Remove accessory pack, if applicable, and store safely in the packaging for later attachment.
- Hang sling gear into the crane eyes.
- Carefully lift vacuum circuit-breaker module.
- Transport to installation site or leave suspended from crane for further work steps.

**Note**

If necessary, keep accessory pack on hand for the installation.

Reusing the transport unit

To transport the vacuum circuit-breaker module again, the pallet with carton and most of the components can be reused.

Do not reuse severed tensioning belts or plastic wrap.

Pack the vacuum circuit-breaker module in reverse order:

- If the transport bracket was already removed, re-mount in reverse order (see “Delivery state with transport bracket” on page 36). The transport bracket serves to lock the withdrawable part in place in the cartridge insert during transport.
- Attach the vacuum circuit-breaker module safely to the pallet using the appropriate tools.
- Cover with film and seal with adhesive tape.
- Attach accessories pack.
- Attach carton securely to the pallet floor.
- Before returning to the factory, ask the responsible sales representative for a returned goods number (see also “Service”, on page 51).
- When returning a vacuum circuit-breaker module, always indicate the type and serial number (see “Rating plate” on page 27).
Storage

Note

Store the vacuum circuit-breaker module in the following condition:

- OPEN switching position
- Closing spring discharged

Note

Risk of corrosion damage if stored improperly!

If the storage conditions listed below are met, the vacuum circuit-breaker module can be stored for up to a year in its transport unit.

If the storage conditions are not met, the vacuum circuit-breaker module cannot be stored in the transport unit any longer than 6 months.

If storage of longer than one year is planned, unpack the vacuum circuit-breaker module from the transport unit. Further storage may necessitate fresh corrosion protection, and it must be ensured that the vacuum circuit-breaker module cannot be damaged.

<table>
<thead>
<tr>
<th>Storage room</th>
<th>Transport unit</th>
<th>Storage time</th>
<th>Temperature range</th>
<th>Comments</th>
<th>Number of units per stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosed, dry, well ventilated and as free from dust as possible, with a relative humidity of less than 60 %.</td>
<td>unopened</td>
<td>max. 6 months</td>
<td>-40 °C to +55 °C</td>
<td>—</td>
<td>max. 4</td>
</tr>
<tr>
<td></td>
<td>unopened</td>
<td>max. 1 year</td>
<td>-5 °C to +40 °C</td>
<td>—</td>
<td>max. 4</td>
</tr>
<tr>
<td></td>
<td>open</td>
<td>over 1 year</td>
<td>-5 °C to +40 °C</td>
<td>if necessary, with new corrosion protection</td>
<td>—</td>
</tr>
</tbody>
</table>
General information

WARNING

Dangerous voltage and mechanical movements

When operating electrical devices, certain parts will always be live, and mechanical parts may move very quickly, even when remotely controlled.

If the warnings are not observed, serious injury or damage to material may be the result.

Only personnel with the relevant qualifications may work on or in the vicinity of this device. These personnel must be familiar with all the warnings and servicing measures specified in these operating instructions.

Smooth and safe operation of this device requires proper transport and storage, and professional installation and assembly, as well as careful operation and maintenance.

The basic version and all listed configurations of the vacuum circuit-breaker modules are type-tested devices as per IEC (3AK3 as per IEEE).

Note

In the event of subsequent attachments or integrations, e.g. locking parts in connection with switchgears, ensure that

• fast-moving parts are not additionally loaded with mass or force, and
• additional parts have sufficient clearance, especially from moving and live parts.

If vacuum circuit-breaker modules are to be equipped with additional functions by the customer, we recommend consulting the factory, since tried and tested solutions are frequently available (see also “Additional equipment”, on page 17).

Range of application

3AK vacuum circuit-breaker modules are 3-pole interior circuit-breakers for a rated voltage range of 7.2 kV - 17.5 kV.

Under normal operating conditions, the vacuum circuit-breaker modules are maintenance-free up to 10 000 operating cycles.

Intended use

3AK vacuum circuit-breaker modules are suitable for switching any type of alternating current circuits under normal operating conditions, such as:

• Three-phase motors for reversing, turning and direct operation
• Transformers
• Capacitors
• Generators
• Resistor consumers

Suitable for high frequency of operation and unlimited on-time.

3AK vacuum circuit-breaker modules operate in continuous, periodic and short-term operation.
Standards
The 3AK vacuum circuit-breaker modules comply with the regulations:

- IEC 62271-100,
- IEC 62271-1,
- IEC 60265-1
- IEEE C37.013 (only 3AK3).

All 3AK vacuum circuit-breaker modules comply with the specifications for C2-, E2- and M2-class circuit-breakers in accordance with IEC 62271-100.

Design approval as per X-Ray Ordinance
The vacuum interrupters installed in the vacuum circuit-breaker modules are of a design approved under the X-Ray Ordinance (RöV) of the Federal Republic of Germany. They meet the requirements of RöV of 8 January 1987 (BGbl. I, page 114) § 8 and Annex II No. 5 up to the level of the rated voltage stipulated according to DIN VDE/IEC.

Scope of delivery
Delivery includes:

- 3AK Vacuum circuit-breaker module
- Hand crank for circuit-breaker 3AX 1530-2B (optional)
- Traversing crank with hand screen for disconnecting component 3AX 1531-4B (optional)
- Operating tool for the earthing switch (manual operation) 3AX1531-3C (optional)
- Operating tool for the earthing switch (motor operation) 3AX1531-3D (optional)
- Operating instructions
- Circuit-breaker-specific circuit diagrams
Description

Design

The 3AK vacuum circuit-breaker module consists of
• the mechanism box (60.),
• the 3 pole assemblies (19.) with vacuum interrupters (30.),
• the cartridge insert (90.) with withdrawable part (80.).

Fig. 7 Operating mechanism side

15. Pole plate
19. Pole assembly, complete
51. Rating plate
60. Mechanism box
60.3 Transportation eye
80. Withdrawable part of the cartridge insert
81. Locking bracket
84. Mounting rail
90. Cartridge insert
93. Locking pin
95. Unlocking lever of the cartridge insert
96. Actuating opening for manually operating the earthing switch (optional)
97. Position indicator of the earthing switch (optional)
98. Actuating opening for manually operating the withdrawable part
99. Indication of the operating and disconnected position of the withdrawable part
Pole assembly

The pole assembly of the 3AK vacuum circuit-breaker module consists of
• the upper interrupter support (20.),
• with the upper terminal (27.) and the break contact (21.),
• the vacuum interrupter (30.),
• the lower interrupter support (40.) with the lower terminal (29.) and the break contact (21.).

Each of the 3 pole assemblies is supported by the pole columns (23.), which are screwed to the pole plate (15.).

Contact system in the vacuum interrupters

A slight change in the contact stroke that occurs over the entire useful life of the vacuum interrupter has no effect on its function. There is no need for a status indicator for the contact system.
**Mechanism box**  The mechanism box (60.) contains all the electrical and mechanical components required to switch the vacuum circuit-breaker module on or off. Insulating operating rods (48.) transfer the switching movement to the pole assemblies.

The mechanism box is closed with a removable cover (60.1).

---

**Functions**

The CLOSE pushbutton (53.) is used to close the vacuum circuit-breaker module. The motor (50.4) immediately charges the closing spring (62.). If the supply voltage for the motor fails, the closing spring can be charged with a hand crank (50.). There is an opening (50.1) for this in the cover, behind which you will find the hand crank coupling (50.5) of the gear unit (50.2).

**Indicators**

The charged state of the springs is indicated via the spring state indicator (55.). The position indicator (59.) shows the CLOSED or OPEN state. The operating cycle counter (58.) indicates the number of operating cycles. An operating cycle consists of one closing and one opening. The rating plate (51.) is attached to the pole plate (15.).
Fig. 10  Opened mechanism box

50.2  Gear unit
50.4  Motor M1
50.4.1 Position switch
50.5  Hand crank coupling
53.1  Closing solenoid Y9
54.1  Shunt release Y1
54.2  Shunt release Y2
54.3  Transformer-operated release Y4
54.4  Undervoltage release Y7
54.5  Transformer-operated release (0.1 Ws) Y6
55.  Spring state indicator
58.  Operating cycle counter
59.  Position indicator CLOSED-OPEN

60.  Mechanism box
61.  Dashpot
62.  Closing spring
63.  Circuit-breaker shaft
64.  Opening spring
66.  Closing damper
68.  Auxiliary switch S1
68.1 Operating rod (for auxiliary switch S1)
69.  Contactor relay K1
71.  Heater (condensation water protection)
Equipment

Basic equipment
The basic equipment of the 3AK vacuum circuit-breaker module contains:

- Motor (M1)
- Contactor relay (electrical anti-pumping device) (K1)
- Closing solenoid (Y9)
- Shunt release (Y1)
- Auxiliary switch (optional) (S1)
  - 6NO + 6NC
  - 12NO + 12NC
- Position switch for signal “Closing spring charged” (S41, S42)
- Circuit-breaker tripping signal, cut-out switch (S6, S7)
- Low-voltage interface (automatically coupling low-voltage plug 64-pole) (X0)
- Operating cycle counter
- Mechanical anti-pumping device
- Mechanical manual closing and opening
- Mechanical locking device

Additional equipment
Every 3AK vacuum circuit-breaker module can also be fitted with the following equipment:

- Shunt release\(^1\) 3AX1101 (Y2, Y3)
- Transformer-operated release 3AX1102\(^1\) (Y4, Y5)
- Transformer-operated release 3AX1104 (0.1 AC)\(^1\) (Y6)
- Undervoltage release 3AX1103\(^1\) (Y7)
- Heater (condensation water protection)\(^1\) (R01)
- Electrical manual closing\(^2\)
- Priority opening\(^2\)
  1) Subsequent installation possible
  2) No subsequent installation possible

In addition to the serial shunt release (Y1), the vacuum circuit-breaker module can be equipped with a maximum of 2 releases of the type 3AX11.

For the permitted possible combinations of the additional equipment as well as special designs, refer to catalogue HG11, or contact the responsible sales representative.
Motor M1

After the supply voltage is applied and if the closing spring is discharged, the motor starts immediately and is automatically deactivated internally after charging has taken place.

Power consumption, maximum:
- in the event of direct voltage approx. 750 W
- in the event of alternating voltage 1400 W.

In the short charging time, the motor temporarily operates in the overload range. See Fig. 12 for the rated current for the required motor short-circuit protection.

Note: The motor protection devices are not included in the delivery of the vacuum circuit-breaker module and must be ordered separately.

Fig. 11 Motor (50.4)

<table>
<thead>
<tr>
<th>Rated supply voltage U*) V</th>
<th>DC 24</th>
<th>DC 48</th>
<th>DC 60</th>
<th>DC 110</th>
<th>AC 50/60 Hz 110</th>
<th>DC 220</th>
<th>AC 50/60 Hz 230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended rated current of the protective device I**) A</td>
<td>16</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

*) The operator's supply voltage may deviate from the rated supply voltage of the vacuum circuit-breaker module by -15 % to +10 %.

**) Built-in automatic circuit-breaker with C characteristic

Fig. 12 Recommendation for motor protection device

Contactor relay K1

If simultaneous CLOSED and OPEN commands are continuously applied to the vacuum circuit-breaker, it returns to the open position after being closed.

Via the function of the contactor relay K1, the vacuum circuit-breaker pauses there until the CLOSE command is given again.

This prevents continuous closing and opening (pumping).

Fig. 13 Contactor relay (69.)
Closing solenoid (Y9) 3AY1510

The closing solenoid Y9 unlatches the charged closing spring and switches the vacuum circuit-breaker module on electrically. It is available for DC or AC voltage.

The closing solenoid Y9 is not designed for continuous operation and is automatically deactivated within the circuit-breaker.

The operator's supply voltage may deviate from the rated supply voltage of the vacuum circuit-breaker module by -15 % to 10 %.

The closing solenoid Y9 can be operated using AC or DC voltage and is protected against overvoltage.

Power consumption is approximately 140 W / VA

Fig. 14  Closing solenoid (53.1)

1st shunt release (Y1) 3AY1510

In the case of the 1st shunt release Y1, the electrically fed tripping pulse is passed to the “OPEN” latch by means of a directly acting magnet armature, thus switching off the vacuum circuit-breaker module.

The 1st shunt release Y1 is not designed for continuous operation and is automatically deactivated within the circuit-breaker.

The operator's supply voltage may deviate from the rated supply voltage of the vacuum circuit-breaker module by -30 % to +10 % in the event of DC voltage and by -15 % to +10 % in the event of AC voltage.

The 1st shunt release Y1 can be operated using AC or DC voltage and is protected against overvoltage.

Power consumption is approximately 140 W / VA

Fig. 15  1st shunt release (54.1)
** Auxiliary switch S1 **

Two versions of the auxiliary switch S1 are available for delivery: with 6 or 12 NO/NC contacts each.

- Rated insulation voltage: 250 V AC/DC
- Insulation group: C as per VDE 0110
- Continuous current: 10 A
- Closing capacity: 50 A

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**Breaking capacity**

<table>
<thead>
<tr>
<th>Operating voltage U (V)</th>
<th>Operating current I (A)</th>
<th>Operating voltage U (V)</th>
<th>Operating current I (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 40 to 60 Hz</td>
<td>DC</td>
<td>AC 40 to 60 Hz</td>
<td>DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 230</td>
<td>10</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>110</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>220</td>
<td>2.5</td>
</tr>
</tbody>
</table>

- Ohmic load
- Inductive load (T = 20 ms)

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**Fig. 16** Auxiliary switch (68.)

**Fig. 17** Breaking capacity of the auxiliary switch 3SV92
Position switch

- S21, S22: Position switches (switch off the motor after charging)
- S3: Position switch (opens when closing spring is charged)
- S41, S42: Position switches (report charging state)

Fig. 18 Position switch (50.4.1)

Circuit-breaker tripping signal, cut-out switch (S6, S7)

The position switch S6 makes contact briefly when the vacuum circuit-breaker module is opened by means of an electrical release.

This contacting can be used for a signal.

In the event of intentional mechanical opening, the cut-out switch S7 interrupts the contacting.

Fig. 19 Circuit-breaker tripping signal
Low-voltage interface X0, 64-pole

For connection of the control line, the standard version of the vacuum circuit-breaker modules is equipped with a 64-pole low-voltage plug (68.7).
A further shunt release, transformer-operated release, undervoltage release or instantaneous release can be installed as a 2nd release.

2nd shunt release (Y2) 3AX1101

The second shunt release Y2 is installed whenever more than one shunt release is needed.

In this version, the electrical “open” command is passed by means of a magnet armature to the “OPEN” latch by release of an energy storage mechanism, thus opening the vacuum circuit-breaker module. This opening solenoid is not designed for continuous operation. Any necessary varistors and rectifiers are integrated in the release.

Power consumption is approximately 60 W / VA

Transformer-operated releases (Y4, Y5) 3AX1102, (Y6) 3AX1104

The transformer-operated releases Y4, Y5 or Y6 consist of an energy storage mechanism, an unlatching fixture and an electromagnetic system. If the tripping current is exceeded (90 % of the transformer-operated release’s rated current), the energy storage mechanism is unlatched, thus initiating opening of the vacuum circuit-breaker module.

For use of the transformer-operated release, matching transformers are also needed for matching, in addition to the main current transformers.

Power consumption for 0.5 A and 1 A ≤ 6 VA at ≤ 90 % of the transformer-operated release’s rated current and with open armature.
Undervoltage release (Y7) 3AX1103

Note
The undervoltage release Y7 must only be operated with the supplied series resistor R1.

Note
For switching operations (mechanical or electrical), the undervoltage release 3AX1103… must be connected to control voltage, as otherwise closing is not possible.

The undervoltage release Y7 has an electromagnet system that has voltage permanently applied to it when the vacuum circuit-breaker module is in the closed state. If the voltage drops below a certain value, the undervoltage release Y7 is unlatched, thus initiating opening of the vacuum circuit-breaker module via the stored energy mechanism.

Random tripping of the undervoltage release Y7 is generally performed by an NC contact in the tripping circuit, but can also be done with the aid of an NO contact by short-circuiting the solenoid coil. If this latter method is used, the solenoid coil’s short-circuit current is limited by the built-in resistor.

The undervoltage release Y7 can also be connected to voltage transformers.

The undervoltage release Y7 automatically trips the vacuum circuit-breaker module if the rated supply voltage drops to an inadmissible value. Any necessary varistors and rectifiers are integrated in the release.

Power consumption ≤ 6.5 W or ≤ 7.5 VA

Fig. 23 Undervoltage release (54.4)  
Fig. 24 Typical circuit for connection of the undervoltage release Y7
Heater (condensation water protection)

The heater limits condensation and corrosion of the vacuum circuit-breaker module.
To this end, the heater has to be connected to the supply voltage (see circuit diagram included with the delivery).
The heater's surface temperature is at the most 180 °C.
Power consumption 50 W

**Electrical manual closing/electr. locking device**

In the basic version, the vacuum circuit-breaker module with on-site connection is closed by direct mechanical unlatching of the closing spring. Instead of this mechanical manual closing, “electrical manual closing” is also available.
In this version, the closing circuit of the vacuum circuit-breaker module is electrically actuated by a sensing device and must also be enabled via a command element from the control room.
With on-site closing, this permits taking into account system-related interlocking and allows you to prevent unintentional closing by the control room, for example. This allows for interlocking the vacuum circuit-breaker module, for example, via the auxiliary contact of a disconnector.
Vacuum circuit-breaker modules with electrical manual closing cannot be switched mechanically.

**Locking devices**

To lock vacuum circuit-breakers as a function of the switching position, the spring charge mechanisms of the vacuum circuit-breaker can be equipped with a locking device. This is also the case for vacuum circuit-breakers on switchgear trucks, in withdrawable sections or with disconnectors.

**Conditions**
The vacuum circuit-breaker must only be switched on in operating or disconnected position. The operating or disconnected position is the position of the vacuum circuit-breaker on the switchgear truck or withdrawable section in the switchgear. At the same time, the vacuum circuit-breaker may be moved on the switchgear truck or withdrawable section only when it is open.

**Positions of the vacuum circuit-breaker in the switchgear**

**Disconnected position**
The isolating distance between the vacuum circuit-breaker contacts and the switchgear counter-contacts is attained fully.

**Operating position**
The vacuum circuit-breaker is inserted fully into the switchgear and the vacuum circuit-breaker contacts overlap completely with the switchgear counter-contacts.
Description

Locking the vacuum circuit-breaker
A sensing and actuation component in the cartridge insert detects the operating position (CLOSED/OPEN) of the vacuum circuit-breaker.

CLOSED switching position
If the vacuum circuit-breaker is closed, actuation of the system's sensing and actuation component in the cartridge insert is prevented. A mechanical system in the switchgear truck or withdrawable section reliably blocks movements of the withdrawable part on the switchgear truck or withdrawable section.

OPEN switching position
If the vacuum circuit-breaker is open, the sensing and actuation component in the cartridge insert actuates the vacuum circuit-breaker's mechanical locking device and reliably blocks closing of the vacuum circuit-breaker.

Locking device of the cartridge insert
When the unlocking lever (95.) is fully folded down, the cartridge insert is locked in the switchgear by the locking pins projecting from the side (93.) With this the withdrawable part is enabled for moving.

Locking device for the actuating openings (optional)
The locking magnets Y8 (102.) and Y10 (103.) are used to electrically lock the actuating openings in the switch cabinet door. As a result the actuating openings for manually operating the earthing switch (96.) and the withdrawable part (98.) are no longer accessible.
Fig. 28  Example – vacuum circuit-breaker module rating plate 3AK

Fig. 29  Technical data

### Technical data

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage* $U_r$</td>
<td>kV</td>
<td>7.2</td>
<td>12</td>
<td>17.5</td>
</tr>
<tr>
<td>Rated operating current $I_r$</td>
<td>A</td>
<td>1250, 2000, 2500, 3150, 4000**</td>
<td>1250, 2000, 2500</td>
<td></td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage (peak value) $U_p$</td>
<td>kV</td>
<td>60</td>
<td>75</td>
<td>95</td>
</tr>
<tr>
<td>Rated power frequency withstand voltage (effective value) $U_d$</td>
<td>kV</td>
<td>20 (32, 42***)</td>
<td>28 (42***)</td>
<td>38 (42***)</td>
</tr>
<tr>
<td>Rated short-circuit breaking current $I_{sc}$</td>
<td>kA</td>
<td>40/50</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Distance between pole centres</td>
<td>mm</td>
<td>210</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>A</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A  O - 3 min - CO - 3 min - CO  
B  CO - 30 min - CO  
*  In the event of a rated frequency $f_r$ of 50/60 Hz  
**  4000 A only with additional cooling  
***  On request  

### Dimensions and weights

The dimensions of the vacuum circuit-breaker module can be taken from the relevant dimension drawing. If required, these are available from your sales representative.

The weight is given on the rating plate of the vacuum circuit-breaker module (see Fig. 28) or can be taken from the relevant dimension drawing.
Ambient conditions

3AK vacuum circuit-breaker modules are suitable for use in the following climate classes in accordance with IEC 60721, Part 3-3:

Class
- Climatic ambient conditions: 3K4\(^1\), 3K6\(^2\), 3Z2, 3Z5
- Biological ambient conditions: 3B1
- Mechanical ambient conditions: 3M2
- Chemically active substances: 3C2\(^3\)
- Mechanically active substances: 3S2\(^4\)

1) Peak value of the 24-hour means: +35 °C
2) Without ice formation and wind-driven precipitation
3) Without occurrence of salt fog and simultaneous condensation
4) Restriction: clean insulating parts
5) Average value, measured over 24 hours
6) Average value, measured over 1 month

Insulating capacity

The insulating capacity of insulation in air decreases with rising altitude due to the lower air density. In conformity with IEC 62271-102, the rated lightning impulse voltage values given in Fig. 29 are valid up to an installation altitude of 1,000 m above sea level.

At altitudes of 1,000 m and higher, the insulation level must be corrected as shown in Fig. 31:

\[
U \geq U_0 \cdot K_a
\]

\(U\) Rated withstand voltage \(U\) under standard reference atmosphere
\(U_0\) Required rated withstand voltage for the installation location
\(K_a\) Altitude correction factor

\[
K_a = e^{m \cdot (H – 1000)/8150}
\]

Calculating the altitude correction factor \(K_a\):

\(H\) Installation altitude in metres
\(m = 1\) for AC voltage, lightning impulse voltage (between phases, phase-to-earth, applied longitudinally)

Example

For a required rated withstand voltage of 75 kV at an altitude of 2,500 m, an insulation level of at least 90 kV under standard reference atmosphere conditions is required:

\[
90 \text{ kV} \geq 75 \text{ kV} \cdot e^{1 \cdot (2500 – 1000)/8150} = 75 \text{ kV} \cdot 1.2
\]
Switching times

<table>
<thead>
<tr>
<th>Time Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing time</td>
<td>period between starting (command) of the closing movement and the moment of contact touch in all poles.</td>
</tr>
<tr>
<td>Opening time</td>
<td>period between starting (command) of the opening movement and opening of the last pole.</td>
</tr>
<tr>
<td>Arcing time</td>
<td>period from the start of the first arc to extinction of the arcs in all poles.</td>
</tr>
<tr>
<td>Break-time</td>
<td>period between starting (command) of the opening movement and extinction of the arc in the last pole to become extinct (= opening time + arcing time).</td>
</tr>
<tr>
<td>Close/Open time</td>
<td>period in an OPEN/CLOSE cycle between the moment of contact touch in the first pole during closing and the time when contact touch has been cancelled in all poles during subsequent opening.</td>
</tr>
<tr>
<td>Dead-time</td>
<td>period from the end of the current flow in all poles up to the start of current flow in the first pole.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing time</td>
<td>$&lt; 75$ ms</td>
</tr>
<tr>
<td>Opening time</td>
<td>$&lt; 60$ ms</td>
</tr>
<tr>
<td>1st shunt release</td>
<td>$&lt; 60$ ms</td>
</tr>
<tr>
<td>2nd and 3rd release</td>
<td>$&lt; 55$ ms</td>
</tr>
<tr>
<td>Arcing time</td>
<td>$&lt; 15$ ms</td>
</tr>
<tr>
<td>Break-time</td>
<td>$&lt; 75$ ms</td>
</tr>
<tr>
<td>1st shunt release</td>
<td>$&lt; 75$ ms</td>
</tr>
<tr>
<td>2nd and 3rd release</td>
<td>$&lt; 70$ ms</td>
</tr>
<tr>
<td>Dead-time</td>
<td>$300$ ms</td>
</tr>
<tr>
<td>Close/Open time</td>
<td>$&lt; 90$ ms</td>
</tr>
<tr>
<td>1st shunt release</td>
<td>$&lt; 90$ ms</td>
</tr>
<tr>
<td>2nd and 3rd release</td>
<td>$&lt; 70$ ms</td>
</tr>
<tr>
<td>Minimum command duration</td>
<td>$45$ ms, $40$ ms, $20$ ms</td>
</tr>
<tr>
<td>Closing solenoid</td>
<td>$45$ ms</td>
</tr>
<tr>
<td>1st shunt release</td>
<td>$40$ ms</td>
</tr>
<tr>
<td>2nd and 3rd release</td>
<td>$20$ ms</td>
</tr>
<tr>
<td>Shortest pulse time for breaker tripping signal</td>
<td>$&gt; 15$ ms</td>
</tr>
<tr>
<td>1st shunt release</td>
<td>$&gt; 15$ ms</td>
</tr>
<tr>
<td>2nd and 3rd release</td>
<td>$&gt; 10$ ms</td>
</tr>
<tr>
<td>Charging time if actuated electrically</td>
<td>$&lt; 15$ s</td>
</tr>
<tr>
<td>Synchronous operation error between the poles</td>
<td>$\leq 2$ ms</td>
</tr>
</tbody>
</table>

Fig. 32 Switching times
Circuit diagrams

The circuit diagrams show all the available components with their wiring options.

Fig. 33 to Fig. 39 show some non-binding examples of vacuum circuit-breaker modules.

The circuit diagrams for the vacuum circuit-breaker module are compiled depending on your order.

Mechanical manual closing and electrical closing

Fig. 33 Sample circuit diagram – connection via low-voltage interface, 64-pole, basic version

Electrical manual closing and electrical closing

Fig. 34 Example – circuit diagram with connection via low-voltage interface 64-pole.

HA Manual opening S3 Position switch (opens when closing spring is charged)
HE Manual closing S41, S42 Position switches (signal charging status)
K1 Contactor relay (anti-pumping device) S6, S7 Position switches (for circuit-breaker tripping signal)
M1 Motor X0 Low-voltage interface
P Energy storage mechanism Y1 1st shunt release
R1 Resistor Y2 2nd shunt release
S1 Auxiliary switch Y4, Y5, Y6 Transformer-operated release
S10, S11 Position switch (mechanical anti-pumping device) Y7 Undervoltage release
S12 Position switch (prevents electrical closing if there is a mechanical locking device) Y9 Closing solenoid
S21, S22 Position switches (switch off the motor after charging) V6 Integrated rectifiers for motor

This legend is also valid for the following circuit diagrams.
1) Integrated varistor
2) Integrated rectifier for AC/DC ≥ 100 V
3) Line H07V-K1x2.5sw (as per EN 50525-2-31) when motors are used with DC 24 V/48 V and 60 V
4) Only if a mechanical closing lock is ordered at the same time

a) Motor winding for DC
b) Motor winding with rectifier for AC
c) Closing
d) Closing with anti-pumping device

Fig. 35  Sample circuit diagram 64-pole (part 1) of the vacuum circuit-breaker
1) Integrated varistor
2) Integrated rectifier for AC/DC ≥ 100 V

a) 1st shunt release with 64-pole plug-connector
b) 2nd shunt release with 64-pole plug-connector

Fig. 36 Sample circuit diagram (part 2) of the vacuum circuit-breaker module
1) Integrated varistor
2) Integrated rectifier for AC/DC ≥ 100 V
3) Attention: connect L+ for direct current (DC)

a) Undervoltage release
b) Low-energy trip-coil
c) 1st transformer-operated release
d) Signal: spring state with 64-pole plug-connector
e) Circuit-breaker tripping signal for 64-pole plug-connector

Fig. 37 Sample circuit diagram (part 3) of the vacuum circuit-breaker module
The unassigned auxiliary switch terminals are wired up (as shown) with the 64-pole plug bottom.

**Fig. 38** Example – auxiliary switch terminals

**Fig. 39** Sample switching operation for connection of the undervoltage release Y7
Mounting

**DANGER**

**High-voltage – danger to life**
Touching live parts causes an electric shock.
- Do not touch live parts!
- When performing work on the switchgear, de-energise it and earth it.
- The work described in the following sections must only be performed when the switchgear has been de-energised:
  - Take safety measures to prevent reclosing.
  - Observe industrial safety regulations.
  - Ensure that the vacuum circuit-breaker module is installed and commissioned only by qualified personnel who are familiar with the operating instructions and observe the warning notices.

**WARNING**

**Risk of injury due to wrong transport means!**
Using wrong transport means may cause the vacuum circuit-breaker module to fall and injure persons.
- Observe weight.
- Use means of transport suited to the requirements and load-carrying capacity.
- The vacuum circuit-breaker module must not fall over.
- Sharp edges may cause injury.

**Note**

For preliminary work, the vacuum circuit-breaker module must be
- secured against falling over,
- placed onto a suitable support or
- suspended from a crane to prepare for installation.

**Attachment in the switching cubicle**
The vacuum circuit-breaker module is delivered in the OPEN switching position. Before installing the vacuum circuit-breaker module, remove the transport aids (see “Unpacking” on page 6).

**Mounting position**
The 3AK vacuum circuit-breaker module can only be installed vertically (to the vacuum interrupter), as an indoor withdrawable section and as an indoor fixed installation.

![Fig. 40 Mounting position](image)
Coding

Note

The vacuum circuit-breaker module can only be fitted into switchbays or switch cabinets whose coding allows for such fitting.

The coding must not be modified.

The transport bracket locks the withdrawable part into place during transport and must be removed as follows:

- Removal of the M10 nut with washer.
- Carefully pull the transport bracket forwards, lift slightly and over closing solenoid Y8 (optional).
- Remove film and now loose nut underneath. It serves as height adjustment and must be reused for further transport securing, as does the film.

The mechanical coding of the circuit-breaker and the circuit-breaker room prevents that similar withdrawable sections with lower rated operating currents are fitted into switchbays with larger rated operating currents.

For example, a circuit-breaker for 2500 A rated operating current can replace a 1250 A circuit-breaker, if the voltage and opening values are equal or larger than those of the 1250 A switchbay.

However, the 1250 A circuit-breaker cannot replace the 2500 A circuit-breaker.

Fig. 41 Coding, example
Earthing

**Note**

If the 3AK vacuum circuit-breaker module is installed into an earthed metal frame and is connected permanently and electrically conductive, no separate earthing is required.

Place serrated washers under the screw heads when fastening the vacuum circuit-breaker module in this case.

Connect the vacuum circuit-breaker module under the cartridge insert (90.) on the earth terminal (70.) the high-voltage protective earth as specified (DIN EN 50341). For this, connection to earth on the system must be present in the form of a clamp. If the vacuum circuit-breaker module is moved into the system, the clamp must positively lock onto the bolt.
Mounting

Fitting the vacuum circuit-breaker module
- Lift the withdrawable section unlocking lever (95.). This draws in the laterally projecting locking pins (93.).
- Fit the vacuum circuit-breaker module into the system's guide rails and push in as far as it will go.
- Fully fold the withdrawable section unlocking lever (95.) back down. The locking pins (93.) now secure the vacuum circuit-breaker module in the switchgear.
Removing the transport securing device from the undervoltage release

Undervoltage release (Y7) present?

The vacuum circuit-breaker modules with an undervoltage release (Y7) 3AX1103 are supplied with a transport securing device.

- Remove the two top screws (60.2) from the cover (60.1).
- Undo the two bottom screws (60.2) on the cover (60.1) until the cover (60.1) can be taken off.
- Slightly tilt the cover (60.1) of the mechanism box and lift off.
- Shift the locking screw of the striker from position A to B (see reference note in mechanism box [60.] of the vacuum circuit-breaker module).
- Replace the cover (60.1) in the reverse order
- and fasten the screws (60.2) with a tightening torque of 10 Nm.

Fig. 47 Removing the cover
Fig. 48 Removing the transport securing device
Mounting

Moving the vacuum circuit-breaker module into operating position

Note
When moving, ensure that the vacuum circuit-breaker module is in following condition:

- OPEN switching position
- Closing spring discharged

If the switchgear door is locked, the actuating opening (98.) for manual operation of the withdrawable part (80.) is enabled.

Moving the withdrawable section with traversing crank with hand screen 3AX1531-4B:

- Through the actuating opening (98.) Fit traversing crank with hand screen (108.) onto the hexagon head.
- Turn clockwise until the position indicator (99.) for the withdrawable part (80.) switches the symbol to .

While turning, a progress indicator between these two symbols indicates the traversing path.

Fig. 49  Moving the vacuum-circuit breaker module into operating position
Electrical connection of the prime conductor

⚠️ DANGER

High-voltage – danger to life
Test the vacuum circuit-breaker module in the switchbay with high-voltage applied only after faultless functioning has been ascertained (see “Commissioning” on page 43).

🔍 Note

Grease the mating contacts with contact grease prior to mounting.

The main current path is automatically closed by the tulip contacts (21.) when the withdrawable part withdraws.
For this there must be mating contacts in the switchbay that do not deviate by more than ±2 mm from the nominal dimensions.
The mating contacts can be purchased from the Siemens Service Center.

Fig. 50 Tulip contacts
Commissioning

Before commissioning, check the following points to ensure that the 3AK vacuum circuit-breaker module is functioning faultlessly:

<table>
<thead>
<tr>
<th>Checklist</th>
<th>✓</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the information on the rating plate (see page 27) match the order data?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Ensure correct operating voltage.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>If necessary, clean the vacuum circuit-breaker module (details on this in section “Cleaning” on page 47).</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Check that screw connections are tightened securely.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Check functioning of the auxiliary switches.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>If necessary, check and adjust customer's devices.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>If there is an undervoltage release (Y7) 3AX1103 : has the locking screw of the striker been shifted from position A to B (see “Removing the transport securing device from the undervoltage release” on page 39)?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Test switching without supply voltage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Charge the closing spring (62.) with the hand crank (50.) (see Fig. 51), then actuate the CLOSE pushbutton (53.) and, once closing has been performed, actuate OPEN pushbutton (54.).</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Test switching with supply voltage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>To perform test switching with the motor, switch on the supply voltage. The motor starts up immediately and charges the closing spring (62.). Check the indicator for charge state of the closing spring (mechanically and electrically).</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Electrically check through auxiliary switch S1 (68.) and position switch (50.4.1) in both end positions – operate the 3AK vacuum circuit-breaker module to do so.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Check functioning of the closing solenoid Y9 (53.1) and all available shunt releases by operating them electrically.</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
First closing operation

If all functions have been checked and are ok, switch on high-voltage while observing all of the safety regulations and operative requirements.

Charging the closing spring

**WARNING**

Do not commission the vacuum circuit-breaker module if there are malfunctions.

If the malfunctions or the damage cannot be remedied, contact a sales representative or Siemens Service and, if necessary, send back the vacuum circuit-breaker module.

**WARNING**

Risk of injury if hand cranks other than the original hand crank are used.

When the supply voltage is present, the motor immediately recharges the spring after a closing operation. If the hand crank does not have a slip coupling, the hand crank will also rotate.

To avoid injuries caused by the motor starting suddenly, the vacuum circuit-breaker module must be charged only using the original hand crank.

If the supply voltage is applied, the closing spring (62.) is automatically charged by the motor (50.4).

**Hand crank**

If the supply voltage fails, the closing spring (62.) can be charged with a hand crank (50.).

1. For this, fit the hand crank (50.) onto the hand crank coupling (50.5) through the opening (50.1) with the adapter pushed forward (50.6).
2. Turn clockwise until the spring state indicator (55.) changes over:

![Discharged](image1)  ⟷  ![Charged](image2)

**Fig. 51** Charging the closing spring with the hand crank

**Fig. 52** Operating elements and spring state indicator
The adapter (50.6) of the hand crank (50.) is designed in such a way that the hand crank becomes uncoupled when the motor supply voltage returns.

**Closing**

Provided there is no lock-out due to a mechanical locking device, send the closing command via the CLOSE pushbutton (53.) or the corresponding command element until the vacuum circuit-breaker module is closed and shows and signals the CLOSED position.

Change of the position indicator (59.):

![OPEN](open_icon) => ![CLOSED](closed_icon)

After switching on and possibly releasing the CLOSE pushbutton (53.), the closing spring (62.) is immediately automatically charged by the motor and the indicator “Closing spring charged” (55.) becomes visible.

Change of the spring state indicator (55.):

![Charged](charged_icon) => ![Discharged](discharged_icon) => ![Charged](charged_icon)

**Note**

If an undervoltage release 3AX1103… is fitted, it must be connected to the control voltage for switching operations (mechanical or electrical), as otherwise closing is not possible.

**Opening**

The opening spring (64) is charged during the closing operation.

To open, send the opening command via the OPEN pushbutton (54.) or the corresponding command element until the vacuum circuit-breaker module is open and shows and signals the OPEN switching position.

Change of the position indicator (59.) after electrical opening:

![CLOSED](closed_icon) => ![OPEN](open_icon)

The spring state indicator (55.) does not change.

**Discharging the closing spring**

To discharge the closing spring:

- the supply voltage must be deactivated
- the vacuum circuit-breaker module must be closed manually (see “Closing” on page 45) and then
- opened manually (see “Opening” on page 45).

The spring state indicator (55.) does not change.
Operating tools

50. 3AX1530-2B hand crank (optional) for charging the closing spring by hand
106. Operating tool for the earthing switch (manual operation) 3AX1531-3C (optional)
107. Operating tool for the earthing switch (motor operation) 3AX1531-3D (optional)
108. Traversing crank with hand screen for withdrawable part 3AX 1531-4B (optional)

Fig. 53 Operating tools
Maintenance and servicing

DANGER

High voltage – danger to life

Touching live parts is fatal or causes serious physical injury.

Before beginning maintenance work, note the five safety rules for high-voltage equipment specified in EN 50110-1, namely:

• Isolate from the power supply*)
• Secure against reclosing
• Verify safe isolation from the power supply
• Earth and short-circuit
• Cover or cordon off neighbouring live parts

* On the vacuum circuit-breaker, actuate the OPEN, CLOSE and OPEN pushbuttons manually one after the other. This ensures that the vacuum circuit-breaker is open and the closing spring is discharged.

Note

The vacuum circuit-breaker module should be taken out of the switch cabinet or switchgear for servicing.

Maintenance

The 3AK vacuum circuit-breaker module is maintenance-free under normal operating conditions. We do, however, recommend you carry out regular visual inspections. The maximum permitted mechanical operating cycle number is 10 000.

Cleaning

The insulating parts must be clean if their insulating capacity is to be guaranteed. Rub insulating parts with a moist cloth.

As a cleaning agent, use only warm water with a mild, liquid household detergent added and leave to dry.

Joints and bearings that cannot be disassembled must not be washed out with a detergent prior to work.
Special operating conditions

If the vacuum circuit-breaker module is operated under unfavourable conditions indoors (heavy and frequent condensation, dusty air, etc.), we recommend cleaning the insulating parts and possibly the outer parts of the circuit-breaker at shorter intervals.

For this, only the following agents may be used on the individual functional parts of the circuit breaker module:

Lubricant:

<table>
<thead>
<tr>
<th>Bearings, sliding surfaces:</th>
<th>Isoflex Topas L 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearings and bearings of the auxiliary switch S1 that are inaccessible in terms of greasing:</td>
<td>Shell Tellus Oil 32</td>
</tr>
</tbody>
</table>

Lubricants are available from the responsible Siemens representative:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Lubricant Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 g</td>
<td>Isoflex Topas L 32</td>
<td>3AX11 33-3H</td>
</tr>
<tr>
<td>1 kg</td>
<td>Shell Tellus Oil 32 (special oil)</td>
<td>3AX11 33-2D</td>
</tr>
<tr>
<td>1 kg</td>
<td>Isoflex Topas L 32</td>
<td>3AX11 33-3E</td>
</tr>
</tbody>
</table>
Fig. 54  Bearings and sliding surfaces of the operating mechanism

<table>
<thead>
<tr>
<th>Δ Isoflex Topas L 32</th>
<th>Δ Shell Tellus Oil 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Crankpin for sensing device actuation</td>
<td>Bearing for deflection lever</td>
</tr>
<tr>
<td>c</td>
<td>f</td>
</tr>
<tr>
<td>Curve contour</td>
<td>Auxiliary switch</td>
</tr>
<tr>
<td>d</td>
<td>j</td>
</tr>
<tr>
<td>Close-latch</td>
<td>Circuit-breaker shaft bearing</td>
</tr>
<tr>
<td>e</td>
<td>p</td>
</tr>
<tr>
<td>Deflection of auxiliary switch</td>
<td>Opening spring bearing</td>
</tr>
<tr>
<td>g</td>
<td>r</td>
</tr>
<tr>
<td>Opening spring guide</td>
<td>Spring eyelet on closing spring</td>
</tr>
<tr>
<td>h</td>
<td></td>
</tr>
<tr>
<td>Deflection of auxiliary switch</td>
<td></td>
</tr>
<tr>
<td>k</td>
<td></td>
</tr>
<tr>
<td>OPEN-latch</td>
<td></td>
</tr>
<tr>
<td>l</td>
<td></td>
</tr>
<tr>
<td>Curve for OPEN-latch</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td></td>
</tr>
<tr>
<td>End stop</td>
<td></td>
</tr>
<tr>
<td>s</td>
<td></td>
</tr>
<tr>
<td>Contact area of instantaneous release</td>
<td></td>
</tr>
</tbody>
</table>
Maintenance

**Vacuum interrupter service life**

If switching operations occur frequently under overload or short circuit, the service life of the vacuum interrupters may be reached prematurely.

Replace the interrupters after reaching the maximum permitted operating cycle number of 10,000 mechanical or electrical load setting changes (up to the rated current).

When ordering vacuum interrupters, please always state the circuit-breaker type and serial number (see “Rating plate” on page 27).

**Accessories and spare parts**

To ensure that the device operates reliably, spare parts must be replaced only by trained and certified personnel.

---

**Replacing spare parts**

- **CAUTION**

  **Risk of injury!**

  The vacuum circuit-breaker module should be taken out of the switch cabinet or switchgear for servicing.

  Separate vacuum circuit-breaker module from the control feed voltage or switch it off and disconnect the low-voltage plug or clip connection.

---

### Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand crank for circuit-breaker</td>
<td>3AX1530-2B</td>
</tr>
<tr>
<td>Traversing crank with hand shield for withdrawable part</td>
<td>3AX1430-2C</td>
</tr>
<tr>
<td>Operating instructions</td>
<td>9229 9923 100</td>
</tr>
<tr>
<td>Operating tool for the earthing switch (manual operation)</td>
<td>3AX1531-3C</td>
</tr>
<tr>
<td>Operating tool for the earthing switch (motor operation)</td>
<td>3AX1531-3D</td>
</tr>
<tr>
<td>Klüber Isoflex Topas L32 lubricant</td>
<td>3AX1133-3H</td>
</tr>
<tr>
<td></td>
<td>3AX1133-3E</td>
</tr>
<tr>
<td></td>
<td>180 g</td>
</tr>
<tr>
<td></td>
<td>1 kg</td>
</tr>
<tr>
<td>Shell Tellus lubricant</td>
<td>3AXI 133-2D</td>
</tr>
<tr>
<td></td>
<td>1 kg tin</td>
</tr>
</tbody>
</table>

**Fig. 55** Accessories available for order

Always specify the vacuum circuit-breaker module’s type and serial no. (see “Rating plate” on page 27) when ordering spare parts.
Manufacturer's product liability

The manufacturer's product liability shall be excluded if at least one of the following criteria applies:

- Original Siemens spare parts are not used.
- Fitters carrying out replacements have not been trained and certified by Siemens.
- Parts have been incorrectly fitted or adjusted.
- Adjustments are not made in accordance with Siemens specifications.
- After installation and adjustment, no final test is performed with a tester approved by Siemens including documentation of the test results.

To keep documentation complete, it is important that measurement results are submitted to the responsible sales representative.

Disposal

The materials of the vacuum circuit-breaker module should be recycled. Disposal of the vacuum circuit-breaker module with minimum environmental impact is possible on the basis of existing legal regulations.

Metal

The circuit breaker's metal components can be recycled as mixed scrap, although it is more environmentally sustainable to dismantle the unit as thoroughly as possible into sorted scrap and residual mixed scrap.

Electronics

Electronic scrap must be disposed of in accordance with applicable regulations.

Materials

The vacuum circuit-breaker module consists of the following materials:

- Steel (partly phosphatised, galvanised and yellow chromated)
- Copper (partly silver-plated)
- Plastics (epoxy resin, polyamide, polyester, polycarbonate, ABS-PC mixture; partly glass fibre reinforced)
- Rubber materials
- Ceramics
- Lubricant

Packaging

If the packaging is no longer needed, it can be fully recycled.

Hazardous substances

When delivered by Siemens, the product does not contain any hazardous substances within the scope of the Hazardous Substances Ordnance applicable to the territory of the Federal Republic of Germany. For operation outside the Federal Republic of Germany, the applicable local laws and regulations must be complied with.

Further information

Contact your Siemens Service Center if you require further information.

Service

For details of contacts for service work, consult Siemens IC LMV SE Services at

- Telephone: +49 180/5247000
- Fax: +49 180/5242471 or
- on the Internet at the Web address: www.siemens.com/energy-support
- by e-mail: support.energy@siemens.com
- or any local sales representative.
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