HVX

36-40.5-46kV vacuum circuit-breaker

Medium Voltage Switching Device

Technical Instruction

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Schneider Electric

As a global specialist in energy management with operations in more than 100 countries, Schneider Electric offers integrated solutions across multiple market segments, including leadership positions in energy and infrastructure, industrial processes, building automation, and data centres/networks, as well as a broad presence in residential applications. Focused on making energy safe, reliable, and efficient, the company's 100,000 plus employees achieved sales of more than 15.8 billion Euros in 2009, through an active commitment to help individuals and organisations make the most of their energy.

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Till now, Schneider Electric had established 77 offices, 26 factories, six distribution centers, one learning institute, three research and development centers, one laboratory, 500 distributors and a nation-wide sales network. Schneider Electric currently employs 22,000 staff in China, and helps create thousands of other jobs through its partners and distributors.

Schneider Electric EcoStruxure™ Solutions

With the professional know-how in multi markets we operate and the close care of our customers, as well as our best practices in energy management, Schneider Electric has grown up from a provider of best-in-class products into an integrated solution provider. This year, we launched EcoStruxure™, an architectural approach which unites Schneider Electric's unique expertise in power, datacentres, process and machines, building control, and physical security to enable intelligent energy management solutions for customers seeking to optimise energy efficiencies across multiple domains of their business. By providing our customers with clear and comprehensive reference architectures across key environments and applications, we intend to reduce inefficiencies and save energy up to 30%.

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1 Regulations and Provisions

1.1 Remarks on this Technical Instruction

This Technical Instruction describes transport,assembly,operation,handling and maintenance of the series HVX vacuum service breakers.

It must be stored so that it is at any time readily accessible for and can be used by persons who are to work on the switchgear.

When re-selling the circuit-breaker or the switchgear with circuit=breaker,make sure that this Technical Instruction is transmitted as well.

The following additional documents must be observed for this circuit breaker:

- Purchase agreement containing the stipulations on the specific equipment of the circuit-breaker and the legal details.
- Project notes regarding the HVX circuit breaker.
- For assembly and operation of the circuit-breaker,the operating manual of the switchgear in which it is operate must be complied with.

As our products are subject to continuous futher development,we reserve the right to changes regarding standards,illustrations and technical data.

All dimensions not specified in detail are in millimeters.

1.2 Terms and symbols used

This Technical Instruction uses certain terms and symbols.They warn about dangers or provide important information which must be complied with at all costs so as to avoid danger and damage:

Warning

This symbol warns of dangerous electrical voltage.Contact with voltage may result in fatal injury!

Warning

This symbol is used for instructions non-compliance with which may result in serious injury,death or serious material damage.

Important

This symbol is used for information which is important to avoid damage.

1.3 Use in line with the intended purpose

The HVX vacuum circuit-breaker is intended exclusively as a switching unit in air-insulated medium-voltage switchgear.It may only be used in the scope of the specified standards and the switchgear-specific technical data.Any other use constitutes improper use and may result in danger and damage.

Important:

Operating reliability and service life depend on correct operation.

Disclaimer of liability

The manufacturer shall not be held responsible for damage which occurs if

- Instructions in this Technical Instruction are not complied with
- The circuit-breaker is not operated according to its intended use(see above)
- The circuit-breaker is assembled,connected or operated improperly
- Accessories or spare parts are used which have not been approved by the manufacturer
- The circuit-breaker is converted without the manufacture's approval,or if inadmissible parts are attached

1 Regulations and Provisions

1.4 Applied standards

The three-pole HVX vacuum circuitbreaker

- corresponds to the requirements for AC switchgear for voltage above 1kV acc.to IEC 62271-100;
- complies with Chinese Standard
  - GB 1984-2003
  - GB/T 11022-1999
  - DL/T 402-1999

Environmental and operating conditions

HVX circuit-breakers may only be operated under normal operating conditions acc,to IEC 60694. Operation under conditions deviating from these is only admissible upon consultation and with the written approval of the manufacturer.

Ambient conditions	
Temperature class "minus 5 indoors" [1)]	
Ambient temperature min./max.	-5 / 40℃ [1)]
Average value over 24 hours (max.)	35 [1)]
Max. installation altitude above sea level	1000m [1)]

1)higher values on request

1.5 Safety provisions

The work described in this Technical Instruction may only be performed by specialist electricians who have proved their experience with the HVX circuit-breaker and the EN 50110-1 standard.

Applicable standards and regulations:

- The locally applicable accident prevention,operating and work instructions must be complied with.
- Installtion:IEC 61936-1/HD 637 S1
- Operation of electrical equipment:EN 50110-1

Read these instructions carefully before you work on the circuit-breaker,and perform the work detailed in it according to the descriptions.Do not perform any work on the circuit breaker which is not described in this Technical Instruction.

Warning:

Before starting work on the circuit-breaker,de-energize the system,verify it for zero voltage and earth the system according to the applicable safety rules pursuant to EN50110-1.

Warning:

Before performing work on the circuit-breaker,switch off the auxlllary voltage and prevent it from reclosing.

Warning:

There is a risk of injury when working on the drive mechanism.Before commencing work,release the energy-storing device by performing the operating sequence OFF-ON-OFF.

1.6 Disposal after the end of service life

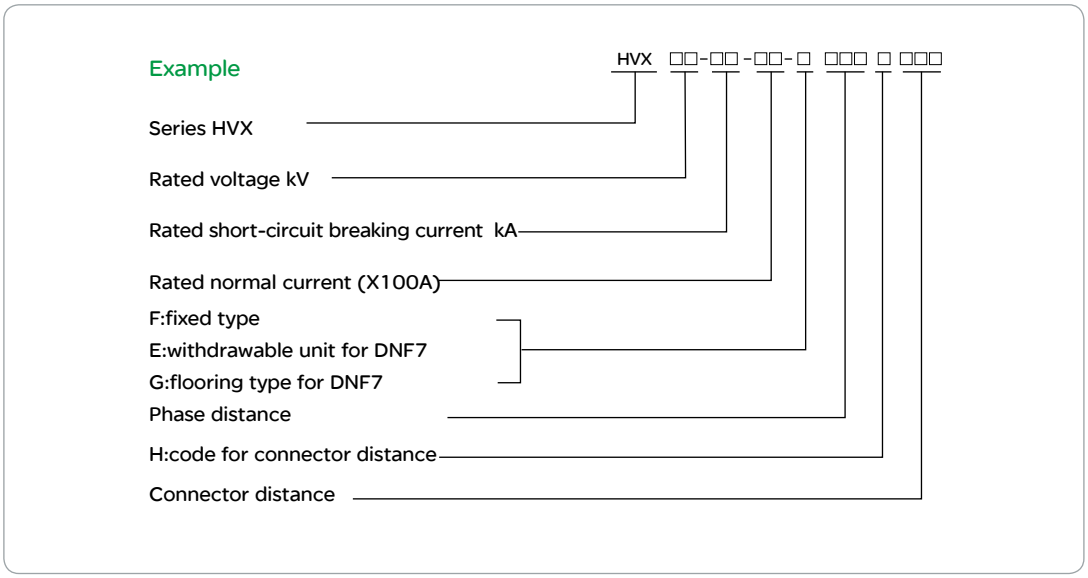
A manual on disposal after the end of the service life is available for disposal of the HVX vacuum circuit breaker.

Disposal at the end of the service life is performed as a serviced by the Service Center at the manufacturer's which is subject to a fee.

2 Technical data

2.1 Type designation

The type designation on the rating plate(Fig,2.1)specifies essential technical data.The type designation (1)is broken down in this example.



The following data on the nameplate are relevant for replacement or in case of any queries:

- Type designation(1)
- Serial number(2)
- Year of construction(3)

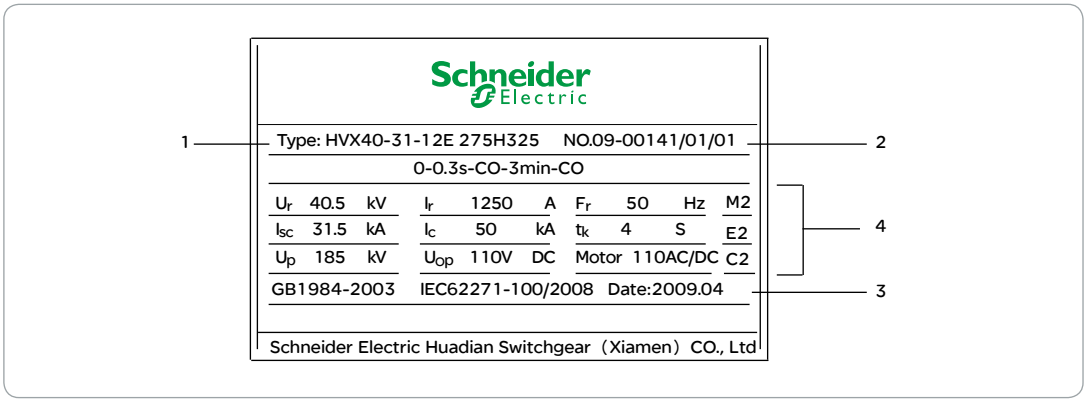


Fig. 2.1
Nameplate
1 Type designation; 2 Serial number; 3 Year of construction; 4 Technical data

2.2 Technical data

Rated voltage Ur	[kV]	36	40.5	46
Rated lightning impulse withstand voltage Up	[kV]	170	185	
Rated power frequency withstand voltage Ud	[kV]	70	95	
Rated operating current Ir	[A]	1250,1600,2000,3150		
Rated cable-charging breaking current Ic	[A]	50		
Rated short-circuit breaking current Isc	[kA]	25, 31.5		20
Rated short-time current Ik	[kA]	25, 31.5/3s	25, 31.5/4s	20/3s
Rated frequency fr	[Hz]	50/60	50	50/60

The forced cooling is necessary when HVX with rated current 3150A is installed in metal-enclosed switchgear

2.3 Control and operating devices

The drive mechanism is designed on principle for manual charging of the energy storing device(closing spring).
The drive can be equipped with additional operating and control devices.

Component fitting options:

- ● Motor
- ○ for charging the energy-storing device(spiral spring)
- ● Opening release
- ○ 3 each max
- ● Under voltage release
- ○ 1 each
- ● Closing release
- ○ 1 each
- ● Blocking coil
- ○ Blocking coils prevent the circuit-breaker from being closed and opened via the push-buttons “ON”or“OFF”,as well as manual actuation of the withdraw able unit.
- ○ If the rated auxiliary voltage has fallen or is shut off,all blocking coils are in “blocked”position.
- ● Push switches
- ○ are snap-action switches on the drive and are installed depending on the customized design.

Technical data,auxiliary switch

Rated auxiliary voltage	[V]	DC[V]			AC[V]	
		⩽48	125	220	120	230
Switching capacity	[A]	10	3.8	2	10	
Switching capacity	[ms]	10		20	-	
Rated short-time current		250A/3S				
Rated continuous current	[A]	15			-	

Power consumption, solenoids and motor

Solenoids / motor	Power consumption [W]	
	DC [W]	AC 50/60 Hz DC[VA]
Closing release	⩽250	
Opening release	⩽250	
Undervoltage release	approx.12	
Motor for energy-storage device	approx.100	

Information about the power consumption of solenoids and the motor is available from the manufacturer.The auxiliary voltage data is required to this effect.

Operating times

Times for solenoids and motor		
Minimum command time "OFF" el. tripping	[ms]	20
Minimum command time "ON" el. tripping	[ms]	20
Motor charging time	[s]	4-12

Rated frequency according to specification on rating plate(50/60Hz)

Auxiliary switches

Auxiliary switches are always actuated directly by the switch shaft via an intermediate linkage.
Their position always corresponds to that of the main contacts.As standard,the circuit-breaker is equipped with two auxiliary switches with 8 contact elements each.
The switching functions have been set in the factory according to the wiring diagram.

Anti-pumping relay

If an ON and OFF command is simultaneously and permanently present at the circuit-breaker,the latter returns to its initial position after closing.It remains in this initial position until the ON command is issued anew.This prevents continuous closing and opening(“pumping”).

Operating counter

- ● The operating counter indicates the number of switching operations.

3 Variants

HVX-F fixed type vavuum circuit-breaker(Fig3.1)

1 Conductor bar terminal
2 Circuit-breaker poles
3 Nameplate
4 Operator interface
5 Front plate

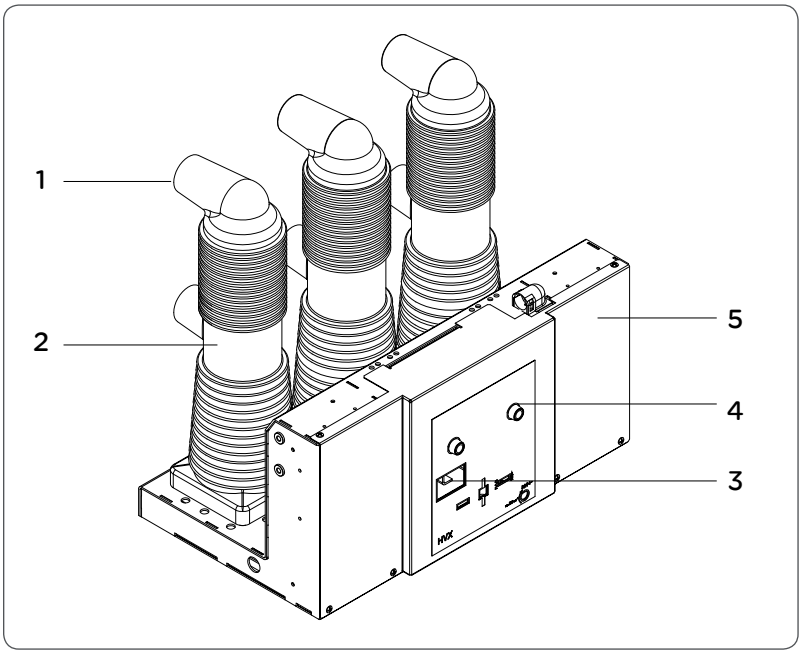


Fig. 3.1
HVX-F fix-type vacuum circuit breaker

3 Variants

HVX-E middle rolling withdrawable type vacuum circuit-breaker(Fig3.2)

1 Contact arms
2 Circuit-breaker poles
3 Withdrawable unit
4 Middle wheels
5 “IP”protection sheet
6 Front plate
7 Operator interface
8 LV plug
9 Insertion opening for crank to move
10 Nameplate
11 Frame and mechanism
12 Shutter rail

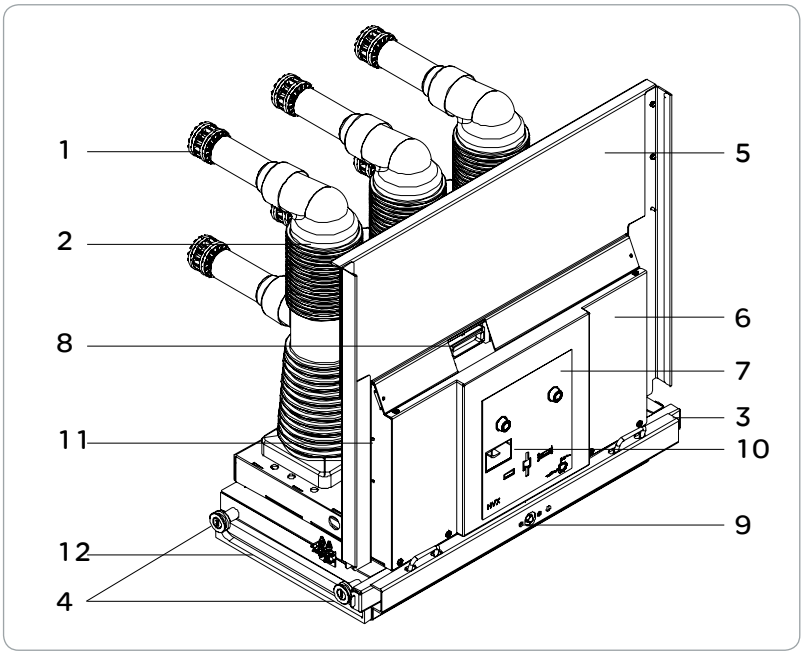


Fig. 3.2
HVX-E middle rolling withdrawable vacuum circuit breaker

3 Variants

HVX-G flooring rolling withdrawable type vacuum circuit-breaker(Fig3.3)

1 Contact arms
2 Circuit-breaker poles
3 Withdrawable unit
4 Middle wheels
5 “IP”protection sheet
6 Front plate
7 Operator interface
8 LV plug
9 Insertion opening for crank to move
10 Nameplate
11 Frame and mechanism
12 Shutter rail
13 Flooring trolley
14 Flooring wheels

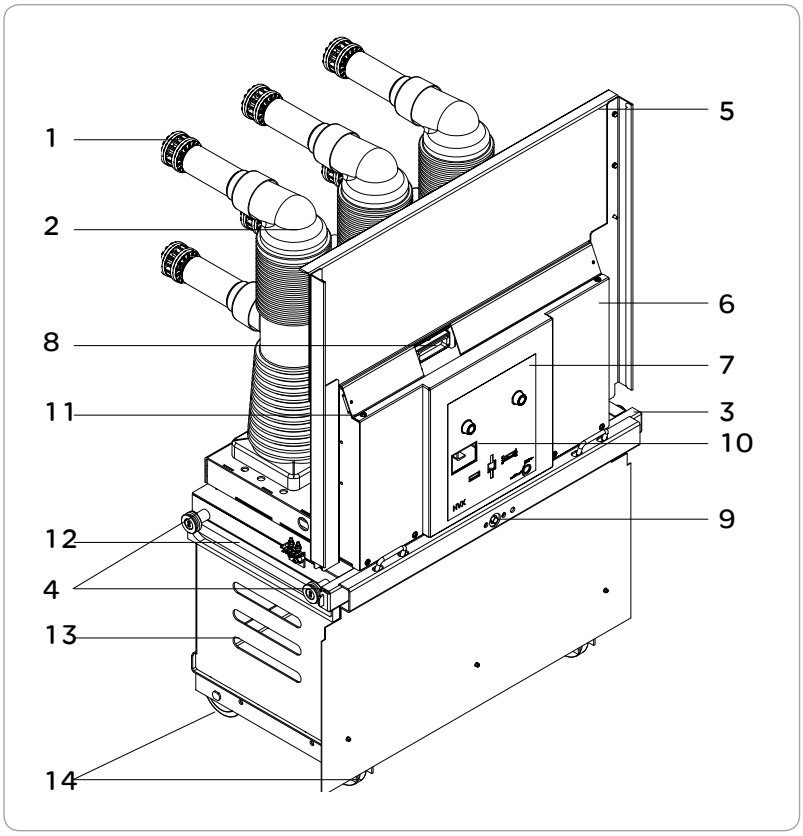


Fig. 3.3
HVX-G flooring rolling withdrawable type vacuum circuit breaker

4 Delivery, storage and transport

Fig. 4.1
Shipping unit

4.1 Delivery

- Handle shipping units carefully when unloading and unpacking them.
- Shipping units must be unpacked immediately after receipt.Any damage occurred in transit must be recorded and reported immediately to the manufacturer.
- On delivery,the consignment must be checked for completeness.
- The supplier must be notified in writing about any discrepancies.

4.2 Storage

The stansport packaging is not interded for storage.The risk of storing the parts in packed condition shall be the consignee's responsibility.

4.3 Transport

Transport using a forklift truck:

Only transport the circuit-breaker within its shipping unit on a pallet.

Transport without pallet:

Lift circuit-breaker acc.to Fig4.2.
A rope(not a metallic steel cable) 12 to 15mm or a strap is required to this effect.Use the hanging holes to maintain the circuit breaker roughly in horizontal position when hanged.

No other hanging point allowed.

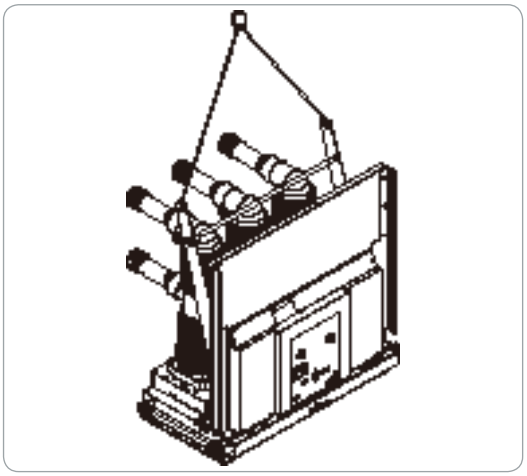


Fig. 4.2
Transport

Warning:

Make sure the rope or strap is strong enough to bear the weight of the circuit-breaker.

Warning:

Remove the lifting brackets before entering in cubicle.

Weights [kg]

Type	Rated Current [kA]		
	1250A	2500A	
HVX-F – fixed type	200	265	265
HVX-E – withdrawable Unit	285	350	380
HVX-G-flooring type	350	415	/

(Guide values without packaging)

5 Assembly

5.1 Insructions for Assembly

Dimension drawings are made available on request.
Check technical data on rating plate.
Check auxiliary voltage of the control and operating devices installed.
The circuit-breaker is supplied in position “OFF”and with the energy storing device “released”.

Warning:

The energy storing device must not be charge until assembly is finished.Risk of Injuries.

Warning:

The safety provisions of chapter 1.5 must be observed.

Fig. 5.1
Transport truck

Fig. 5.2
Couple the transport truck to the Panel

5.2 HVX-E Mechanical assembly:

Mounting the transport truck(optional)

A transport truck(optional) is used to rack the circuit-breaker into the switchgear panel(Fig5.1).
For the design and method of operation of the transport truck used,please refer to the instructions for the panel in question.

Placing circuit-breaker on transport truck and rackig it into the switchgear.

Important:

When performing the following assembly steps,observe and comply with the Instructions given for the panel used.

- Place the circuit-breaker on the transport truck rails.
- Lock the circuit-breaker on the transport truck.
- Make sure that the lifting brackets are removed.
- Grease the disconnecting fingers(Fig.8.3)
- Couple the transport truck to the Panel(Fig5.2).
- Unlock the circuit-breaker from the transport truck.
- Push the circuit-breaker into the panel until it is engaged in the interlock rocker.
- Release the transport truck from the panel.

Fig.5.3
Guide support

5.3 HVX-G Mechanical assembly

A guide support(Fig5.3)is used to move the circuit-breaker into the switchgear panel.

For the design and method of operation of the guide support used,please refer to the instructions for the panel in question.

Important:

When performing the following assembly steps,observe and comply with the instructions given for the panel used.

- Place the guide support in front of cubicle.
- Depend on support,push the circuit breaker access cubicle and lock it on test position(Fig5.4).
- Remove the guide support from cubicle

Fig.5.4
The floor rolling circuit breaker access the cubicle

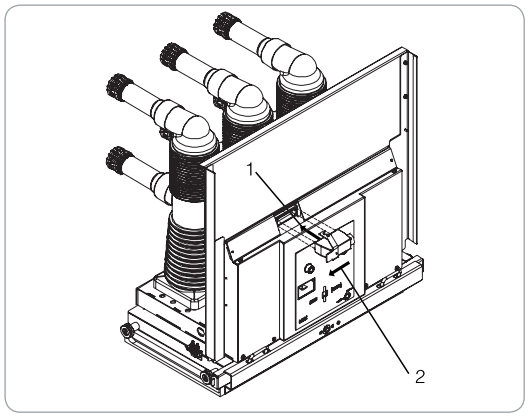


Fig.5.5
Control connector 64-pin(with circuit-breaker coding)
1 Insert control connector
2 lock

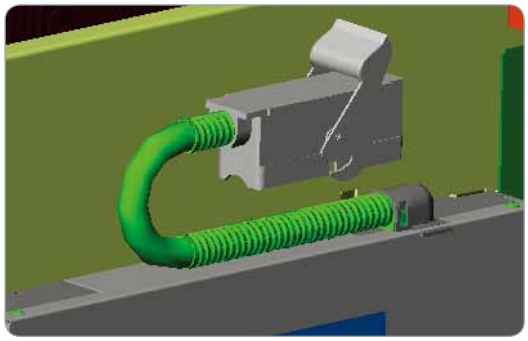


Fig.5.6
Control connector 58-pin for HVX-F

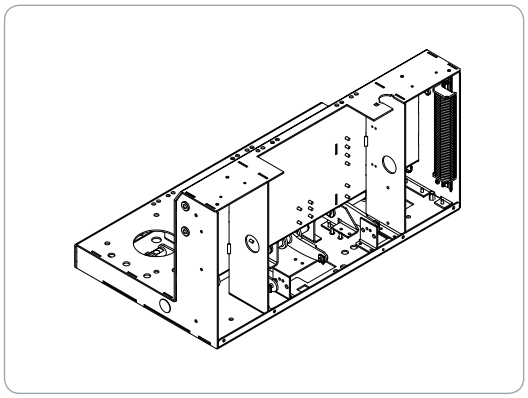


Fig.5.7
Control connector on terminal strip for HVX-F

5.4 Connecting the control lines

The control lines are connected,depending on design,via control connectors(Fig.5.5,Fig.5.6, Fig.5.7).
The control lines are wired in the circuit-breaker up to the control connector or up to the terminal strip.

Single-wire conductors or strands can be connected

- to terminal strip up to 1 mm^2
- in control connector up to 1 mm^2

Terminal with control connector

- HVX-E/HVX-G

Push the 64-pincontrol connector of cubicle onto the connector of HVX-E/HVX-G circuit-breaker and lock it(Fig.5.5).

- HVX-F

Push 58-pin control connector of HVX-F onto of the cubicle and lock it.(Fig.5.6)

Connection to terminal strip

- Remove the cover plate.
- Connect external control lines via the terminal strip.
- The specific circuit diagram valid for the unit in question has been enclosed with each circuit-breaker.If additional control lines are placed in the drive casing,leave a sufficient distance from the movable parts of the drive.
- After connecting the external control line,mount the cover plate.

Important:

Comply with the tightening torques specified for crew fastening(refer to Annex).

6 Commissioning

- Check circuit-breaker for external damage.
- Make sure that there are no external parts in the circuit-breaker compartment.
- Check suiface of insulating components for impurities.If necessary,clean(see Chapter 8).
- Check whether the transport securing devices have been removed(see Chapter 5.2)

Important:

Observe the operating and locking conditions(Chapter 7).

Important:

The energy storing device of motorized circuit-breakers is charged automatically once the auxiliary voltage is applied.

Important:

Under voltage releases/blocking coils(optional)enable switching tests only to be performed with the auxiliary voltage applied.

6.1 HVX-E (withdrawable unit)

Perform functional tests:

- Charge energy-storing device using the crank(Fig.9.1 rep.2).
  - Check the spring position indicator.
- Switch circuit-breaker on and off several times by hand.Check position indicator.
- Move the withdrawable unit to its service and disconnected position via the crank handle(Fig.9.1 rep.3).
  - Check mechanical interlocks between the HVX-E and the cell.Check position indication.
- Check electrical functions of control and operating devices.Apply auxiliary voltage.
  - Actuate the releases to perform switching operations and check functions/ interlocks.Watch position indicators.
- Racking the circuit-breaker in and out.At the same time,check the position indicators and the interlocks in the circuit-breaker and with regard to other devices.

6.2 HVX-F (fixed type)

Check assembly work:

- Check securing bolts.
- Check the conductor bar's screw coupling using a torque wrench.
- Check the screw coupling of the earth terminal.

Perform functional tests:

- Charge energy-storing device using the crank.Check the spring position indicator.
- Switch circuit-breaker on and off several times by hand.Check position indicator.
- Check electrical functions of control and operating devices.Apply supply voltage.
- Actuate the raleases to perform switching operations and check functions/ interlocks.Watch position indicators.
- Check interlocks between circuit-breaker and other devices.

7.1 Control elements and operator interface

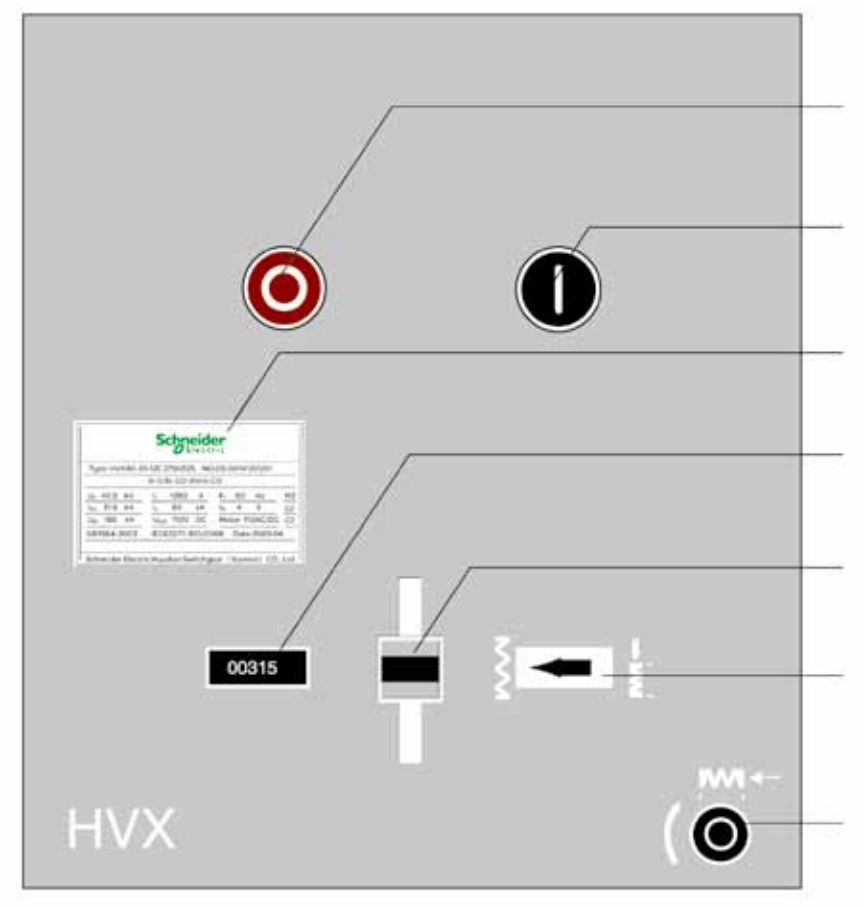
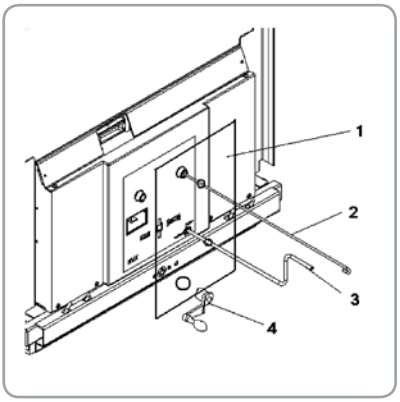


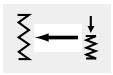
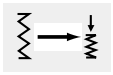
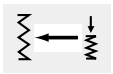
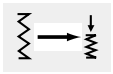
Fig. 7.1
Operator interface of HVX circuit-breaker



- Closed door of the panel
- ON/OFF operating rod
- Spring charging crank for spring operating mechanism
- Moving crank handle(case of HVX-E and HVX-G)

Fig. 7.2
Control elements for the circuit-breaker HVX

Position indicators on circuit-breaker and possible operating sequences

Item	Position indicator Energy-storing device (closing spring)		Position indicator ON/OFF Switch position		possible operating sequence
1		released		OFF	none
2		charged		OFF	C-O
3		released		ON	O
4		charged		ON	O-C-O

C=Switching ON O=Switching OFF

7.2 Interlocks(where applicable)

Mechanical interlocks

The HVX switch features basic interlocks to prevent operating errors.

Warning:

You must be familiar with these interlocks before operating the circuit-breaker.

Electrical interlocks

Have been designed according to the circuit diagram.

Interlock	Function of interlock	Method of operation of interlock
Between the withdrawable unit and earthing swith	The withdrawable unit cannot be racked in while the earthing switch of the switchgear panel is in"ON"position	The moving crank handle is blocked automaticallty
	The earthing switch cannot be switched on as soon as the withdrawable unit has left its disconnected position	The eathing switch cannot be switched on. Do not apply force!
Between the withdrawable unit and the operating state of the circuit-breaker	The withdrawable unit cannot be racked in or out while the circuit-breaker is switched on	The moring crank handle is blocked automatically
	The circuit-breaker cannot be switched on unless the withdrawable unit is completely in its disconnected or service position	The circuit-breaker cannot be switched on or off
Between the withdrawable unit and the door of switchgear panel(Only HVX with door interlock)	The withdrawable unit can't be racked in while the door is switchgear panel is opened	The moving crank handle is blocked automatically
	The door of switchgear can't open as soon as the withdrawable unit has left its disconnected position	Do not apply force!
Between control connector and the withdrawable unit	The withdrawable unit can't be racked in while the control connector don't assembly well	Do not racked in force!
	The control connector cannot remove as soon as the withdrawable unit has left its disconnected position	Do not remove force!

7.3 Actuate withdrawable unit(HVX-E/HVX-G)

Important:

Observe interlock conditions(see chapter7.2).

Move circuit-breaker from disconnected into service position by hand:

- Initial situation:
  - Circuit-breaker OFF
  - Earthing switch OFF
- Insert crank handle(Fig.7.3)and move it clockwise to its stop or until blocking;the circuit-breaker is racked into its service position.Observe the position indicator on the switchgear panel.
- Remove crank handle.

Move circuit-breaker from service into disconnected position by hand:

- Initial situation:
  - Circuit-breaker OFF
- Insert crank handle(Fig.7.3)and move it counter-clockwise to its stop;the circuit-breaker is racked into its disconnected position.Observe the position indicator on the switchgear panel.
- Remove crank handle.

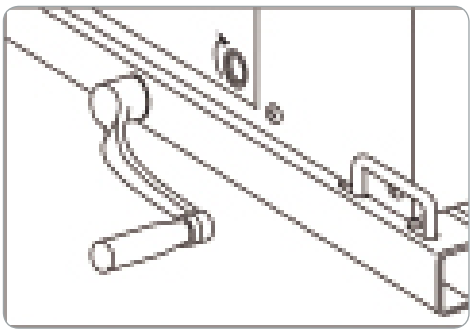


Fig. 7.3
Crank handle to rack the circuit-breaker in and out

7.4 Charging the energy storing device

Manually

Move circuit-breaker in “ready-foreclosing”position.

- Insert crank into opening for tensioning the erengy storing device(Fig.7.4)
- Charge the sprial spring using the spring charging crank.As soon as the spiral spring is charged,the spring charging mechanism is decoupled and the position indicator signals”charged”:
  - If the motor starts during this process,this does not constitute a risk.
- Remove crank.The circuit-breaker is ready for closing(Table,Chapter7.1,item2).

Via motor

The energy storing device of motorized circuit-breakers is charged automatically as soon as the auxiliary voltage is applied.

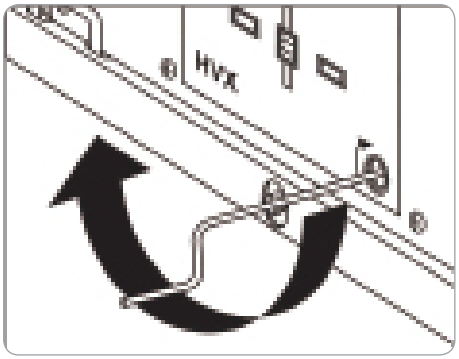
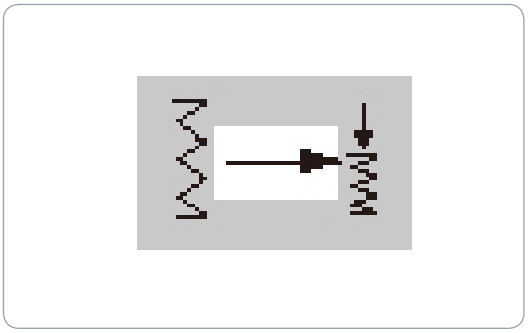


Fig. 7.4
Charge the erengy storing device



7.5 Switching operations

Closing (ON)

- Push button"ON"-or actuate closing release electrically.
- The position indicator shows the switch position "ON" (Table,Chapter7.1,item3).
- The position of the auxiliary switch has changed.The energy storing device can be charged immediately after switching ON(by hand or by motor).If voltage is applied to the motor,charging is performed automatically.
- The position indicator shows the energy storing device position "charged" (Table,Chapter7.1,item4).

Opening (OFF)

- Push button "OFF" -or switch off via opening release,under voltage release or secondary coil.
- The position indicator shows the switch position "OFF" (Table,Chapter7.1,item1or2).
- The position of the auxiliary switch has changed.

8 Servicing

8.1 Servicing schedule

Series HVX vacuum circuit-breakers require regular inspections.The intervals depend on the strain to which the switches are subject during operation,and on the operating conditions.

In case of frequent condensation or air pollution(dust,smoker or corrosive gases),the maintenance intervals must be adapted to the actual conditions.

Important:

The circuit-breaker operating company is responsible for complying with the specified maintenance intervals and for performing maintenance according to the actual operating and ambient conditions.

In case of queries or ambiguities,please contact the manufacture.

8.2 Safety provisions

Only specialist electricians certified by the manufacture for maintenance work regarding series HVX vacuum circuit-breakers and who have the required knowledge regarding operation of medium-voltage switchgear are permitted to perform maintenance and cleaning work.

Warning:

The safety provisions of Chapter1.5 must be observed.

Warning:

The circuit-breaker must not be disassembled for maintenance work(see Disclaimer of liability,section1.3)

- On principle,the 5 safety rules applicable for electrical engineering must be complied with before maintenance work on the circuit-breaker is started:
  - Isolate switchgear from power Supply
  - Prevent it from reclosing
  - Verify it for zero voltage
  - Earth and short-circuit it
  - Cover or bar off adjacent live components.
  - These rules apply for the upper and lower circuit-breaker terminals alike.
- Switch off the auxiliary voltage for the circuit-breaker drive and secure it against reclosing.
- Release the energy-storing device by performing the corresponding operating sequence on the circuit-breaker.OFF-ON-OFF(see Chapter7)

Servicing schedule

Maintenance intervals(ambient conditions according to IEC 60 694)	Maintenance work	Qualification/position performing the work
Every 4 years	• Check for contamination/condensation and damage • If necessary,clean circuit-breaker(see section8.3)and perform several switching tests	Staff qualified accordingly for the work to be done
After 20 years	• Clean,grease circuit-breaker(see Chapter8.3 and 8.6)and perform several switching tests • Cleak releases and blocking coils for proper working order	
Once the summation current limit has been reached(refer to Chapter8.7)	Replace circuit-breaker pole	Manufacturer's Service Center

8.3 Cleaning insulating components

To ensure the specified insulating level,the insulating components must be clean.
On principle,general cleanliness of the circuit-breaker or of its external parts should be ensured.

Use a dry cleaning cloth for slight soiling:

Clean by means of a dry,lint-free cloth.Depending on dirt collected,replace cloth as often as necessary.

Use cleaning agents for severe soiling:

Cleaning agent,1 liter can(see Chapter9.2).

Warning:

The use of other cleaning agents is not admissible.

- Wear protective gloves
- Use cleaning agent according to manufacturer's instructions
- Soak the cloth thoroughly and wipe the insulating components.Keep duration of exposure as short as possible.
- Expose the cleaned surface to the air for at least two hours.

8.4 Corrosion protection

Drive mechanisms and covers have a long-term protection against corrosion.
Any damage to the paint,scratches and other damage must be repaired immediately to avoid corrosion.
Contact the manufacturer's Service Center.

8.5 Avoid condensation

To ensure the specified insulating level,the circuit-breaker-especially its insulating components-must not be exposed to condensation.

Measures to take in case of condensation:

- If condensation of the circuit breaker is detected,the switching device must be cleaned,according to section8.3.
- Installation or inspection of the appropriate heating.It must provide a sufficient heating performance to prevent condensation on the circuit-breaker.

8.6 Lubrication instructions

Preparations

Warning:
Comply with safety Provisions(Chapter1.5).

Warning:
Circuit-breakers and drives must not be disassembled for service and maintenance work(see Disclaimer of liability,section1.3).

Remove the withdrawable unit from the switchgear cubicle for inspection(see instructions for the panel concerned).Remove the cover plate of the circuit-breaker drive.

Lubricants

Important:
Only approved lubricants may be used (section9.2).

- ◯ Cryogenic grease
- ◯ High-pressure grease
- ◯ Contact lubricant Kontasynth

- Lubrication procedure

1.Clean the points of lubrication(Fig.8.1to8.3)using a lint-free cotton cloth;in case of serious contamination,use a cleaning agent(see section8.3).

2.Apply a thin coat of lubricant using e.g.a paintbrush.

Points of lubrication

Important:
The following elements must not be lubricated:

- Motor
- Electric releases
- Push switches
- Blocking colls
- Auxiliary switches
- Ball bearings
- Points of lubrication on the drive(Fig.8.1):

○ All metallicsurfaces sliding upon each other,especially cam discs,cogwheels and ratchet levers.

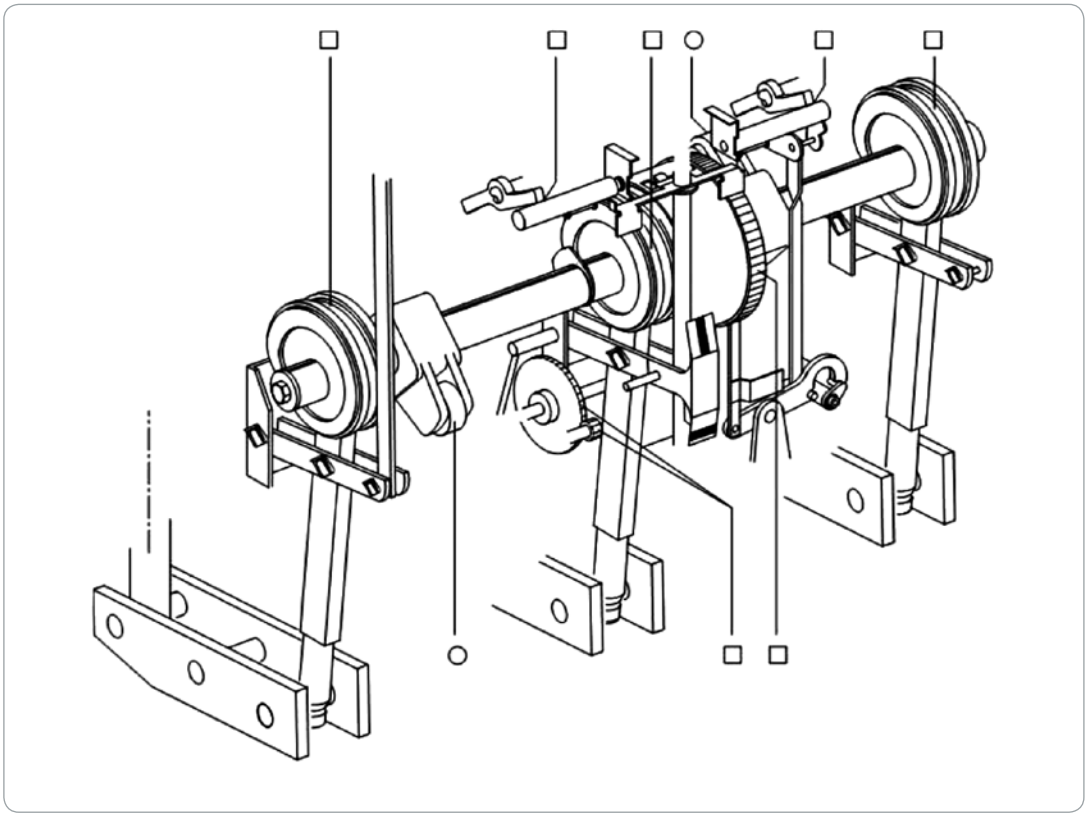


Fig. 8.1
Circuit-breaker drive mechanism ☐ High-pressure grease ◯ Cryogenic grease

- Spindle of withdrawable unit mechanism(Fig.8.2,item1)

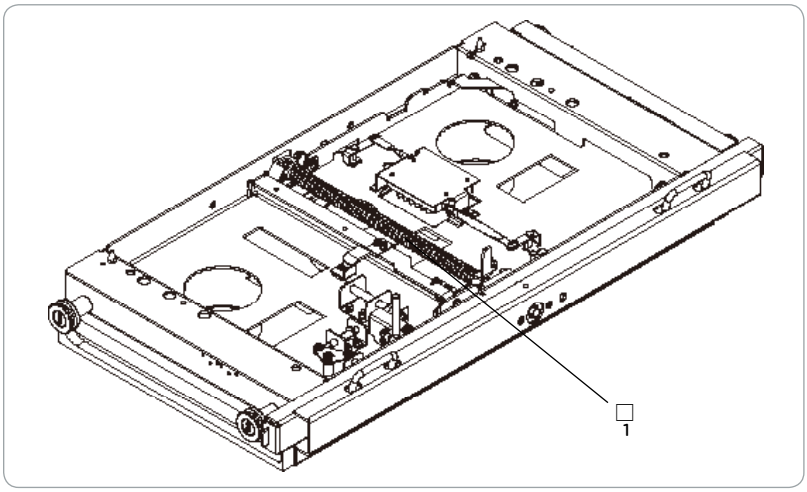


Fig. 8.2
Rack-in mechanism
□ High-pressure grease
1 Spindle

- Moving contacts (Fig. 8.3)

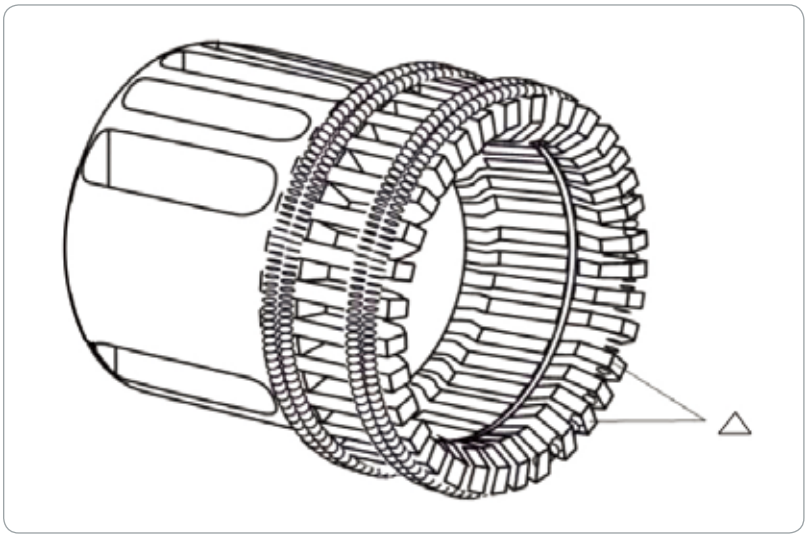


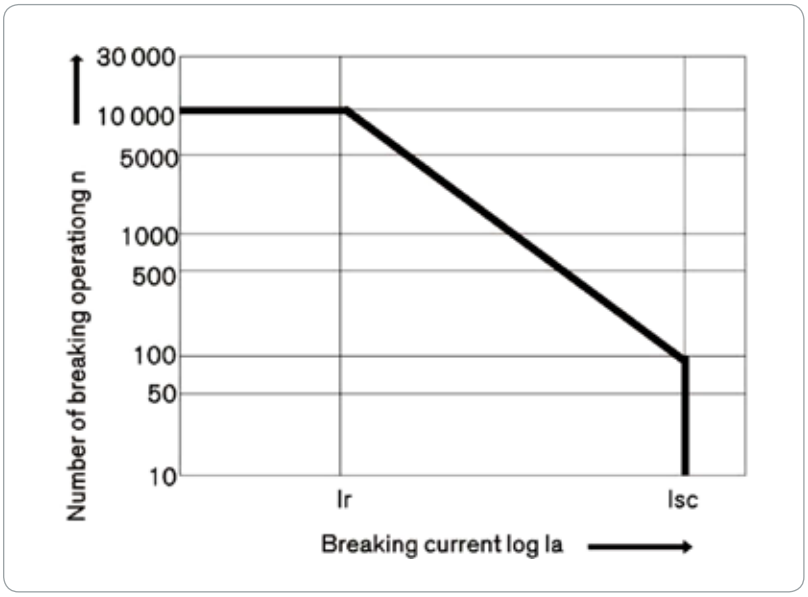
Fig. 8.3
Moving contacts
△ Contact lubricant Kontasynth

Final steps

Re-mount the cover plate and insert the circuit-breaker in the panel(see section5). Check circuit-breaker according to section 6"Commisioning".

8.7 Admissible numbers of breaking operations of vacuum chamber

The diagram defines exclusively the admissible summation current limit.It is a guide as to whether the vacuum interrupter chambers/pole sections need to be replaced or not.



Ir = Rated (normal) current [A]
Isc = Short-circuit breaking current [kA]

For the data regarding the rated normal current Ir and the short-circuit breaking current Isc,please refer to the rating plate(Fig.8.4).

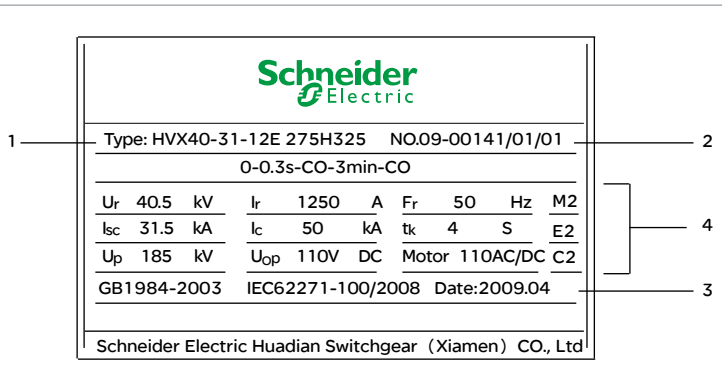


Fig. 8.4
Data for rated normal current Ir(1)and short-circuit breaking current Isc(2)on the rating plate.

9.1 Accessories

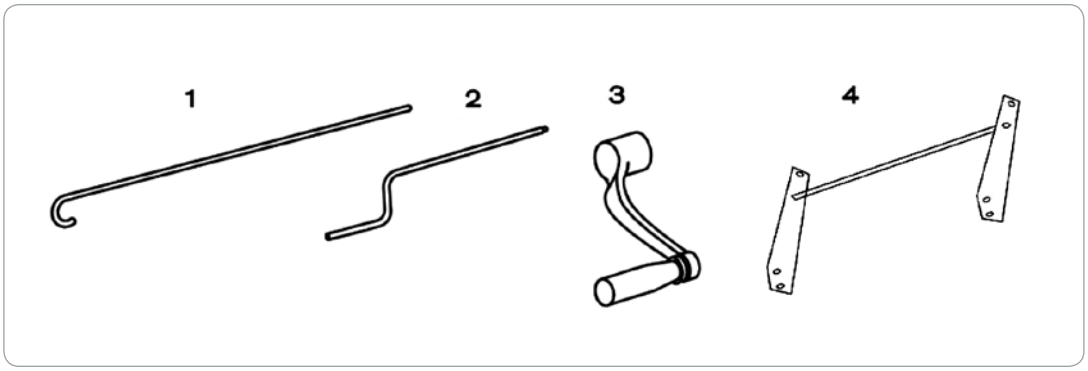


Fig. 9.1
Accessories for HVX circuit-breaker

The accessories depend on the panel type used,and must be enquired about if necessary.

1 ON/OFF operating rod
2 Spring charging crank for spring operating mechnism
3 Moving crank handle(in case of HVX-E and HVX-G)
4 Lifting bracket

9.2 Auxiliary products

Only the following auxiliary products may be used,which are available from AREVA.The use of other auxiliary products is not admissible.

Designation	Order no.
Contact lubricant Kontasynth,0.5kg can	S 008167
High-pressure grease,0.3 liter can	ST 312-101-833
Cryogenic grease,0.3 liter can	ST 312-105-833
Cleaning agent,1 liter can	S 008152

9.3 Screw fastenings

The following elements must be used for all metal screw couplings:

- SScrews and bolts:Grade≥8.8
- Nuts:Grade8.

Thread size	Tightening torque [Nm]	
	min.	max.
M6	7	9
M8	16	24
M10	36	44
M12	63	77

Table 1:
Hex.Bolts and socket-head cap screws(except slotted screws)and nuts(except self-locking nuts)

Thread size	Tightening torque [Nm]	
	min.	max.
M6	5.5	7.5
M8	15	19
M10	30	40
M12	60	76
M16	145	185

Table 2:
Screw coupling between switching device and conductor bar with copper as conductor materical.

9.4 Treatment of firmly screw-connected contact surfaces

Contact surfaces must be subjected to preliminary treatment before screw-fastening.

1.Clean

-use a lint-free cloth,
-in case of severe contamination:use detergent.

2.Polish to achieve a bright surface:

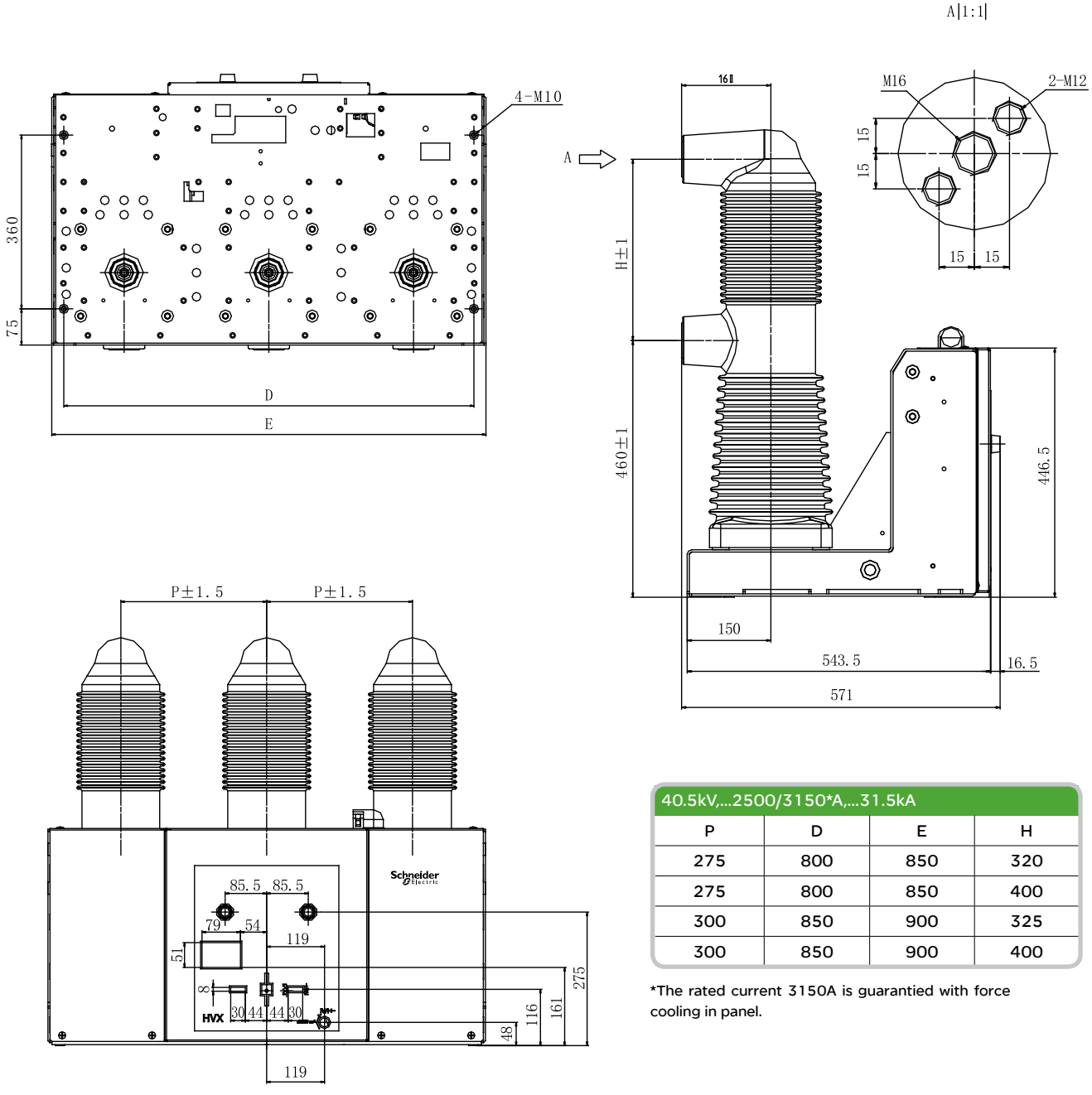
Material of contact surfaces	Pre-treatment
Copper,silver-plated	-
Copper	A
Aluminium silver-plated	-
Aluminium	B
Steel or steel galvanized	C

(A)-use emery cloth (grain size 100 or finer)
-or use a wire brush which is only for copper
(B)-use emery cloth (grain size 100 or finer)
-or use a wire brush which is only used for aluminium
(C)remove any existing passivation using a steel brush which is only used for steel.

3.Immediately after cleaning the material metallically bright,coat it with lubricant KL so that the space between the contact surfaces is completely filled once the screws have been fastened.

10.1 Outline drawing

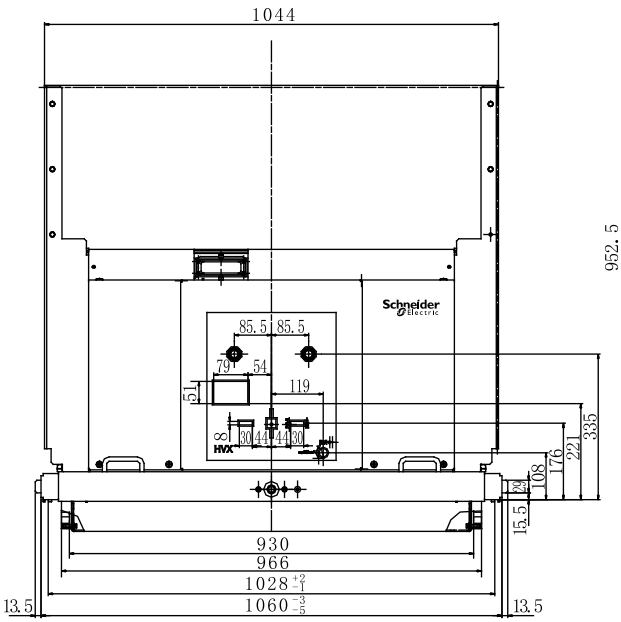
HVX-F fixed type vacuum circuit-breaker(j3150A,j31.5KA)

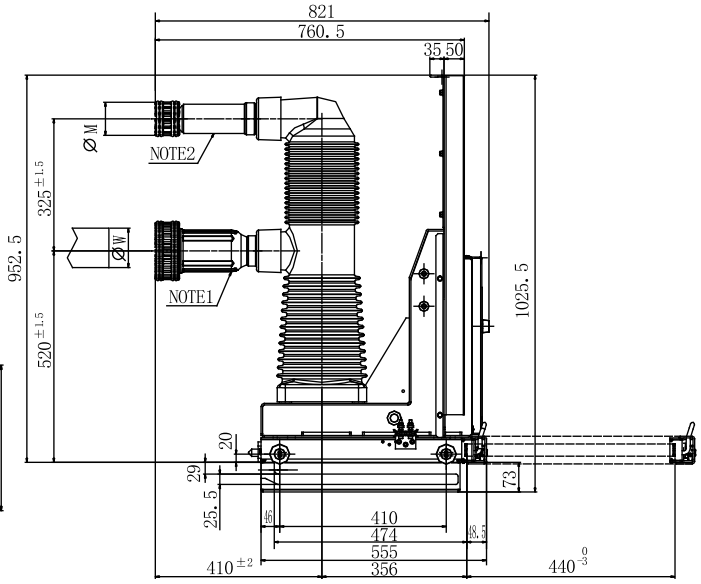


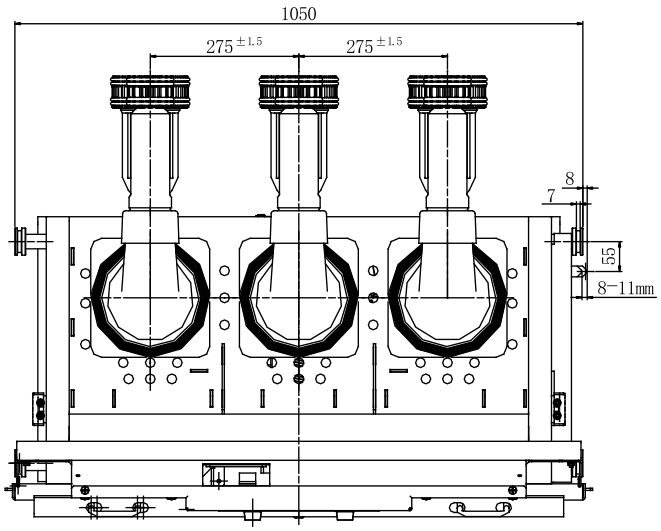
40.5kV,...2500/3150*A,...31.5kA			
P	D	E	H
275	800	850	320
275	800	850	400
300	850	900	325
300	850	900	400

*The rated current 3150A is guarantied with force cooling in panel.

10 Drawing





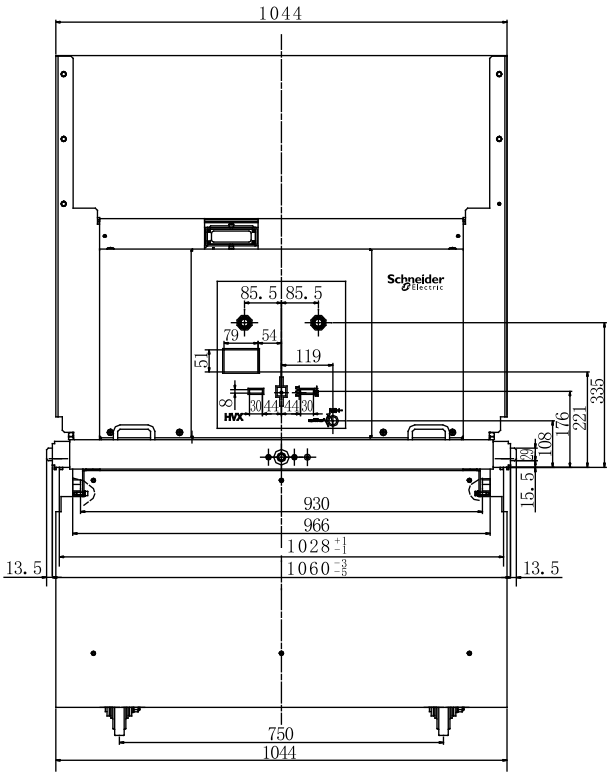


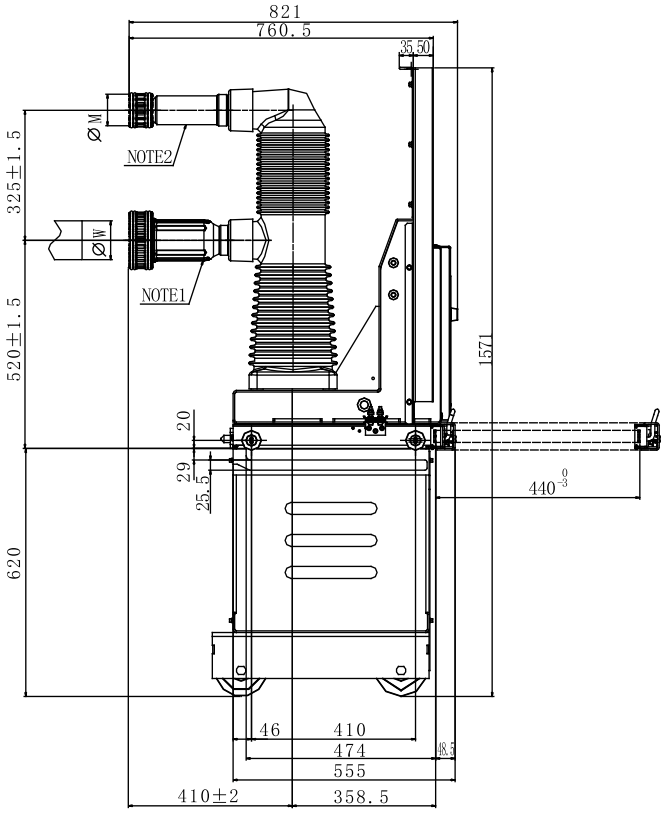
Diameter of connecting finger for different rated current					
Rated current(A)	1250	1600	2000	2500	3150*
M(mm)	88	118	118	148	148
W(mm)	49	79	79	109	109

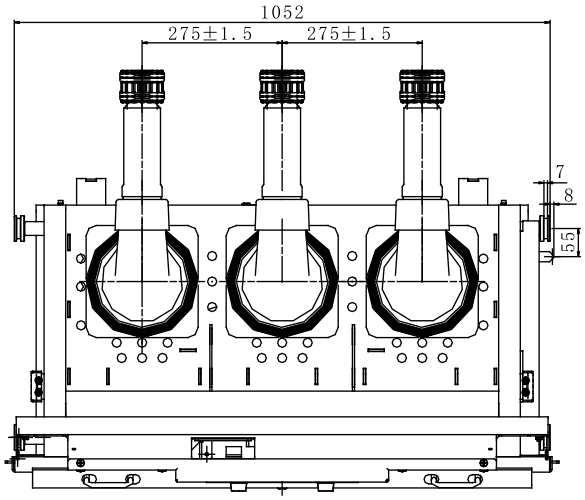
*The rated current 3150A is guarantied with force cooling in panel.
NOTE1:This connecting arm uses for 2500A
NOTE2:This connecting arm uses for ⩽2000A

10 Drawing

HVX-G flooring type vacuum circuit-breaker(j2500A,j31.5KA)





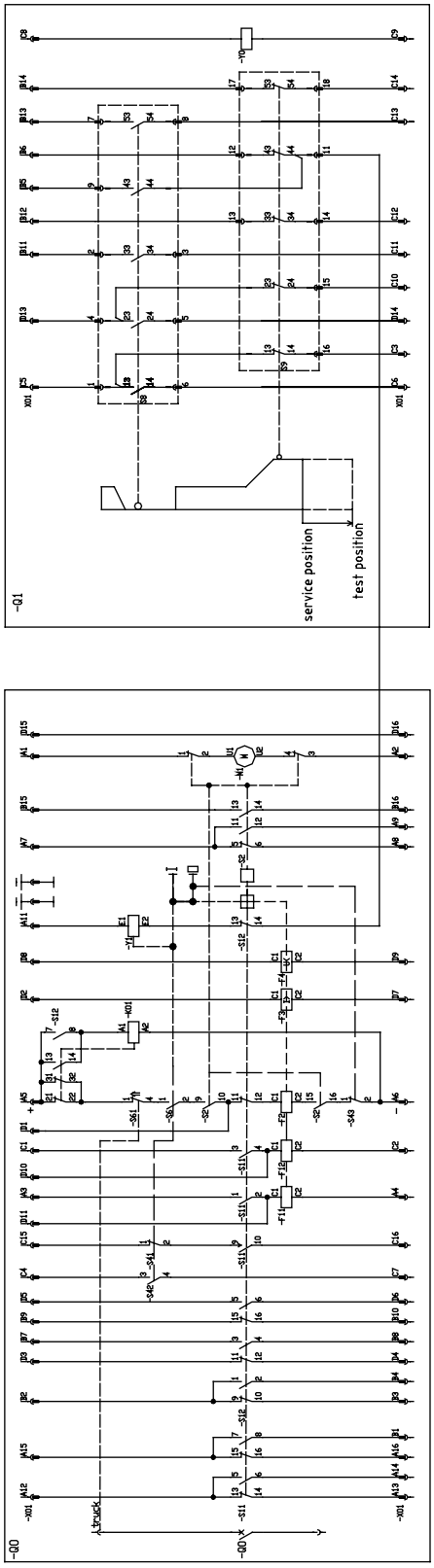


Diameter of connecting finger for different rated current				
Rated current(A)	1250	1600	2000	2500
Φ(mm)	88	118	118	148
Φ(mm)	49	79	79	109

NOTE1:This connecting arm uses for 2500A
NOTE2:This connecting arm uses for ⩽2000A

10.2 Standard wiring diagram

HVX-E/HVX-G 64-pin plug with anti-pumping relay K01



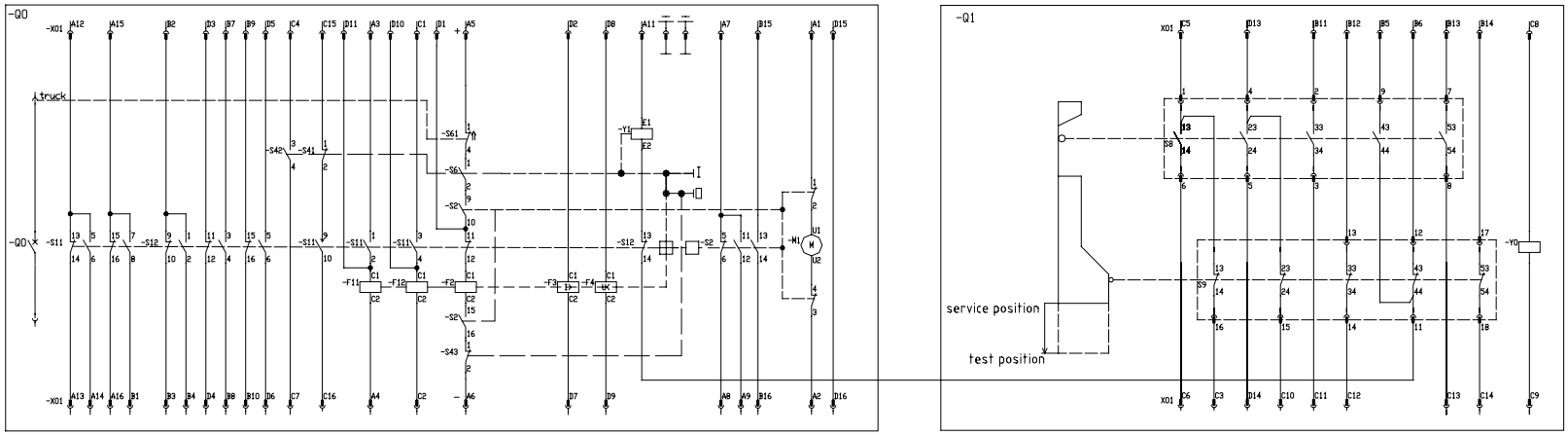
1.This circuit diagram shows the maximum switchgear equipment.The standard equipment doesn't include option items,if the customer requires option items.lease state it when placeing the order.

2.Circuit breaker is in discharge and open position,trolley is in service position,blocking magnet for closing is de-energised.

3.As the drawing show,auxiliary swith S11 is 1P/3NC/4NO;when choice OP/4NC/4NO,the contact 9.10 of S11 will be normally closed contact.

- ● Q0 Units incorporatrd in the circuit breaker in compliance with order
- ○ M1 Motor for energy storing device
- ○ S11/22 Auxiliary switch position indicator
- ○ S2 Micro switch for motor control
- ○ S41/42 Micro swith actuated by push button on/off(option)
- ○ S43 Micro swith actuated by break button(option)
- ○ S6 Micro swith for blocking magnet
- ○ Y1 Blocking magnet for closing(option)
- ○ F11 1.Auxiliary opening release
- ○ F12 2.Auxiliary opening release(option)
- ○ F3 Indirect overcurrent release(option)
- ○ F4 Undervoltage release(option)
- ○ S61/62 Micro switch actuated by truck operation or truck not in end position
- ○ F2 Auxiliary closing release
- ○ K01 Anti-pumping-relay
- ● Q1 Units incorporated in the switchgear truck in compliance with order
- ○ S8 Test position switch
- ○ S9 Service position switch
- ○ Y0 Blocking magnet blockung for trolley(option)

Drawing number:ASX002100-13



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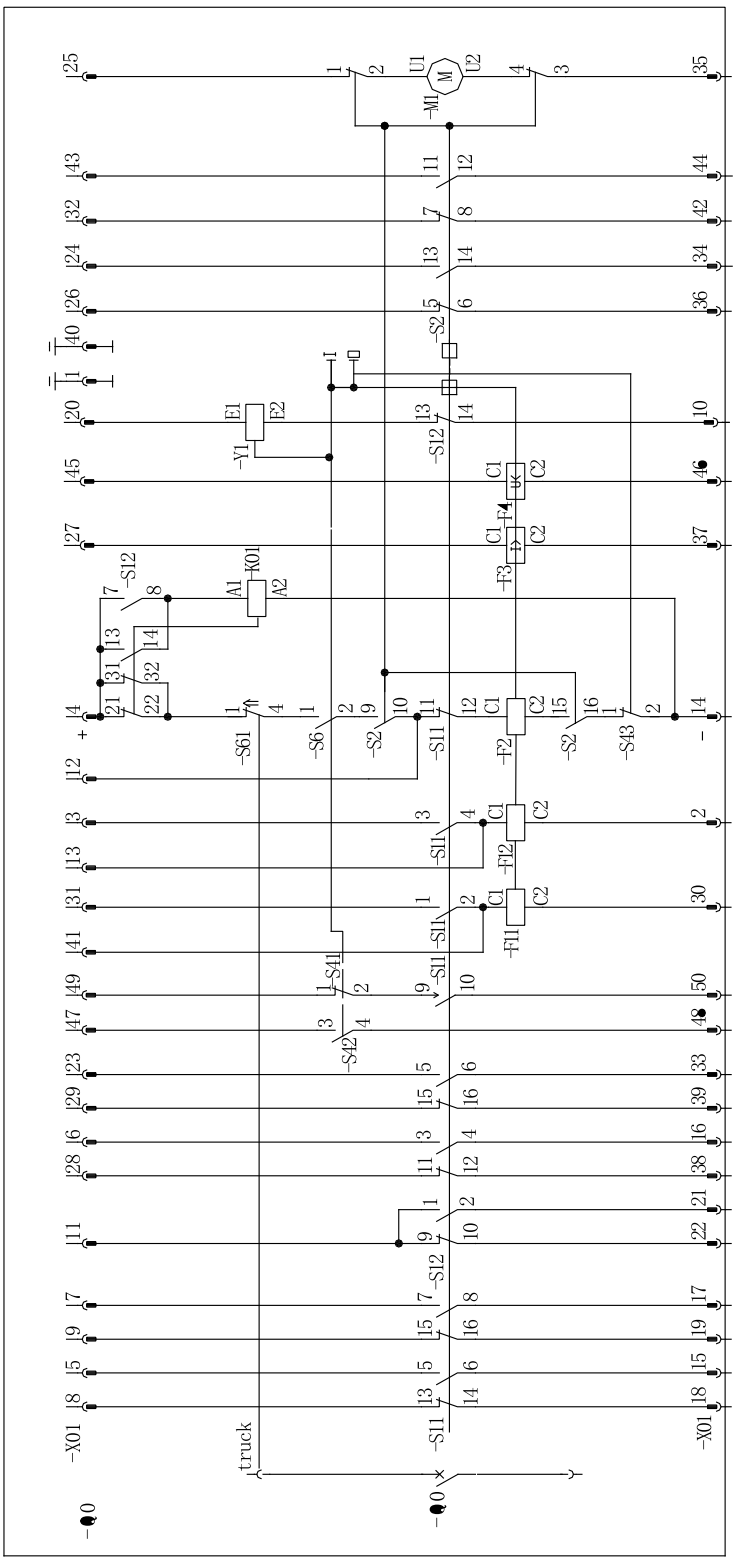
- ○ S43 Micro swith actuated by break button(option)
- ○ S6 Micro swith for blocking magnet
- ○ Y1 Blocking magnet for closing(option)
- ○ F11 1.Auxiliary opening release
- ○ F12 2.Auxiliary opening release(option)
- ○ F3 Indirect overcurrent release(option)
- ○ F4 Undervoltage release(option)
- ○ S61/62 Micro switch actuated by truck operation or truck not in end position
- ○ F2 Auxiliary closing release
- ● Q1 Units incorporated in the switchgear truck in compliance with order
- ○ S8 Test position switch
- ○ S9 Service position switch
- ○ Y0 Blocking magnet blockung for trolley(option)

Drawing number:ASX002100-14

10 Drawing

HVX-F 58-pin plug/terminal strip with anti-pumping relay K01



1.This circuit diagram shows the maximum switchgear equipment.The standard equipment doesn't include option items,if the customer requires option items. lease state it when placeing the order.

2.Circuit breaker is in discharge and open position, blocking magnet for closing is de-energised.

3.As the drawing show,auxiliary swith S11 is 1P/3NC/4NO;when choice OP/4NC/4NO,the contact 9.10 of S11 will be normally closed contact.

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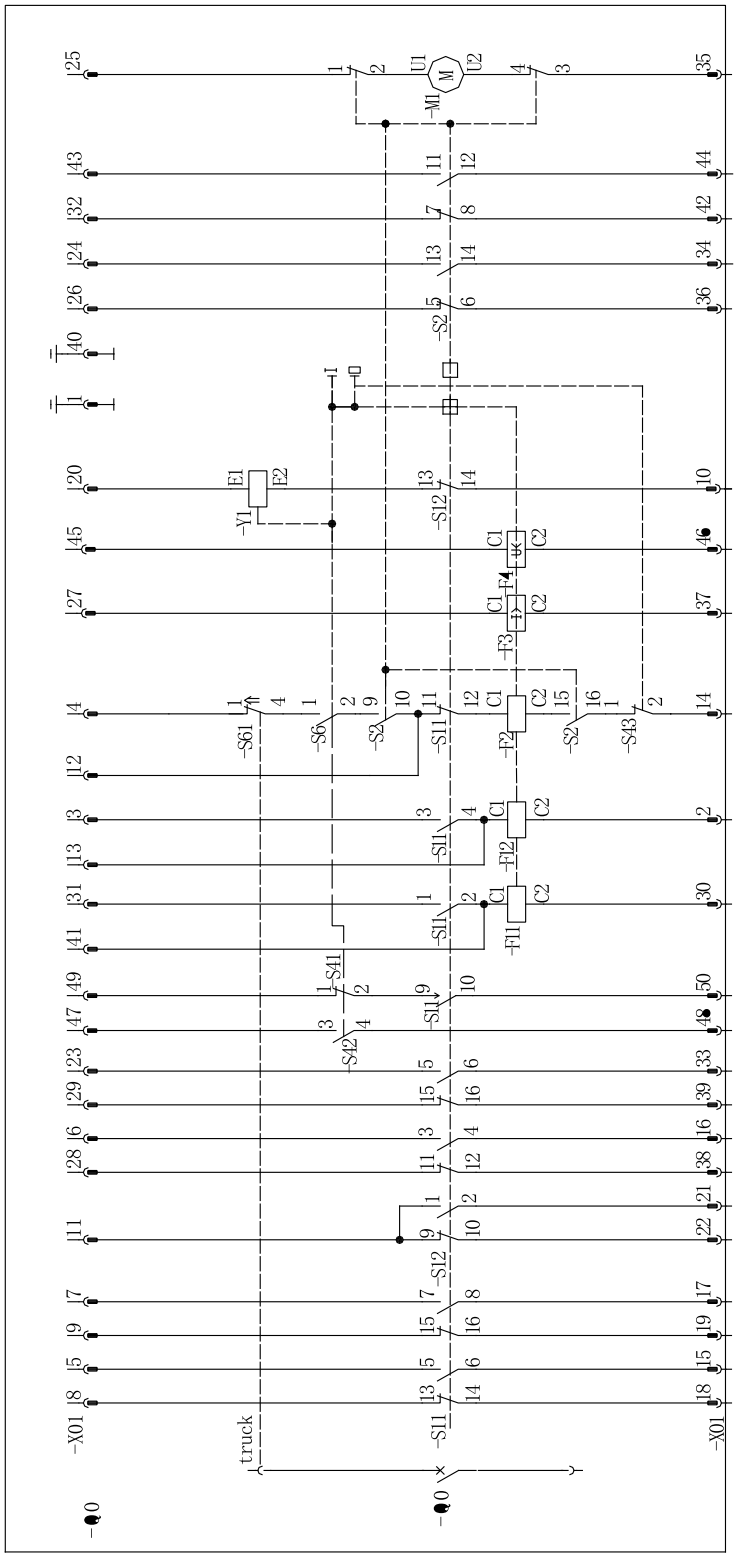
- ○ M1 Motor for energy storing device
- ○ S11/22 Auxiliary switch position indicator
- ○ S2 Micro switch for motor control
- ○ S41/42 Micro swith actuated by push button on/off(option)
- ○ S43 Micro swith actuated by break button(option)
- ○ S6 Micro swith for blocking magnet
- ○ Y1 Blocking magnet for closing(option)
- ○ F11 1.Auxiliary opening release
- ○ F12 2.Auxiliary opening release(option)
- ○ F3 Indirect overcurrent release(option)
- ○ F4 Undervoltage release(option)
- ○ S61 Micro switch actuated by truck operation
- ○ F2 Auxiliary closing release
- ○ K01 Anti-pumping-relay

Drawing number:ASX002100-31

10 Drawing

HVX-F 58-pin plug/terminal strip without anti-pumping relay K01



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2.Circuit breaker is in discharge and open position, blocking magnet for closing is de-energised.

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- ○ M1 Motor for energy storing device
- ○ S11/22 Auxiliary switch position indicator
- ○ S2 Micro switch for motor control
- ○ S41/42 Micro swith actuated by push button on/off(option)
- ○ S43 Micro swith actuated by break button(option)
- ○ S6 Micro swith for blocking magnet
- ○ Y1 Blocking magnet for closing(option)
- ○ F11 1.Auxiliary opening release
- ○ F12 2.Auxiliary opening release(option)
- ○ F3 Indirect overcurrent release(option)
- ○ F4 Undervoltage release(option)
- ○ S61 Micro switch actuated by truck operation
- ○ F2 Auxiliary closing release

Drawing number:ASX002100-32

Note:

Manufac turer:

Schneider Electric Huadian Switchgear(Xiamen) co.,Ltd

No. 22 Huo Ju bei lu,Xiamen

361006,china

Tel: +86(0)592-5775316

Fax: +86(0)592-5775319

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