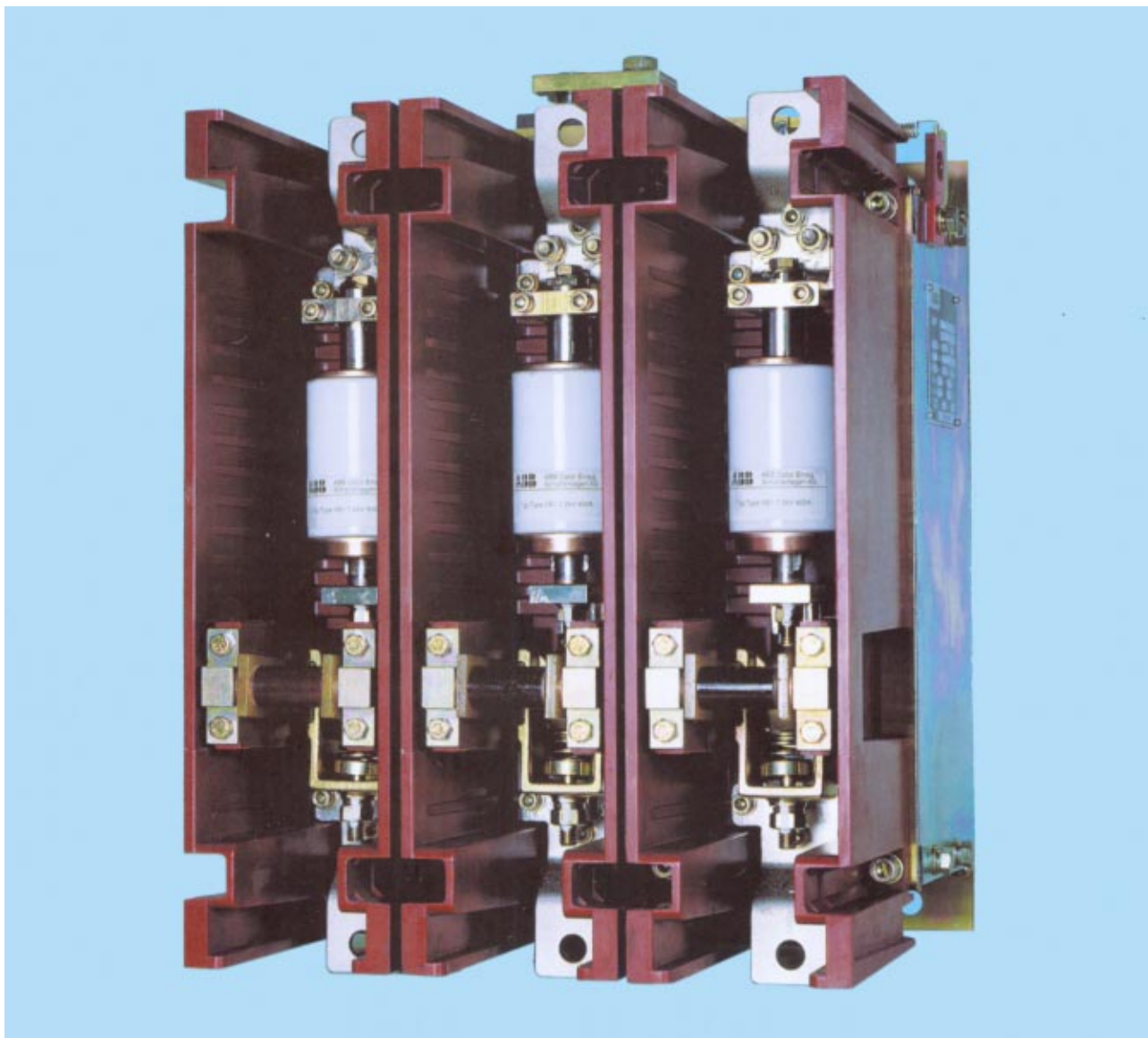


VACUUM CONTACTOR TYPE SVC-T 32

7,2 kV - 400 A

MANUAL FOR MOUNTING, OPERATION AND MAINTENANCE



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1. INTRODUCTION

This manual contains instructions for packing, transport, storage, installation, operation and maintenance of the vacuum contactor type SVC-T 32. The manual is supplied with each contactor and given instructions are obligatory.

All activities regarding installation, commissioning and operation may only be performed by an adequately skilled personnel. Conditions for performance of the maintenance work are described in detail in cl. 9.

Attention:

Inadequate use of devices or material reduce service life of the vacuum contactor and may be dangerous for operators.

1.1 Acceptance inspection on delivery

The customer has to check immediately after delivery:

- whether the delivery of vacuum contactors is complete and complies both with the enclosed specification and ordering documentation.
- Whether there are any damages or material losses due to the transport.

Any deficiencies have to be reported in written form immediately:

- to the manufacturer or his agency
- to the freighter and insurance company

2. GENERAL

Vacuum contactors type SVC-T 32 are manufactured for rated insulation voltage 7.2 kV and rated operational current 400 A. The main contacts of each pole switch inside the vacuum interrupter. A small contact stroke and low weight of contacts make possible to reduce dimensions of the contactor, to restrict maintenance requirements and to ensure high electrical and mechanical life. The contactors are designed for the following applications:

- fix cell mounting
- mounting onto a withdrawable truck for switchgear.

The vacuum contactor is of a three-pole construction. The operating mechanism of the contactor is placed in a steel sheet frame. To this frame insulating enclosures with vacuum interrupters are attached. Vacuum interrupters are operated through insulating pull-rods by means of a common shaft driven by a closing electromagnet.

After this electromagnet is energized, the vacuum contactor is closed by the operating mechanism and held in the closing position. If the magnet is deenergized, the vacuum contactor is opened by means of opening springs.

The vacuum contactor equipped with latching mechanism

By request of customer the latching mechanism is mounted on the upper part of the contactor frame. A shunt release OFF is attached to the closing electromagnet in the frame. The function of vacuum contactor equipped with the latching mechanism is as follows.

After the closing electromagnet is energized, the vacuum contactor is closed. The armature of the closing electromagnet is caught by latching mechanism in the closed position and the power supply of the closing electromagnet circuit is disconnected. The opening is carried out by the shunt release OFF or mechanically - by an emergency opening release. At the same time the latching mechanism is released and the vacuum contactor is opened by means of opening springs.

3. STANDARDS AND SPECIFICATIONS

Vacuum circuit breakers type SVC-T 32 comply with the specification of Publication IEC 470 of 1974 and CSN 35 4280 standard.

4. MAIN TECHNICAL DATA

	CSN 35 4280	IEC 470	
Rated operational voltage	(U _e)	(U _e)	6.6 kV
Rated insulation voltage	(U _i)	(U _i)	7.2 kV
Rated thermal current	(I _n)	(I _{th})	400 A
Rated operational current	(I _e)	(I _e)	400 A
Rated frequency			50/60 Hz
Rated breaking capacity			3200 A
Rated making capacity			4000 A
Maximum switching capacity			5000 A; 3xCO
Rated short-time withstand current 1s	(I _{th})		8 kA
Rated peak withstand current	(I _{dyn})		20 kA
Utilization category			AC1, AC2; 400A AC3, AC4; 400A
Contact operation stroke			6 _{-0.8} mm
Max. total closing time			160 ms
Max. total opening time			100 ms
Intermittent duty - class (10)			1200 Oper./Hr.
Closing magnet			
Control voltage	(U _o)	(U _s)	AC 230 V; DC 220 V, 110 V ca 1100 VA; ca 900 W
Power consumption			
Shunt release OFF			
(only if equipped with latching mechanism)			
Control voltage	(U _o)	(U _s)	AC 110 V, 230 V DC 24 V, 48 V 60 V, 110 V, 220 V ca 500 VA; ca 300 W
Power consumption			
Auxiliary switches S7			Number of switches acc relevant wiring diagram Type S800E/41 AC 400 V, 10 A
Rated values of auxiliary switches			3 vacuum VS 1
Pole number of vacuum contactor			
Quenching medium			
Type of vacuum interrupter			
Rated power frequency withstand voltage between poles and to earth - 1 min.			20 kV
Rated power frequency withstand voltage in clearance between open contacts at contact stroke of 6 mm - 1 min.			20 kV
Rated impulse withstand voltage			60 kV
Rated power frequency withstand voltage of auxiliary and control circuits - 1 min.			2 kV
Service life at switching current 400 A for basic design of vacuum contactor			10 ⁶ operations
Service life of latching mechanism			50 000 operations
Switching capacity of capacitors			
a) Single capacitor bank according to IEC 56 (CSN 35 4220)			7.2 kV; 210 A 2600 kVar;
b) Switching of parallel-connected capacitor bank; connecting of			400 kVar battery to battery 4000 kVar at 7.2 kV
Cross section of wires for connection of control circuits			1,5 mm ²
Protection degree of contactor			IP 00
Weight			
Basic design			40 kg
Equipped with latching mechanism			43 kg

4.1 Service conditions

Indoor vacuum contactors type SVC-T 32 are intended both for normal service conditions according to IEC 694 (CSN 35 4205), and for hot, damp climate type WDa according to IEC 721-2-1 (CSN 721-2-1).

The following limit values apply:

Minimum ambient temperature	-15 °C
Maximum ambient temperature	+45 °C
Relative humidity	max. 98 %
Altitude	max. 1000 m
Mounting position	vertical, deviation max. 5° in any direction

Vacuum contactors can also be operated in hot environment according CSN 33 0300 with max. ambient temperature of 55 °C.

5. DESCRIPTION OF DESIGN

5.1 Basic design

The functional diagram of the basic contactor design is given in fig. 29300170. The vacuum contactor is illustrated in its closed position. Stationary terminals (20) of three vacuum interrupters (1) are attached firmly in two-part holders (2) by means of adapters (16). The position of the vacuum interrupter can be adjusted in the holder during mounting works.

Movable terminal (23) of vacuum interrupter (1) is provided with terminal clamp (26) and suspender (3) with swing bearing in which pivot (4) is mounted. Suspender (3) with pivot (4) is positioned in stirrup (5) together with spring (6).

Spring (6) in combined action with the atmospheric pressure creates the contact force which can be adjusted by screw (7). Stirrup (5) is firmly connected with two insulating pull rods (8). These pull rods are pivoted on pivot (9).

The other ends of pull rods (8) are fitted with its cut-outs into shaft (10) which is common for all three poles. On this shaft adapter (64) of magnet armature (11) is pivoted. The position of shaft (10) and thus a simultaneous switching of interrupters is ensured by stabilizer (54). On the electromagnet armature opening springs (13) are suspended while their other end is fixed to suspender (14) with adjusting screw (15). If the vacuum contactor is open the lower position of armature adapter (64) is limited by bearing on dampers (18). The current path is directed from connecting strip (19) via holder (2) and adapter (16) on stationary terminal (20) and then across the interrupter contacts (21), (22) and movable terminal (23) via clamp (26) with a flexible joint on connecting strip (24). Vacuum interrupters inclusive of all live parts are single-pole mounted in insulating enclosures (25).

In the frame of the vacuum interrupter further terminal block X5 (56) for connection of auxiliary circuits, additional resistance R1 (52), auxiliary switches (70, 71) and alternatively according to the control voltage rectifier (58) or auxiliary contactor (66) are mounted.

5.2 The vacuum contactor equipped with latching mechanism - fig. 29300180

The latching mechanism (76) is placed on the upper part of the contactor frame.

Functional parts are produced from a stainless steel which mechanical properties are improved by hardening. This finish secures high reliability and service life. The latching mechanism is adjustably connected by means of joint (62) with the pull bolt of electromagnet armature (11). Tripping shaft (77) is connected both via links (78) and trip (79) with pull rods (80) with shunt release OFF (60) and also it is possible to connect manual emergency tripping (63) of the latching mechanism.

Accessories of shunt release OFF are auxiliary switch (69) and according to the control voltage, if any, auxiliary contactor (68).

6. DESCRIPTION OF FUNCTION

Basic design - fig. 29300170

Closing - When the vacuum contactor is switched on, the electromagnet armature (11) is pushed in magnet core (12). The armature movement is transmitted via adapter (64), shaft (10) and insulating rods (8) onto stirrup (5) which displaces by means of spring (6) suspender (3) firmly connected with movable terminal (23).

Contacts of vacuum interrupter (21) and (22) get closed. In closed position play (B) is between pivot (4) and suspender (3) so that spring (6) together with the atmospheric pressure creates the contact force. After closing resistance (52) is connected into the circuit of electromagnet (11) which reduces electromagnet power consumption in the closed position.

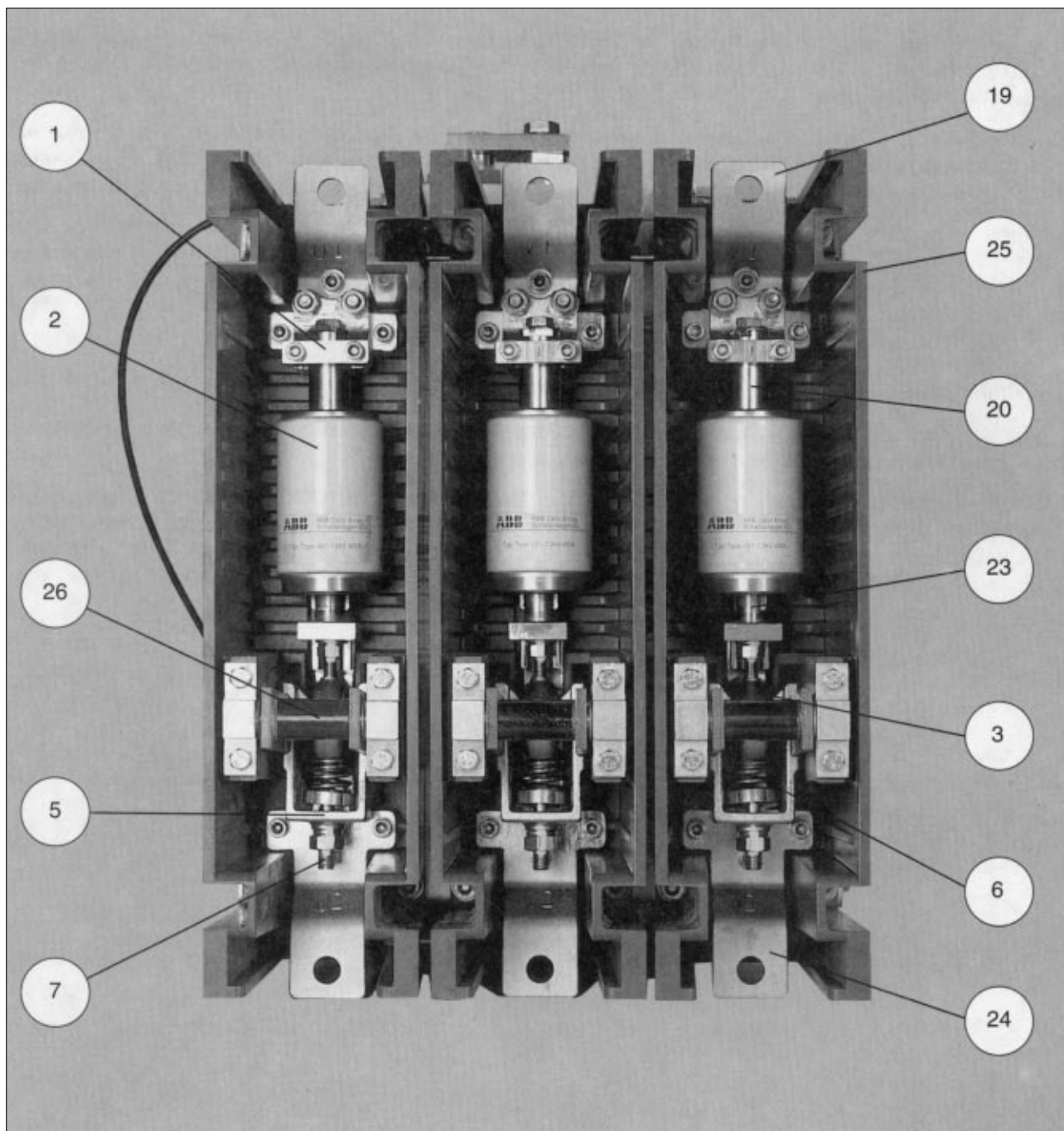
Opening - When the vacuum contactor is switched off, the circuit of electromagnet (12) is deenergized. Armature (11) shifts out due to action of opening springs (13). Stirrup (5) carries along suspender (3) by means of pivot (4) and contacts (21) and (22) are disconnected. Prior to completing of opening the movement of armature (11) is damped with two oil dampers (18) which serve in the opening position at the same time as end stops.

The vacuum contactor equipped with latching mechanism - Fig. 29300180

Closing - Closing is carried out as with the basic design. But after closing the armature (11) is caught by latching mechanism (76) in the closed position and the power supply of electromagnet (12) is disconnected.

Opening - Opening is carried out by shunt release OFF (60). After this release is energized, the electromagnet armature of shunt release OFF (60) shifts links (78) connected with tripping shaft (77) via trip (79) with pull rods (80) and in this way trips latching mechanism (76) and releases armature (11). Further the vacuum contactor is switched off in the same manner as with the basic design. The emergency opening can be carried out manually with actuator (63) which operates links (78).

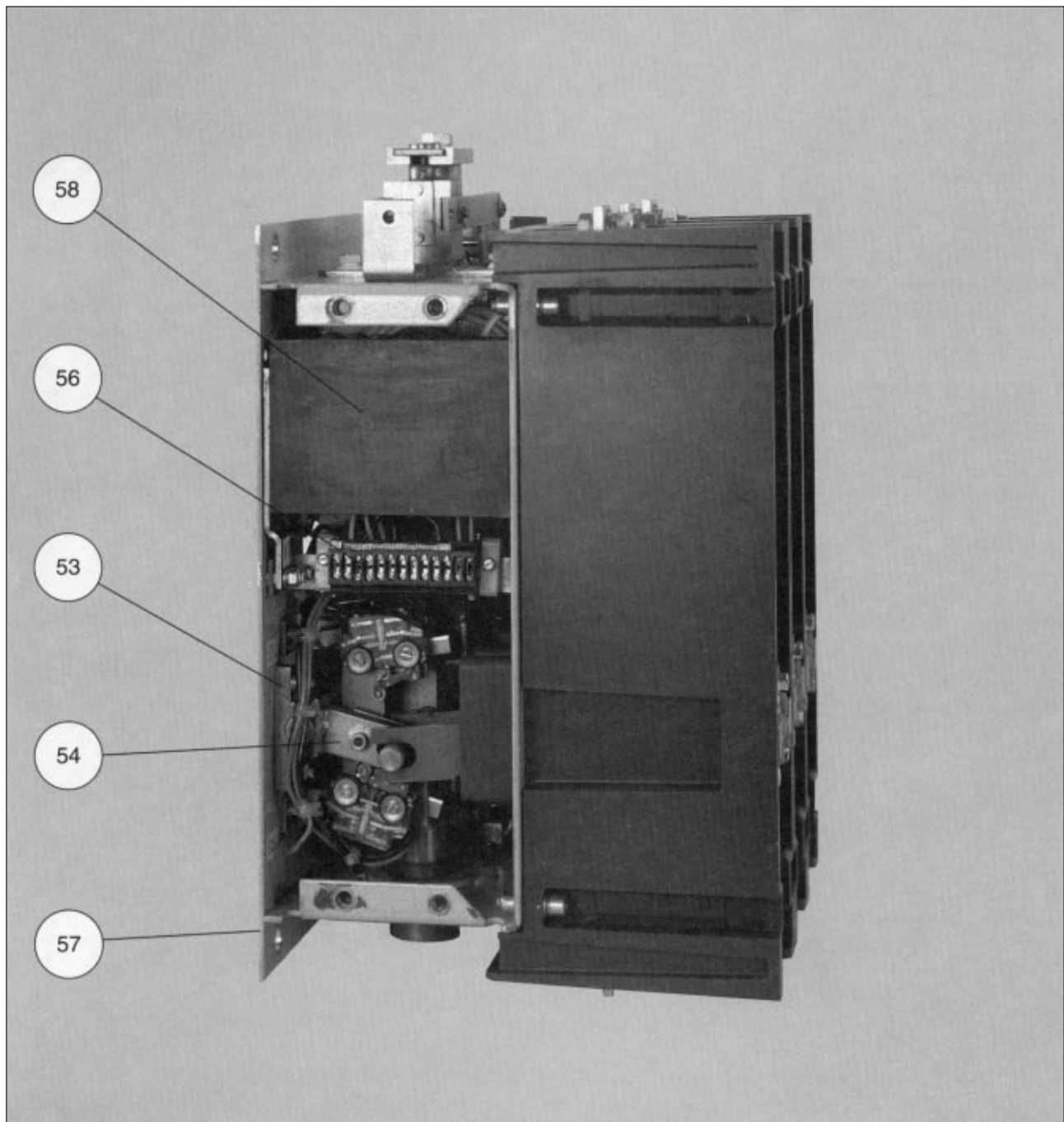
Front view - vacuum contactor with latching mechanism



- 1 - Vacuum interrupter
- 2 - Two-part holder
- 3 - Sponder
- 5 - Stirrup
- 6 - Contact spring
- 7 - Adjusting screw

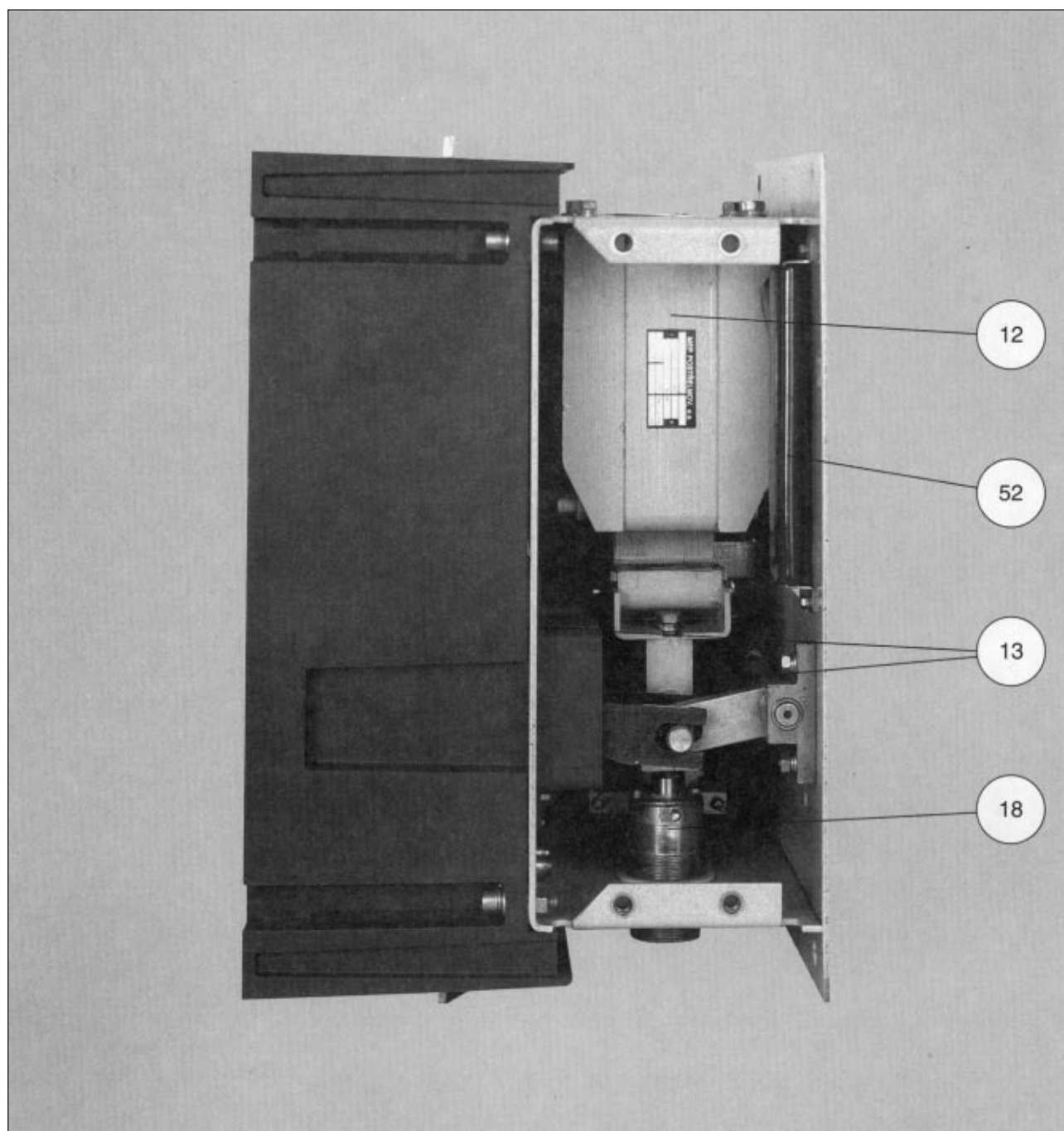
- 19 - Connecting strip
- 20 - Stationary terminal
- 23 - Movable terminal
- 24 - Connecting strip
- 25 - Insulating enclosure
- 26 - Terminal clamp

Left-side view - vacuum contactor with latching mechanism



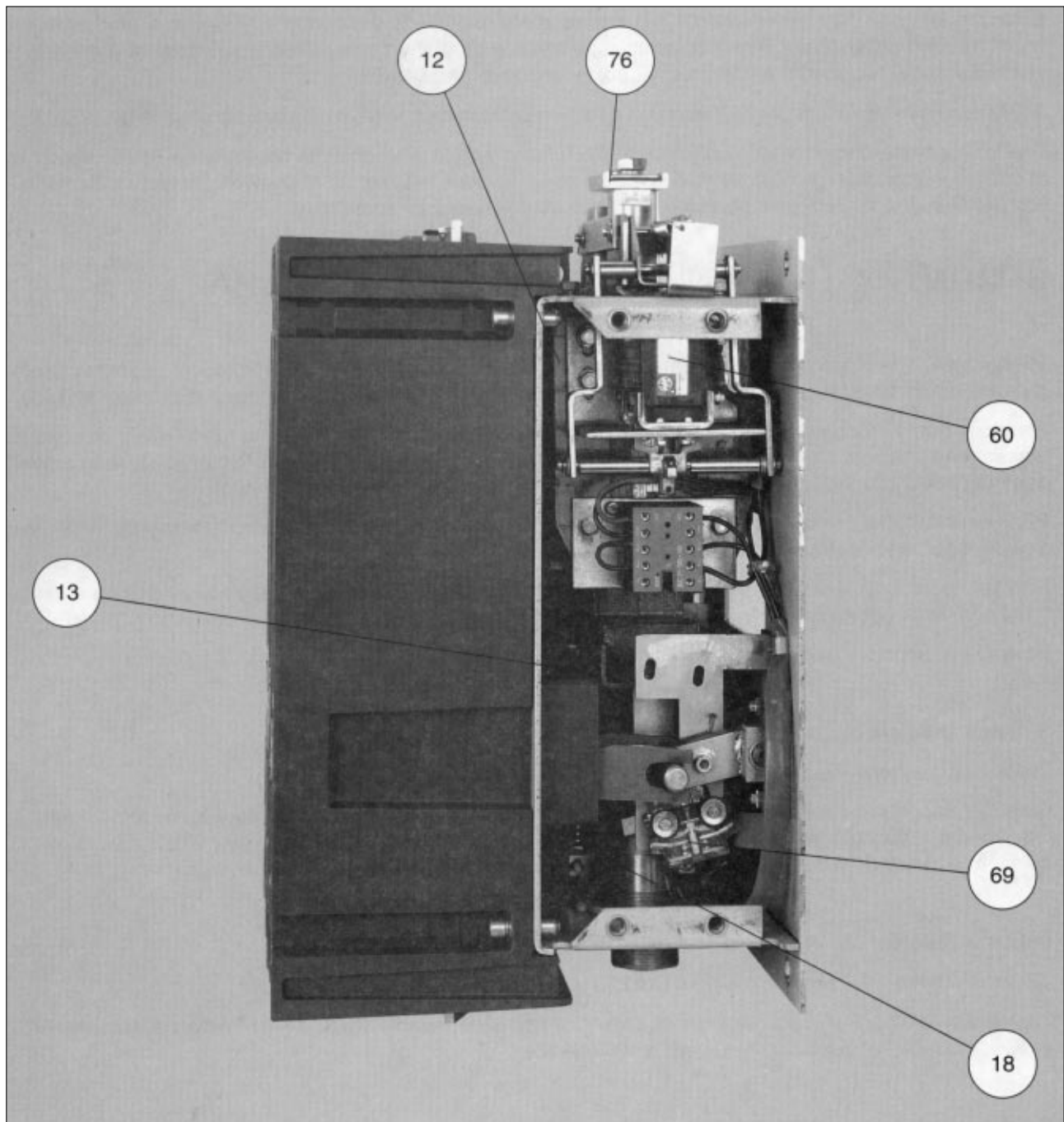
- 53 - Stabilizer holder
- 54 - Stabilizer
- 56 - Terminal block X5
- 57 - Contactor frame
- 58 - Rectifier - alternatively 66 auxiliary contactor
(for operating voltage of closing electromagnet DC 110 and 220 V)

Right-side view - basic design



- 12 - Closing magnet
- 13 - Opening springs
- 18 - Damper
- 52 - Resistance R1

Right-side view - vacuum contactor equipped with latching mechanism



12 - Closing magnet
13 - Opening springs
18 - Damper

76 - Latching mechanism
60 - Shunt release OFF
69 - Auxiliary switch

7. PACKING, TRANSPORT AND STORAGE

The contactors are supplied completely assembled and packed in appropriate transport packing on a manipulatable support plate to keep them safe from impurities, direct effects of weather and to avoid an accidental mechanical damage. Contactors are provided with lifting lugs for their handling and displacement. It is strictly prohibited to attach the lifting tackle to the operating mechanism of vacuum interrupters, insulating enclosures etc. and contactors must be placed on the mounting base only.

Contactors must be stored only in dry and clean rooms with relative humidity max. 80 % at 20 °C. It is recommended to put an appropriate cover (PE foil) on contactors and to provide an adequate ventilation or quipped this cover with an appropriate drying agent. This will prevent deposition of dust and impurities on lubricated parts, insulators and its penetration in fittings of movable parts and possible creation of dew deposits.

8. INSTALLATION, COMMISSIONING AND OPERATION

First of all check if the site complies with service conditions given in cl. 4.1 Service conditions. Careful and professional installation of the switchgear is one of the fundamental conditions of a trouble-free contactor service.

The vacuum contactor shall be mounted in the vertical position with stationary contacts of vacuum interrupters on top on a rigid and flat base to prevent deformation of its frame and change of its setting-up. Before connection of the vacuum contactor carry out earthing according to regulations, clean the contactor and check wiring of LV and HV.

The connection of main terminals shall be carried out without any permanent tension or pressure forces, exerted for example by the conductor bars.

Connection of auxiliary circuits shall be carried out according to the respective wiring diagram see in enclosure and in compliance with the order.

Instructions for connection of control and auxiliary circuits and operation:

Wiring diagram fig. 49302002

Basic design - closing magnet AC 230 V

The control voltage for switching ON of the vacuum contactor is connected to terminals X5:8, X5:9 continuously - terminals X5:6, X5:7 are short-circuited see the wiring diagram.

Switching OFF of the vacuum contactor shall be carried out by disconnecting of a external switch, terminals X5:6, X5:7. Auxiliary switches SQ5.1 and SQ5.3 serve for remote signalling of the vacuum contactor position.

Wiring diagram fig. 49302041

Basic design - closing magnet DC 220 V

Switching ON and OFF of the vacuum contactor is carried out by a external switch, terminals X5:8, X5:9. Auxiliary switches SQ5.1 and SQ5.3 serve for remote signalling of the vacuum contactor position.

Wiring diagram fig. 49302042

Basic design - closing magnet DC 110 V

Switching ON and OFF of the vacuum contactor is carried out by a external switch, terminals X5:8, X5:9. Auxiliary switches SQ5.1 and SQ5.3 serve for remote signalling of the vacuum contactor position.

Wiring diagram fig. 3930556 and 3930557

The vacuum contactor equipped with latching mechanism - closing magnet AC 230 V

The shunt release OFF - control voltage according to request see wiring diagrams.

Switching ON of the vacuum contactor is carried out by a external switch, terminals X5:8, X5:9. Switching OFF of the vacuum contactor shall be carried out by a external switch, terminals X5:23, X5:24. Auxiliary switches SQ5.1 serves for remote signalling of the vacuum contactor position. The vacuum contactor shall be equipped with auxiliary relay (KA - see wiring diagrams) mounted outside of the contactor.

Wiring diagram fig. 49302043 and 49302044

The vacuum contactor equipped with latching mechanism - closing magnet DC 220 V

The shunt release OFF - control voltage according to request see wiring diagrams.

Switching ON of the vacuum contactor is carried out by a external switch, terminals X5:8, X5:9. Switching OFF of the vacuum contactor is carried out by a external switch, terminals X5:23, X5:24. Auxiliary switches SQ5.1 serves for remote signalling of the vacuum contactor position.

Wiring diagram fig. 49302045 and 49302046

The vacuum contactor equipped with latching mechanism - closing magnet DC 110 V

The shunt release OFF - control voltage according to request see wiring diagrams.

Switching ON of the vacuum contactor is carried out by a external switch, terminals X5:8, X5:9. Switching OFF of the vacuum contactor is carried out by a external switch, terminals X5:23, X5:24. Auxiliary switches SQ5.1 serves for remote signalling of the vacuum contactor position.

Any modification in wiring of the vacuum contactor in comparison with given wiring diagrams can be performed only after a preliminary written approval of the manufacturer.

The vacuum contactor operates reliably at range of operating voltage from 85 to 110% (with DC shunt release OFF at range of 70 to 110%). The power supply of operating voltage shall be dimensioned sufficiently to avoid a excessive voltage drop if loaded.

After performance of five check operations (ON-OFF) the vacuum contactor can be connected to HV supply. Further operation shall be carried out within the framework of valid service and safety instructions.

9. MAINTENANCE

Vacuum contactors are characterized by their simple and robust construction. They have a long life expectancy. Their operating mechanism have low maintenance requirements and vacuum interrupters are maintenance-free during their working life. There is no adverse effect on the vacuum, even from frequent switching of operating currents.

Servicing activities are limited to parts subject to wear. The intervals and scope of the work to be carried out to preserve service readiness are determined by the environmental influences and the switching frequency.

With a carefully performed inspection and servicing work, and under prescribed operating conditions one can generally expect working life of contactor basic design of 10^6 operations. The latching mechanism shall be completely replaced after 50 000 operations ON-OFF.

NOTICE:

Maintenance work may only be performed in a careful manner by trained personnel familiar with the characteristics of the individual switchgear installation, in accordance with all the relevant safety regulations of IEC/CSN.

While the work is in progress, all auxiliary voltage sources, if the relevant repair work allows it, must also be disconnected and secured to prevent reconnection.

In order to prevent accidents (particularly injury to hands !) extreme care should be taken during all maintenance work.

9.1 Inspection

Periodical visual inspection of the equipment in service without any dismounting work.

It contains:

- visual inspection of the equipment
- checking of insulation parts for contamination and sim.

If any defects are found out during this inspection, they must be removed in framework of the maintenance work or an (unplanned) repair.

9.2 Maintenance

Performance of the work prescribed in this manual. It is carried out in dependence on service conditions and contains:

- cleaning
- lubrication
- adjustment
- tightening of bolted connections

For a detailed description see cl. 9.4 .

9.3 Repair

The performed work complies with maintenance activities but worn-out and defective parts are replaced see cl. 10. The planned and unplanned repairs are distinguished.

- Planned repair

is carried out according to service time of the equipment or number of operations (ON-OFF).

- Unplanned repair

is carried out after a failure, excessive stress or if during the inspection a defective part is found.

9.4 Schedule of inspections, maintenance and repairs

Activity	according to clause	Time interval in months ¹⁾	According to No. of operations (ON-OFF)
Inspection	9.1	12	-
Maintenance	9.2, 9.4	24	100 000
Repair	9.3, 9.4, 10	36	250 000

¹⁾ Under more demanding service conditions of the vacuum contactor it is recommended to shorten given time intervals to half.

The vacuum contactor equipped with latching mechanism

If the vacuum contactor is equipped with latching mechanism it is necessary to carry out complete replacement of this mechanism including the shunt release OFF after 50 000 operations (ON - OFF). To secure reliable function of the latching mechanism this replacement must be carried out exclusively by ABB EJP service personnel.

Following activities are carried out during the maintenance and repair work:

- Checking of vacuum interrupters contact erosion see cl. 9.4.1.
- Checking of dimension (X) both in closed (ON) and open (OFF) position of the contactor on all three poles successively (for measuring use the gauge fig. 4932047). The difference of both dimensions must be in the range of 6 - 0,8 mm (contact stroke of vacuum interrupters)
- Checking of vacuum in interrupters see cl. 9.4.2
- Contact force checking of vacuum interrupters according to enclosure fig. 3930586
- Adjustment of auxiliary switches see cl. 9.4.3
- Setting-up of the vacuum contactor shall be carried out according to instructions given in cl. 9.5
- Retightening of screwed connections should be carried out after each 100 000 operations. For tightening of screws on the terminal box X4 it is necessary to loosen of the nut for the rectifier holder (58) and swing the latter out.
- Removal of dust deposits from insulating parts.
- Relubrication of sliding parts with grease Isoflex Topas NB 52 and ball bearings with NH2 lubricant.

9.4.1 Checking of vacuum contactor contact erosion - fig. 4932047

The contact erosion limit is 2 mm. After this value is reached, vacuum interrupters must be replaced. The contact erosion value depends not only on number of operations (ON-OFF) but also on the value of switching currents. For this reasons contact erosion values must be checked regularly after each 100 000 operations (ON-OFF). The contact erosion value can be found out according to change of the play X. On the new vacuum contactor this play is 3 mm in the vacuum contactor closed position. Due to contact erosion this play decreases and at the value $X = 1$ mm the contact erosion of 2 mm is reached.

For adjustment reasons we recommend to replace all three vacuum interrupters after the contact erosion value of 2 mm has been reached in one of them regardless of contact erosion values in remaining two vacuum interrupters.

9.4.2 Checking of vacuum in interrupters

The following equipment, for example, can be used to check the vacuum (without dismantling the vacuum contactor):

- VIDAR vacuum tester, from
Programma Electric GmbH
Bad Homburg v.d.H.
Germany

The test value of DC 25 kV has to be set for checking of the internal interrupter chamber pressure with the VIDAR vacuum tester.

Testing is to be performed at the rated contact stroke in OFF position.

Procedure for vacuum interrupter testing for stationary mounted switching devices:

- Isolate and secure the working area in accordance with relevant safety regulations:
- Open the SVC-T 32 contactor
- Earth all poles of the SVC-T 32 contactor on one side.
- Connect the earthed test lead of the VIDAR vacuum checker conductively to the station earth.
- Connect the high voltage test lead of the VIDAR vacuum checker with phase L1 of the unearthed pole side and test the vacuum interrupter chamber with the vacuum contactor gap open. Repeat for phases L2 and L3.

Note:

Connected cables may lead to a "defective" indication on the vacuum checker as a result of their cable capacitance. In such cases, the cables are to be removed.

9.4.3 Adjustment or in case of need replacement of auxiliary switches (fig. 4932034, 2930170, 29300180)

Dimensions and instructions of auxiliary switches adjustment are given in the fig. 4932034 in enclosure. If it is necessary to replace them then the procedure is as follows:

- Dismount respective auxiliary switch(es) 106 type S800E/41 by loosening screws 108 or 109 and together with switch(es) remove plate 101, partition(s) 102, rubber washers 103 and washes 104.
- Disconnect connecting wires and connect them according to their marking and respective wiring diagram to new auxiliary switch(es).
- Carry out mounting in the reverse sequence. The washer 101 can be held in position during mounting above on its extension.

9.5 Setting-up of vacuum contactor

fig. 29300170, 29300180, 39300542 (contactor shown in the closed position)

9.5.1 Basic design

- When the vacuum contactor is in its closed position and terminals (20) with adapters (16) movably fitted in holders (2) (screws in holder (2) loosened), insert between pivot (4) and stirrup (5) gauges 0.5 and 1 (total dimension 1.5 mm according to fig. 4931967 and 4931968).
- Preliminary adjust spring (6), then push slightly vacuum interrupter (1) against stirrup (5) and secure position of terminal (20) with screws in holder (2). These screws should be secure with binder Aldurit S 111.
- Now, with gauges still inserted, check vacuum interrupter closed position with tester.
- Remove both gauges (0.5 and 1 mm) and check adjustment with gauges 0.5 and 0.7 (total dimension 1.2 mm according to fig. 4931827 and 4931967). Gauges must easily slide in with a minimum play.
- In the next step adjust the contact force according to the procedure in fig. 3930586.
- Carry out the adjusting procedure as described above successively on all three poles of the vacuum contactor.
- Switch the vacuum contactor off (prior to it check dimension (G)) and adjust the stroke of all interrupters by means of dimension (X) change according to fig. 4932047.

Perform necessary adjustment with the change of oil dampers (18) height and secure them with lock nuts.

Prestressing of opening spring (13) i.e. dimension (H) is set up in the production works and can not be change without metering of the closing and opening time and speeds.

9.5.2 The vacuum contactor equipped with latching mechanism

- First check dimension (J) in closed contactor position. If this is not in prescribe limits perform its adjustment on the vacuum contactor mechanically secured in the closed position after loosening screw (59) and lock nut (67) by means of joint (62).
- After setting-up of dimension (J) tighten lock nut (67) and screw (59); secure screw (59) with binder Aldurit S 111.

Setting-up of shunt release OFF

- Adjust dimension (D) while shifting shunt release OFF (60) after loosening screws (80) then tighten properly screws (80).
- Set up dimension (F), if necessary, by means of adjustment of manual emergency tripping (63).

Further continue in setting-up as with the basic vacuum contactor design.

Dimensions for setting-up (mm)

Z	B	C	D)	E	F	G	J
6 _{-0.8}	1.2 ^{+0,1}	43	21	1.5	21	(21)	0.3 ^{+0,1}
Contact stroke see fig. 4932047						(with oil dampers pushed down)	

*) For control voltage of shunt release OFF DC 24 V; D = 0.

After finishing the maintenance or repair work put the vacuum contactor into operation according to cl. 8.

10. SPARE PARTS

Spare parts are delivered in the quantity specified by the customer.

The list of available spare parts

Spare part	Replacement	
	by customer	by ABB service
Vacuum interrupter type VS1		■
Electromagnet type EMST V3-S-T - for basic design		■
Electromagnet type EMST V3-S-T with pull bolt - for contactor equipped with latching mechanism		■
Opening springs (2 pcs)		■
Rectifier, closing electromagnet AC 230 V	■	■
Auxiliary switches S7 type S800E/41 - 10 A, AC 400 V	■	■
Latching mechanism		■
shunt release OFF for latching mechanism	■	■
Coil for the shunt release OFF - the required control voltage must be given.	■	■

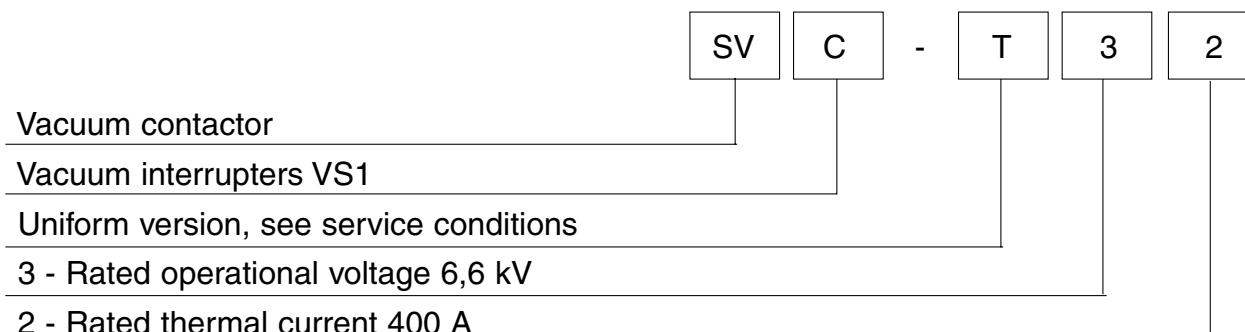
While ordering of spare parts all important data from the relevant vacuum contactor nameplate must be given.

11. ORDERING DATA

The following data have to be specified in the order:

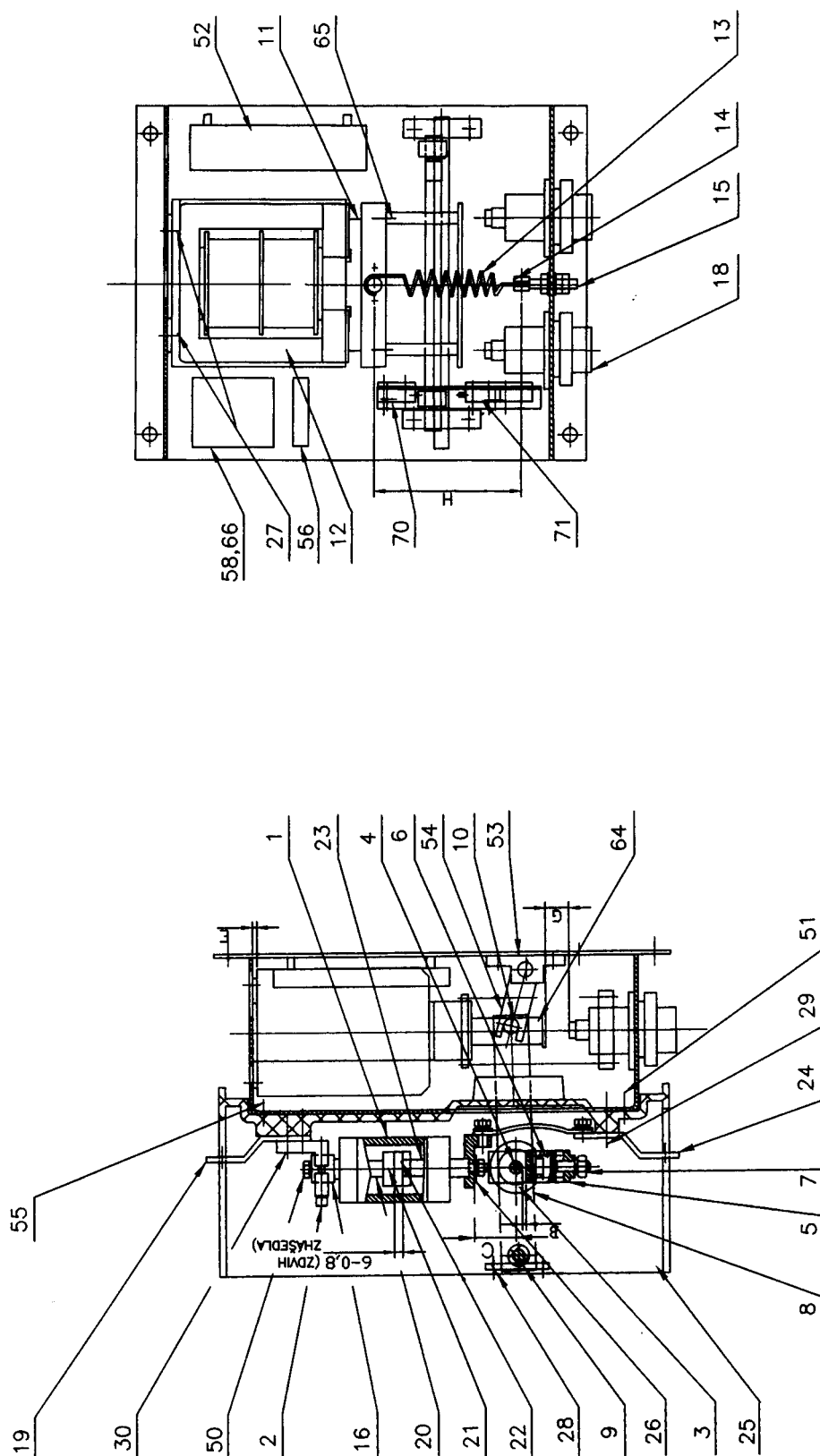
- Type designation code of the product
- Control voltage of the closing electromagnet
- Requirements for equipment with latching mechanism and control voltage of the shunt release OFF
- If the vacuum contactor is intended for fix cell mounting or for the switchgear
- Number of vacuum contactors
- Requirements for adjustment gauges (set of gauges)

Type designation code

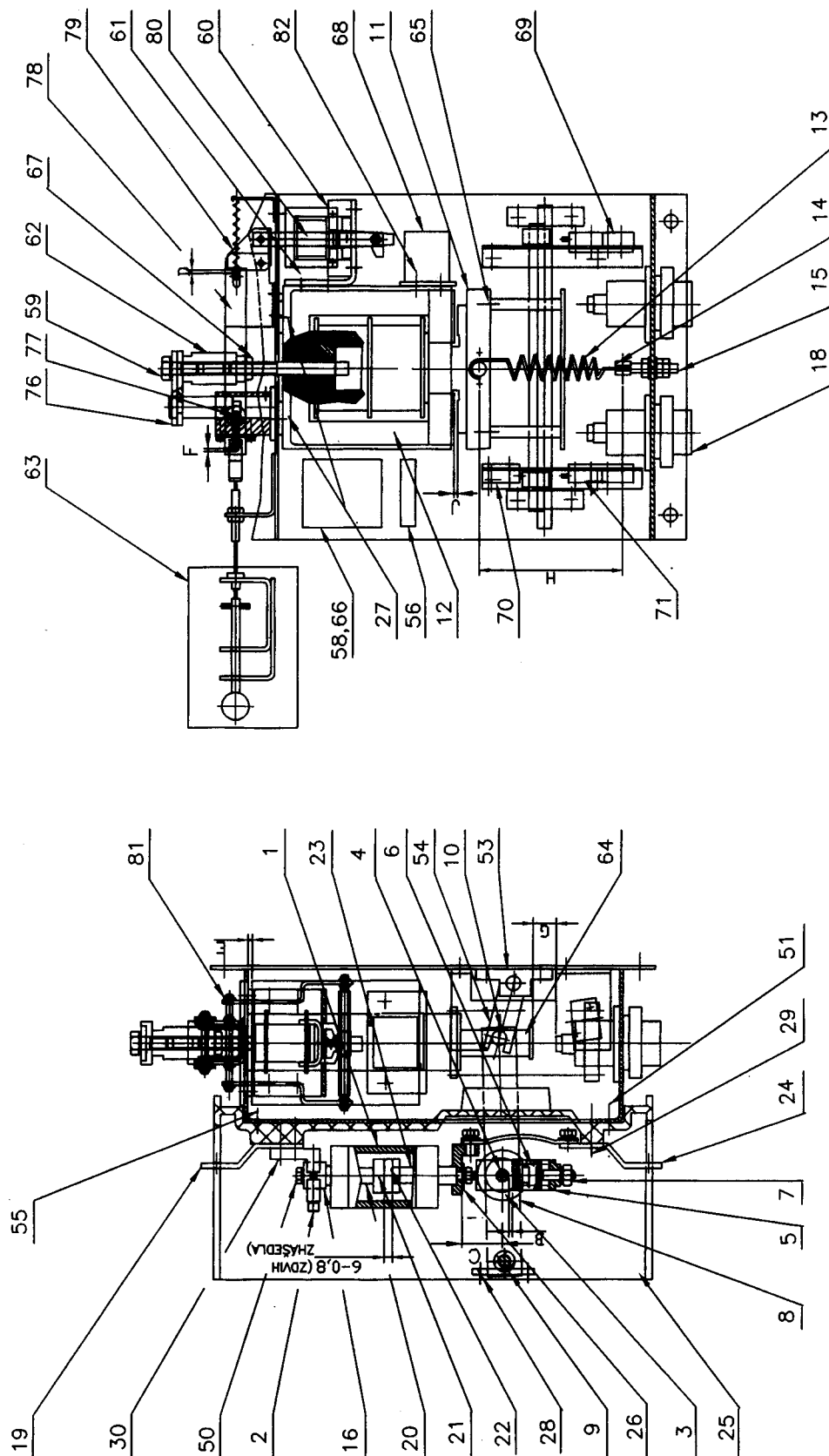


Example of type designation code: SVC-T 32

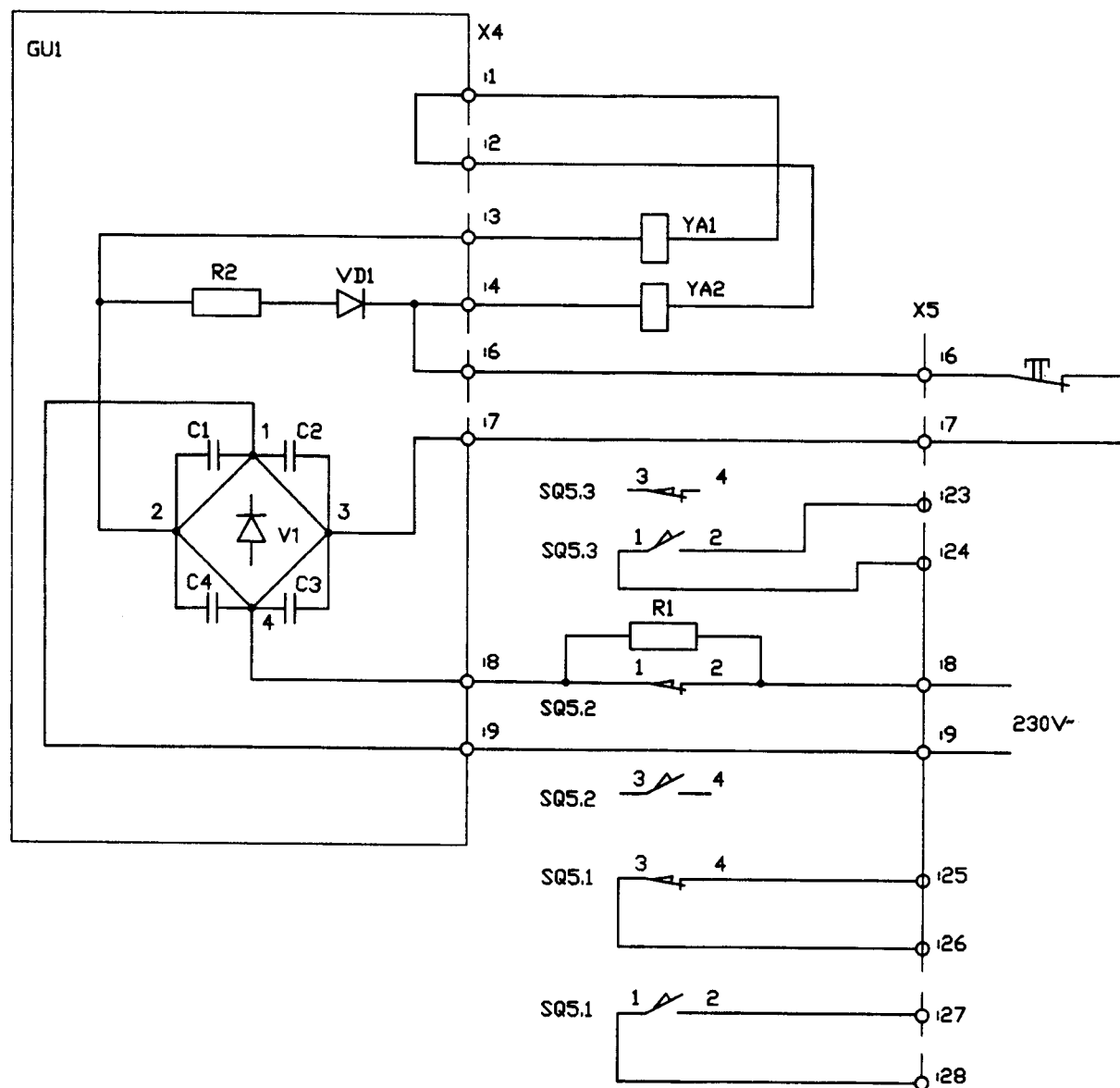
Functional diagram - basic design
Enclosure fig. 29300170



Functional diagram - with latching mechanism
 Enclosure fig. 29300180



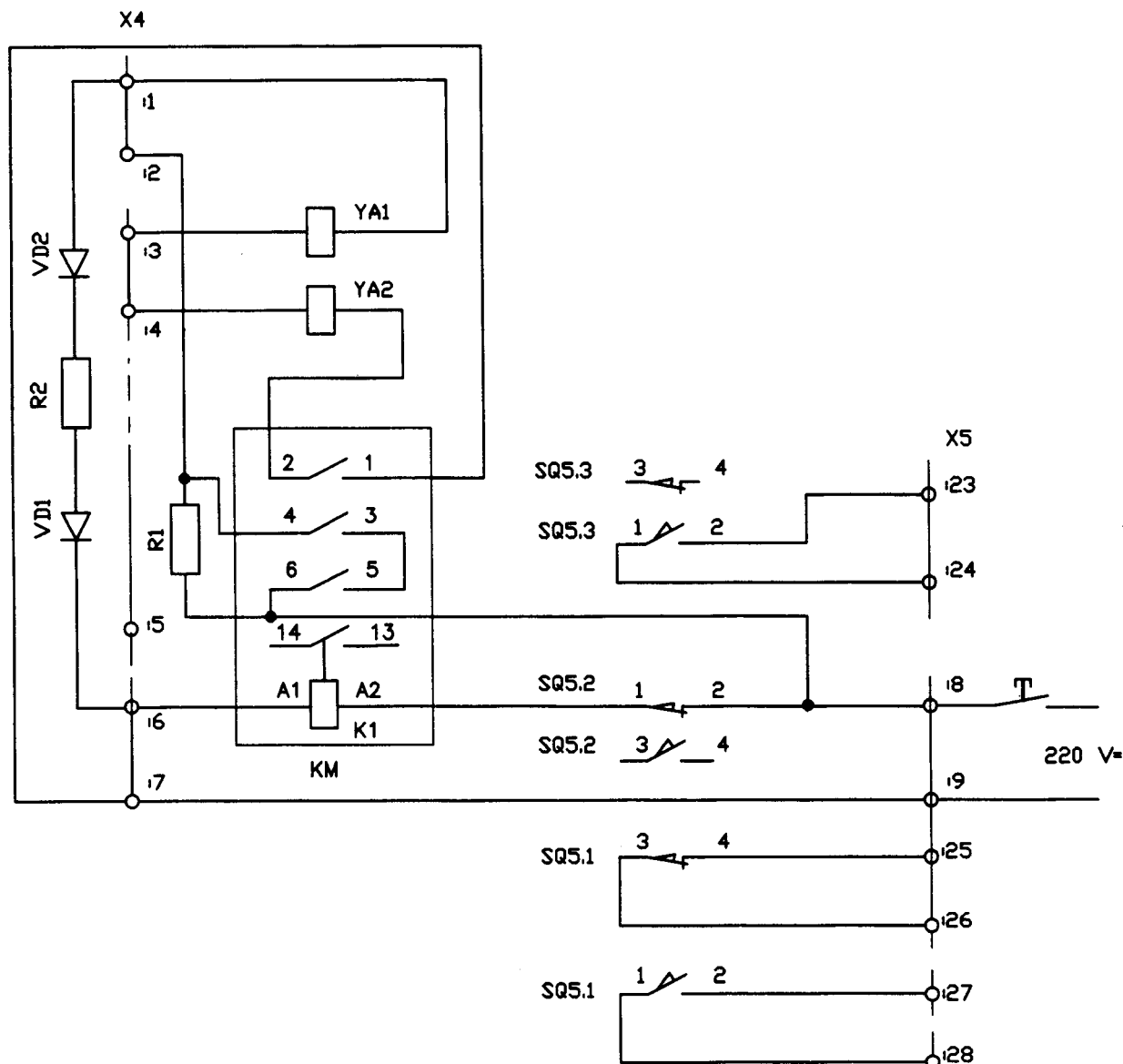
Wiring diagram - Enclosure fig. 4932002
Basic design - Closing magnet AC 230 V



Legend:

- GU1 Rectifier for closing magnet (epoxy resin casting)
- VD1 Diode type 1N 5408
- V1 DC bridge type VDD 411
- C1 ÷ C4 C210/1000 V, 47 k
- R2 TR 512/15 W, 330 Ω
- YA1, YA2 Coils of closing electromagnet - 2x1100 turns; 0,6 mm² Cu; total coils resistance 37,6 Ω
- SQ5.1÷3 Auxiliary switches S7, type S800E/41
- R1 TR 648/100 W, 560 Ω
- Note: Connecting wires CYA 1,5 mm², colour black

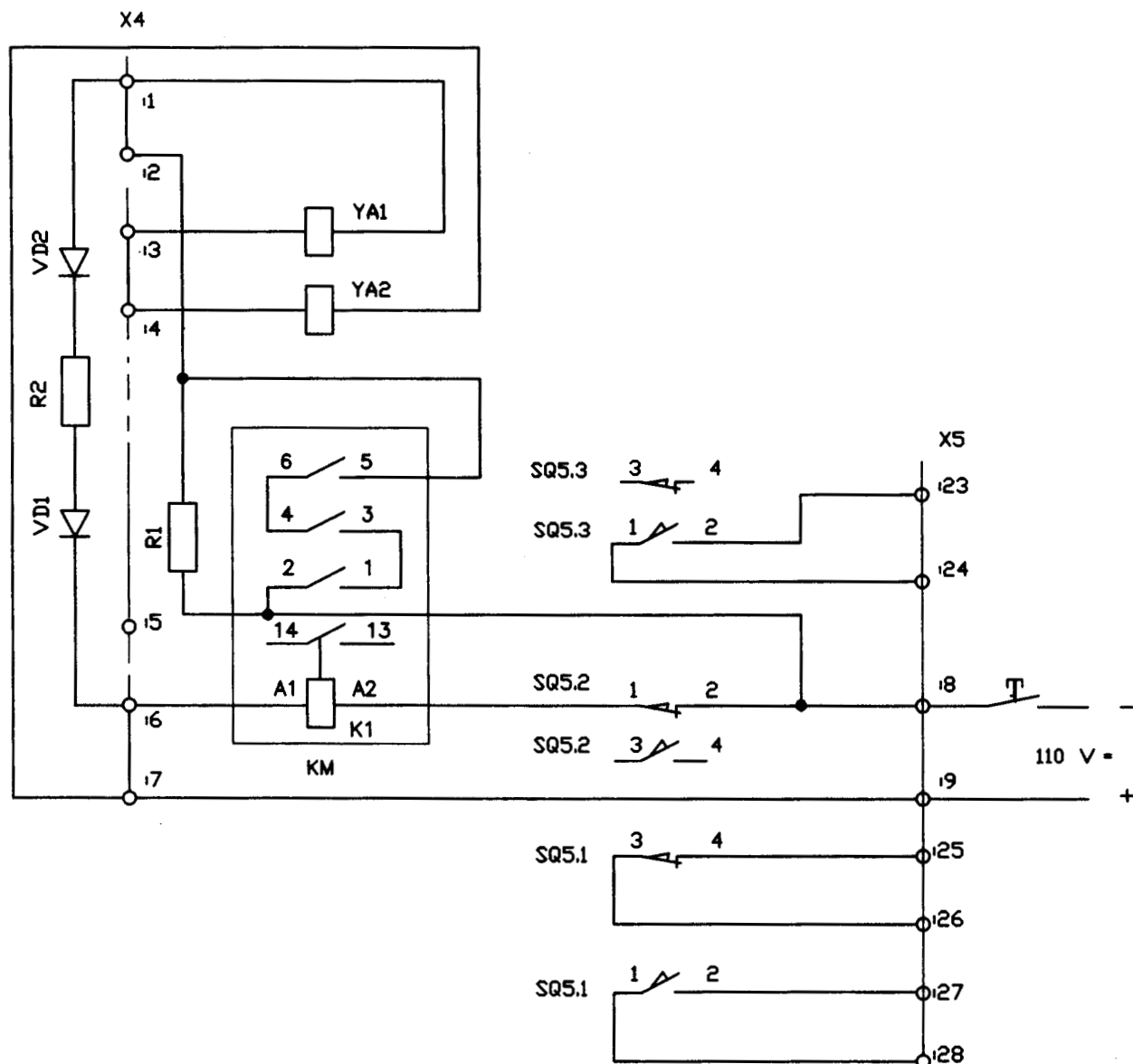
Wiring diagram - Enclosure fig. 4932041
Basic design - Closing magnet DC 220 V



Legend:

- VD1,VD2 Diode type 1N 5408
- YA1,YA2 Coils of closing electromagnet - 2x1100 turns; 0,6 mm² Cu; total coils resistance 37,6 Ω
- SQ5.1÷3 Auxiliary switches S7, type S800E/41
- R1 TR 648/100 W, 560 Ω
- R2 TR 512/15 W, 330 Ω
- KM Auxiliary contactor type BC7 - 30 - 10 220 V DC
- Note: Connecting wires CYA 1,5 mm², colour black

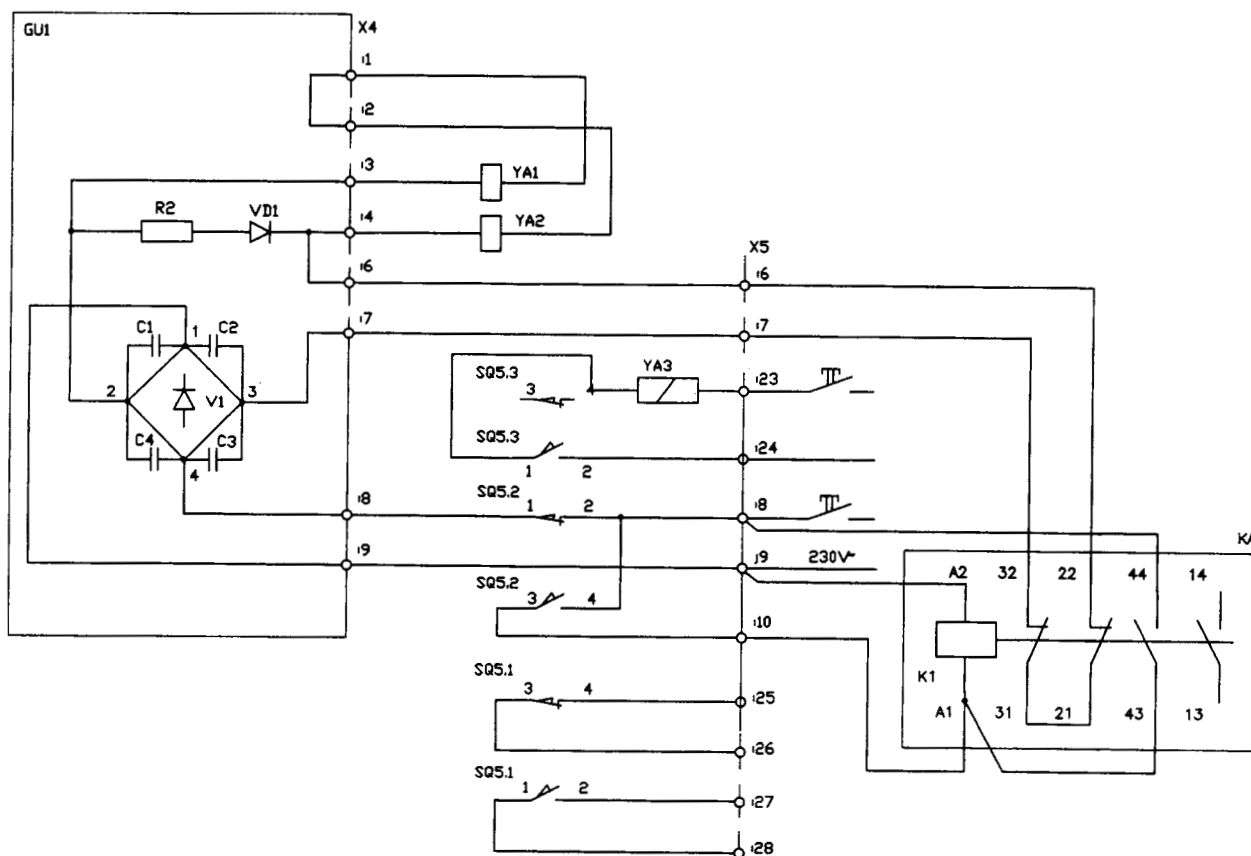
Wiring diagram - Enclosure fig. 4932042
Basic design - Closing magnet DC 110 V



Legend:

- VD1,VD2 Diode type 1N 5408
YA1,YA2 Coils of closing electromagnet - 2x600 turns; 0,8 mm² Cu; total coils resistance 11,8 Ω
SQ5.1÷3 Auxiliary switches S7, type S800E/41
R1 TR 648/100 W, 150 Ω
R2 TR 512/15 W, 120 Ω
KM Auxiliary contactor type BC7 - 30 - 10 110 V DC
Note: Connecting wires CYA 1,5 mm², colour black

Wiring diagram - Enclosure fig. 3930556
 Vacuum contactor with latching mechanism
 - Closing magnet AC 230 V
 - Shunt release OFF AC 230 V, 110 V



Legend:

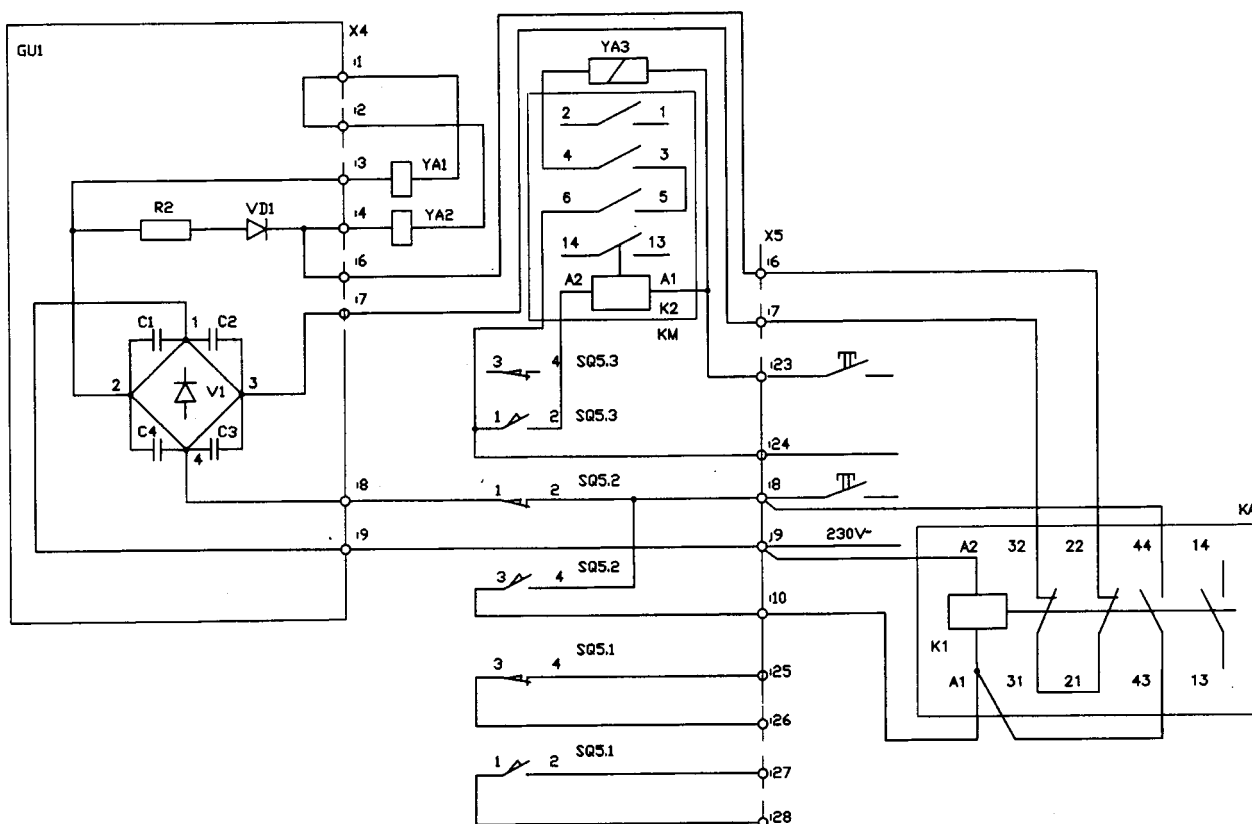
GU1 Rectifier for closing electromagnet (epoxy resin casting)
 VD1 Diode type 1N 5408
 V1 DC bridge type VDD 411
 C1 ÷ C4 C210/1000 V, 47 k
 R2 TR 512/15 W, 330 Ω
 YA1, YA2 Coils of closing electromagnet - 2x1100 turns; 0,6 mm² Cu; total coils resistance 37,6 Ω
 YA3 Shunt release OFF
 SQ5.1÷3 Auxiliary switches S7, type S800E/41
 KA Auxiliary relay CS4-22Z, coil AC 230 V (Installation outside the vacuum contactor)
 Note: Connecting wires CYA 1,5 mm², colour black

Wiring diagram - Enclosure fig. 3930557

Vacuum contactor with latching mechanism

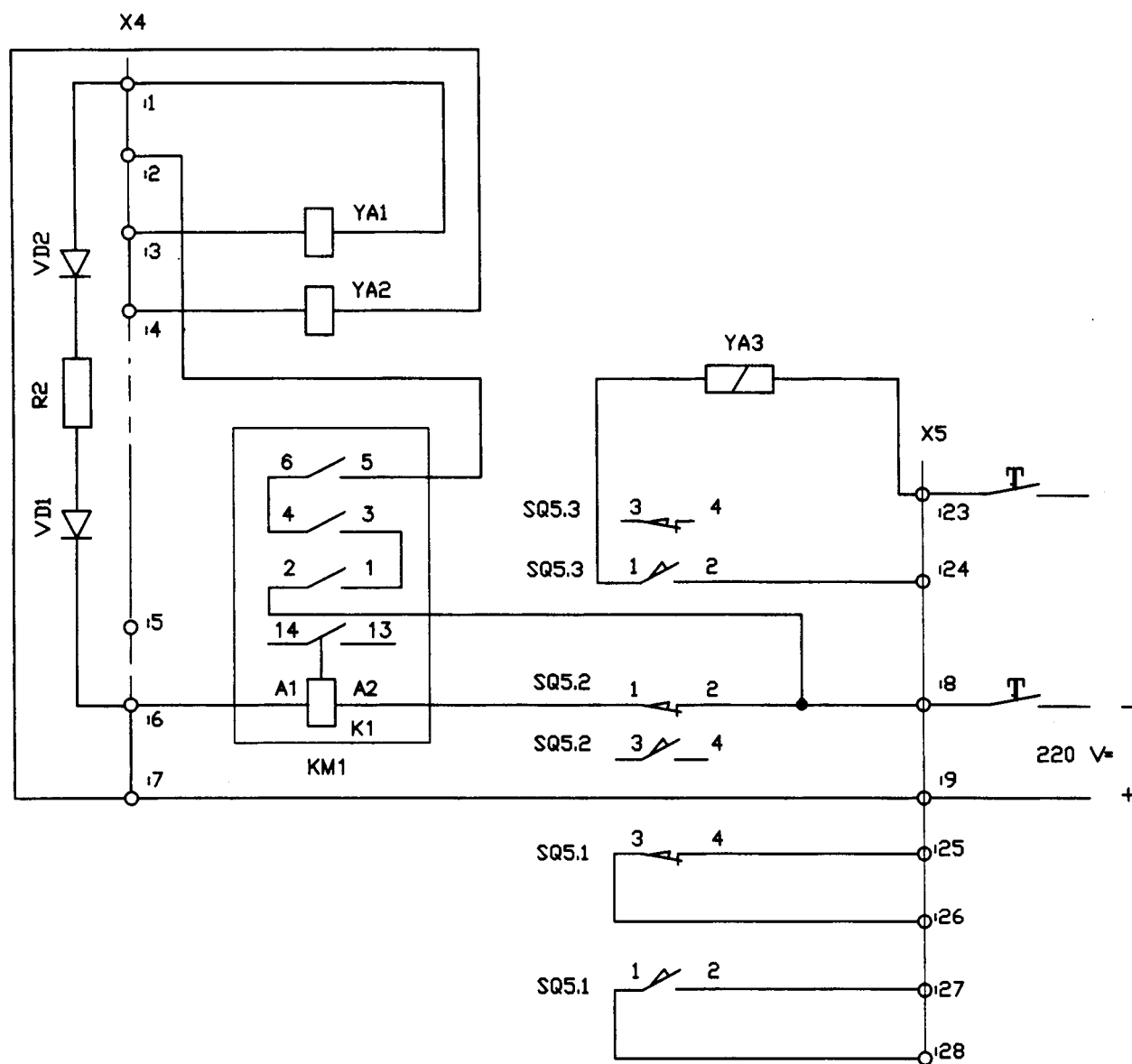
- Closing magnet AC 230 V

- Shunt release OFF DC 24 V, 48 V, 60 V, 110 V, 220 V

**Legend:**

GU1	Rectifier for closing electromagnet (epoxy resin casting)
VD1	Diode type 1N 5408
V1	DC bridge type VDD 411
C1 ÷ C4	C210/1000 V, 47 k
R2	TR 512/15 W, 330 Ω
YA1, YA2	Coils of closing electromagnet - 2x1100 turns; 0,6 mm ² Cu; total coils resistance 37,6 Ω
YA3	Shunt release OFF
SQ5.1÷3	Auxiliary switches S7, type S800E/41
KM	Auxiliary contactor type BC7 -30 -10 ...
KA	Auxiliary relay CS4-22Z, coil AC 230 V (installation outside the vacuum contactor)
Note:	Connecting wires CYA 1,5 mm ² , colour black

Wiring diagram - Enclosure fig. 4932043
 Vacuum contactor with latching mechanism
 - Closing magnet DC 220 V
 - Shunt release OFF AC 230 V, 110 V



Legend:

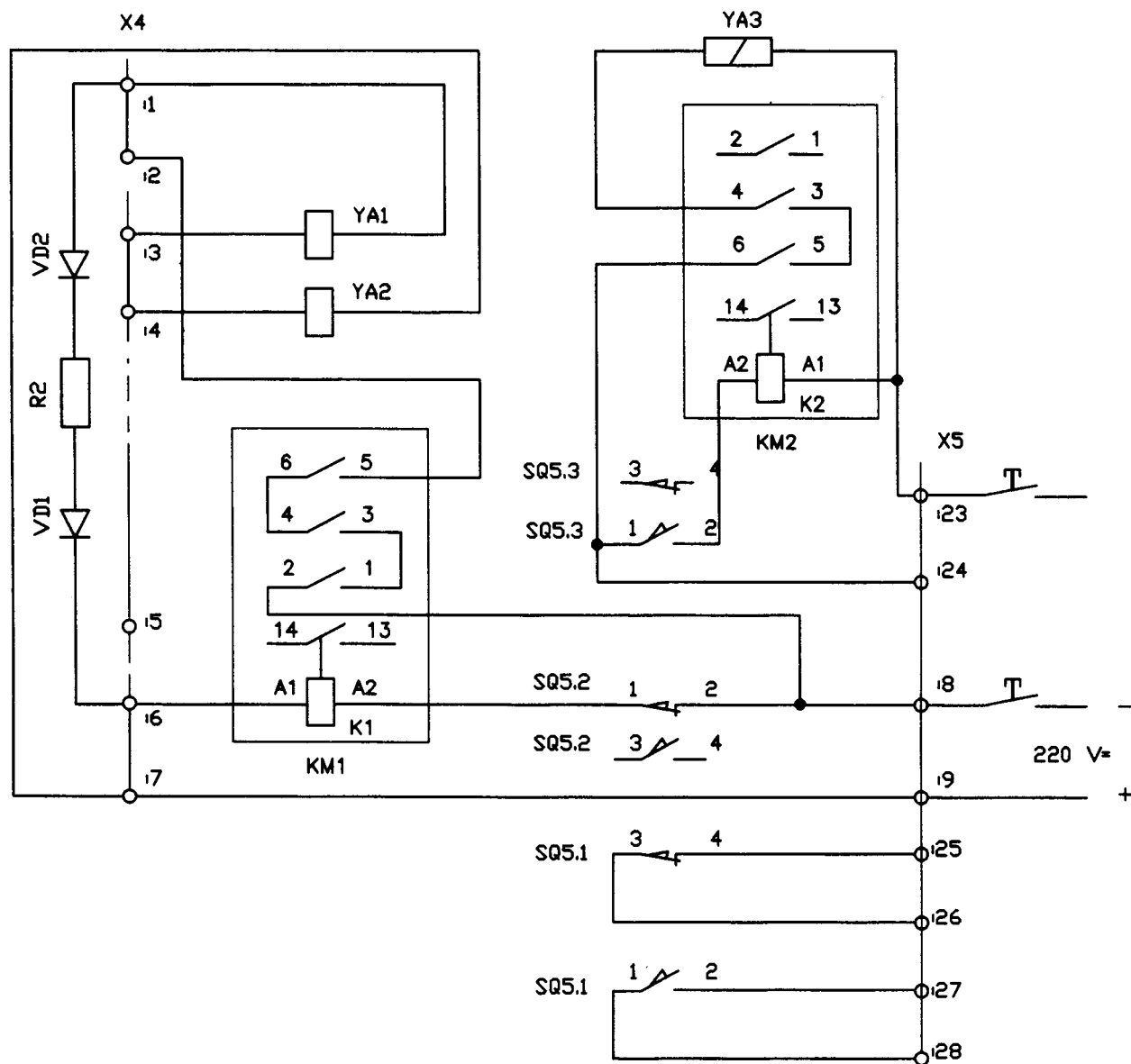
VD1,VD2 Diode type 1N 5408
 YA1,YA2 Coils of closing magnet - 2x1100 turns; 0,6 mm² Cu; total coils resistance 37,6 Ω
 YA3 Shunt release OFF
 SQ5.1÷3 Auxiliary switches S7, type S800E/41
 R2 TR 512/15 W, 330 Ω
 KM1 Auxiliary contactor type BC7 - 30 - 10 220 V DC
 Note: Connecting wires CYA 1,5 mm², colour black

Wiring diagram - Enclosure fig. 4932044

Vacuum contactor with latching mechanism

- Closing magnet DC 220 V

- Shunt release OFF DC 24 V, 48 V, 60 V, 110 V, 220 V



Legend:

VD1,VD2 Diode type 1N 5408

YA1,YA2 Coils of closing magnet - 2x1100 turns; 0,6 mm² Cu; total coils resistance 37,6 Ω

YA3 Shunt release OFF

SQ5.1÷3 Auxiliary switches S7, type S800E/41

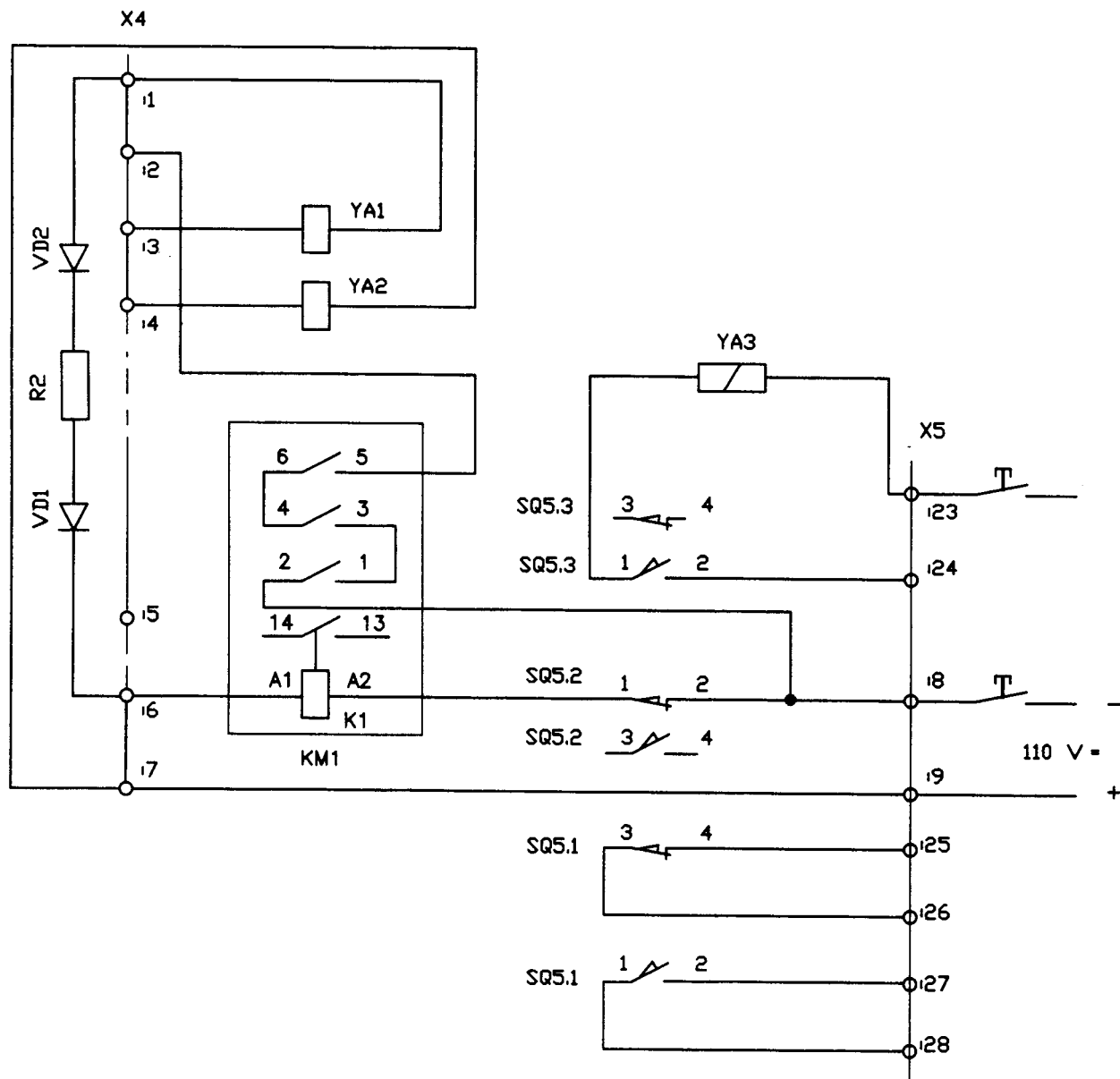
R2 TR 512/15 W, 330 Ω

KM1 Auxiliary contactor type BC7- 30 - 10 220 V DC

KM2 Auxiliary contactor type BC7 - 30 - 10 ...

Note: Connecting wires CYA 1,5 mm², colour black

Wiring diagram - Enclosure fig. 4932045
 Vacuum contactor with latching mechanism
 - Closing magnet DC 110 V
 - Shunt release OFF AC 230 V, 110 V



Legend:

VD1,VD2 Diode type 1N 5408

YA1,YA2 Coils of closing magnet - 2x600 turns; 0,8 mm² Cu; total coils resistance 11,8 Ω

YA3 Shunt release OFF

SQ5.1÷3 Auxiliary switches S7, type S800E/41

R2 TR 512/15 W, 120 Ω

KM1 Auxiliary contactor type BC7 - 30 - 10 110 V DC

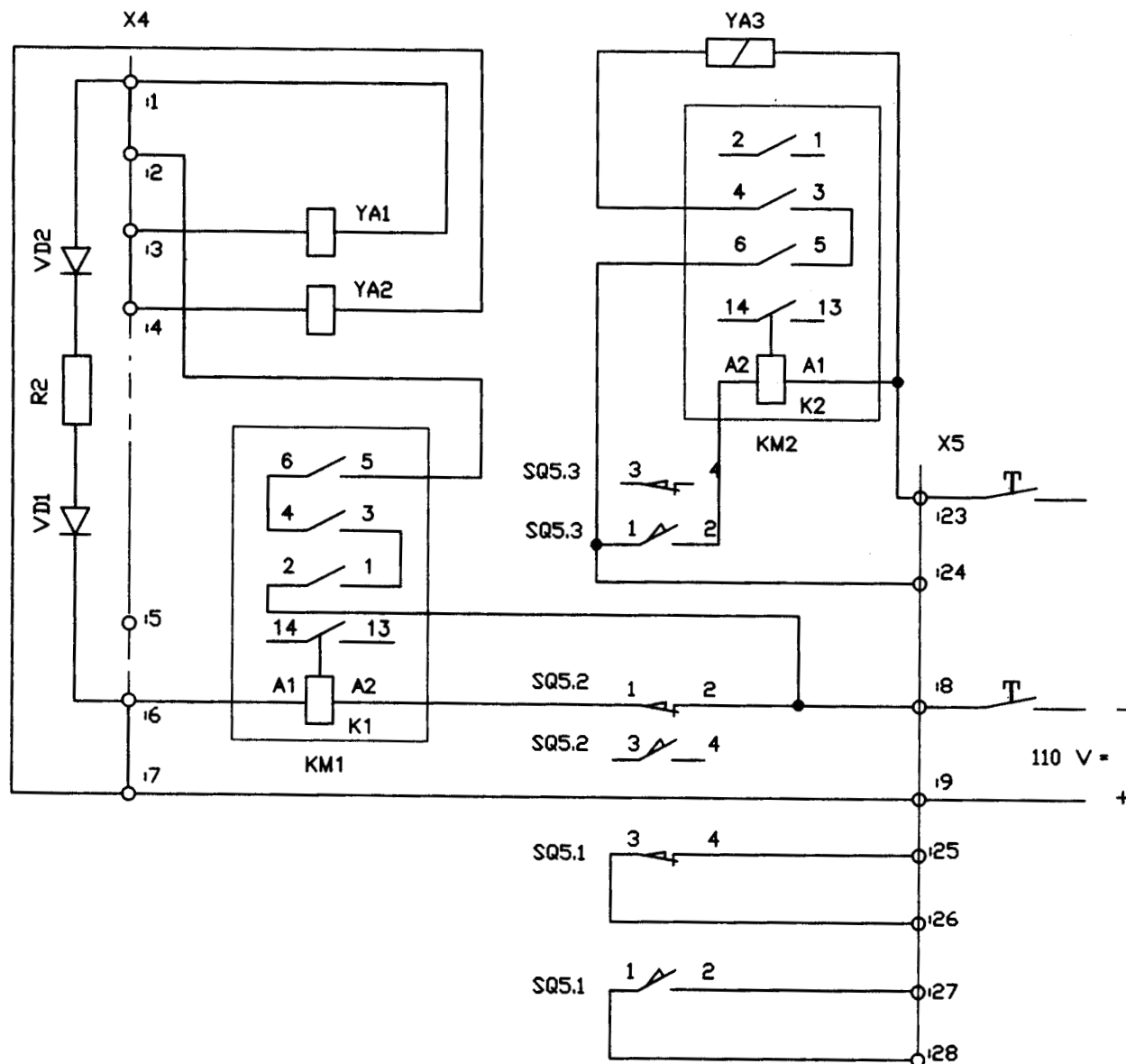
Note: Connecting wires CYA 1,5 mm², colour black

Wiring diagram - Enclosure fig. 4932046

Vacuum contactor with latching mechanism

- Closing magnet DC 110 V

- Shunt release OFF DC 24 V, 48 V, 60 V, 110 V, 220 V



Legend:

VD1,VD2 Diode type 1N 5408

YA1,YA2 Coils of closing magnet - 2x600 turns; 0,8 mm² Cu; total coils resistance 11,8 Ω

YA3 Shunt release OFF

SQ5.1÷3 Auxiliary switches S7, type S800E/41

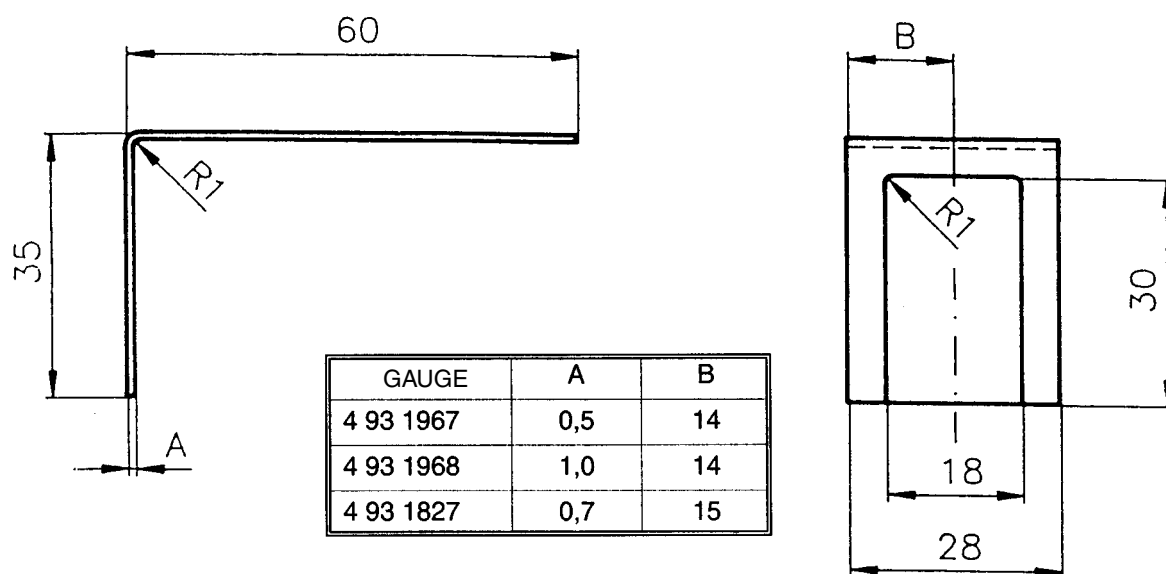
R2 TR 512/15 W, 120 Ω

KM1 Auxiliary contactor type BC7- 30 - 10 110 V DC

KM2 Auxiliary contactor type BC7 - 30 - 10 ...

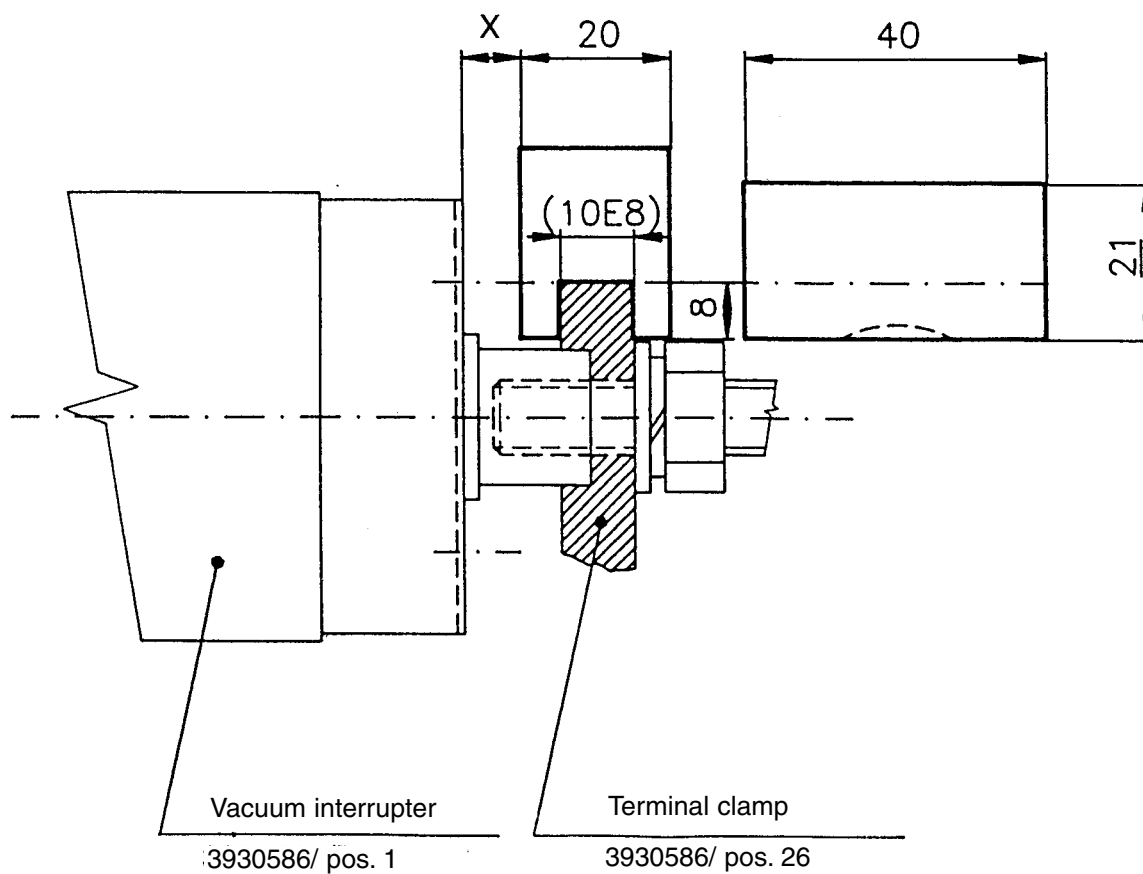
Note: Connecting wires CYA 1,5 mm², colour black

GAUGES - Enclosures fig. 4931967, 4931968, 4931827



GAUGE - Enclosure fig. 493 2047

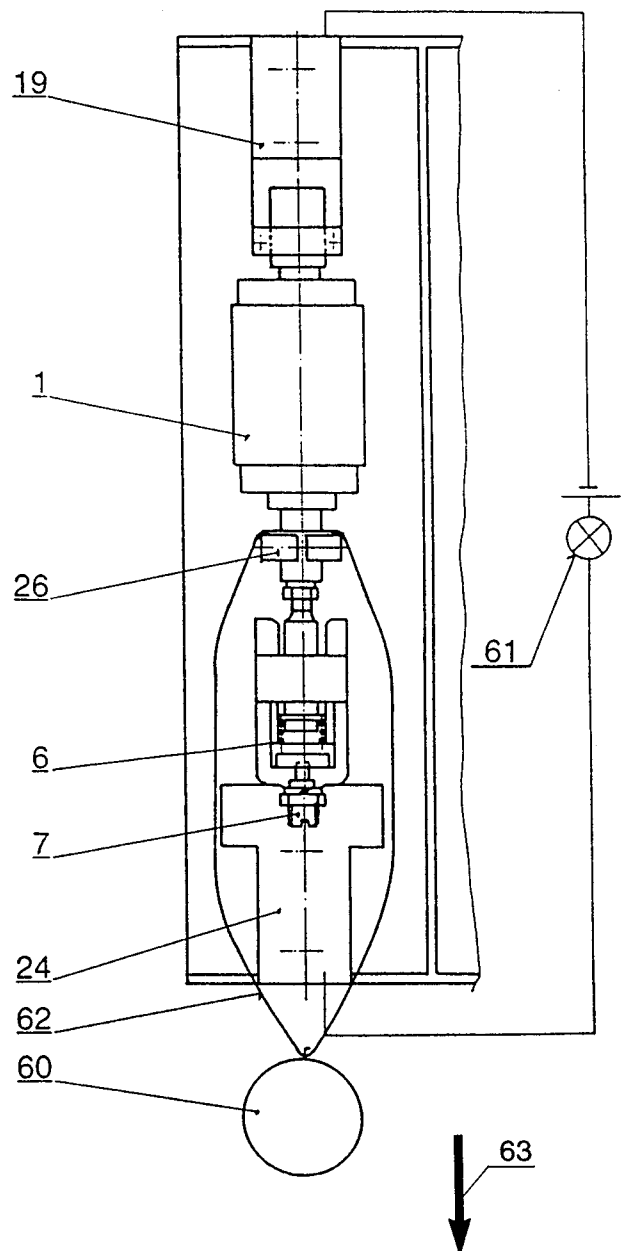
To check setting-up measure dimension (X) both in closed (ON) and open (OFF) position of the contactor on all three contactor poles successively. The difference of both dimensions must be in the range of $6_{-0.8}$ mm (contact stroke of vacuum interrupters).



SETTING-UP OF CONTACT FORCE - Enclosure fig. 3930586

Setting procedure of contact force:

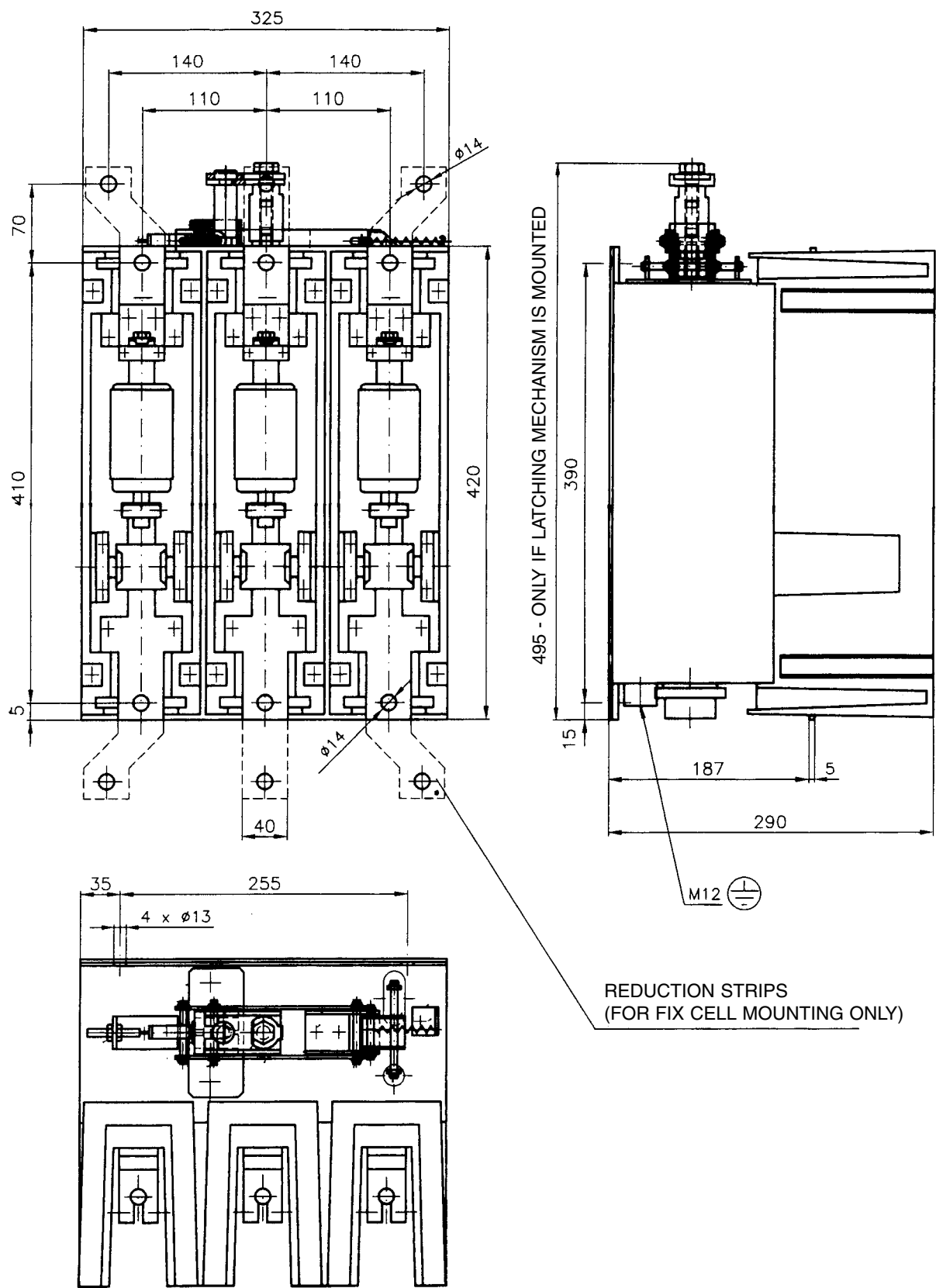
1. Hang up dynamometer 60 by mean of sling 62 on terminal clamp 26.
2. Circuit of tester 61 is closed over switched on vacuum interrupter 1 (tester is connected to strips 19, 24).
3. Apply force on dynamometer 60 in axis of interrupter 1 in closed contactor position to cause interrupter switch off, what is indicated by tester 61. In this moment read the value of the contact force. Set up this force on the value of $300\text{ N} + 10\%$ by means of adjusting screw 7 and secure this screw with the nut. This setting is carried out gradually on three contactor poles.



Legend:

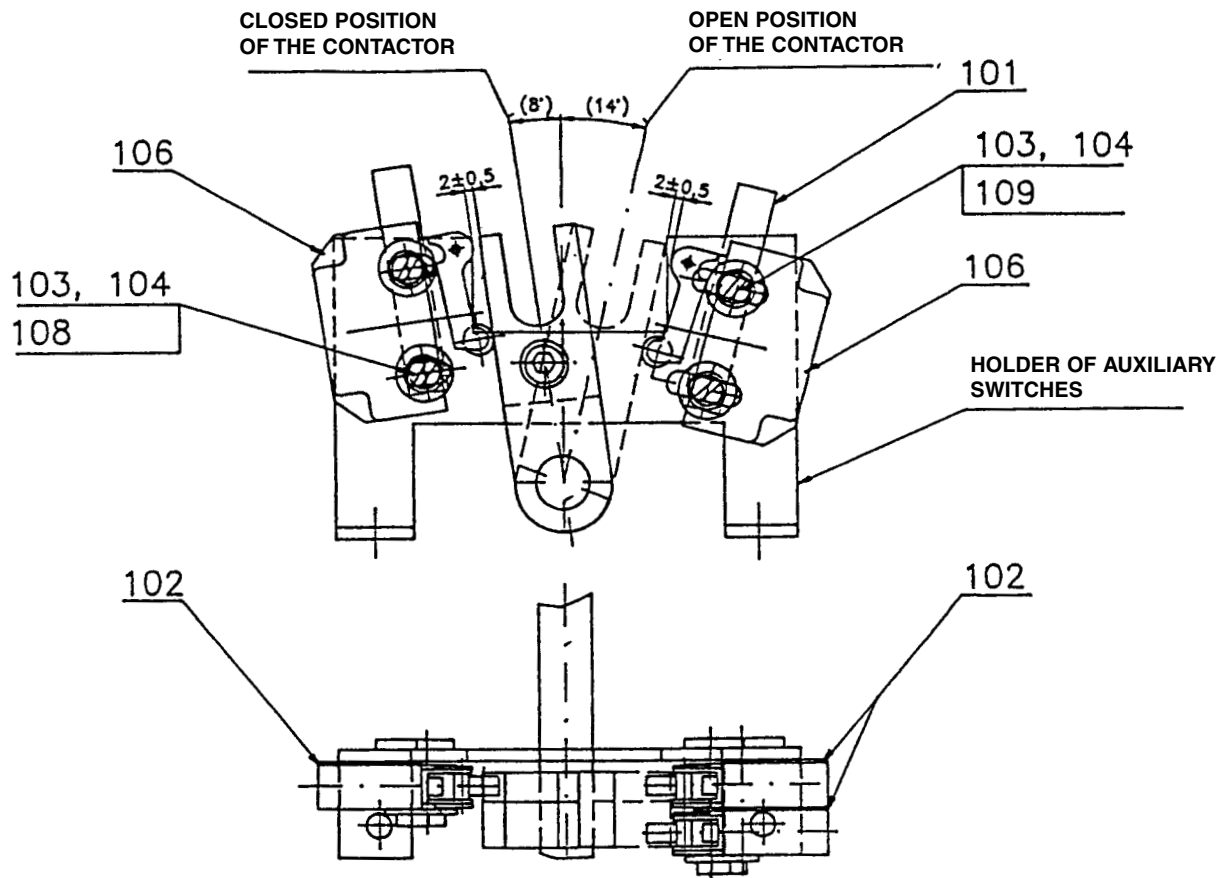
- 1 - Vacuum interrupter
- 6 - Contact spring
- 7 - Adjusting screw
- 19 - Connecting strip - upper
- 24 - Connecting strip - lower
- 26 - Terminal clamp
- 60 - Dynamometer - range 500 N
- 61 - Tester
- 62 - Sling of steel stranded wire
- 63 - Direction of applied force

DIMENSIONAL DRAWING - Enclosure fig. 3932038



Replacement and adjustment of auxiliary switches

- enclosure 4932034



NOTES:

- 1) Adjustment of auxiliary switches is carried out after setting-up of the vacuum contactor.
- 2) Adjust auxiliary switches in their end positions with a play of $1_{+0.5}$ mm to the stop position of the respective switch.
- 3) Lubricate threads of screws 108, 109 slightly with oil or grease and tighten these screws with a tightening moment of 1.4 Nm.
- 4) Secure heads of screws 108, 109 after tightening with a locking paint.
- 5) Adjustment of the auxiliary switch (SQ5.3) of the shunt release OFF is carried out in the same manner.

Legend:

- 101 Plate
- 102 Partition
- 103 Rubber washer
- 104 Washer
- 106 Auxiliary switch
- 108 Screw M4x20
- 109 Screw M4x35



A 358-331-I/2000M

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