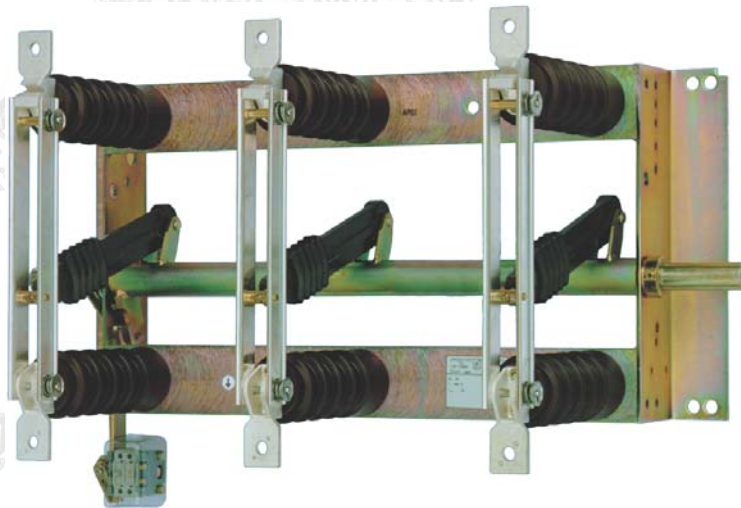


Instructions for assembly, operation and maintenance of indoor disconnectors

with LM 50 motor operated drives
single- and three-pole design
rated voltage 12, 25 and 38.5 kV
rated current 630 and 1250 A

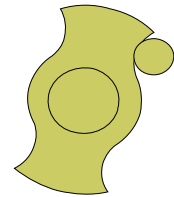
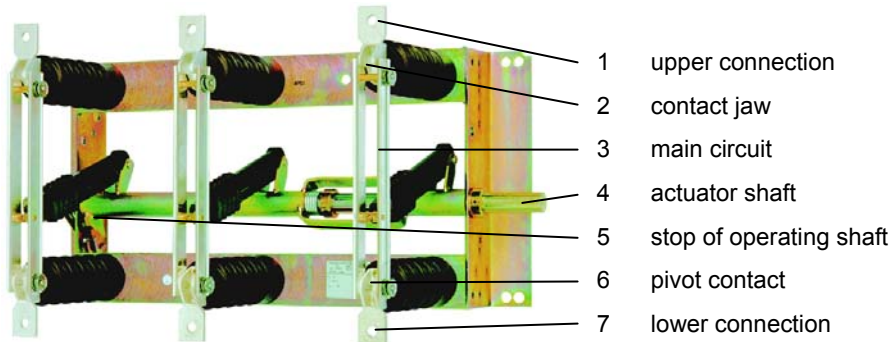


DRIBO, spol. s r.o.

Pražákova 36
619 00 Brno
Czech Republic

Tel.: +420 533 101 111, Fax: +420 543 216 619, E-mail: dribo@dribo.cz, Internet: <http://www.dribo.eu>

Indoor disconnectors



Handling and storage

Unpack the disconnector upon arrival. Check for damages caused during the transport. Any damage should be reported immediately to the supplier. After unpacking remove all remaining packaging material from the switching device and accessories.

Lift the disconnector by holding it at the base frame, only. Use never the arc quenching chambers and the current-carrying path as a component for lifting up the switching device. During the storage protect the device from damages, humidity and dirt.

Operating conditions

The disconnector is intended for operation under normal conditions as defined by the EN 62271-1 standard, class „minus 15, indoor use“. Highest ambient temperature: 40°C; average temperature during 24 hours is not allowed to exceed 35 °C.

Assembly

The switching devices are designed for vertical mounting. Devices for horizontal mounting are modified and identified accordingly.

Assembly of the load disconnector

Screws are to be tightened up in a way to prevent the occurrence of deformation or stress in the disconnector base frame (use shim blocks if needed).

Connection of busbars or cable terminals

When making connections take care of incoming terminals of the disconnector (1,7) which have to be kept away from stresses. Fix the connecting bolts with 70 Nm torque (using another key in opposite position).

Connection of the drive mechanism

Follow the wiring diagrams included. If motor drives are used on both the switching device and the earthing switch, an electrical interlocking system has to be implemented. The built-in mechanical interlocking on the switching devices is intended for manual control, only. Drive mechanism operating into the mechanically locked-up state may suffer damage.

The position of cams of the drive end switches is adjusted at the manufacturer's plant and has not be changed in any case. The adjustment can be done only by a trained serviceman of the supplier. Unprofessional handling may cause damages.

Putting the blocking system into operation

In order to reduce the probability of damage to the switching knife contacts both the disconnectors and the earthing switches are transported in ON switching position. Consequently, the blocking system is not operative during the transport.

Prior putting the device into operation the blocking system is to be enabled. This is done using the following steps:

1. Switch the disconnector OFF.
2. Using a torque wrench tighten special cut-in M10x25 bolt in the blocking segment with a torque of 55 Nm.
3. Check the proper function of the blocking mechanism.

Operation test before putting the device in operation

Checking the end position of the disconnecter and the earthing switch.

In the course of handling with both the manual and motor operated drive the switching shaft (4) must abut against the end block (5). If the disconnecter is equipped with earthing switch also the earthing switch shaft (12) must reach the end positions.

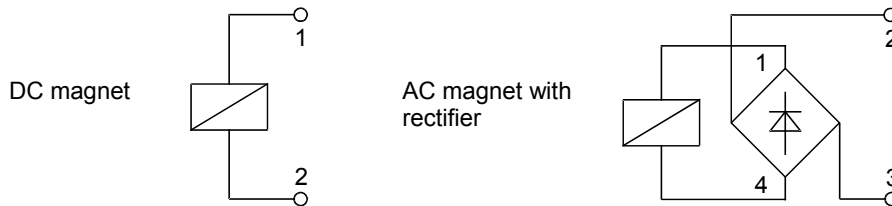
Checking the current-carrying path

The knife contacts (3) must approach the fixed contact in a symmetrical way.

Checking the blocking magnets

Switching of devices equipped with blocking magnets can take place only if voltage is connected to the magnet. In no-voltage state the switching device is blocked by magnet. The magnet is designed for 100 % of load capacity.

Connecting the blocking magnets to the power:



Checking the LM 50 motor operated drive and manual emergency control

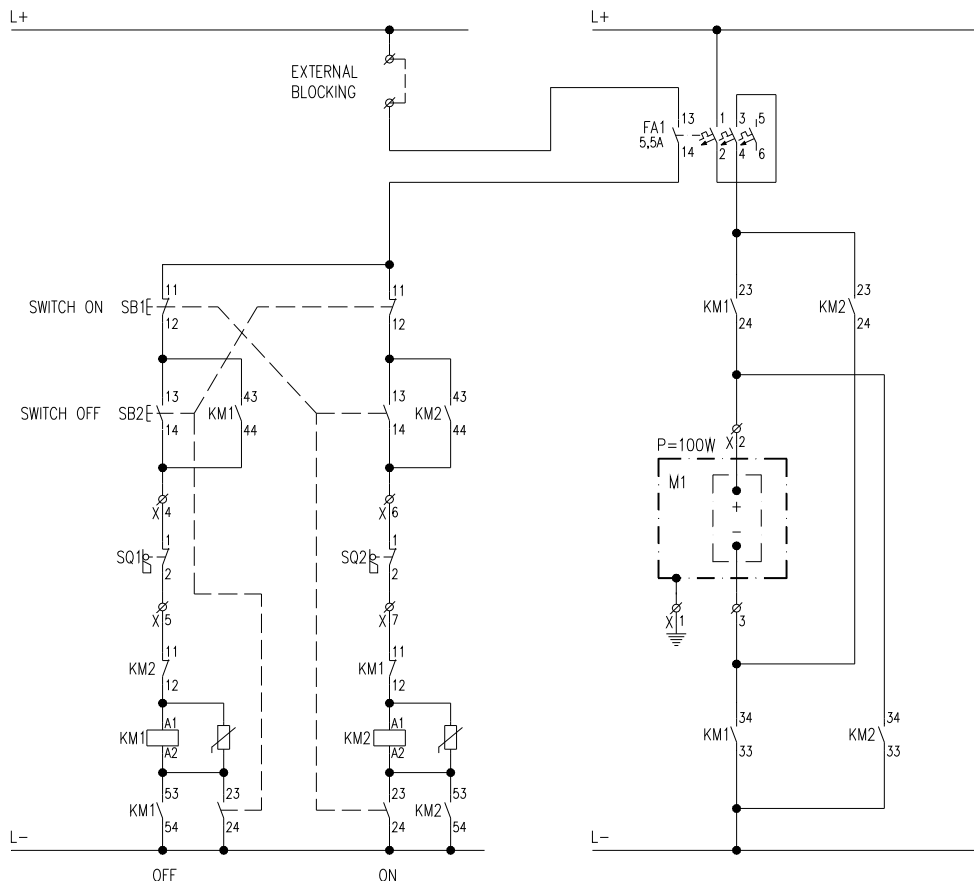
Function of the drive, its parameters and protections are described in a separate catalogue. The drive is capable of reliable operation at voltages within the range of 85 to 110% of rated control voltage.

In case of emergency the shaft mounted drives (UM 50) can be controlled using breaking rod and handle with lug, fixed to the load disconnecter shaft. When operating the device in case of emergency the connection between the drive and the switching device becomes uncoupled automatically. The operator is thus protected from faulty switching. If the positions of the load disconnecter and the drive do not correspond following the emergency operation, the connection becomes established after the positions become aligned.

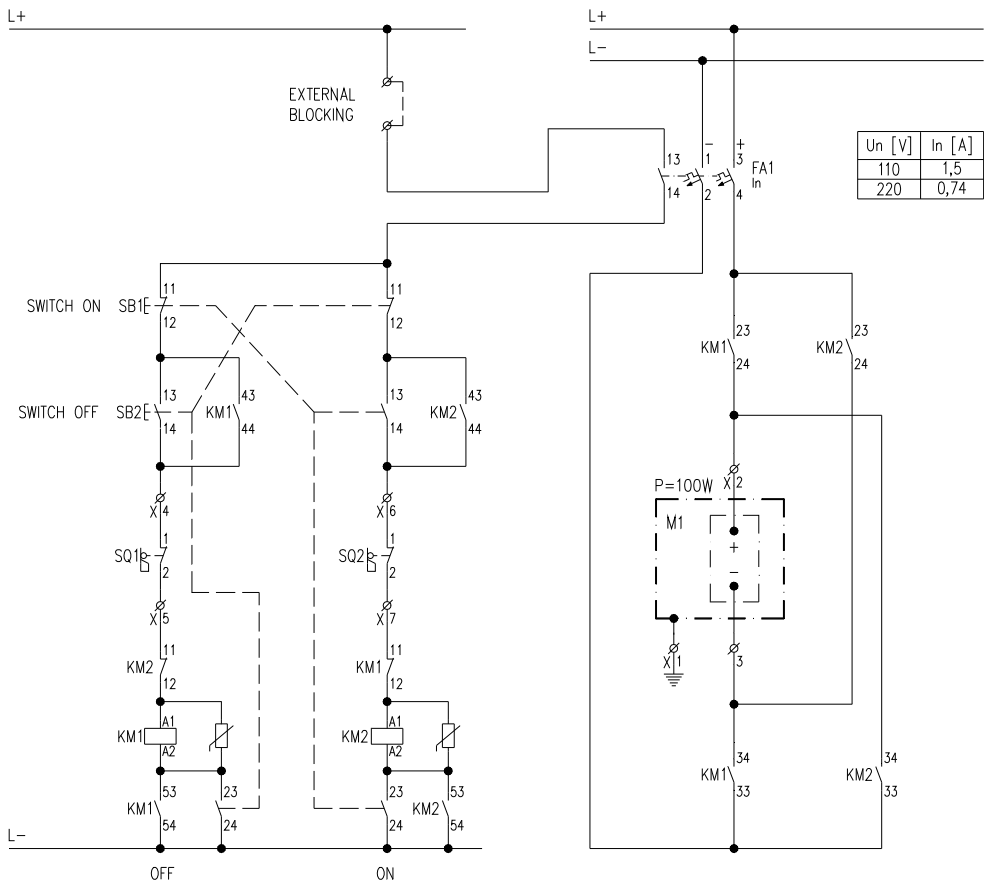
During emergency operations the switching shaft has to reach the end position for both switching positions, and abut on the end block.

The wiring diagram of the motor drive is shown below.

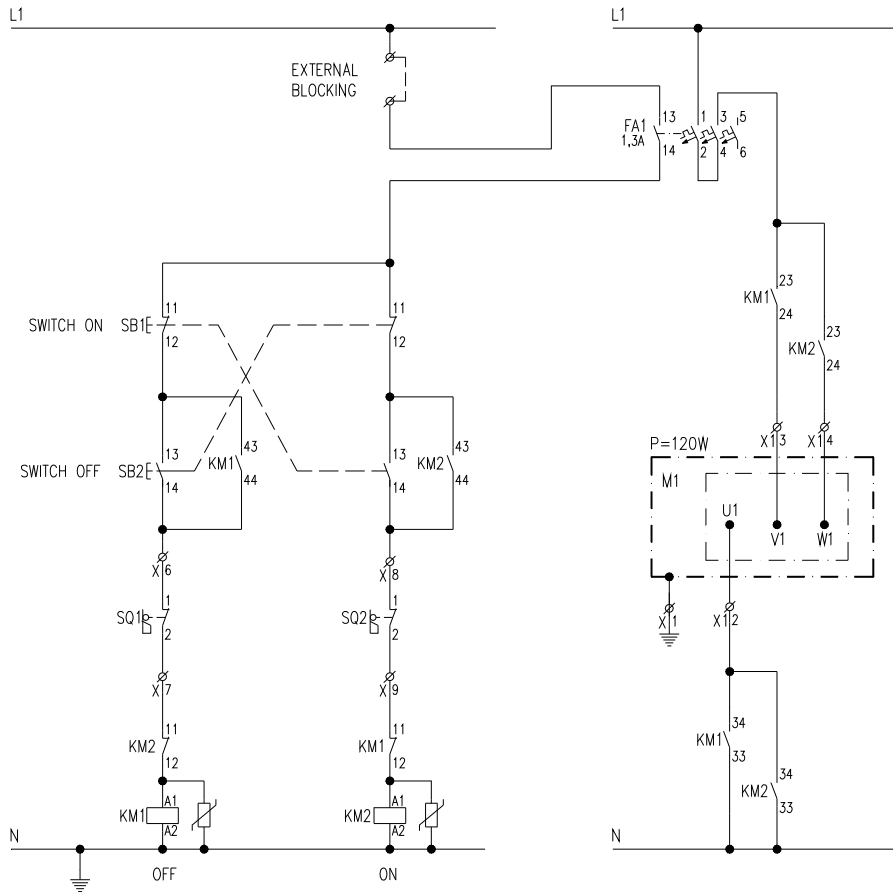
Recommended circuit diagram of LM 50 motor operated drive for 24 V DC



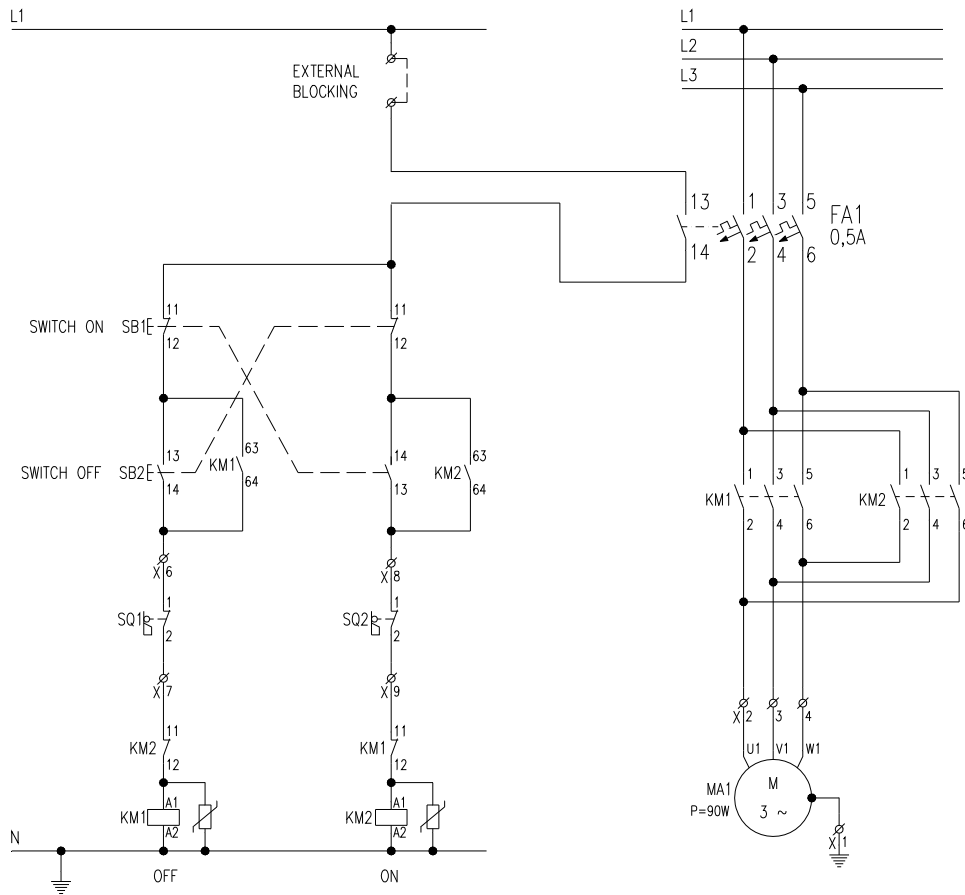
Recommended circuit diagram of LM 50 motor operated drive for 110 V a 220 V DC



Recommended circuit diagram of LM 50 motor operated drive for 230 V AC



Recommended circuit diagram of LM 50 motor operated drive for 400 V AC



Protection of the LM 50 motor drives

Linear drive motors need for their protection circuit breakers with the M characteristics. For voltages of 230 V AC, 400 V AC and 24 V DC it is recommended to use three-phase AC motor starters, such as:

Type	Manufacturer
EP1 M	Elektrořístroj Písek
GV2-M	Telemecanique
PKZM0	Moeller
140-MN	Allen-Bradley
LMS 25	Lovato
SM1	OEZ Letohrad
MI	SEZ Krompachy

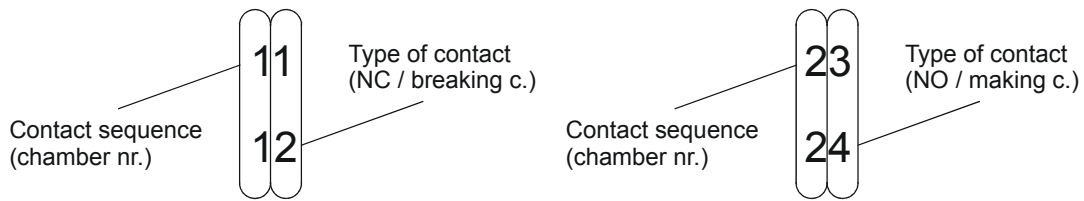
However, voltages of 110 V DC and 220 V DC need to have circuit breakers capable of interrupting DC short-circuit current. For this purpose the following circuit breakers have been tested:

Type	Manufacturer
140-MN	Allen-Bradley
S 282 UC-K	ABB
RI 5 J2 M	SEZ Krompachy

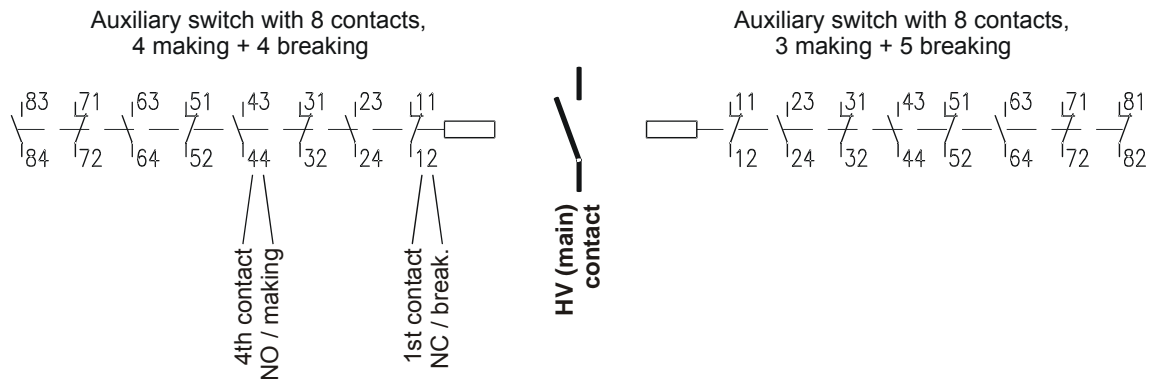
The use of another types of circuit breakers, for 110 V DC and 220 V DC voltages, needs to be discussed with the DRIBO company. Each such circuit breaker has to be completed with auxiliary contact that opens the control circuits in case it starts to operate. When connecting the circuit breaker into power circuit recommendations of the manufacturer have to be adhered to, especially concerning the polarity.

Checking the auxiliary switches

The adjustment of auxiliary switches takes place at the manufacturer's, in accordance with the stipulations of standards, and has not been changed without the consent of the suppliers. Contact terminals of auxiliary switches are marked with numbers, depending on the sequence and type of contact:



The numbering starts always from the shaft (see the following example of contact description). The first contact is a NC contact followed with NO contact. In such a way the contacts are alternating until the required number of one specific type of contact runs out. The remaining contacts of one specific type are grouped at the end. Switching devices are equipped with auxiliary switches containing always even number of contacts. Examples of description and the arrangement of contacts:



Operation

Motor drives are controlled locally using electrical pushbuttons, or from a central control room. In emergency cases the LM50 motor drives can be operated using a breaking rod and lever with lug, mounted on the device's shaft.

In the course of emergency switching the connection between the drive and the device becomes automatically uncoupled. The operator is thus protected from faulty switching. If the positions of the load disconnecter and the drive do not correspond following the emergency operation, the connection becomes established after the positions become aligned.



Maintenance

Under normal operating conditions maintenance works are to be carried out every 10 years. During the maintenance the following works are carried through:

Cleaning

- insulators
- insulated switching pull rod
- switching knife-type contacts (in OFF position)
- switching springs
- earthing contacts

Lubrication

- all bearings, friction lodgement and hinges (on mechanical parts of the base frame) shall be treated with oil applied by spraying (see table below)
- surfaces of the main contacts may be greased with specified greasing agent, only, with a very thin layer of grease applied
- after having been cleaned the earthing switch contacts are treated with grease

To be applied to	Lubricating means prescribed
main contact surfaces	contact vaseline TDP 33-078-62
all bearings	Omnigliss spray or other spray containing Molykote
earthing switch contacts	Barrierta grease

Make a few switching operations after the termination of maintenance works.