



PRŮVODNÍ DOKUMENTACE ACCOMPANYING DOCUMENTATION

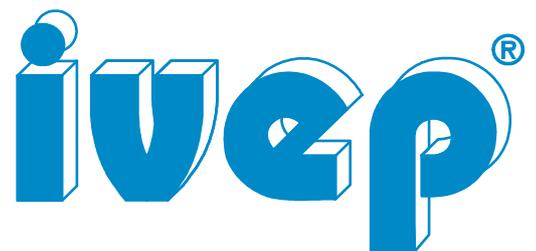
D0109.PD.01

ELECTRIC MOTOR DRIVE MECHANISM

for a switching device used outdoors on traction current
lines (Austrian Railways)

ISO 9001:2009
ISO 14001:2005
OHSAS 18001:2008

TYPE **SUP-A**



USE

The SUP-A type electric motor drive mechanism is intended to be used in dependent machinery systems to control switching devices mounted outdoors, such as medium voltage disconnectors, switch disconnectors and earthing switches. It can be used as a means for local, remote and emergency control of the switching device. The values of output torque provide for adequate switching reliability, even in heavy duty operating conditions. The drive mechanism features a simple and reliable design with only minor demands on maintenance. The drive mechanism is designed in a way to achieve the switching device's end positions with adequate reliability while sending out positive signals about the ON and OFF switching positions.

STANDARDS AND REGULATIONS

The SUP electric motor drive mechanism meets the requirements of the following standards: ČSN EN 62271-103; ČSN EN 62271-102; ČSN EN 62271-1; ČSN EN 61439-1

MAIN TECHNICAL PARAMETERS

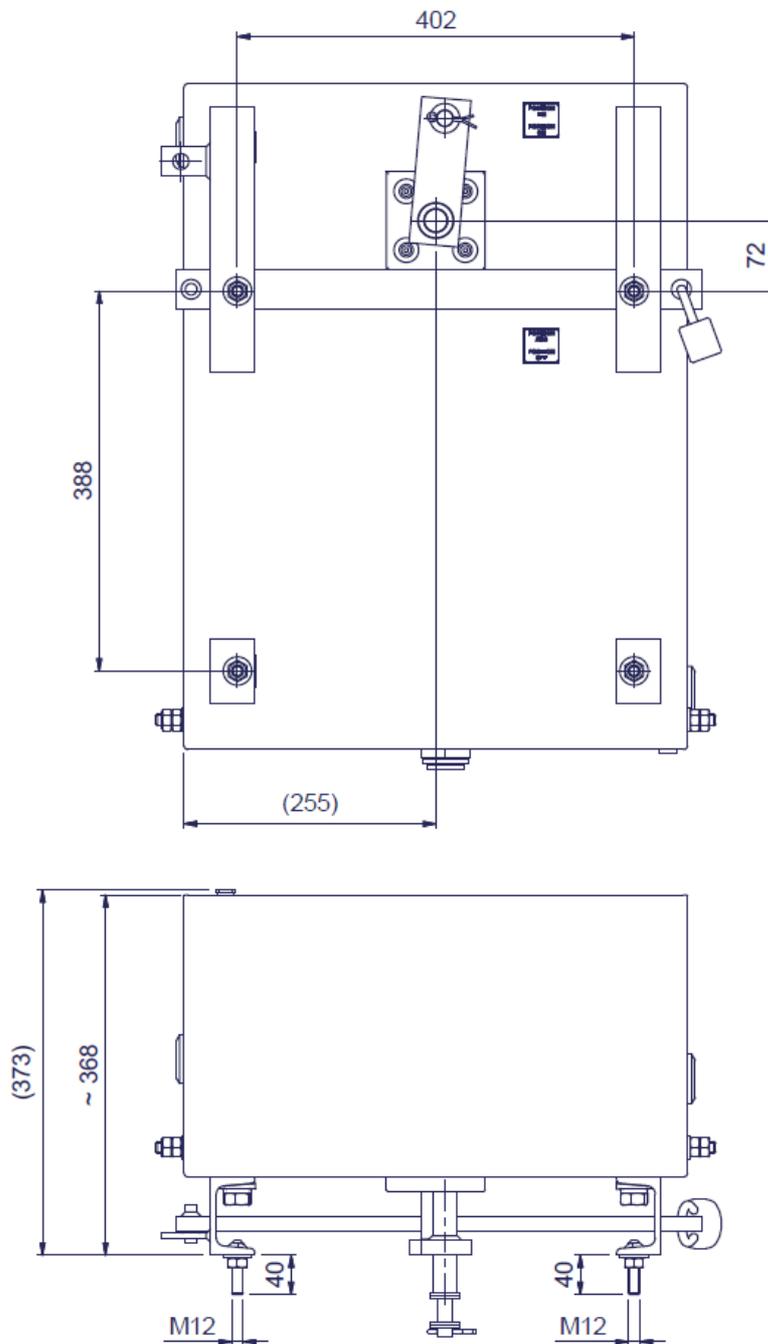
Type of used cabinet	SUS 1 (IVEP, a.s. manufacturer)
Protection degree (of closed drive mechanism)	IP 55
Covering of inner doors	IP 30
Mechanical toughness	IK 07
Protection against direct touch	connecting all metal parts together
Weight (depending on the type and equipment level)	approx. 60 kg
Output torque – rated value	76 Nm
Output torque – highest value	240 Nm
Min. forces in rod	2150 N
Max. forces in rod	10000 N
Cycle duration	breaking operation: 1.5 s making operation: 1.5 s
Working angle	185° (adjusted at the manufacturer's shop)
Minimum control impulse	0.15
Range of control voltages	0.85 to 1.1 x Un
Rated insulation voltage Ui	300V, 50Hz
Rated voltage Un	230V, 50Hz
Rated withstand impulse voltage Uimp	1,5kV
Motor drive control voltage	230V AC, 50Hz
Motor drive power supply voltage	230V AC, 50Hz
Motor type	DAGU, 220V DC, 300W
Rated cabinet current Inc	4A
Rated suspended short-circuit current Icc	10kA (external protection)
Ambient temperature	- 25°C to + 40°C (without heating)
Maximum ambient humidity	50%
Mechanical service life	20000 C-O cycles operations or 3 to 5 years
Input opening for the insertion of cables	2 x M 32x1,5; 2 x M 25x1,5
Cross section of connecting conductor	1 connecting conductor
solid wire	0.5...4 mm ²
stranded wire	1.5...4 mm ²
stranded wire with ferrule	0.5...2.5 mm ²
Tightening torque of connecting terminals	0.4...0.6 Nm (M2.5)
Mounting possibility	wall or pole mounting

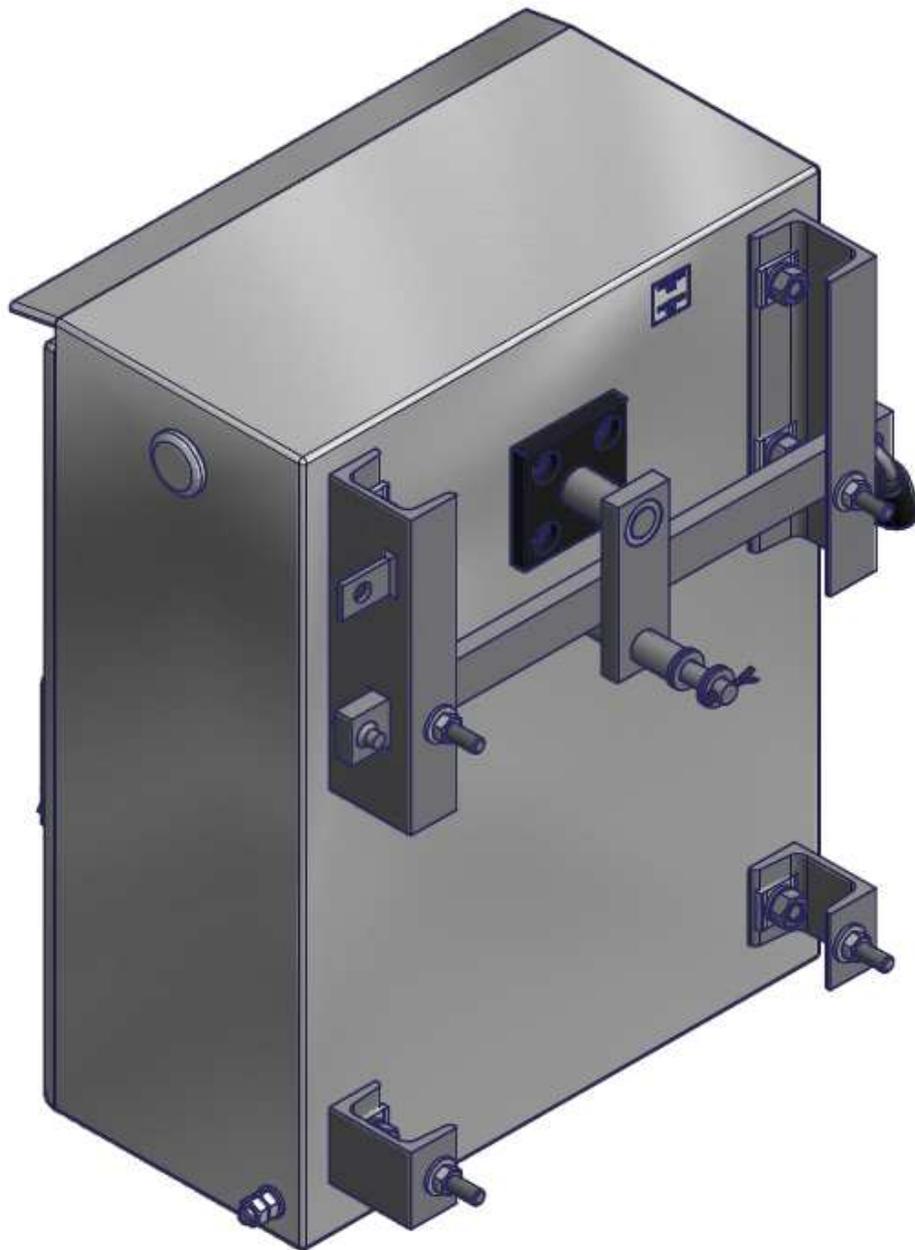
INSTALLATION OF THE DRIVE MECHANISM

The proper functioning necessitates to have the electric motor drive mechanism mounted onto a stable supporting structure of adequate carrying capacity. The installation (Fig. 1) can be accomplished in two ways: option (variant) 1 is used for mounting the device on a pole, option (variant) 2 serves for mounting the device on a supporting steel structure. The fixing is done using four M12 screws. The tightening torque values – see Table 1.

Fig. 1

Mounting points location





The main shaft of the drive mechanism (Fig. 2 – item 1) carries a control handle installed at the manufacturer's (Fig. 2 – item 2). The drive stroke (travel) attains 200 mm. A pull rod hooked up on the controlled switching device is fixed to the control handle journal (Fig. 2 – item 3). The pull rod needs to be preloaded in order to ensure the proper functioning of the drive mechanism and of the whole assembly, and to attain the ON switching end position. The adjustment procedure of the whole assembly is not a subject of this manual.

Fig. 2

Control handle of drive mechanism

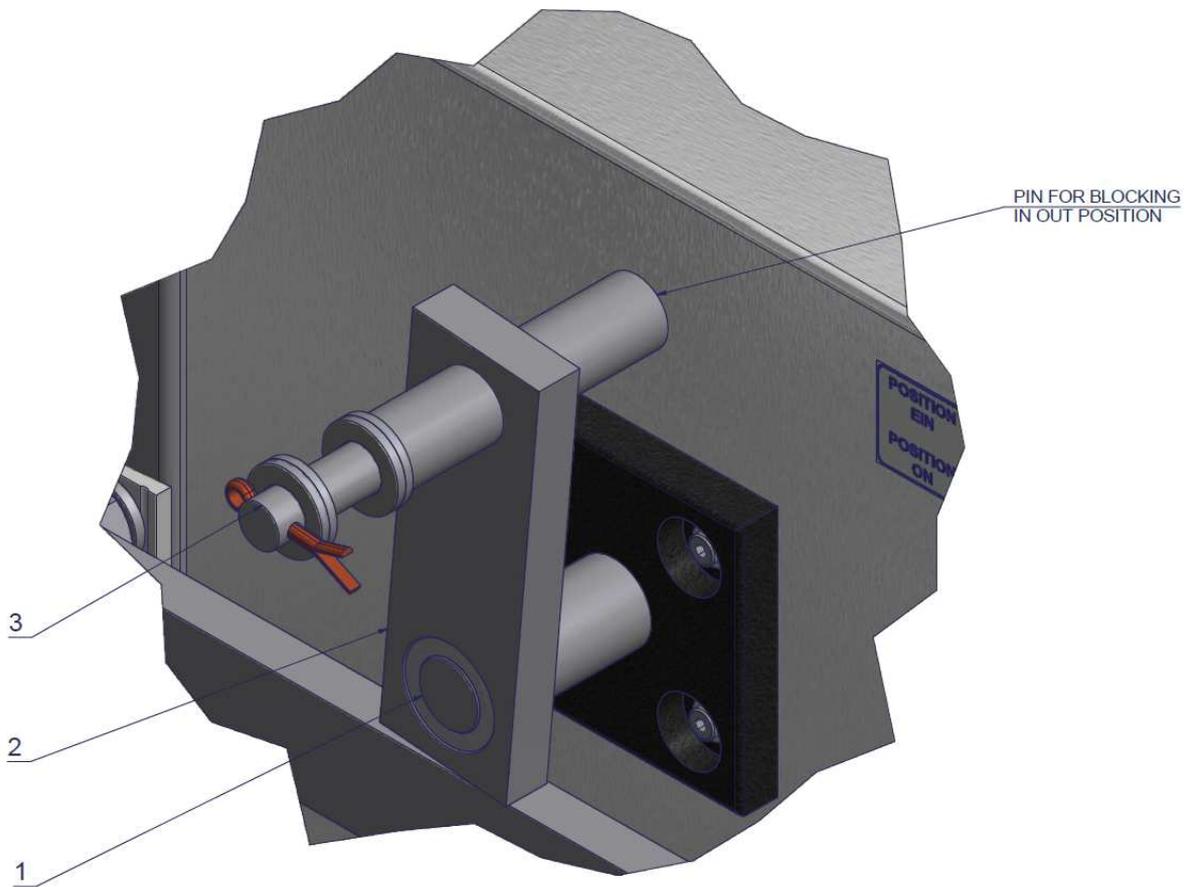


Table 1

Table with specified torque values

Screw size	Tightening torque (Nm)
M4	2.5
M6	9
M8	22
M10	45
M12	75
M16	180

- Terminal boards X1 and X2 mounted in the inside of the cabinet serve to connect the power supply, control and indication voltages (Fig. 3, item 1)

- Cables enter into the cabinet from the bottom side via 2pcs of M 32x1,5 bushing and via 2pcs M 25x1,5 bushing.

- Grounding is to be connected to the cabinet from both sides, to the M12 terminals (Fig. 4).

Fig. 3

Cabinet internal wiring; layout

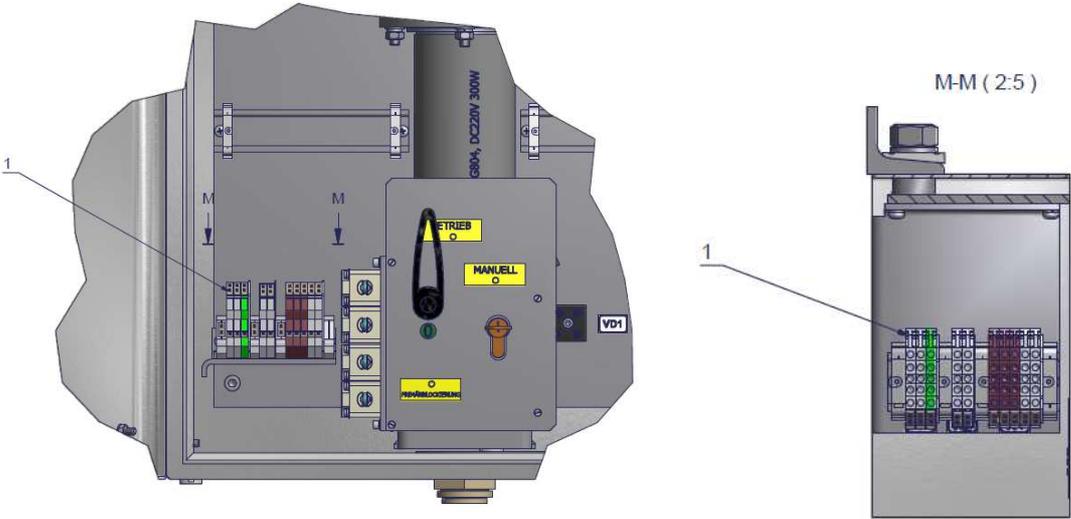
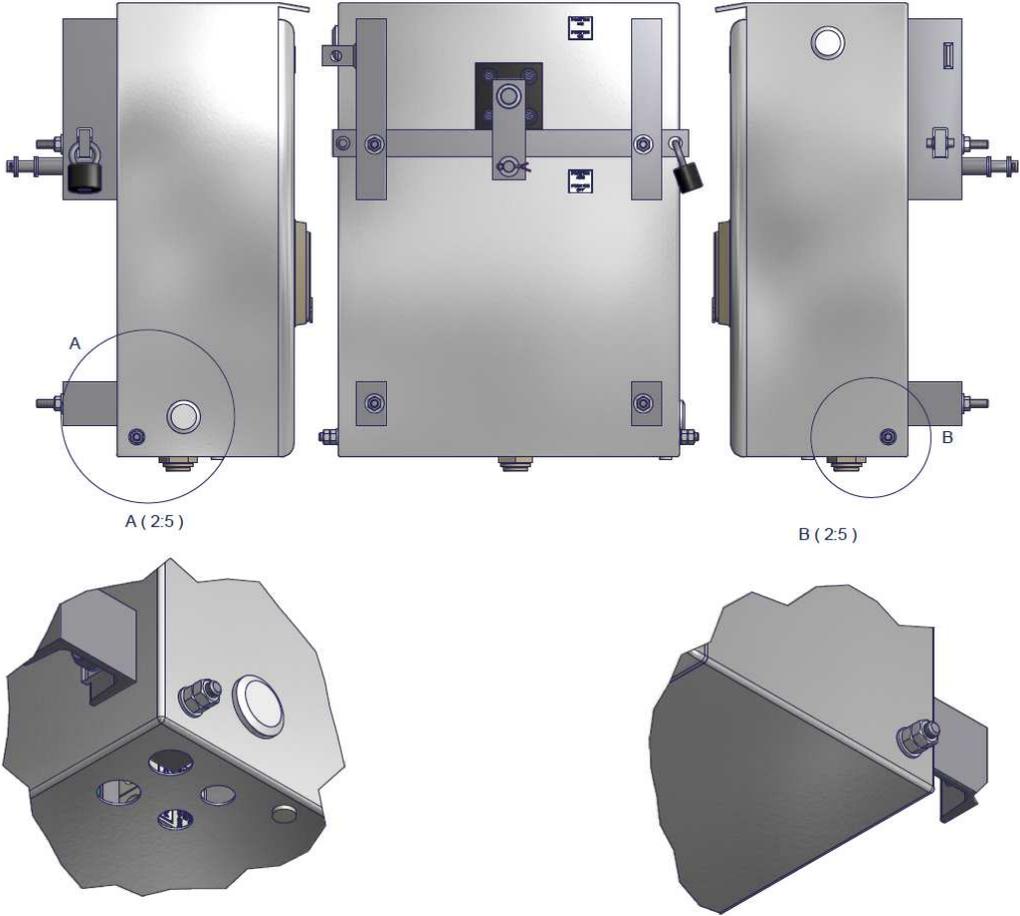


Fig. 4

Location of cabinet grounding points



TYPE DESIGNATION OF THE ELECTRIC MOTOR DRIVE UNIT

Table 1

Design	Electric drive	Rated voltage of motor (V)	Motor power output (W)	Rated current (A)	Highest current (A)	Rated output torque (Nm)	Highest breakaway torque (Nm)
SUP-A-HF 50-80	DAGU MG804.1	230 V AC, 50 Hz	300	2,0	8,0	76	240

Note:

Rated current flows through the motor during ordinary operating conditions (rated torque)

Highest current denotes the peak value of starting current

OPERATING CONDITIONS

The electric motor drive mechanisms are envisaged to be used in common outdoor and indoor operating environments as defined by the ČSN EN 60694 standard, part 2.

DESCRIPTION, FUNCTION

The SUP -A-HF 50-80... electric motor drive mechanism consists of subassemblies such as the cabinet and a panel with the drive unit (see Fig. 5). The figure shows a drive mechanism with opened external door.

The external door does not incorporate any locking mechanism and its purpose is only to protect the drive mechanism from atmospheric influences. The internal door (panel) comprises the switching position indicator and the changeover lever for setting the respective operating modes, completed with a locking mechanism. The lever can be secured in any switching position with a key, to prevent it from tampering.

Fig. 5

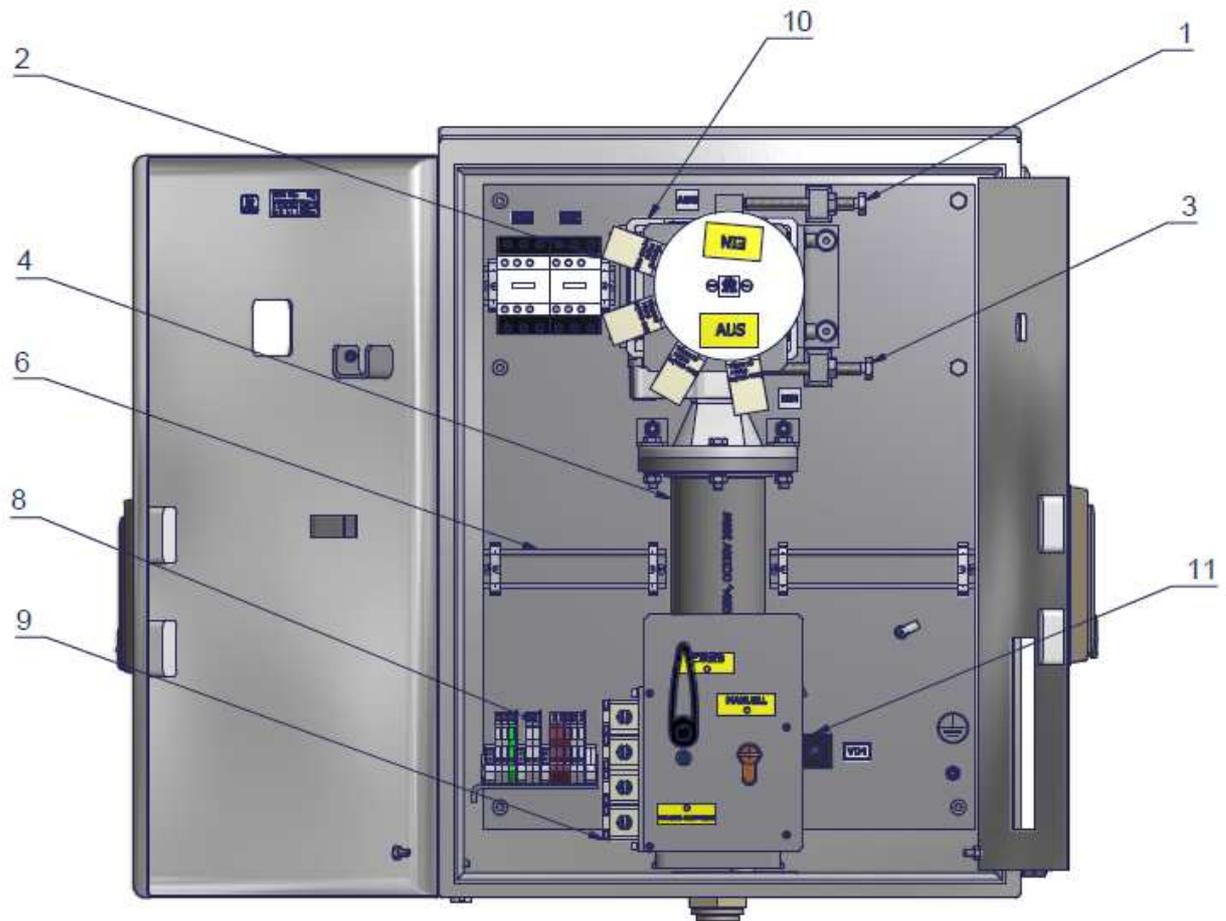
Cabinet of drive mechanism, with opened outside door



- | | | | |
|---|--|----|-----------------------------|
| 1 | Cabinet of drive mechanism – external door | 10 | Entry for control cables |
| 2 | Cabinet of drive mechanism – internal door | 11 | Draining plug |
| 3 | Internal door handle – with lock | 12 | Blocking rod |
| 4 | External door handle – with lock | 13 | Padlock |
| 5 | Indicator of drive switching position | 14 | Eye for blocking rod |
| 6 | Venting louvers | 15 | Entry for emergency control |
| 7 | Lever to control the drive operation modes | | |
| 8 | Control lever lock | | |
| 9 | Earthing screw (terminal) | | |

Fig. 5

Cabinet of drive mechanism, with opened internal door

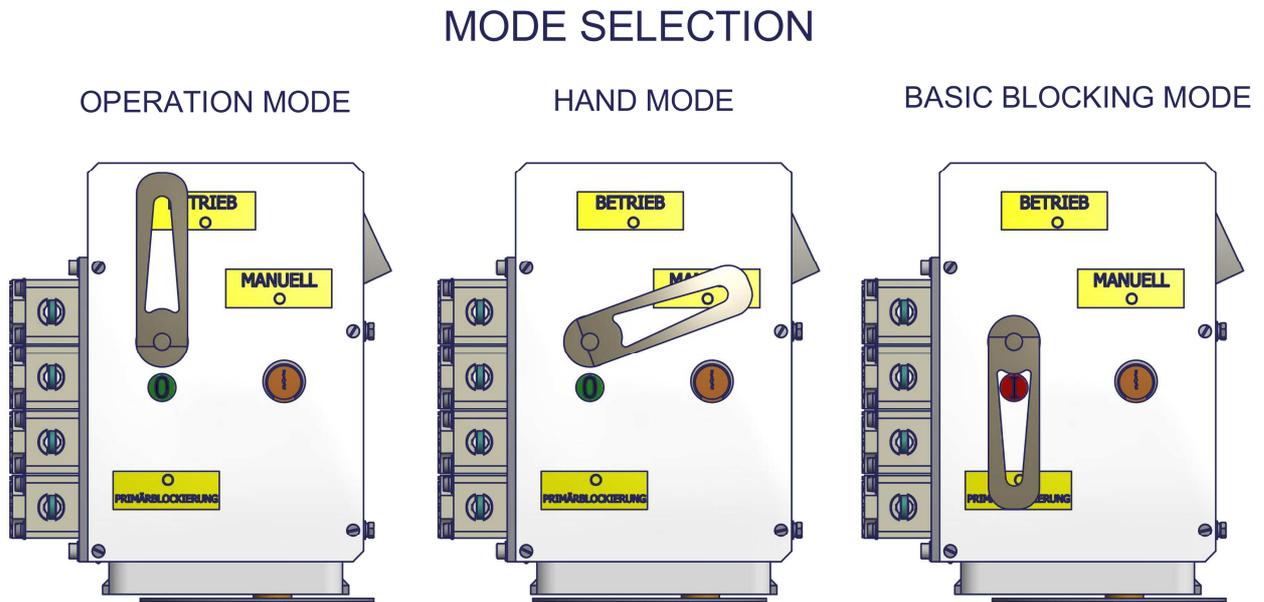


- | | | | |
|---|--|----|-----------------------------------|
| 1 | Mechanical stop – OFF switching position | 7 | Auxiliary terminal board |
| 2 | End switches for control of motor and indication | 8 | X1 and X2 Main terminal boards |
| 3 | Mechanical stop – ON switching position | 9 | End switches of internal door |
| 4 | Electric motor | 10 | Gearbox |
| 5 | Contactors of electric motor | 11 | Rectifier |
| 6 | Removable free DIN rail approx..150mm length | 12 | Blocking and changeover mechanism |

The wiring diagram of the electric motor drive mechanism is shown in the appendix (Fig. 9). With manual handle of the drive operation mode changeover switch (Fig. 6) in position BETRIEB (= OPERATION) the drive mechanism can be remotely controlled in all its functions. In the MANUELL (=MANUAL) position the sliding block guide of the blocking mechanism is displaced which makes it possible to insert the operating handle of emergency manual control into the drive cabinet from the bottom. The insertion of the handle disables the remotely controlled motor-actuated operation of the switching device as a means to protect the operating staff. In the PRIMÄRBLOCKIERUNG (= ELECTRICAL AND MECHANICAL CONTROL BLOCKING) position of the changeover switch the power connection to the electric motor is broken and, at the same time, the shaft is blocked mechanically.

Fig. 6

Changeover switch of the drive mechanism operation mode



MANUAL EMERGENCY CONTROL

In emergency situations the drive mechanism can be operated manually using a manual handle slipped in over the hexagonal end of the motor shaft after the removal of a cover on the bottom side of the drive (Fig. 5, item 10), and after putting the changeover switch into "MANUAL" position. When slipping the handle an end switch in the power circuit of the motor becomes opened still before the hexagonal shaft end has been reached by the handle, which is a protective measure to protect the staff in case of faulty handling.

Caution! The system of emergency manual control of the drive mechanism **under load** serves only to control the switching device in emergency situations. It is not allowed to finish the handling process in an interim position and, if such happens, it is necessary to complete the handling process as soon as possible, using the highest possible speed of the movement. Devices **without load** can be operated with any arbitrary speed, and the movement can be stopped at any moment chosen. **The operating staff is strongly discouraged to use the system of emergency control for switching the device ON and OFF under load.**

MAINTENANCE RULES

The SUP-A-HF 50-80... electric motor drive mechanism poses only minimum demands on the maintenance. The gearbox is filled with solid grease and does not require any topping up or checks over the whole service life i.e. 30 years or 50 000 C-O switching operations.

It is recommended to perform annual inspection of the drive, in the course of which the following items are being checked:

- verification whether the end switching positions are achieved by the drive mechanism
- visual inspection of surface damages and obvious defects both in the inside and outside of the cabinet
- excessive noise, etc.

FIG. 7 - SWITCH DISCONNECTOR WITH THE SUP ELECTRIC MOTOR DRIVE MECHANISM ASSEMBLED STATE

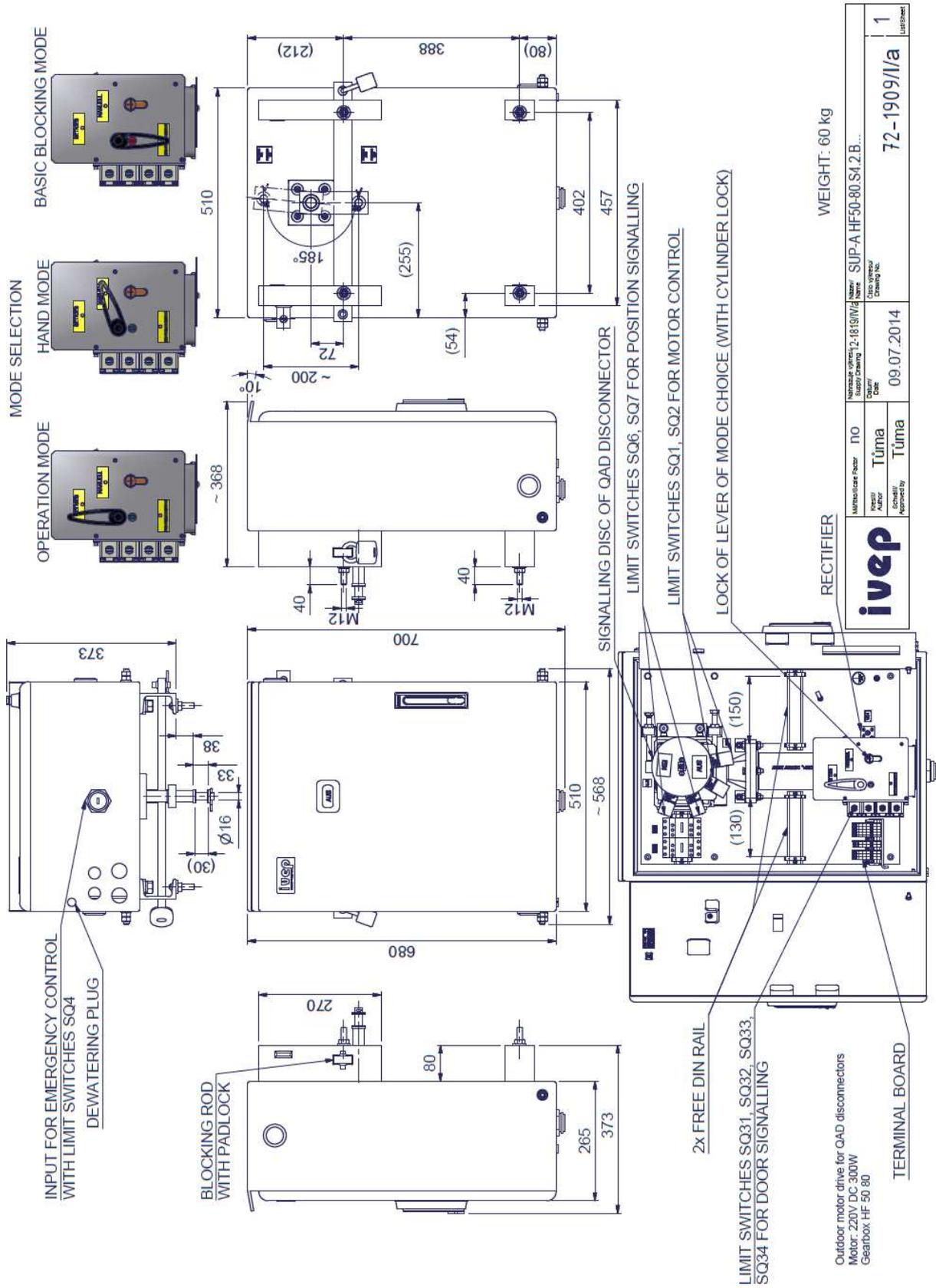
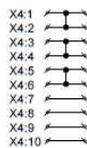
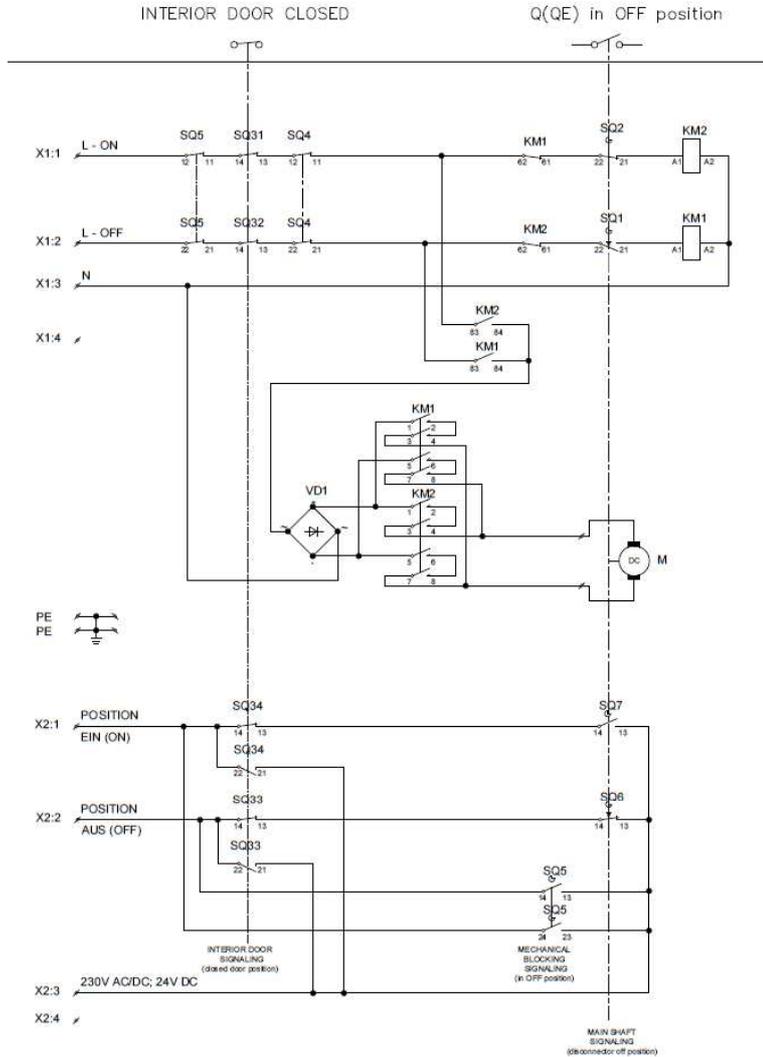


FIG. 9 – WIRING DIAGRAM OF THE SUP DRIVE MECHANISM



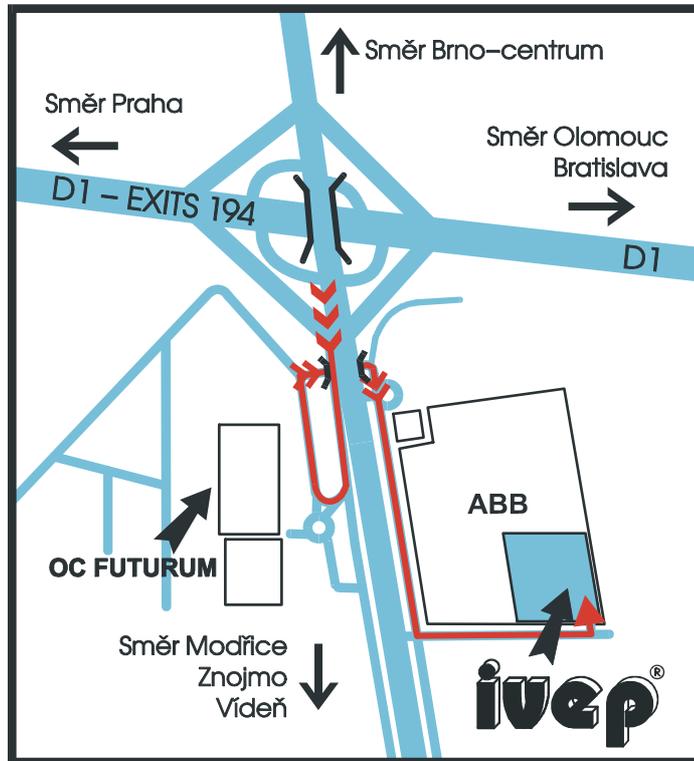
SQ1, SQ6 - pressed down in position AUS
 SQ2, SQ7 - pressed down in position EIN
 SQ4 (FR1117) - pressed down in position MANUELL and PRIMÄRBLOCKIERUNG
 SQ5 (FR215) - pressed down only in position PRIMÄRBLOCKIERUNG

M motor 220V DC 300W
 KM1, KM2 contactors (control voltage 230V AC)

SQ1 Limit switch (FR515: 1NO 1NC) – OFF POSITION
 SQ2 Limit switch (FR515: 1NO 1NC) – ON POSITION
 SQ3,1–4 Limit switches (FR515: 1NO 1NC) – DOORS SIGNAL
 SQ4 Limit switch (FR1117: 2NC) – EMERGENCY CONTROL SIGNAL
 SQ5 Limit switch (FR215: 2NO 2NC) – REVIEW POSITION SIGNAL
 SQ6 Limit switch (FR515: 1NO 1NC) – POSITION SIGNAL OFF POSITION
 SQ7 Limit switch (FR515: 1NO 1NC) – POSITION SIGNAL ON POSITION

VD1 RECTIFIER (KBPC2506 – usm. mostek 250V/600V I=25A)
 X1 TERMINAL BLOCK 2x WK 4 E/U, 1x WK4 E SL/U
 X2 TERMINAL BLOCK 2x WK 4 E/U
 X4 ASSEMBLING AUXILIARY TERMINAL BLOCK 3x WK4 E/U/VB,
 2x WK 4 E/U

DOKUMENT-NUMMER		REVISIONEN		NÄHEZV		GESAMTLE	
PROJEKT	ZEICHEN	REVISION	VERFAHREN	PROJEKT	ZEICHEN	PROJEKT	ZEICHEN
ivcp	16.10.2014			SUP-A V2 outdoor drive		1	1
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Směr = direction

Manufactured and supplied by:

IVEP, a.s.
Vídeňská 117a, 619 00 Brno, Czech Republic

Tel.: +420 547136 654 e-mail: marketing@ivep.cz
 Fax: +420 547136 402 [http:// www.ivep.cz](http://www.ivep.cz)

