EPU electromotive drive

The EPU electromotive drive is designed to control the disconnecting switches for the internal assembly up to 4000 A. The EPU electromotive drive may be produced in two versions:
- located on the disconnecting switch frame
- located out of frame in free cell space

In the version on the disconnecting switch frame it does not include the reversing and signalling elements i.e. necessary control signalling circuits shall be located in the cell distributors. The emergency control is performed by means of the ESPA handling bar. In the cases of re-construction of the switching rooms with disconnecting switches with pressure-air drive or replacement of old manual or electromotive drives it is possible to locate the drive out of the device frame. In such case, the drive is located in the metal sheet or plastic material case. The output shaft of the drive may be led to the right or to the left depending on the device version. Fastening of the drive is performed by four screws M 12. The output lever of the drive with the output shaft of the drive are provided with grooves whereby the adjustment of the end positions of the device in various positions of the drive against the location of the device is allowed. The emergency control is performed by a crank.

Drive description

The drive is fastened on the base by means of which the drive is fastened to the carrying structure of the cell. The transmission is created by the gearing of cylindrical gears Schmachtl, parts of which is an electric motor for different control voltages. The nut transmits the linear movement through the link to be the rotary one. The output shaft is ended by fine grooving.

The terminal switches are used with independent switching-on and switching-off contacts. They are adjustable in both horizontal and vertical directions.

Drive parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output moment:</td>
<td>400 Nm</td>
</tr>
<tr>
<td>Run period:</td>
<td>4 - 8 seconds</td>
</tr>
<tr>
<td>Control voltage:</td>
<td>24, 110, 220 V DC, 230 V AC</td>
</tr>
<tr>
<td>Weight:</td>
<td>28 kg</td>
</tr>
<tr>
<td>Operation voltage:</td>
<td>24, 220 V DC, 230V AC</td>
</tr>
</tbody>
</table>
Three-pole disconnecting switch OMI 25/630 – 30 L with EPU

Three-pole disconnecting switch OMZI 12 / 630 - 30 L with EPU
Accessories - electromotive drives

Supplied voltage:
- 24 V DC
- 220 V DC

Control voltage:
- 24 V DC (110 V DC, 230 V AC/DC)

Motor:
- GE 63 x 55 + PLG 52

Switches:
- S1 - Locally/Remotely Switching Over
- S2 - Auxiliary Switch

Table:
<table>
<thead>
<tr>
<th>X</th>
<th>8-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>6-5</td>
</tr>
<tr>
<td>X</td>
<td>4-3</td>
</tr>
<tr>
<td>X</td>
<td>2-1</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
</tr>
</tbody>
</table>

Diagram:
- Auxiliary Switch
- Local Out of Control Case
S1 - LOCALLY/REMOTELY SWITCHING OVER

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>Ø</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5-6</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### 2. Electromotive drive ETMP

<table>
<thead>
<tr>
<th>Drive type</th>
<th>Rated supply voltage, V</th>
<th>Rated power output, W</th>
<th>Rated current, A</th>
<th>Usage</th>
<th>Weight*, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETMP-P0*</td>
<td>24 DC</td>
<td>200</td>
<td>8,5</td>
<td>Three-pole disconnecting switches</td>
<td>12</td>
</tr>
<tr>
<td>ETMP-P1</td>
<td>24 DC</td>
<td>200</td>
<td>8,5</td>
<td>Three-pole disconnecting switches</td>
<td>12</td>
</tr>
<tr>
<td>ETMP-P2*</td>
<td>230 AC</td>
<td>150</td>
<td>2,5</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P3</td>
<td>230 AC</td>
<td>150</td>
<td>2,5</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P4*</td>
<td>230 AC</td>
<td>300</td>
<td>3,5</td>
<td>12, 25 kV/2000 A</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P5</td>
<td>230 AC</td>
<td>300</td>
<td>3,5</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P6*</td>
<td>110 DC</td>
<td>200</td>
<td>2,5</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P7</td>
<td>110 DC</td>
<td>200</td>
<td>2,5</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P8*</td>
<td>220 DC</td>
<td>200</td>
<td>2,0</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P9</td>
<td>220 DC</td>
<td>200</td>
<td>2,0</td>
<td>Three-pole disconnecting switches</td>
<td>10</td>
</tr>
<tr>
<td>ETMP-P10*</td>
<td>3 x 400 AC</td>
<td>180</td>
<td>0,8</td>
<td>12,25,38,5 kV/400,630,1250,1600,2000 A</td>
<td>12</td>
</tr>
<tr>
<td>ETMP-P11</td>
<td>3 x 400 AC</td>
<td>180</td>
<td>0,8</td>
<td>Three-pole disconnecting switches</td>
<td>12</td>
</tr>
</tbody>
</table>

* with emergency control led into the wall (page G 31). Others with the emergency control by means of handling bar ESPA 415.3

### Regulation to project the emergency control

The producer requires to follow this regulation by the project designer and the user to assure the correct function of the emergency control of the disconnecting switches.

When failing to follow the determined procedures and regulations, the producer will not be responsible for any failures of the emergency handling with the disconnecting switches.

Emergency control using the joint aspects

1. Emergency control with the ETMP drives

The ETMP drive is designed so that the electric motor provided with the gearbox is located on the disconnecting switch frame. The emergency control of the ETMP drive is solved through the sprung bevel wheels by means of joint couplings and pull rod led onto the wall or cell door. The ETMP drive is produced for the control voltages of 24, 110, 220 V DC; 230, 3 x 400 V AC. The emergency control consists of the joint holder 8 (possibility of width modification so that the „B” point will be followed), pipes (10), bars (9) and superstructure of the bevel wheels (5), (6). The bevel wheels are not in operation during the motive driving, they are in operation during the emergency switching-off only (Figure on the page G 34).

The emergency control process is performed as follows: the operator puts the handling crank into the shaft of the emergency control, press it approximately 10 mm down (toothed wheels are engaged) and then he/she rotates the crank. To open or to close the device, minimum 70 revolutions of the crank are necessary. To operate the emergency control, it is necessary, from the project point of view, to follow:

a) solid angle of the pull rod inclination of max. 45° given by the work area of the joint couplings (Figure on the page G 31).
b) the alignment of the emergency control drive axis with the emergency control shaft axis (Figure on the page G 31).
c) that the emergency control shaft 12 shall be ejected minimum 10 mm when assembling the pull rod (so that the toothed wheel (7) may be engaged with the toothed wheel (6) in the emergency control shaft by pressing the crank).

2. Emergency control by means of the switching-off bar ESPA 415.3 (Figure on the page G 35).

The emergency control is performed by inserting the switching-off bar provided with special terminal (universal cardan with the adapter OK 19) into the shaft (4) which is connected with the gearbox shaft by means of special cogged wheels (2), (3).
Electromotive drive ETMP
Assembly (ETMP electromotive drive on the page G 31)

1. After fastening the device in the cell, fasten the joint holder (8) onto the cell wall or cell console. The bar (9) - maximum inclination angle of the control bar of 45° - shall be connected with the upper joint (7) and the lower joint by pins. Insert the pipe (10) into the bar (9) and join them with pins by means of the pre-drilled holes. Drill the other pipe end with the bar to required pull rod length. After drilling of the necessary pull rod length, the control shaft (12) shall be ejected approximately 10 mm. After joining the last connection by pins, verify the operation of the emergency control. If the pull rod is too long, cut off the bar. Shifting the lever into the control shaft (12) and pressing approximately 10 mm the toothed wheel (5) will be engaged with the toothed wheel (6). Following handling of the lever, the device will be opened or closed. After finishing this procedure, the spring (18) will disengage the toothed wheel i. e. the emergency control is out of operation with the motive control.

2. After finishing the adjusting works, attach the individual control and signalling wires to the series terminal boards.
   A) Attach the terminal strips 1 up to 6 on the terminal board X1 are designed to interconnect the electric motor control voltage
   B) The electric motor reversing terminal switches are led to the terminal strips A, A1, B and B1 on the terminal board X1.
   C) The signalling change-over switch S 10 N consisting of 6 ON and 6 OFF positions and 2 switching units of the intermediate position.

3. Before testing electrically it is recommended to put the contacts into the intermediate position and verify the electric motor rotation sense and correct operation of the terminal switches. Then, the device is ready to be operated.

Operating bar ESPA

Note: The bar length in accordance with requirement of the customer. The standard length is 3000 mm.
Accessories - electromotive drives

AC drives

DC drives – number of outlets: 2

DC drives – number of outlets: 3

Electric motor type | ATE 63.4
---|---
Drive | ETMP
U | 400/230 V
P | 180W
I | 0.9 A

Electric motor type | P2SZ 447
---|---
Drive | ETMP
U | 24 V DC
P | 200 W
I | 8.3 A

Electric motor type | NK3K8H - 00
---|---
Drive | ETMP
U | 110 V DC 220 V DC
P | 200W
I | 2.5 A 2 A
Accessories - electromotive drives

AC + DC drives – number of outlets: 6

- aC + DC drives
- Number of outlets: 6

- Electric motor type: NK3K8F 00
- Drive: ETMP
- U: 220 V AC
- P: 150 W
- I: 2.5 A

Diagram showing connections and outlet colors:

- Terminal X1:
  - black: 3
  - red: 1
  - black: 5

- Terminal X1:
  - yellow: 4
  - white: 2
  - brown: 6

Connectors KM1 and KM2 are also illustrated in the diagram.
**Layout of the electromotive drive control part**

- the circuit breaker according to the electric motor type
- contactors KM1, KM2
- push-buttons SB1, SB2
- terminal switches KS1, KS2
- switching-on contactor contacts KM1, KM2
- switching-off contactor contacts KM1, KM2
- contactor coils A1, A2

**Basic version of the electromotive drive signal contacts**

(it is possible to increase the number of contacts but maximum 12 ON, 12 OFF)
Drive assembly EPU N
- remove the pressure-air drives
- replacement of the pressure – air drives
- drill the holes D9 to fasten the drive (use a template or attach the whole drive to the disconnecting switch)
- shorten the disconnecting switch shaft to the required length
- shift the drive to the disconnecting switch shaft and screw in the electric drive to the disconnecting switch frame by means of 8 screws M 8 x 30.
- Drill the coupling 3 together with the disconnecting switch shaft (pin D8) with the closed device, and adjust the drive for the ON condition – the terminal switch „5 – 6” disconnected.
- attach the control voltage to the electric motor terminals „1, 2, 3” and verify the correct wiring to the terminal switches.
- shift or eject the disconnecting switch electrically (verify the correct rotation sense of the electric drive and terminal switches from the intermediate position).
- when the device is not suitably open or closed, it is possible to adjust the terminal positions by means of the screw M4
- after the drive is adjusted, inspect all screwing connections, re-lubricate the sliding parts of the drive and emergency control (gearbox part with e. g. Metabond, other parts with petrolatum).

Drive maintenance
- during the regular inspections, check the condition of the toothed wheels – remove impurities (by technical petrol), re-lubricate with Merabond
- inspect the screwing connections
- re-lubricate the emergency control parts

Ordering data
1. operational voltage of the electric motor
2. drive location
3. emergency control method
4. mention the type of the device reconstructed and its location in the cell to be identified unambiguously
EPU N

Dimensions:
- Width: 290 mm
- Height: 72 mm
- Depth: 180 mm
- Side: 127 mm
- Side: 135 mm
- Side: 240 mm
- Side: 170 mm

Markings:
- 4X M10

Accessories - electromotive drives