Emergency charging unit
for hydromechanical operating mechanisms
Product manual - 1HDS680608 Rev. E

The emergency charging unit for hydromechanical operating mechanisms is designed for manual charging of hydromechanical operating mechanisms of type AHMA, HMB and HMC in emergency cases.
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1 General information
The emergency charging unit 1HDS112207R0200 for hydromechanical operating mechanisms is designed for manual charging of hydromechanical operating mechanisms in emergency cases. In cases of temporary power outage, defective pump motor or failure in power supply, the operability of the hydromechanical operating mechanism can be ensured with the emergency charging unit.

The emergency charging unit is equipped with three high pressure and three low pressure terminations. Depending on the emergency situation, a single operating mechanism or three operating mechanisms installed in one switchgear group may be charged simultaneously.

The emergency charging unit is designed for hydromechanical operating mechanisms of types AHMA, HMB and HMC. For usage of the emergency charging unit the oil handling set 1HDS112025R0008 is recommended additionally.

2 Abbreviations
AHMA  hydromechanical operating mechanism type A
C-operation  Close operation
ELK-04  ABB GIS type
GIS  Gas-insulated switchgear
HMB  hydromechanical operating mechanism type B
HMC  hydromechanical operating mechanism type C
O-operation  Open operation

3 Scope of supply
The emergency charging unit is supplied in a transportation case. Figure 2 shows the scope of supply. The detailed scope of supply is printed on a packing list provided with the transportation case.

The emergency charging unit (5) is connected with a high pressure hose (2) to the high pressure terminations of the hydromechanical operating mechanism. Low pressure hose (1) connects the low pressure terminations of emergency charging unit and hydromechanical operating mechanism. The hand crank (11) and the extension (3) are inserted into link (4) and the emergency charging unit is operated manually. The emergency charging unit can be fixed with base plate (6) at the bottom plates of the hydromechanical operating mechanisms or at the support structure of the gas-insulated switchgear (GIS). Alternatively the base plate can be used on the ground fixing it with the feet.

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02 Scope of supply
4 Standards and directives
The emergency charging unit is in conformance with the machine directive 2006/42/EG. Additional directives do not apply.

5 Intended use
The emergency charging unit shall only be used for the manual charging of the energy storage module of the following hydromechanical operating mechanisms manufactured by ABB. The applications is only permitted with original operating mechanisms:

The application with other types of operating mechanisms or operating mechanisms by different manufacturers is not permitted.

The use of the emergency charging unit is only permitted when the operation with the integrated pump or the motor supply voltage is not possible. In all other cases charge the energy storage module only via the control circuits by motor or operation with the integrated pump.

The intended use requires the use of the supplied pressure hoses. The intended use requires also that the operating mechanisms are filled with oil approved by ABB.

Approved types of oil are:
• Mobil UNIVIS HVI 13
• Shell Aeroshell Fluid 41

6 Shipping and storage
Store the emergency charging unit including the accessories only in the supplied case. Store the pressure hoses protected from light in the supplied case.

Store only in dry and dust-free areas. Storage temperature +5°C...+40°C.

7 Safety instructions
• When using emergency charging unit regard all local regulations concerning safety on work and those regulations of the operator of the installation.
• Disconnect control and motor voltage of the faulty hydromechanical operating mechanism to prevent an accidental operation of the hydromechanical operating mechanism by motor. Secure against reconnection.
• In addition prevent any switching operation during manual charging.
• Never install the emergency charging unit on top of the GIS. This causes falling hazard. The pressure hoses have sufficient length to operate the emergency charging unit on the floor.
• There is a risk of stumbling. Block the working place to prevent stumbling on the emergency charging unit pressure hoses.
• Only personnel which has been trained on the product (operating mechanism, switching apparatus, emergency charging unit) shall operate the emergency charging unit.
• Wear safety glasses, oil-resistant gloves and safety shoes during work.
• Do not release hydraulic oil of the operating mechanism to the environment. Dispose oil-soaked clothes environmentally compatible. Hydraulic oil is harmful to the environment.
• Avoid direct contact to hydraulic oil. Direct contact may cause irritations. Clean affected sites with abundant amount of water.
• Do not breathing or swallowing hydraulic vapor, mist and oil. Breathing high concentration levels or swallowing may cause damages to health or death.
• Do not put defective or damaged parts into operation. Replace damaged parts and parts which recommended period of use is exceeded by new parts. The device shall only be repaired by the manufacturer.
8 Technical information

- A mechanically controlled safety valve in the operating mechanisms AHMA, HMB and HMC prevents overcharging of the energy storage.
- An overpressure valve which is integrated into the emergency charging unit prevents a rise in nominal pressure.
- A bit adapter has been supplied for connecting a cordless screwdriver. The selection of a suitable cordless screwdriver is within the responsibility of the operator. The operator shall indicate possible vibrations to the user when operating with a cordless screwdriver.

9 Commissioning

Check all parts of the emergency charging unit for damage before commissioning:
1. Check emergency charging unit for damage. If emergency charging unit is damaged do not put into operation.
2. Check pressure hoses for damage.
   - If the pressure hoses are damaged replace the damaged pressure hoses by new pressure hoses before commissioning.
3. Check if the date of expiry of the pressure uses is exceeded.
   - The date of expiry is five years from purchase. If the date of expiry of the pressure hoses is exceeded replace the pressure hoses by new pressure hoses.

**WARNING**

**Danger**
Personal injury or damage to equipment due to sudden loss of pressure.
Personal injury due to spraying high pressure hydraulic fluid.

**Cause**
Damaged parts can burst at nominal pressure.

**Action**
Replace damaged parts and parts which expiry date is exceeded by new parts. The device shall only be repaired by the manufacturer.

10 Operating instructions

10.1 Assembly of base plate

Installation on the floor
1. Place the base plate (2) of the emergency charging unit on the floor.
2. Stand with your feet on the base plate to fix it on the floor.

**Installation for operation of the emergency charging unit - Figure 03**

1 Link for hand crank
2 Base plate
Installation at the operating mechanism
For hydromechanical operating mechanisms of types AHMA-4/-8, HMB-4/-8 and HMC-4 the base plate of the emergency charging unit may be assembled directly to the bottom plate of the hydromechanical operating mechanism.

Installation example for HMB-4:
1. Fix base plate (2) of emergency charging unit using the boreholes at the fixation points (1) at the operating mechanism.
2. Tighten the screws with 80 Nm.

Installation for operating of emergency charging unit at operating mechanism - Figure 04

![Diagram showing installation at the operating mechanism](image)

1. Fixation point at operating mechanism
2. Base plate

Installation at gas-insulated switchgear
Fix the emergency charging unit exclusively to the support structure of the switchgear. Do not open flange connections of the pressurized enclosure. The emergency charging unit can be fixed to the busbar module of gas-insulated switchgear type ELK-04.

The base plate of the emergency charging unit is fixed between nuts (1) and (2) at the busbar module. This fixation opportunity is valid for ELK-04 GIS with flange diameters of 520 mm as well as 735 mm.

The nuts (1) are not fixed after coupling of the bays and are not used during operation of the switchgear anymore. However, the nuts (2) must never be loosened because they fix pressurized parts. The base plate must never be fixed between nuts (1) and the housings of the compensation units (3) because in this case the compensation of dilatation is not effective anymore.

Fixation at busbar ELK-04 - Figure 05

![Diagram showing fixation at busbar ELK-04](image)

1. Nuts
2. Nuts
3. Balancer
**WARNING**

**Danger**
Personal injury or damage to equipment due to sudden loss of pressure.

**Cause**
Loosening nuts which fix pressurized parts will result in sudden loss of pressure. This can result in failure of the insulation and in a fault arc.

**Action**
Follow exactly the instructions. Tighten and loosen only the nuts which are mentioned in the instructions.

1. Select the suitable borehole pattern of base plate (1) fitting to the flange diameter of the GIS.
2. Attach base plate to bolts (3).
3. Fix the base plate with the two nuts (2) and thight them with 80 Nm.

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**Fixation at busbar ELK-04 - Figure 06**

1. Base plate
2. Nuts
3. Bolts
10.2 Assembly and disassembly of pressure hoses
Before connecting the pressure hoses check if the terminations are clean. Contamination of the oil can result in damage to the operating mechanism. For connection of the hoses consider also the operating instructions which have been supplied with the operating mechanism (position of connections). The connections for high pressure and low pressure connections are designed to prevent false connections.

Working steps:
1. Open housing of hydromechanical operating mechanism.
2. Remove covers from high pressure and low pressure hose.
3. Remove covers from low and high pressure connection of the operating mechanism.
4. Connect low pressure hose to low pressure termination (2) at emergency charging unit and with the appropriate adapter to the low pressure connection of the operating mechanism.
5. Connect high pressure hose to high pressure termination (1) at emergency charging unit.
6. Remove cover from oil filling connection at operating mechanism.
7. Open oil draining valve at the low pressure connection of the operating mechanism if available.
8. Open the check valve at the end of the high pressure hose through connecting the angle adapter (7).
9. Hang in the open end of the angle adapter into a appropriate container to collect leaking hydraulic oil.
   Fill back leaked hydraulic oil to the low pressure tank of the operating mechanism.
10. Insert and operate the hand crank of the portable emergency pump until oil flows continuously out of the high pressure hose. This measure prevents that trapped air is pumped into the operating mechanism.
11. Connect the other side of the angle adapter (7) to the high pressure connection of the operating mechanism.
12. Close oil filling termination with cover again. Apply a torque of 25 Nm.

Connection of pressure hoses - Figure 07

1 High pressure termination
2 Low pressure termination

10.3 Operation of emergency charging unit

NOTICE

- It has to be ensured, that no switching operations can be performed during manual charging of the operating mechanism! The ON and OFF valves are not allowed to be actuated under no circumstances because slow switching operation will be performed due to not sufficient charged energy storage!
- Identify the current position (ON or OFF) of the CB prior to work with the emergency charging unit when working on hydromechanical operating mechanisms of type HMB-1. Then, bring the changeover valve in the current CB position (ON or OFF). Only afterwards, the emergency charging unit is allowed to be operated.
  Through this measure, slow switching operations are prevented and no charging is prevented, if changeover valve is in intermediate position.
- Take the spring travel from the technical documentation which has been supplied with the operating mechanism. Measure the O and C blocking values via the spring travel switch of the operating mechanism (contacts 03-04 for O blocking and 23-24 for CO blocking) with a suitable measuring instrument with acoustic or optical indication and check them.
Working steps
1. Install the emergency charging unit as described in chapters assembly.
2. Insert hand crank, if necessary with extension, into link (1) at emergency charging unit.
   Use the bit adapter and operate it with the cordless screwdriver, if necessary.
3. Turn hand crank until the necessary spring travel for a C or an O operation is reached.
   The sense of rotation is irrelevant.
4. Dismantle the portable emergency pump as described in chapter disassembly.

Operation of the emergency charging unit - Figure 08

1 Link for hand crank

10.4 Disassembly

**NOTICE**

Hydraulic oil remains in the hydraulic hoses and the emergency charging unit after operation. Small amounts of hydraulic oil may leak during disconnection of the hydraulic hoses.

The hoses have a back pressure valve. The pressure hoses need not to be drained.

**Working steps:**
1. Close oil draining valve at the low pressure connection, if available.
2. Disconnect low pressure hose from low pressure connection of the operating mechanism.
3. Disconnect low pressure hose from emergency charging unit.
4. Disconnect high pressure hose from the angle adapter.
   **Attention!** The angle adapter remains at the operating mechanism.
5. Disconnect the high pressure hose from the emergency charging unit.
6. Disconnect the angle adapter from the high pressure connection of the operating mechanism.
7. Dismantle emergency charging unit with base plate.
8. Check oil level and, if necessary, correct oil level according to operating instructions of the operating mechanism.
9. Close low and high pressure connection at the operating mechanism with covers by hand (if union nuts are available, tighten them with 25 Nm).
10. Close housing of operating mechanism.
11. Close connections of hydraulic hoses with cover caps.
12. Close connections at the emergency charging unit with covers again.
11 Maintenance
Replace the pressure hoses when expiry date has been reached.

Spare part list

<table>
<thead>
<tr>
<th>Part</th>
<th>Identification number</th>
</tr>
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<tbody>
<tr>
<td>High pressure hose 4 m with back pressure valves</td>
<td>1HDS112207P0222</td>
</tr>
<tr>
<td>High pressure hose 1 m with back pressure valves</td>
<td>1HDS112207P0223</td>
</tr>
<tr>
<td>Low pressure hose 4 m</td>
<td>1HDS112207P0221</td>
</tr>
<tr>
<td>Low pressure hose 1 m</td>
<td>1HDS112207P0220</td>
</tr>
</tbody>
</table>

12 Troubleshooting
Hydraulic pressure cannot be generated.

<table>
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<tr>
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<th>Action</th>
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<tr>
<td>Hoses are connected incorrectly</td>
<td>Check hoses and connect them correctly</td>
</tr>
<tr>
<td>Ball tap at operating mechanism is closed</td>
<td>Open ball tap at operating mechanism</td>
</tr>
<tr>
<td>Oil does not flow into the emergency charging unit</td>
<td>Open oil filling termination at operating mechanism</td>
</tr>
<tr>
<td>Overpressure valve has released</td>
<td>Release some pressure. Built up slowly the pressure again while using the hand crank</td>
</tr>
<tr>
<td>The oil level in the complete system is too low</td>
<td>Fill oil into operating mechanism according to operating instructions</td>
</tr>
<tr>
<td>Oil leaks from operating mechanism (external leakage)</td>
<td>Put operating mechanism out of service and organize repair</td>
</tr>
<tr>
<td>Trapped air is in the system</td>
<td>Exhaust the trapped air (acc. to working steps 10. in chapter 10.2)</td>
</tr>
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13 Disposal
The emergency charging unit consists of materials which may be recycled. The main components are aluminum (emergency charging unit, base plate) and steel (fixation material). However, most of the components are directly in contact with hydraulic oil. Observe the local regulations for this case. In doubt contact the local ABB representative.

14 Technical data

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<th>Parameters</th>
<th>Value</th>
<th>Unit</th>
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<tr>
<td>Maximum pressure (Bursting pressure of bursting protection)</td>
<td>80</td>
<td>MPa</td>
</tr>
<tr>
<td>Weight</td>
<td>9.6</td>
<td>kg</td>
</tr>
<tr>
<td>Length of hydraulic hoses</td>
<td>1...4</td>
<td>m</td>
</tr>
<tr>
<td>Maximum rotation speed</td>
<td>3200</td>
<td>min-1</td>
</tr>
<tr>
<td>Temperature range (operation)</td>
<td>-35...+ 70</td>
<td>°C</td>
</tr>
<tr>
<td>Temperature range (storage)</td>
<td>+5...+40</td>
<td>°C</td>
</tr>
</tbody>
</table>

15 Manufacturer information
ABB AG
High Voltage Products
Brown-Boveri-Strasse 30
63457 Hanau-Grossauheim, Germany
E-mail: hv-service.technics@de.abb.com

For any assistance, support or service we recommend to contact directly our local representatives first. They have extensive knowledge of the specific customer needs, the individual circumstances and the possibilities of the whole ABB group and are consequently able to organize an optimal service.

INFORMATION
In case of an ABB Power Care contract the customer is able to use our 24-h hotline for free. In case of emergency our troubleshooting experts offers a fast and reliable support.

24-h hotline: +49 (0)180 6 222007

Please have following information ready when calling our 24-h hotline:
• Your contact details
• Designation of station
• Order / Serial No
• Bay number
• Module number
EG declaration of conformity

Original declaration of conformity in accordance with the EG machine 2006/42/EG of 17th May 2006, appendix IIA

We hereby declare that the following described machine in the version put by us into circulation is in accordance with all relevant requirements of the EC machine directive 2006/42/EG:

Manufacturer/Representative       ABB AG
                                    Kallstadter Straße 1
                                    68309 Mannheim
                                    Germany

Authorized person for technical documentation       Markus Ramel, PGHV-SE
                                                    ABB AG, Brown-Boveri-Straße 30, 63457 Hanau

Description of the machine operating       Emergency charging unit for hydromechanical operating mechanisms
                                            1HDS112207R0200

Applied harmonized standards       EN ISO 12100:2010

Mannheim, July 9, 2019

[Signature]

Quirin Hall
LPG Manager Service High Voltage Products