Emergency charging unit
for hydromechanical operating mechanisms

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Emergency charging unit
Overview

- The world of operating mechanism
- Product description
- Components of emergency charging unit
- Safety aspects
- Scope of delivery
- Product improvements
The world of operating mechanisms

Applikations

Gas-insulated switchgear (GIS)
- 52 – 1100 kv

Dead tank breaker (DTB)
- 52 – 800 kV

Generator circuit breaker (GCB)
- Up to 250 kA

Air-insulated switchgear (AIS)
- 52 - 550 kV
Product description

Overview

- The emergency charging unit allows a temporary use for manual charging of hydromechanical operating mechanisms

- The pump is especially suitable when
  - the power supply has failed temporarily
  - the pump gear has any problems
  - The motor of the pump is defect
  - The oil pump of the operating mechanism has a malfunction

ABB order number: 1HDS112207R0200
Product description
Advantages

- Simple handling
- Easy installation is possible via mounting plate
- Fast recharging of the operating mechanism
- Charging via electric screwdriver is possible instead of a hand crank
- Up to 3 operating mechanisms can be recharged simultaneously (for single-phased enclosed types)
- Can be used for all hydromechanical operating mechanisms
Product description
Application of emergency charging unit

All hydromechanical operating mechanisms *)

<table>
<thead>
<tr>
<th>Operating mechanism</th>
<th>AHMA</th>
<th>HMB</th>
<th>HMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type HMB-16</td>
<td>AHMA-1</td>
<td>HMB-1 (s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AHMA-4</td>
<td>HMB-2 (s)</td>
<td></td>
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<tr>
<td></td>
<td>AHMA-8</td>
<td>HMB-4</td>
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<td></td>
<td>AHMA-8</td>
<td>HMB-8</td>
<td>HMC-4</td>
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<td></td>
<td>HMB-16</td>
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</tbody>
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- Hydromechanical operating mechanisms with nitrogen storage type HA / HKA is also possible*)
Components of emergency charging unit installation position

Installation position

Flange installation at ELK-04 (520)

1. Operating mechanism type HMB-1
2. Hydromechanical connection
3. Emergency charging unit
4. ELK-04 flange
Components of emergency charging unit

Pump module

Detailed drawing of charging unit

Charging unit of the emergency charging unit

- Eccentric shaft
- Pump element
- Burst protection
- Charging unit
- High pressure connection
- Low pressure connection
Components of emergency charging unit

Mounting plate

- Charging unit mounting
- GIS-frame mounting
- ELK-04 (520) flange connection
- GIS-frame mounting
- ELK-04 (735) flange connection
- GIS-frame mounting
- AHMA-4/-8 und HMB-4/-8 mounting
- GIS-frame mounting
### Components of emergency charging unit

**Charging times**

- Charging via rotational movement
- Around 500 rotations per charging
- Hand crank is included in delivery
- Charging via electric screwdriver is possible
Components of emergency charging unit

Charging times

<table>
<thead>
<tr>
<th>Operating mechanism type</th>
<th>Charging time*) manual operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMB-1</td>
<td>≤ 5 min</td>
</tr>
<tr>
<td>HMB-4</td>
<td>≤ 10 min</td>
</tr>
<tr>
<td>HMB-8</td>
<td>≤ 20 min</td>
</tr>
<tr>
<td>AHMA-1</td>
<td>≤ 6 min</td>
</tr>
<tr>
<td>AHMA-4</td>
<td>≤ 15 min</td>
</tr>
<tr>
<td>AHMA-8</td>
<td>≤ 25 min</td>
</tr>
</tbody>
</table>

*) Charging time, until a safe OPEN operation is possible (completely discharged operating mechanism).

Hydromechanical operating mechanisms with nitrogen accumulator type HA/HKA are also possible.
Safety aspects

Emergency charging unit

- Loading unit with integrated burst protection (800 bar)
  - Triggers in case of maloperation
  - Protects operating personnel

According to current valid EU-guidelines the emergency charging unit was tested and satisfies the requirements for CE-marking
Safety aspects

Operating mechanism

- Operating mechanisms are protected from overloads by a mechanical controlled relief valve

  ➡️ A mechanical connection to the energy storages opens a pressure relief valve as soon as the maximum storage piston stroke is reached. Due to this the high pressure system will be connected with the low pressure system internally, which leads to a temporary hydromechanical short circuit.

- Possibility to get a signal when operating mechanism is successfully charged.

  ➡️ By monitoring of a contact of the spring travel switch with a multimeter.
Scope of delivery
Delivered parts

1. Loading unit
2. High pressure hose l = 1 m
3. Low pressure hose l = 4 m
4. Coupling pieces for connection of all mechanism types
5. Extension of hand crank
6. Mounting plate for installation
7. Hand crank
8. Mounting parts
9. Bits for cordless screwdriver
10. +Optional: 1 l /5 l hydraulic oil
Scope of delivery

Package

- All material is packaged in a heavy-duty toolbox
- All necessary connections for a manual charging are directly available
- Easy to transport between sites
- Safe and clean storage for the portable emergency charging unit
Scope of delivery

Package

Package contents

- Layer 1
- Layer 2
Product improvements

- Compared to the former swing arm pump the following improvements have been realized:
  - **Easier handling** through weight reduction
  - Different installation positions for all application types are possible
  - Up to 3 operating mechanisms can be recharged **simultaneously**
    - For single-phase enclosed circuit breakers
  - An electric screwdriver can be used optionally
    - Faster and easier than hand crank