Table of Contents

1 General .................................................................................................................................................................................................................. 4
   1.1 Summary of the technical data ....................................................................................................................................................... 4
   1.2 Survey ........................................................................................................................................................................................................ 6

2 Technical Data ................................................................................................................................................................................................... 15
   2.1 Rated through-current ($I_u$), rated step voltage ($U_{i}$) and step capacity ($P_{StN}$) ................................................................. 15
   2.2 Contact life .................................................................................................................................................................................................. 17
   2.3 Rated withstand voltages of the internal insulation ................................................................................................................ 17

3 Appendix – dimensional and installation drawings ......................................................................................................................... 20

NOTE

These technical data are intended for the calculator and designer of the transformer. These type-specific data are only valid in connection with the information contained in the general section (TD 61) since this section contains important information on such subjects as potential connection, leakage inductance, current division, and so on.
Dimensional drawings and connection diagrams are subject to change without prior notice.
Drawings submitted during bidding and ordering are always binding.

Since the on-load tap-changer is delivered to the specifications of the transformer manufacturer, the transformer manufacturer is responsible for selecting the correct properties of the on-load tap-changer so that the requirements of the transformer are met.
## 1 General

### 1.1 Summary of the technical data

<table>
<thead>
<tr>
<th>On-load tap-changer</th>
<th>R III 1200 Y</th>
<th>R I 1201</th>
<th>R I 2002</th>
<th>R I 2402</th>
<th>R I 3003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of poles and application</td>
<td>3 (neutral point)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max. rated through-</td>
<td>1200</td>
<td>1200</td>
<td>2000</td>
<td>2400</td>
<td>3000</td>
</tr>
<tr>
<td>current $I_{\text{UM}}$ (in A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand</td>
<td>15</td>
<td>15</td>
<td>24</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>current (in kA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit duration</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>(in s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>37.5</td>
<td>37.5</td>
<td>60</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>(in kA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rated step voltage $U_{\text{lim}}$</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>3000</td>
</tr>
<tr>
<td>(in V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step capacity $P_{\text{STN}}$</td>
<td>3000</td>
<td>3000$^3$</td>
<td>4400$^3$</td>
<td>6000$^3$</td>
<td>6000</td>
</tr>
<tr>
<td>(in kVA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated frequency (in Hz)</td>
<td>50 to 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating positions</td>
<td>Without change-over selector: max. of 18</td>
<td>With change-over selector: max. of 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated insulation level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest voltage for equipment $U_m$ (in kV)$^3$</td>
<td>72.5</td>
<td>123</td>
<td>170</td>
<td>245$^3$</td>
<td>300</td>
</tr>
<tr>
<td>Highest operating voltage $U_b$ (phase-phase) on diverter switch (in kV)</td>
<td>55</td>
<td>79</td>
<td>145</td>
<td>170</td>
<td>245</td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage (in kV, 1.2 $I_\text{50}$)</td>
<td>350</td>
<td>550</td>
<td>750</td>
<td>950</td>
<td>1050</td>
</tr>
<tr>
<td>Rated switching impulse withstand voltage (in kV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>850</td>
</tr>
<tr>
<td>AC withstand voltage (in kV, 50 Hz, 1 min.)</td>
<td>140</td>
<td>230</td>
<td>325</td>
<td>395</td>
<td>460</td>
</tr>
<tr>
<td>Rated withstand voltages of internal insulation</td>
<td>see table 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil compartment</td>
<td>Pressure-proof up to 0.3 bar continuous difference pressure (test pressure 0.6 bar), head and cover of the on-load tap-changer are vacuum-proof.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil suction pipe</td>
<td>Installed as standard (for details, see BA 18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>The on-load tap-changer OILTAP® R can be operated in the rated load range with oil temperatures of -25 °C to +105 °C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 a
1. General

<table>
<thead>
<tr>
<th>On-load tap-changer</th>
<th>R III 1200 Y</th>
<th>R I 1201</th>
<th>R I 2002</th>
<th>R I 2402</th>
<th>R I 3003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (in kg) ca.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without change-over selector</td>
<td>525</td>
<td>360</td>
<td>445 (^\text{i})</td>
<td>445</td>
<td>525</td>
</tr>
<tr>
<td>with change-over selector</td>
<td>595 ((770 \text{\textsuperscript{i}}))</td>
<td>410 ((500 \text{\textsuperscript{i}}))</td>
<td>505 ((640 \text{\textsuperscript{i}}))</td>
<td>505 ((640 \text{\textsuperscript{i}}))</td>
<td>595 ((780 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td>Displacement volume (in dm(^3)) ca.</td>
<td>72.5 kV</td>
<td>289 ((367 \text{\textsuperscript{i}}))</td>
<td>274 ((353 \text{\textsuperscript{i}}))</td>
<td>280 ((360 \text{\textsuperscript{i}}))</td>
<td>280 ((360 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td></td>
<td>123 kV</td>
<td>314 ((392 \text{\textsuperscript{i}}))</td>
<td>299 ((376 \text{\textsuperscript{i}}))</td>
<td>305 ((384 \text{\textsuperscript{i}}))</td>
<td>305 ((384 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td></td>
<td>170 kV</td>
<td>334 ((412 \text{\textsuperscript{i}}))</td>
<td>319 ((396 \text{\textsuperscript{i}}))</td>
<td>325 ((404 \text{\textsuperscript{i}}))</td>
<td>325 ((404 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td></td>
<td>245 kV</td>
<td>354 ((432 \text{\textsuperscript{i}}))</td>
<td>339 ((416 \text{\textsuperscript{i}}))</td>
<td>345 ((424 \text{\textsuperscript{i}}))</td>
<td>345 ((424 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td></td>
<td>300 kV</td>
<td>369 ((446 \text{\textsuperscript{i}}))</td>
<td>374 ((453 \text{\textsuperscript{i}}))</td>
<td>374 ((453 \text{\textsuperscript{i}}))</td>
<td>380 ((461 \text{\textsuperscript{i}}))</td>
</tr>
<tr>
<td>Oil filling quantity (V_s) and minimum volume (DV) of the diverter switch oil compartment</td>
<td>72.5 kV</td>
<td></td>
<td></td>
<td></td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>123 kV</td>
<td></td>
<td></td>
<td></td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>170 kV</td>
<td></td>
<td></td>
<td></td>
<td>203</td>
</tr>
<tr>
<td></td>
<td>245 kV</td>
<td></td>
<td></td>
<td></td>
<td>218</td>
</tr>
<tr>
<td></td>
<td>300 kV</td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
</tbody>
</table>

Table 1 b

Notes for tables 1a and 1b:
1) The maximum rated step voltage may be exceeded by 10% due to overexcitation of the transformer if the step capacity is limited to its rated value.
2) Higher step capacities available as special design
3) Forced current division by two parallel winding branches required
4) Applies to tap selector size E
5) In accordance with VDE 0111, part 1: R.m.s. value of the phase-phase voltage for which a piece of equipment is rated for its insulation
6) Minimum volume of oil conservator for oil temperature \(\vartheta = -30 \degree \text{C} \ldots +100 \degree \text{C}; DV = 0,1 V_S + 4 \text{ (dm}^3\text{)}\)
7) On request
8) Oil filter unit 0F 100 (combi-filter) required, \(U_{\text{BST}} > 300 \text{ kV}\) on request
9) Rated withstand voltages comply with IEC 60214: 1989; unrestricted tests possible up to 1050 kV 1.2\text{}/50 or 460 kV, 50 Hz, 1 min.
1.2 Survey

<table>
<thead>
<tr>
<th>Model</th>
<th>Without Change-Over Selector</th>
<th>With Change-Over Selector</th>
<th>Installation Length h (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R III 1200 Y C / D</td>
<td><img src="8997406_01" alt="Diagram" /></td>
<td><img src="8997405_01" alt="Diagram" /></td>
<td><img src="8997408_01" alt="Table" /></td>
</tr>
<tr>
<td>R III 1200 Y E</td>
<td>182</td>
<td><img src="8997406_01" alt="Diagram" /></td>
<td><img src="8997408_01" alt="Table" /></td>
</tr>
<tr>
<td>R I 1201 C / D</td>
<td><img src="8997405_01" alt="Diagram" /></td>
<td><img src="8997406_01" alt="Diagram" /></td>
<td><img src="8997408_01" alt="Table" /></td>
</tr>
<tr>
<td>R I 1201 E</td>
<td>182</td>
<td><img src="8997406_01" alt="Diagram" /></td>
<td><img src="8997408_01" alt="Table" /></td>
</tr>
</tbody>
</table>

**Fig. 1a** Survey of the on-load tap-changer designs (no. of poles, change-over selector, and installation lengths)
**Fig. 1b** Survey of the on-load tap-changer designs (no. of poles, change-over selector, and installation lengths)
Survey of the basic connection diagrams (figures 2a, 2b, 2c) with designation of the tap selector contact terminals in accordance with MR standards. This contact terminal designation corresponds to the specifications in the on-load tap-changer dimensional drawings.

Fig. 2a
Fig. 2b
1 General
Examples of connection diagrams (contact designation in acc. w. MR standards)

Fig. 3 Example: On-load tap-changer R III 1200 Y–C/D, basic connection diagram 10 19 1 W
Fig. 4 Example: On-load tap-changer R III 1200 Y–E, basic connection diagram 14 27 1 G
Fig. 5 Example: On-load tap-changer R I 2002–C/D, basic connection diagram 18 35 1 W
Fig. 6 Example: On-load tap-changer R1 3003–C/D, basic connection diagram 18 35 1 W
2 Technical Data

2.1 Rated through-current ($I_u$), rated step voltage ($U_i$) and step capacity ($P_{StN}$)

<table>
<thead>
<tr>
<th>On-load-tap-changer</th>
<th>R III 1200 Y</th>
<th>R I 1201</th>
<th>R I 2002</th>
<th>R I 2003 (Special design)</th>
<th>R I 2402</th>
<th>R I 3003</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_u$ (A)</td>
<td>700</td>
<td>1200</td>
<td>700</td>
<td>1200</td>
<td>1070</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>1300</td>
<td>2000</td>
<td>1400</td>
<td>2400</td>
<td>2000</td>
</tr>
<tr>
<td>$U_i$ (V)</td>
<td>4000</td>
<td>2500</td>
<td>4000</td>
<td>2500</td>
<td>4000</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td>2200</td>
<td>4000</td>
<td>3000</td>
<td>4000</td>
<td>4000</td>
<td>2500</td>
</tr>
<tr>
<td>$P_{StN}$ (kVA)</td>
<td>2800</td>
<td>3000</td>
<td>2800</td>
<td>3000</td>
<td>4280</td>
<td>4400</td>
</tr>
<tr>
<td></td>
<td>5200</td>
<td>6000</td>
<td>5600</td>
<td>6000</td>
<td>6000</td>
<td>6000</td>
</tr>
</tbody>
</table>

Table 2 Rated through-currents ($I_u$), related rated step voltages ($U_i$) and step capacities ($P_{StN}$), at highest and lowest rated step voltage of the step capacity curve (see fig. 7 and fig. 8)

Note: 1) R I 2402 with forced current division by two parallel winding branches

Fig. 7
Step capacities (rated step voltages $U_i$, rated through-currents $I_u$) for on-load tap-changer R III 1200 Y, R I 1201, R I 1202

CAUTION:
Only applies to network service. When used for industrial transformers, please contact us.
2 Technical Data

Fig. 8
Step capacities (rated step voltages $U_i$, rated through-currents $I_u$) for on-load tap-changer R I 2002, R I 2003 (= special design), R I 2402, R I 3003.

Note: R I 2402 with forced current division by two parallel winding branches.

CAUTION: Only applies to network service. When used for industrial transformers, please contact us.
2.2 Contact life

The mean expected contact life of the arcing diverter switch contacts can be estimated based on the relative load \( \frac{I_u}{I_{um}} \) as shown in figure 9. Since actual contact life in individual cases depends on many influencing factors while in service, only estimations can be given (not applicable to constant current service). The inspection regulations must be observed.

---

Fig. 9  Expected mean contact life under average load

\[ n = \text{Number of operations} \]

\[ I_u = \text{Rated through-current} \]

\[ I_{um} = \text{Max. rated through-current} \]
2.3 Rated withstand voltages of the internal insulation

Fig. 10 shows diagrams of the voltage stress present on the tap winding of the three primary basic connections of three-pole on-load tap-changers and single-pole on-load tap-changers. When selecting the on-load tap-changer, a check must be made to determine whether the highest stress on the tap selector does not exceed the related rated withstand voltages.

\[ a_0 = \text{Between preselected and selected tapping on the diverter switch} \]

\[ a_1 = \text{Between tap selector contacts of the winding of one tap position (connected or not)} \]

\[ a = \text{Between beginning and end of a tapped winding and, with coarse tap winding, between beginning and end of a coarse tap winding.} \]

\[ \text{Note for coarse tapping arrangement in (-) -position of the change-over selector:} \]

\[ \text{When stressed with impulse voltage, the permissible withstand voltage } \alpha \text{ must be adhered to between the end of a coarse tap winding connected with the K tap selector contact and the tap selector contact at the end of the tapped winding of the same phase.} \]

\[ b = \text{Between the tap selector contacts of different phases and between change-over selector contacts of different phases, which are connected with the beginning/end of a tapped winding or with a tap selector contact.} \]

\[ f = \text{Between diverter switch terminal and ground} \]

Additional for coarse tapping arrangement in (+) - position of the change-over selector:

\[ c_1 = \text{From one (-) -change-over selector contact to terminal of the same phase.} \]

\[ c_2 = \text{Between (-) -change-over selector contacts of different phases} \]

CAUTION

Adhere to the maximum rated lightning impulse withstand voltage stress on \( a_0 \) in mid-position.
## Technical Data

Table 3  Rated withstand voltages (in kV) of the internal insulation of the tap selector

<table>
<thead>
<tr>
<th>Insulation distances</th>
<th>Tap selector size C kV 1.2I50</th>
<th>Tap selector size D(^i) kV 1.2I50</th>
<th>Tap selector size E kV 1.2I50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kV, 50 Hz, 1 min</td>
<td>kV, 50 Hz, 1 min</td>
<td>kV, 50 Hz, 1 min</td>
</tr>
<tr>
<td>a0</td>
<td>( U_b \leq 72.5 \text{ kV}: 140 \text{ kV; } 30 \text{ kV, 50 Hz, 1 min} ) / ( U_b &gt; 72.5 \text{ kV: } 80 \text{ kV; } 3 \times U_{St} )</td>
<td>150 30 150 30 150 30</td>
<td></td>
</tr>
<tr>
<td>a1</td>
<td>150 30</td>
<td>150 30</td>
<td>150 30</td>
</tr>
<tr>
<td>a</td>
<td>400 85</td>
<td>500(^i) 110</td>
<td>670 180</td>
</tr>
<tr>
<td>b(^i)</td>
<td>400 100</td>
<td>500(^i) 150</td>
<td>670 180</td>
</tr>
<tr>
<td>c(_1)</td>
<td>550 180</td>
<td>590 210</td>
<td>820 250</td>
</tr>
<tr>
<td>c(_2)(^i)</td>
<td>550 195</td>
<td>590 225</td>
<td>820 280</td>
</tr>
</tbody>
</table>

Table 3  Rated withstand voltages (in kV) of the internal insulation of the tap selector

Note:

\(^i\) Tap selectors in accordance with basic connection diagrams 10 09 1 W, 12 11 1 W, 14 13 1 W are designed as 18 09 1 W, 18 11 1 W, 18 13 1 W.

\(^i\) Tap selectors in accordance with basic connection diagrams 16 15 1 W and 18 17 1 W are not possible.

\(^i\) Higher values up to 550 kV on request

\(^i\) Omitted for on-load tap-changers R I 1201, R I 2002/2402, R I 3003

The tap selector size (ID letters C, D, E) characterizes the internal insulation of the tap selector whose rated withstand voltages must be adjusted to the requirements of the transformer winding.

The permissible maximum service voltage along the individual tap selector paths is half the AC withstand voltages listed in table 3.
3 Appendix

Dimensional drawings
On-load tap-changer OILTAP® R III 1200 Y, tap selector size C/D, E ................................................................. 896722, 897867
On-load tap-changer OILTAP® R I 1201, tap selector size C/D, E ................................................................. 899753, 899401
On-load tap-changer OILTAP® R I 2002, tap selector size C/D, E ................................................................. 896721, 897866
On-load tap-changer OILTAP® R I 2402, tap selector size C/D, E ................................................................. 897490, 897864
On-load tap-changer OILTAP® R I 3003, tap selector size C/D, E ................................................................. 896720, 897865
Tap selector and change-over selector terminal contacts, tap selector size E ...................................................... 897868

Installation drawings
Tap selector size C/D .................................................................................................................................................... 896705
Tap selector size E .................................................................................................................................................... 897873

Additional drawings
On-load tap-changer head ............................................................................................................................................. 893899
On-load tap-changer cover with mounting flange for pressure relief valve ......................................................... 895168
Versions of the on-load tap-changer head, swiveling range of gear unit ......................................................... 896703
Special design for installation in bell-type tanks .................................................................................................... 896762
Horizontal drive shaft, tap selector size C/D, E ........................................................................................................ 896708, 897872
Jumpers for parallel connection of tap selector terminal contacts for on-load tap-changer OILTAP® R I 2002, R I 3003, selector size C/D, E ................................................................. 896706, 898713
Tap selector bottom, shielding, tap selector size C/D .......................................................................................... 896702
Tap selector bottom, tap selector size E .................................................................................................................. 897869
Tie-in resistors, tap selector size C/D ..................................................................................................................... 896707, 898124 - 898135
Potential switch, tap selector size C/D, E .................................................................................................................. 898136, 898614
Additional drawings for on-load tap-changer ......................................................................................................... 898826
On-load tap-changer OILTAP® R

R I 2002 - C/D, dimension drawing

ARRANGEMENT OF TAP SELECTOR CONTACTS

A - A

B - B

ON-LOAD TAP-CHANGER HEAD

(PLAN VIEW)

COARSE TAP SELECTOR

FINE TAP SELECTOR

COARSE TAP SELECTOR

FINE TAP SELECTOR

REVERSING SWITCH

CONNECTING LEAD BETWEEN X AND 0 IS ALREADY INSTALLED AT THE FACTORY

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES REFER TO THE CONNECTION DIAGRAM OF THE ON-LOAD TAP-CHANGER

FOR INHERENT DRAWINGS REFER TO 0967.06

SCALE 1:10 (1:5, 1:15)
On-load tap-changer OILTAP® R
R I 2402 – C/D, with forced current division with two parallel winding branches, dimension drawing
On-load tap-changer OILTAP® R
R I 2402 – E, with forced current division with two parallel winding branches, dimension drawing
On-load tap-changer OILTAP® R
Tap selector size E, tap selector and change-over selector terminal contacts

THE SELECTION OF STRAIGHT CABLE SOCKET OR ANGLE-SHAPED BY 90° MUST BE MADE BY THE Transformer MANUFACTURER FOR EACH TERMINAL. (FOR MODEL WITH CHANGE-OVER SELECTOR, CONTACT “N MINUS 1” ALLOWS STRAIGHT CABLE SOCKET ONLY, CONTACT “K” IS NOT FOR CUSTOMER’S USE.)

VARIANT 1
FINÉ TAP SELECTOR AND CHANGE-OVER SELECTOR TERMINAL WITH STRAIGHT SOCKET

VARIANT 2
FINÉ TAP SELECTOR AND CHANGE-OVER SELECTOR TERMINAL WITH 90° ANGLE SOCKET

TABLE 1: DISTANCE TO THE CENTRE OF FINÉ TAP SELECTOR / CHANGE-OVER SELECTOR (CONNECTING POINTS)

<table>
<thead>
<tr>
<th>DESIGNATION OF TERMINALS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FINE TAP SELECTOR TERMINAL</td>
<td>352</td>
</tr>
<tr>
<td>CHANGE-OVER SELECTOR TERMINAL “0”</td>
<td>116</td>
</tr>
<tr>
<td>CHANGE-OVER SELECTOR TERMINAL “A” AND “C”</td>
<td>383</td>
</tr>
</tbody>
</table>

THE ABOVE VARIANTS ARE APPLICABLE TO ONE TAP SELECTOR CONNECTING LEAD FOR EACH TERMINAL, TWO TAP SELECTOR CONNECTING LEADS FOR EACH TERMINAL AVAILABLE ON DEMAND.

X MM. BETWEEN SCREENING SHELL AND ADJACENT LEAD: 25 MM.
RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE: 300 KV 1/2 50 AND LEAD ø10 / ø20.

SCALE 1: 2 (1: 8)
On-load tap-changer OILTAP® R
Tap selector size C/D, installation drawing

11 MOUNTING FLANGE ON TRANSFORMER COVER
12 FIXING BOLT M2
13 GASKET FOR ON-LOAD TAP-CHANGER HEAD COVER
14 POSITION INDICATOR
15 INSPECTION WINDOW
16 DRIVE SHAFT FOR POSITION INDICATOR
17 THROUGHHOLE TAPPING M6
21 ON-LOAD TAP-CHANGER HEAD COVER
22 BOLT FOR ON-LOAD TAP-CHANGER HEAD COVER
23 GASKET FOR ON-LOAD TAP-CHANGER HEAD COVER
24 ON-LOAD TAP-CHANGER HEAD COVER
25 CENTRING BEAR UNIT WITH DRIVE SHAFT 25a
26 PIPE CONNECTION 5 FOR PROTECTIVE RELAY
27 PIPE CONNECTION 5 FOR RETURN PIPE
28 PIPE CONNECTION 5 FOR RETURN PIPE
29 BLEEDING VALVE FOR ON-LOAD TAP-CHANGER HEAD COUVER
30 BLEEDING FACILITY FOR TRANSFORMER OIL
31 BLEEDER SCREW FOR SUCTION PIPE
32 ELECTRIC SWITCH OIL COMPARTMENT
33 BOTTOM OF OIL COMPARTMENT
34 BOTTOM OF ELECTRIC SWITCH OIL COMPARTMENT
35 TERMINAL OF ELECTRIC SWITCH OIL COMPARTMENT
36 ON-LOAD TAP-CHANGER TAKE-OFF TERMINAL
37 WITH 1DZ02 NEUTRAL
38 SUCTION OIL
39 ELECTRIC OIL
40 MAGNETIC TAP SELECTOR
41 TAP SELECTOR BOTTOM 96a/76c
42 TAP SELECTOR BOTTOM 96a/76c
43 TAP SELECTOR BOTTOM 96a/76c
44 TAP SELECTOR TERMINAL A
45 TAP SELECTOR TERMINAL B
46 CONTACTING LEAD FOR TAP SELECTOR
47 HOLDING STRIP FOR A
51 DIVERTER SWITCH UNIT
52 SUPPORTING CYLINDER
53 GEAR PLATE
54 FIXING BOLT
55 LIFTING LUG
56 TRANSITION RESISTERS
57 DRIVE SIDE OF THE TAP SELECTOR
E1 = BLEEDING FACILITY FOR ON-LOAD TAP-CHANGER HEAD
E2 = BLEEDING FACILITY FOR SPACE UNDER THE HEAD OUTSIDE
THE TAP-CHANGER OIL COMPARTMENT (SAME PIPE CONNECTION AS R, S, Q OR BLEEDER SCREW CAN BE USED)
Q = CONNECTION FOR OIL RETURN PIPE (ONLY FOR OIL FILTER) - CONNECTIONS ORIENTABLE THROUGH 360°
S = CONNECTION FOR SUCTION PIPE - CONNECTIONS ORIENTABLE THROUGH 360°
R = CONNECTION FOR PROTECTIVE RELAY (EXCHANGEABLE WITH CONNECTION Q) - CONNECTIONS ORIENTABLE THROUGH 360°
T = THERMOMETER BAG
SR = INSPECTION WINDOW, RIGHT
SL = INSPECTION WINDOW, LEFT

SCALE: 1:2.5 (1:1)
On-load tap-changer OILTAP® MS, M, R, RM
With flange for pressure relief valve
On-load tap-changer OILTAP® R
Versions of the on-load tap-changer head, swiveling range and drive direction of the gear unit

POSITION OF DRIVE SHAFT OF GEAR UNIT
LEFT

RIGHT

SWIVELING RANGE FOR CENTRIC DRIVE
DRIVE SHAFT LEFT GAL
HEAD VARIANTS

DRIVE SHAFT RIGHT GUR
HEAD VARIANTS WITH MOUNTING FLANGE FOR PRESSURE RELIEF VALVE

DRIVE SHAFT LEFT GAL

DRIVE SHAFT RIGHT GUR

SWIVELLING RANGES

FOR ADAPTING THE HORIZONTAL PART OF THE DRIVE SHAFT TO THE TRANSFORMER TANK, A CONSIDERABLE NUMBER OF VARIANTS OF THE ON-LOAD TAP-CHANGER HEAD ARE ON DISPOAL.

THE MOUNTING POSITION OF THE TAP SELECTOR A AND DIVERTER SWITCH OIL COMPARTMENT B IS DETERMINED BY THE DRIVE SIDE OF TAP SELECTOR C.

THE ON-LOAD TAP-CHANGER HEAD C TOGETHER WITH ITS PIPE CONNECTIONS D MAY BE TURNED THROUGH 180 DEGREES COUNTERWISE OR ANTI-COUNTERWISE.

THE UPPER GEAR UNIT F MAY BE TURNED CONTINUOUSLY ROUND ITS AXES.

PLEASE INDICATE DESIRED POSITION OF INSPECTION WINDOW, USING KEY LETTERS SHOWN IN THE FIGURES:

A = TAP SELECTOR
B = DIVERTER SWITCH OIL COMPARTMENT
C = ON-LOAD TAP-CHANGER HEAD
D = PIPE CONNECTIONS (I, S, L, E, E)
DV = PRESSURE RELIEF VALVE
E = ON-LOAD TAP-CHANGER HEAD COVER
F = UPPER GEAR UNIT
G = DRIVE SHAFT, HORIZONTAL
H = BEVEL GEAR
MA = MOTOR DRIVE UNIT
MA = DRIVE SIDE OF TAP SELECTOR
SR = INSPECTION WINDOW ON THE RIGHT
SL = INSPECTION WINDOW ON THE LEFT
T = TEMPERATURE SENSOR
R = ONE-SIDED SHAFT DRIVEN FROM THE RIGHT
L = ONE-SIDED SHAFT DRIVEN FROM THE LEFT

* THE VALUES IN BRACKETS APPLY IF PIPE CONNECTIONS ARE MOUNTED TO G AND E2.
On-load tap-changer OILTAP® MS, M, R, RM

Special design for installation in bell-type tank
On-load tap-changer OILTAP® MS, M, R, RM
Horizontal drive shaft (limit dimensions)
Tap selector size C/D, centric drive

ARRANGEMENT

<table>
<thead>
<tr>
<th></th>
<th>G4</th>
<th>G9, G10</th>
<th>G11, G12</th>
<th>G13, G14</th>
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<tr>
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<tr>
<td>SPECIAL DESIGN</td>
<td></td>
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<tr>
<td>MINIMUM DIMENSIONS (^1)</td>
<td>H1</td>
<td>535</td>
<td>545</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H2</td>
<td>-</td>
<td>318</td>
<td>515</td>
</tr>
<tr>
<td></td>
<td>H2'</td>
<td>-</td>
<td>-</td>
<td>840</td>
</tr>
<tr>
<td></td>
<td>H2''</td>
<td>-</td>
<td>-</td>
<td>840</td>
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1. FOR OLTS WITH THE CHANGE OVER SELECTOR ATTACHED LATERALLY, THE DIMENSIONS OF THE CHANGE OVER SELECTOR AFTER INSTALLED IN POSITION HAVE TO BE TAKEN INTO ACCOUNT (SEE THE CORRESPONDING OLTC DIMENSION DRAWING).

INTERMEDIATE BEARING FOR

\(H1> \) 2254 2309 - 2309
\(H2> \) - 2259 2254 2259
\(H2' > \) - - 2259 2259
\(H2'' > \) - - 2259 2259

1 2 3 - HEAD VARIATIONS

- - - - - DRIVE SIDE OF TAP SELECTOR
On-load tap-changer OILTAP® R
Horizontal drive shaft (limit dimensions)
Tap selector size E, centric drive

ARRANGEMENT

<table>
<thead>
<tr>
<th>ARRANGEMENT</th>
<th>G4</th>
<th>G9,G10</th>
<th>G11,G12</th>
<th>G13,G14</th>
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<td>STANDARD DESIGN</td>
<td>*</td>
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<tr>
<td>SPECIAL DESIGN</td>
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<tr>
<td>MINIMUM DIMENSIONS</td>
<td>H1</td>
<td>535</td>
<td>545</td>
<td>545</td>
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<tr>
<td></td>
<td>H2</td>
<td>-</td>
<td>318</td>
<td>515</td>
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<tr>
<td></td>
<td>H3</td>
<td>-</td>
<td>-</td>
<td>1040</td>
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<tr>
<td></td>
<td>H4</td>
<td>-</td>
<td>-</td>
<td>1040</td>
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2. IN GENERAL, DETERMINED BY THE INSULATING DISTANCE BETWEEN POLES ABC

INTERMEDIATE BEARING FOR

| H1 | 2254 | 2309 | - | 2309 |
| H2 | -    | 2259 | 2254 | 2259 |
| H3 | -    | -    | 2249 | 2259 |
| H4 | -    | -    | 2249 | 2259 |
On-load tap-changer OILTAP® R
R I 2002, R I 3003, tap selector size C/D
Jumpers for parallel connection of tap selector terminal contacts

REQUIRED PARALLEL BRIDGES ON ON-LOAD TAP-CHANGERS WITHOUT CHANGE-OVER SELECTOR

<table>
<thead>
<tr>
<th>USE</th>
<th>PART</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
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REQUIRED PARALLEL BRIDGES ON ON-LOAD TAP-CHANGERS WITH CHANGE-OVER SELECTOR

<table>
<thead>
<tr>
<th>USE</th>
<th>PART</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
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<tr>
<td>FINE TAP SELECTOR / TAP SELECTOR SIZE C AND D / CONTACTS 1 TO N-2</td>
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<td>74</td>
<td>57</td>
<td>75</td>
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PLEASE NOTE: PARALLEL BRIDGES ARE NOT INCLUDED IN THE STANDARD DELIVERY

ARRANGEMENT OF THE PARALLEL BRIDGES ON THE ON-LOAD TAP-CHANGER SINGLE TAP SELECTOR PITCH 10 REPRESENTATION

WITHOUT CHANGE-OVER SELECTOR | WITH REVERSING SWITCH | WITH COARSE TAP SELECTOR

THE BRIDGES FOR PARALLEL CONNECTION OF TERMINALS ARE NOT NECESSARY WITH OILTE R I 2002 WITH TWO PARALLEL WINDING BRANCHES FROM THE TRANSFORMER. OILTE R I 3003 WITH THREE PARALLEL WINDING BRANCHES FROM THE TRANSFORMER.

THE LIGHTNING IMPULSE WITHSTAND VOLTAGE BETWEEN THE PARALLEL OILTE TAP SELECTOR TERMINALS IS 400 kV 1.2 / 50.

SCALE 1 : 10 (1 : 15)
On-load tap-changer OILTAP® R
R I 2002, R I 3003, tap selector size E
Jumpers for parallel connection of tap selector terminal contacts

R I 2002 TAP SELECTOR SIZE E
2 TAP SELECTOR CONTACT PLANES IN PARALLEL / 3 TERMINALS FOR CUSTOMER'S USE

R I 3003 TAP SELECTOR SIZE E
3 TAP SELECTOR CONTACT PLANES IN PARALLEL / 5 TERMINALS FOR CUSTOMER'S USE

PLEASE NOTE: PARALLEL BRIDGES ARE NOT INCLUDED IN THE STANDARD DELIVERY.

THE BRIDGES FOR PARALLEL CONNECTION OF TERMINALS ARE NOT NECESSARY WITH:
OILT C R I 2002 WITH TWO PARALLEL WINDING BRANCHES FROM THE TRANSFORMER
OILT C R I 3003 WITH THREE PARALLEL WINDING BRANCHES FROM THE TRANSFORMER.

THE LIGHTNING IMPULSE WITHSTAND VOLTAGE BETWEEN THE PARALLEL, IDLE TAP SELECTOR TERMINALS IS 400 KV 1.2 / 50.

SCALE 1:3
On-load tap-changer OILTAP® R

Tap selector size C/D, tap selector bottom shown with the lowest parts connected to the voltage, standard design without grading ring, special design with grading ring

**ON-LOAD TAP-CHANGER WITHOUT AND WITH CHANGE-OVER SELECTOR**

**STANDARD DESIGN**

- **TAP SELECTOR SIZE C (10 - 18 PITCH)**
  - Insulating cylinder

- **TAP SELECTOR SIZE D (10 - 18 PITCH)**
  - Insulating cylinder

**SPECIAL DESIGN**

- **MODEL I**
  - TAP SELECTOR SIZE C AND D
    - Insulating cylinder
    - Ø 22 with insulation
    - Bent as a spiral, IS ON POTENTIAL A

- **MODEL II**
  - TAP SELECTOR SIZE C AND D
    - Insulating cylinder
    - Extension for design with grading ring
    - Ø 90 with insulation
    - Remove supporting ring after installation of OLTC

**ON-LOAD TAP-CHANGER WITH POTENTIAL SWITCH**

TAP SELECTOR SIZE C AND D

1 2

IS VIA THE TIE IN RESISTOR ON THE POTENTIAL OF THE MIDDLE OF THE TAP WINDING

IS ON POTENTIAL A

DIMENSION h REFER TO DIMENSION DRAWING

A = ON-LOAD TAP-CHANGER TAKE-OFF TERMINAL (WITH R11200 NEUTRAL)

Scale 1:5 11:21
On-load tap-changer OILTAP® R
Tap selector size E, tap selector bottom shows lowest parts connected to voltage
On-load tap-changer OILTAP® R
Tap selector size C/D, principal arrangement of potential switch and tie-in resistors

LONGITUDINAL SECTION Rp WITHOUT GRADING RING  1 : 5
LONGITUDINAL SECTION Rp WITH GRADING RING  1 : 5

DIMENSIONS A, B, AND r REFER TO DIMENSION DRAWING.

NOTE: ADDITIONAL SCREENINGS AT THE CUSTOMER'S REQUEST.

SCALE 1 : 15 (1 : 5)
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R I to WP, tap selector size C/D, $U_m = 72.5$ kV to 300 kV, 2 x 14 to 2 x 18 resistors

Einzelheit aus Schnitt C - C 1:2
DETAIL FROM SECTION C - C SCALE 1:2

dargestellt: Ausführung
2 x 18 Widerstände
1:10 (1:2)
DESIGN REPRESENTED
IS 2 x 18 RESISTORS
SCALE 1:10 (1:2)
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R I to WP, tap selector size C/D,
\( U_m = 72.5 \text{kV to 300 kV}, 2 \times 3, 2 \times 5, \text{to} 2 \times 13 \text{ resistors} \)
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R I to WP, tap selector size C/D,
U_m = 72.5 kV to 300 kV, 2 x 4, 2 x 6 to 2 x 12 resistors
On-load tap-changer OILTAP® R

Tie-in resistor cylinder R I to WP, tap selector size C/D, $U_m = 72.5 \text{ kV}$ to 300 kV, 3 to 26 resistors

---

**Diagram Description**

- **On-load tap-changer OILTAP® R**
- Tie-in resistor cylinder R I to WP, tap selector size C/D.
- $U_m = 72.5 \text{ kV}$ to 300 kV, 3 to 26 resistors.

---

**Technical Details**

- **Function**: On-load tap-changer
- **Connection**: Tie-in resistor cylinder R I to WP
- **Position**: Tap selector size C/D
- **Voltage Range**: $72.5 \text{ kV}$ to 300 kV

---

**Table**

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<tr>
<th>Ausführung</th>
<th>Funktionsschluss</th>
<th>Lage</th>
<th>M - Anschluss</th>
<th>Lage</th>
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<tr>
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<td>C</td>
<td>unten / BOTTOM</td>
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<td>D</td>
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</table>

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**Additional Notes**

- **Customer Connection**: 1.2
- **Connection for Customer**: Scale 1:2
- **Connecting Leads**: Will be delivered attached.
- **Part Numbers**: 8981272M

---

**Diagram Elements**

- **Verbindungsteile automatisch geliefert**: Connecting leads will be delivered attached.
- **Einzelheit aus Schnitt C - C**: Detail from section C - C, Scale 1:2
- **Ansicht der Polungswiderstände**: Top view of resistance windings.
- **Gegenüberstellung der Polungswiderstände**: For a longitudinal section of the tie-in resistors, see 896 to 707.

---

**Design Representation**

- **26 Resistors**: Design represented, 26 resistors, Scale 1:10.
On-load tap-changer OILTAP® R

Tie-in resistor cylinder R I to WR, tap selector size C/D, $U_m = 72.5 \text{kV}$ to $300 \text{kV}$, 2 x 14 to 2 x 18 resistors

---

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<th>Ausführung</th>
<th>Kundenanschluss</th>
<th>Lage</th>
<th>Position</th>
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<tr>
<td>2 x 14</td>
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<td>2 x 18</td>
<td>oben / BOTTOM</td>
<td>A, H</td>
<td>unten / BOTTOM</td>
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</tbody>
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---

Leitung ø14 isoliert auf ø20 liegt an Potential von Α.
LEAD ø14 ISOLATED TO ø20 IS ON POTENTIAL ø20.

Dargestellte Leitungen werden abgebaut geliefert.
REPRESENTED LEADS WILL BE DELIVERED ATTACHED.

- Leitungsanschlussleitungen
- ON-LOAD TAP-CHANGER TAKE-OFF TERMINAL

Einzelheit aus Schnitt C - C 1:2
DETAIL FROM SECTION C - C SCALE 1:2

Dargestellt Ausführung
2 x 18 Widerstände
1:10 (1:2)

DESIGN REPRESENTED
IS 2 x 18 RESISTORS
SCALE 1:10 (1:2)
On-load tap-changer OILTAP® R

Tie-in resistor cylinder R I to WR, tap selector size C/D, 
$U_m = 72.5 \text{kV to } 300 \text{kV}$, $2 \times 3$, $2 \times 5$, to $2 \times 13$ resistors
On-load tap-changer OILTAP® R

Tie-in resistor cylinder R I to WR, tap selector size C/D,
$U_m = 72.5 \text{kV to } 300 \text{kV}$, 2 x 4, 2 x 6, to 2 x 12 resistors
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R I to WR, tap selector size C/D,
$U_m = 72.5$ kV to $300$ kV, 3 to 26 resistors

**Figure 1:** Connection for customer
Scale 1:2

**Figure 2:** Detail from section C-C
Scale 1:2

- Lead no. 4 isolated on no. 20
- Lead no. 5 isolated on no. 20 is on potential

**OILTAP® R** design represented
26 resistors
Scale 1:10 (1:2)
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R III 1200 WP, tap selector size C/D, $U_m = 72.5$ kV to 245 kV, 3 x 2 to 3 x 7 resistors

Connection for customer
Scale 1:2

Design represented
IS 3 x 7 Resistors
Scale 1:10 (1:21)
On-load tap-changer OILTAP® R

Tie-in resistor cylinder R III 1200 WP, tap selector size C/D,
U_m = 72.5 kV to 245 kV, 3 x 8 to 3 x 10 resistors

---

Einzelheit aus Schnitt C–C: 1:2

DETAIL FROM SECTION C–C

SCALE 1:2

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Lampenstellung der Polungswiderstände
siehe 896.707.

FOR A LONGITUDINAL SECTION OF THE TIE-IN RESISTORS SEE 896.707.

dargestellt: Ausführung 3 x 10 Widerstände

1 x 10 (1:2)

DESIGN REPRESENTED IS 3 x 10 RESISTORS

SCALE 1:10 (1:2)
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R III 1200 WR, tap selector size C/D,
$U_m = 72.5\, \text{kV}$ to $245\, \text{kV}$, $3 \times 2$ to $3 \times 8$ resistors

Einzelheit aus Schnitt E - E
DETAIL FROM SECTION E - E
SCALE 1:2

Verbindlich für die Beantragung
by Phases ist das Ausführungsschema.
FOR BINDING DESIGNATIONS OF PHASES
REFER TO THE CONNECTION DIAGRAM OF THE TAP CHANGER.
On-load tap-changer OILTAP® R
Tie-in resistor cylinder R III 1200 WR, tap selector size C/D,
U_m = 72.5 kV to 245 kV, 3 x 9 to 3 x 11 resistors
On-load tap-changer OILTAP® R
Potential switch R III 1200 WS, R I to WS, tap selector size C/D, \( U_m = 72.5 \) kV to 300 kV
On-load tap-changer OILTAP® R

Potential switch R III 1200 WS, R I to WS, tap selector size E, $U_m = 72.5$ kV to $300$ kV
Basic connection diagrams ................................................................. 890616

Tap selector and change-over selector terminal contacts,
tap selector size E .............................................................................. 897868

Tap selector bottom, shielding,
tap selector size C/D ........................................................................... 896702

Tap selector bottom, tap selector size E ........................................... 897869

Versions of the on-load tap-changer head ....................................... 896703

Horizontal drive shaft, tap selector size C/D ....................................... 896708

Horizontal drive shaft, tap selector size E ........................................... 897872

Installation drawing, tap selector size C/D .......................................... 896705

Installation drawing, tap selector size E ............................................. 897873

On-load tap-changer head .................................................................. 893899