On-Load Tap Changer Type G
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The on-load tap changer type G is used to vary the ratio of an oil-immersed transformer under load. In general, it is designed to suit power transformers with high ratings for network and industrial service.

The on-load tap changer type G offers a great number of advantages for both manufacturer and user.

Versatility

- star-point design for 1600 A and 2000 A for use in 3-phase star-connected windings.
- single-pole design at 1600 A, 2000 A, 3000 A and 4500 A.
- insulation to ground up to $U_{in} = 245$ kV and 2 tap selector sizes which can be selected independently of each other.
- available with $\pm 9$, $\pm 11$, $\pm 13$, or $\pm 1!$ ($\pm 17$) steps.
- additional devices for potential tie-in of the tap winding during change-over selector operation (potential switch with or without integrated tie-in resistors).
- additional screening for the diverter switch oil compartment, free of partial discharge, offering minimum distance to the tank.

OLTC Type G
Model G I 3022,
$U_{in} = 123$ kV,
$I_{lm} = 3000$ A,
$\pm 17$ steps,
potential switch and tie-in resistors
Heavy-duty on-load tap changer

- Diverter switch designed as a high-speed transition resistor type with arc extinction at the first current zero.
- Rapid tap change operation of the diverter switch, low thermal stress on the transition resistors.
- Automatically controlled motion sequence of arcing contacts which are made of tungsten-copper material, separate shunt contacts.
- Robustly designed selector, effective contact cooling, silverplated connection terminals, high short-circuit withstandability.
- Simple selector mechanics with precise action, all movable parts run on backlashfree roller bearings.

Cost-saving — easy installation and reduced maintenance

- Oil-immersed installation of the entire tap changer in the transformer main tank.
- Simple to connect.
- No diverter switch unit/tap selector leads connecting to outside.
- Straightforward coupling to motor drive unit.
- Little maintenance required due to long contact life.
- Diverter switch quick and easy to disassemble.
- Simple to adjust and control.
- Oil suction pipe built-in.
Diverter Switch Tap Selector Unit

This unit comprises the spring-operated energy accumulator, the diverter switch itself and the transition resistors. For inspection, the unit can be withdrawn from the oil compartment through the head.

The tap selector comprises the gearing, the column with take-off rings, the insulation bar cage with connecting terminals, the contact bridges with the corresponding drive tubes and segments, and the upper and lower cage rings. The tap selector may also include a changeover selector for doubling the number of steps. The gear casing of the tap selector is also the pressure-tight junction with the diverter switch oil compartment.
Group 10 — Tap changer head
11 mounting flange
12 tap changer head casing
13 tap changer cover
14 position indication
15 pipe connection for suction pipe
16 drive shaft
17 bleeder screw
18 suction pipe

Group 20 — Diverter switch oil compartment
21 a oil compartment cylinder (steel)
21 b oil compartment cylinder (GFRP)
22 upper flange with gasket and supporting flange for installation into bell-type tank (special design)
23 lower flange with gasket
24 guiding pin and plug contact for tap changer neutral terminal
25 plug contact for selector connecting lead
26 grading ring (for Uₘ ≥ 170 kV only)

Group 30 — Diverter switch unit
31 coupler
32 supporting stay
33 supporting cylinder
34 drive shaft
35 winding crank
36 energy accumulator with pawl 36 a
37 a stationary contact system
37 b movable contact system
38 shunt contact
39 transition resistor

Group 40 — Fine tap selector
41 tap selector gear
42 drive shaft
43 connection terminal
44 laminated paper terminal bar
45 tap selector column with take-off ring 45 a
46 tap selector contact bridge
47 tap selector drive tube
48 a upper cage ring
48 b lower cage ring
49 bottom

Group 50 — Changeover selector
51 changeover selector drive
52 changeover selector terminal bar
53 connecting terminal
54 movable contact
Technical Data

The technical data of the tap changer type G have been verified in type tests according to IEC International Standard 214 (1989). Moreover, it complies with all relevant national standards. Detailed information and comprehensive data for the selection of a type G tap changer for particular applications can be inferred from our manual TD 48.

<table>
<thead>
<tr>
<th>Tap changer model</th>
<th>G III 1602 Y</th>
<th>G III 2002 Y*</th>
<th>G I 1612</th>
<th>G I 2012</th>
<th>G I 3022</th>
<th>G I 4502*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of poles and application</td>
<td>3 (neutral)</td>
<td>3 (neutral)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max. rated through-current (A)</td>
<td>1600</td>
<td>2000</td>
<td>1600</td>
<td>2000</td>
<td>3000</td>
<td>4500</td>
</tr>
<tr>
<td>Short-circuit strength (kA)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Thermoic (3 sec.)</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Dynamic (peak)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Max. rated step voltage (V)</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>Rated switching capacity (kVAR)</td>
<td>5000</td>
<td>5000</td>
<td>5000*</td>
<td>5000*</td>
<td>6500*</td>
<td></td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>50 . . 60</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Operating positions</td>
<td>without changeover selector: max. 16 (special design: 18)</td>
<td>with changeover selector: max. 31 (special design: 35)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation to ground</td>
<td>72.5</td>
<td>123</td>
<td>170</td>
<td>245</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest voltage for equipment $U_{in}$ (kV)</td>
<td>(Insulation to ground for $U_{in} &gt; 245$ kV on request)</td>
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<tr>
<td>Rated lightning impulse withstand voltage (kV, 1.2/50)</td>
<td>350</td>
<td>550</td>
<td>750</td>
<td>950</td>
<td></td>
<td></td>
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<tr>
<td>Rated power-frequency withstand voltage (kV, 50 Hz, 1 min.)</td>
<td>140</td>
<td>230</td>
<td>325</td>
<td>395</td>
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<tr>
<td>Tap selector</td>
<td>optional tap selector size (D, E) available according to the requirements by voltage stress on the tap winding; the tap selector size may be chosen independently of the voltage class.</td>
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<tr>
<td>Diverter switch oil compartment</td>
<td>pressure-proof up to 0.3 bar pressure difference (test pressure 0.6 bar)</td>
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<tr>
<td>Oil suction pipe</td>
<td>standard equipment</td>
<td></td>
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<tr>
<td>Oil displacement</td>
<td>approx. 1000 . . 1190 litres</td>
<td></td>
<td></td>
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<tr>
<td>Oil filling quantity</td>
<td>approx. 750 . . 880 litres</td>
<td></td>
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<tr>
<td>Weight</td>
<td>approx. 1380 . . 1950 kg</td>
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<tr>
<td>Drying procedure</td>
<td>vacuum drying up to max. 110 °C vapor phase drying up to max. 125 °C</td>
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<tr>
<td>Motor drive</td>
<td>motor drive unit MA 7, protective housing in outdoor design, motor data: 3 AC 230/400 V, 50 Hz, 0.75 . . 1.5 kW, step-by-step operation with local and remote control, mechanical and electrical position limitation, facility for remote position indication (pointer instrument, lamp panel, digital display), hand crank operation for emergency and adjustment purposes.</td>
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<tr>
<td>Notes:</td>
<td>° higher max. rated through-current on request</td>
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<td>° on request only</td>
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<td>° up to 8000 kVA as special design</td>
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</tbody>
</table>

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