TG
Gas-insulated high voltage current transformers
72.5 - 800 kV
Description

Gas-insulated high voltage current transformers
72.5 - 800 kV

- For outdoor installation
- Hot zinc-plated ferrous components
- Synthetic rubber gaskets resistant to sulphur hexafluoride and unaffected by thermal variations
- No partial discharges
- Construction in conformity with ISPESL Italian standards
- Electrical signalling for low gas pressure
- Design according to IEC 60044-1 standards
- Temperature range: from -60 °C to +55 °C
The TG type current transformers are derived from the T 145-420 type transformers, which have already been in production for a long time. Their architecture, electromagnetic sizing and primary and secondary transfer devices remain the same. As before, the cores and secondary windings are located at the top, in the head of the CT. High voltage insulation is entirely obtained in SF₆ gas instead of with paper-oil. Considerable and numerous advantages are gained thanks to this solution:
- dielectric quality no longer depends on complex and lengthy treatments then followed by delicate checks. In particular, monitoring partial discharges has become meaningless, since the only solid dielectric medium which might be subject to ageing is the external porcelain insulator;
- internal discharges can practically be excluded because of the coordination selected for insulation and the gaseous nature of the internal dielectric medium. The specific characteristics of SF₆ gas are such as to considerably limit the consequences of any discharges;
- the presence of a device with a pre-set rupture point protects the transformer against overpressures;
- the level of internal insulation can be continuously monitored remotely by means of a densimeter with contacts, fitted with an alarm and trip threshold for minimum SF₆ gas pressure.
Main characteristics

Base plate
The base plate consists of a special light alloy casting. By means of a tube, it supports the live part of the transformer, closes the supporting insulator at the bottom and incorporates the secondary terminal box, the filling valve and the densimeter.

Insulator
The insulator can either be made of high strength porcelain or of a composite material with silicone rubber sheds. Both types comply with the strictest mechanical requirements (CENELEC-ANSI-ISPESL Standards).

Head and live parts
The metallic head of the transformer is cast in a special alloy, using a special process which ensures total absence of porosity and consequently hermetic sealing of the SF₆ gas. The transformer head contains the following:
- the primary winding
- the toroidal cores made either of hot-rolled steel strip with oriented crystals, or Mumetal, or a mix of these two materials
- the secondary windings, evenly distributed around the cores. By means of wires housed in the supporting tube, the windings are connected to a secondary terminal box, which is part of the base plate
- the rupture disk which, in the case of an internal arc, allows the internal overpressures to be limited to values considerably lower than the breakage values of the castings and insulators
- the shields provided inside the insulator for optimal longitudinal distribution of the dielectric field.

Versions
• Solution with special multi-ratio head and large number of cores.
• Alternatively, fibreglass insulators with silicone rubber sheds.
• Possible solutions with linearized response cores: TPY, TPS and TPZ according to IEC 60044-6 standards.

TG 145 kV.
The benefit gained from the particular design choice of the TG current transformers has been further increased by using suitable production systems.

Assembly is carried out in a specially fitted workshop, designed taking into account both the experience gained in the field of transformers insulated in oil-paper and also that of the metal-clad SF6-insulated circuit-breakers and apparatus. In particular, the same procedures for pressure and air tightness testing are followed.

The cores precision class check is carried out on automated test benches. A special laboratory with background noise of less than 2pC has been set up for the dielectric tests next to the production workshop. ABB operates in accordance with the ISO 9001 Quality System, certified by an independent external organisation.

This means that during all the TG current transformer production stages, from sale to delivery and including the design stage, are carried out in compliance with the prescriptions of the above-mentioned Standards.

The Environmental Management system conforms to the ISO 14001 Standards, certified by an independent external organisation.

### Rated insulation levels

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum system voltage (kV)</th>
<th>Test voltage (according to IEC 60044-1)</th>
<th>Impulse withstand (kV)</th>
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<tbody>
<tr>
<td>TG 72.5</td>
<td>72.5</td>
<td>140</td>
<td>325 (wave 1.2/50 µs)</td>
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<tr>
<td>TG 145</td>
<td>145</td>
<td>275</td>
<td>650 (wave 1.2/50 µs)</td>
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<tr>
<td>TG 170</td>
<td>170</td>
<td>325</td>
<td>750 (wave 1.2/50 µs)</td>
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<td>TG 245</td>
<td>245</td>
<td>460</td>
<td>1050 (wave 1.2/50 µs)</td>
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<td>TG 362</td>
<td>362</td>
<td>510</td>
<td>1175 (wave 1.2/50 µs)</td>
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<td>TG 420</td>
<td>420</td>
<td>630</td>
<td>1425 (wave 1.2/50 µs)</td>
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<td>TG 550</td>
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<td>680</td>
<td>1550 (wave 1.2/50 µs)</td>
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Overall dimensions

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<th>TG 72.5 ... 362 kV</th>
<th>TG 420 kV</th>
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<tr>
<td>A B C D E F G SF₆ Weight</td>
<td>A B C D E F G H SF₆ Weight</td>
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<td>TG mm mm mm mm mm mm mm kg kg</td>
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<td>420 5650 5025 3950 650 580 655 550 -- 32 1350</td>
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<tr>
<td>362 3400 3000 2400 490 385 760 1000 7.5 650</td>
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1 Primary bar 7 SF₆ gas filling cock
2 Aluminium alloy head 8 Earthing screw
3 Terminals 9 Low voltage cable entry
4 Insulator 10 Secondary terminal box
5 Pressure relief device 11 Base
6 Densimeter
TG 550 kV

<table>
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<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>SF₆</th>
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<tbody>
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TG 800 kV

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<td>840</td>
<td>790</td>
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</table>

1. Primary bar
2. Aluminium alloy head
3. Terminals
4. Insulator
5. Pressure relief device
6. Densimeter
7. SF₆ gas filling cock
8. Earthing screw
9. Low voltage cable entry
10. Secondary terminal box
11. Base