High voltage products

TVI
SF₆ Inductive Voltage Transformer
Inductive Voltage Transformer

TVI (Inductive Voltage Transformer) is the result of practical experience with SF₆ instrument transformers and inductive voltage transformers for PASS and GIS. This SF₆ gas insulated inductive type of voltage transformer is built for revenue metering and protection in high voltage networks. It is designed for the most varied conditions, from polar to desert climates. The use of a composite insulator and pressure relief device ensures greater safety and a higher performance in very heavy polluted environments.

Advantages
The TVI, thanks to the use of SF₆ gas and of a composite insulator, offers several advantages:

- highly reliable equipment
- explosion proof design
- maintenance free
- dielectric quality not depending on long treatments
- negligible level of partial discharge
- dielectric mean not subjected to ageing
- wide safety margin against saturation and ferro-resonance
- high seismic withstand capability
- suitable for applications in mobile substations
- higher performance in very heavy polluted environments
- available with a gas insulated disconnector for increased flexibility during operation.

Technical features
- Suitable for both metering and protection
- Magnetic cores made of laminated steel with oriented grain and a high level of permeability
- Windings made of electrolytic copper
- Primary winding connected directly to the high voltage side while the secondary winding supplies the low voltage panels
- Insulation system designed to guarantee a life cycle of 30 years. Declared maximum gas leakage: less than 0.1 % per year
- Safety margin for normal wind loads, stress from conductors and seismic forces
- Construction in conformity with national pressure standards
- Installed on a metal support with four eyebolts for lifting.

Electrical and mechanical data

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum system voltage (kV)</th>
<th>Power frequency (kV)</th>
<th>Impulse Withstand (kV)</th>
<th>Min Flashover Distance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVI 72.5</td>
<td>72.5</td>
<td>140</td>
<td>325</td>
<td>670</td>
</tr>
<tr>
<td>TVI 123</td>
<td>123</td>
<td>230</td>
<td>550</td>
<td>1184</td>
</tr>
<tr>
<td>TVI 145</td>
<td>145</td>
<td>275</td>
<td>650</td>
<td>1184</td>
</tr>
<tr>
<td>TVI 170</td>
<td>170</td>
<td>325</td>
<td>750</td>
<td>1364</td>
</tr>
<tr>
<td>TVI 245</td>
<td>245</td>
<td>460</td>
<td>1050</td>
<td>1950</td>
</tr>
<tr>
<td>TVI 420</td>
<td>420</td>
<td>630</td>
<td>1425</td>
<td>3590</td>
</tr>
</tbody>
</table>

Installation
- Outdoor

Design
- Inductive type

Insulation
- SF₆ gas

Highest voltage for equipment
- 72.5 - 420 kV

Voltage factor (Vf)
- Up to 1.9/8 hrs

Insulators
- Silicone rubber

Creepage distance
- ≥ 25 mm/kV

Ambient temperature
- -60 °C to +40 °C

Design altitude
- Maximum 1000 m
### TVI features

<table>
<thead>
<tr>
<th>kV</th>
<th>72.5</th>
<th>123</th>
<th>145</th>
<th>170</th>
<th>245</th>
<th>420</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>SF₆</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>TVI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of cores</td>
<td>1 @ 3*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated primary voltage</td>
<td>kV 66/√3 110/√3 132/√3 150/√3 220/√3 380/√3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated secondary voltage</td>
<td>V 100,115,120,100/3,115/3,120/3,100/3,115/3,120/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Metering Core**
- Burden VA: 10 @ 200
- Class: 0.2 @ 1

**Protection Core**
- Burden VA: 10 @ 200
- Class: 3P-6P

**Thermal Burden VA**
- 1000-1500

* This is a general indication. The number of cores available in standard case depends on the power required.

** This is a general indication. Other voltage values can be required.

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1. **High voltage terminal**
   - made of highly conductive aluminum (either cylindrical or the NEMA flat type)

2. **Composite insulator**
   - made of composite material in accordance with IEC 61642, suitable for installation in highly polluted areas (level IV)

3. **Aluminum tank**
   - made of a corrosion-proof aluminum alloy, in conformity with national vessel standards

4. **Rupture disk**
   - pressure relief device to limit internal gas overpressure in case of flash over, designed to avoid early bursting

5. **Name plate**
   - placed on the secondary terminal box, including all the data required by the IEC 60044-2 Standards

6. **Secondary terminal box**
   - with a protection degree of not less than IP44 according to IEC 60529

7. **Cable gland for LV cables**

8. **Density monitor**
   - temperature compensated density monitor with two electric contacts scaled on alarm and lock out gas thresholds

<table>
<thead>
<tr>
<th>Type</th>
<th>Height, A (mm)</th>
<th>Width, B (mm)</th>
<th>Total weight (Kg)</th>
<th>SF₆ weight (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVI 72.5</td>
<td>1860</td>
<td>863</td>
<td>200</td>
<td>4.7</td>
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<tr>
<td>TVI 123-145</td>
<td>2374</td>
<td>863</td>
<td>280</td>
<td>6.5</td>
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<tr>
<td>TVI 170</td>
<td>2594</td>
<td>863</td>
<td>290</td>
<td>7.0</td>
</tr>
<tr>
<td>TVI 245</td>
<td>3360</td>
<td>1100</td>
<td>480</td>
<td>19.0</td>
</tr>
<tr>
<td>TVI 420</td>
<td>5820</td>
<td>1300</td>
<td>850</td>
<td>35.0</td>
</tr>
</tbody>
</table>