PFU
Concrete enclosure for Transformer Substations
Up to 40.5 kV, 1000 kVA  IEC Standards

Reliable innovation. Personal solutions.
Design

Ormažabal’s Transformer Substations in pfu enclosure:
- pfu monoblock enclosure (base and walls) with removable roof
- Fully gas insulated MV switchgear: cgm.cosmos system (up to 24 kV) cgm.3 system (up to 40.5 kV)
- Up to 2 MV/LV distribution transformers filled with dielectric liquid up to 40.5 kV and a unit power of 1000 kVA\(^1\) per transformer
- Low Voltage Boards(s) with up to 8 outlets
- Ormažabal’s protection, control and metering units (remote control, remote metering, integrated control, remote management, etc.)
- Direct interconnections by means of MV and LV cable
- Earthing circuit
- Lighting and auxiliary services circuit

\(^1\) For other values, please consult Ormažabal

Typical electrical configurations
- pfu.3 \[\begin{align*} & 2l + 1p + 1\text{ Transformer} + 1\text{ lvb} \end{align*}\]
- pfu.4 \[\begin{align*} & 3l + 1v + 1\text{ Transformer} + 1\text{ lvb} \end{align*}\]
- pfu.5 \[\begin{align*} & 2l + 1s + 1p + 1m + 1\text{ tr} + 1\text{ lvb} \end{align*}\]
- pfu.6 \[\begin{align*} & 2l + 2p + 2\text{ Transformers} + 2\text{ lvb} \end{align*}\]
- pfu.7 \[\begin{align*} & 3l + 2p + 2\text{ Transformers} + 2\text{ lvb} \end{align*}\]

Note: For other configurations, please consult Ormažabal

Where:
- l = Feeder Function
- p = Fuse Protection Function
- v = Prot. Function with Vacuum Circuit Breaker
- s = Busbar Switch Function
- r = Riser function
- m = Metering Function
- lv = Low Voltage Board
- tr = Transformer

External dimensions and weights

<table>
<thead>
<tr>
<th>pfu.3</th>
<th>pfu.4</th>
<th>pfu.5</th>
<th>pfu.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length [mm]</td>
<td>3280</td>
<td>4460</td>
<td>6080</td>
</tr>
<tr>
<td>Width [mm]</td>
<td>2380</td>
<td>2380</td>
<td>2380</td>
</tr>
<tr>
<td>Height [mm]</td>
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<td>3045</td>
<td>3045</td>
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<tr>
<td>Visible height [mm]</td>
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<td>2585</td>
<td>2585</td>
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<tr>
<td>Weight* [kg]</td>
<td>10545</td>
<td>13465</td>
<td>17460</td>
</tr>
</tbody>
</table>

\(^*\) Weight of the empty building with standard cover and ventilation for 1000 kVA
Optional: raised cover for 36-40.5 kV (standard height + 195 mm) not applicable to pfu.7
Dimensions of staff access door: 900 (24 kV) / 1100 (36-40.5 kV) x 2100 mm
Dimensions of transformer door: 1260 x 2100 mm

Family

pfu.3
pfu.4
pfu.5
pfu.7

Sustainability
- Long operational life against harsh environmental conditions
- Reduction in manufacturing energy consumption and emissions
- Research on mechanical properties and durability of the concrete

Continuous innovation
- Ventilation modelling and testing optimized with Ormažabal transformers
- Great capacity for aesthetic integration to the environment
- Available prefabricated solutions according to EN 62271-202
- Compatible with rest of the wide range of Ormažabal substations

Safety
- Same equipotential earthing throughout the whole structure: walls, roof and floor
- Transformer fence with protection mesh
- Dielectric liquid collection pits
- Individual front door for every transformer
- Addable physical separation between the utility and private cubicles
- Additional fire barrier protection elements (pebbles over the pit)
- Optional internal arc and seismic tests

Reliability
- Industrialized uniform quality
- Fully factory assembled, process controlled and tested
- Simple and quick installation, optimizing times and costs
- Protection against strong external impacts

Efficiency
- Switchgear can be factory installed
- Ventilation: natural air circulation (class 10)
- MV and LV cables input/output through semi-perforated holes in the base front and rear
- LV auxiliary feeder on the front wall

Preface
After decades of manufacturing different types of transformer substations, in 1991 Ormažabal developed the pfu, its first concrete monoblock prefabricated enclosure for transformer substations. Since then, pfu has continuously evolved into a more extended range with flexible configurations for different MV distribution diagrams and with a great variety of external surface finishes.

All pfu buildings consist of industrialized monoblock concrete enclosures for Ormažabal’s walk-in type, ground level Transformer Substations up to 40.5 kV.

pfu is used into several Distribution Network Solutions (DNS) for utilities (conventional generation, public distribution, smart grids...), end users (infrastructures, industry, tertiary) and renewable energy (windfarms, and -PV- photovoltaic solar plants). Currently over 22,000 pfus have been installed in more than 15 countries.

Dimensions of transformer door: 1260 x 2100 mm
Dimensions of staff access door: 900 (24 kV) / 1100 (36-40.5 kV)
Dimensions of removable roof: 195 mm
Weight\(^1\) of the empty building with standard cover and ventilation for 1000 kVA:
- pfu.3: 2790 kg
- pfu.4: 2585 kg
- pfu.5: 2585 kg
- pfu.7: 2585 kg

\(^1\) Weight of the empty building with standard cover and ventilation for 1000 kVA
Optional: raised cover for 36-40.5 kV (standard height + 195 mm) not applicable to pfu.7
Dimensions of staff access door: 900 (24 kV) / 1100 (36-40.5 kV) x 2100 mm
Dimensions of transformer door: 1260 x 2100 mm