



MV/LV Substations
for Distribution Network Solutions

pfu

Concrete enclosure
for Transformer Substations

Up to 40.5 kV, 1000 kVA

IEC Standards

Reliable innovation. Personal solutions.

Preface

After decades of manufacturing different types of transformer substations, in 1991 **Ormazabal** 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 **Ormazabal'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.

Safety

- » Same equipotential earthing throughout the whole structure: walls, floor and roof
- » 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

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 **Ormazabal** 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 **Ormazabal** substations

Technical data

Ormazabal's Transformer Substations in pfu enclosure:

- » **pfu** monoblock enclosure (base and walls) with removable roof
- » Fully gas insulated MV switchgear: **cgmcosmos** 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
- » **Ormazabal'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 **Ormazabal**

Typical electrical configurations

pfu.3	2l + 1p + 1 Transformer + 1lvb
pfu.4	3l + 1v + 1 Transformer + 1lvb
pfu.5	2l + 1s + 1p + 1m + 1 tr + 1lvb 2l + 2p + 2 Transformers + 2lvb 3l + 2p + 2 Transformers + 2lvb 3l + 1r + 1p + 1m + 1 tr + 1lvb 1l + 1v + 1m + 2p + 2 tr + 2lvb
pfu.7	6l + 2p + 2 tr + 2 lvb (24 kV) 3l + 1r + 1v + 1m + 2p + 2 tr + 2lvb 3l + 1r + 1v + 1m + 2p + 1 tr + 1lvb

Note: For other configurations, please consult **Ormazabal**

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
lvb = Low Voltage Board
tr = Transformer

External dimensions and weights

		pfu.3	pfu.4	pfu.5	pfu.7
Length	[mm]	3280	4460	6080	8080
Width	[mm]	2380	2380	2380	2380
Height	[mm]	3045	3045	3045	3250
Visible height	[mm]	2585	2585	2585	2790
Weight*	[kg]	10545	13465	17460	29090

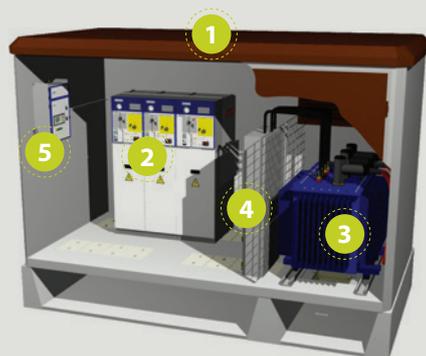
(* Weight of the empty building with standard cover and ventilation for 1000 kVA

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

Design



- 1** **pfu enclosure**
- 2** **MV Switchgear:**
- 2a** **cgmcosmos Up to 24 kV**
- 2b** **cgm.3 Up to 40.5 kV**
- 3** **Transformer(s): Up to 2 x 1000 kVA**
- 4** **Low voltage board**
- 5** **Protection, control and metering units**

Family

pfu.3



pfu.4



pfu.5



pfu.7

