

# ***TECHNICAL OFFER***

## **Typical PFU-3 Substation for 150kW Solar Park**

**Project:** 150 kW Solar Park

**Client:**

**Reference:**

**Date:**

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#### **1. DESCRIPTION - TECHNICAL DATA**

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- B. MV Switchgear
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## 1. DESCRIPTION

The PFU building consists of an industrialised monoblock concrete enclosure for Ormazabal's walk-in type, ground level Transformer Substations up to 36 kV.

This prefabricated substation is designed in accordance with standard IEC 62271-202 and applicable regulations.



The model of PFU included in this offer is a **PFU3** containing the following elements:

- A. Concrete Enclosure
- B. MV Switchgear
- C. MV/LV transformer
- D. Low voltage board
- E. Interconnection cables

### A. PFU 3 Concrete enclosure

#### Characteristics

- Prefabricated removable concrete cover.
- Hinged doors for accessing the switchgear measuring 900 x 2100 mm galvanised steel colour brown RAL-8017, folding 180° over the outside wall, with a two-fixing-point lock and a fastening rod to hold it open preventing untimely closures.
- 1260 x 2100 mm transformer access door galvanised steel colour brown RAL-8017
- Air inlet grilles for natural ventilation.
- Cable entry and exit holes on the front and rear lower side of the enclosure.
- Oil collection pit with oil collector and firewall made of a layer of pebbles for 2100l
- A hole above level 0 on the front wall, of diameter 140 mm, for access of an auxiliary LV supply.
- A protection earth disconnection box (metallic parts) and a service earth disconnection box (neutral) located respectively on the inner left and right side of the front wall.
- Lighting and auxiliary services.
- Protection degree IP23D, IK10.
- Earthing protection circuit Cu 50 mm<sup>2</sup>
- Galvanised steel partition between transformer and MV and LV switchgear

**B. MV SWITCHGEAR: Secondary distribution cubicle****SERVICE CONDITIONS**

Installation	Indoor
Maximum ambient temperature	+40 °C (*)
Minimum ambient temperature	-25 °C
Maximum average ambient temperature, measured in a 24 hours period of time	+35 °C
Maximum average relative humidity, measured in a 24 hours period of time	<95%
Maximum average relative humidity, measured in a 1 month period of time	<90%
Maximum altitude a.s.l.	2.000 m (**)
Sun radiation	No significant
Pollution	No significant

(\*) For special work conditions (Maximum outdoor ambient temperature over 40 °C) consult with Technical-commercial department.

(\*\*) For higher altitudes consult with Technical-commercial department.

**CGMCOSMOS System Ring Main unit**

The **CGMCOSMOS system** consists of a range of modular cubicles, with fixed single-bay metal-enclosed switchgear, which uses sulphur hexafluoride (SF<sub>6</sub>) as the insulating medium and breaking agent.

**CGMCOSMOS system** cubicles can be connected together to configure the various diagrams which may be used in MV installations of public and private distribution MV/LV Transformer Substations up to 24 kV.

The basic characteristics of this system are:

1. Modularity
2. Extensibility
3. Simple, maintenance-free operation and use
4. Small size
5. High level of protection of people and equipment
6. Temporarily submersible
7. Long service life, due to their sealing and resistance to corrosion and contamination, etc.
8. Internal arc tested
9. Routine testing in factory to all the positions

**CGMCosmos 2LP**

**NON EXTENSIBLE FULLY SF<sub>6</sub> GAS INSULATED RMU**

- 1 SF<sub>6</sub> gas interrupting and total insulation panel designed according to international IEC standards. Maintenance free gas envelope and sealed for life technology, tested even to withstand an eventual flooding. Maximum dimensions: 1,190 mm. x 1,740 mm. x 735 mm. (W x H x D), including the following equipment properly assembled and connected:

*TWO FEEDER POSITIONS WITH:*

- 1 SF<sub>6</sub> gas insulated, rotating arc technology, three – pole load break switch with earthing position  
rated system voltage 24 kV  
rated normal current 630 A  
rated peak making current 40 kA  
type B mechanism: manual charge, stored energy, manual release  
Manuf. **ORMAZABAL**



- 1 Voltage indicating system, rated voltage 24 kV
- 1 SF<sub>6</sub> gas insulated main copper busbar, rated normal current 630 A

*ONE FUSE PROTECTION POSITION WITH:*

- 1 SF<sub>6</sub> gas insulated, rotating arc technology, three – pole load break switch with earthing position  
rated system voltage 24 kV  
rated normal current 630 A (\*)  
rated peak making current 40 kA  
type BR mechanism: manual charge, stored energy, manual and electrical (tripping coil) release, fuse operated tripping system with aux contacts for fuse blown indication.  
Manuf. **ORMAZABAL**
- 3 Fuse holders for 24kV fuses inside the gas tank, according to DIN-43.625 standard
- 1 Three-pole fuse earthing switch rated system voltage 24 kV, manual mechanism.  
Manuf. **ORMAZABAL**
- 1 Voltage indicating system, rated voltage 24 kV

**AND:**

- 1 SF<sub>6</sub> gas insulated main copper busbar, rated normal current 630 A
- 1 30 x 3 mm<sup>2</sup> earthing copper busbar
- 1 Assorted equipment & accessories

(\*) Transformer off rated current: 200 A

**C. MV/LV transformer**
**TRANSFORMER TYPE:** ONAN

**STANDARDS:** EN 60076 EN 50464

<b>POWER RATING (kVA)</b>	<b>250</b>
<b>Number of units</b>	<b>1</b>

			Single voltage
<b>VOLTAGE</b>	PRIMARY	V	<b>20,000</b>
	Secondary NO LOAD Between phases	V	<b>400</b>
<b>PRIMARY TAPPING RANGE</b>			<b>+2x2,5%</b>
<b>VECTOR GROUP</b>			<b>DYN11</b>
<b>NO LOAD LOSSES</b>	(+15% tolerance accepted)	W	<b>530</b>
<b>LOAD LOSSES</b>	(+15% tolerance accepted)	W	<b>3250</b>
<b>Short-circuit impedance (75°C)</b>	(± 10% tolerance accepted)	%	<b>4</b>
<b>Sound power level (LwA)</b>		dB	<b>60</b>
<b>COOLING LIQUID</b>			<b>OIL</b>

<b>Accessories Included</b>
MV Open type Porcelain Bushings
LV Open type Porcelain Bushings without connecting flags
2 Earthing terminals (1 in cover and 1 in tank)
Lifting lugs
Filling hole and plug in cover
Drain and sampling valve in tank

Standard Paint: 1 primer coat + 1 colour coat (total 80 microns average)	<b>Spanish BLUE Colour</b>
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Packaging:	<b>Wooden Pallet + Plastic bag</b>
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#### **D. Low voltage board**

With Incoming from rear to a load switch 1,600A-4P, on a metallic cabinet 1,810 X 300 X 550 mm (h x d x l), RAL7035, IP2X protection degree. Reference: EII20110614-2.

It has 10 nos DIN00 fuse carriers including 40 fuses (NH00 25A gG/gL 500V), for direct connection from the 9 inverters

It includes an auxiliary circuit containing:

- Indication light
- Ammeter + Transformer
- MCCB II 10A 6kA for lighting and protection
- Differential switch

*\*Note: no synchroniser, filter, etc is included in the quote*

#### **E. Interconnection set**

Delivered duly fitted and tested from factory:

- MV Interconnection cable, for connection between the MV switchgear and the MV/LV transformer, including Elastimold plug in type connector on the switchgear side: RHZ1 1x 95mm<sup>2</sup> Al
- LV Interconnection cable, for connection between the LV side of transformer and the LVB: 2 x phase 1x neutral, 240mm<sup>2</sup> Al, XZ1

## 2. Commercial Offer

**Project:** 150kW Solar Park  
**Ref. No:**  
**Customer:**  
**Date:**

### PRICES

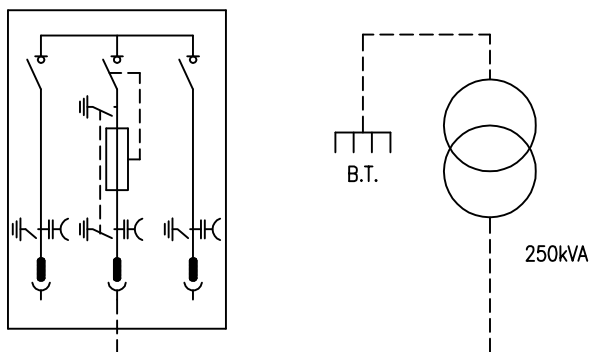
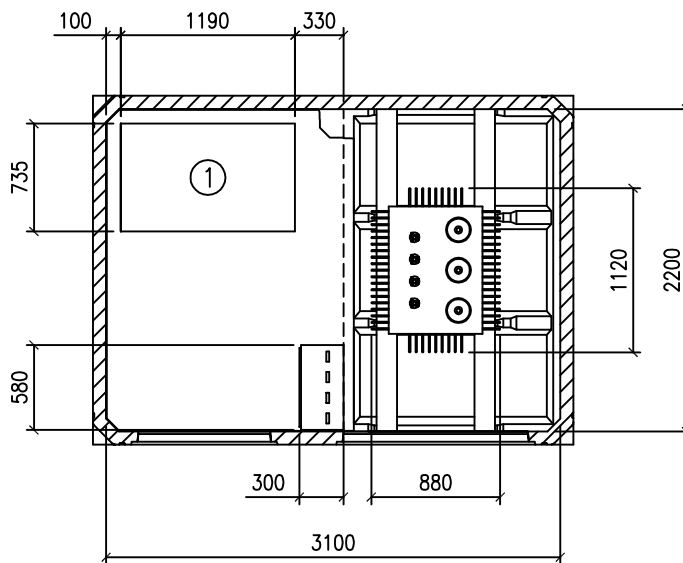
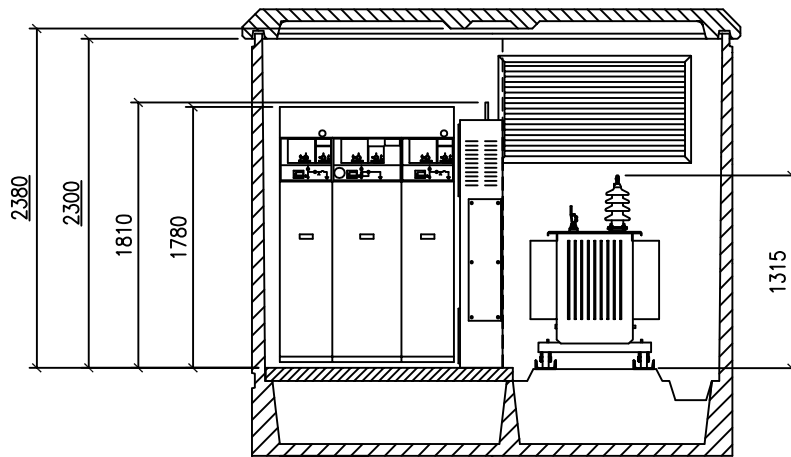
<i>Item</i>	<i>Description</i>	<i>Qty</i>	<i>Unit Price</i> (€)	<i>Total Price</i> (€)
A	Prefabricated Transformer Substation , PFU-3 model, according to above description and attached drawing	1		
<b>TOTAL EXW Seseña (SPAIN)</b>				
<b>TOTAL CIF Piraeus (GREECE)</b>				

### Commercial & Technical Explanations

- All prices given in this offer are in EURO, offered as EXW Seseña (SPAIN) or CIF Piraeus (GREECE) for materials as described above and valid only for this project.
- The EXW delivery term would be of 9 weeks, excluding August, after reception of your official purchase order AND all technical, logistic and commercial doubts are fully clarified.
- Payment conditions: 30% of order amount in advance, 30% before shipment from Spain, 40% by delivery at site.
- This offer is valid until xxx.
- Rest of conditions as per Ormazabal General Sales Conditions. Please check them at [www.ormazabal.com](http://www.ormazabal.com)
- Please indicate the following number in case of order: O-xxxx

## 3. DRAWINGS

Attached drawings PO14182R0



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ORMABLOC CGMcosmos / PFU-3

Dibujado por	I.F.G.	14-06-11
Revisado por	E.D.S.	
Aprobado por		

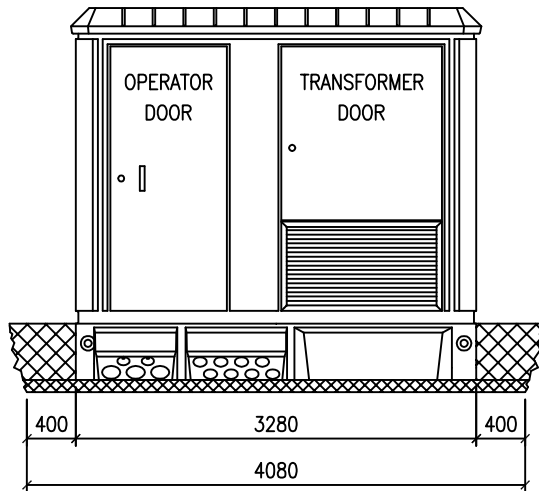
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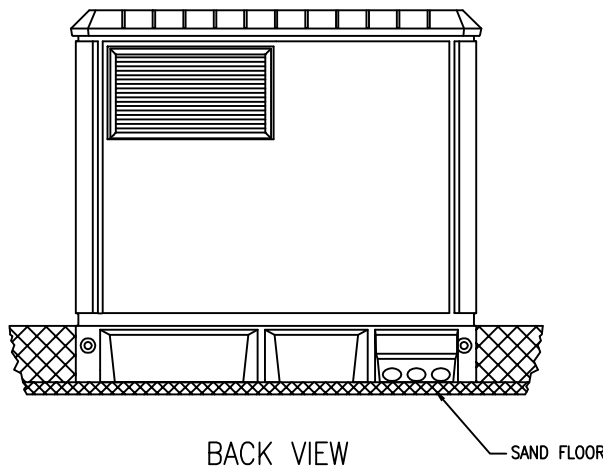
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 metric Ref. No.

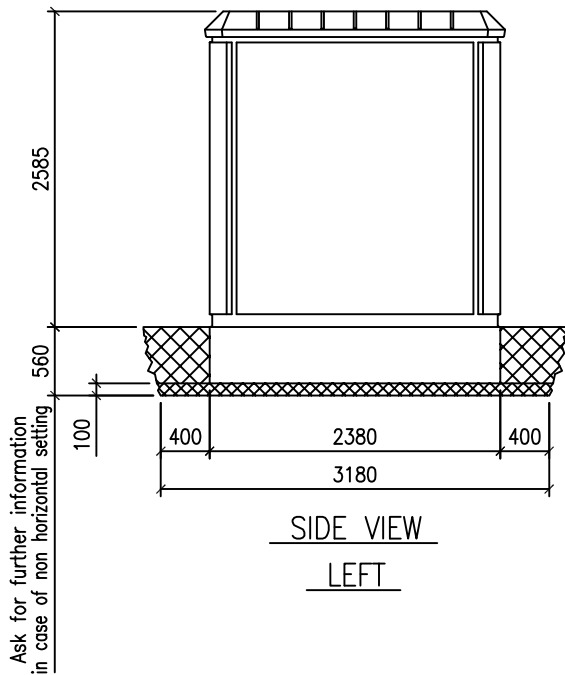




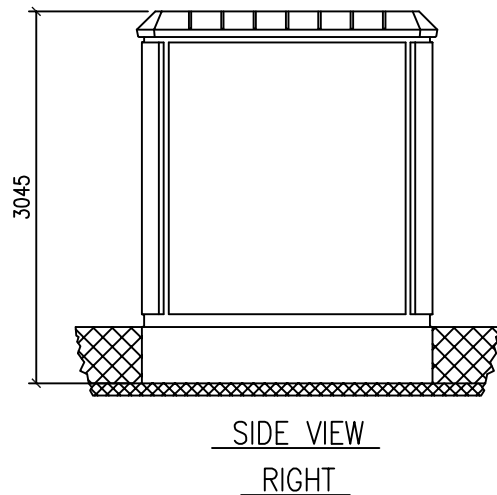
FRONT VIEW



BACK VIEW



SIDE VIEW LEFT



SIDE VIEW RIGHT

EXCAVATION MINIMUM DIMENSIONS  
4.08 m. long x 3.18 m. wide x 0.56 m. deep



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PFU-3

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Rev. N°: 0 Hoja 2 de 2

Dibujado por I.F.G. 14-06-11

Escala: 1/60

Revisado por E.D.S.

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