Modular Solutions for Prefabricated e-Rooms
INGEHOUSE system offers **prefabricated and modular designed Power Control Rooms** (PCRs), housing complete power distribution and control cabinets for industrial installations in prefabricated, solid, transportable and re-locatable enclosures.

Its modular and flexible design can meet any equipment configuration and requirement. Its modularity also makes possible its transportation according to the transit gage limitations established by the destination country. Logistic is taken into account from designing phase.

**INGEHOUSE** system is supplied duly **seaworthy packaged** ready to be transported by ship, and also with special packages when required.

Depending on the **configuration of the equipment** to be installed and the physical limitation of the facility **INGEHOUSE** offers two different type of enclosures.
Ingenteam Power Technology, S.A.

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Enclosure units meet ISO container dimensions (ISO 668, ISO 1161).

Any kind of configuration is possible combining unitary modules.

To pile them up to get rooms with different levels is also achievable.
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**INGEHOUSE MOD**

Custom-engineered enclosures, built by combination of standard transportable modules.

Typical dimensions:

- H: 3.000/3.300/3.600 mm
- W: 2.500 ÷ 5.000 mm
- L: 6.100/12.200/18.300 mm

Larger configurations can be supplied in separated modules assembled on-site
INGEHOUSE is the alternative to traditional on-site building constructions, featuring an e-room completely assembled and tested at OEM facilities. It is transportable, easy to relocate and to expand, and designed to withstand the most challenging weather conditions.
SECTORS & APPLICATIONS
Modular Solutions for Prefabricated e-Rooms

INDUSTRY

INGEHOUSE is a solutions widely implemented in different industrial sectors, mainly:

- Mining
- Oil & Gas
- Steel
- Water and Environment
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**Country:** Russia  
**Sector:** Mining
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Country: Russia
Sector: Mining
INGEHOUSE offers the right solution to cover the specific demand of each sector:

- Wind Farms
- Solar Power Plants
- DERs and Distribution Grids
- Substations
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**Country:** Angola

**Sector:** Energy. Thermal Power Plants
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*Country:* Algeria  
*Sector:* Energy. Combined Cycle Power Plant
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**Country:** Italy  
**Sector:** Energy. Photovoltaic Farm
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Characteristics

- Resistant frame built with steel profiles (ASTM A36).
- Inner and outer panels made of galvanized steel (G90) with the following min. sheet thickness:
  - Outer: 2 mm
  - Inner: 1.5 mm
  - Roof: 2.5 mm
  - Ceiling: 1.5 mm
  - Doors: 2.5 mm
  - Floor: 6 mm, coated with antiskid material
- Live load up to 3000 kg/m2.

Environmental Conditions

- Installation altitude: up to 4,500 msnm
- Min. outdoor temperature: -20°C
- Max. outdoor temperature: 45°C
- Pollution: Severe dust ambient
- Seismic category: Zone 4 UBC
- Wind: up to 180 km/h

Metal enclosure

- Installation altitude: up to 4,500 msnm
- Min. outdoor temperature: -20°C
- Max. outdoor temperature: 45°C
- Pollution: Severe dust ambient
- Seismic category: Zone 4 UBC
- Wind: up to 180 km/h
Modular Solutions for Prefabricated e-Rooms

Characteristics

Protection and Isolation

- Wall and ceiling isolation with standard thickness of 50÷75mm, made of mineral wool, polyurethane foam or extruded polystyrene panels.
- Thermal transmittance $K<0.5 \text{ W/m}^2\text{°C}$
- Average acoustic insulation $> 25 \text{ dB}$
- Protection rating IP65
- Fire resistance F120 (120 minutes)
- Paint system according to customer specification

Interconnection

- Wire entry and exit floor cutouts, with screwed 5mm aluminum watertight covers.
- Interconnection wire-ways are fireproof sealed.
- Ground bus on perimeter with multiple connection to external ground system.
Modular Solutions for Prefabricated e-Rooms

Characteristics

Access

- Personnel access designed for each specific installation.
- Access and presence control:
  - Low temperature resistant automatic locks.
  - Fingerprint readers and security cards and codes.
  - IP or CCTV cameras for remote monitoring, with or without recording.
- Equipment rear access doors.
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Characteristics

Safety

- Upper vented plenum for arc-resistant applications.

- Fire detection and suppression system with local panels (LFP) communicated with central control panel (PFP) and with control over HVAC and pressurization system.

- Alarm system: sirens, horns, beacons.
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Auxiliary systems

HVAC

• Different systems and solutions designed to evacuate thermal loads and to maintain the room at the specified temperature range (20°C ... 25°C)

Pressurization

• Independent pressurization equipment with air filtering function (dust bags or cartridges) and automatic cleaning sequences.
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Auxiliary systems

Lightning

- Indoor
- Outdoor
- Security

Auxiliary Systems

- DC battery system.
- Convenience outlet.
- Public address system.
- Remote operation and monitoring.
- Personnel accommodation (offices, resting areas, bathrooms, etc.).
- O&M kit.
**INGEHOUSE** is an *integral* solution that **enables customers** to deal with a *sole supplier* from designing to start-up on site.
Modular Solutions for Prefabricated e-Rooms

Customer → INGEHOUSE → Modular Solutions for Prefabricated e-Rooms → Applications → Value → Components → Industrial Solutions
INGEHOUSE shortens significantly the life-time investment cycle, from customer order up to start-up on site:

- The delivery time for a complete INGEHOUSE solution is only 2÷3 weeks longer than separate equipment supply.
- All equipment and auxiliary systems are fully tested before its delivery (FAT’s).
- Shipping is easier and shorter.
- Civil works on site are drastically reduced saving time and money.
INGEHOUSE reduces installation investment and operation and maintenance costs:

- Significant works on site are not necessary.
- Highly qualified personnel for its assembly is not required.
- Design is optimized to meet customer requirements and is ready to be enlarged according to future needs.
- It can be installed closed to the main consumers, reducing losses and interconnection costs.
**INGEHOUSE** reduces the necessary resources the customer must assign to the different investment performances and guarantees its proper start-up at the minimum term.

**ROI**
- Integrated supply
- Reliability
- Flexible design
- Easy to expand
- Easy to relocate

**Capex**
- Delivery time
- Purchasing management
- Project management
- Logistic
- Civil works and buildings
- Start-up time
- Opex
INGETEAM SOLUTIONS
INGEHOUSE is a flexible solution, housing complete power distribution and control cabinets such as:

- **MV Distribution Center:**
  - Distribution Cabinets from 1 to 36 kV.
  - Transformation Centers.
  - Motor Control Centers (MCC) from 1 to 7,2 kV.

- **Variable Frequency Drives (VFD):**
  - Medium Voltage up to 36 kVA
  - Low Voltage up to 6,5 kVA

- **Low Voltage Cabinets:**
  - Power Distribution Cabinets
  - AC and DC Motor Control Centers
  - Starter Cabinets
  - Auxiliaries

- **Control Boards:**
  - Protection and Measurement Boards
  - Regulation and Control Cabinet
  - PLC’s, Distributed Controls Systems DCS
  - Control Desks, Consoles, Synoptics
  - SCADA
  - Communications
  - Remote Operation and Monitoring
Modular Solutions for Prefabricated e-Rooms

Medium Voltage Distribution Centers  **MVDC**

**Execution**
- Fixed or Withdrawable
- IEC 62271-200

**Electrical Specifications**
- Rated Voltage: 7,2/12,5/17,5/24/36V
- Rated Current: 3150/4000A
- Max. Short-circuit Current: 50kA, 3seg
- Frequency: 50/60Hz
- Arc Resistant Level: 50kA 0,5seg

**Mechanical Specifications**
- Type: LSC1/LSC2A
- Protection: IP42 (certified)
- Structure: Screwed panel
- Thickness: 2÷3mm

**Testing**
- Heating: 62271-200
- Short-circuit: 62271-200
- Protection: 20324:1993
- Arc Resistant Level: 62271-200
- Seismic: 60068-3-3
Modular Solutions for Prefabricated e-Rooms

Low Voltage Distribution Centers - LVDC

Main Power/Distribution Cabinets
According to IEC 60439 standard

Electrical Specifications
Rated Voltage: 220/380/440/690V
Rated Current: 6000A
Max. Short-circuit Current: 100kA
Frequency: 50/60Hz

Mechanical Specifications
Minimum Protection: IP42 (certified)
Minimum Thickness: 2mm
Structure: Screwed Panel
Internal Divisions: 1, 2, 3b, 4b

Testing
Heating: 60439-1:2001
Short-circuit: 60439-1:2001
Protection: 20324:1993
Seismic: 60068-3-3
Modular Solutions for Prefabricated e-Rooms

Low Voltage Motor Control Centers  LV MCC

Motor Control Centers Fixed & Withdrawable
According IEC 60439 standard

Electrical Specifications
Rated Voltage  220/380/440/690V
Rated Current  3150A
Max. Short-circuit Current  70kA
Frequency  50/60Hz

Mechanical Specifications
Minimum Protection  IP54 (certified)
Minimum Thickness  2mm
Structure  Screwed Panel
Internal Divisions  3b or 4b

Testing
Heating  60439-1:2001
Short-circuit  60439-1:2001
Protection  20324:1993
Seismic  60068-3-3
Variable Speed Drives **VSD**

AC Frequency converters based on a combination of a rectifier stage with different options (DFE or AFE), a DC bus and an inverter stage with two or three levels NPC.
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Variable Speed Drives

Motor Voltage

![Diagram showing variable speed drives with Motor Voltage and Power Range KVA]
Modular Solutions for Prefabricated e-Rooms

- **Protection and Control Integrated System: SIPC**
  - Supervision console
  - Substation control unit: UCS
  - Position control unit: TCP
  - Protection PL70
  - Multifunction protection: PL300
  - Motor protection: PM300
  - Transformer/generator differential protection: PD300
  - Distance protection: PZ1000

- **61850 solutions**
  - Automation and RTU: IC3
  - Local IEDs: Ingepac EF
  - Software tools: Energy Factory Suite
  - Human Machine Interface (HMI): Ingesys IT
Modular Solutions for Prefabricated e-Rooms

Protection and Control Integrated System **SIPC**

**SOLUTIONS**

**APPLICATIONS**

**COMPONENTS**

**VALUE**

**INGLETEAM**
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Protection and Control Integrated System **SIPC**

![Diagram of Protection and Control Integrated System](image)
technology + innovation + commitment