

MV DRIVE E-HOUSE PRODUCT FAMILY

# MPA-200

Prefabricated MV VFD E-House Solution for Fan  
& Pump application

Modular · Prefabricated · Digitalized · Safety Integrated

Product Promotion Version | 2026-05-30



## MARKET CONTEXT

# The Market Is Moving to Prefabricated E-House Solutions

The E-House market is a growing modular power-distribution segment. Owners need grid modernization, renewable integration, faster industrial deployment, and compact solutions for constrained sites.

**\$1.72B**

E-House Market 2024

→ \$3.05B by 2033

**\$52.1B**

MV VFD Market 2024

→ \$86.5B by 2032

Source: Grand View Research (2024), Market reports for E-House and MV VFD segments

## Key Demand Drivers

### Schedule Compression

Power infrastructure is often on the critical path for industrial projects

### Grid Modernization

Utilities need fast replacement, bypass, and expansion options

### Remote Industrial Sites

Mining and process plants need robust transportable power rooms

### Reduced Site Labor

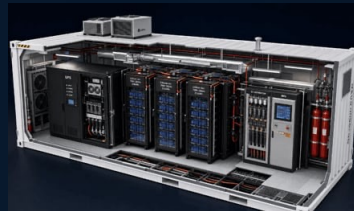
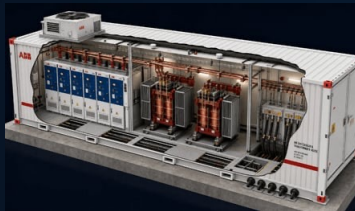
Skilled electrical labor can be constrained at remote project sites

### Renewable Integration

Solar, wind, BESS need repeatable grid-connection packages

### Data Center Growth

Data centers need compact, repeatable power blocks for expansion



# MPA-200 Is a Productized MV Drive E-House Platform

## DEFINITION

**Not a single cabinet, but an integrated product platform with two configurable variants.**

MPA-200A for pump stations (1–5MW, 20ft container) and MPA-200B for power plant automation (multi-module, 4×1800kW). Both share the same platform architecture: power chain, automation, auxiliary systems, safety, and digital service.

The platform integrates five delivery dimensions



## CUSTOMER OUTCOME

### Shorter Site Schedule

Prefabricated integration reduces onsite coordination and installation uncertainty.

### Clearer Interfaces

Defined product boundary simplifies EPC, owner and vendor responsibilities.

### Higher Availability

HVAC, fire, automation and monitoring designed together from the beginning.

### Repeatable Delivery

Scenario-based standard packages support faster quotation and replication.

**From project integration to product delivery**

MPA-200 converts medium-voltage drive rooms into a **standardized, configurable and serviceable E-House product family** for industrial customers and channel partners.

# Six Modules Define the Product Boundary

A configurable MPA-200 package that converts project scope into repeatable delivery interfaces.

**EHOUSE**

MODULAR · PREFABRICATED · DIGITALIZED

MPA-200 is not a single cabinet. It is a productized E-House system assembled from six functional modules.

## A MV Switchgear

Incoming, busbar, metering, feeder and protection interfaces.

## B MV VFD

Drive room, transformers, bypass options, cooling and drive quantity.

## C Control Room

PLC, SCADA server, HMI, networking, UPS/DC and remote access.

## D HVAC

Precision air conditioning, hot/cold aisles, sensors and redundancy.

## E Fire Protection

VESDA, smoke/temperature alarms, suppression and interlock matrix.

## F Digital Energy

Energy monitoring, trends, reports, alarms and diagnostic interfaces.

### BOUNDARY LOGIC

The six-module definition aligns technical configuration, procurement scope, FAT/SAT checks, and customer handover documents into one repeatable product package.

### REFERENCE TECHNICAL ARCHITECTURE



**Power chain + automation chain + auxiliary safety systems** are packaged together so the project team can manage interfaces by module rather than by isolated equipment item.

MPA-200 Product Boundary

Conceptual technical illustration

## MPA-200 ARCHITECTURE LOGIC

# System Architecture

### Main Power Chain

Utility Grid → MV Switchgear → MV VFD → Motor → Process Equipment

The medium-voltage power path is packaged for repeatable engineering, coordinated protection, and simplified site interfaces.

Typical loads: pumps, fans, compressors, mills, and other large MV motor systems.

### Control & Data Chain

PLC / RTU → SCADA / HMI → Energy Platform → Remote O&M

Equipment status, alarms, trends, energy consumption, and reports are unified through a local monitoring layer and digital energy platform.

Data objects: drive status, motor status, HVAC, fire, meter, UPS, power quality.

### Auxiliary & Safety

HVAC · Fire System · UPS/DC · Metering · Cybersecurity

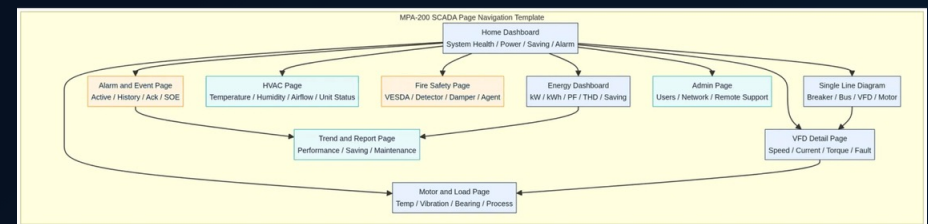
Environmental control, detection, interlocking, emergency response, power backup, and access governance are designed as part of the product boundary.

Verified through standard I/O, fire matrix, HVAC calculation, FAT, and SAT templates.

Power chain + automation + auxiliary systems  
integrated into one prefabricated E-House package

### SCADA Navigation as the Operating View

### DIGITAL INTERFACE

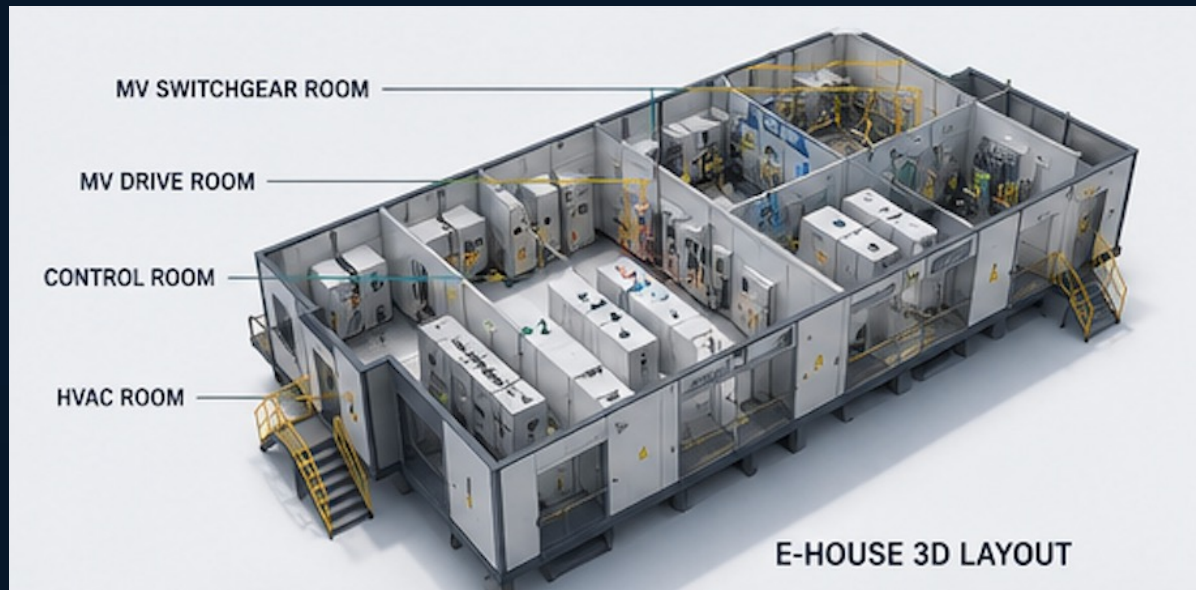


The SCADA layer translates the electrical architecture into actionable pages for overview, drive status, motor status, energy monitoring, HVAC, alarms, trends, reports, and settings.



# Architecture Attachment

Conceptual technical illustration for MPA-200 E-House layout, auxiliary systems, and safety integration



## ENGINEERING ATTACHMENT

**A productized layout makes the E-House easier to configure, review, manufacture, and verify.**

The layout template translates the MPA-200 product boundary into a physical cabin arrangement, linking electrical rooms, equipment access, HVAC zones, fire protection interfaces, and commissioning checkpoints into one repeatable engineering reference.

This page is intended as a conceptual technical illustration. Final dimensions, equipment quantities, protection ratings, and room zoning shall be confirmed against project-specific engineering documents.

### Room-Level Zoning

Supports separation of MV switchgear, drive equipment, control functions, HVAC service space, and maintenance circulation.

### Safety & Auxiliary Interfaces

Provides a reference for HVAC, fire detection, suppression, emergency access, alarm routing, and operating clearances.

### Repeatable Delivery Reference

Helps sales, engineering, manufacturing, FAT, SAT, and site teams align on the same productized E-House boundary.

# Technical Package Supports Fast Engineering

Standard templates convert repeated engineering work into a controlled product delivery process.

# 8

## Core technical deliverables for repeatable MPA-200 delivery

The package connects **design, integration, operation and verification** so sales, engineering, manufacturing, commissioning and service teams work from the same product boundary.

### 01 · DESIGN BASIS

#### Electrical & Spatial Definition

##### Single Line Diagram

Defines the utility interface, MV switchgear, MV VFD feeders, motor loads and protection boundary.

##### E-House Layout

Translates equipment scope into room zoning, access, maintenance clearance and auxiliary space.

### 02 · INTEGRATION BASIS

#### Signals & Functional Interfaces

##### I/O List

Standardizes PLC/RTU signals, status points, alarms, interlocks and equipment communication tags.

##### SCADA Page Template

Provides overview, drive status, motor status, HVAC, alarms, trends, reports and settings pages.

### 03 · AUXILIARY SYSTEMS

#### Environment & Safety Logic

##### HVAC Calculation

Supports heat-load review, cooling capacity, temperature control and redundancy assumptions.

##### Fire Matrix

Defines VESDA, smoke/temperature alarm, release logic, shutdown actions and emergency response.

### 04 · VERIFICATION

#### Factory & Site Acceptance

##### FAT Checklist

Confirms wiring, devices, logic, alarms, SCADA pages, interlocks and documentation before shipment.

##### SAT Checklist

Controls site inspection, energization support, loop checks, function tests and handover evidence.

## Standard Inputs

### Faster Quotation

Module boundaries and template assumptions reduce early-stage ambiguity.

### Faster Engineering

Reusable documents shorten design iteration and internal review cycles.

### Lower Interface Risk

Power, automation, HVAC, fire, and O&M interfaces are confirmed as one package.

### Evidence-Based Handover

FAT/SAT records connect factory integration to site acceptance and lifecycle support.

## Repeatable Outcomes

# 3D Layout Shows Productized Space Planning

From equipment list to engineered cabin zones with access, cooling, safety and O&M logic built in

## MPA-200 turns an electrical room into a repeatable E-House product layout.

The 3D layout makes room relationships visible before manufacturing and site work begin, helping sales, engineering, customer review, FAT preparation and commissioning teams align on the same spatial plan.

01

### MV Switchgear Zone

Incoming, feeder, metering and protection cabinets are arranged for cable access and operating clearance.

02

### MV Drive Zone

VFD lineups, transformers, bypass options and cooling paths are coordinated within the prefabricated cabin.

03

### Control & O&M Zone

PLC, SCADA, networking, UPS/DC and maintenance circulation are organized for operability and service access.

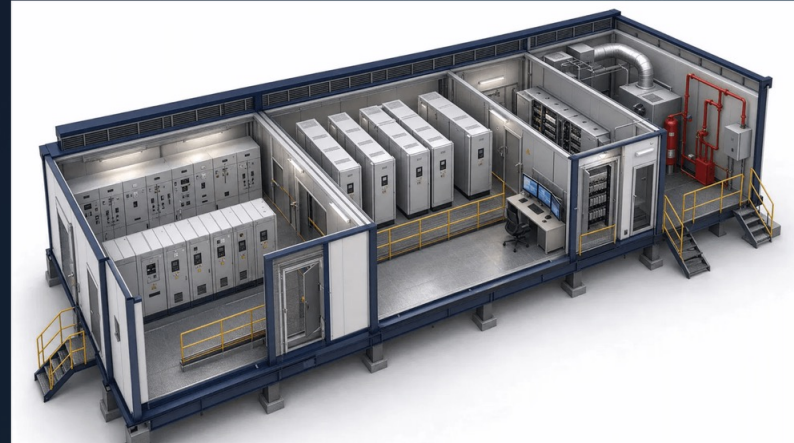
04

### Auxiliary Safety Zone

HVAC, fire detection, suppression interfaces, alarms and emergency response points are integrated by design.

Generated E-House 3D Cutaway Layout

CONCEPTUAL VISUALIZATION



## Why 3D matters

A visualized layout reduces ambiguity in room zoning, access direction, equipment sequence, HVAC routing, fire-protection coverage and customer review. It also supports a clearer handover from proposal to detailed engineering.



## Internal O&M Space

### DESIGN INTENT

The E-House is engineered as an operable electrical room, not only as an equipment container.

MPA-200 internal space planning supports routine inspection, troubleshooting, emergency response, and lifecycle service. Clear access routes and maintainable equipment faces help reduce operating risk after commissioning.

#### 01 Defined Access Corridor

Supports inspection of MV switchgear, VFD cabinets, control panels, UPS/DC, HVAC interfaces, and fire equipment.

#### 02

#### Serviceable Equipment Faces

Allows front-side operation, planned maintenance, replacement work, and commissioning checks with clearer working zones.

#### 03 Safety-Oriented Circulation

Improves visibility,

Operation access, safe inspection routes, and serviceable equipment arrangement

### Generated 3D Interior Corridor Visualization

### O&M SPACE



**Interior operation space is part of the product value.** By considering access, cooling paths, fire detection, cabinet operation faces, and service routes together, MPA-200 improves long-term maintainability and reduces dependence on ad-hoc site arrangements.



# Digital Platform Turns Equipment into Operable Data

**MPA-200 converts the MV drive E-House from a packaged electrical room into a measurable, diagnosable and serviceable asset.**

The digital platform connects equipment signals, control logic, operator pages, energy indicators and remote support workflows, so customers can operate the package with clearer evidence and faster response.

## Device Layer

**MV switchgear, VFD, motor, HVAC, fire, meter and UPS/DC**

Field devices provide running status, alarms, trips, measurements, environmental conditions and power-quality data.

SOURCE SIGNALS →  
STRUCTURED TAGS

## Local SCADA

**HMI overview, alarms, trends, reports and historian**

Operators view drive status, motor status, HVAC, alarms, trends and reports through a

## Edge Control

**PLC / RTU, industrial Ethernet, time sync and cybersecurity**

Local control and communication architecture standardizes data acquisition, interlocking, alarm handling and secure access boundaries.

CONTROL LOGIC → VALIDATED  
EVENTS

## Energy O&M

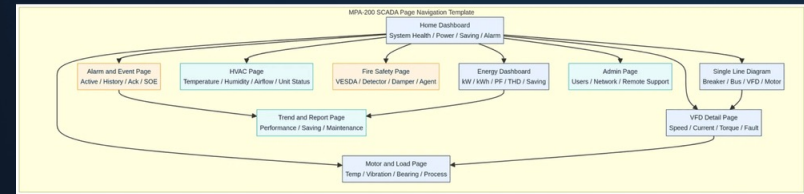
**Energy baseline, KPI, power quality, saving report and remote support**

Energy data and service records support lifecycle

Device acquisition, SCADA operation, diagnostics, energy reporting and remote O&M in one data chain

## SCADA Navigation as the Operating Front End

### OPERATOR VIEW



## From signal to decision

The SCADA layer transforms equipment signals into pages for overview, drive status, motor status, energy monitor, HVAC system, alarms, trends, reports and settings.

### Alarm Management

Reduces missed warnings and supports closed-loop event handling.

### Energy Reporting

Supports baseline, KPI, power-quality and saving-report workflows.

### Trend Visibility

Tracks load, temperature, status and energy patterns over time.

### Remote O&M

Enables authorized access, log tracing, version support and expert service.

# Safety Integration Is Designed In

HVAC, Novec 1230 fire suppression, interlocks, emergency stop and FAT/SAT evidence as one logic chain

## 01 · ENVIRONMENTAL PROTECTION

### HVAC keeps electrical assets within controlled conditions.

Precision cooling sized per heat load. MPA-200B uses 3x180kW (N+1) units with 28,600 m<sup>3</sup>/h airflow per E-House module.

**Cooling** N+1 precision AC for MV switchgear and VFD cabinets. Ambient: -5°C to +40°C.

**Airflow** Hot air exhaust + fresh air inlet with temperature distribution simulation.

**Monitoring** Temperature, humidity, filter alarms integrated to PLC/SCADA.

## 02 · FIRE & EMERGENCY LOGIC

### Novec 1230 gas suppression with 2-zone detection.

Clean agent fire suppression (FM200 or Novec 1230) with dual-zone coverage. Smoke detectors, VESDA early warning, and manual release stations.

**Detection** VESDA early warning + smoke/heat detectors per zone.

**Suppression** Novec 1230 / FM200 clean agent, gas bottle rack + nozzles.

**Interlocks** E-stop, HVAC shutdown, damper close, VFD trip per fire matrix.

## 03 · VERIFICATION EVIDENCE

### FAT/SAT converts safety design into testable evidence.

Factory and site procedures verify alarms, logic sequences, and handover records per IEC 61439 / IEC 62271 standards.

**FAT** Factory checks: wiring, devices, alarm behavior, interlock logic.

**SAT** Site checks: installation, functional response, loop verification.

**Standards** IEC 61439, IEC 62271, IP54/IP55 enclosure protection.

## DETECT

### VESDA / Smoke / Heat

Early warning and zone-level sensing

## DECIDE

### Fire Matrix & PLC Logic

Signal mapping, permissive and interlock

## RESPOND

### Novec 1230 Release

Gas suppression + HVAC shutdown + E-stop

## VERIFY

### FAT / SAT Records

IEC 61439/62271 acceptance evidence

## Customer Value

**MPA-200 reduces safety-interface uncertainty** by designing HVAC (N+1), Novec 1230 fire suppression, and digital alarm visibility into one prefabricated package with IEC-compliant verification.

# Where MPA-200 Creates the Strongest Fit

Buyers who value schedule certainty, integrated engineering, reduced site risk, and modular deployment

## SEGMENT POSITIONING

**Two variants serve six core market segments with tailored configurations.**

MPA-200A for compact pump/utility applications. MPA-200B for large power plant automation with multi-module configurations.

## Selection Logic

- A** 1–5MW pump/utility loads → MPA-200A compact 20ft container
- B** Multi-MW power plant VFD systems → MPA-200B multi-module
- +** Both share: PLC+SCADA, HVAC, fire protection, digital platform

### Utilities & Grid

200A

Brownfield upgrade windows are short and outages are difficult to schedule.

**Position:** Modular substation replacement for faster energization.

### Data Centers

200A

Capacity must be deployed quickly while maintaining reliability.

**Position:** Repeatable power block for critical infrastructure expansion.

### Mining & Remote

200A

Site labor is expensive, logistics are difficult, harsh environments increase risk.

**Position:** Ruggedized factory-integrated electrical room for remote deployment.

### Oil & Gas

200B

Safety, hazardous interfaces, and approval requirements are demanding.

**Position:** Engineered electrical room with fire, gas, and hazardous-area interface.

### Renewables & BESS

200A

Grid interfaces and site construction schedules must be coordinated.

**Position:** Modular collector, PCS interface, or auxiliary power E-House.

### Power Generation

200B

High-power VFD systems for ID/FD fans, pumps with 24/7 operation.

**Position:** Power plant automation house with N+1 HVAC and Novec 1230.

## Common Pattern

**These buyers are not shopping for a low-cost enclosure.** They seek a risk-reduction package combining engineering, manufacturing, testing, logistics, and documentation.

**One platform, two variants, six market segments.**

# Controlled Delivery Chain for MPA-200

Factory prefabricated, FAT completed,  
plug & play deployment for both variants

**Both MPA-200A and MPA-200B share the same 7-stage delivery workflow.**

All-in-One prefabricated solution: factory assembled, FAT completed, shipped as a complete unit. Site work is limited to foundation, cable connection, and SAT verification.

| 01                                                                                                       | 02                                                                                         | 03                                                                                            | 04                                                                                                          | 05                                                                                                      | 06                                                                                                     | 07                                                                                      |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Requirements Clarification</b>                                                                        | <b>Selection &amp; Configuration</b>                                                       | <b>Engineering Design</b>                                                                     | <b>Prefabrication</b>                                                                                       | <b>Factory Acceptance Test</b>                                                                          | <b>Site Acceptance Test</b>                                                                            | <b>Remote O&amp;M</b>                                                                   |
| Confirm process duty, motor list, grid voltage, site condition, customer standards and package boundary. | Select MV drive, switchgear, transformer, bypass, control, HVAC, fire and digital modules. | Develop SLD, layout, I/O, SCADA pages, HVAC load, fire matrix, cable and interface documents. | Manufacture E-House structure, install equipment, integrate wiring, auxiliary systems and digital platform. | Check wiring, logic, interlocks, alarms, SCADA display, HVAC, fire signals and documentation readiness. | Validate installation, loop tests, energization conditions, functional response and operator handover. | 24/7 continuous operation support: alarms, trends, diagnostics, predictive maintenance. |
| <b>Output: scope matrix</b>                                                                              | <b>Output: configured package</b>                                                          | <b>Output: design package</b>                                                                 | <b>Output: integrated cabin</b>                                                                             | <b>Output: FAT records</b>                                                                              | <b>Output: SAT acceptance</b>                                                                          | <b>Output: service continuity</b>                                                       |

## PLUG & PLAY CONCEPT

### Factory-complete delivery minimizes site work.

Both MPA-200A (20ft container) and MPA-200B (multi-module) arrive at site as complete, tested units. Site scope is limited to foundation, cable entry, and commissioning verification.

#### MPA-200A

12–16 tons, forklift pockets, single container delivery.

#### MPA-200B

Multi-module transport, bolted assembly on foundation.

#### Schedule

Prefabrication reduces site duration by 40–60%.

## EVIDENCE PACKAGE

### Each gate leaves records for acceptance and lifecycle support.

Drawings, I/O lists, SCADA templates, HVAC notes, fire logic, FAT/SAT checklists and O&M records transfer knowledge to operation.

#### Design

SLD, layout, control, HVAC and fire documents.

#### Test

Factory and site records for signals and functions.

#### Service

Remote monitoring, predictive maintenance history.



# Steel Industry E-House Solution

Scenario-based MV drive E-House configuration for steel manufacturing processes



## STEEL SCENARIO CONFIGURATION

### A repeatable E-House package for demanding steel plant environments.

MPA-200 can be configured around the plant's equipment, motor loads, site space and digital operation needs.

|           |                                                                                                                               |           |                                                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>P1</b> | <b>Manufacturing Process Fit</b><br><br>Supports raw-material handling, blast furnace, continuous casting and rolling areas.  | <b>P2</b> | <b>Internal Functional Rooms</b><br><br>Includes MV switchgear, VFD, MCC and PLC/control rooms with coordinated access.                                 |
| <b>P3</b> | <b>Application Areas</b><br><br>Suitable for BF fan houses, rolling-mill drives, casting houses and water-treatment E-Houses. | <b>P4</b> | <b>Structure &amp; Auxiliary Integration</b><br><br>Aligns enclosure, HVAC, fire protection, anti-vibration and O&M space into one engineered boundary. |

- 01 Process Coverage**  
Applicable to high-power motor and drive loads across steel production routes.
- 03 Plant-Ready O&M**  
Supports safer installation, faster site work and visible equipment operation.

- 02 Packaged Delivery**  
Integrates switchgear, VFD, MCC, PLC/control and auxiliary systems.

**Commercial message:** For steel customers and EPCs, MPA-200 reduces on-site

Feedwater and condensate extraction. Variable flow demand with pressure regulation.

FGD slurry circulation. High torque at low speed. Continuous duty 24/7 operation.

### STEP 5

#### Fan / Pump Load

# Differentiation Comes from Scenario-Based Standard Packages

MPA-200 is positioned against site-built rooms, standalone drives, generic E-Houses and low-cost integration

## STRATEGIC POSITION

**MPA-200 is not only a VFD cabinet; it is a productized MV drive E-House package.**

Combines power chain, automation, auxiliary systems, digital platform, safety logic and acceptance evidence into one repeatable model.

## Why this matters

- 01** Customers buy a defined package boundary instead of disparate equipment.
- 02** Distributors get a clearer product story and repeatable configuration.
- 03** EPCs receive drawings, FAT/SAT records and interface evidence earlier.

### ALTERNATIVE

### TYPICAL LIMITATION

### MPA-200 DIFFERENCE

### COMMERCIAL IMPACT

#### Traditional VFD Room

Site-built electrical room plus separate systems

Long coordination cycle, multiple interfaces and fragmented commissioning responsibility.

**Prefabricated package:** switchgear, MV drive, control, HVAC and digital interfaces engineered together.

Reduces ambiguity and speeds project alignment before site work accumulates.

#### Standalone Outdoor MV VFD

Drive-focused equipment supply

May solve speed control but leaves system architecture and operation visibility to the project.

**System boundary:** power chain, automation, environmental control and SCADA delivered as one package.

Shifts value from component sale to complete MV drive infrastructure.

#### Generic E-House

Containerized electrical room

Often customized and may lack a clear MV drive process story or repeatable module map.

**Scenario standardization:** module logic, SCADA architecture and reference templates are pre-structured.

Makes sales, engineering review and distributor training more consistent.

#### Low-Cost Local Integration

Price-led assembly approach

May reduce initial cost but increase lifecycle uncertainty via limited documentation and testing.

**Evidence-based delivery:** technical package, FAT/SAT workflow and remote O&M support simplify acceptance and maintenance.

Supports premium positioning through risk reduction and lifecycle service capability.

## Core Message

MPA-200 differentiates by packaging repeatable engineering knowledge into a product. It converts complex MV drive rooms into configurable offers with clear boundaries and traceable acceptance.

### Standard

Module map and reference templates

### Digital

SCADA, energy and diagnostics

### Projectable

Adaptable to industry scenarios

### Serviceable

FAT/SAT and lifecycle O&M

# Product Package + Engineering Package + Digital Service

Two configurable variants for pump stations and power plant automation

**MPA-200 is positioned as a standardized solution package, not a one-off electrical room.**

Two product variants (MPA-200A for pump stations, MPA-200B for power plants) share the same platform architecture: MV power chain, automation, auxiliary systems, digital monitoring, and delivery documentation.

01

## Product Package

MV switchgear, VFD, control, HVAC, fire protection, UPS/DC, metering and enclosure.

02

## Engineering Package

SLD, layout, I/O, SCADA, HVAC, fire matrix, FAT/SAT and handover records.

03

## Digital Service

SCADA, alarms, trends, energy reports, diagnostics, remote support and lifecycle O&M.

## Who gains value?

### End Users

Faster deployment, clearer O&M data and reliable production support.

### Distributors

Repeatable solution story with defined modules and easier selling.

### EPC Teams

Reduced interface risk, documented gates and simplified coordination.

## MPA-200 Product Family

## TWO VARIANTS



MPA-200A Pump Station



MPA-200B Power Plant

Configure around the application scenario, verify through engineering deliverables, extend value through digital service.

### Modular

Functional modules scale with project scope.

### Digitalized

Operation data supports monitoring and service.

### Prefabricated

Factory integration reduces site complexity.

### Project-Ready

Documentation supports faster acceptance.

## NEXT STEP

**Start with a project configuration workshop.**

**Recommended input:** motor list, voltage level, process duty, site conditions, cooling/fire requirements, communication requirements and preferred delivery schedule.

**MPA-200: a configurable MV drive E-House platform for industrial growth.**