



**ME-Automation Projects**

*Performance. Precision. Partnership.*

A Group Company of



ME-Automation Projects GmbH

**Your partner for  
the Electrical Balance  
of Plant (EBoP)**

We offer you a turnkey package  
with all the necessary components  
for the electrical balance  
of your plant.

*Performance. Precision. Partnership.*





# ME-Automation Projects

Performance. Precision. Partnership.

## COMPANY OVERVIEW



## WHO WE ARE

ME-Automation Projects GmbH (MEAG), a 100% subsidiary of Mitsubishi Electric Corporation, provides cutting edge solutions and services in the automation and electrification space. As a daughter company of Mitsubishi Electric Corporation,

MEAG stands for the same values. Our motto "Changes for the better" directly drives our attitude to "continuously strive to achieve something better", as we continue to change and grow.



WHAT WE DO

# PERFORMANCE. **PRECISION.** PARTNERSHIP.

Our statement of commitment to our customers.

## *Performance.*

Emphasizes the fact that MEAG always performs to the highest standards – within budget and on time.

## *Precision.*

Underlines that MEAG specifies and delivers projects with utmost care. Our engineers' precise eye for detail means that we meet our customers' exact requirements.

## *Partnership.*

Stands for lasting and successful partnerships with our customers. Working with us, your concerns and risks are reduced. MEAG is a trustworthy partner who consistently delivers as promised.

## **RELIABLE ENERGY SYSTEMS SUPPLIER**

We recognise that our customers require the latest, appropriate technology for their projects delivered by experienced suppliers who can ensure its successful and timely commissioning. To do justice to this expectation, we make sure that we select the correct and best technology and combine this with exceptional services to give our customers the exact and best solution for their plant as a fully comprehensive package provided by MEAG.

MEAG ensures through its engineering services and close co-operation with our clients that the provided technology solutions precisely and sufficiently address the needs of their projects. This ensures the most cost-effective and optimally operable solution for the client's investment.





### WHAT WE OFFER

# KEY CHALLENGES WITH ELECTRICAL BALANCE OF PLANT (EBoP) SYSTEMS

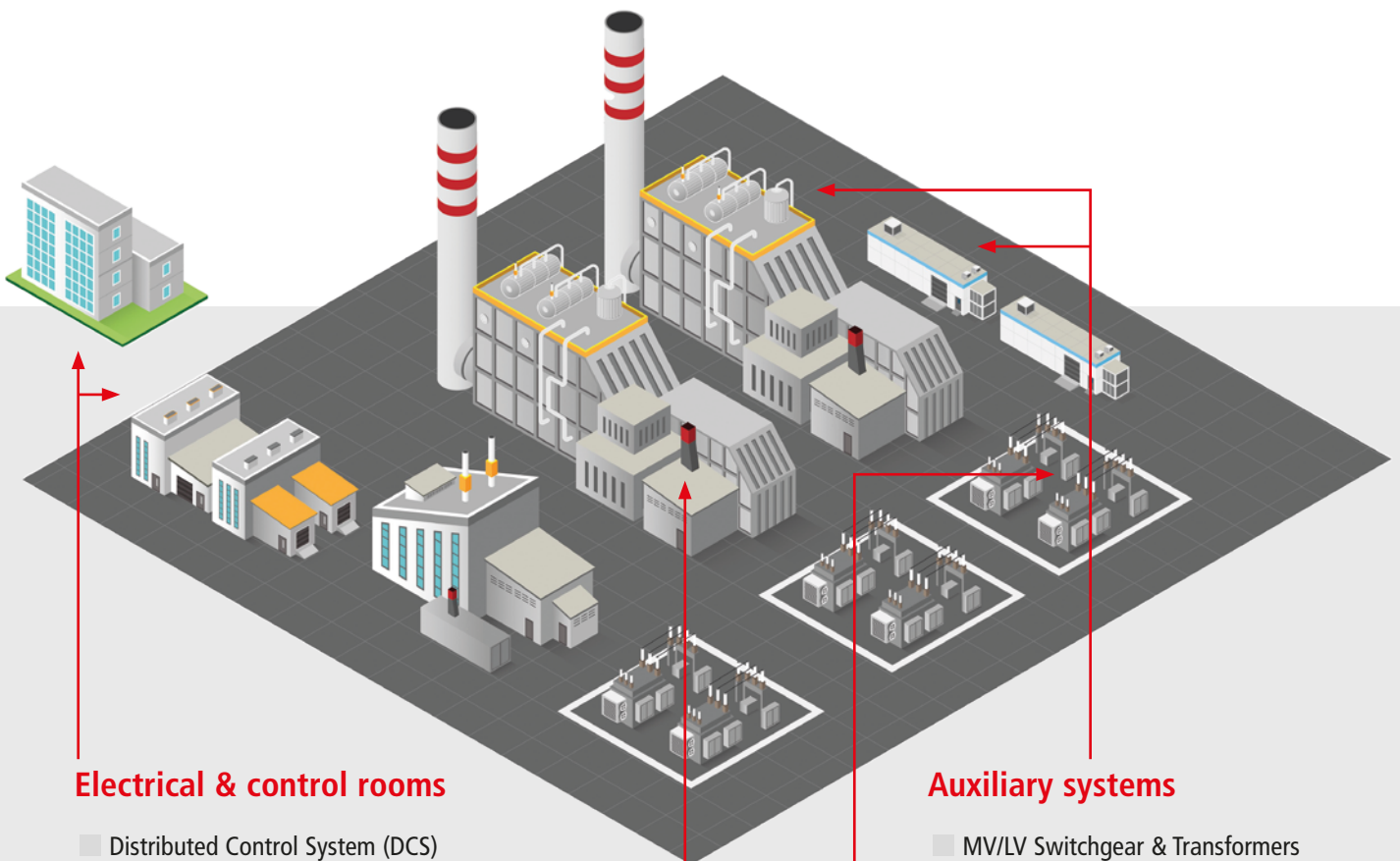


When extending or building any new plant, the successful implementation of the EBoP systems has to overcome multiple challenges, whether these be to ensuring compliance of the installation with all relevant local regulations, assuring a proper interconnection with the electricity supply, effective

interfacing with the plant's Automation System, or securing long-term support and upgrade-ability for the installation. Mitsubishi Electric is exactly the competent partner you need for the electrical distribution system of your next project.

WHAT WE OFFER

# ELECTRICAL SYSTEMS IN INDUSTRIAL PLANTS



## Electrical & control rooms

- Distributed Control System (DCS)
- MV/LV electrical distribution equipment
- MV feeder protection
- Power quality equipment
- MCCs & UPS (AC+DC)
- Telecommunications & site CCTV

## Auxiliary systems

- MV/LV Switchgear & Transformers
- MCCs
- Motors & Variable Speed Drives
- Motor protection
- Communications
- Substation automation & metering

## Associated Equipment

- Bus-duct and MV/LV cabling
- Generator Circuit Breaker
- Generator step up transformer
- Auxiliary transformers
- Protection & control equipment

## High Voltage Switchyard

- Communications
- Substation automation system
- Protection & control
- Metering



## ME-Automation Projects

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### WHAT WE OFFER



Our EBoP offering for industrial plants includes the complete package with all the required systems in your electrical switchgear and control rooms, auxiliary systems, HV switchyard, covering the Distributed Control System (DCS), MV/LV electrical distribution equipment, all protection relays, power quality equipment, UPS (AC and DC), telecommunications & site Closed-Circuit Television (CCTV).

Equipment we provide includes medium voltage as well as low voltage switchgears and transformers, Motor Control Centers (MCCs), electrical motors and variable speed drives as well as

motor protection, complemented by the latest communication systems, substation automation and metering.

In addition, we offer energy distribution bus-ducts and medium voltage/low voltage cabling, generator circuit breakers, generator step-up and auxiliary transformers as well as the necessary protection & control equipment.

**WHAT WE OFFER**

## Medium Voltage Switchgear

Our Type MS-EBG Medium Voltage Switchgear is an essential component of systems for the distribution of medium voltage electrical energy in the plant, ensuring reliable and safe distribution and switching of medium voltage electrical power throughout your plant and provides extensive protection of all medium voltage electrical equipment it supplies. We offer a package of highest possible safety, efficiency and availability for your plant. This includes the complete switchgear offer of circuit breakers, protection relays plus metering and energy

analyzers. Our MS-EBG Medium Voltage Switchgear is type-tested to IEC 62271 standards conformance, setting standards for long, trouble-free life and safe service.

In short, we cover the entire voltage range from 3.3 to 24kV and current ratings of up to 4000A busbar rated current and short-circuit withstand current of up to, 40kA / 3s and IP4X environmental protection (with IP55 as an option). The table below shows the technical specifications in detail.

### Key MS-EBG Specifications

1. Applicable standard		IEC 62271-200				
2. Switchgear type		AIS Metal enclosed. PM				
3. Rated voltage	$U_r$	kV rms	7.2	12	17,5	24
4. Rated power frequency withstand voltage	$U_d$	kV rms	20	28	38	50
5. Rated lightning impulse withstand voltage	$U_p$	kV peak	60	75	95	125
6. Rated frequency	$f_r$	Hz	50/60			
7. Rated normal busbar current	$I_r$	Arms	4000			
8. Rated short-time withstand current (symmetrical)*	$I_k$	kA rms	25, 31.5, 40, (50, 63)			
9. Rated duration of short-circuit	$t_k$	second	1,3			
10. Rated peak withstand current	$I_p$	kA	50 Hz: $2.5 \times I_k$ , 60 Hz: $2.6 \times I_k$			
11. Rated short-circuit breaking current*	$I_{sc}$	kA rms	25, 31.5, 40, 50			
12. Rated short-circuit making current*	$I_{mk}$	kA peak	63, 78.8, 100			
13. Degree of protection: MV compartments. LV compartments	-		IP4X, IP54 (option) IP 54			
14. Safety: Internal Arc Classification, Option. pressure relief duct (type tested)	-		AFLR, 40kA (50kA) rms 1 sec			
15. Loss of Service Continuity category	-		LSC2B-PM			

\* rating dependent



## WHAT WE OFFER

### Low Voltage Switchgear

Our Type LS-EBG Low Voltage Switchgear covers all low voltage power distribution and switching applications from main distribution boards, through Motor Control Centers (MCCs) to smaller building power distribution systems. LS-EBG includes a flexible configuration with a wide range of options. It provides protection against overload, short-circuit and electrocution and represents a switchgear package of highest possible reliability, safety, scalability and flexibility – all offered in a turnkey manner if required. We adapt the solution exactly to

client requirements, complemented by related equipment as needed, e.g. VFDs or soft starters, UPS, power quality and energy management.

LS-EBG covers voltage levels of up to 400Vac or 690Vac / 1000Vdc, busbar current ratings of up to 6800A, and short-circuit withstand currents of up to 120kA / 1s. LS-EBG’s environmental protection ranges from IP31 up to IP54 protection. The table below shows LS-EBG’s technical specifications in further detail.

#### Key LS-EBG Specifications

1. Applicable standard		EC61439-1 and -2
2. Switchgear type		Fixed and withdrawable (MCC) type
3. Rated operating voltage	$U_e$ kV	690 V AC
4. Rated insulation voltage	$U_i$ kV rms	1000 V AC
5. Rated impulse withstand voltage	$U_{imp}$ kV peak	6 / 8 / 12 kV, depending on equipment
6. Rated frequency	$f_r$ Hz	Up to 60Hz
7. Rated main busbar current	$I_e$ A rms	630A to 6300A
8. Rated short-time withstand current	$I_{pk}$ kA rms	Up to 120 kA / 1s
9. Rated peak withstand current	$I_{pk}$ kA	Up to 220 kA
10. Rated distribution bar current*	$I_e$ kA rms	1000 A / 2000 A
11. Rated peak withstand current	$I_{pk}$ kA peak	187 kA
12. Rated short-time withstand current	$I_{cw}$ kA peak	85 kA / 1s.
13. Degree of protection: MV compartments. LV compartments		IK10 mechanical & ≤ IP54 ingress protection
14. Seismic option		UBC cat.4 (Richter 7.x)
15. Form of internal subdivision		Up to type 4b

\* rating dependent



**WHAT WE OFFER**



## Transformers

Our transformer portfolio includes power and distribution transformers (oil- and dry-type) for MV/LV applications. Based on Mitsubishi Electric's rich experience in manufacturing transformers since 1910, it is possible to precisely match

customer specification and quality requirements. We provide transformers together with comprehensive transformer protection relays and monitoring equipment.



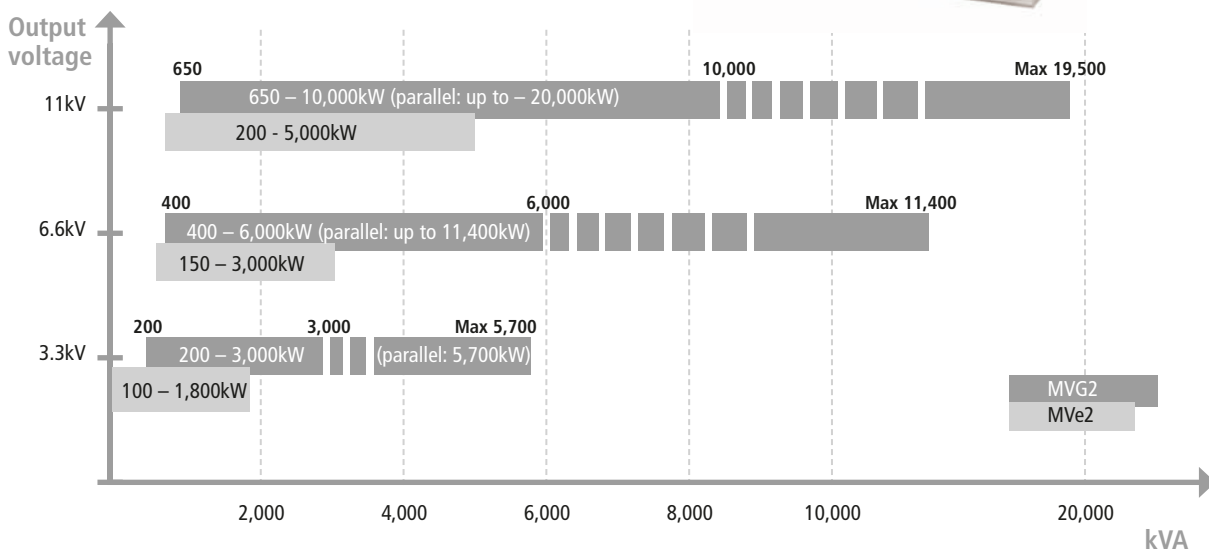
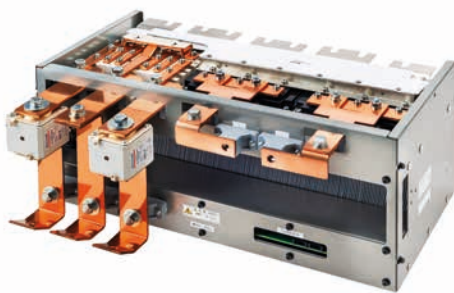
## WHAT WE OFFER

# MEDIUM VOLTAGE DRIVES

Our portfolio includes a wide range of medium voltage drives with output voltage of 3.3kV, 6.6kV and 11kV (13.8kV) and power rating of up to 20,000 kW. Our drive range of offered

products encompasses both regenerative TMdrive MVe2 and non-regenerative TMdrive MVG2 types as further specified below:

- Our MVe2 regenerative medium voltage drive is characterized by high reliability, evidenced by a proven 16-year mean time between failure, with plant availability benefits resulting from power supply failure compensation, ride through control and automatic restart control. Its energy recovery results in significant electricity cost savings while greatly improving maintainability and mean-time-to-repair, as the modules can be swapped out individually without any problems.
- The non-regenerative TMdrive MVG2 has a consciously conservative design with 1,700V IGBTs leading to it being extremely efficient at about 97+%, which results in lower energy costs. Multi-pulse rectifiers and phase shifted output transformers assure that no harmonic filter is needed and the clean output waveforms to the motors ensure minimal motor losses. Multiple motors can be fed from a single MVG2 drive because of its synchronous transfer to line option. Its small footprint makes installation easier than comparable drives.

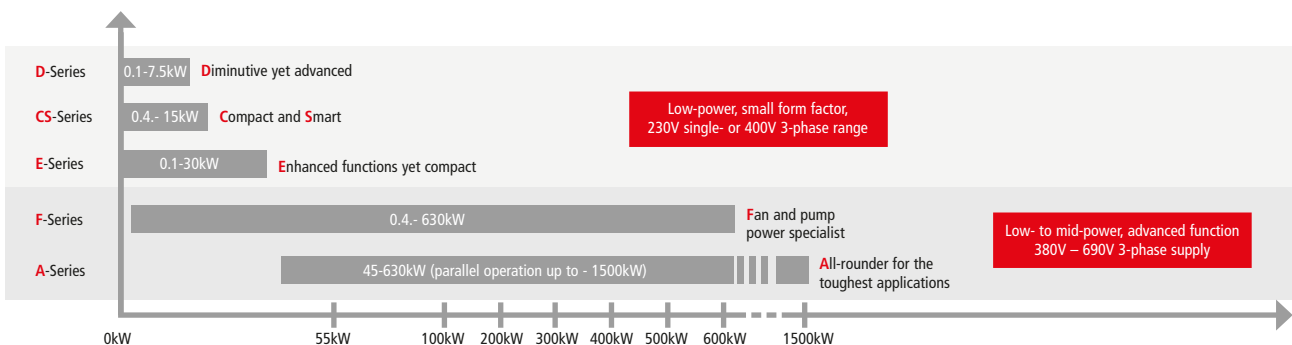


**WHAT WE OFFER**

# LOW VOLTAGE VARIABLE FREQUENCY DRIVES AND SOFT STARTERS

The Mitsubishi Electric FREQROL family of low voltage drives series includes several different variable frequency drives with a power output range of 0 – 1,500kW starting from low-power drives of small form factor (230V single-phase or 400V 3-phase range) to high power drives with advanced functions (380V – 690V 3-phase supply).

A full spectrum of our specialist and cost-effective models are available for routine variable-speed applications (e.g. pumps and fans), while yet others are used in precision position or speed control or in high-power, high-torque applications such as heavy-duty material handling in adverse environments.





**WHAT WE OFFER**

# PROTECTION RELAYS AND ENERGY ANALYZING METERS

Any electrical system requires extensive operational control as well as protection against off-design conditions, that might otherwise damage critical electrical machines or systems. With Mitsubishi Electric's various digital protection relays, this requirement is more than adequately met, with several options to choose from including IEC 61850 compliant relays. The EMC-B is perfect for general low voltage motor protection, while the MELPRO-D protection relay series is specialized for

MV digital protection applications. MEprotect is an extremely versatile DIN-rail mountable protection relay, equally at home in Medium Voltage and Low Voltage applications. Moreover, we offer energy analyzers such as our type ME96SS multi-measurement instruments. They are available with billing or standard accuracy as needed and provide the full gamut of power, energy and power quality measurements plus communication ports needed for all high-spec installations.



EMC-B



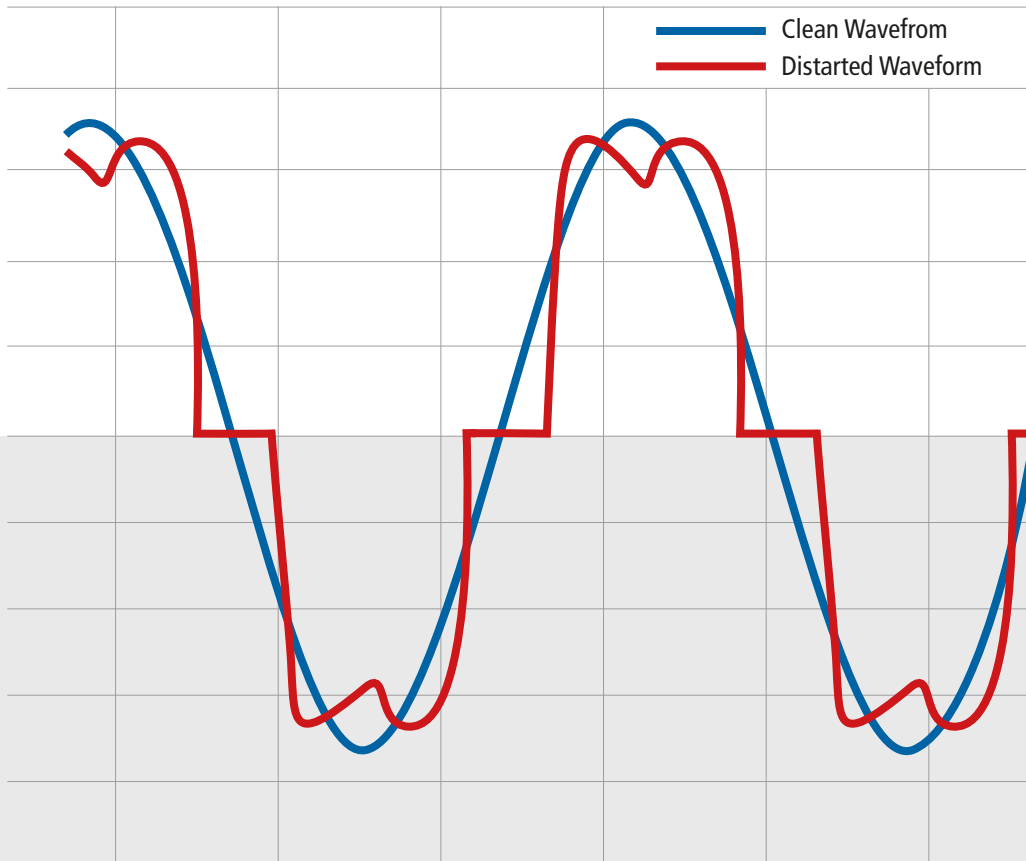
MEprotect



ME96SS



MELPRO-D

**WHAT WE OFFER**


## POWER QUALITY MANAGEMENT SYSTEMS

Any facility consuming significant amounts of electrical energy requires effective power quality management to track, avoid or better react to unexpected power interruptions including spikes, dips, surges or outages (and plant downtime), reduce utility bills through better power factor compensation, avoid penalties due to excessive harmonics and increase safety of the connected electric devices.

Our Power Quality Management offering includes solutions for reducing line harmonics to operate within regulatory limits, comply with electromagnetic compatibility regulations

(by reducing electromagnetic interference) and Power Factor Compensation to reduce utility bills, and to minimize power cabling and transformer size (and hence costs) to only that actually needed by the combined loads.

By using our Power Quality Management Systems, compliance with international power quality standards and regulations is ensured, so that utility connection permits are issued and the facility can be energized and brought online without costly project delays and penalties.



### WHAT WE OFFER



## PMSXsas SUBSTATION AUTOMATION SYSTEM

PMSXsas provides you with the opportunity to plan and execute your next EBoP installation as a smart substation project – confidently and without risk. PMSXsas clearly depicts substation primary (electrical) network state in addition to that of the system’s secondary network (control and protection scheme – protection equipment vendor neutral). Moreover, it supervises and regulates the safe operation of all remote-controllable breakers in the substation. The solution also includes monitoring of all substation components, such as transformers,

power quality equipment, major loads, etc. With respect to compliance with IEC 61850 standards, PMSXsas auto-discovers the network, control and protection topologies from the substation’s SCD-files, reducing setup costs and the chance of human error. Additional features are bidirectional maximum power control (demand or export), high-speed event recording and high precision disturbance analysis. The highest possible level of cyber-security will be ensured so that the system can be controlled locally or remotely for a network dispatch center.

WHAT WE OFFER

## UNINTERRUPTIBLE POWER SUPPLY (AC/DC)

The Mitsubishi Electric's Uninterruptible Power Supply (UPS) products range from small, single-phase (6 to 12 kVA) UPS to large three-phase (10 to 2,000 kVA) UPS covering all possible applications. The focus of our UPS design is on maximal reliability and availability, which is made possible by fast mean time to repair with modular hot-swap critical components. Our three-phase uninterruptible power supply systems are designed to be modular and expandable, so you can increase your backup power support as your needs change.

Supported by silicon carbide technology, online double conversion and compatible with a range of battery solutions, including lithium ion, you can rely on our three phase UPS products to protect your equipment. From server room UPS to large capacity UPS for Data Centres, we can help you find the best UPS to ensure maximum uptime and a balanced power load.

Uninterruptible power supply for server rooms and data centers.





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