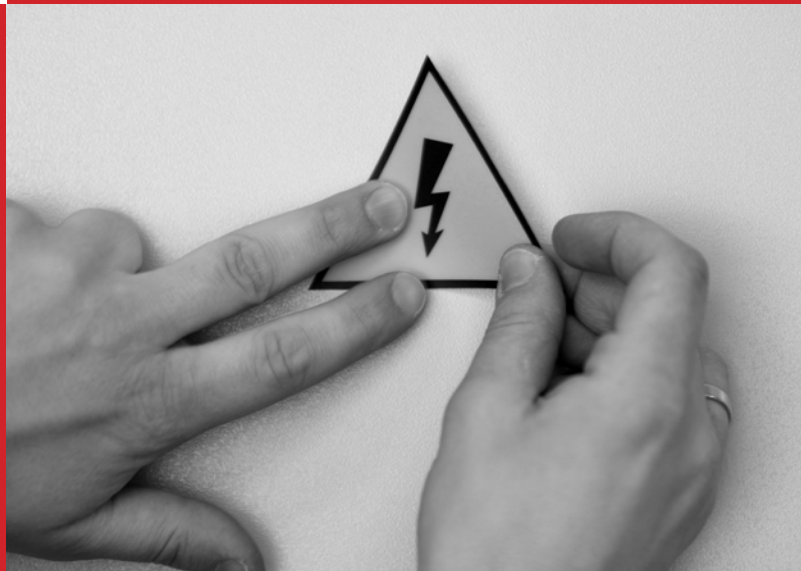




Elektrometal Energetyka SA



e²ALPHA[®] Medium Voltage Switchgear





WE CREATE IDEAS WITH POWER!

ELEKTROMETAL ENERGETYKA SA provides solutions for electrical power engineering. Our services are carried out by a team of experienced professionals.

We employ professional engineers with vast practical knowledge who have many years of industry experience in power engineering. The synergy of their competences together with openness to non-standard ideas and the use of modern solutions are ensuring the highest quality of service and create foundation for harmonious, based on dialogue cooperation with our customers. We are winning the trust of our customers through reliability and immediate reaction to their specific needs.

Our activity focuses not only on production of modern MV switchgears, MV switching devices and digital protection terminals. We also provide a wide range of services which maximize operational capabilities and minimize cost. We offer our customers an innovative method in which we integrate the best and proven solutions for power engineering and adapt them to the specific individual needs.

We continually increase our potential and improve our offer. Our company is developing dynamically and is following industry trends.

Transparency of procedures and documents is a rule in Elektrometal Energetyka SA. Our priority is to satisfy customers through reliability, ease of use and intuitiveness of our devices. We believe that good energy in relationship helps both parties achieve a lot more, that's why we take care of fully team involvement in the course of cooperation. We are building our company with firm belief that our success depends on trust and satisfaction of our customers. Therefore, one of the most important distinguishing elements for ELEKTROMETAL ENERGETYKA SA is the highest quality of offered solutions.

We have implemented an Integrated Management System, which consists of: Quality Management System ISO 9001, Environmental Management System ISO 14001, Occupational Health and Safety Management Systems ISO 45001. Those implemented systems are consistent with the highest standards of management and they create daily practice in our company, which aims at professional customer service and maintaining the highest standards of health and environment protection. Our products have certificates confirming full type-examination. Those examinations have been conducted among others in laboratories of the Institute of Power Engineering and the Institute of Electrical Power Engineering in Warsaw.



Jacek Jackiewicz

Director of the Mechanical Development Department
Elektrometal Energetyka SA

SWITCHGEAR CHARACTERISTICS

e²ALPHA switchgear belongs to the group of modern, four-compartment indoor MV switchgears suitable for wall- or self standing installation. The standard range of e²ALPHA consists of cubicles with a width of 400, 600, 750, 800 and 950 mm. The high degree of operational safety for e²ALPHA switchgear was achieved by applying an extended system of mechanical and electrical interlocks as well as reinforced mechanical cubicle construction characterized by a high level of arc proofness. The switchgear is available in IP54, IP 4X, IP 41 and SMA versions.

SWITCHGEAR CHARACTERISTICS

e²ALPHA switchgear is an excellent solution for industrial-, distribution- and mining power companies. Advanced design combined with reliable interlocks makes e²ALPHA ideal for applications in the strategic areas of power system where the highest reliability of power supply is required (eg. main point of supply, main switching station, power plants and mines).

ADVANTAGES OF e²ALPHA SWITCHGEAR



efficient ventilation

High level of arc-proofness (31,5kA/1s)

SMA
approved for use in mining facilities

compact design
only 2100 mm high, compact rigid design allowing easy access to the LV compartment and easier indicators observation

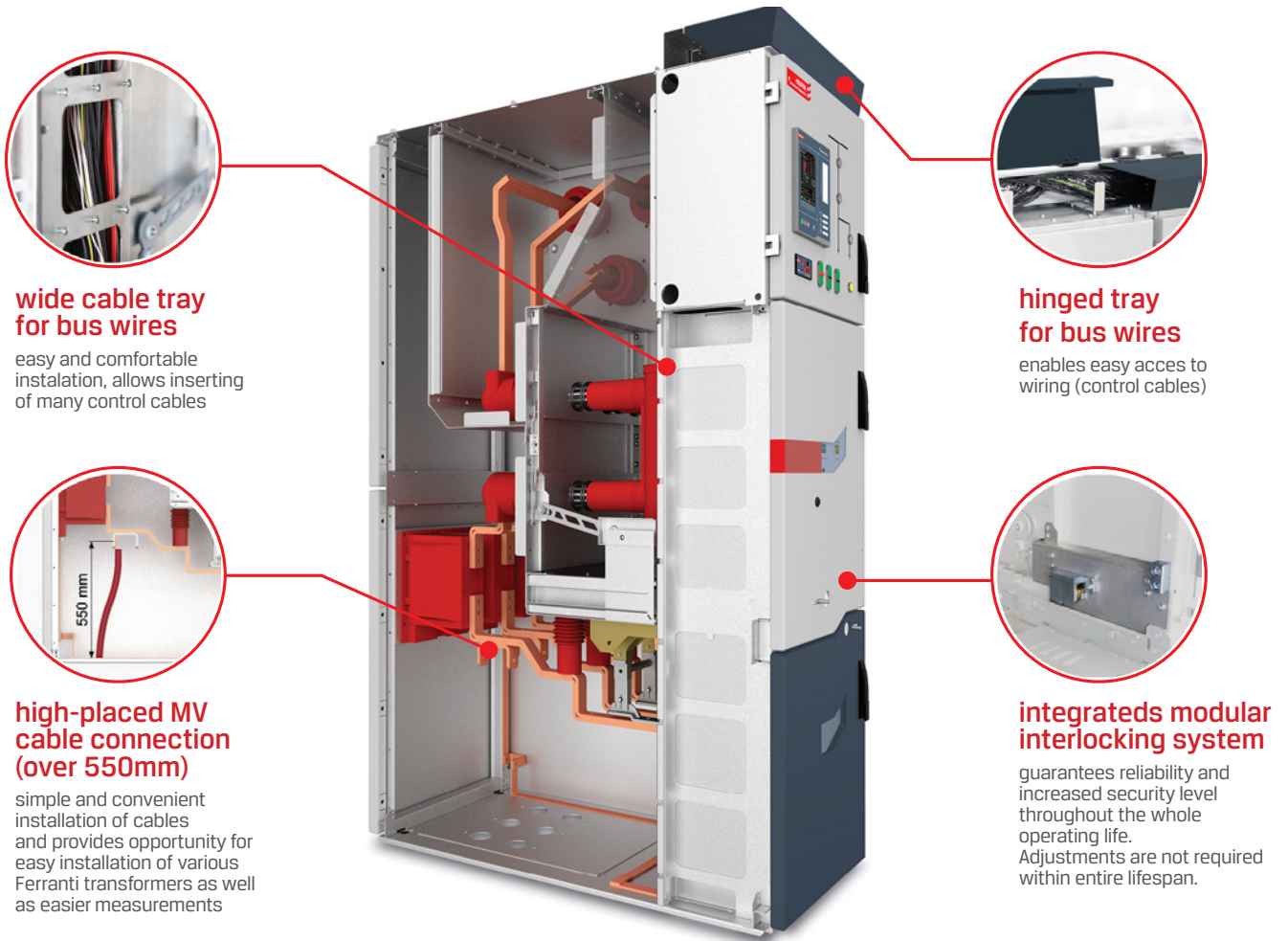
enlarged LV compartment
provides possibility for installation protection and control relays in different sizes, it allows also easy start-up, service, technical review and modifications

easy adaptation to customer's requirements

IEn
Reliability and high quality
fully type tested

CUBICLE DESIGN

Switchgear cubicle is made of prefabricated steel and Al-Zn plates with thickness of 1 to 3 mm. In the areas particularly exposed to internal arcing and pressure of arcing gases has been applied high-quality steel sheet with a thickness of 3 mm with powder ink coating. Additionally, in the case of cubicles made in arc-proofness 31.5 kA/1s, the door of cable compartment and withdrawable module has been provided with additional reinforcements and shields.



wide cable tray for bus wires

easy and comfortable installation, allows inserting of many control cables

hinged tray for bus wires

enables easy access to wiring (control cables)

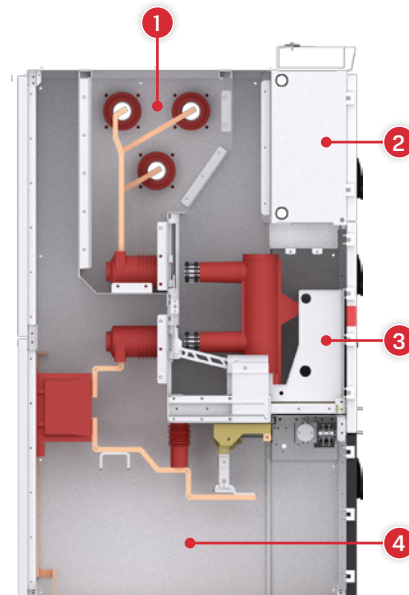
high-placed MV cable connection (over 550mm)

simple and convenient installation of cables and provides opportunity for easy installation of various Ferranti transformers as well as easier measurements

integrated modular interlocking system

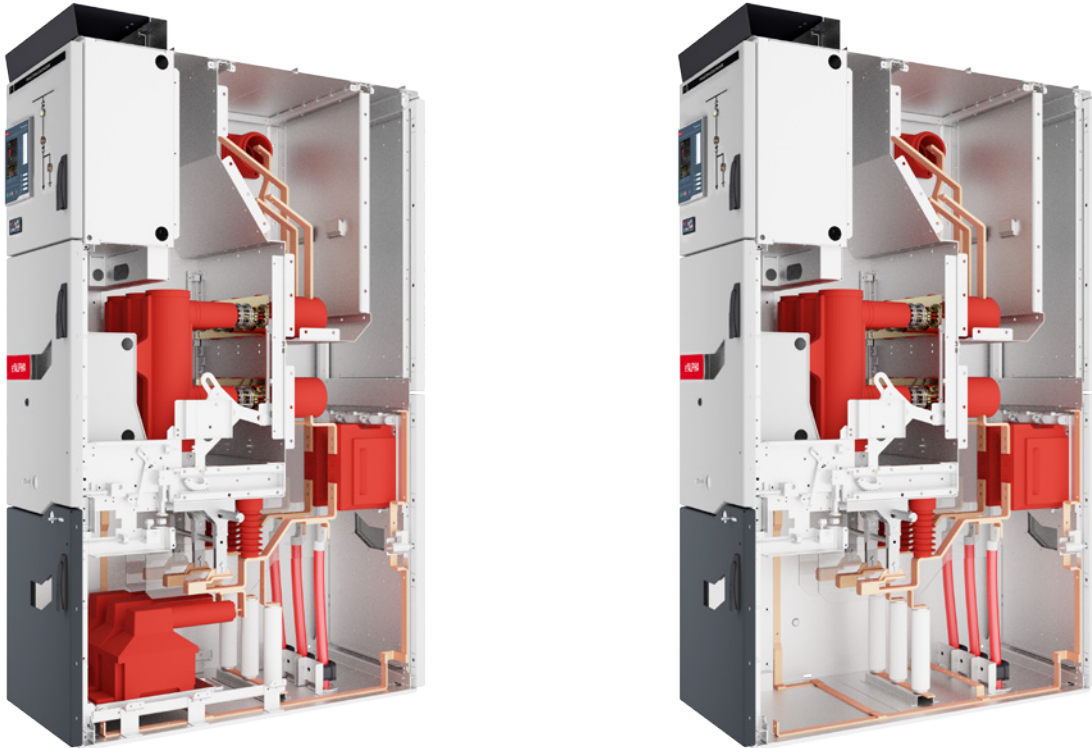
guarantees reliability and increased security level throughout the whole operating life. Adjustments are not required within entire lifespan.

- 1 Busbar compartment
- 2 Compartment of control circuits
- 3 Compartment of the withdrawable unit
- 4 Connection cable compartment



* available types of cells and locks - see tables page 7-8

SELF STANDING INSTALLATION



The cross-sections show exemplary variants of the self standing e²ALPHA switchgear. The way of placing the cables in the connection cable compartment is each time agreed with the customer. Wall standing version available for 12 and 17.5 kV switchgears.

WALL STANDING INSTALLATION



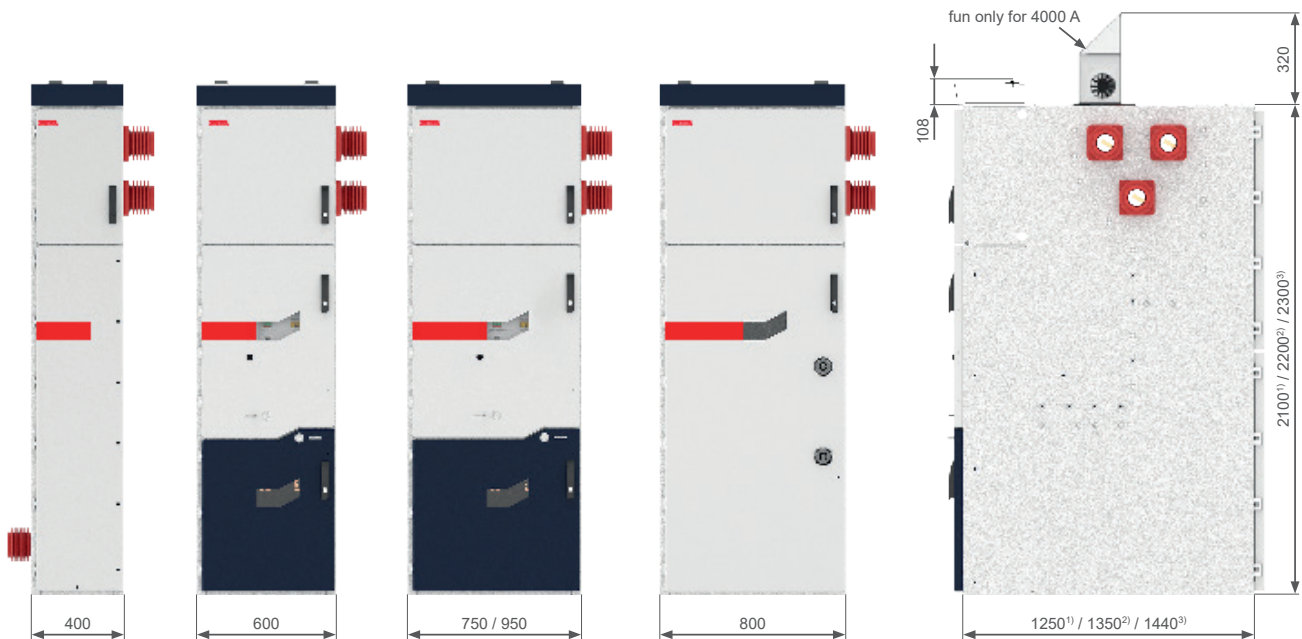
The cross-sections show exemplary variants of the e²ALPHA wall switchgear. At the customer's request we adjust the placement of measuring transformers, cable heads or overvoltage limiters in the connection cable compartment to enable easy access directly from the front of the bay.

TYPICAL CUBICLES

- incoming bay
- line bay
- incoming-outgoing bay
- coupling - circuit breaker bay
- coupling - cutoff breaker bay
- auxiliary transformer - circuit breaker or disconnector bay
- voltage measurement bay
- bus riser bay
- others - according to customer's needs

Presented types of switching cubicles are only examples of basic configurations being used in power industry. On this basis there is possibility of wide development of technical infrastructure of the cubicle through additional switches, transformers, surge arresters and others elements according to the requirement of contractor.

BASIC DIMENSIONS OF CUBICLES



1) - rated busbar current up to 1250 A (12 - 17,5 kV)

2) - rated busbar current up to 2000 A (12 - 17,5 kV), up to 2500 A (12 kV)

3) - rated busbar current up to 2000 A (24 kV), rated busbar current up to 4000 A (12 kV), rated busbar current up to 3150 A (17,5 kV)

INTERLOCK SET

Standard interlock:

- Interlock prevents changing position of the withdrawable module to "OPERATION" when the earthing switch is closed.
- Interlock prevents opening the contactor compartment doors when the withdrawable module is in "OPERATION" or intermediate position.
- Interlock prevents leaving earthing switch crank and withdrawable module crank in operating sockets at the same time.
- Interlock prevents changing position of the withdrawable module to the position "OPERATION" when the circuit breaker is closed.
- Interlock prevents closing the circuit breaker when it is in the intermediate position between "TEST" and "OPERATION".
- Interlock prevents closing the earthing switch when the withdrawable module is in position "OPERATION" or intermediate.
- Interlock prevents inserting of withdrawable module with lower rated current to the panel with higher rated current.
- Interlock prevents closing the earthing switch when earthed side is under voltage.
- Interlock prevents opening the cable compartment door when the earthing switch is open.
- Interlock prevents shifting the withdrawable module in "OPERATION" position when the compartment door is open.

- Interlock prevents opening the earthing switch when the compartment door is open.
- Interlock prevents opening the shutter covering fixed contacts in the withdrawable module compartment when it is empty.
- Automatic interlocking of accidental opening of the movable panels in the compartment of the withdrawable unit when the member is outside the distribution field.
- Interlocking for circuit-breaker operation with open connection compartment.

Optional interlock:

- Electromagnetic interlock prevents opening back door/cover of the cable compartment.
- Mechanic interlock prevents opening back door/cover of the cable compartment.
- Key interlock of earthing switch
- Interlock prevents closing withdrawable module compartment door when the withdrawable module is not racked-in.
- Electromagnetic interlocking preventing unauthorised opening of doors.
- Screw interlocking of external door and covers which requires a special tool
- Others according to the requirement of contractor.

TECHNICAL PARAMETERS

Rated voltage of the switchgear	12 kV	17.5 kV	24 kV
Lighting impulse test voltage (1,2/50µs)	75/85 kV	95/110 kV	125/145 kV
Power frequency test voltage (1 min.)	28/32 kV	38/45 kV	50/60 kV
Rated frequency	50 Hz	50 Hz	50 Hz
Rated main busbar current, for incoming and coupling panel	630-4000 A ⁴⁾	630-3150 A	630-2500 A
Rated current of outgoing panels	630-4000 A ⁴⁾	630-3150 A	630-2500 A
Rated short-time withstand current (3s)	up to 40 kA	up to 31,5 kA	up to 25 kA
Internal arc resistance (1s)	up to 40 kA	up to 31,5 kA	up to 25 kA
Rated peak current strength	up to 100 kA	up to 80 kA	up to 63 kA
Degree of protection of the switchgear	IP 4X/IP 41/IP 54	IP 4X/IP 41/IP 54	IP 4X/IP 41/IP 54
Service continuity	LSC2B	LSC2B	LSC2B
Classification of enclosures	PM	PM	PM
Classification of internal arc resistance	AFLR	AFLR	AFLR
Cubicle width	400/600/750/ 800/950 mm	400/600/750/ 800/950 mm	600/750/ 950 mm
Cubicle height	2100 ¹⁾ /2200 ²⁾ /2300 ³⁾ mm	2100 ¹⁾ /2200 ²⁾ /2300 ³⁾ mm	2300 mm
Cubicle depth	1250 ¹⁾ / 1350 ²⁾ /1400 ³⁾ mm	1250 ¹⁾ / 1350 ²⁾ /1400 ³⁾ mm	1440 mm
Max. operating altitude	1000 m asl	1000 m asl	1000 m asl
Max. relative humidity at 25°C	100%	100%	100%

1) - busbar rated current up to 1250 A (12 - 17.5 kV)

2) - busbar rated current up to 2000 A (12 - 17.5 kV), up to 2500 A (12 kV)

3) - busbar rated current up to 4000 A (12 kV), rated busbar current up to 3150 A (17.5 kV)

4) - forced ventilation for 4000A currents

STANDARDISATION

PN-EN 62271-1	High-voltage switchgear and controlgear - Part 1: Common specifications
PN-EN 62271-100	High-voltage switchgear and controlgear - Part 100: Alternating current circuit breakers
PN-EN 62271-102	High-voltage switchgear and controlgear- Part 102: High-voltage alternating current disconnectors and earthing switches
PN-EN 62271-103	High-voltage switchgear and controlgear –Part 103: Switches for rated voltages above 1 kV up to and including 52 kV
PN-EN 62271-106	High-voltage switchgear and controlgear –Part 106: Alternating current contactors, contactor-based controllers and motor-starters
PN-EN 62271-200	High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

CERTIFICATES & AWARDS



IEC Certificate
no 066/2020



WUG Certificate
no GE-17/18



Bronze medal
ENERGETAB 2014 Fairs



The Minister of Energy Cup
ENERGETAB 2018 Fairs



Forbes Diamonds 2023

ELEKTROMETAL ENERGETYKA SA QUALITY

Implemented Integrated Management System based on following standards:

- PN-EN ISO 9001 Quality Management Systems
- PN-EN ISO 14001 Environmental Management System
- PN-EN ISO 45001 Health and Safety Management System

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