

10/2015



## CUBICLE AND METAL-CLAD MEDIUM VOLTAGE SWITCHGEARS

WEGA 07

WEGA 12

WEGA 17

WEGA 24

WEGA 36



***„Improving the competitiveness of the company ELMOR through investments introducing new certified products on domestic and foreign markets,,***

Project financing agreement No.: WND-RPPM.01.01.02-00-143/13

*Beneficiary*

**ELMOR S.A. ul. Spadochroniarzy 20, 80-298 Gdańsk**

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The project is financed under the Regional Operational Programme for Pomorskie Region for 2007-2013

Elmor SA headquartered in Gdańsk within the above mentioned project, co-financed by the European Union, introduced to the market the following certified products:

- **MV Switchgear with z single busbar system type WEGA 36**

*The certificate of conformity No DN/245/2014 issued by the Electrotechnical Institute in Warsaw 04-703, 28 Mieczysława Pożaryskiego Str., Poland*

- **MV Switchgear with z single busbar system type WEGA 24**

*The certificate of conformity No DN/020/2015 issued by the Electrotechnical Institute in Warsaw 04-703, 28 Mieczysława Pożaryskiego Str., Poland*



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## 1. INTRODUCTION

This description contains information and technical data concerning a series of medium voltage switchgears type WEGA.

WEGA system is a construction, which has been subjected to a type test required by the rules IEC 62271-200 and is carried out acc. to IEC 62271-1, IEC 60694, IEC 60466. The system has a Certificate of the Electrotechnical Institute -Research Laboratory in Warsaw. The description is provided for designers and investors. The data presented in this document allow knowing the WEGA type switchgears. Designers will get information, how to choose the switchgear according to customer' s requirements.

For customer's request, there is a possibility to make other solutions than these presented in this product description.

### 1.1 STANDARDS

Primary norms for designing, manufacturing and testing:

- IEC 62271-200 – A.C. metal-enclosed switchgear and controlgear for rated voltage above 1kV and up to and including 52kV,
- IEC 62271-1 High-voltage switchgear and controlgear – Part 1: Common specifications
- PN-EN 60298 – A.C. metal-enclosed switchgear and controlgear for rated voltage above 1kV and up to and including 52kV
- PN-IEC 60466 – A.C. insulations-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 38kV,
- IEC 60243-1 – Methods of tests for electric strength of solid insulating materials – Part1:Tests at power frequencies,
- IEC 60529 – Degrees of protection provided by enclosures (IP Code),
- IEC 60694 – Common clauses for high-voltage switchgear and controlgear standards.

## 2. APPLICATION OF THE SWITCHGEARS

### 2.1 SWITCHGEARS TYPE WEGA 36, WEGA 24 AND WEGA 17

They are provided for operation in medium voltage networks of the professional power industry and especially in main points of the supply stations with decreased voltages 110kV/MV.

### 2.2 SWITCHGEARS TYPE WEGA 12 AND WEGA 07

They are provided for operation in main stations supplying the industrial plants, as area switchgears and as service switchgears of power stations and thermal-electric power stations and also applied as container switchgears (small dimensions version).

### 3. TECHNICAL CHARACTERISTIC

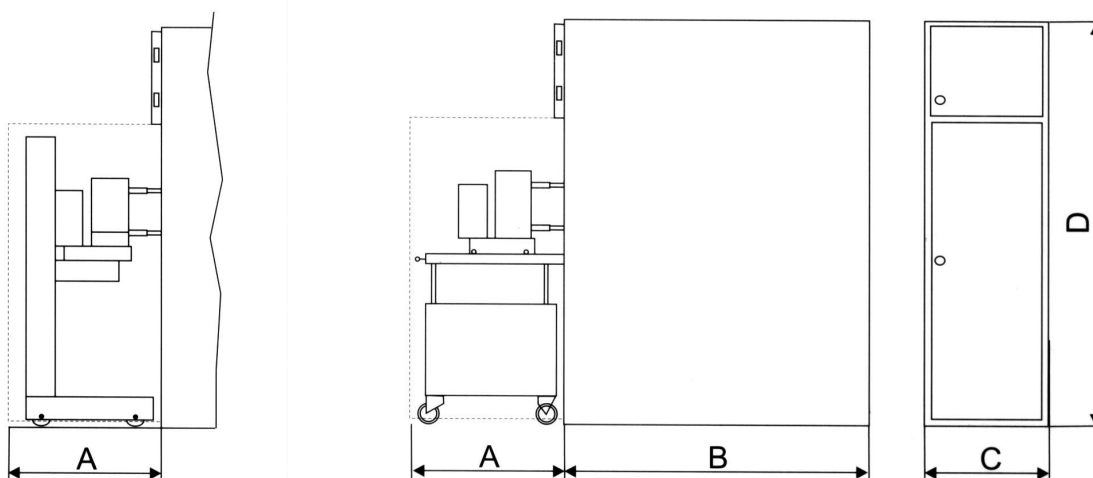
#### 3.1 ENVIRONMENTAL CONDITIONS FOR OPERATION OF THE SWITCHGEAR

The switchgears are provided for operation in heavy conditions:

- Ambient temperature does not increase 55°C
- Minimal ambient temperature is -20°C
- Sea level height does not increase 1000m
- Average monthly humidity value does not increase 90%.

#### 3.2 TECHNICAL DATA

#### **WEGA MEDIUM VOLTAGE SWITCHGEARS SYSTEM**



MAIN DIMENSIONS [mm]					
Typ		A	B	C	D
<b>WEGA 07</b>	For rated voltage 7,2 kV	650	1250÷1450	600÷1000	2100÷2250
<b>WEGA 12</b>	For rated voltage 12 kV	650	1250÷1450	600÷1000	2100÷2250
<b>WEGA 17</b>	For rated voltage 17,5 kV	650	1250÷1450	600÷1000	2100÷2250
<b>WEGA 24</b>	For rated voltage 24 kV	850	1450÷1600	750÷1000	2250÷2350
<b>WEGA 36</b>	For rated voltage 36 kV	1000	1900÷2200	1200÷1600	2500÷2600



<b>TECHNICAL DATA</b>					
<b>Type</b>	<b>WEGA 07</b>	<b>WEGA 12</b>	<b>WEGA 17</b>	<b>WEGA 24</b>	<b>WEGA 36</b>
<b>Rated voltage [kV]</b>	<b>7,2</b>	<b>12</b>	<b>17,5</b>	<b>24</b>	<b>36</b>
<b>Rated frequency [Hz]</b>	50 or 60				
<b>Surge withstand test voltage [kV]</b>	60	75	95	125	170
<b>Test voltage 1-min [kV]</b>	20	28	38	50	70
<b>Rated current of bus bars [A]</b>	up to 3150	up to 3150	up to 2500	up to 2500	up to 1250
<b>Rated current n-sec [kA/s]</b>	31,5	31,5	31,5	25	25
<b>Peak rated current [kA]</b>	up to 80	up to 80	up to 80	up to 63	up to 63
<b>Immunity on internal arc [kA]</b>	31,5	31,5	31,5	25	25
<b>Immunity class on internal arc</b>	AFLR				
<b>LSC class</b>	LSC2B				
<b>PM/PI class</b>	PM				
<b>Housing protection degree</b>	IP41/ IP4X				
<b>Arc fault protection [kA]</b>	31,5	31,5	31,5	25	25

#### **4. CONSTRUCTION OF WEGA SYSTEM SWITCHGEARS**

##### **4.1 METAL-ENCLOSED SWITCHGEARS WITHOUT REMOVABLE PARTS - TYPE WEGA S**

These are single-unit cubicle switchgears, metal enclosed. Their construction is made of thin walled sections, which are rolled of steel and Aluzinc coated strips with special perforation. It is a profile of a channel bar 50 x 25 mm, connected by means of screws.

Metal shields and doors are reinforced and resistant to electric arc.

Single bus bars system is installed in upper part of the switchgear with using of resin bushing insulators.

All apparatuses of primary circuits like circuit breakers, load breaking switches, contactors, disconnectors, earthing switches, current and voltage transformers and fuse holders are installed as fixed parts.

For quick access to apparatuses installed in a panel there is an option with a circuit breaker installed on a withdrawable truck. Easy access to other apparatuses is possible.



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## 4.2 METAL-ENCLOSED SWITCHGEARS WITH REMOVABLE PARTS - TYPE WEGA P AND K

### 4.2.1 *Fixed part of the double-unit basic panel*

All versions of the WEGA switchgear panels such as: incoming feeder panels, outgoing feeder panels, metering panels, bus section panels have been constructed based on incoming feeder panels.

Construction of incoming feeder panels, outgoing feeder panels and metering panels is realized in one cubicle but bus-tie panels are realized in two cubicles.

In the metal-clad and double-unit switchgears there are following compartments:

- bus bar compartment
- connection compartment
- auxiliary circuit compartment
- withdrawable part compartment

The connection compartment is a space separated with enclosures inside a panel, where following apparatuses are mounted:

- current transformers
- voltage transformers
- ground fault transformers
- earthing switches
- surge arresters

The connection compartments are made with bottom cable leads and with top and bottom bus bar leads. The top and bottom bus bar junctions are led through insulated bus bar bridges or additional cable ducts fixed to back part of a panel. Total depth of a switchgear is increased by 200 mm.

The auxiliary circuit connection compartment is a space separated with enclosures and situated over a withdrawable part compartment. Apparatuses, control circuits, signaling circuits, metering and protection circuits are installed in that compartment.

Connection of the main circuit and auxiliary circuits of the withdrawable part with the fixed unit is made with coupling terminals.

The withdrawable part compartment is equipped with a device for changing a position of the withdrawable part together with an interlock system and shutters.

#### 4.2.2 *Withdrawable part*

There are three basic types of withdrawable parts:

- circuit breaker or contactor unit
- disconnecter unit
- metering unit

The withdrawable parts comply with the standard requirements; the main of them is a possibility to change following positions:

- “*service*”
- “*test*” / “*disconnected*”
- “*removed*”

### 4.3 CONSTRUCTION OF THE FIXED PART

#### 4.3.1 *Cubicle switchgear type P or S*

This type of construction is provided for fixed apparatuses and for apparatuses installed on withdrawable parts as well.

The construction is divided into a MV part and LV part with exhaust flaps in the upper part.

#### 4.3.2 *Cubicle switchgear type P2*

This type of construction provides that the bus bars are placed in a space separated with metal enclosures.

A switch in the main circuit is situated on the withdrawable part. Drawing out of the part causes that contacts of the switch are shielded automatically on bus bars side.

Exhaust flaps are placed in the upper part.

#### 4.3.3 *Metal-clad switchgear type P3 or K3*

This type of construction provides that each component of the main circuit:

- bus bars,
- switch in the main circuit,
- terminals together with current transformers and earthing switch,

are placed in a separate compartment with metal enclosures. Changing the position of the withdrawable unit from “*service*” to “*test*” causes that contacts are shielded automatically.

Decompression of gases follows through a safety flap in a bottom of the switchgear; other ventilation flaps are situated in the upper part.



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#### 4.3.4 Metal-clad switchgear type P4 or K4

This type of construction is similar to type P3 and K3 besides the way of gas decompression. In this case gases are led through a duct in a roof of the switchgear.

### 5. APPARATUSES

Following apparatuses are applied in the switchgears:

- **circuit breakers** SION (SIEMENS) or 3AH(SIEMENS) or VD4/ VMAX/ HD4 (ABB) or EVOLIS (SCHNEIDER) or HVX (SCHNEIDER) or TM2C (TAVRIDA) or VC-1 (JM-TRONIK) or e2BRAVO (ELEKTROMETAL ENERGETYKA)
- **earthing switches** E/ EK (ABB) or UW-EL (ELTOM) or UZ (AKK ENERGIA)
- **current transformers** TPU (ABB) or GIS (RITZ) or ACJ (ARTECHE) or AB (ALCE)
- **voltage transformers** UMZ (ABB) or GSES (RITZ) or UCJ (ARTECHE) or VBF (ALCE)
- **load break switches** NALF (ABB)
- **disconnectors** OWIII (ABB) or OW (ZWAE) or OW-EL (ELTOM)
- or other ones agreed with a customer.

### 6. INTERLOCKS AND OPERATING MECHANISMS

The principle is that service of the switchgear is carried out at closed doors.

To assure safe and reliable operation without faults and to provide proper sequence of switching activities, each panel has been equipped with a system of interlocks required by Norms IEC 60298 and IEC 62271-200:

- Mechanical interlock unenabling draw out and draw in of the withdrawable part when the circuit breaker is switched on,
- Interlock which does not allow to draw in the withdrawable part without connection of auxiliary circuits and also disconnection of auxiliary circuit when the withdrawable part is in position “*service*”,
- Electric interlock which enables switching activities of the circuit breaker in positions “*service*” and “*test*” only,
- Mechanical interlock which does not allow to open or to close a door when the withdrawable part is in position “*service*”,
- Mechanical interlock which does not allow to close an earthing switch when the withdrawable part is in position “*service*” and to move the withdrawable part from “*test*” position to “*service*” when an earthing switch is closed,
- Mechanical interlock (key) assure a proper sequence of switching activities between the withdrawable parts of a circuit breaker and a disconnector,
- Interlock of enclosures for fixed contacts does not allow to uncover these contacts when the withdrawable part is in position “*removed*”.



## **7. FOUNDATION OF THE SWITCHGEAR**

The switchgear is erected on a floor in a room and its cable compartment is situated over a cable duct.

Design of a building shall provide making of ducts and their framing by means of an angle 50x50x5.

The switchgear can be installed as free standing or at a wall standing with a possibility to access to a connection compartment.

## **8. PREFABRICATION OF THE SWITCHGEAR**

Single panels of the WEGA type switchgears are equipped acc. to the received technical documentation. Panels are erected in a switchgear room, next the prefabricated bus bars are mounted, control circuits and earthing are connected.

The withdrawable part is mounted at the end.

## **9. TRANSPORT AND STORAGE**

The switchgears can be transported by car or rail transport.

A foil protects panels. Loading and unloading can be realized by means of a crane or traveling crane.

The switchgears are equipped with ears for hoisting.

The switchgear can be stored in dry compartments protecting it against bad weather conditions and hazardous chemicals.

The withdrawable part is transported in the fixed unit in position "service" and interlocked.

## **10. HOW TO ORDER**

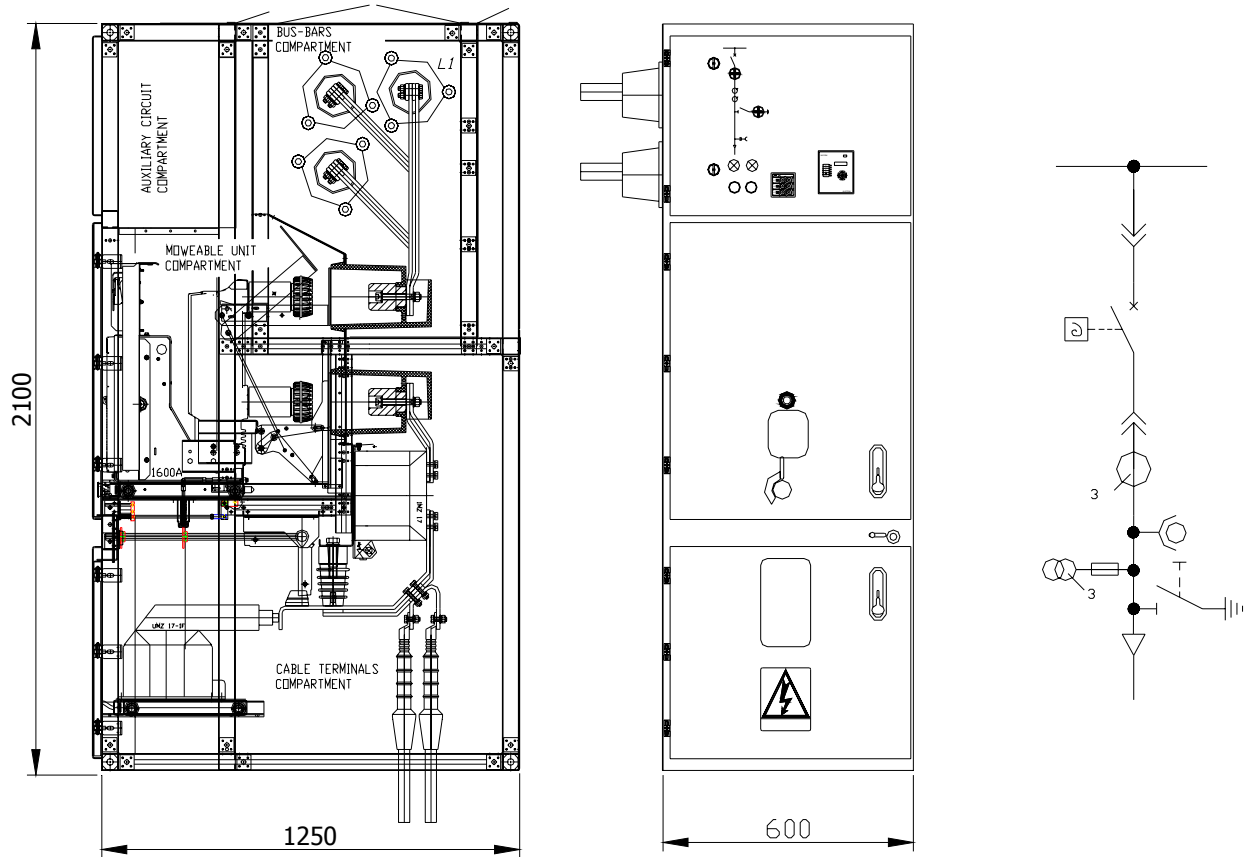
Please enclose to your order:

- structural diagram,
- principal diagrams, connection diagrams,
- lists of apparatuses and accessories,
- front view,
- contents of description labels,
- arrangement of the switchgear,
- cross-section and type of the connected electric supply and control cables,
- additional requirements of the customer.

A/m diagrams, drawings and lists of apparatuses and accessories to be built in the switchgear can be prepared by ELMOR Design Office for request of the customer.



EXHAUST FLAPS

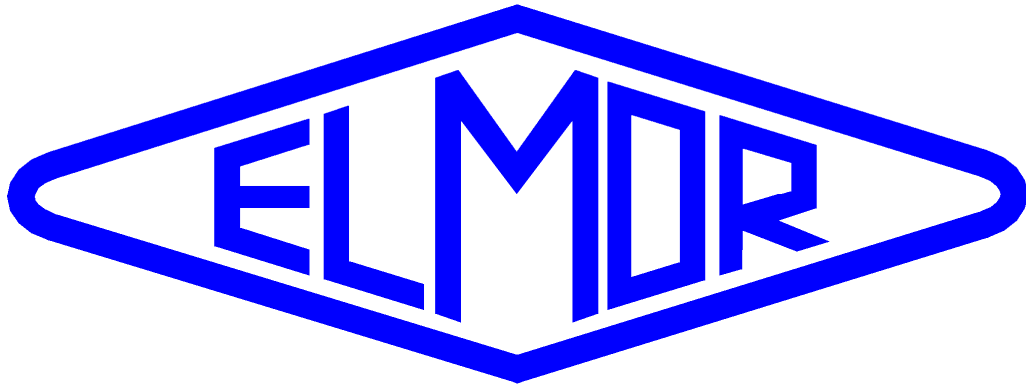


ELECTRICAL DATA

RATED INSULATION VOLTAGE	17,5 kV
IMPULSE WITHSTAND VOLTAGE	95kV
WITHSTAND VOLTAGE 1-min	38
BUS-BARS RATED CURRENT	1600 A
REATED CURRENT 1-SEK.	31,5kA
PEAK RATED CURRENT	75 kA
PROTECTION DEGREE IP	IP4X

CUBICLE EQUIPMENT	APPARATUS	Q-ty
	VACCUM BREAKER 17,5KV 1600A	1
	MOVEABLE UNIT INTERLOCK SYSTEM WITH EARTHING SWITCH AND DOOR	1
	FAST EARTHING SWITCH	1
	CURRENT TRANSFOMER	3
	VOLTAGE TRANSFOMER	3
	MOVEABLE VOLTAGE TRANSFORMER UNIT	1

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