Container transformer stations
Design Catalogue 2010
Range of product offered:

- Container transformer stations
- Pole-mounted transformer stations
- Medium voltage switchgear (Sulphur Hexafluoride (SF₆) gas insulated)
- Low voltage switchgear
- Pole-mounted switchboards
- Medium voltage industrial switchgear
- Low voltage industrial switchgear
- Enclosed switchgear
- Street lighting cabinets
- Primary switchgear cubicles and staircase distribution boards for residential buildings
- Cable boxes and metering and cable boxes
- Steel, aluminium and stainless steel enclosures
- Control cabinets and Universal Control Desks
- Site cubicles
- Indoor medium voltage disconnectors and switch-disconnectors
- Outdoor disconnectors and switch-disconnectors (air insulated, SF₆ gas insulated and vacuum chamber insulated)
- Outdoor fuse bases
- Power engineering structures on traditional poles and pre-tensioned spun concrete poles
- Any custom design switchgear cubicles and structures according to individual documentation, type catalogues, or original designs
- E type pre-tensioned spun concrete poles
- ŻN type power poles
- Street lighting poles

Our offer also includes:

- Capacitive voltage dividers,
- Power and step-by transformers
- Low voltage switch-disconnectors
- Electrical installation works

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<td>1-63</td>
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</table>

For more information on selection of switchgear and associated accessories please refer to sections 2 and 3 of this catalogue.
Concrete container transformer stations with an internal service

Introduction
MRw-b concrete container transformer stations are designed for operation with cable networks, ring or radial medium voltage cable and overhead lines and low voltage cable networks. They provide power to:
- residential area in towns and cities,
- parks and recreational areas,
- suburban residential and rural areas,
- construction sites,
- industrial parks and workshops.
Container stations are transported to the installation site complete and ready for operation. Once the container is positioned, medium and low voltage cables and earthing system require connection and the transformer has to be placed inside and connected.

Container station design
MRw-b container station comprises 3 monolithic components:
- Base foundation -- made from B30 class reinforced concrete,
- main body -- made from B30 reinforced concrete,
- roof -- made from B30 ferroconcrete or metal (see pages 1 to 5).
The foundation frame is divided into 2 separate compartments:
- sealed oil collection pit, which can contain the entire contents of transformer's oil tank,
- cable compartment with bushings.
Main structure with installed medium voltage and low voltage switchgear and transformer(s) has ventilation openings protected with aluminium slats ensuring IP 43 degree of protection.
Hatch leading to the cable compartment is installed in the corridor's floor.
Standard station design allows placement in the transformer chamber of a hermetically sealed oil-filled transformer with a rating ranging from 630 kVA to 1000kVA.
On customer's request it is possible to redesign the transformer chamber to individual requirements (higher rating transformer or a transformer of a different type, such as an oil-filled transformer with an expansion tank (conservator) or a cast resin transformer). Transformer installation is carried out through the chamber door or from the top after the roof is dismantled. Transformer can be accessed and operated after opening the transformer chamber door.
Standard installed switchgear:
- Medium voltage type:
  - Rotoblok,
  - RotoblokSF,
  - RELF,
  - RELFex,
  - RXD,
  - RXD36,
  - TPM-W,
  - TPM
- Low voltage type:
  - RN-W,
  - ZR-W,
  - ZMR,
  - or other after consultation with the manufacturer.
Switchgear cubicles are independent station components and they can be accessed and operated from the common corridor inside the container station.
Connections between medium voltage switchgear and the transformer as well as between the transformer and low voltage switchgear are made using cables (however there is an option to connect to the transformer and switchgear using busbars).
**Container station technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(U_n) - Rated voltage</td>
<td>24 / (6, 10, 15) 36 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>(I_n) - Rated continuous current</td>
<td>630 + 4000 A</td>
<td>1250 + 6300 A</td>
</tr>
<tr>
<td>(I_{shunt}) - Rated short-circuit withstand current</td>
<td>16 ÷ 40 kA (1s)</td>
<td>16 ÷ 105 kA (1s)</td>
</tr>
<tr>
<td>(I_{peak}) - Rated peak withstand current</td>
<td>40 ÷ 100 kA</td>
<td>35 ÷ 200 kA</td>
</tr>
<tr>
<td>(f) - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>(S_n) - Maximum transformer power</td>
<td>up to 4000 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43 (up to IP 54)</td>
<td></td>
</tr>
</tbody>
</table>

The stations are certified by the following notified bodies: Warsaw Electrotechnical Institute, ENERGOSERT in Moscow, BELENERGO in Minsk and Warsaw Building Research Institute.

**Selection of the fuse link**

<table>
<thead>
<tr>
<th>Transformer rated power [kVA]</th>
<th>6 kV</th>
<th>10 kV</th>
<th>10 kV</th>
<th>15 kV</th>
<th>20 kV</th>
<th>30 kV</th>
<th>0,4 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse-link rated voltage [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>-</td>
<td>6.3</td>
<td>6.3</td>
<td>6.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>63</td>
<td>-</td>
<td>10</td>
<td>6.3</td>
<td>6.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>100</td>
<td>20</td>
<td>16</td>
<td>10</td>
<td>10</td>
<td>6.3</td>
<td>9.6</td>
<td>5.8</td>
</tr>
<tr>
<td>160</td>
<td>31.5</td>
<td>20</td>
<td>16</td>
<td>10</td>
<td>10</td>
<td>15.4</td>
<td>9.2</td>
</tr>
<tr>
<td>250</td>
<td>50 lub 63</td>
<td>31.5</td>
<td>20</td>
<td>16</td>
<td>16</td>
<td>24.1</td>
<td>14.4</td>
</tr>
<tr>
<td>400</td>
<td>80*</td>
<td>50</td>
<td>31.5</td>
<td>25</td>
<td>25</td>
<td>38.5</td>
<td>23.1</td>
</tr>
<tr>
<td>630</td>
<td>125*</td>
<td>80*</td>
<td>50 lub 63</td>
<td>40</td>
<td>31.5</td>
<td>60.6</td>
<td>36.4</td>
</tr>
<tr>
<td>800</td>
<td>-</td>
<td>130*</td>
<td>63</td>
<td>40 lub 50</td>
<td>40</td>
<td>-</td>
<td>46.2</td>
</tr>
<tr>
<td>1000</td>
<td>125*</td>
<td>63 lub 80</td>
<td>50 lub 63</td>
<td>40</td>
<td>-</td>
<td>57.7</td>
<td>38.5</td>
</tr>
</tbody>
</table>

**Container station installation into ground**

Container station installation into ground is shown for example of the station MRw-bpp 20/630-3 and MRw-b (6,1x2,6) 20/2x630. The first stage of building container station installation is excavating the pit. Earth ring conductor must be laid in the pit and then earthing leads attached to it which will be connected to the station’s electrical system. An 200 millimetre layer of sand and gravel bedding must be constructed under the foundation.

It should be ensured that the sealing tape does not overlap (do not lay a double layer) as this can lead to leaking of water inside the station. When laying the sealing tape do not stretch it, as this can lead to damage or deformation. On a foundation prepared as described above the station’s main structure and then the roof should be placed.

If the container station is installed on wetland, the foundation should be additionally protected with a moisture barrier and a system of efficient drains should be constructed around the station’s building. The station can be also constructed in category 3 and 4 mining excavation area, which has been certified by an opinion issued by a construction expert. In this instance, in order to ensure a correct foundation design, it is required to construct an additional sliding layer comprising two layers of sandless tar paper laid on a 100 millimetre concrete screed slab and provide a 500 millimetre sand cushion under the entire footing (in the form of subsoil or made ground in the excavated pit).
MRw-bpp 20/630-3 container station foundation

MRw-b (6,1x2,6) 20/2x630 container station foundation

For more information on selection of switchgear and associated accessories please refer to sections 2 and 3 of this catalogue.
Standard roofs

Flat concrete roof

Metal hip roof

Gable metal roof

Tall gable metal roof

Metal pent roof

Tall gable metal roof - regional design (Zakopane)

Tall hippoc metal roof

Examples of non-standard roofs

Note:
Individual customised roof design is optional

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## Roofing material

<table>
<thead>
<tr>
<th>Roof type</th>
<th>Standard roofing material</th>
<th>Optional roofing materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete slab</td>
<td>metal roofing tiles</td>
<td>bitumen shingles</td>
</tr>
<tr>
<td>Gable roof</td>
<td>metal roofing tiles</td>
<td>ceramic roofing tiles</td>
</tr>
<tr>
<td>Hipped roof</td>
<td>metal roofing tiles</td>
<td>ceramic roofing tiles</td>
</tr>
<tr>
<td>Tall hipped roof</td>
<td>metal roofing tiles</td>
<td>ceramic roofing tiles</td>
</tr>
<tr>
<td>Tall gable roof</td>
<td>metal roofing tiles</td>
<td>ceramic roofing tiles</td>
</tr>
<tr>
<td>Pent roof</td>
<td>metal roofing tiles</td>
<td>ceramic roofing tiles</td>
</tr>
</tbody>
</table>

## Medium voltage and low voltage cable glands (produced by ZPUE S.A.)

### Front view and dimensions of medium voltage cable gland

![Front view of medium voltage cable gland](image1)

### Front view and dimensions of low voltage cable gland

![Front view of low voltage cable gland](image2)

### View of an opening prepared for installation of a low voltage or medium voltage cable gland

![View of opening](image3)

### Installation of medium voltage and low voltage cables and glands in the gland openings of the station’s foundation

![Installation diagram](image4)

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**Note:**
Applications of other sealing systems is optional.

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The roof and walls finish

Internal wall surfaces are finished with decorative white acrylic plaster. External wall surfaces are finished with acrylic plaster. All metal components installed on the station’s exterior are made from powder painted aluminium available in RAL colours palette. Standard facade type and colour are offered, however individual architectural designs are possible, taking into account available technical capabilities and materials for finishing of concrete surfaces as well as available roof types and finishing elements. Standard plaster colours applied for concrete containers station facade and standard powder paint colours are presented below.

<table>
<thead>
<tr>
<th>Colour of the container</th>
<th>Colour of the door and slats</th>
<th>Colour of the roof</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>White</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>TEXAS TX2</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>TEXAS TX2</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>ETNA ET2</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>ETNA ET2</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>FLORIDA FL2</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>FLORIDA FL2</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>ATLANTIC AT2</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>ATLANTIC AT2</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>MADEIRA M D1</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>MADEIRA M D1</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>SAVANNE SV4</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>SAVANNE SV4</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>POLAR PL1</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>POLAR PL1</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
<tr>
<td>BALI BL2</td>
<td>Red - RAL 3003</td>
<td>Red - RAL 3005</td>
</tr>
<tr>
<td>BALI BL2</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
</tbody>
</table>

**Standard colour systems**

The stations can be constructed directly adjacent to existing buildings (or at parcel perimeter) provided that the station’s wall facing the building (or parcel perimeter) is a fireproof partition (for details see MRw-bpp container stations). All potential station locations must be considered individually and consulted with ZPUE S.A.

**Container station location with respect to fire safety regulations**

Location of the container station must be selected in compliance with the regulation of the Minister of Infrastructure of 12 April 2002 on the technical requirements for buildings and their location (Journal of Laws No 75 of 15 June 2002, item 690).
1.1 Concrete container transformer stations with internal service and operation with insulated switchgear medium voltage air.

1.1.1 MRw-b2pp 20/630-3 "a" ("b") / 3P container station

Standard MRw-b2pp 20/630-3 "a(b)" / 3P container station diagram

MRw-b2pp 20/630-3 "a" / 3P container station facade

Weight:
- foundation
- main structure
- roof
- concrete
Usable area:

Note: Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok SF</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>

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1.1.2 MRw-b2pp 20/630-3 “c” i “d” / 3P container station

**Standard MRw-b2pp 20/630-3 “c(d)”/ 3P container station diagram**

- **Earthing checking point**
- **Max 630 kVA**
- **Station lighting**
- **Transformer no-load operation compensation capacitor**
- **Intermediate system energy measurement**
- **Circuit trip coil**
- **CPZ - short arrester**
- **Circuit breaker measuring**
- **Selector with coupling**
- **Pepper**
- **ZK**
- **GTR SF**
- **GTR SF 2V**
- **GTR SF 1**

**MRw-b2pp 20/630-3 “c”/ 3P container station facade**

- **Front view**
- **Rear view**
- **Side view - left**
- **Side view - right**

**Weight:**
- **Foundation**: 4500 kg
- **Main structure**: 9000 kg
- **Roof**: 3500 kg
- **Concrete**: 450-600 kg
- **Usable area**: 7.18 m²

**Note:**
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>MR as number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok SF</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating</td>
<td>- 630 kVA</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>20</td>
</tr>
</tbody>
</table>

**MRw-b2pp 20/630-3 “c” “d”/ 3P**
1.1.3 MRw-bpp 20/630-3 container station

1.1.3.1 MRw-bpp 20/630-3 /3P container station

MRw-bpp 20/630-3 “a”/3P

MRw-bpp 20/630-3 “b”/3P

Standard MRw-bpp 20/630-3 “a(b)”/3P container station diagram

MRw-bpp 20/630-3 “a”/3P container station facade

Weight:
- Foundation
- Main structure
- Roof
- Concrete
- Metal
Usable area:

Note:
Optional accessories are marked in red.

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113.2 MRw-bpp 20/630-3/4P container station

MRw-bpp 20/630-3/4P

Standard MRw-bpp 20/630-3/4P container station diagram

MRw-bpp 20/630-3/4P container station facade

Weight:
- foundation 5400 kg
- main structure 10000 kg
- roof 4000 kg
- concrete 450-600 kg
- metal
Usable area: 8,72 m²

Optional accessories are marked in red.

Note:

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<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok</td>
</tr>
<tr>
<td></td>
<td>Rotoblok SF</td>
</tr>
<tr>
<td></td>
<td>Rotoblok 17,5 kV</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>

Maximum numbers of medium voltage bays (low voltage outgoing feeders):

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok</td>
</tr>
<tr>
<td></td>
<td>Rotoblok SF</td>
</tr>
<tr>
<td></td>
<td>Rotoblok 17,5 kV</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>
1.1.4 MRw-bpp 15/1000-3/3P container station

MRw-bpp 15/1000-3/3P

Standard MRw-bpp 15/1000-3/3P container station diagram

MRw-bpp 15/1000-3/3P container station facade

Weight:
- Foundation: 5400 kg
- Main structure: 10000 kg
- Roof: 4000 kg
- Concrete: 450-600 kg
- Metal: 8.72 m²

Usable area: 8.72 m²

Optional accessories are marked in red.

Note:

Type | Maximum number of medium voltage bays (low voltage surge units needed)
--- | ---
Standard design | Rotoblok 17.5 kV | 3
Standard design | Rotoblok SF | 4
Standard design | RN-W | 10
Non-standard design | RN-W | 19

Maximum transformer rating - 1000 kVA | Enclosure class - 20

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11.5 MRw-bpp 20/1000-3/4P container station

MRw-bpp 20/1000-3/4P

Standard MRw-bpp 20/1000-3/4P container station diagram

MRw-bpp 20/1000-3/4P container station facade

Weight:
- foundation: 5400 kg
- main structure: 10000 kg
- roof: 4000 kg
- concrete: 450-600 kg
- metal: 8.72 m²

Note:
Optional accessories are marked in red.
**1.16 MRw-bpp 20/630-4 container station**

### 1.16.1 MRw-bpp 20/630-4 / 4P container station

#### MRw-bpp 20/630-4 “a” / 4P

- Fire-proof partition (RN 20)
- Transformer bay
- Feeder bay
- Transformer bay
- Transformer no-load operation
- Compensation capacitor
- Station lighting

#### MRw-bpp 20/630-4 “b” / 4P

- Fire-proof partition (RN 20)
- Transformer bay
- Feeder bay
- Transformer bay
- Transformer no-load operation
- Compensation capacitor
- Station lighting

---

**Standard MRw-bpp 20/630-4 “a(b)” / 4P container station diagram**

- Earthing checking point
- Transformer no-load operation
- Compensation capacitor
- Station lighting

---

**MRw-bpp 20/630-4 “a” / 4P container station facade**

- Front view
- Rear view
- Side view - left (right)

**Weight:**
- Foundation: 6500 kg
- Main structure: 11500 kg
- Roof: 4500 kg
- Concrete: 600-700 kg

**Usable area:** 30.93 m²

**Note:**
Optional accessories are marked in red.

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---

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (10)</th>
<th>Max number of medium voltage outgoing feeders (12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok</td>
<td>4</td>
</tr>
<tr>
<td>Rotoblok SF</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Rotoblok 17,5 kV</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
<td>10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
<td>12</td>
</tr>
</tbody>
</table>

Maximum transformer rating - 630 kVA

Enclosure class - 20
1.1.7 MRw-bpp 15/630-4/4P container station

MRw-bpp 15/630-4/4P

Standard MRw-bpp 15/630-4/4P container station diagram

MRw-bpp 15/630-4/4P container station facade

Weight:
- foundation
- main structure
- roof
- concrete
- metal

Usable area:

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage coupling testers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok 17,5 kV</td>
</tr>
<tr>
<td>Rotoblok SF</td>
<td>6</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>

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4.2 PST-b 20/630 /3(4)G container station

PST-b 20/2 x 630 /6(8)G

PST-b 20/630-3G(4G) container station diagram

---

**PST-b 20/ 630-3G(4G) container station diagram**

- TPM-W medium voltage switchgear unit
- RN-W low voltage switchgear unit

**Table:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Medium voltage bays (low voltage outgoing feeders)</th>
<th>Max number of medium voltage bays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>TPM-W</td>
<td>2 x 4</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
<td>2 x 10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
<td>2 x 12</td>
</tr>
</tbody>
</table>

- Weight:
  - main structure: 2 x 25,000 kg
  - Usable area: 2 x 12.32 m²

**Note:** Optional accessories are marked in red.
5 Metal container transformer stations

Introduction

MRw aluminium and zinc aluminium container transformer stations are designed for operation with cable networks, even the most complex medium voltage cable and overhead lines and low voltage cable (or overhead line) networks. They primarily provide power to large industrial sites, for example: aggregate strip mines and logistics centres. Container stations are transported to the installation site complete and ready for operation. Once the container is positioned, medium and low voltage cables and earthing system require connection and the transformer has to be placed inside and connected.

Container station design

All internal components of MRw container stations, including the roof, sidewalls, gutters, finishing elements and the doors are made of aluminium sheet (or zinc aluminium sheet) which are polyester powder painted. Container framework is made of structural steel and protected with anticorrosion coating. A sealed oil basin is constructed in the transformer chamber and directly above it there are transformer rails. The oil basin has a drain plug located in an easily accessible place. Cable conduits are made in the floor to enable running of the medium and low voltage cables through them. Floor at medium and low voltage switchgear is removable and divided. It helps in easy and quick installation of cables.

Ventilation is achieved through: inlet openings in the station’s door, outlet opening protected with aluminium slats is located in the station’s rear and side walls. The station’s roof can be additionally equipped with an external gutter system. In addition to the standard station designs it is possible to produce customised designs, where the client can request a different shape of the roof, type of finishing components, facade finish and door layout.

Electrical accessories

Standard installed switchgear:

- Medium voltage type:
  - Rotoblok
  - Rotoblok SF
  - RELFex
  - TPM-W,
  - or other after consultation with the manufacturer.

- Low voltage type:
  - RN-W,
  - ZR-W,
  - ZM-R,
  - or other after consultation with the manufacturer.

Container station installation into ground

The station is transported to its place of installation fully assembled. The station should be placed on F-1 prefabricated foundation blocks produced by ZPUE SA or an combined concrete foundation footing. Prior to placing the station, check that the foundation is constructed correctly, paying special attention to its dimensions, levelling, positioning of cable outlets and earth ring conductor.

Container station installation into ground

The station is transported to its place of installation fully assembled. The station should be placed on F-1 prefabricated foundation blocks produced by ZPUE SA or an combined concrete foundation footing. Prior to placing the station, check that the foundation is constructed correctly, paying special attention to its dimensions, levelling, positioning of cable outlets and earth ring conductor.
Container station foundation

Available station and roof options

Station with a tall gable roof

Station with a low gable roof
The roof and walls finish

All metal components installed on the station’s exterior are made of powder painted aluminium (or zinc-aluminium sheets) available in RAL colours palette. Standard facade type and colour are offered, however individual architectural designs are possible, taking into account available technical capabilities and materials for finishing of metal surfaces.

### Standard colour systems

<table>
<thead>
<tr>
<th>Colour of the container</th>
<th>Colour of the door and roof finishing elements</th>
<th>Colour of the roof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light grey - RAL 7032</td>
<td>Dark grey - RAL 7023</td>
<td>Dark grey - RAL 7023</td>
</tr>
<tr>
<td>White - RAL 9016</td>
<td>Blue - RAL 5010</td>
<td>Blue - RAL 5010</td>
</tr>
<tr>
<td>White - RAL 9016</td>
<td>Brown - RAL 8017</td>
<td>Brown - RAL 8017</td>
</tr>
</tbody>
</table>
Examples of MRw station designs

5.1 MRw 20/2x630-7 container station

MRw 20/2x630-7 container station

MRw 20/2x630-7 container station diagram

MRw 20/2x630-7 container station facade

Container station technical data

<table>
<thead>
<tr>
<th>Switchgear</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>U_n - Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>I_n - Rated continuous current</td>
<td>630 A</td>
<td>1250 A</td>
</tr>
<tr>
<td>I_n - Short - time withstand current (1sec)</td>
<td>16 kA</td>
<td>16 kA</td>
</tr>
<tr>
<td>I_n - Withstand current</td>
<td>40 kA</td>
<td>35 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>S_n - Maximum T1 T2 transformer rated power</td>
<td>630/630 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td>IP 43</td>
</tr>
</tbody>
</table>
5.2 MRw 20/2x630-7 "SZR" container station (with automatic transfer switch system)

MRw 20/2x630-7 "SZR"

![Container station diagram]

![Front view]

MRw 20/2x630-7 container station diagram

MRw 20/2x630-7 container station facade

Container station technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uₚ - Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>Iₚ - Rated continuous current</td>
<td>630 A</td>
<td>1250 A</td>
</tr>
<tr>
<td>Iₙₜ - Short - time withstand current (1 sec)</td>
<td>36 kA</td>
<td>36 kA</td>
</tr>
<tr>
<td>Iₙₛ - Withstand current</td>
<td>40 kA</td>
<td>35 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>Sₚₜ - Maximum T1/T2 transformer rated power</td>
<td>630/630 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
<td></td>
</tr>
</tbody>
</table>
5.3 MRw 20/ 3x1250- 11 container station

MRw 20/ 3x1250- 11

MRw 20/ 3x1250- 11 container station diagram

MRw 20/ 3x1250- 11 container station facade

Container station technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>( U_r ) - Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>( I_n ) - Rated continuous current</td>
<td>630 A</td>
<td>2500 A</td>
</tr>
<tr>
<td>( I_{\text{sh}} ) - Short - time withstand current (1sec)</td>
<td>36 kA</td>
<td>50 kA</td>
</tr>
<tr>
<td>( I_{\text{sw}} ) - Withstand current</td>
<td>40 kA</td>
<td>125 kA</td>
</tr>
<tr>
<td>( f ) - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>( S_n ) - Maximum T3/ T2/ T3 transformer rated power</td>
<td>1250/ 1250/ 1250 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
<td></td>
</tr>
</tbody>
</table>
5.4 MRw 20/2x1600-6 container station

MRw 20/2x1600-6 container station diagram

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MRw 20/ 2x1600- 6 container station facade

**Switchgear**

- Medium voltage: 24 kV, 400 V
- Low voltage: 630 A, 4000 A
- Rated continuous current: 630 A, 4000 A
- Short-time withstand current (1 sec): 16 kA, 75 kA
- Withstand current: 40 kA, 165 kA
- Rated frequency: 50 Hz
- Maximum T1/T2 transformer rated power: 1600/ 1600 kVA
- Degree of protection: IP 43
### 5.5 MRw 15-18 container station

**MRw 15-18. Station dedicated to RS station reconstruction**

**RELF ex medium voltage switchgear electrical diagram**

**5.5 MRw 15/18 container station facade**

<table>
<thead>
<tr>
<th>Container station technical data</th>
<th>Switchgear</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium voltage</strong></td>
<td></td>
</tr>
<tr>
<td>Uₚ - Rated voltage</td>
<td>17.5 kV</td>
</tr>
<tr>
<td>Iₑₚ - Rated continuous current</td>
<td>1250 A</td>
</tr>
<tr>
<td>Iₘₚ - Short-time withstand current (1sec)</td>
<td>315 kA</td>
</tr>
<tr>
<td>Iₘₙ - Withstand current</td>
<td>80 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
</tr>
</tbody>
</table>
5.6 MRw 20/2x1000-5 "P" container station

MRw 20/2x1000-5 "P". Station specially designed for strip mines as it can be dragged on the ground.

**MRw 20/2x1000-5 "P" container station diagram**

**MRw 20/2x1000-5 "P" container station facade**

---

**Container station technical data**

<table>
<thead>
<tr>
<th>Switchgear</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>U&lt;sub&gt;r&lt;/sub&gt; - Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>I&lt;sub&gt;n&lt;/sub&gt; - Rated continuous current</td>
<td>630 A</td>
<td>2000 A</td>
</tr>
<tr>
<td>I&lt;sub&gt;s1&lt;/sub&gt; - Short - time withstand current (1sec)</td>
<td>16 kA</td>
<td>50 kA</td>
</tr>
<tr>
<td>I&lt;sub&gt;s2&lt;/sub&gt; - Withstand current</td>
<td>40 kA</td>
<td>25 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>S&lt;sub&gt;n&lt;/sub&gt; - Maximum T1/T2 transformer rated power</td>
<td>1000/3000 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 54</td>
<td></td>
</tr>
</tbody>
</table>
5.7 MRw 6/ 630-1 container station (powered from an overhead line)

**MRw 6/ 630-1**

![Container station diagram](image)

**MRw 6/ 630-1 container station facade**

![Facade diagram](image)

**Container station technical data**

<table>
<thead>
<tr>
<th>Switchgear</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>U&lt;sub&gt;n&lt;/sub&gt; - Rated voltage</td>
<td>6 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>I&lt;sub&gt;n&lt;/sub&gt; - Rated continuous current</td>
<td>630 A</td>
<td>1250 A</td>
</tr>
<tr>
<td>I&lt;sub&gt;sh&lt;/sub&gt; - Short - time withstand current (1sec)</td>
<td>36 kA</td>
<td>50 kA</td>
</tr>
<tr>
<td>I&lt;sub&gt;sw&lt;/sub&gt; - Withstand current</td>
<td>40 kA</td>
<td>30 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>S&lt;sub&gt;n&lt;/sub&gt; - Maximum T3/T2 transformer rated power</td>
<td>630 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
<td></td>
</tr>
</tbody>
</table>
Technical description

The ZK-SN/TPM-W-3 (4,5) concrete cable box with an external access is designed as a freestanding unit for operation with ring or radial cable network and overhead lines.

Cable box design

Enclosure

ZK-SN/TPM-W-3 (4,5) comprises two monolithic components:

- roof - made from B30 ferroconcrete,
- main structure - made from B30 ferroconcrete.

The central component of the cable box is the TPM-W (SF₆) gas insulated medium voltage switchgear, which can be operated from outside after the metal access door is open. The station's floor is made from concrete with openings to run medium voltage and low voltage cables (located under the medium voltage switchgear unit). The switchgear unit is compatible with cable bushings provided by all leading manufacturers (EUROMOLD, Raychem, F&G, 3M, ABB).

<table>
<thead>
<tr>
<th>Specification</th>
<th>Medium voltage switchgear technical specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td>Rated insulation level between conductors and earth</td>
<td>125/50 kV</td>
</tr>
<tr>
<td>Rated insulation level across safe isolation gap between phases</td>
<td>145/60 kV</td>
</tr>
<tr>
<td>Rated continuous current of main busbars and feeder bays</td>
<td>630 A</td>
</tr>
<tr>
<td>Rated continuous current of main busbars in transformer bay</td>
<td>250 A</td>
</tr>
<tr>
<td>Rated 1-second withstand current of main busbars and feeder bays</td>
<td>16 kA</td>
</tr>
<tr>
<td>Rated peak current strength of main busbars and feeder bays</td>
<td>40 kA</td>
</tr>
<tr>
<td>Rated short-circuit current @ 24 kV</td>
<td>630 A</td>
</tr>
</tbody>
</table>

Dimensions for cable box

<table>
<thead>
<tr>
<th></th>
<th>ZK-SN/TPM-W-3</th>
<th>ZK-SN/TPM-W-4</th>
<th>ZK-SN/TPM-W-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>1500 mm</td>
<td>1800 mm</td>
<td>2400 mm</td>
</tr>
<tr>
<td>Width</td>
<td>1100 mm</td>
<td>1100 mm</td>
<td>1160 mm</td>
</tr>
<tr>
<td>Height (from the ground)</td>
<td>1800 mm</td>
<td>1800 mm</td>
<td>1900 mm</td>
</tr>
<tr>
<td>Roof outline</td>
<td>1650 mm x 1250 mm</td>
<td>1950 mm x 1250 mm</td>
<td>2600 mm x 1360 mm</td>
</tr>
<tr>
<td>Total weight</td>
<td>2900 kg</td>
<td>3400 kg</td>
<td>5000 kg</td>
</tr>
</tbody>
</table>
6.1 Available options for ZK-SN/TPM-W-3 cable box

**ZK-SN/TPM-W-3**

6.1.1 Option 1. ZK-SN/TPM-W-3/LLL

6.1.2 Option 2. ZK-SN/TPM-W-3/TLL

6.1.3 Option 3. ZK-SN/TPM-W-3/LZZ

---

6.1.1 Option 1. ZK-SN/TPM-W-3/LLL

6.1.2 Option 2. ZK-SN/TPM-W-3/TLL

6.1.3 Option 3. ZK-SN/TPM-W-3/LZZ
6.1.4 Option 4. ZK-SN/TPM-W -3/ TZZ

6.1.5 Option 5. ZK-SN/TPM-W -3/ L2Z

6.1.6 Option 6. ZK-SN/TPM-W -3/ T2Z

6.1.7 Option 7. ZK-SN/TPM-W -3/ LL2Z
6.2 Available options for ZK-SN/TPM-W-4 cable box

6.2.1 Option 1. ZK-SN/TPM-W-4/LLLL

6.2.2 Option 2. ZK-SN/TPM-W-4/TLLL
6. Available options for ZK-SN/TPM-W-5 cable box

6.3 ZK-SN/TPM-W-5

6.3.1 Option 1. ZK-SN/TPM-W-5/LLLLL

6.3.2 Option 2. ZK-SN/TPM-W-5/TLLL

6.3.3 Option 3. ZK-SN/TPM-W-5/TLLT
1.1.8 MRw-bpp 20/1000-4 /5P container station

**MRw-bpp 20/1000-4 /5P**

Standard MRw-bpp 20/1000-4 /5P container station diagram

MRw-bpp 20/1000-4 /5P container station facade

---

**Standard MRw-bpp 20/1000-4 /5P container station diagram**

- Earthing checking point
- Transformer no-load operation compensation capacitor
- Transformer chamber door fan (for transformers above 630 kVA)
- Rotoblok SF medium voltage switchgear
- Transformer
- Switchgear chamber door fan
- RN-W low voltage switchgear unit
- Control
- Measurement

---

**MRw-bpp 20/1000-4 /5P container station facade**

- Front view
- Rear view
- Side view - left (right)

---

**Weight:**
- Foundation: 6500 kg
- Main structure: 11500 kg
- Roof: 4500 kg
- Concrete: 600-700 kg
- Usable area: 10.93 m²

**Note:** Optional accessories are marked in red.

---

**Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok</td>
</tr>
<tr>
<td>Rotoblok SF</td>
<td>5</td>
</tr>
<tr>
<td>Rotoblok 17,5 kV</td>
<td>10</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
</tbody>
</table>

**Maximum transformer rating:** 1000 kVA

**Enclosure class:** 20
1.1.9 MRw-b (4,7x3) 20/1000 container station

MRw-b (4,7x3) 20/1000

MRw-b (4,7x3) 20/1000/4P container station diagram

MRw-b (4,7x3) 20/1000/4P container station facade

Weight:
- Foundation: 7500 kg
- Main structure: 12500 kg
- Roof: 5500 kg
- Concrete: 650-800 kg
- Metal: 12.74 m²

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard design</th>
<th>Non-standard design</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotoblok</td>
<td>Rotoblok SF</td>
<td>RN-W</td>
<td>Rotoblok 17.5 kV</td>
</tr>
<tr>
<td>Standard design</td>
<td>4</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Standard design</td>
<td>10</td>
<td>RN-W</td>
<td>19</td>
</tr>
<tr>
<td>Non-standard design</td>
<td></td>
<td>RN-W</td>
<td></td>
</tr>
</tbody>
</table>

Max transformer rating - 1000 kVA

Enclosure class - 20
1.1.10 MRw-b (5,4x2,6) 20/1000 container station

**MRw-b (5,4x2,6) 20/1000**

- CB Switching
- CB Switching
- CB Switching
- Transformer chamber door fan
- Station lighting
- Transformer no-load operation compensation capacitor
- KTS lighting regulator
- Transformer chamber diagram
- Transformer chamber facade

**MRw-b (5,4x2,6) 20/1000 /4P container station diagram**

- Transformer chamber diagram
- Transformer chamber facade

**MRw-b (5,4x2,6) 20/1000 /4P container station facade**

Weight:
- Foundation: 7500 kg
- Main structure: 12500 kg
- Roof: 5500 kg
- Concrete: 650-700 kg

Usable area: 12.63 m²

Note:
Optional accessories are marked in red.

Maximum transformer rating: 1000 kVA

Enclosure class: 20
1.1.11 MRw - bpp (5,4x3) 30/ 630 container station

MRw - bpp (5,4x3) 30/ 630

MRw - bpp (5,4x3) 30/ 630/4P container station diagram

MRw - bpp (5,4x3) 30/ 630/ 4P container station facade

Weight:
- foundation 8000 kg
- main structure 10000 kg
- roof 5700 kg
- concrete 650-800 kg
- metal 34.72 m²

Usable area:

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok SF 36</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>

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1.2 Concrete container transformer stations with an internal service and operation equipped with medium voltage switchgear (SF6) gas insulated.

1.2.1 MRw-b120/630-3 “a” (“b”) / 4G container station

**Standard MRw-b120/630-3 “a(b)”/4G container station diagram**

**MRw-b120/630-3 “a”/4G**

- **TPM-CW (TPM-W) medium voltage switchgear unit**
- **RN-W low voltage switchgear unit**

**MRw-b120/630-3 “b”/4G**

- **TPM-CW (TPM-W) medium voltage switchgear unit**
- **RN-W low voltage switchgear unit**

**MRw-b120/630-3 “a”/4G container station facade**

- **Front view**
- **Rear view**
- **Side view - left**
- **Side view - right**

**Weight:**
- Foundation: 3500 kg
- Main structure: 4600 kg
- Roof: 2000 kg
- Concrete: 2000 kg
- Metal: 300-600 kg

**Usable area:** 5.49 m²

**Note:** Optional accessories are marked in red.

**Type**

<table>
<thead>
<tr>
<th>Medium voltage switchgear unit</th>
<th>Maximum transformer rating - 630 kVA</th>
<th>Enclosure class - 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design TPM-CW</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Standard design TPM-W</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Standard design RN-W</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Non-standard design RN-W</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

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1.2.2 MRw-b2pp 20/630-4 “a” (“b”) / 4G container station

MRw-b2pp 20/630-4 “a”/4G

MRw-b2pp 20/630-4 “b”/4G

Standard MRw-b2pp 20/630-4 “a(b)”/4G container station diagram

MRw-b2pp 20/630-4 “c”/4G container station facade

Weight:
- foundation
- main structure
- roof
- concrete
- metal
Usable area:

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>TPM-CW 4</td>
</tr>
<tr>
<td>TPM-W</td>
<td>3</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W 10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W 12</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>

www.zpue.pl
Container transformer stations

**MRw-bpp 20/1000-3 “a”/4G container station**

**MRw-bpp 20/1000-3 “b”/4G container station**

**Standard MRw-bpp 20/1000-3 “a(b)”/4G container station diagram**

**MRw-bpp 20/1000-3 “a”/4G container station facade**

**Weight:**
- Foundation: 5400 kg
- Main structure: 30000 kg
- Roof:
  - Concrete: 4000 kg
  - Metal: 450-600 kg
- Usable area: 8.72 m²

**Note:**
Optional accessories are marked in red.

**Type**
- Max number of medium voltage bays (low voltage outgoing feeder):
  - Standard design: TPM-W 4
  - Non-standard design: RN-W 30
  - Non-standard design: RN-W 18

**Maximum transformer rating:** 1000 kVA

**Enclosure class:** 20
1.3 Concrete container two-transformer stations with an internal service and operation equipped with air-insulated medium voltage switchgear.

1.3.1 MRw-b 20/2x630-4 “b”/4P container station

MRw-b 20/2x630-4 “b”/4P
Concrete container two-transformer stations with an internal service and operation equipped with air-insulated medium voltage switchgear.

MRw-bpp 20/2x630-4 “b”/4P

Standard MRw-b 20/2x630-4 “b”/4P container station diagram

MRw-b 20/2x630-4 “b”/4P container station facade

Weight:
- foundation 6500 kg
- main structure 9000 kg
- roof 600-700 kg
- concrete 5000 kg
- metal 600-700 kg

Usable area: 10.93 m²

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok SF</td>
</tr>
<tr>
<td>Low voltage switchgear unit</td>
<td>Standard design</td>
</tr>
<tr>
<td>Maximum transformer rating - 630 kVA</td>
<td>Enclosure class - 20</td>
</tr>
</tbody>
</table>
1.3.2 MRw-b (6,1x2,6) 20/2x630 container station

Weight:
- Foundation 9500 kg
- Main structure 11400 kg
- Roof 7000 kg
- Concrete 700-900 kg
- Metal 34.32 m²

Usable area: 14.32 m²

Note:
Optional accessories are marked in red.

Weight
- Foundation
- Main structure
- Roof
- Concrete
- Metal

Usable area: 14.32 m²

Note:
Optional accessories are marked in red.
1.3.3 MRw-b (6,1x3) 20/2x630 container station

MRw-b (6,1x3) 20/2x630-5

MRw-bpp (6,1x3) 20/2x630-6

Standard MRw-b (6,1x3) 20/2x630-5(6) container station diagram

MRw-b (6,1x3) 20/2x630-5 container station facade

Weight:
- foundation: 8500 kg
- main structure: 12000 kg
- roof: 6000 kg
- concrete: 700-900 kg
- metal: 36.69 m²

Usable area: 16.69 m²

Weight:
- foundation: 8500 kg
- main structure: 12000 kg
- roof: 6000 kg
- concrete: 700-900 kg
- metal: 36.69 m²

Note:
Optional accessories are marked in red.
1.3.4 MRw - b (6,1x3) 20/ 2x630- 5 container station (1000 - optional equipment)

MRw - b (6,6x2,6) 20/ 2x630- 5 container station diagram

MRw - b (6,1x2,6) 20/ 2x630- 5 container station facade

Weight:
- Foundation: 9500 kg
- Main structure: 11400 kg
- Roof: 7000 kg
- Concrete: 7000 kg
- Metal: 700-900 kg

Usable area: 15.53 m² (8.10 m²)

Note:
Optional accessories are marked in red.

Type | Max number of medium voltage bays (low voltage outgoing feeder)
---|---
Rotoblok | 4 (5)
Rotoblok SF | 6 (7)
Rotoblok 17,5 kV | 4 (5)

Max transformer rating - 630 (1000) kVA

Enclosure class - 20
1.3.5 MRw-b 20/2x630 container station

MRw-b (7,1x2,6) 20/2x630-7

MRw-b (7,1x3) 20/2x630-6

MRw-b 20/2x630-7(6) container station diagram

MRw-b (7,1x2,6) 20/2x630-7 container station facade

Weight:
- foundation 9000 kg
- main structure 12000 kg
- roof 7000 kg
- concrete 7000 kg
- metal 700-900 kg

Usable area: 36.74 (39.51) m²

Note: Optional accessories are marked in red.

Maximum transformer rating - 630 kVA

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage switching feeds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>Rotoblok 5 (6)</td>
</tr>
<tr>
<td>Standard design</td>
<td>Rotoblok SF 7 (6)</td>
</tr>
<tr>
<td>Standard design</td>
<td>Rotoblok 17.5 kV</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W 2 x 10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W 2 x 34 (for MRw-b (1x3) container station)</td>
</tr>
</tbody>
</table>

Enclosure class - 20
1.3.6 MRw-b 20/ 2x630 container station

MRw-b (8,1x2,6) 20/ 2x630-6

MRw-b (8,1x3) 20/ 2x630-9

MRw-b 20/ 2x630-6(9) container station diagram

MRw-b (8,1x2,6) 20/ 2x630-6 container station facade

Weight:
- Foundation 11500 kg
- Main structure 29000 kg
- Roof 9000 kg
- Concrete 3000-3200 kg
- Metal 19.16 (22.33) m²

Usable area:
- Roof
- Foundation 11500 kg
- Concrete 9000 kg
- Metal 1000-1200 kg

Note:
Optional accessories are marked in red.

Type | No. of medium voltage bays | Low voltage voltage outgoing feeders |
--- | --- | --- |
Standard design | Rotoblok | 6 (7) |
| Rotoblok SF | 9 (10) |
| Rotoblok 17,5 kV | 6 (7) |

Max number of medium voltage bays (low voltage outgoing feeders)
1.4 Concrete two-transformer container stations with internal service and operation equipped with medium voltage switchgear in (SF₆) gas insulated.

1.4.1 MRw-bpp 20/2x630-4 “a” /4G container station

**Standard MRw-bpp 20/2x630-4 “a” /4G container station diagram**

**MRw-bpp 20/2x630-4 “a” /4G container station facade**

**Weight:**
- Foundation: 6500 kg
- Main structure: 9000 kg
- Roof: 5000 kg
- Concrete: 600-700 kg

**Usable area:** 30.93 m²

**Note:** Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum number of medium voltage bays (low voltage outgoing feeds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>TPM - W</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN - W</td>
</tr>
</tbody>
</table>

Maximum transformer rating - 630 kVA

Enclosure class - 20
14.2 MRw-b 20/2x630-4 “b” / 4G container station

Standard MRw-b 20/2x630-4 “b”/4P container station diagram

MRw-b 20/2x630-4 “b”/4G container station facade

MRw-b 20/2x630-4 “b”/4G

Weight:
- foundation
- main structure
- roof
- concrete
- metal
Usable area:

Note:
Optional accessories are marked in red.
14.3 MRw-b (5,4x2,6) 20/2x1000-4 /4G container station

MRw-b (5,4x2,6) 20/2x1000-4 /4G

Standard MRw-b (5,4x2,6) 20/2x1000-4 /4G container station diagram

MRw-b (5,4x2,6) 20/2x1000-4 /4G container station facade

Weight:
- Foundation
- Main structure
- Roof
- Concrete
- Metal

Usable area: 12.63 m²

Note:
Optional accessories are marked in red.

Note:
- Transformer no-load operation
- Compensation capacitor
- Transformer chamber door fan
- Station lighting
- Control measurement
- Semi-direct electricity metering
- Earthing checking point
- Trip coil

Type | Maximum number of medium voltage bays (low voltage outgoing feeders) | Weight (kg) | Usable area (m²) | Enclosure class |
--- | --- | --- | --- | --- |
Standard design | TPM-W | 4 | 7500 | 12.63 |
Standard design | RN-W | 2 x 10 | 5500 - 8000 | 20 |

Maximum transformer rating - 1000 kVA

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MRw-bS... Concrete transformer station SYSTEM according to individual customers requirements.

MRw-bS... container station system comprises standard concrete containers, which are bolted together. There is possible any configuration of the station equipped with medium voltage and low voltage switchgears. Each container is composed of two reinforced concrete modules: foundation and side walls together with floor base. Container station equipment (doors, door frames and ventilation shutters made of aluminium). The station’s roof cover all of the joined containers and can be made in two architectural designs: two slope roof or hip roof consisting of a light structure made of steel profiles, coated by metal roofing sheets. Optional casings that can be arranged into a SYSTEM:

Dimensions: height 2250 (2350 (max 3000)) mm main structure +... mm station roof + 900 mm station foundation, width, length - consult the manufacturer.

This catalogue presents examples of actually existing stations. It is possible to produce many other solutions according to individual requirements. ZPUE S.A. will present design proposals free of charge.

Container transformer stations
1.5.1 MRw-bS 20/2x630-9 container station

Container station technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_{n}$ - Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>$I_{n}$ - Rated continuous current</td>
<td>630 A</td>
<td>1250 A</td>
</tr>
<tr>
<td>$I_{nb}$ - Short - time withstand current (1sec)</td>
<td>36 kA</td>
<td>36 kA</td>
</tr>
<tr>
<td>$I_{w}$ - Withstand current</td>
<td>40 kA</td>
<td>35 kA</td>
</tr>
<tr>
<td>$f$ - Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>$S_n$ - Maximum T1/T2 transformer rated power</td>
<td>630/630 kVA</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
<td></td>
</tr>
</tbody>
</table>

MRw-bS 20/2x630-9

Switchgear

- Rated voltage: 24 kV, 400 V
- Rated continuous current: 630 A, 1250 A
- Short - time withstand current: 36 kA, 36 kA
- Withstand current: 40 kA, 35 kA
- Rated frequency: 50 Hz
- Maximum T1/T2 transformer rated power: 630/630 kVA
- Degree of protection: IP 43

MRw-bS 20/2x630-9 container station diagram

- Rotoblok medium voltage switchgear
- Earthing checking point

Weight:
- Foundation: 16500 kg
- Main structure: 22600 kg
- Metal roof: 18000 kg

MRw-bS 20/2x630-9 container station facade

- Front view
- Side view - left (right)
1.5.2 MRw-bS 20/2x630-7 container station

<table>
<thead>
<tr>
<th>Container station technical data</th>
<th>Switchgear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium voltage</td>
</tr>
<tr>
<td>Uₚ</td>
<td>24 kV</td>
</tr>
<tr>
<td>Iₚ</td>
<td>630 A</td>
</tr>
<tr>
<td>Iₚₛ</td>
<td>25 kA</td>
</tr>
<tr>
<td>Iₚₛₕ</td>
<td>40 kA</td>
</tr>
<tr>
<td>f</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Sₑₘ</td>
<td>630/630 kVA</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
</tr>
</tbody>
</table>

- Weight:
  - foundation: 13000 kg
  - main structure: 18000 kg
  - metal roof: 12000 kg

MRw-bS 20/2x630-7 container station diagram

MRw-bS 20/2x630-7 container station facade

Rear view

Side view - left (right)
To reduce the cost of investment for sites with high power demand, two level concrete transformer stations can be applied. The main advantage of these stations is concentration of high power rating transformers within a compact building.

Our proprietary design and technology office as well as cast concrete block production line allow production of other non-standard, two-level transformer station designs.

1.6.1 MRw-bP 20/2x2500-6 container station

**Container station technical data**

<table>
<thead>
<tr>
<th></th>
<th><strong>Switchgear</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium voltage</td>
</tr>
<tr>
<td><strong>Uₙ</strong> - Rated voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td><strong>Iₙ</strong> - Rated continuous current</td>
<td>630 A</td>
</tr>
<tr>
<td><strong>Iₙₜ</strong> - Short - time withstand current (1sec)</td>
<td>36 kA</td>
</tr>
<tr>
<td><strong>Iₙₚ</strong> - Withstand current</td>
<td>40 kA</td>
</tr>
<tr>
<td><strong>f</strong> - Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td><strong>Sₙ</strong> - Maximum T1/T2 transformer rated power</td>
<td>2500/2500 kVA</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
</tr>
</tbody>
</table>

**MRw-bP 20/2x2500-6**

*Ground floor*

*1st floor*
MRw-bP 20/2x2500-6 container station diagram

MRw-bP 20/2x2500-6 container station facade
Introduction
Concrete container transformer stations with an external service are designed as freestanding units for operation with cable networks, ring or radial medium voltage cable and overhead lines and low voltage cable networks. They provide electrical power to public buildings, and also to:
- residential area in towns and cities,
- parks and recreational areas,
- suburban residential and rural areas,
- construction sites,
- Industrial parks and workshops.
Container stations are transported to the installation site complete and ready for operation. Once the container is positioned, medium and low voltage cables and earthing system require connection and the transformer has to be placed inside and connected.

Container station design
These container station comprise two monolithic components:
- main structure (side walls and base floor) - made from B30 ferroconcrete,
- roof - made from B30 ferroconcrete or metal (for Minta 20/630 station).
Main structure with installed medium voltage and low voltage switchgear and a transformer has ventilation openings protected with aluminium slats ensuring IP 43 degree of protection. Additional foundation is not necessary when constructing the station, however the subsoil must be prepared according to construction guidelines. The container stations are delivered to place of installation together with cable glands. Once the foundation is constructed low voltage and medium voltage cables must be run through cable glands.
In front of transformer chamber there is a sealed oil collection pit, which can contain the entire contents of transformer’s oil tank. The station foundation is insulated on both sides in order to prevent ingress of groundwater inside the station and leaking of the transformer oil into the ground in the event of transformer failure.
The station’s ventilation is convection-based through specially designed ventilation openings protected with aluminium slats and through ventilation openings in the station’s doors (Mzb1 station has an additional ventilation gap located under the station's roof). Standard station design allows placement in the transformer chamber of a hermetically sealed oil-filled transformer with a rating up to 630 kVA (up to 250 kVA for Mrw-bk 20/250 station). Transformer can be placed in the chamber after the station’s roof is removed. Standard installed switchgear:
- Medium voltage type:
  TPM-W,
  TPM-CW,
  or other after consultation with the manufacturer.
- Low voltage type:
  RN-W,
  or other after consultation with the manufacturer.
Switchgear cubicles are independent station components and they can be serviced when the doors for LV or MV switchgears are open. Connections between medium voltage switchgear and the transformer as well as between the transformer and low voltage switchgear are made with cables (however (as an option) there is possibility to make all this connections with busbars).
Container station

Installation into ground

The first stage of building container station installation is excavating the pit as shown in the figure below. Earth ring conductor must be laid in the pit and then connected to the station’s control systems. A 200 millimetre layer of sand and gravel bedding must be constructed under the station. Special attention must be paid to levelling the underlying bedding. Once the bedding is prepared as described above: Construct the station’s main structure, place the transformer in the chamber from the top (placing it on rails) and install the roof.

If the container station is installed on wetland, the foundation should be additionally protected with moisture barrier and a system of efficient drains should be constructed around the station’s building. The station can be also constructed in category 3 and 4 mining excavation area, which has been certified by an opinion issued by a construction expert.

In this instance, in order to ensure a correct foundation design, it is required to construct an additional sliding layer comprising two layers of sandless tar paper laid on a 100 millimetre concrete screed slab and provide a 500 millimetre sand cushion under the entire footing (in the form of subsoil or made ground in the excavated pit).

Minibox 20/630 container station foundation

* - height according to architectural requirements

Container station technical data

<table>
<thead>
<tr>
<th>Container station technical data</th>
<th>Switchgear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium voltage</td>
</tr>
<tr>
<td>$U_n$ - Rated voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td>$I_n$ - Rated continuous current</td>
<td>400 / 630 A</td>
</tr>
<tr>
<td>$I_{sh}$ - Rated short-time withstand current</td>
<td>36 kA</td>
</tr>
<tr>
<td>$I_{SW}$ - Withstand current</td>
<td>40 kA</td>
</tr>
<tr>
<td>$f$ - Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>$S_n$ - Maximum transformer rated power</td>
<td>630 kVA</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
</tr>
</tbody>
</table>

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2.1 Minibox 20/630 container station

Minibox 20/630 “a”

Minibox 20/630 “b”

Standard Minibox 20/630-3 “a(b)“/3(4)G container station diagram

Minibox 20/630 “a” container station facade

Weight:
- main structure 4800 kg
- roof 3800 kg
- concrete 300 kg

Usable area: 4.152 m²

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Medium voltage bays</th>
<th>Low voltage outgoing feeders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>TPM-W</td>
<td>4</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
<td>10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
<td>15</td>
</tr>
</tbody>
</table>

Maximum transformer rating - 630 kVA

Enclosure class - 30

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### 2.2 Mzb120/630 container station

#### Mzb120/630

- **Standard design:**
  - **Type:** TPM-W
  - Max number of medium voltage bays (low voltage outgoing feeders): 3

- **Non-standard design:**
  - **Type:** RN-W
  - Max number of medium voltage bays (low voltage outgoing feeders): 12

#### Weight:
- Main structure: 7600 kg
- Concrete roof: 1800 kg
- Usable area: 4.06 m²

#### Note:
Optional accessories are marked in red.

---

**Standard Mzb120/630 container station diagram**

- Earthing checking point
- Trip coil
- Control measurement
- **TPM-W medium voltage switchgear unit**
- **TPM-CW medium voltage switchgear unit**

---

**Standard Mzb120/630 container station facade**

- Front view
- Rear view
- Side view - left
2.3 MRw-bk 20/250 simplified, freestanding container transformer station

MRw-bk 20/250

Standard MRw-bk 20/250 container station diagram

MRw-bk 20/250 container station facade

Weight (excluding transformer) 4800 kg

Note:
Optional accessories are marked in red.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>RN-W 4</td>
</tr>
</tbody>
</table>

N maksymalna moc transformatora - 250 kVA
Introduction
The WST 20/630 small size concrete transformer station with an external service is designed as a freestanding unit for operation with cable network, ring or radial medium voltage cable and overhead line and low voltage cable network. They provide electrical power to public buildings, and also to:

- residential area in towns and cities,
- parks and recreational areas,
- suburban residential and rural areas,
- construction sites,
- Industrial parks and workshops.

The station is transported to its place of installation fully equipped with medium and low switchgear units and all internal systems. Once the station is positioned, it only requires the connection of external medium voltage and low voltage cables, earth ring conductor and placing and connecting of the transformer.

Station design
WST 20/630 Station design incorporates four monolithic cast blocks made from B30 ferroconcrete:

- Foundation (cable compartment with the glands)
- Main structure incorporating medium voltage and low voltage switchgear, transformer chamber
- Station roof (see point 5)

The station’s roof can be made of metal or a steel profiles clad with metal roofing tiles or bitumen shingles. In main service corridor we can find hatches to the foundation part and transformer chamber.

The station's floor is made from concrete with openings for medium voltage and low voltage cables. The transformer chamber is designed as sealed basin which can hold all transformer’s oil in case of failure. Additional foundation is not necessary, however the subsoil must be prepared according to construction guidelines. The container station is delivered to its place of installation equipped with cable glands through which low voltage and medium voltage cables must be pass. The station’s ventilation is convection-based through specially designed ventilation openings located in the lower section of the main structure and also through the station’s doors and an additional ventilation gap located under the station’s roof. Station design allows to use hermetically sealed oil-filled transformer up to 630 kVA. Transformer installation is carried from the outside when the roof is removed. Transformer can be accessed through a hatch located at the top of the main structure.

Switchgear cubicles are independent station components and they can be accessed and operated from the common corridor inside the station. Connections between medium voltage switchgear and the transformer as well as between the transformer and low voltage switchgear are made with cables.

Standard installed switchgear:

**Medium voltage type:**
TPM-CW,
or other after consultation with the manufacturer.

**Low voltage type:**
RN-W,
or other after consultation with the manufacturer.
Container station technical data

<table>
<thead>
<tr>
<th></th>
<th>Switchgear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium voltage</td>
</tr>
<tr>
<td>Uₚₘ - Rated voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td>Iₚₘ - Rated continuous current</td>
<td>400 / 630 A</td>
</tr>
<tr>
<td>Iₛₘ - Short - time withstand current (1 sec)</td>
<td>16 kA</td>
</tr>
<tr>
<td>Iₛₙ - Withstand current</td>
<td>40 kA</td>
</tr>
<tr>
<td>f - Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Sₙₘ - Maximum transformer rated power</td>
<td>630 kVA</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 43</td>
</tr>
</tbody>
</table>

Container station foundation

The first stage of building container station foundation is excavating the pit. Earth ring conductor must be laid in the pit and then connected to the station’s control systems terminals. A 200 millimetre layer of sand and gravel bedding must be constructed under the foundation. Then a 250 mm lean concrete slab must be poured on top. Special attention must be paid to the correct levelling the base plate. Once the bedding is prepared as described above: Place the foundation, then the station’s main structure, place the transformer in the chamber from the top arranging it on rails) and install the roof. If the container station is installed on wetland, the foundation should be additionally protected with moisture barrier and a system of efficient drains should be constructed around the station’s building. Once the station is correctly placed, make sure that ventilation conduits at the bottom of the station are not obstructed.

Station installation method

Pit under the station
Available roof types

Concrete roof

Front view

General view

Tall metal roof

Front view

General view

Roofing material

<table>
<thead>
<tr>
<th>Roof type</th>
<th>Optional roofing materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete slab</td>
<td>Bitumen shingle</td>
</tr>
<tr>
<td>Tall metal roof</td>
<td>Bitumen shingle</td>
</tr>
</tbody>
</table>

Medium and low voltage cable entry

Cross-section view and dimensions of medium and low voltage cable entry

Assembly and sealing of medium and low voltage cable entry in the station’s foundation
WST 20/630 container station diagram

Weight:
- Foundation: 3600 kg
- Switchgear chamber: 4800 kg
- Transformer chamber: 5300 kg
- Roof: concrete: 1500 kg, metal: 350 kg

Usable area: 3.46 m²

Note:
Optional accessories are marked in red.
* - when 4-bay medium voltage switchgear is used, a maximum of 6 category 1-3 switch disconnectors can be installed.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max number of medium voltage bays (low voltage outgoing feeders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard design</td>
<td>TPM-W</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W</td>
</tr>
<tr>
<td>Maximum transformer rating</td>
<td>- 630 kVA</td>
</tr>
</tbody>
</table>

WST 20/630 station facade
4 Underground transformer station

Introduction

PST-b 20/630 Underground transformer station is designed to provide power to buildings where it is not possible to install a traditional container transformer station. It is designed for operation with cable network, ring or radial medium voltage cable and overhead line and low voltage cable network. It provides electrical power to public buildings, and also to:

- residential area in towns and cities,
- parks and recreational areas,
- industrial parks and workshops.

The station can also provide power to communal buildings where transformers, due to being a nuisance, should be installed outside of residential buildings. Container stations are transported to the installation site complete and ready for operation. Once the container is positioned, medium and low voltage cables and earthing system require connection and the transformer has to be placed inside and connected.

Container station design

The PST-b 20/630 station is a leakproof concrete container which can be buried underground. Ventilation openings above the manhole and the transformer provide the necessary cooling for the transformer rated up to 630 kVA and also medium and low voltage switchgear.

It is possible to install canopies with slat-protected openings in side walls above the hatch and transformer ventilation conduit, in order to guard the openings against atmospheric precipitation and dirt accumulating around the unit. PST-b 20/630 container is made of B30 ferroconcrete. The entire external surface of the container is additionally protected with Hydrobit bitumen layer. The station is delivered to its place of installation equipped with cable glands through which low voltage and medium voltage cables must be run from the outside. As a consequence of the type of switchgear units used (Sulphur Hexafluoride (SF₆) gas insulated) only dry insulation medium voltage cables should be used. Oil-insulated cables must be attached to a dry cable outside the station, which is then run through the glands and connected to medium voltage switchgear.

The station's floor is raised by approximately 30 cm above the base where two drainage outlets are placed. Water drainage hoses should be connected to them through special check valves. Ensure that drainage outlets are connected to an efficient sewer system. The space between the floor and the station's base forms a water receptacle to collect condensation and rain which could get inside when the hatch is open.

Access to the container station is gained through the top hatch (once the lock is released and platform grid is removed) down the stairs in the staircase, from where separate locked doors lead to medium and low voltage switchgear access corridor.

The transformer is placed on rails with openwork enclosure under which sealed oil collection pits is provided to contain the entire oil from transformer's oil tank. Oil collection pit guarantees that in the event of oil spill from the transformer, pollution of the environment will be prevented. Ventilation openings ensuring correct ventilation of the transformer chamber are provided in the partition wall along the length of the transformer. Station design allows placement in the transformer chamber of a hermetically sealed oil-filled transformer rated up to 630 kVA.

Transformer can be installed through the staircase once the platform grade is removed, and also the stairs and transformer chamber partition wall is dismantled. Standard installed switchgear:

- SF₆ gas insulated medium voltage switchgear: TPM - W,
  or other after consultation with the manufacturer.
- Low voltage switchgear type: RN-W,
  or other after consultation with the manufacturer.

Switchgear cubicles are independent station components and they can be accessed and operated from the common corridor inside the station. Connections between medium voltage switchgear and the transformer as well as between the transformer and low voltage switchgear are made using cables with insulated connectors.
### Container station technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
<th>Medium voltage</th>
<th>Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uₙ</td>
<td>Rated voltage</td>
<td>24 kV</td>
<td>400 V</td>
</tr>
<tr>
<td>Iₙ</td>
<td>Rated continuous current</td>
<td>400 / 630 A</td>
<td>1250 A</td>
</tr>
<tr>
<td>Iₙₑₜ</td>
<td>Short - time withstand current (1 sec)</td>
<td>16 kA</td>
<td>16 / 20 kA</td>
</tr>
<tr>
<td>Iₙₑₙ</td>
<td>Withstand current</td>
<td>40 kA</td>
<td>35 / 40 kA</td>
</tr>
<tr>
<td>f</td>
<td>Rated frequency</td>
<td>50 Hz</td>
<td>630 kVA</td>
</tr>
<tr>
<td>Sₙₘ</td>
<td>Maximum transformer rated power</td>
<td>630 kVA</td>
<td>35 / 40 kA</td>
</tr>
</tbody>
</table>

### Container station foundation

The station should be located at high ground (not in a depression) to protect it from flooding, for instance by meltwater. A correct location will guarantee normal continuous operation. The first stage of building container station foundation is excavating the pit. And that should be filled with large stone gravel on top of which the foundation slab should be constructed at the station installed. Gaps around the station should be also filled with gravel mixed with yellow river sand (it is not recommended to reuse the excavated subsoil). Grass should be planted or paving stones laid around the hatch and ventilation outlets to integrate these structures with the surroundings. Warning signs that should be posted on the hatch. These warning signs can also be posted on a freestanding post in the vicinity of the station. The station is not designed for installation under road or in other locations where vehicles may park or move along. The draining system which is connected to local sewer system must be provided around the station, appropriate for the type of soil and other geodetic conditions.

### Example of station foundation and drainage system

- **Foundation slab**
- **Gravel mixed with river sand**
- **Drain pipes**
- **Gravel fillin**
- **Station drain outlets**
- **Subsoil**
**Drainage system overview**

1. Foundation slab
2. Coarse-grained gravel bedding
3. Drain pipes, which must be connected to local sewer system
4. Connection to local sewer system through check valves accessed through an inspection sump
5. Cable glands

**Dimensions and view of medium and low voltage cable glands.**

| Dimensions and layout of medium and low voltage cable glands. Side facade - left |
| Assembly and sealing of medium voltage cable glands |

| Assembly and sealing of low voltage cable glands |

1. Foundation slab
2. Coarse-grained gravel bedding
3. Drain pipes, which must be connected to local sewer system
4. Connection to local sewer system through check valves accessed through an inspection sump
5. Cable glands

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4.1 PST-b 20/630 /3(4)G container station

PST-b 20/630 /3(4)G container station diagram

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<td>TPM-W 4</td>
</tr>
<tr>
<td>Standard design</td>
<td>RN-W 10</td>
</tr>
<tr>
<td>Non-standard design</td>
<td>RN-W 12</td>
</tr>
</tbody>
</table>

Maximum transformer rating - 630 kVA

Enclosure class - 20

Weight:
- main structure 25000 kg
- Usable area: 12.32 m²

Note:
Optional accessories are marked in red.
Please visit www.zpue.pl
from more information

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