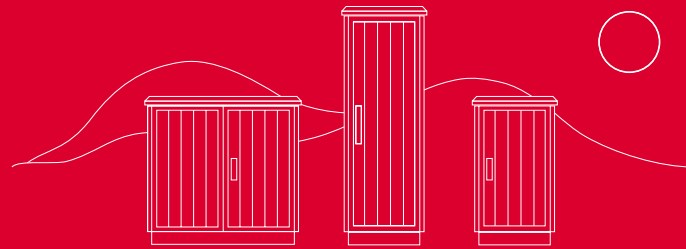


Outdoor cabinets

[2009]

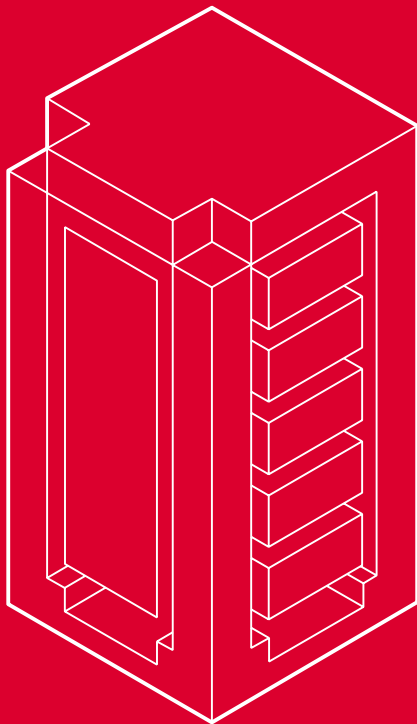


ZPAS
net

connections for you

ZPAS

G R O U P



**35 YEARS
OF EXPERIENCE
1973-2008**

ZPAS Group

The ZPAS Group, pursuing shared goals and business philosophy, integrates the product offer of ZPAS S.A. and ZPAS-NET sp. z o.o. The idea is reflected in our motto "solutions for connections", which refers to advantages of our products, benefits of using them, a superb system of communication with our customers, partnership, technical consulting and high level of customer service, from the moment of first contact until order fulfilment. The motto thus reflects our attitude to clients whose requirements we wish to satisfy, offering them top-quality services.

We have achieved a strong status in the industry over 35 years of our business activity. As a manufacturer, we operate in accordance with our well-established reputation as a reliable business partner providing customers with top-quality products, short lead times and very reasonable prices.

Electronic communication products (elements of IT, telecommunications and power systems) must demonstrate parameters and features capable of meeting rigorous high-tech requirements. Our primary goal is to supply such products.

Our capital is not limited to modern machines. We also boast of highly qualified staff. Our employees are young, creative and innovation-minded. They also make the best use of vast industry experience acquired over more than 30 years by specialists who have worked for our company ever since its beginnings. Advanced technologies and well-planned organisation of all manufacturing processes are supported by INFOR ERP LN, our IT system.

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ZPAS-NET

Construction of cabinets

Ventilation of SZD cabinets

Tests of SZD cabinets

Supplementary accessories

Examples of appliances

ABOUT THE COMPANY



ZPAS-NET office building

ZPAS-NET sp. z o.o.

Since the very beginning of its business activity in 1973, ZPAS in Przygórze has manufactured enclosures and equipment for the power sector and other industry branches. Initially, the Company operated as the Experimental Department of the Power System Automation Institute (IASE) in Wrocław, to become a part of the Research and Manufacturing Centre for Power System Automation (CNPAE). After 1989, the management of the Company undertook actions aimed at privatisation, which resulted in the establishment of a private joint-stock company at the end of 1991.

ZPAS-NET sp. z o.o. was established on 1 June 2004 as a result of spinning off departments specialising in network solutions and power sector equipment from the general structure of ZPAS S.A. The name of the new company features the "net" element that stands for the line of products necessary to develop the infrastructure of modern networks and supervision/control systems. Another, equally important, product group comprises dedicated elements for the electric power industry incorporating intelligent IT solutions.

The two companies making up the ZPAS Group (ZPAS S.A. and ZPAS-NET sp. z o.o.) offer complementary products, marketing a broad range of articles performing important functions in electronic communications. ZPAS products are widely used as an infrastructural base for telecom and IT networks, as well as enclosures for the telecommunications and power equipment.

ZPAS-NET has been developing very rapidly, recently opening a new plant in Nowa Ruda-Drogosław, within the sub-zone of the Wałbrzych Special Economic Zone. The plant was officially put into operation on 5 October 2007. The new ZPAS-NET facility has an office area of 800 m² and the production area of 2500 m². Detailed information is available at www.zpas.pl.

Quality and the environment

The ZPAS Group holds the ISO 9001:2000 Quality Assurance System Certificate and the ISO 14001:2004 Environmental Management System certificate.

Sales agencies

The Company has around a dozen sales agencies all over Poland. A detailed list is available on the Company's website.

ZPAS products are also sold abroad through a distribution network in: Austria, Belarus, Belgium, Bosnia and Herzegovina, Cyprus, Denmark, France, Germany, Great Britain, Greece, Hungary, Iceland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Morocco, the Netherlands, Norway, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland and the Ukraine. Detailed information is available on request from the ZPAS Group Marketing Department.

ABOUT THE COMPANY



ZPAS-NET production facility



Cutting of aluminium profiles used in frames of outdoor cabinets



Fastening of aluminium panels for outdoor cabinets shields

ZPAS-NET offers:

- structural cabling systems
- fibre optic distribution frames and accessories
- telecommunications accessories
- ZPAS Control Oversee supervising system
- DataCenter integration of equipment and systems
- aluminium outdoor telecom cabinets
- dispatch and control desks
- mimic boards
- prefabrication of power supply, protection, control and automatics cabinets

ZPAS offers:

- 19" and 21" data communication enclosures (including server cabinets, telecommunications cabinets, EMC enclosures and others – both in free-standing and wall-mounted versions)
- empty power cabinets (without electrical devices)
- customised cabinets
- universal control desks
- products made of stainless acid-resistant steel

REFERENCES

ZPAS-NET, as the manufacturer of outdoor cabinets, co-operates with well-known companies like: Aster City, Clearwire, Delta Energy Systems, DGT, Eltek Polska, Energis Polska, Ericsson, Keymile, Molex (Norway), Multimedia, Netia, Nokia Siemens, Polkomtel, Sprint, Sunlight Systems (Greece), Teletra Komtrans, Telzas, TP SA.



REFERENCES



ISO 9001, ISO 14001

CERTIFICATE

Management system as per
ISO 9001:2000

In accordance with TÜV CERT procedures, it is hereby certified that

ZPAS GROUP Zakład Produkcji Automatyki Sieciowej S.A.
Przygorze 209, 57-431 Woiłbórz
with production site
ul. Spacerowej 59, 57-402 Nowa Ruda
ZPAS-NET sp. z o.o.
ul. Gómicza 19, 57-401 Nowa Ruda

applies a quality system in line with the above standard for the following scope
**data and telecommunication enclosures, industrial enclosures,
outdoor cabinets, fibre optic distribution frames, dispatch and
control desks, mosaic mimic systems, structured cabling elements**

Certificate Registration No. 75 100 6807 Valid until 2010-11-29
Order No. 2100071688

TÜV CERT Certification Body
TÜV Rheinland Polska Sp. z o.o. Warsaw, 2007-11-30

This certification was conducted in accordance with the TÜV CERT auditing and certification procedures and is
subject to regular surveillance audits.
TÜV Rheinland Polska Sp. z o.o. 00-146 Warszawa ul.17 Stycznia 68 www.tuv.pl

CERTIFICATE

The TÜV CERT Certification Body
of TÜV Rheinland Cert GmbH
certifies in accordance with
TÜV CERT procedures that

ZPAS GROUP Zakład Produkcji Automatyki Sieciowej S.A.
Przygorze 209, 57-431 Woiłbórz
with production site
ul. Spacerowa 59, 57-402 Nowa Ruda
ZPAS-NET sp. z o.o.
ul. Gómicza 19, 57-401 Nowa Ruda

has established and applies an environmental management system for
**data and telecommunication enclosures, industrial enclosures,
outdoor cabinets, fibre optic distribution frames, dispatch
and control desks, mosaic mimic systems, structured cabling elements.**

An audit was performed, Report No. 010785.
Proof has been furnished that the requirements according to
ISO 14001:2004
are fulfilled.
The certificate is valid until 2010-09-30.
Certificate Registration No. 01 104 010785

TÜV CERT Certification Body of
TÜV Rheinland Cert GmbH

Warsaw, 2007-11-28 **TÜVRheinland®**

First certification 2007

www.tuv.com

GUARANTEE

5-YEARS GUARANTEE

ZPAS GROUP

ZPAS Group offers 5 years guarantee for its elements. Post-guarantee service is provided without a time limit.

GENERAL INFORMATION

In the period of last few years, the increase of telephone-users and density of ducts surrounding cities which are endangered on easy damage, forces the manufacturers of telecommunication links to work out and use ducts under the earth-surface. Together with the increase of transferring wider frequency band, it appeared that there are some difficulties with providing appropriate quality of transmission with using copper wires. Wider pass bands in fast networks, like Gbit Ethernet or ATM, means necessity of assistance the copper wires with complicated electronic systems. That is the reason why fibre optics became alternative solution to copper wires.

Not mentioning creation of brand-new networks, one of the biggest tasks for telecommunication network is protection of already made investments and re-usage of the biggest possible part of already existing cable-networks. This possibility is given by access systems. Access systems enable gradual changing distributive copper wires with fibre optics. This solution allows using existing exchange lines not only for transmission telephone and ISDN services, but also for transmission 2Mb/s flux with using digital exchange line technology.

The technology of access exchange guarantees updating existing transmission network with usage of valuable electronic equipment. In order to lower the costs of modernisation, the most common solution is joining old part of installation (copper wires) with new one (fibre optic cables) in outdoor access cabinets (like SZD).

The main task of outdoor access cabinet is full protection of installed equipment. The cabinet fulfils the requirements of protection against negative influence of environment (rain and snow falls, sun, dust etc) and vandalism. Another very important task of SZD cabinets is providing specified climatic conditions which depend on installed equipment.

The construction of SZD cabinet enables optional arrangement of inside equipment. It makes possible to use SZD cabinets not only in access systems, but also in each case where the protection of outdoor equipment working in extreme conditions is very important. SZD cabinets produced by ZPAS-NET have been already used in telecommunication industry, on ships, platforms, stamping press and intermediate pumping gas stations, heat and power stations, power industry plants, refineries, cement plants, for protection of machinery for outdoor lightning operating etc.



SZD CABINETS

Technical data

Material:

Cabinets framework	- aluminium profile,
Side shields and doors	- aluminium profile,
Roof (internal mantle)	- 1.5 mm thick aluminium steel,
Roof (external mantle)	- alternatively stainless steel or aluzinc,
Plinth	- alternatively stainless steel or aluzinc.

Surface finishing:

Aluminium profiles of the framework and aluminium frames of shield and doors:

Anodised (in EMC version chromate coated and powder painted in RAL 7035)

Aluminium profiles of shield and doors:

Chromate coated and powder painted in RAL 7035

Internal mantle of the roof:

Natural aluminium

Plinth and external mantle of the roof:

Powder painted in RAL 7035

In EMC version of the cabinet conductivity between each elements of the construction is ensured.

Protection Degree:

Standard cabinets have got protection degree IP 54 in accordance with PN 92/E-08106. If required it can be increased up to IP 65.



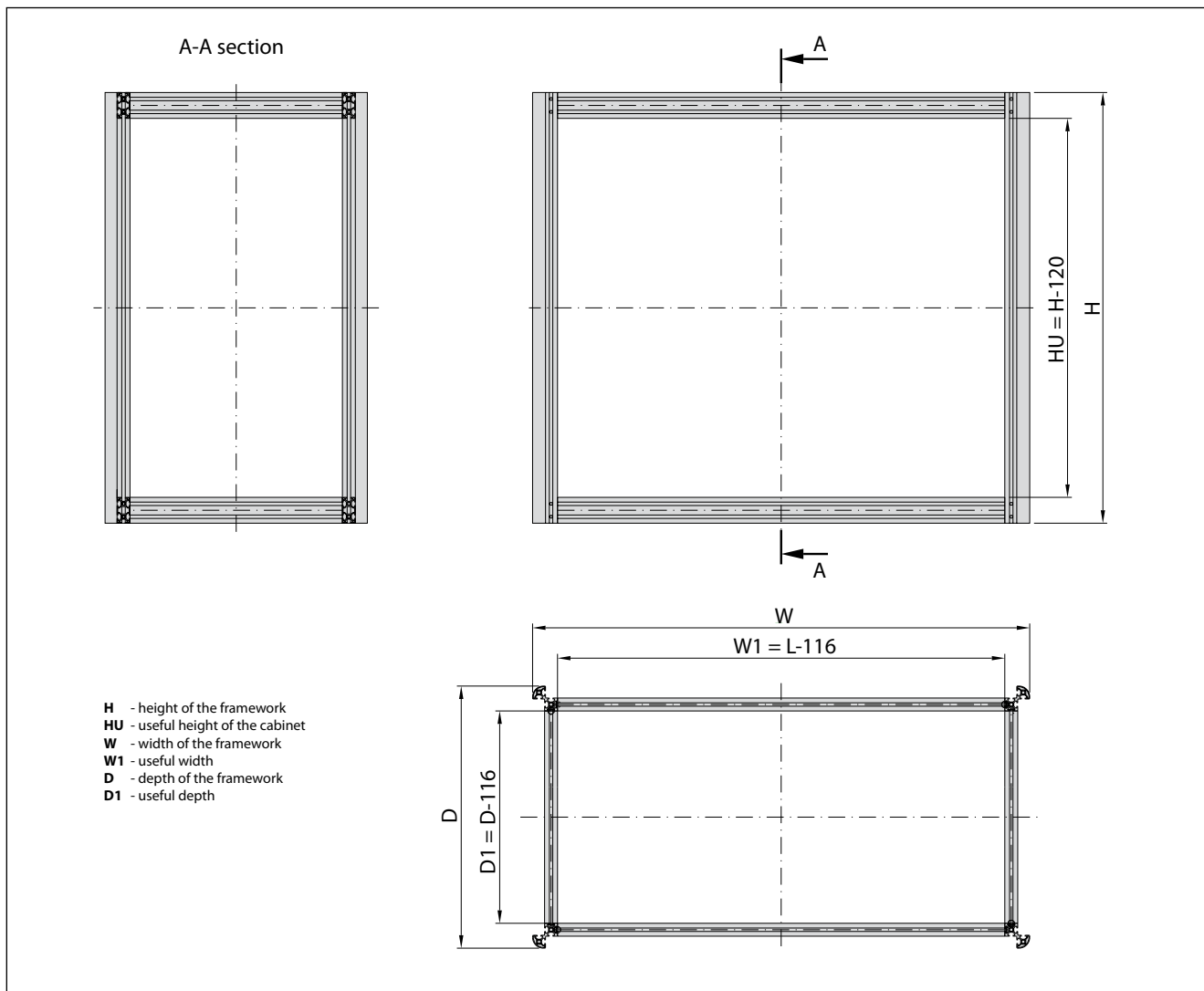
Note:

ZPAS reserves the rights to implement changes in construction. All technical solutions used in construction of SZD cabinets are reserved in Patent Office of Poland.



FRAMEWORK

Supporting structure of the cabinet is the framework made of aluminium profiles, which are joint together by adaptors. In profiles there are special ducts, which enable the assembly of swing frame or optional creation of supporting structure for mounting equipment. The framework of the cabinet is in standard set on the plinth. The height of the plinth depends on customer's request: from 40 to 300 mm.



DOORS, SIDE SHIELDS

Doors and side shields of SZD cabinets are made of aluminium rail-profiles which are fastened together. The aluminium profiles make double ventilation wall. In the cabinet there are mounted two-point rod-latch locks. The door handle is made of zinc and aluminium alloy. On customer's request it is possible to have optional type of patent insert (ABLOY, KABA, EMKA, etc). It is possible to make special opening for temporary cable entry (e. g. from outside power supply unit).



Cable entry - view from the inside of the cabinet



Cable entry - view from the outside of the cabinet



Lock - view from the inside of the cabinet

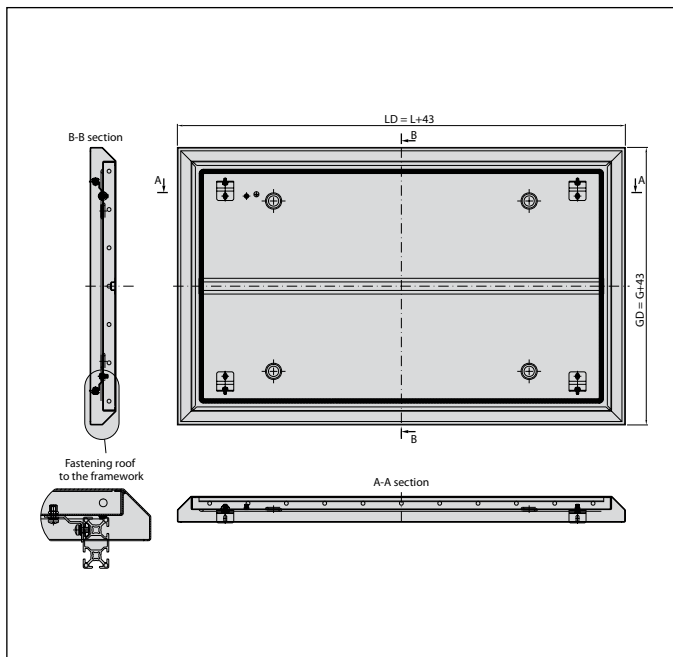


Lock - view from the outside of the cabinet

STANDARD ROOF FOR SZD

Standard roof for SZD cabinets is made of two mantles of 1.5 mm thick sheet steel. Between the mantles there is a gap, which enables to carry away accumulated condensation water.

A part of standard roof



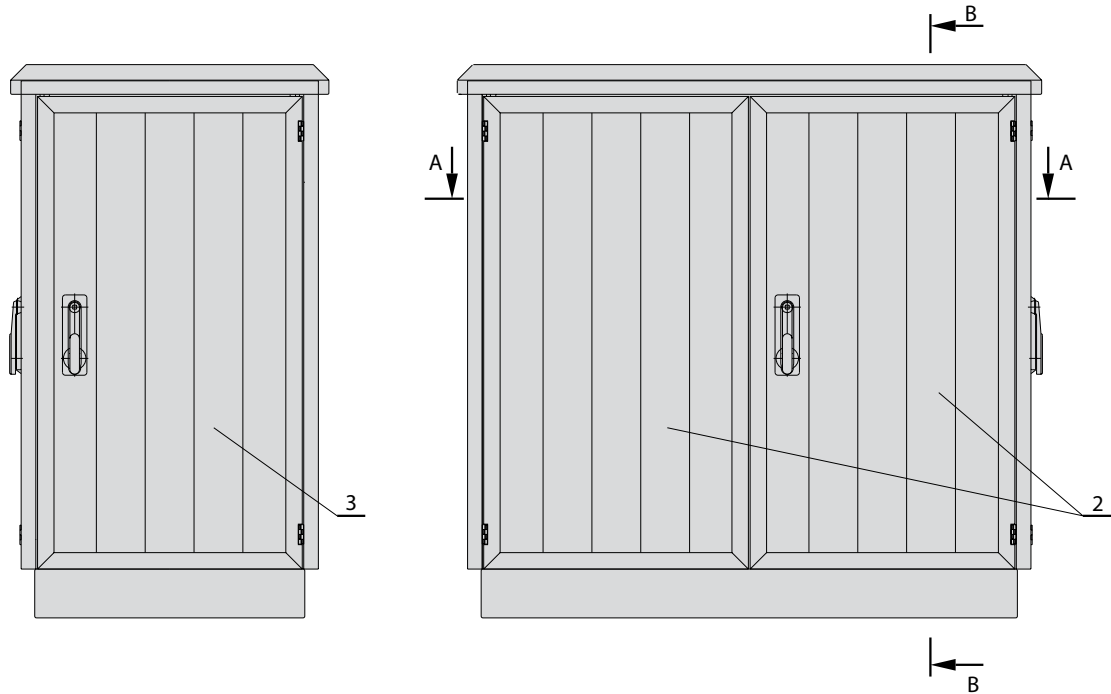
ROOF WITH LIFTING EYES

On customer request roof can be equipped into the lifting eyes.

A part of roof in special configuration



DIMENSIONS OF SZD CABINETS

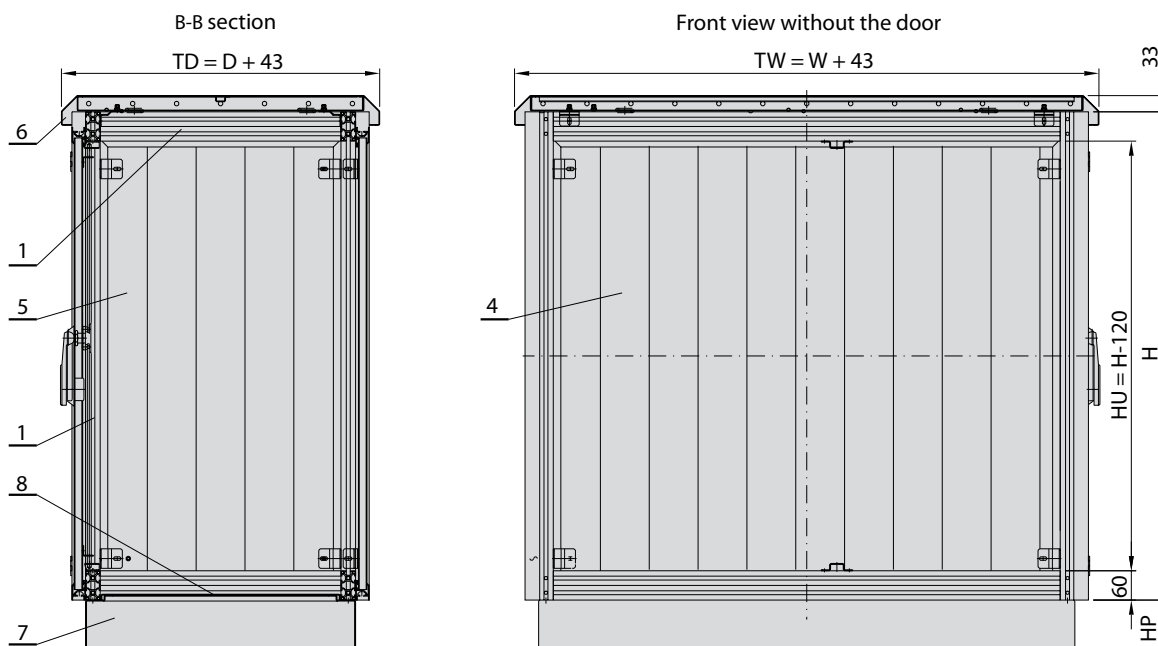


SZD cabinet has got modular construction. Main part of the cabinet is made of panels (which are fastened by latches) and aluminium profiles. Both panels and profiles can be cut for any length. This kind of construction enables to achieve each required dimension. **Every cabinet is designed and manufactured on individual request (together with interior installation - it is possible to create universal partitions and supporting structure of the cabinet).** When ordering the cabinet, it is necessary to take into account, that useful dimensions are different than total dimensions - in accordance with presented drawings.

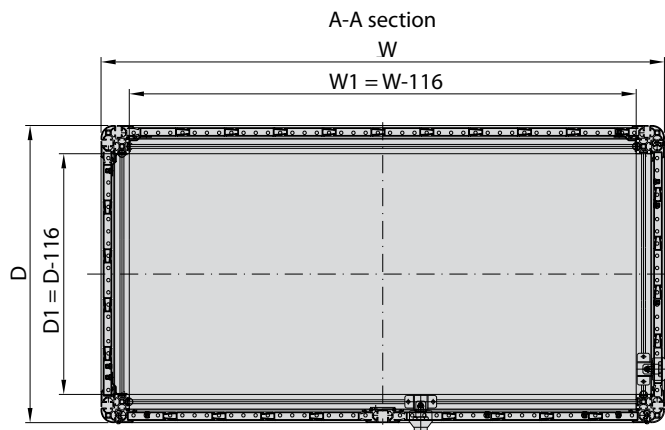


SZD cabinet set on plinth

DIMENSIONS OF SZD CABINETS



Height of the plinth HP - by customer's needs



CONSTRUCTION

1. Framework
2. Two-wings front door
3. Side door
4. Rear shield
5. Side shield
6. Roof
7. Plinth
8. Bottom plate

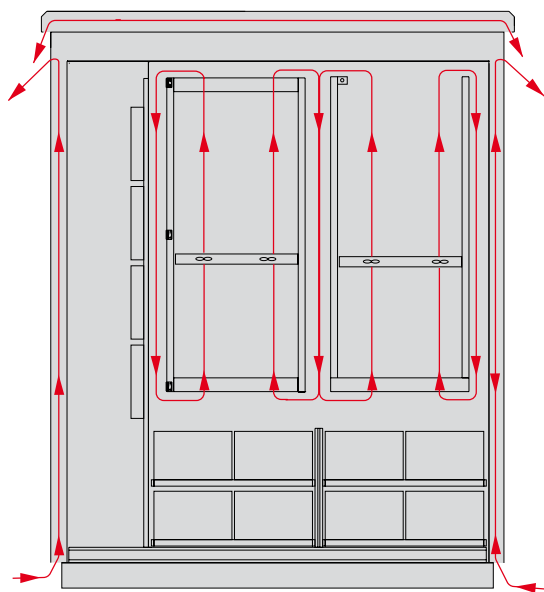
- TD** - total depth of the cabinet
- D** - depth of the framework
- D1** - useful depth of the cabinet
- TW** - total width of the cabinet
- W** - width of the framework
- HP** - height of the plinth
- W1** - useful width of the cabinet

VENTILATION SYSTEMS

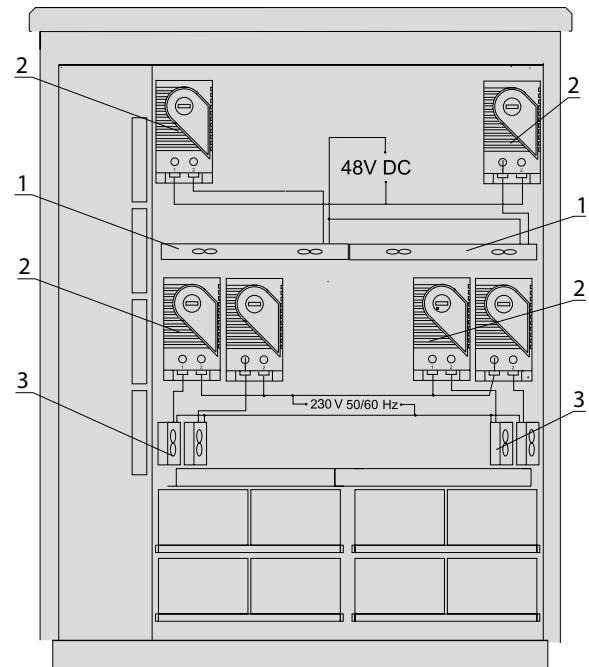
Ventilation with forced internal and free external air circulation

Fan units are mounted inside SZD cabinet in order to shorten time of carrying away heat dissipation emitted by equipment installed in the cabinet. Fan units cause faster air movement inside the cabinet and in the cabinet's walls. In case of low temperature the system of heaters joint with thermostats is applied. Above solutions enable failure-free operation of access systems.

Diagram of air flow



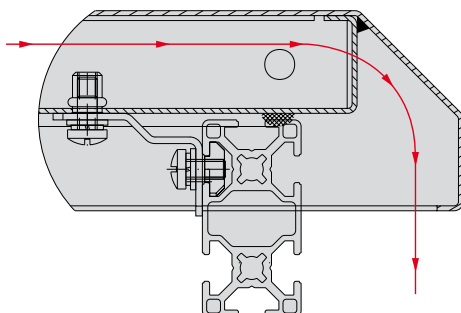
Pictorial diagram of supplying fan units PW and heaters



CONSTRUCTION

1. Fan unit
2. Thermostats
3. 400 W heaters with fan 220 V, 50/60 Hz

Air flow in standard roof



Fan unit with six cooling fans

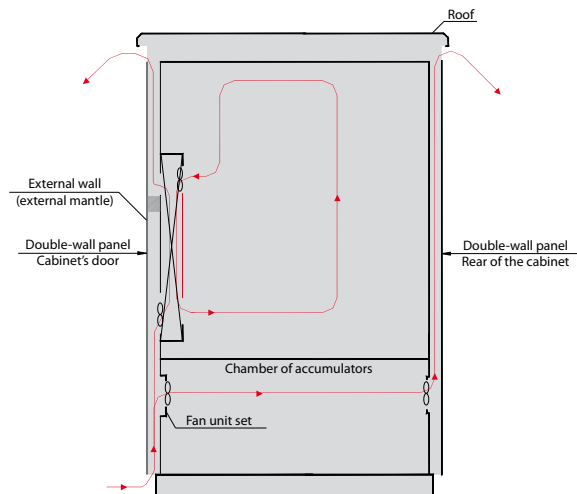
VENTILATION SYSTEMS

Ventilation based on use of heat exchanger and direct venting

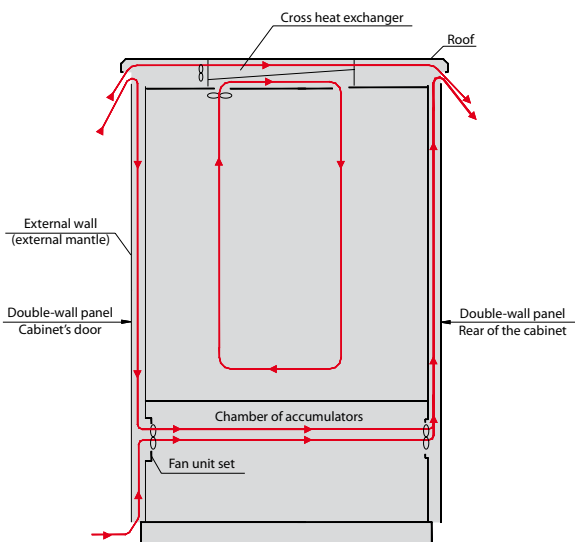
In order to intensify the cooling process in cabinets with installed equipment with high heat dissipation, there is solution based on cross heat exchanger. Heat exchanger is a type of radiator, where there are two air flows: warm from the inside of the cabinet (radiator's plates collect heat) and second from the outside of the cabinet (cooled by exchanger). Cross system of the heat exchanger enables to retain tightness of the cabinet and external and internal air flows do not mix together.

Another solution is direct venting of the cabinet, which is used when it is necessary to carry away lots of heat dissipation. In cabinet's roof or on the door there are mounted fans which pull external air (through double wall and filters system). External air goes through appliances which emit heat and is carried away outside by roof or perforations on the doors.

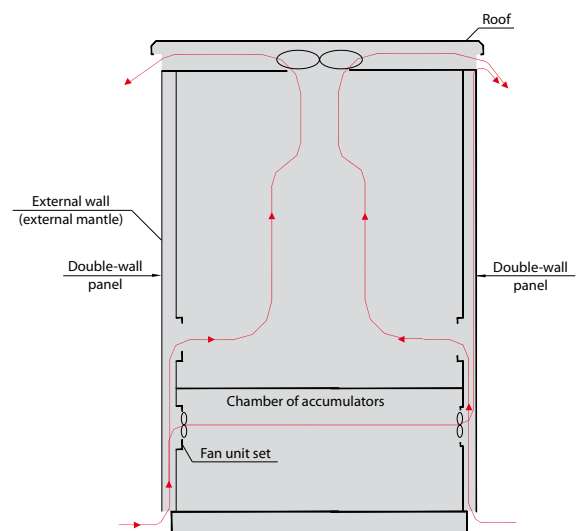
Pictorial diagram of air circulation in the cabinet with heat exchanger mounted on the door.



Pictorial diagram of air circulation in the cabinet with heat exchanger mounted on the roof.



Pictorial diagram of air circulation in the cabinet with direct venting



VENTILATION SYSTEMS



Cabinet with heat exchanger mounted in the door



Cabinet with heat exchanger mounted in the roof

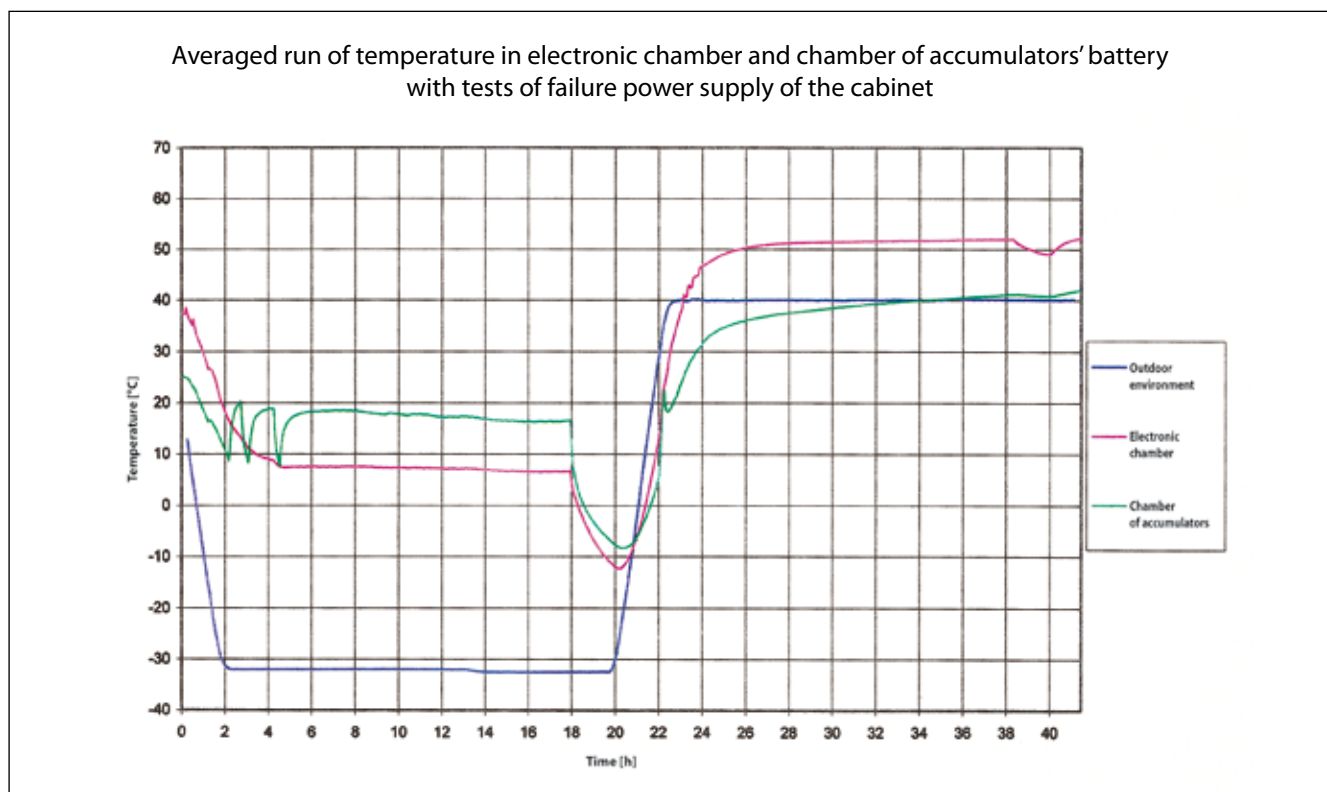
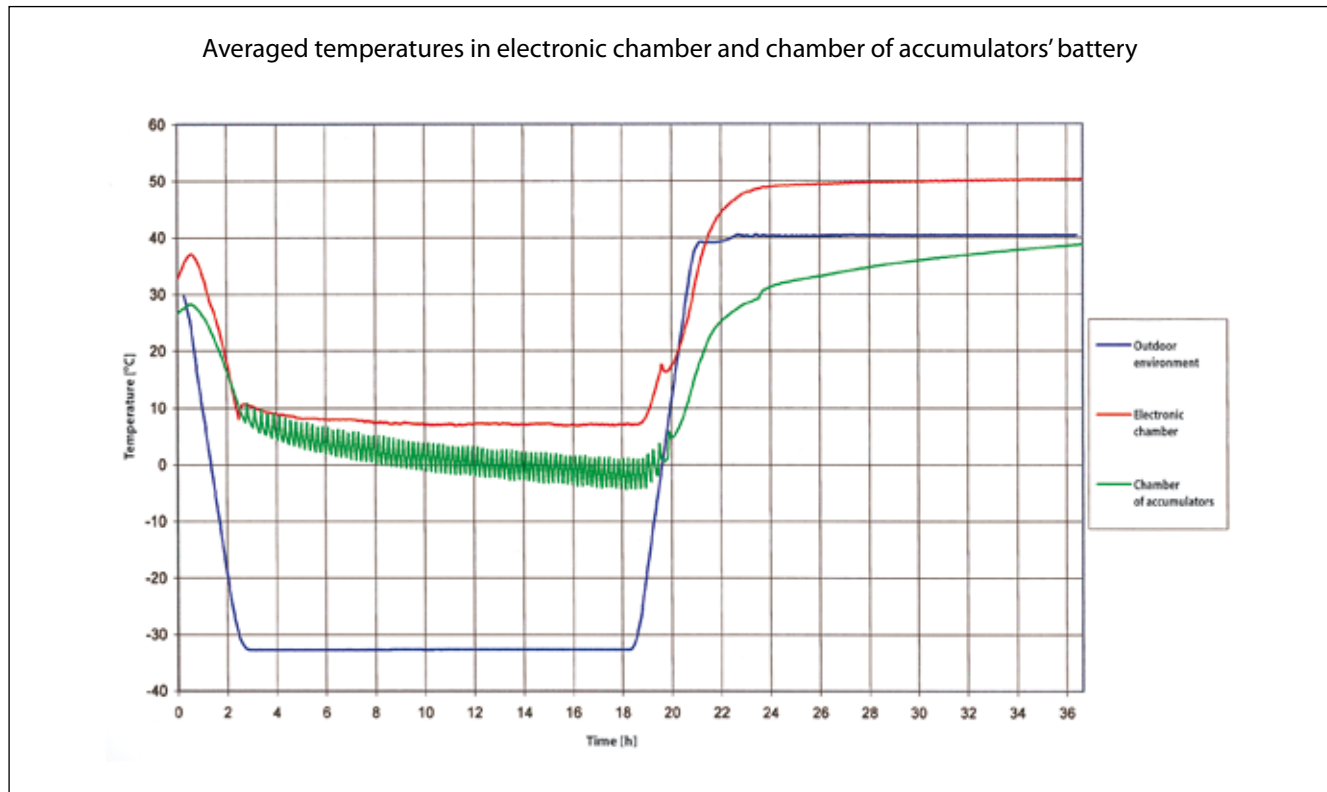


Cabinet with direct venting

CLIMATIC TESTS OF SZD

SZD cabinets equipped with access systems of different suppliers (Siemens, Ericsson, DGT, Ascom) have been climatic tested at Laboratory of Telecommunications Accessories and Devices Research in Szczecin. SZD cabinet was placed in climatic chamber, where it was first tested for 12 hours in temperature -33°C and then for 12 hours in temperature $+40^{\circ}\text{C}$.

Below, there are some climatic diagrams.



PROTECTION DEGREE IP TESTS

SZD cabinets have been tested for protection degree, IP rated.

Measurements have been made in following sequences:

- measurement of IP degree
- vibration test on the shaker
- next measurement of IP degree

Both tests (before and after vibration) proved IP 65 degree

The tests were carried out in two independent laboratories:

- Laboratory of Telecommunications Accessories and Devices Research in Szczecin
- ZPBE Energo Pomiar



Polish certificates of IP 65 protection

ZPBE ENERGOPOMIAR Sp. z o.o. Zakład Techniki i Gospodarki Ciepłej i Elektroenergetycznej ul. Gen. J. Świrskiego 3 44-101 Gliwice tel. (0-32) 237 63 00	ŚWIADECTWO SPRAWDZENIA STOPNIA OCHRONY IP-65 SZAFY DOSTĘPWEJ TYPU SZD - JEDNODRZWIWEJ	Numer: 443100 Data wydania: 21.03.2008r. Strona / stron: 1 / 1
Dział Automatyki i Pomiarów		
1. CHARAKTERYSTYKA TECHNICZNA Przedmiot sprawdzenia: Stopień ochrony IP szafy dostępowej typu SZD - jednodrzwiowej wg PN-92/E-08106 Producent: Zakład Produkcji Automatyki Sietciowej S.A. w Przygórzu Oznaczenie szafy: typ SZD		
2. ZLECENIODAWCA: Zakład Produkcji Automatyki Sietciowej S.A. w Przygórzu 57-431 WOLIBÓRZ		
3. WARUNKI SPRAWDZENIA Zakres sprawdzenia: oględziny zewnętrzne, sprawdzenie zgodności wymiarów z dokumentacją techniczną, sprawdzenie stopnia ochrony przed dostępem do części niebezpiecznych oznaczone pierwszą charakterystyczną cyfrą 6 - Tablica 1 wg PN-92/E-08106, sprawdzenie stopnia ochrony przed obcymi ciałami stałymi oznaczone pierwszą charakterystyczną cyfrą 6 - Tablica 2 wg PN-92/E-08106, sprawdzenie stopnia ochrony przed wodą oznaczone drugą charakterystyczną cyfrą 5 - Tablica 3 wg PN-92/E-08106 Wybór szaf do badań: szafę wybrano losowo z przedmiotowej partii Warunki środowiskowe: temperatura otoczenia 20 °C, wilgotność względna 50%, ciśnienie barometryczne 970 kPa, temperatura wody wodociągowej 18 °C Inne dane: szafa dostępowa typu SZD - jednodrzwiowa nr fabryczny 1, nr dokumentacji technicznej 1319-1-3 o wymiarach: szerokość 750 mm, głębokość 750 mm, wysokość 1365 mm, ciężar 95 kg		
4. WYMAGANIA 4.1 PN-92/E-08106 - Stopnie ochrony zapewniane przez obudowy (KOD IP) 4.2 Specyfikacja zamawiającego		
5. WYNIK SPRAWDZENIA Stwierdza się, że szafa dostępowa typu SZD - jednodrzwiowa, spełnia stopień ochrony IP-65 wg PN-92/E-08106		
Badania wykonał: Kierownik Działu J. Hibner	ZAKŁAD POMIARÓW BADAWCZE ENERGETYKI ENERGOPOMIAR Sp. z o.o. TEL. 237-68-00, FAX 231-65-42 ul. gen. Józefa Sowińskiego 3 SKR. POCZT. 402 44-101 GLIWICE (1)	Dyrektor Zakładu: mgr inż. J. Penar

ZPBE ENERGOPOMIAR Sp. z o.o. Zakład Techniki i Gospodarki Ciepłej i Elektroenergetycznej ul. Gen. J. Świrskiego 3 44-101 Gliwice tel. (0-32) 237 63 00	ŚWIADECTWO SPRAWDZENIA STOPNIA OCHRONY IP-65 SZAFY DOSTĘPWEJ TYPU SZD - DWUDRZWIWEJ	Numer: 443200 Data wydania: 21.03.2008r. Strona / stron: 1 / 1
Dział Automatyki i Pomiarów		
1. CHARAKTERYSTYKA TECHNICZNA Przedmiot sprawdzenia: Stopień ochrony IP szafy dostępowej typu SZD - dwudrzwiowej wg PN-92/E-08106 Producent: Zakład Produkcji Automatyki Sietciowej S.A. w Przygórzu Oznaczenie szafy: typ SZD		
2. ZLECENIODAWCA: Zakład Produkcji Automatyki Sietciowej S.A. w Przygórzu 57-431 WOLIBÓRZ		
3. WARUNKI SPRAWDZENIA Zakres sprawdzenia: oględziny zewnętrzne, sprawdzenie zgodności wymiarów z dokumentacją techniczną, sprawdzenie stopnia ochrony przed dostępem do części niebezpiecznych oznaczone pierwszą charakterystyczną cyfrą 6 - Tablica 1 wg PN-92/E-08106, sprawdzenie stopnia ochrony przed obcymi ciałami stałymi oznaczone pierwszą charakterystyczną cyfrą 6 - Tablica 2 wg PN-92/E-08106, sprawdzenie stopnia ochrony przed wodą oznaczone drugą charakterystyczną cyfrą 5 - Tablica 3 wg PN-92/E-08106 Wybór szaf do badań: szafę wybrano losowo z przedmiotowej partii Warunki środowiskowe: temperatura otoczenia 20 °C, wilgotność względna 50%, ciśnienie barometryczne 970 kPa, temperatura wody wodociągowej 18 °C Inne dane: szafa dostępowa typu SZD - dwudrzwiowa nr fabryczny 2, nr dokumentacji technicznej 1171-1-3 o wymiarach: szerokość 1600 mm, głębokość 655 mm, wysokość 1185 mm, ciężar 180 kg		
4. WYMAGANIA 4.1 PN-92/E-08106 - Stopnie ochrony zapewniane przez obudowy (KOD IP) 4.2 Specyfikacja zamawiającego		
5. WYNIK SPRAWDZENIA Stwierdza się, że szafa dostępowa typu SZD - dwudrzwiowa, spełnia stopień ochrony IP-65 wg PN-92/E-08106		
Badania wykonał: Kierownik Działu J. Hibner	ZAKŁAD POMIARÓW BADAWCZE ENERGETYKI ENERGOPOMIAR Sp. z o.o. TEL. 237-68-00, FAX 231-65-42 ul. gen. Józefa Sowińskiego 3 SKR. POCZT. 402 44-101 GLIWICE (1)	Dyrektor Zakładu: mgr inż. J. Penar

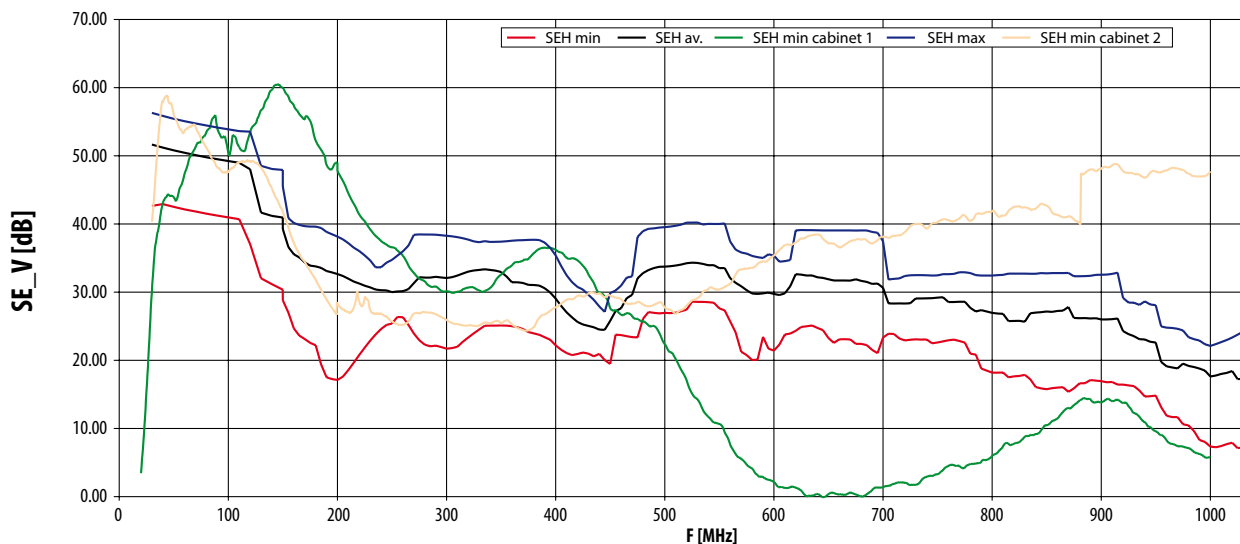
SCREENING EFFICIENCY TESTS

SZD cabinet was subjected to screening efficiency tests at the Telecommunication and Acoustic Laboratory of the Institute of Technology in Wrocław. On the basis of measurements, the cabinet's screening efficiency was specified in the magnetic field's frequency range of 100 kHz up to 1000 MHz:

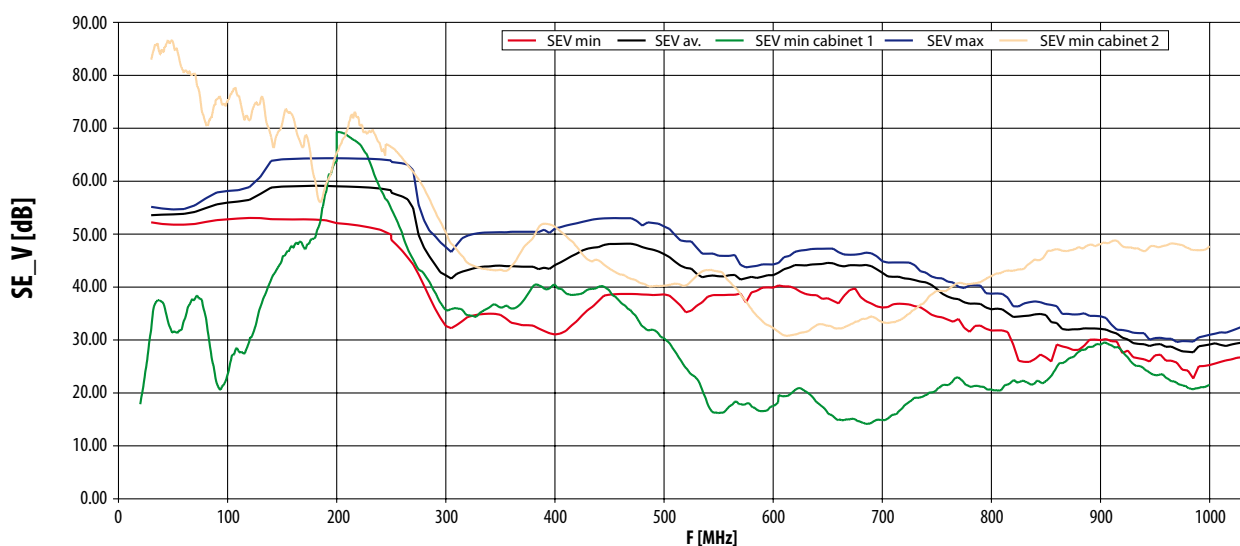
- a) Screening efficiency in the frequency range of 100 kHz up to 30 MHz
- for horizontal polarisation is included in the following limits: from 15 dB to 26 dB (average value varies from 18 dB to 22 dB),
 - for vertical polarisation is included in the following limits: from 21 dB to 44 dB (average value varies from 32 dB to 40 dB).

- b) Screening efficiency in the frequency range of 30 MHz up to 1000 MHz
- for horizontal polarisation is included in the following limits: from 55 dB to 5 dB (average value varies from 52 dB to 19 dB),
 - for vertical polarisation is included in the following limits: from 65 dB to 23 dB (average value varies from 59 dB to 29 dB).

Cabinet's screening efficiency for the horizontal component of the electric field



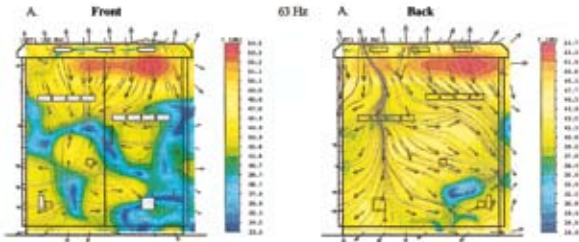
Cabinet's screening efficiency for the vertical component of the electric field



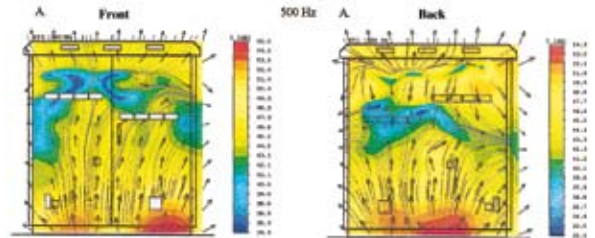
ACOUSTIC TESTS

Example of sound diffusion in front and rear part of SZD cabinet.

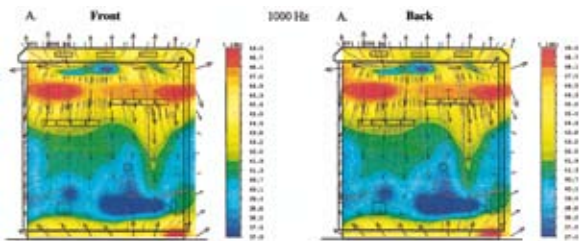
Sound diffusion for 63 Hz



Sound diffusion for 500 Hz

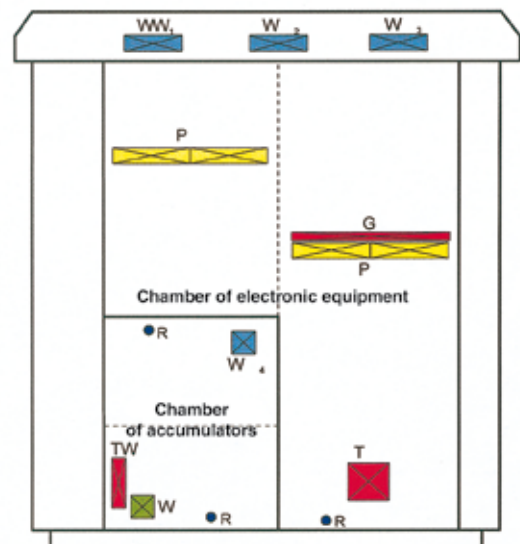


Sound diffusion for 1000 Hz



The SZD cabinet with specified quantity of fans and heaters (in accordance with the below drawing) have been tested for checking the noise emission of the cabinet.

Places of fans in tested cabinet

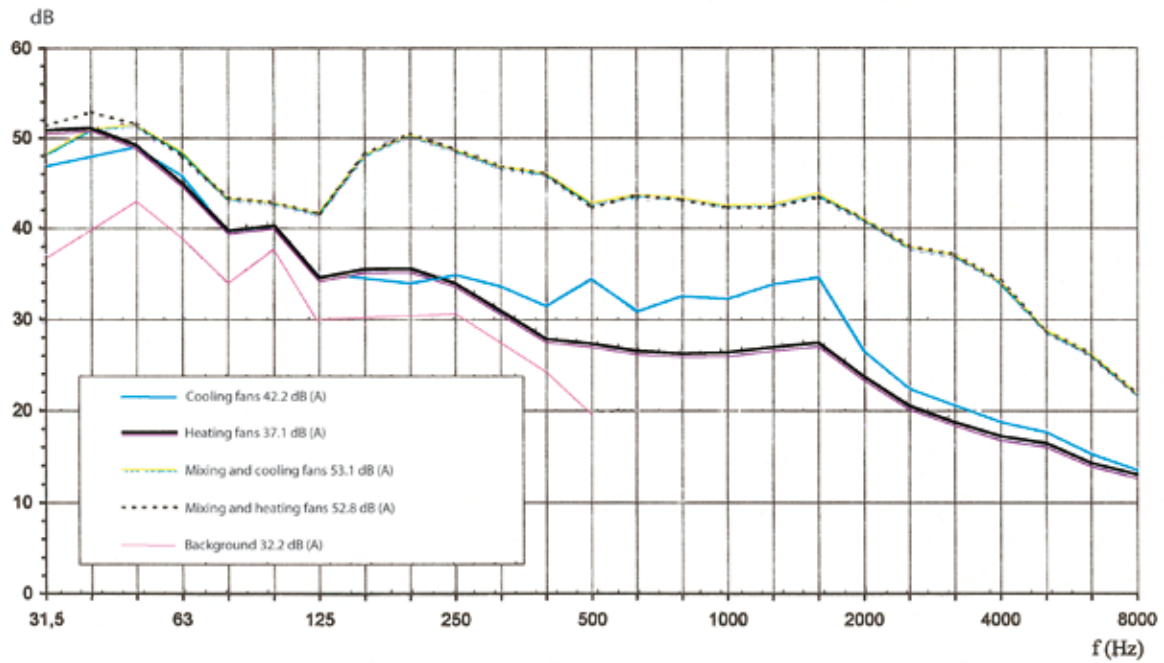


- WW₁, WW₂, WW₃** - exhaust fans, placed symmetrical in the upper part of the cabinet under the roof
- WW₄** - exhaust fan
- WN** - downcast fan
- PN** - fan units mixing air inside the cabinet
- TW** - thermo fans
- G** - heater of transmission shelf
- R** - temperature controllers

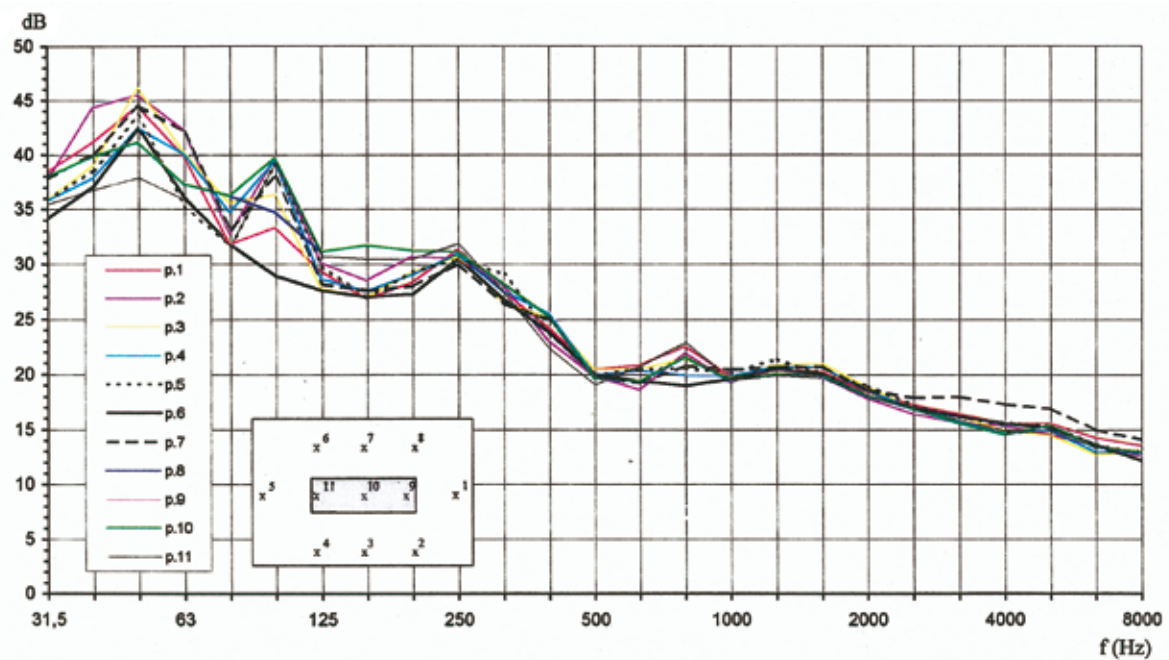
ACOUSTIC TESTS

The level of noise emitted by tested SZD cabinet (average values from 11 measuring points)

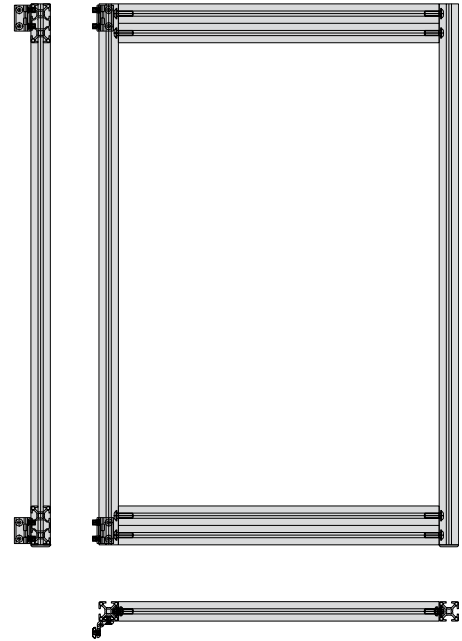
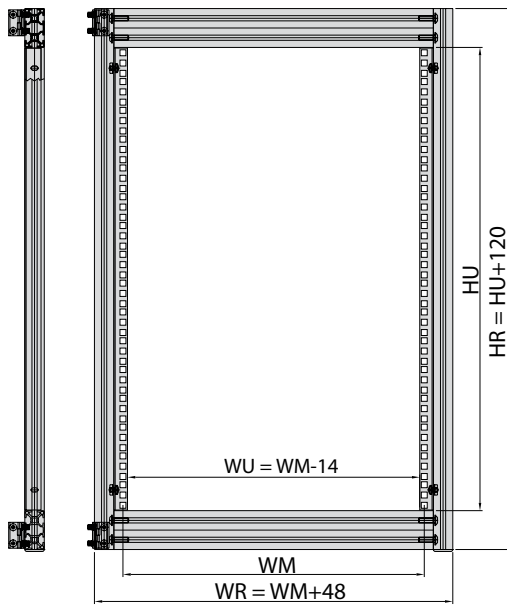
(Averaging values)



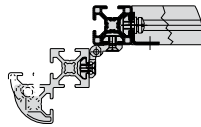
The level of background noise (the cabinet switched off)



SWING FRAME



Detail:
frame fastening



WM = 456 (19") or 515 (21") - mounting width
WU - useful width
HU - useful height

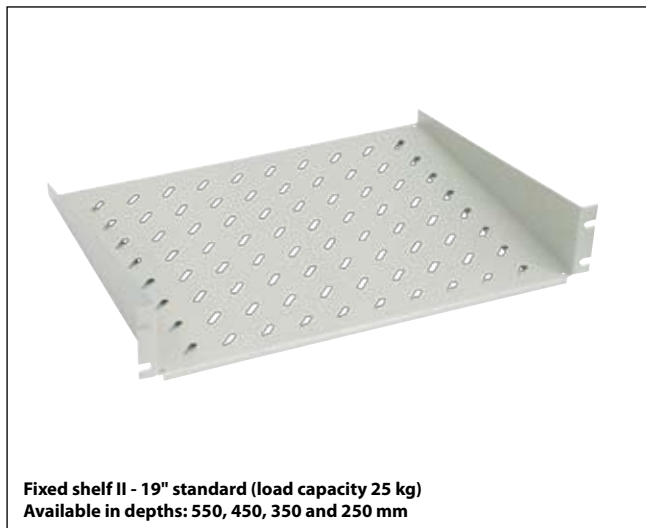
The frames can be manufacture as single-section or double-section.
 In case of big loading there are used chest-like frame



Chest-like frame



Double-section frame

SHELVES

Shelves for mounting batteries of emergency power supply are made of stainless steel. Dimensions of shelf depend on quantity of mounted batteries are determined by customer's request.

PARTITION

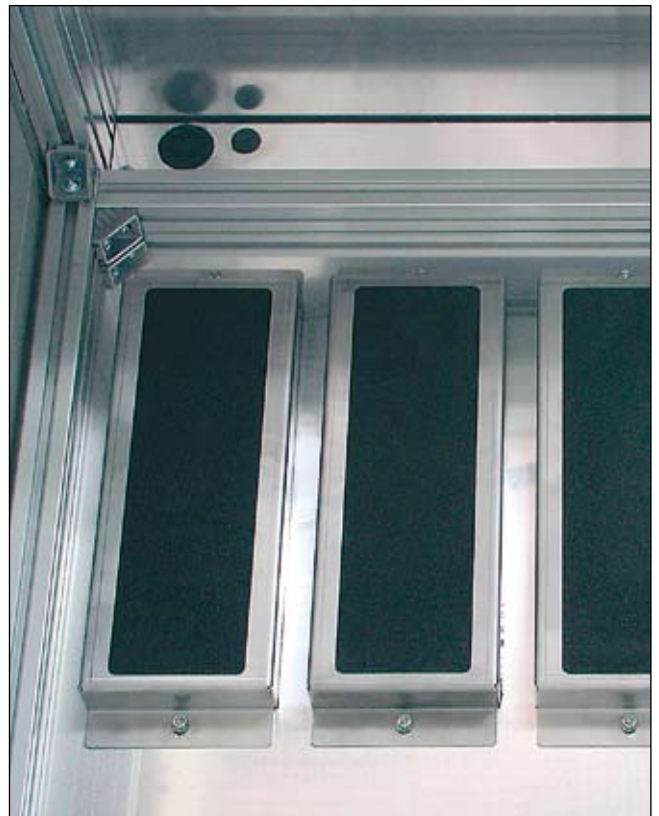
The partition divides the chambers of the cabinet. It is made of aluminium sheet. In the partition there can be different types of cable entries: foam cable openings, rubber gland seals, cable entries ROXTEC type.



Cable entry ROXTEC type



Cable entry made of rubber gland seals



Foam cable entry

MICRO SWITCH AND DOOR STOP

The 3-positioned micro switch is mounted at cabinet's door, positions:

- pos. 1 - unstable pushed-in (door closed)
- pos. 2 - stable pushed out (door opened)
- pos. 3 - "service position", pushed in manually, stable (door opened)

Example:

Cabinet's door closed

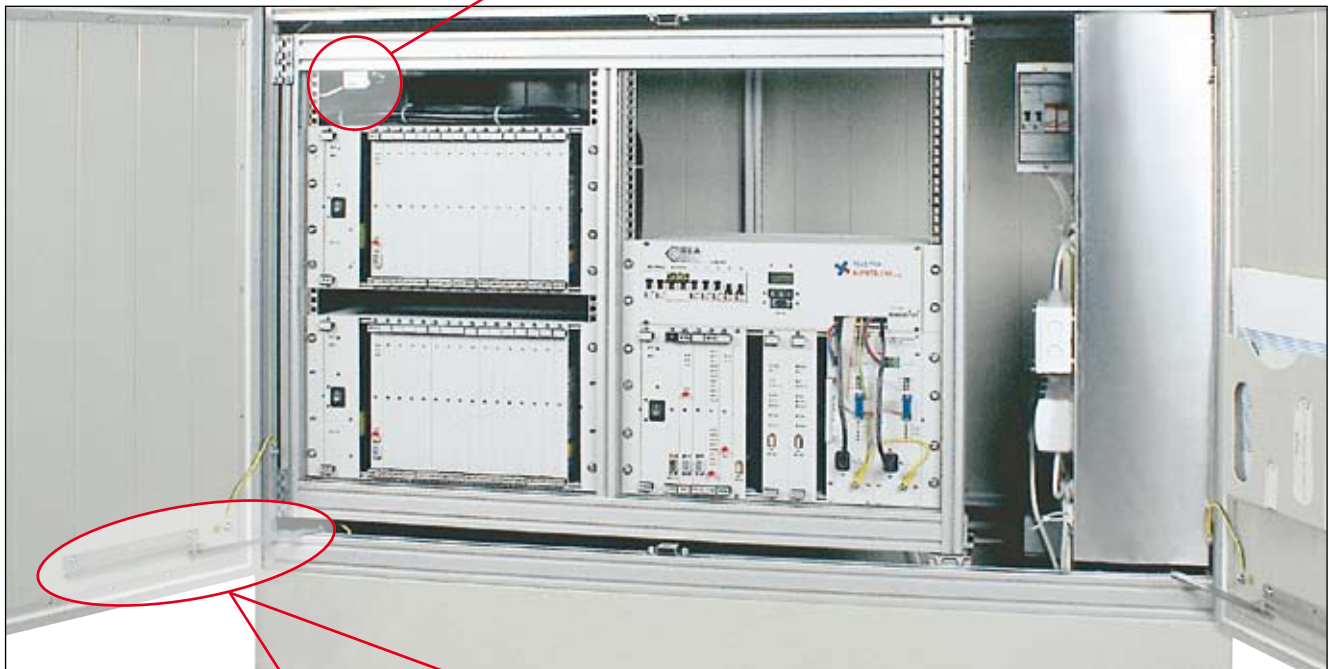
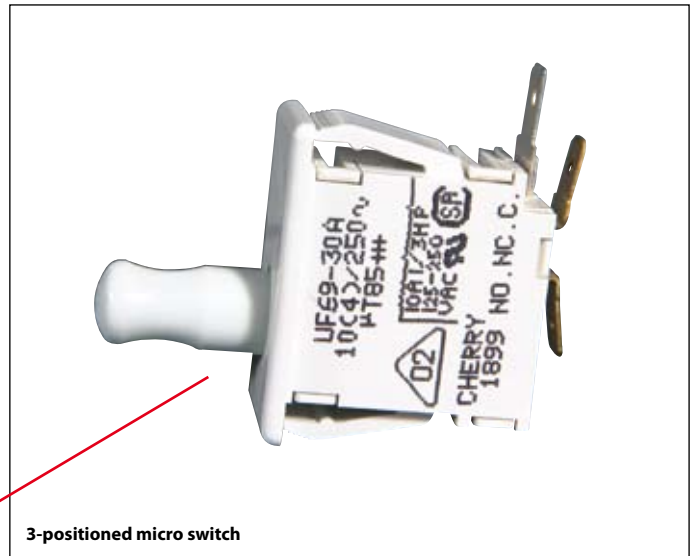
- option I - open circuit
- option II - closed circuit

Cabinet's door opened

- option I - closed circuit
- option II - open circuit

Cabinet's door opened "service" position

- option I - open circuit
- option II - closed circuit

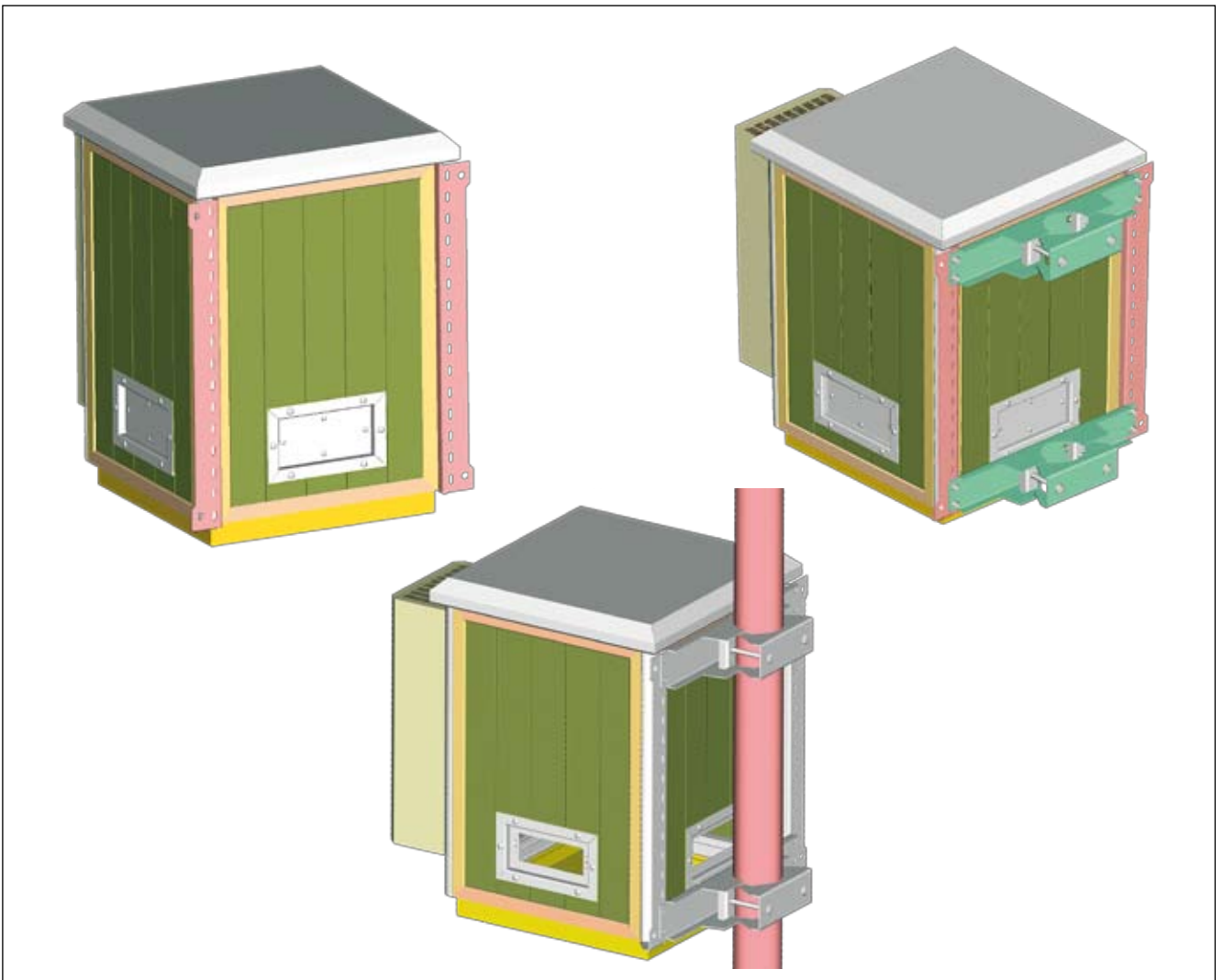


Door stop and micro switch in cabinet with equipment



HANDLES FOR MOUNTING OF CABINET

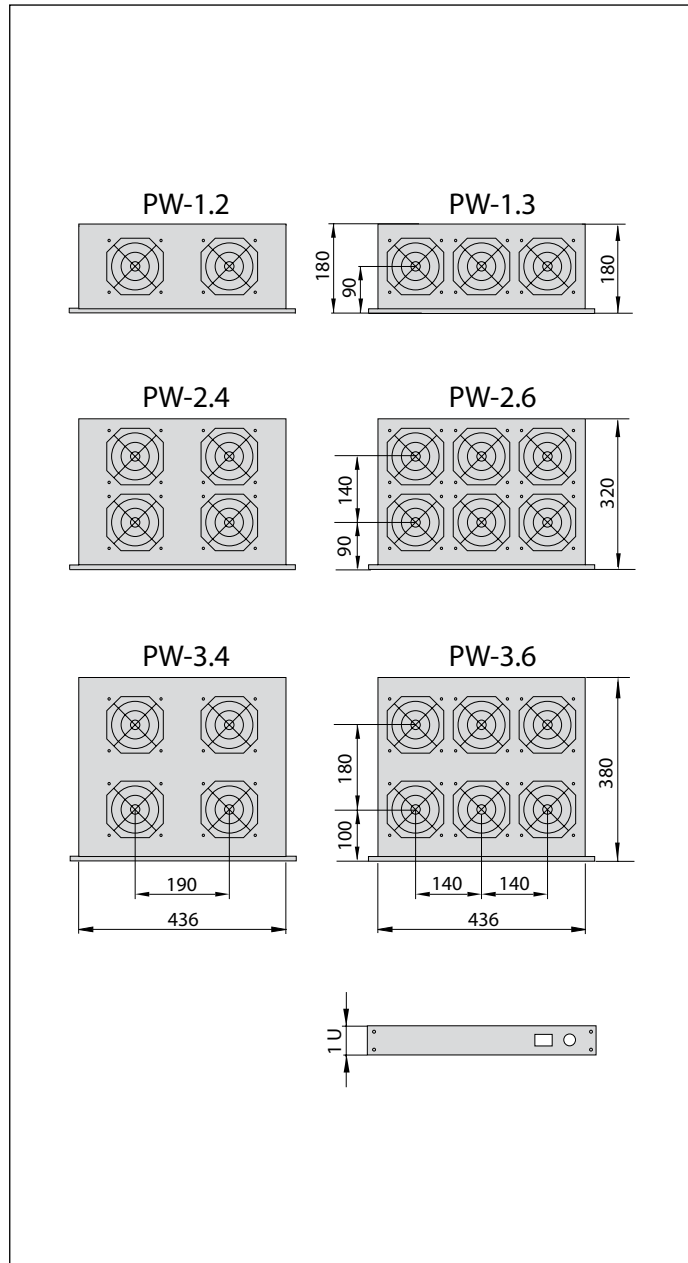
Often, in case of small cabinets exists necessity to adaptation them to mounting directly on the wall or column. Then to the cabinet we mounted a special mounting handles.



PW FAN UNITS

Technical data

- voltage rating 220 V / 230 V
- frequency 50/60 Hz
- power rating 15/14 W
- rated current 120/100 mA
- rotational speed 2600/2900 1/min
- noise level 37/41 dB
- pressure 75/90 Pa
- capacity 162/192 m³/h
- durability min. 50000 h
- dimensions 119 x 119 x 38 mm



PARAMETER	PW-1.2	PW-1.3	PW-2.4 PW-3.4	PW-2.6 PW-3.6
Voltage rating [V]	220 (230) V, 50 Hz			
Rated current [A]	0.24	0.36	0.48	0.72
Power rating [W]	30	45	60	90
Capacity [m ³ /h]	320	480	640	960
Ambient temperature [K]	253 - 343 (-20 ÷ 70°C)			
Relative humidity [%]	20 ÷ 80			
Work position	arbitrary			
Protection degree	IP - 20			
Electric shock protection	neutral grounding			
Colouring	Enclosure - black Masking cover - RAL 7035			

THERMOSTAT

Application:

Thermostats are used for controlling fan units, heaters and heat exchangers, also can be used as a signal generator for monitoring the enclosure internal temperature.

Technical data

- sensor element:
thermal bimetal
- temperature range:
0 - 60°C, hysteresis ca. 7 K
- contact types:
snap action contact,
- power carrying capacity:
6 A (1) 250 VAC
- Radio frequency interference:
"N" (according to VDE 0875)



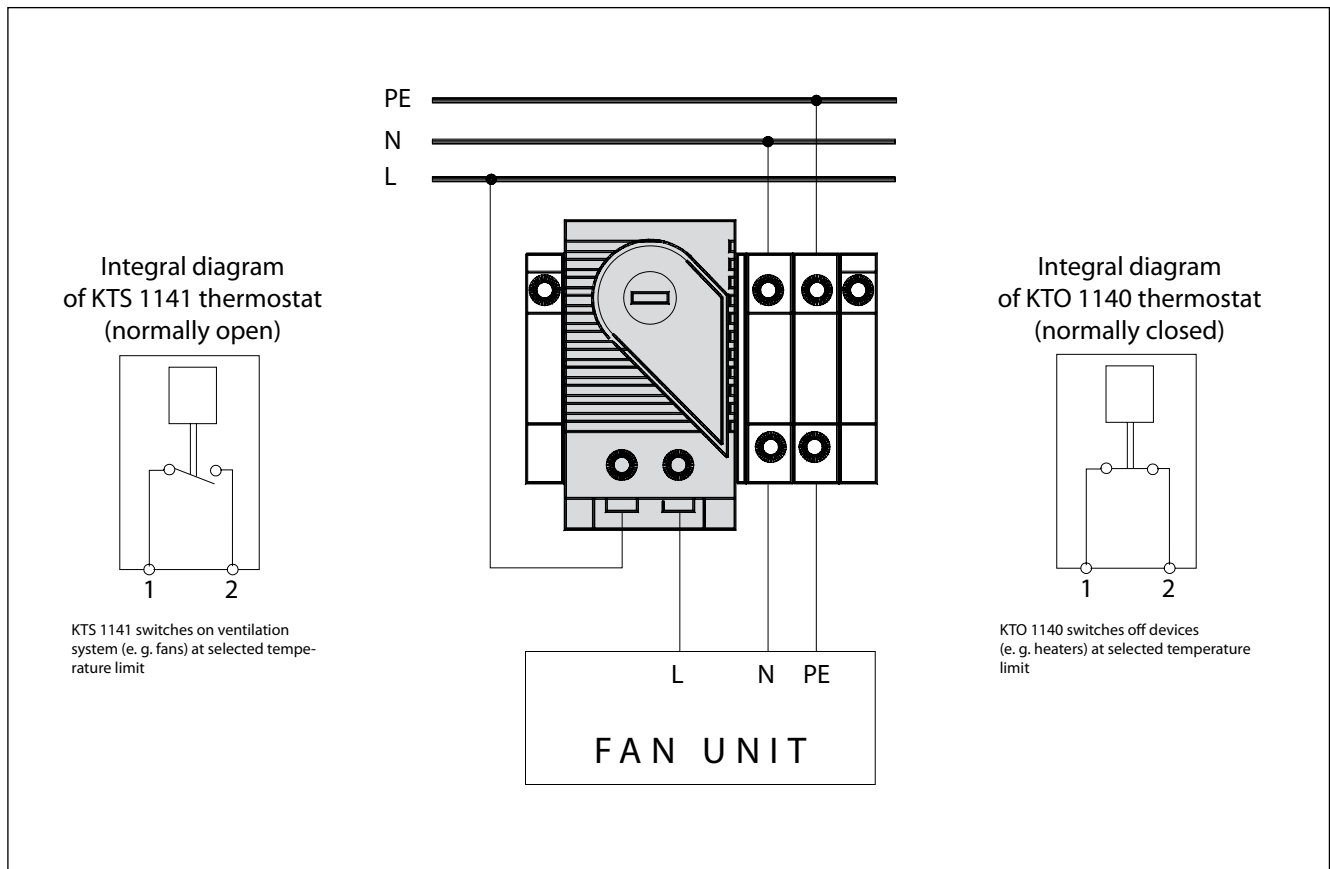
KTO 1140 Thermostat (normally closed)
Supply includes: thermostat, rail TS-35/7.5, two holders, two screw clamps

NOTE:

Depending on the way the thermostats work, we divide them into "normally open" and "normally closed". The colour of handwheel indicates thermostat type:

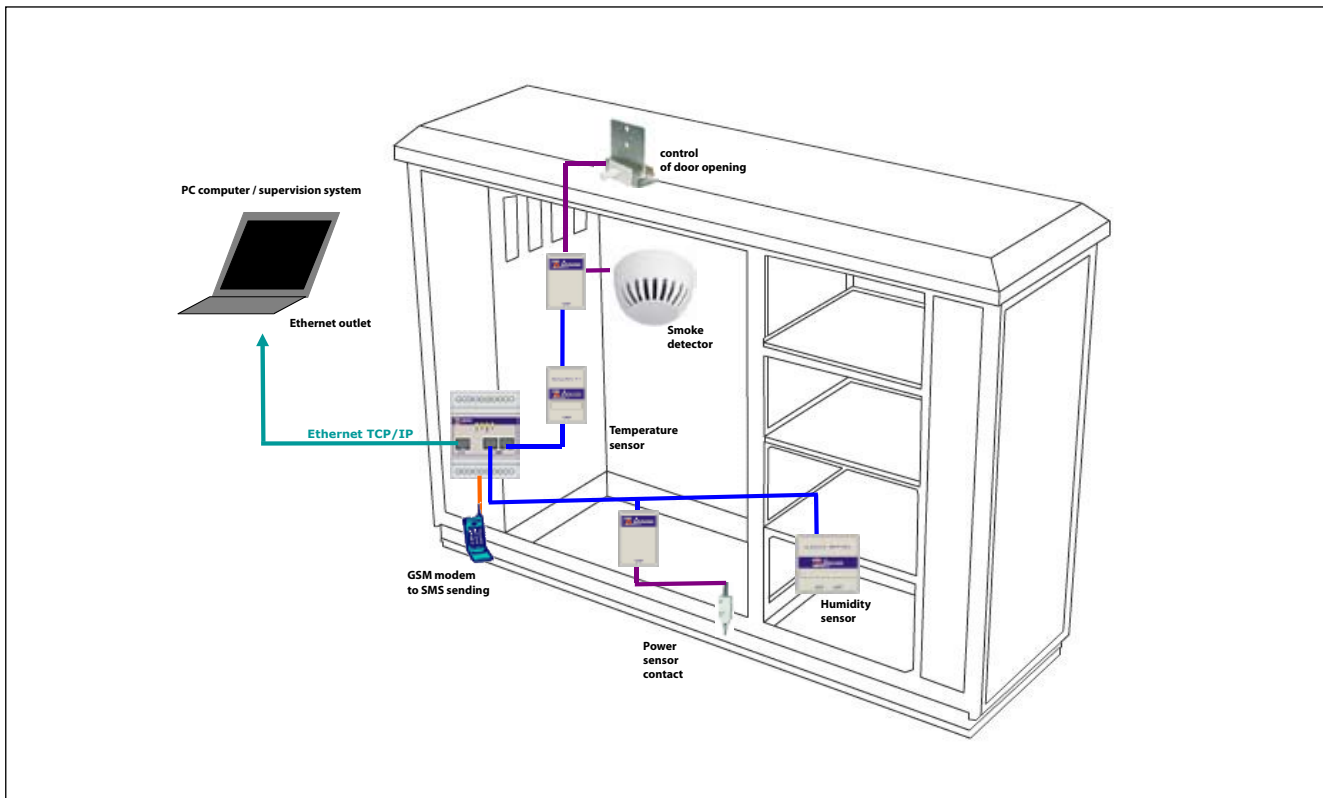
- KTS 1141 thermostat (normally open)
- KTO 1140 thermostat (normally closed)

Connection diagram



MONITORING SYSTEM OF CLIMATIC CONDITIONS AND ACCESS CONTROL IN SZD CABINETS

On below example we see a system of: access control, climatic conditions supervising system and fire protection. Devices inside the cabinet are protect against flooding. All events can be instant pass on by GSM modem or mobile phone, as SMS message or email on devices administrator address. Driver worked in the cabinet enable to communication with supervising system by interactive network or internet.



System is very adaptable and easy in extension. Thoughtful way of devices connect technology selection, enable a max simplify installation of monitoring devices. Devices can be switch on to bus with any topology by RJ-45.

This solution allow to spare time on wires "screw" connection. Bus communicated and supply devices, so there isn't any requirement to lead separate supply to sensors and converters.

The main part of system is software, enable to data gather, visualization and processing. User receive a complex system of remote supervising, operate by internet viewer. Its enable to object monitoring from any place of the world. Building any visualization and selection only interesting measurements, both current and archival. Allow to accommodation of set-ups to clients individually necessities. System also have a complex mechanism of alarm operation. In alarm situation, status will be identified with any measurement and situated in predefinition alarms group, in consequence, in alarm situation on many sensors, will be generate only one alarm.

Mechanism of data access control, gathered by supervising system, separate users rights, both in sense of task in system, and also access to monitoring objects. Archival data can be view by table listing and graph. All data from system can be printed. To additional virtue of system is absence of users quantity license.

MPSK G1 MICROPROCESSOR PANEL FOR FAN CONTROL

Intended purpose:

The basic function of the control device is overheating and over-cooling protection of devices installed in the 19" standard cabinets by measuring temperature and humidity levels in selected points within the cabinet and appropriate control of fans placed in the ventilation panel and heaters.

In addition, the control device makes it possible to supervise cabinet safety by monitoring two-step sensors (e.g. sensors signalling door-opening, flooding, power failure, smoke, etc.) and recording changes in status as events (with a time record) in the history of events which can then be read by the master system (e.g. PC) via a serial port. The event-recording function is also used to save e.g. instances of temperature and humidity sensors exceeding preset alarm levels and instances of detecting sensor failure.

Fully compatible with fire-extinguishing systems, the control unit cuts off power supply to output devices (fans, heaters) in the event of a fire hazard.

In the standard version, the control device is provided with a serial port which, in addition to event viewing, enables full remote control of the device. Communication is effected in the RS 232 or RS 485 standard via the Modbus protocol. Optionally, the MPSK G1 panel can be equipped with the Ethernet or USB interface.

Usable functions:

- 4 relay outputs for fan control.
- 1 relay output for heater control.
- 3-step control of fan unit operations by switching 2 or 4 fans depending on the maximum temperature of sensors.
- cooperation with the 4-fan or 6-fan panel (double parallel connection of two fans).
- function of uniform fan wear with programmable switching period.
- 3 two-step inputs for event-recording sensors activated e.g. by cabinet door opening or shock.

- event-recording function, activated e.g. by changes of the two-step input state, exceeding alarm levels of sensor temperature, sensor failure, fan failure, power supply failure (with max. 100 events recorded).
- built-in device clock, memory of settings, states and recorded events, battery-supplied.
- asynchronous RS 232 or RS 485 serial interface for communication with the master system to monitor sensor states, read recorded events, read and record settings and system time of the device.
- for each sensor, programmable and recordable settings of fan activation levels, hysteresis, alarm levels and correction factors of measurement errors.
- LCD display, 2x16 characters with illumination and 4-button keyboard for device programming and monitoring.
- password-protected access to settings and configuration via panel buttons and the serial interface.
- option of manual fan and heater control.

Parameters:

- Power supply: 12 V DC, 1 A
- Relay outputs: 250 V AC/DC, 16 A
- Measuring range: temperature from -50°C to +99°C; humidity from 10% to 90%
- Measurement accuracy: temperature 1°C; humidity 1%
- Dimensions: 19" x 1 U x 150 mm

Available temperature and humidity sensors:

- Temperature sensor
 - Integrated temperature and humidity sensor
- Each of sensors has got a wire 2 m long.
- Connecting cable RS232/Ethernet
 - Ethernet converter

Software for communication with panel MPSK G1 by serial port can be downloaded from web site www.zpas.pl



MPSK G1 microprocessor panel with integrated temperature and humidity sensor

INSULATING BASE

For additional cold and humidity protection, the cabinet can be set on insulating base filled with foam. The insulating frame shall be ordered separately.



VOLTAGE DISTRIBUTION PANELS

Cabinets can be equipped with power distribution panels configured according to customers' request.



HEATER HVL 031

Compact heating device includes: heating element, axle fan with bearing, protective thermostat.

Technical data

- voltage rating 230 V AC 50-60 Hz
- heating power 400 W
- fan capacity 108 m³ /h
- protection class I (protective conductor)

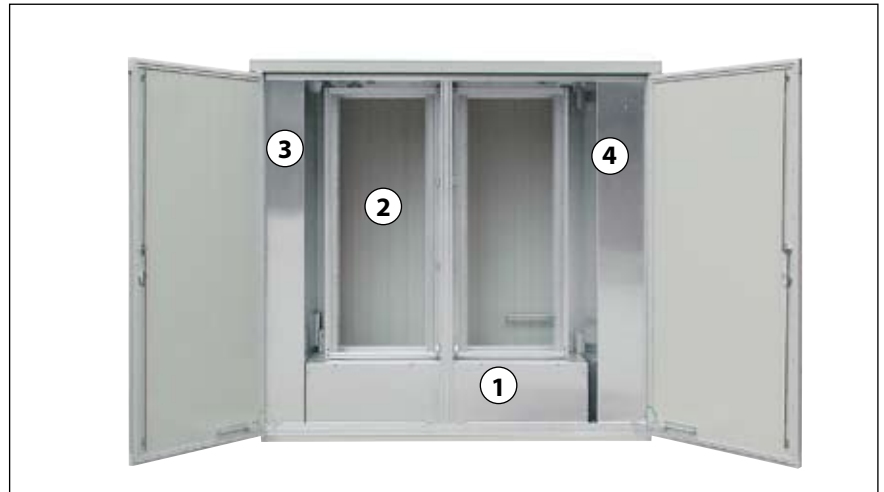


APPLIANCES IN SUBSCRIBERS' ACCESS SYSTEMS

Division of cabinet's interior

In the cabinet's construction there are four autonomous sections:

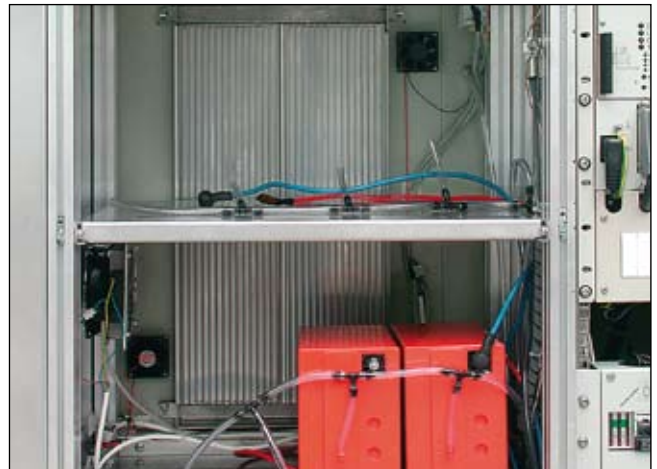
- 1) Battery section
- 2) Chamber of devices
- 3) MDF section
- 4) Energy section



Battery section

In standard, it is placed in the bottom part of the cabinet and is designed for installing temporary emergency power supply of the system. For additional lower of temperature in summer season, there are used two solutions:

- thermal battery,
- ventilating fans - ventilation of the section through the cabinet's mantle.



APPLIANCES IN SUBSCRIBERS' ACCESS SYSTEMS

Chamber of devices

In standard, it is placed in the central part of the cabinet and equipped with mounting bars in 19" or 21" standard or the swing frame. This section is designed for mounting active devices of subscribers' access system (service of optical fibre and patch panels).



APPLIANCES IN SUBSCRIBERS' ACCESS SYSTEMS

Distribution section

This section is designed for operator. It is equipped with teletechnical links (instillation of copper cables). Additionally, the section can be equipped with support moveable construction which adapts to each type of terminal blocks.



Energy section

This section is intended for power industry plants and designed for input of power supply. It has got fuses and a socket to plug in standby diesel generator in case of energy failure. In this section it is also possible to mount electricity meter and additional a special sight-glass, which enables reading of the meter without opening the cabinet's door.



SZD CABINETS ADAPTED FOR POWER SUPPLY SYSTEMS

SZD cabinets are also used for outdoor installation of amplifiers for cordless power supply of telecommunication devices. Cabinet's interior is divided into two autonomous parts: battery section (bottom part of the cabinet) and devices section (upper part of the cabinet). Additionally, on customer's request, it is possible to manufacture a special type of roof intended to assembly of electric accessories.

Inside the cabinets there are mounted telecommunication amplifiers with high power, what is consequence of big power losses (heat dissipation). Direct venting, by means of two fans (which capacity is 510 m³/h each) mounted on the roof or on the cabinet's door, provides specific climatic conditions inside the cabinet.

Additionally, the system of fans' control can be used. It is able to switch on the roof fans on pre-set inside temperature threshold. Fans' rotation is lineal regulated and depends on temperature of modems installed inside of the cabinet.



WIRING CABINET SZDs-355

The wiring cabinet SZDs-355 offered by the ZPAS Group is specially designed for outside assembly. Electric instrumentation installed inside the cabinet is used for supplying power to and controlling drives of HV and MV power station switches and transmitting data from measuring circuits.

As a standard, the plinth of the cabinet is equipped with a fire-screen compartment. In addition, it is possible to deliver the cabinet in an option with a special concrete foundation.

The cabinet has a basic wiring system designed for:

- supplying power to the cabinet's circuits and transferring it to other cabinets;
- maintaining preset climatic conditions inside the cabinet to ensure correct operation of electric devices;
- providing a lighting system;
- supplying power to one- and three-phase maintenance sockets;
- installing electric gear inside the cabinet, as per customer's request and in accordance with specifications prepared for a specific facility.

The basic configuration of the wiring cabinet is made in conformance with assumptions typically adopted for wiring cabinets designed for HV and MV power stations and is available with or without sectionalisation of circumferential circuits.

The basic electric circuits of the cabinet are protected by means of RCCBs with overcurrent protection. The cabinet's heating is provided using two HGL 250 heaters, with a power output of 250 W each, controlled by means of a KTO 1140 thermostat with a control range of 0-600°C. Heating is controlled automatically using the thermostat or manually, by means of a special switch located in the control panel. 40 W light fixtures, two on each side of the cabinet, are powered by door limit switches or manually, by means of a switch located in the control panel. The basic wiring system is designed for the operation in the TN-C-S power system. The wiring cabinet meets the requirements listed in the EN 60439-1 standard.



RATING

Factory marking	SZDs-355
Rated primary voltage	400/230 V
Rated continuous current of the cabinet's own wiring system	25 A
Rated frequency	50 Hz
Rated insulation voltage	500 V
Protection degree	IP 54 / IP 55

OPERATING CONDITIONS

Environmental conditions according to		IEC 364-3
Ambient temperature	-25 ÷ +40°C	AA3-AA4
Climatic conditions (temperature and humidity)	temperature from -25 to +40°C relative humidity from 5 to 100 %	AB3-AB4
Altitude above sea level	< 2000 m	AC1
Water presence	water splashes	AD4
Presence of foreign solids	slight dustiness	AE4
Presence of substances causing corrosion or contamination	atmospheric	AF2
Surge	medium	AG2
Vibrations	medium	AH2
Presence of flora and/or mould	none	AK1
Presence of fauna	none	AL1
Electromagnetic, electrostatic or ionizing effect:		
- harmonics	normal	AM-1-2
- signal voltage levels	medium	AM-2-2
- voltage amplitude changes	normal	AM-3-2
- voltage asymmetry	normal	AM-4
- mains frequency changes	normal	AM-5
- induced low-frequency voltage	not classified	AM-6
- magnetic field radiation	high	AM-8-2
- electric fields	high	AM-9-3
Solar radiation	medium	AN2
Seismic shock	negligible	AP1
Atmospheric discharge	indirect effect	AQ2
Wind	strong	AS3

AIR CONDITIONED SZD CABINETS

Air conditioners are used when the required temperature inside of the cabinet is lower than ambient temperature. The power of air conditioners is selected according to pre-set climatic conditions, heat dissipation by active equipment and dimensions of the cabinet. On individual customer's request the air conditioners can be fixed inside or outside of the cabinet. In case of inside installation, they are usually fixed on the doors or side shields, what enables easy service access.



AIR CONDITIONED SZD CABINETS



SZD CABINETS IN ACCORDANCE WITH EMC STANDARD

EMC shielded cabinets are used when devices which are mounted inside the cabinet require protection in electromagnetic compatibility. Aluminium profiles used in the cabinet are additionally chromated. Special current conductive gasket is used in order to provide conductivity between each element of the cabinet (roof, plinth, side shields, door).



SZD CABINETS FOR EMPLOYMENT IN ENERGETIC INDUSTRIAL

SZD Cabinets are used as a enclosure to measuring system also and energetic distribution. Enclosure of this type requires the special organization of cabinet interior.

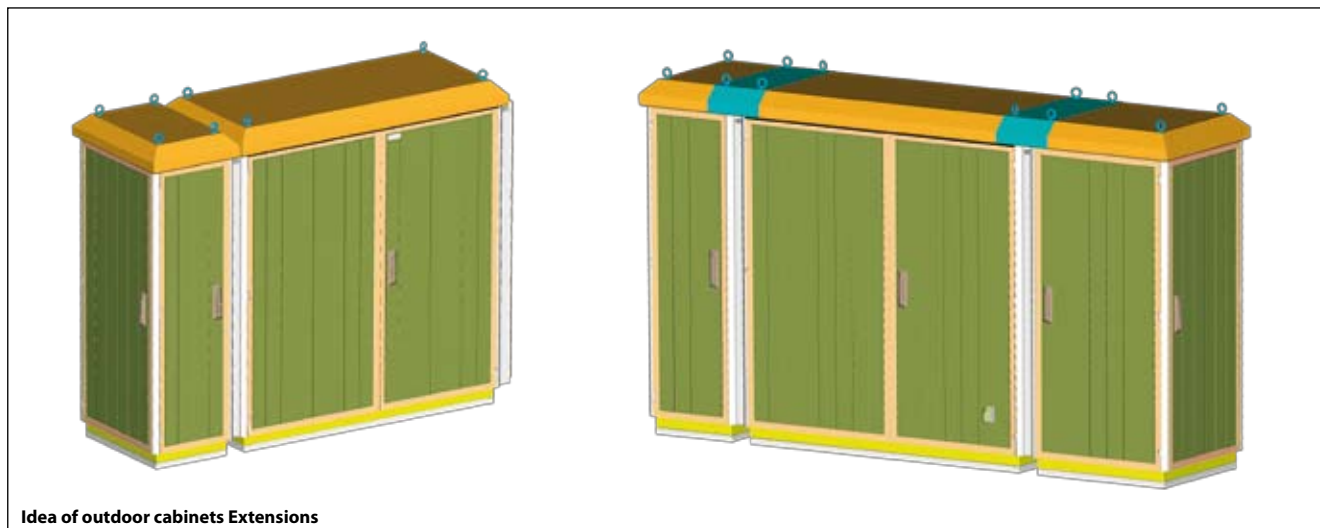
Applied in earlier solutions mounting bars was replaced by mounting board or system of special cross bars. Often on outside of the cabinets additionally is installed a energetic terminal socket.



EXTENSION OF OUTDOOR CABINETS

Often after several years since moment of installing the cabinet appears a necessity of installation in enclosures a new equipment. With way on fact that space in cabinets was already used earlier, it state a serious problem for fitters. Going out to opposite of requirement ZPAS company worked out three ways of increasing existing cabinet:

1) Extension of cabinet on sides – This solution consist on mounting to existing cabinet on sides a DOSTAWKA which can be used at will. (MDF section, battery section, chamber of devices, energy section)



Idea of outdoor cabinets Extensions

Cabinet before extension



The Cabinet after extension



EXTENSION OF OUTDOOR CABINETS

2) **Cover plate on cabinet** – the solution consists on disassembly of doors and shields in old cabinet and putting on from top, new larger enclosure. It covers so far installed equipment and it allows on adding new one. This variant does not require stopping work of installed equipment on time of exchange enclosure



Cabinet before extension



Cabinet during extension



The Cabinet after extension



The Cabinet after extension

EXTENSIONS OF OUTDOOR CABINETS

3) **Extension upwards** – the solution consists on disassembly of external mantle and internal roof then putting on and installing top swage



Idea of outdoor cabinets Extensions



The Cabinet after extension



The Cabinet after extension



The Cabinet after extension

CUSTOM SOLUTIONS



Cabinets completely made of aluminium sheet

CUSTOM SOLUTIONS



Cabinet made of Al-Zn coated sheet steel



Cabinet based on standard SZD type; aluminium doors and shields panels were replaced by aluminium sheet.

Outdoor cabinets

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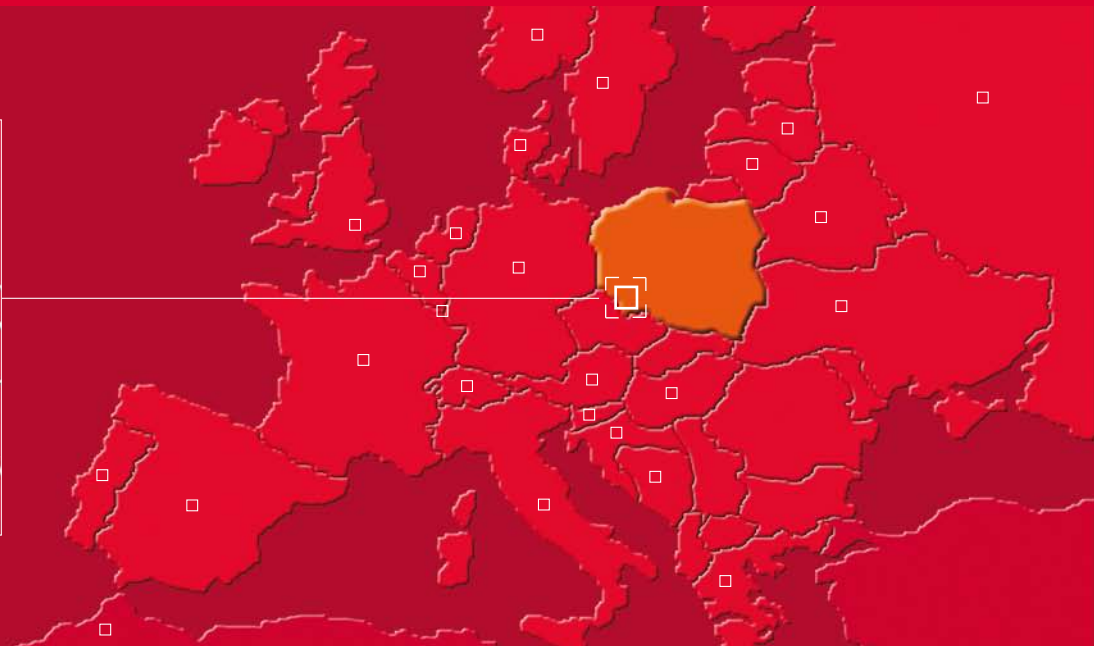
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