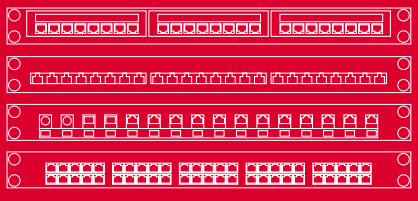
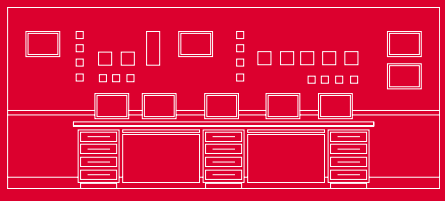
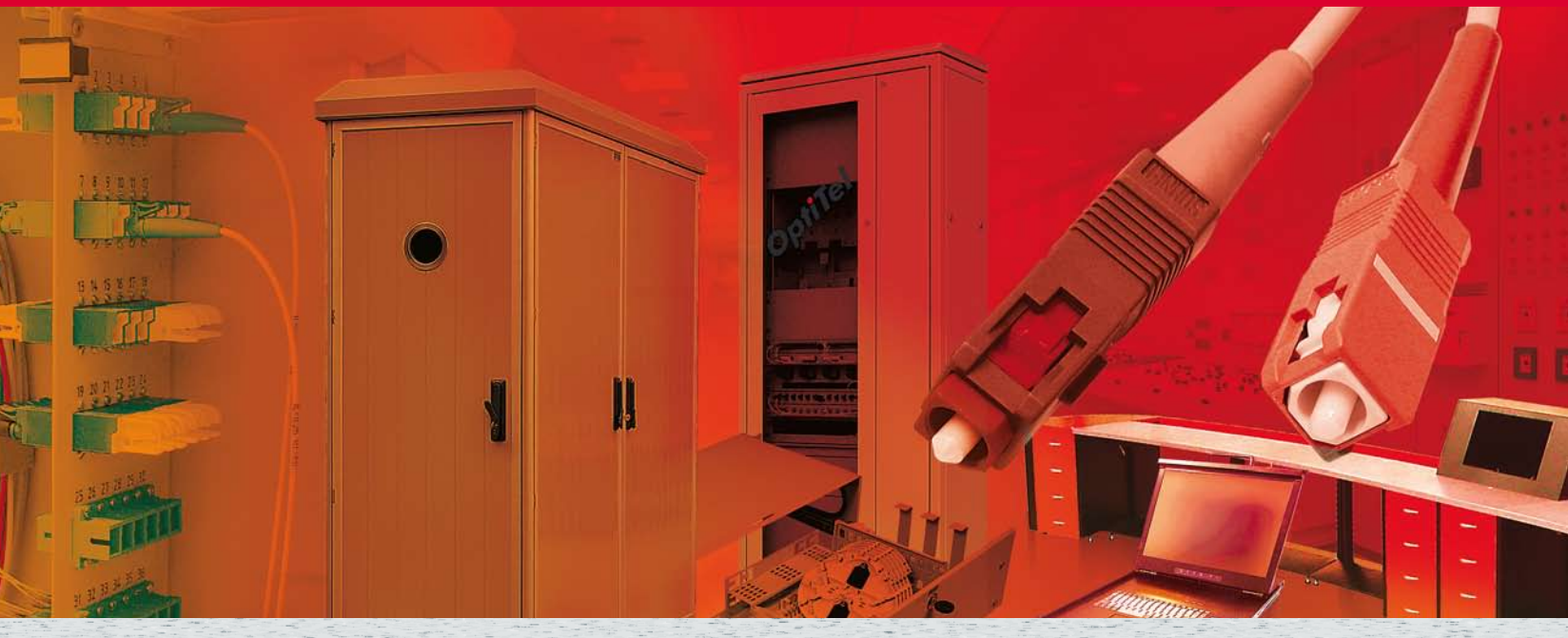
Catalogue of ZPAS-NET products

Structured cabling and telecommunication accessories
Outdoor cabinets
Dispatch and control desks
Mimic boards







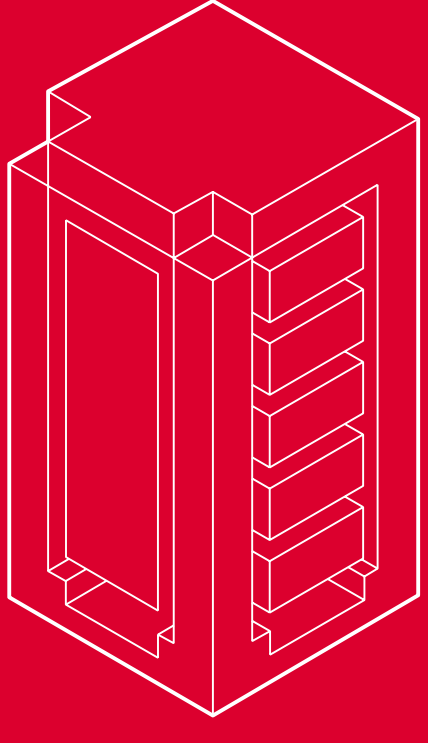
ZPAS net

connections for you

ZPAS GROUP

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.

TABLE OF CONTENTS

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 subzone 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 m^2 and the production area of 2500 m^2. 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

Product assembly

Structured cabling warehouse

ZPAS-NET offers:

- structured 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

ISO 9001, ISO 14001

CERTIFICATE

TÜV CERT

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.
Przygórze 209, 57-431 Wolibórz
with production site
ul. Spacerowej 59, 57-402 Nowa Ruda

ZPAS-NET sp. z o.o.
ul. Górnicza 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. 210/Q071666

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. 02-146 Warszawa ul.17 Stycznia 56 www.tuv.pl

IAF

TSA-ZW-23-06-05

TÜVRheinland® InterCert

TÜV CERT

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.
Przygórze 209, 57-431 Wolibórz
with production site
ul. Spacerowa 59, 57-402 Nowa Ruda

ZPAS-NET sp. z o.o.
ul. Górnicza 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

Warsaw, 2007-11-28

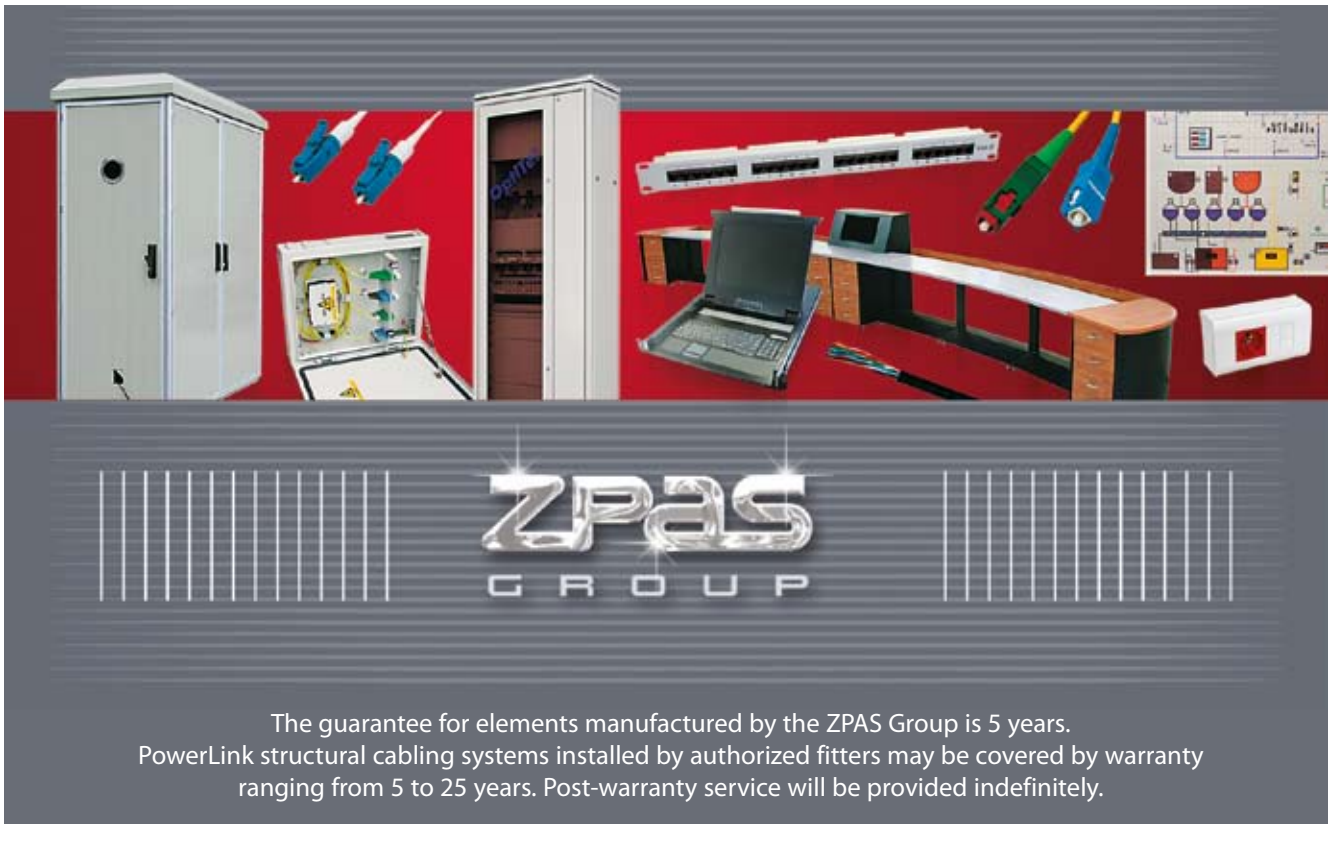
First certification 2001

TÜVRheinland®

TÜV CERT Certification Body of TÜV Rheinland Cert GmbH

www.tuv.com

GUARANTEE



The guarantee for elements manufactured by the ZPAS Group is 5 years.
PowerLink structural cabling systems installed by authorized fitters may be covered by warranty ranging from 5 to 25 years. Post-warranty service will be provided indefinitely.


Cat.6

ZPAS-NET TELECOMMUNICATION INFRASTRUCTURE

Reliability, security, confidence

In modern business environment, influenced by constant changes and modifications, it is very important to secure work of communication systems and reliability of cable and wire infrastructure. It can be achieved through choosing solutions, which belong to companies with huge trade experience, recognized on the market, offering high quality products legitimized by certificates issued by independent laboratories.

Full security of data and cable infrastructure can only be assured by a system installed by professional and authorized installers with highly developed skills confirmed by the producer.

The authorized contractors of ZPAS-NET are the best installing companies. The company takes care of their appropriate qualifications; offering advanced training programs and technical support.

ZPAS-NET co-operates only with trusted, authorized partners. We are convinced that once you decide to order their services they will confirm their professionalism during installation works.

The warranty of safety for user of cable system includes not only high quality products and professional service but also warranty of the system. The procedure of obtaining ZPAS-NET warranty of the system is not complicated and it is the customer who decides on the period of guarantee duration. The guarantee embraces installations performed by companies authorized by ZPAS-NET The longest possible period of duration is "life time" guarantee, the shortest period is 5 years.

The Powerlink Structured Cabling system consist of 5 subsystems:

- PowerLink system UTP category 5e.
- PowerLink TX system UTP category 6.
- PowerSafe System STP category 5e
- PowerSafe TX System STP category 6.
- PowerVS - telephone system.

PowerLink 5e system, 5e category, UTP

PowerLink 5e system, 5e category, UTP - this is a cable system compatible with trade standards defining all technical parameters for 5e category, that is EIA/TIA 568B.2, ISO11801, EN 50173.

The basis for the system is a universal IDC (insulation displacement contact) connection compatible with 110 and LSA connections. These connections are placed in distribution panels and telecommunication outlets.

Unshielded 5e category, UTP cable is of special construction providing increased resistance against mechanical damages.

Accessible in PVC and LSOH coatings, telecommunication outlets are realized through universal modules. These are keystone RJ45 UTP, 5e category transmission modules placed in front plates 22.5 x 45 mm or 25 x 50 mm with anti-dust shutter. The offer includes also sockets in "Polish" standard of fixing. ZPAS-NET also offers systems of frames and wall-mounted boxes as well as electrical sockets to be applied in dedicated supplying installations.

In smaller wall-mounted installations single and dual superficial sockets may turn out to be necessary. These are RJ45 UTP, 5e category with RJ connection without anti dust shutter.

Distribution panels in 1 U height with 24 RJ45 ports and in 2 U height with 48 RJ45 ports are constructed on the basis of specially designed printed circuits providing 5e category at maximal density of connections.

Patch cords are made of cable of "stranded type" at the section of 26 AWG what causes their flexibility and practically full resistance against mechanical damages. Smaller section of patch cords provides greater possibilities of them being placed in "ordering panels" in a distribution cabinet.

ZPAS-NET TELECOMMUNICATION INFRASTRUCTURE

PowerLink TX system, 6 category, UTP

PowerLink TX system, 6 category, UTP - this is a cable system compatible with EIA/TIA 568B.2 norm, specifying parameters for 6 category, dedicated for application in transmission systems compliant with 1000 Base-TX protocol.

Unshielded UTP, 6 category cable has a special construction providing increased resistance against mechanical damages and improving transmission parameters. It is equipped with special plastic divider separating single pairs. Available in PVC and LSOH coatings.

Telecommunication sockets are realized on the basis of universal modules. These are keystone RJ45, UTP, 6 category placed in front plates 22.5 x 45 mm or 25 x 50 mm with anti-dust shutter. The offer also includes sockets in „Polish" standard of fixing.

Distribution panels in 1U height with 16 or 24 RJ45 ports realized on the basis of modular patch panels and RJ45 UTP, 6 category modules.

The characteristic feature of patch cords is application of special type RJ45 plugs fixed on the cable by means of molding technology. This solution improves transmission parameters of patch cords and protects cable's connection through modular pin.

PowerSafe system, 5e category, STP

PowerSafe system, 5e category, STP - this is a shielded cable system compatible with trade standards defining all the technical parameters for 5e category, that is EIA/TIA 568B.2, ISO11801, EN 50173. The offer includes two versions of shielding: fully shielded and with continuity of screening.
Shielded FTP cable, 5e category has an additional grounding wire parallel to conductor's pairs. It also has two layers of braid of artificial and aluminum foil. Available in PVC and LSOH coating.

Telecommunication outlets are realized on the basis on universal transmission modules. These are keystone RJ45 STP, 5e category fully shielded and continuous screen transmission modules, placed on front plates 22.5 x 45 mm or 25 x 50 mm with anti-dust shutter. The offer also includes „Polish" standard of fixing.

16 and 24 port distribution panels in 1 U height are realized on the basis of modular blank patch panels and keystone RJ45 STP, 5e category modules fully shielded and with continuity of shielding.

Patch cords are made of stranded type cable at the section of 24 AWG with exceptional as for STP flexibility. Available in four colours.

Power VS - telephonic system

Power VS is a system of 10 pair telephonic terminal blocks based on ID connection of LSA type. The system includes disconnect modules in dry and gel version, connecting modules and accessories such as grounding elements, descriptive fields, single and multi-pair protections against overvoltage, test cables and mounting boxes.

Wall-mounted rails for fixing terminal blocks and panels of terminal blocks in 19" standard supplement the offer.

PATCH PANELS CATEGORY 5e, 6

- 19" standard.
- The basis of cat. 5e network system, designed for main and through distribution points of fast telecommunications systems.
- Panels are constructed on the basis of specially designed boards with compensation circuit.
- Equipped with universal IDC (Insulation Displacement Contact), compatible with 110 and Krone connectors in 568A/B standard.
- The drawer type STP patch panel is equipped with grounding strip providing connection of the cable shield to panel shield.
- Place for cable labels.
- Convenient use and reconfiguration.
- Dismountable shelf and cable ties providing easy cable management.
- WNK-805-114, WNK-805-218 and WNK-805-524 panel sets also include assembly hardware and cable ties.

Mechanical parameters:

Catalogue number	Dimensions [mm]			Colour	Weight [kg]
	Width	Height	Depth		
WNK-805-114	483	44	100	RAL 7035	1.01
T-SO-900-024	483	44	30	RAL 9005	0.77
WNK-805-218	483	88	100	RAL 7035	1.39
WNK-805-524	483	44	250	RAL 7035	2.27
T-SO-806-114	483	44	30	RAL 7035	0.62

Material: sheet steel 1.5 mm

Surface finish: powder painting

Electrical parameters:
- Contact resistance.....< 20 mΩ
- Insulation resistance.....> 500 MΩ

Parametry transmisyjne:

Parameter	Frequency [MHz]		
	1	16	100
Attenuation [dB]	0.001	0.017	0.030
NEXT [dB]	80.010	63.000	43.300
Return Loss [dB]	40.000	35.000	20.000

Socket:
- Insertion life ..... > 750 cycles
- Contacts material ..... Phosphor bronze
- Contact plating ..... 1.25 µm gold over 2.50 µm nickel
- Contact force ..... > 100 g
- Plastic housing..... Thermoplastic UL94V0

IDC contact:
- Insertion life ..... > 200 cycles
- Contacts material ..... Phosphor bronze
- Contacts plating ..... Sn 60 % / Pb 40 %
- Wire acceptance..... 22-26 AWG (solid/stranded)

Patch panel UTP 19" x 1 U, cat. 5e, 24 ports
RAL 7035 (grey) - cat. no. WNK-805-114
RAL 7035 (black) - cat. no. T-SO-900-024

Patch panel UTP 19" x 2 U, cat. 5e, 48 ports
- cat. no. WNK-805-218

Patch panel - drawer type STP 19" x 1 U, cat. 5e, 24 ports
- cat. no. WNK-805-524

Patch panel UTP 19" x 1 U, cat. 5e, 24 ports
- cat. no. T-SO-806-114

CABLE ORGANIZERS

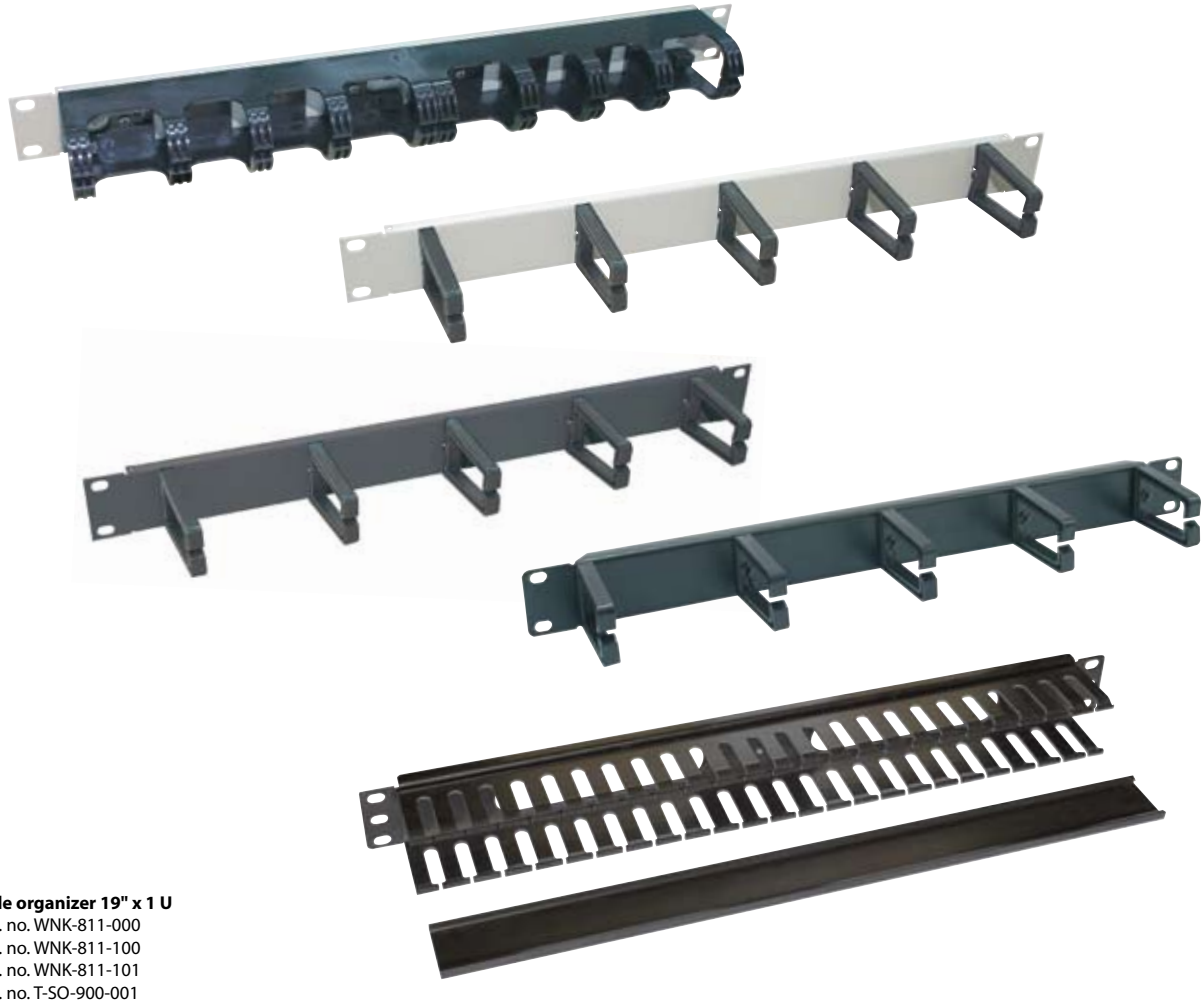
- 19" standard.
- Esthetical look.
- Convenient reconfiguration.
- WNK-811-000, WNK-811-100 and WNK-811-101 cable organizer sets include assembly hardware.

Mechanical parameters:

Catalogue number	Dimensions [mm]			Colour	Weight [kg]
	Width	Height	Depth		
WNK-811-000	483	44	80	RAL 7035	0.53
WNK- 811-100	483	44	70	RAL 7035	0.51
WNK- 811-101	483	44	70	RAL 9005	0.51
T-SO-900-001	483	44	82	RAL 9005	0.55
T-SO-900-004	483	44	62	RAL 9005	0.40

Material: sheet steel 1.5 mm

Surface finish: powder painting.



Cable organizer 19" x 1 U
- cat. no. WNK-811-000
- cat. no. WNK-811-100
- cat. no. WNK-811-101
- cat. no. T-SO-900-001
- cat. no. T-SO-900-004

BOXES AND FACEPLATES

Sample configuration of user outlet

User outlet with 2 faceplates 25 x 50 mm

To configure complete user outlet for 2 faceplates in 25 x 50 mm standard the following elements should be applied:

- Wall-mounted box for 2 faceplates, cat. no. T-SO-828-111 - 1 pc.
- Box cover for 2 sockets - cat. no. T-SO-828-211 - 1 pc.
- Faceplate 25 x 50 mm with shutter for keystones - 2 pcs.
- Keystone module - 2 pcs.
- Instead of faceplate any 25 x 50 mm socket can be used.

Sample of outlet with two faceplates 25 x 50 mm

Outlet with 2 mosaic-type faceplates

To configure complete subscriber point for 2 faceplates in 22.5 x 45 mm standard the following elements should be applied:

- Wall-mounted box for 2 faceplates, cat. no. T-SO-828-111 - 1 pc.
- Support for 2 faceplates cat. no. T-SO-828-711 - 1 pcs.
- Box cover 45 x 45 mm for 2 faceplates, cat. no. T-SO-828-811 - 1 pc.
- Faceplate 22.5 x 45 with shutter for keystones cat. no. T-SO-828-050 - 2 pcs.
- Keystone module - 2 pcs.
- Instead of 2 faceplates electrical socket 45 x 45 mm can be used.

Sample of outlet with faceplate and blind faceplate

User outlet with 4 mosaic-type faceplates

To configure complete user outlet for 4 faceplates in 22.5 x 45 mm standard the following elements should be applied:

- Wall-mount box for 4 faceplates, cat. no. T-SO-828-112 - 1 pc.
- Support for 4 faceplates cat. no. T-SO-828-712 - 1 pc.
- Box cover 90 x 45 mm for 2 faceplates cat. no. T-SO-828-812 - 1 pc.
- Faceplate 22.5 x 45 with shutter for keystones cat. no. T-SO-828-050 - 4 pcs.
- Keystone module - 4 pcs.
- Instead of 2 faceplates electrical socket 45 x 45 mm can be used.

Sample of outlet with faceplate, blind faceplate and electrical socket

User outlet with 6 mosaic-type faceplates

To configure complete user outlet for 6 faceplates in 22.5 x 45 mm standard the following elements should be applied:

- Wall-mounted box for 6 faceplates, cat. no. T-SO-828-113 - 1 pc.
- Support for 6 faceplates cat. no. T-SO-828-713 - 1 pc.
- Box cover 135 x 45 mm for 2 faceplates cat. no. T-SO-828-813 - 1 pc.
- Faceplate 22,5 x 45 with shutter for keystones cat. no. T-SO-828-050 - 6 pcs.
- Keystone module - 6 pcs.
- Instead of 2 faceplates electrical socket 45 x 45 mm can be used.

Sample of outlet with 3 faceplates, blind faceplate and electrical socket

BOXES AND FACEPLATES

Faceplates for keystones

- Possibility of configuration of complete user outlet using keystone sockets: UTP RJ11, UTP and FTP RJ45 category 5e and UTP RJ45 category 6.
- Designed to fit places in boxes and universal panels.
- Faceplates are snap fastened (tools are not required).
- Faceplates T-SO-828-050 and T-SO-828-100 are equipped with anti-dust shutter.

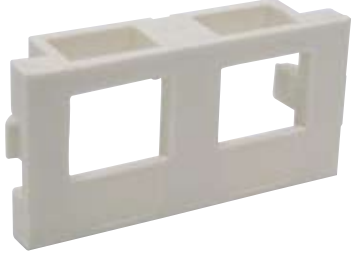
Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-828-050	22.5	45	10	0.004
T-SO-828-100	25	50	10	0.005
T-SO-828-040	25	50	10	0.003

Material: thermoplastic ULV94V0

1) Faceplate 22.5 x 45 mm for keystone module
- cat. no. T-SO-828-050

2) Faceplate 25 x 50 mm for keystone module
- cat. no. T-SO-828-100



Faceplate 25 x 50 mm for 2 keystones
- cat. no. T-SO-828-040

Blind faceplates

- Designed for masking of unused fields in faceplates and universal panels.
- Possibility of fibre adapters mounting.
- Snap fastening (tools are not required).

Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-828-010	25	50	7	0.004
T-SO-828-030	22.5	45	7	0.004

Material: thermoplastic ULV94V00

1) Blind faceplate 22.5 x 45 mm - cat. no. T-SO-828-030
2) Blind faceplate 25 x 50 mm - cat. no. T-SO-828-010

BOXES AND FACEPLATES

Wall mounted boxes

- Ideal for surface installation, possibility of right/left cable entry.
- T-SO-828-111 box accommodates 2 sockets.
- T-SO-828-112 box accommodates 4 sockets.
- T-SO-828-113 box accommodates 6 sockets.
- Esthetic look, easy fitting using 2 screws (not included).
- Delivery with mounting screws for cover or for support frame.

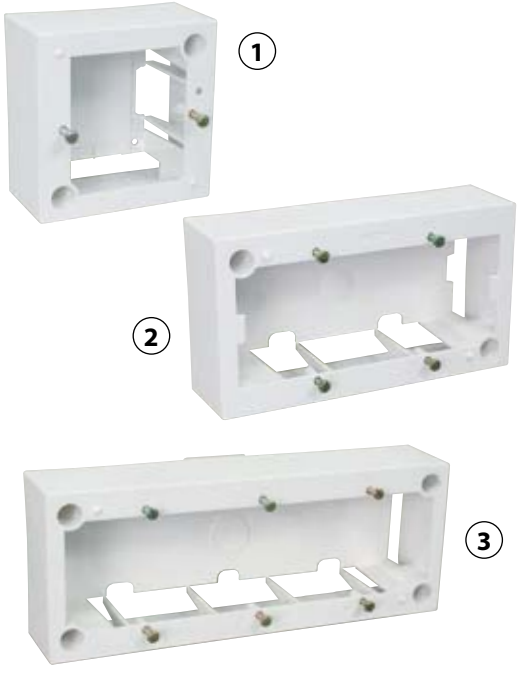
Mechanical parameters:

Catalogue number	Capacity	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
T-SO-828-111	2 sockets	81	81	40	0.040
T-SO-828-112	4 sockets	148	81	40	0.065
T-SO-828-113	6 sockets	203	81	40	0.100

Spacing of mounting screws:
- T-SO-828-111 box - 60 mm
- T-SO-828-112 box - 60 x 57 mm
- T-SO-828-113 box - 60 x 57 x 57 mm

Material: thermoplastic ABS

Colour: white



Wall mounted boxes
1) for 2 sockets - cat no. T-SO-828-111
2) for 4 sockets - cat no. T-SO-828-112
3) for 6 sockets - cat no. T-SO-828-113

Under surface wall boxes

- Intended for empty gypsum walls.
- Reliable and quick fastening using screws with wide pitch.
- Delivery with screws for support mounting.

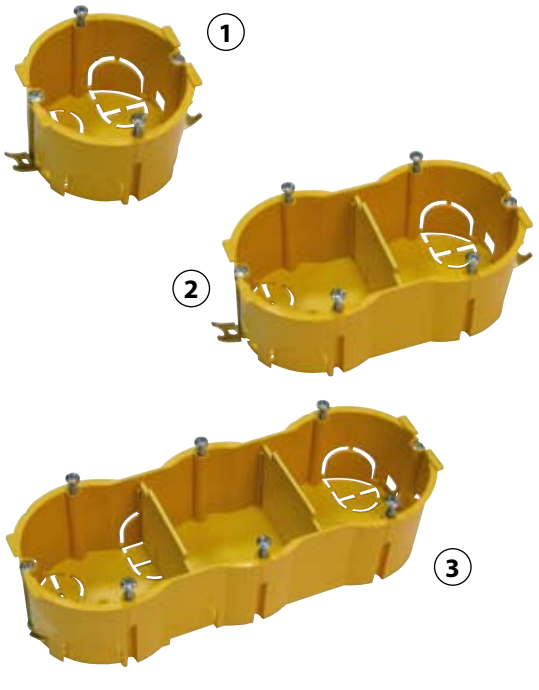
Mechanical parameters:

Catalogue number	Capacity	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
T-SO-828-411	2 sockets	65	65	40	0.030
T-SO-828-412	4 sockets	121.8	65	40	0.045
T-SO-828-413	6 sockets	178.6	65	40	0.060

Spacing of mounting screws:
- T-SO-828-411 box - 60 mm
- T-SO-828-412 box - 60 x 57 mm
- T-SO-828-413 box - 60 x 57 x 57 mm

Material: thermoplastic ULV94V0

Colour: yellow



Under surface wall boxes
1) for 2 sockets - cat. no. T-SO-828-411
2) for 2 sockets - cat. no. T-SO-828-412
3) for 2 sockets - cat. no. T-SO-828-413

BOXES AND FACEPLATES

Covers for installations boxes

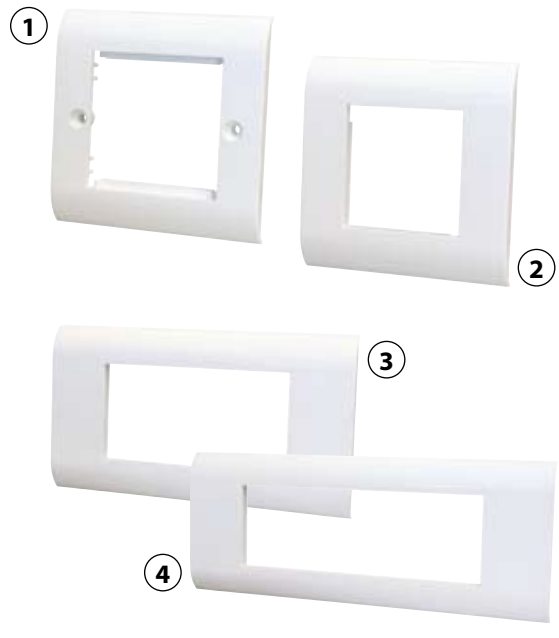
- Covers designed for universal wall-mounted boxes.
- Rounded look, without sharp edges.
- Fastening type:
  - Covers for 25 x 50 mm faceplates are fastened using 2 screws (included).
  - Covers for 22.5 x 45 mm faceplates are fastened using support frame.
- Intended for boxes: T-SO-828-111, T-SO-828-112, T-SO-828-113 and T-SO-828-411, T-SO-828-412, T-SO-828-413.

Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-828-211	81	81	9	0.015
T-SO-828-811				0.015
T-SO-828-812	148			0.022
T-SO-828-813	203			0.029

Material: thermoplastic ULV94V0

Colour: white



1) Cover for 2 faceplates 25 x 50 mm
- cat. no. T-SO-828-211
2) 1G cover for 2 faceplates 22.5 x 45 mm
- cat. no. T-SO-828-811
3) 2G cover for 4 faceplates 22.5 x 45 mm
- cat. no. T-SO-828-812
4) 3G cover for 6 faceplates 22.5 x 45 mm
- cat. no. T-SO-828-813

Support frames for wall boxes

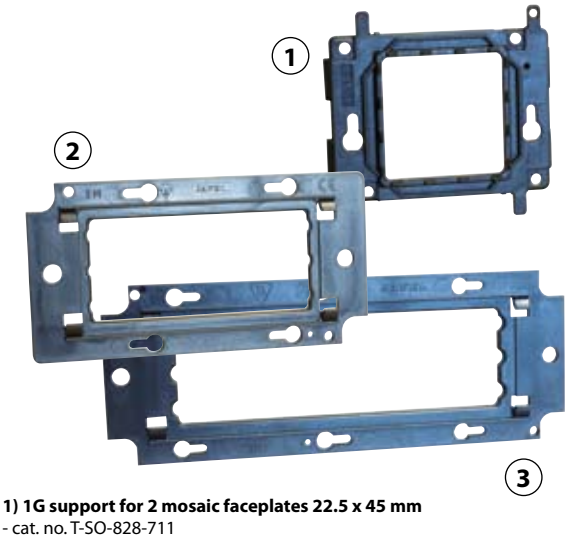
- Support frames makes possible mounting of 22.5 x 45 mm faceplates in universal wall boxes.
- Easy fastening in box using screws (delivered with the box).

Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-828-711	76,5	70,3	11.7	0.010
T-SO-828-712	138	71	11.7	0.020
T-SO-828-713	196	71	11.7	0.030

Material: thermoplastic ABS

Colour: black

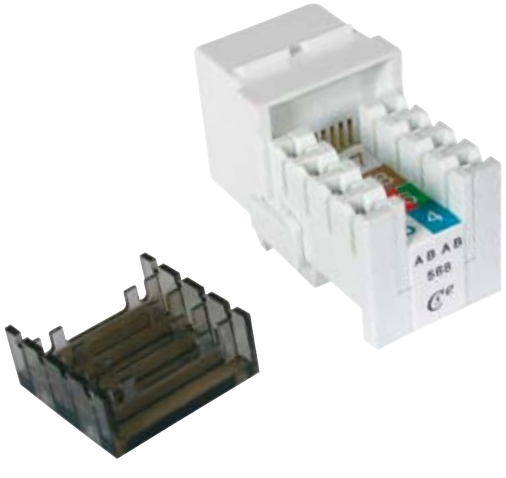


1) 1G support for 2 mosaic faceplates 22.5 x 45 mm
- cat. no. T-SO-828-711
2) 2G support for 4 mosaic faceplates 22.5 x 45 mm
- cat. no. T-SO-828-712
3) 3G support for 6 mosaic faceplates 22.5 x 45 mm
- cat. no. T-SO-828-713

KEYSTONES AND SOCKETS

Transmission modules cat. 5e UTP, STP

- Keystone modules RJ45 cat. 5e are designed for user outlet, as well as patch panels.
- The connection match the TIA/EIA 568A/B norm and cat. 5e requirements.
- The keystones are terminated using universal IDC (Insulation Displacement Contact) with punch-down cap for quick installation.
- Modules T-SO-831-918 are built using monolithic construction from ABS.
- Restant modules are built using printed circuit board.
- List of mounting accessories available on page 12 (See configuration of user outlet).
- Available in versions: STP cat. 5e fully shielded (360°).



Keystone HD, Monoblock white
- cat. no. T-SO-831-918

Mechanical parameters:

Catalogue number	Colour	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
T-SO-831-918	white	14.80	19.00	19.90	0.007
T-SO-832-921	white	19.7	24	34 or 52*	0.014

*) Depended of the cable entry - 34 mm in case of side entry.

Material of case: socket - thermoplastic ABS and UL94V0.

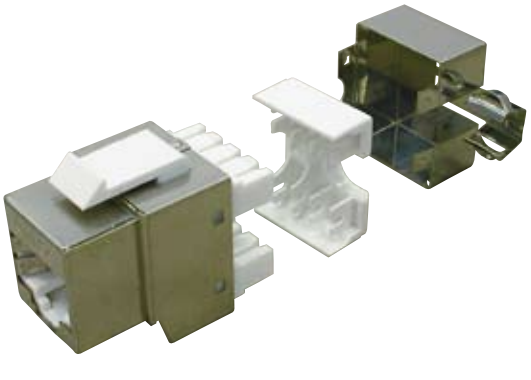
Electrical parameters:
- Attenuation.....< 20 mΩ
- Return loss.....> 500 MΩ

Transmission parameters:

Parameter	Frequency			
	1 MHz	16 MHz	25 MHz	100 MHz
Attenuation [dB]	0.017	0.021	0.025	0.720
NEXT [dB]	86.97	66.31	62.75	52.20
Return loss [dB]	53.67	41.46	37.56	26.50

Socket:
- Insertion life .....> 750 cycles
- Contacts material .....Phosphor bronze
- Contact plating .....1.25 µm gold over 2.50 µm nickel
- Contact force .....> 100 g
- Displacement force.....15 kg

IDC connector:
- Insertion life .....> 200 cycles
- Contacts material .....Phosphor bronze
- Contacts material .....Sn 60 % / Pb 40 %
- Wire acceptance.....22-26 AWG (solid/stranded)



Keystone STP RJ45 category 5e, rear clamped, white
- cat. no. T-SO-832-921

KEYSTONES AND SOCKETS

Transmission modules cat. 6 UTP, STP

- Keystone modules RJ45 cat. 6 are designed for user outlet, as well as patch panels.
- Possibility of connecting cables in 568A and 568B standards.
- Possesses advantages of universal displacement contact.
- Available in white colour.

Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-834-912	16	22	43	0.015
T-SO-834-922	17	24	54	0.020

Material of case: thermoplastic ABS and UL94V0.

Electrical parameters:
- Attenuation ..... < 20 mΩ
- Return loss ..... > 500 MΩ

Transmission parameters:

Parameter	Frequency [MHz]				
	1	25	100	200	250
Attenuation [dB]	0.02	0.04	0.05	0.05	0.10
NEXT [dB]	85.1	68.3	58.3	52.5	46.2
Return loss [dB]	53.0	59.4	33.2	21.0	17.8

UTP keystones kategory 6 - rear clamped
- cat. no. T-SO-834-912

STP keystones kategory 6 - rear clamped
- cat. no. T-SO-834-922

Socket:
- Insertion life ..... > 750 cycles
- Contacts material ..... Phosphor bronze
- Contact plating ..... 1.25 µm gold over 2.50 µm nickel
- Contact force ..... > 100 g
- Displacement force.... 15 kg

IDC connector:
- Insertion life ..... > 200 cycles
- Contacts material ..... Phosphor bronze
- Contacts plating ..... Sn 60 % / Pb 40 %
- Wire acceptance..... 22-26 AWG (solid/stranded)

Electrical sockets 45 x 45 mm

- Electrical sockets in 45 x 45 mm standard are designed for electrical installation dedicated for telecommunications devices.
- Excellent integration with transmission sockets in 45 x 22.5 mm standard.

Mechanical parameters:

Catalogue number	Colour	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
T-SO-839-515	red	45	45	32	0.010
T-SO-839-520	red	31	34	24	0.001

Material: thermoplastic ABS and UL94V0

Electrical parameters:
- Max. current .....16 A
- Voltage .....250 V ~

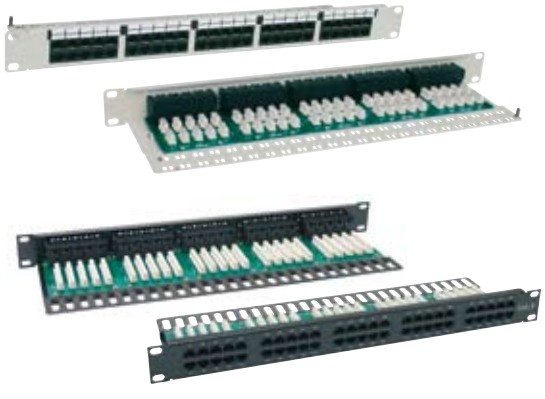
Safety shutter with self adhesive type
- cat. no. T-SO-839-520

Electrical socket 45 x 45 mm with safety shutter, red
- cat. no. T-SO-839-515

POWER VS TELEPHONE SYSTEM

Telephone patch panel

- 19" panel 50 x RJ45 is designed for termination of vertical cabling and accepts multi-pair unshielded telecom cables or 4 pairs twisted cable.
- Made on the basis of 10 ports unshielded boards and two pairs cat. 3 connectors for telephone applications.
- Ensures transmission parameters required for telephone applications, easy and convenient mounting, high durability of wires and easy cross connections.
- High density of cross connections (double pair modular RJ45 sockets).
- The WNK-807-155 panel set includes assembly caps, cable ties and duct markings.
- In the back panel these is a shelf to provide easy cable management.



Telephone patch panel UTP 19" x 1 U, category 3, 50 ports
RAL 7035 (gray) - cat. no. WNK-807-155
RAL 9005 (black) - cat. no. T-SO-900-050

Mechanical parameters:

Catalogue number	Dimensions [mm]			Colour	Weight [kg]
	Width	Height	Depth		
WNK-807-155	483	44	110	RAL 7035	1.28
T-SO-900-050	483	44	140	RAL 9005	1.56

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Electrical parameters:
- Contact resistance. . . . . < 20 mΩ
- Insulation resistance. . . . . > 500 MΩ

IDC connector:
- Insertion life . . . . . > 200 cycles
- Contacts material . . . . . Phosphor bronze
- Contacts plating . . . . . Sn 60 % / Pb 40 %
- Wire acceptance. . . . . 22-26 AWG (solid/stranded)

Printed board 10 x RJ45
- Contacts material . . . . . Phosphor bronze (0.35 mm)
- Contacts plating . . . . . Ni/Pb
- Material of case . . . . . Thermoplastic ULV94V0

Mount frame for telephone modules

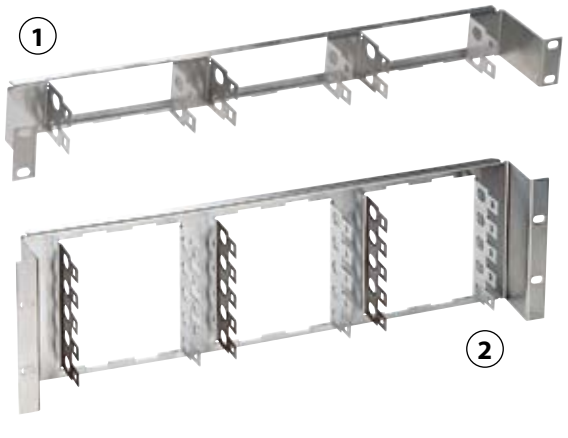
- Produced of stainless steel.
- Equipped with sockets for telephone modules.
- Available in two sizes:
  - 19" x 1 U - 6 modules
  - 19" x 3 U - 15 modules

Mechanical parameters:

Catalogue number	Capacity	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
WNK-803-160	6 modules	483	44 (1U)	81	0.300
WNK-803-115	15 modules		133 (3U)		0.422

Material: stainless sheet steel 0.75 mm

Surface finish: none



1) Mount frame for telephone modules 19" x 1 U, for 6 modules
- cat. no. WNK-803-160

2) Mount frame for telephone modules 19" x 3 U, for 15 modules
- cat. no. WNK-803-115

POWER VS TELEPHONE SYSTEM

Telephone connectors

Disconnecting module

Disconnecting module is basis of telephone system. Module is placed on mount frame. Equipped with IDC contacts for termination of wires. There is also possibility of placing on them a set of magazine of gas surge arrestors. The module possesses shorted contacts. Application of insulation plug allows to disconnect any line.

Disconnecting module, 10 pairs, 1-0, white
- cat. no. T-SO-870-500

Technical data

Case material ..... thermoplastic ULV94V0
Connector material ..... silver plated phosphor bronze
Wire acceptance ..... 0.4 - 0.8 mm
Contact resistance ..... 5 mΩ
Accordance with norm ..... DIN 41611
Category 3
Weight ..... 0.060 kg
Dimensions ..... 124.0 x 19.5 x 40.0 mm
Colour ..... white

Magazine for tri-pole arrestors

Equipping telephone module with gas surge arrestors with thermal protection allows to protect system against dangerous consequences of external overvoltage. At the moment of emergency destructed is only arrestor, providing protection of other elements from destruction. Special contacts fitted on both sides of the magazine provide automatic connection of middle strip with frame.

Magazine of arrestors (without arrestors)
- cat. no. T-SO-870-540

Technical data of magazine

Case material ..... thermoplastic ULV94V0
Contacts material ..... silver plated phosphor bronze
Weight ..... 0.080 kg
Dimensions ..... 113.0 x 22.2 x 41.0 mm
Colour ..... gray

Technical data of arrestors

Rated voltage of ignition [a-e, b-e] ..... 230 V 20 %
Maximum output voltage [1 kV/ms] ..... < 450 V
Rated voltage [8/20 ms, a+b-e] ..... 20 kA
Max. alternating current [a+b-e, 50 Hz, 1 s] ..... 10 A
Insulation resistance [for 100 V] ..... 10^{10} Ω
Capacity [a-e, b-e] ..... < 1.5 pF
Capacity [a-b] ..... < 1.0 pF
Weight ..... 0.0024 kg

Tri pole surge gas arrestor 230 V
- cat. no. T-SO-870-542

POWER VS TELEPHONE SYSTEM

Labels and covers

- The telephone system contains elements which simplify indication of particular connectors.
- Labels are equipped with paper labels, making it possible writing of description.

Catalogue number	Dimensions [mm]	Weight [kg]
T-SO-870-562	108 x 17 x 14	0.015

Cover for module
- cat. no. T-SO-870-562

Distribution boxes

Distribution boxes provide safe installation of telephone modules. Made from non-flammable material, are necessary protection of installed equipment against casual mechanical damages.

Mechanical parameters:

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
T-SO-870-570	140	152	55	0.20
T-SO-870-571	235	190	105	0.61
T-SO-870-572	220	272	108	0.88

Material: non-flammable ABS thermoplastic.

Distribution box for 3 modules - without modules
- cat. no. T-SO-870-570

Distribution box - for 5 modules without modules
- cat. no. T-SO-870-571

Distribution box for 10 modules - without modules
- cat. no. T-SO-870-572

SKI2 10" WALL-MOUNTED CABINET

- Designed for indoor applications.
- Usable height of the cabinet is 7 U.
- The cabinet is based on body with steel or glass door. The cabinet includes two mounting angles for installation of 10" appliances. The mounting angles are fixed to the walls of the body.
- Openings in the cabinet's top and bottom plate are covered with knock-out blanking plates.
- Following removal of the knock-out plate, a brush strip supplied together with the cabinet can be placed in one of the cable openings.
- The cabinet does not have a rear panel.

Catalogue number	Cabinet type	Weight [kg]
WZ-3661-01-01-011	SKI2 cabinet with steel door	5.00
WZ-3661-01-02-011	SKI2 cabinet with glass door	5.20

Supply includes:
SKI2 cabinet is sold as an empty enclosure. Additional equipment in 10" standard should be ordered separately (see below).

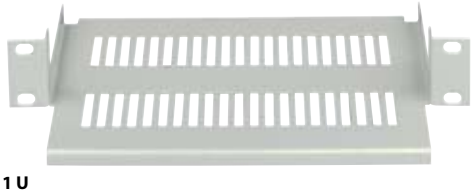
Dimensions (width x height x depth):
310 x 355 x 260 mm

Material:
- Body, steel door, mounting angles .....1.0 mm thick sheet steel
- Glass door .....4.0 mm thick safety glass

Surface finishing:
Powder painted in RAL 7035. Application of other colours on request.

Supplementary accessories ordered separately:

Catalogue number	Product name	Weight [kg]
WNK-891-319	Universal patch panel 10" x 1 U, 4 ports 25 x 50 mm	0.20
WNK-891-315	Terminal block panel 10" x 1 U, 10 pairs	0.14
WNK-891-312	Patch panel 10" x 1 U for keystones, 8 ports	0.26
WNK-891-316	Patch panel 10" x 1 U, cat. 5e, 8 ports RJ45	0.35
WNK-891-311	Shelf 10" x 1 U	0.40
T-SO-891-317	Power strip 10" x 1 U, 4 sockets type E (CEE 7/5)	0.60



Shelf 10" x 1 U
- cat. no. WNK-891-311

Power strip 10" x 1 U, 4 sockets type E (CEE 7/5), voltage rating 230 V AC, maximum current 10 A, cable 1.8 m with universal plug, body made of anodized aluminium
- cat. no. T-SO-981-317

SKI2 cabinet with steel door
- cat. no. WZ-3661-01-01-011

SKI2 cabinet with glass door
- cat. no. WZ-3661-01-02-011

Universal patch panel 10" x 1 U, 4 ports 25 x 50 mm
- cat. no. WNK-891-319

Patch panel 10" x 1 U, for keystones, 8 ports
- cat. no. WNK-891-312

Terminal block panel 10" x 1 U ,10 pairs
- cat. no. WNK-891-315

Patch panel 10" x 1 U, cat. 5e, 8 ports RJ45
- cat. no. WNK-891-316

TOOLS AND ACCESSORIES FOR INSTALLERS

Punch down tool for telephone connectors

- Tool for Krone system.
- Built-in scissors for cutting of wire.
- Additional endings for taking off telephone modules from fame and arrestors from magazine.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Lenght	
T-SO-881-302	35	20	180	0.120
T-SO-870-530	177	37,5	21	0.060
T-SO-900-605	177	35	17	0.055

Case material: plastic

Ending material: tooling steel

Punch down tools
- cat. no. T-SO-881-302
- cat. no. T-SO-870-530
- cat. no. T-SO-900-605

Crimp tool for plugs WE8W, WE6W (for two plugs)

- Intended for modular plugs 8P8C (RJ45), 6P6C (RJ12), 6P4C (RJ11), 6P2C.
- With cable stripper and cutter for flat cables KP-8, KP-6.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Lenght	
T-SO-885-104	60	20	205	0.280

Handle material: plastic

Cross cable stripper

- Adjustable cable stripper and cutter with replaceable knife.
- Four UTP/STP cables, flat telephone cables 2C, 4C, 6C, 8C, and for 18-22 AWG wires.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Lenght	
T-SO-882-300	53	17	122	0.080

Case material: plastic

TOOLS AND ACCESSORIES FOR INSTALLERS

Fluke DTX-1800 (DTX-1800 INTL) cable analyzer

DTX-family cable testers are durable and handy measuring instruments designed for the certification, identification of damage and passporting of cable systems, both copper and optical fibre types. DTX-1800 certifies copper cabling as Class F (600 MHz) in less than 45 seconds and category 6 in less than 12 seconds. It meets requirements associated with the accuracy level III and proposed accuracy level IV.

Fluke DTX-1800 cable analyzer (front and rear views)
- cat. No. T-SO-883-210

Tester properties:

- **Standards tested:** TIA Category 3 and 5e per TIA/EIA-568B; TIA Category 5 (1000BASE-T) per TIA TSB-95; TIA Category 6 per TIA/EIA-568B.2-1 (Addendum #1 to TIA/EIA-568B.2); ISO/IEC 11801 Class C, D, E, F, EN 50173 Class C, D, E; ANSI TP-PMD IEEE 802.3 10BASE-T; 100BASE-TX; 1000BASE-T; IEEE 802.5 (STP, IBM Type 1, 150 Ohm) Token Ring, 4 Mbps and 16 Mbps
- **Auto-test speed:** 10 s (complete auto-test of UTP cat. 6 cabling)
- **Tests performed:** connection map; length; propagation delay; delay skew; DC loop resistance; Insertion Loss; Return Loss (RL); RL @ Remote NEXT; NEXT @ Remote; Attenuationto-crosstalk Ratio (ACR); ACR @ Remote; ELFEXT; ELFEXT @ Remote; Power Sum ELFEXT; PSELFEXT @ Remote; Power Sum NEXT; PSNEXT @ Remote Power Sum ACR; PSACR @ Remote
- **Tone generator:** integrated, 440 Hz ÷ 831 Hz
- **Operating range:** 900 MHz
- **Accuracy level:** IV
- **Display:** 3.7", resolution 240x320, passive colour type with backlighting
- **Operation in active network:** Yes (optional DTX-NSM adapter)
- **Graphic memory of measurements:** 250
- **External memory:** 16 MB
- **USB connection:** Yes
- **RS-232 connection:** Yes
- **Channel cat. 6 type adapters:** Yes
- **Additional features:** incorporated locator of faults in fibre optic cables (VFL), autotest initiation from the remote unit
- **Operating temperature range:** 0 °C ÷ 45 °C
- **Maximum acceptable ambient humidity:** 0 % ÷ 70 %, non-condensing
- **Vibration resistance:** random vibrations, 2 g, 5 Hz ÷ 500 Hz
- **Impact resistance:** drop from a height of 1 m without attached modules
- **Maximum operating altitude:** 4000 m
- **Power supply:** Li-Ion battery, 7.4 V, 4000 mAh
- **Calibration validity:** 1 year
- **Supported languages:** English, French, German, Spanish, Portuguese, Italian, Japanese, simplified Chinese
- **Manufacturer:** Fluke Networks

DC loop resistance test:
- Parameter.....twisted pair wire
- Range .....0 Ω ÷ 53 Ω
- Resolution .....0.1 Ω
- Accuracy.....± (1 Ω + 1 %)

Delay skew:
- Parameter.....twisted pair wire
- Range .....0 ns ÷ 100 ns
- Resolution 1ns
- Accuracy.....± 10 ns

Length measurement for twisted pair wire:
- Range .....800 m (without remote unit), 150 m (with remote unit)
- Resolution .....0.1 m
- Accuracy.....± (1 m + 4 %)

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Thickness	
T-SO-883-210	112	216	60	1.1

TOOLS AND ACCESSORIES FOR INSTALLERS

Modular plug

- Effective protection of cable and plug against mechanical damages.
- Accordance with category 5e.
- Esthetical look.
- Durable fastening of cable in the plug.
- Flexible thermoplastic material ensures high durability and comfort usage.
- Various types of plugs.
- Package contains 100 pcs.

Case material: thermoplastic UL94V0
Contacts material: phosphor bronze
Contacts plating: 1.25 µm gold over 2.50 µm nickel

Modular plug:
- RJ45 for rounded stranded cable - cat. no. T-SO-855-030
Boot for plug WE8W:
- gray - cat. no. T-SO-855-811

Reference chart

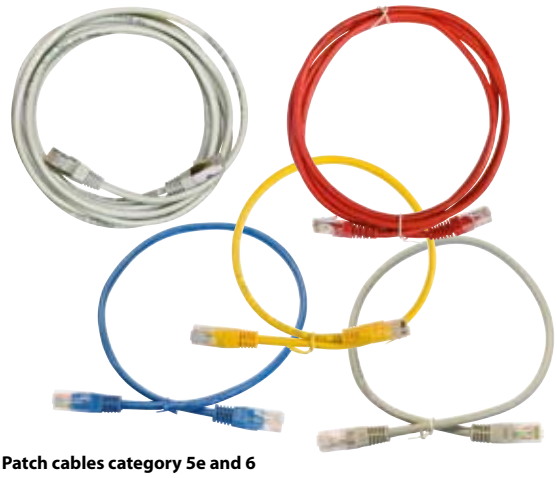
Part	Colour / type	Catalogue number	Dimensions [mm]			Weight [kg]
			Width	Height	Depth	
Boot	gray	T-SO-885-811	10	12	22	0.003
Plug	RJ45 for rounded stranded UTP cable	T-SO-855-030	15	15	28	0.003
	RJ45 for rounded FTP solid	T-SO-855-130	11	15	23	

PATCH CABLES

- Designed for cross connections at distribution points as well as connections of terminals with user outlet.
- Compatible with category 5e, sequence 568B.
- FTP cables are resistant from mechanical damages, providing continuity of shielding.
- Five standard length options: 0.5 m, 1 m, 2 m, 3 m, 5 m.
- Equipped with special type RJ45 plugs fixed on the cable by means of moulding technology.

Mechanical parameters:
- Cable insulation material .....PVC
- Plug case UL94V2
- Plug contacts material.....phosphor bronze
- Plug contacts plating.....gold over nickel;
- Durability .....> 750 cycles
- Temperature range.....-40 to +60

Electrical parameters:
- Maximum voltage.....> 125 V
- Maximum current .....1.5 A
- Insulation resistance.....> 500 MΩ



Patch cables category 5e and 6

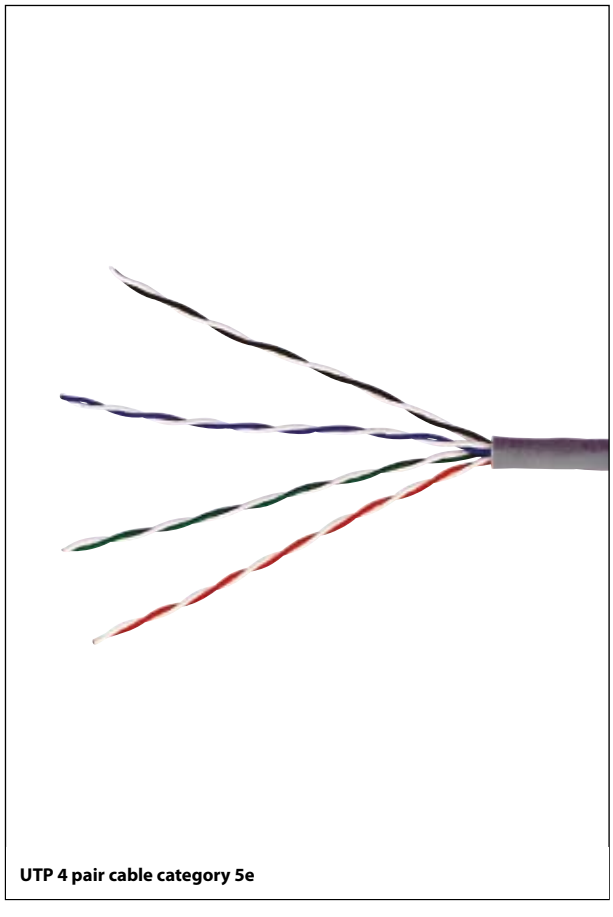
Available types of patch cables:
- UTP cat. 5e and 6 patch cables are available in the following colour range: grey, ivory, black, red, green, blue, yellow, orange, brown, purple and pink
- FTP cat. 5e and 6 patch cables available in the following colour range: grey, ivory, black, red, green, blue, yellow
- SSTO cat. 6 patch cables available in the following colour range: grey, ivory, black, red, green, blue, yellow

We also offer Cross Over, 6A SSTP PiMF patchcords.

DATA TRANSMISSION CABLES

Indoor cables category 5e

- Fullfilness of category 5e requirements.
- Basis element of category 5e products line, designed for high speed networks.
- Recommended for vertical and horizontal cabling.
- Small outer diameter, high elasticity and flexibility.
- Standard packing in 305 m cardboard boxes.
- 4 pairs, each pair twisted in different skip (Norway twist).
- Available in PVC version, LSZH version (Low Smoke Zero Halogen).



UTP 4 pair cable category 5e

Mechanical parameters:

- Wire diameters ..... 24 AWG
  (Cables 26 AWG available at special order.)
- Shield of single pair ..... unshielded
- Screen of cable core ..... unscreened
- Number of pairs 4
- Sheath ..... PVC, LSZH or PE
- Sheath colour for stranded wire ..... gray, red, blue, yellow, green
- Length tolerance ..... +/- 1 %

Min. bending ratio:

- During the installation. ..... 8 x outer cable diameter
- After installation ..... 4 x outer cable diameter

Temperature range:

- Installation ..... 0 to 50 °C
- Working conditions ..... -20 to +60 °C

Colour code:

- Pair 1 - white-blue / blue
- Pair 2 - white-orange / orange
- Pair 3 - white-green / green
- Pair 4 - white brown / brown

Solid and stranded cables

Cat. no.	Type of cable
T-SO-841-161	Cable UTP 4 pairs, category 5e, PVC, ultralink, 305 m
T-SO-841-160	Cable UTP 4 pairs, category 5e, PVC, powernet, 305 m
T-SO-841-861	Cable UTP 4 pairs, gray, category 5e, PVC, 305 m
T-SO-841-000	Cable UTP 4 pairs, gray, category 5e, PVC, 305 m

On customer's request it is possible to pack cables in sections.

DATA TRANSMISSION CABLES

Outdoor cables category 5e

- Basis element of category 5e products line, designed for high speed networks.
- Recommended for vertical and horizontal cabling.
- 4 pairs UTP, each pair twisted in different skip (Norway twist).
- Small outer diameter, high elasticity and flexibility.

Outdoor cable - cat. no. T-SO-841-173

Mechanical parameters:
- Wire diameter.....24 AWG
- Number of pairs.....4
- Sheath.....black polyethylene
- Wire insulation.....solid polyethylene
- Length tolerance.....+/- 1 %

Min. bending ratio:
- During the installation.....8 x outer cable diameter
- After installation .....4 x outer cable diameter

Temperature range:
- Installation.....-10 to +50 °C
- Working conditions .....-20 to +60 °C

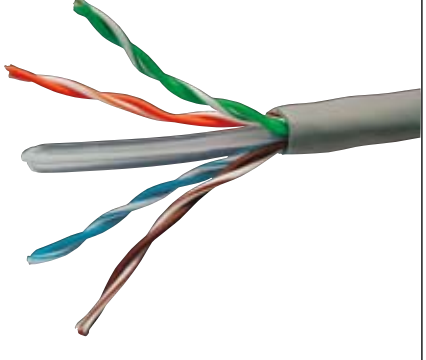
Reference chart

Cat. no.	Type of cable
T-SO-841-173	Cable UTP outdoor 4 pairs, cat. 5e, PE, 305 m

Colour code:
- Pair 1 - blue / white-blue
- Pair 2 - orange / white-orange
- Pair 3 - green / white-green
- Pair 4 - brown / white-brown

Cables category 6

- Fulfilment of category 6 requirements.
- 4 pairs UTP placed between the walls of cross web assures reduction of NEXT and ELFEXT parameters.
- Intended for horizontal and vertical cabling in fast telecommunication networks.
- Small outer diameter, high elasticity and flexibility.



UTP 4 pair category 6 cable

Mechanical parameters:
- Wire diameters..... 24 AWG
- Insulated wire diameter ..... ≤ 1.0 mm
- Shield of single pair ..... unshielded
- Screen of cable core..... unscreened
- Number of pairs..... 4
- Sheath..... PVC
- Length tolerance..... +/- 1 %

Min bending ratio:
- During the installation.....8 x outer cable diameter
- After installation .....4 x outer cable diameter

Temperature range:
- Installation.....0 to +50 °C
- Working conditions .....-20 to +60 °C

Reference chart

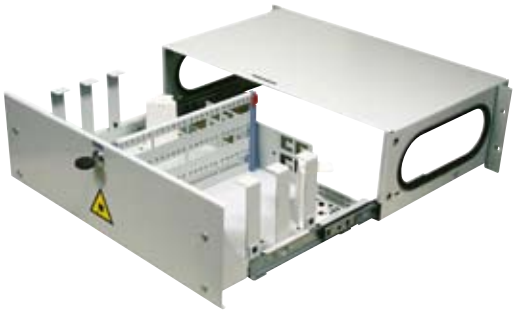
Cat no.	Type of cable
T-SO-841-663	Cable UTP 4 pairs, solid, category 6, PVC, 305 m

Colour code:
- Pair 1 - white-blue / blue
- Pair 2 - white-orange / orange
- Pair 3 - white-green / green
- Pair 4 - white brown / brown

OptiTel FIBRE OPTIC TELECOMMUNICATION ENCLOSURES

OptiTel fibre optic enclosures family were designed according to newest solution used in telecommunications networks. During designing of new distribution frames, the attention was paid to functional adapting for new building access networks.

OptiTel is full range of fibre optic distribution enclosures with various number of adapter ports, starting from panel and wall-mounted models, through rack to special cabinet with cable accessories. OptiTel distribution enclosures make possible switching of optic lines between fibre lines and end terminals. Using OptiTel enclosures it is possible to flexible configure fibre optic lines, switching reserve trunks, add new devices, and make exploitation and control measurements.



1) OptiTel PSP - Fibre optic patch panels
2) OptiTel PSM - Modular fibre optic distribution panels

OptiTel PSN- Wall mounted fibre optic distribution boxes (adapters and pigtails should be ordered separately)

1) OptiTel SPS - Cabinet for fibre optic patch panels
2) Optitel SPM - Cabinet for modular fibre optic distribution panels

OptiTel

Optitel enclosures are compatibile with norm ZNm 96/TPSA-009

OptiTel SPS II 19/45U/800 CABINET FOR FIBRE OPTIC PATCH PANELS

Technical data:

Max. amount of outdoor cables 8
Useful height ..... 45 U
Dimensions (w. x h. x d.) ..... 800 x 200 x 600 mm
Weight ..... 128 kg

Material:
- profile, supporting bars ..... steel 2.0 mm
- side panels, plinth, plinth's sides ..... steel 1.0 mm
- right front door ..... steel 1.0 mm
- door with safety plexiglas window ..... steel 1.5 mm
- plinth's corners ..... steel 2.5 mm

Surface finish: powder painting RAL 7035

Protection degree: IP 20 in accodance with EN 60 529 / IEC 529

Catalogue number:

Optitel SPS 19/45U/800 cabinet with standard equipment
- cat. no. WNK-405-123

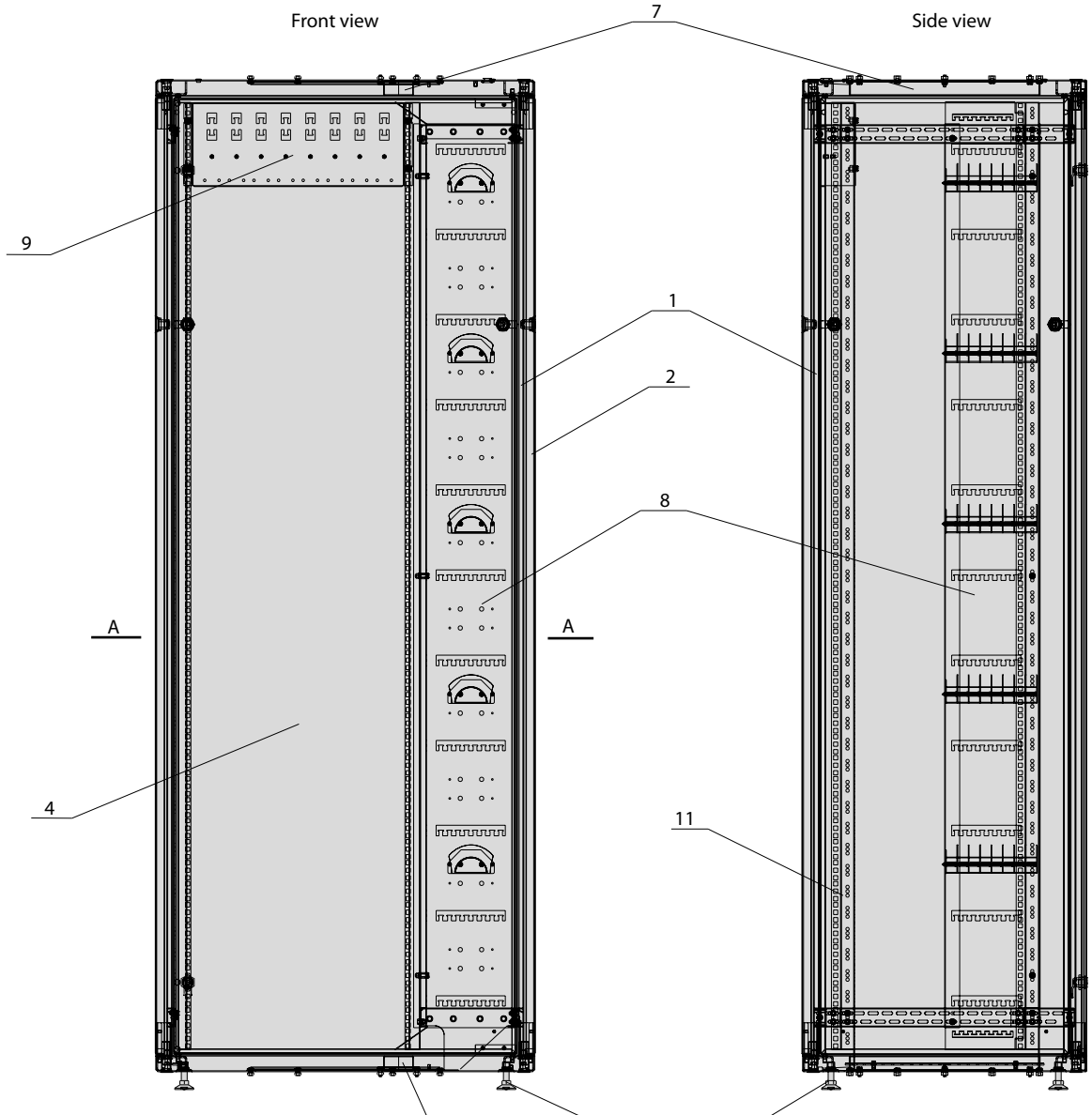
Supply includes:
- frame of the cabinet,
- front door with glas window,
- removable panels (side and rear),
- separated compartment for cross cables 200 mm width
- 4 supporting bars in 19" standard,
- foam sealing in top and bottom plate of the frame,
- tube distributor RTR-8
- earthing strip and cables.

Cabinet OptiTel SPS II 19/45/800 with supplementary accessories
- cat. no. WNK-405-123

OptiTel SPS II 19/45/800 cabinet
- view of bottom cover

OptiTel SPS II 19/45/800 cabinet
- view of top cover

OptiTel SPS II 19/45U/800 CABINET FOR FIBRE OPTIC PATCH PANELS



CONSTRUCTION

1. Cabinet's frame
2. Side panel
3. Rear panel
4. Glass door
5. Adjustable feet
6. Brush sealing
7. Foam sealing
8. Module of reserve
9. Tube distributor RTR-8
10. Earthing strip
11. Mounting profile

ADDITIONAL ACCESSORIES FOR OptiTel SPS

OptiTel MZ - module of reserve

- Intended for storing reserve tubes of fibre optic cable.
- Standard version includes two cross frameworks; possibility to enlarge the set by four additional cross frameworks.
- Fitted to holes in side walls of supporting bars; the supply includes assembly elements.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-878-015	465	215	189	2.05

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Module of reserve
- depth 189 mm (for SPS 19/45U/800 and 1000) - cat. no. WNK-878-015

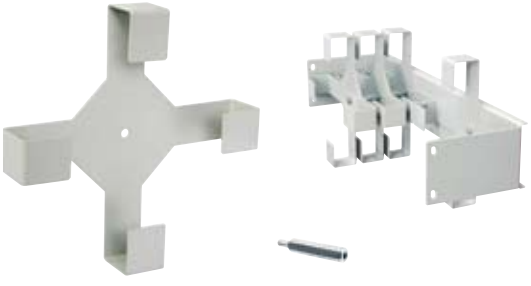
OptiTel KZK - cross framework for module of reserve

- Cross framework comprise additional equipment for module of reserve.
- Delivered with spacer for fitting on module of reserve.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-878-002	215	215	40	0.35

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour



Additional cross framework for module of reserve
- cat. no. WNK-878-002

Module of distributors OptiTel RTR-8

- Intended for mounting and fiting of fibre tubes entering into the case.
- Delivered with set of assembly hardware.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-878-025	465	170	70	2.41

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Capacity: 8 cables

Module of distributors RTR-8
- depth 70 mm (for SPSII 19/ 45U/ 800) - cat. no. WNK-878-025

ADDITIONAL ACCESSORIES FOR OptiTel SPS

OptiTel SZP - drawers of cable reserve

- Intended for managing indoor cable reserve (patch cords and pigtails).
- Available in front and rear cable entry versions.
- Delivered with set of assembly hardware.

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-874-421	483 (19")	44 (1U)	200	1.63
WNK-874-431			280	2.74

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Drawer of reserve OptiTel SZP with front and rear cable entry
- 19" x 1 U x 200 mm - cat. no. WNK-874-421
- 19" x 1 U x 280 mm - cat. no. WNK-874-431

Drawer of reserve with front and rear cable entry

OptiTel PSP 19/1U/12 FIBRE OPTIC PATCH PANEL

- Intended for 19" and 21" cabinets and racks.
- Number of adapter ports: 12
- Depth:
  - 200 mm - versions with half extending drawer
  - 280 mm - version with fully extending drawer
- Available front panels for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of many cables terminating.
- Space inside allows for that the minimum bend radius is exceeded.
- Ergonomic storage for pigtails.
- Tube guiding units ensure the minimum bend radius exceeding
- Drawer makes installation easy and comfortable.
- Flowing regulation of depth of panel installation in cabinet
- Delivered with set of assembly hardware.
- Brackets for 21" standard, should be ordered separately.

Catalogue number	Dimensions [mm]			Type of adapters	Weight [kg]
	Width	Height	Depth		
WNK-875-103	483 (19")	44 (1U)	200	SC/E2000	3.8
WNK-875-403			280	SC/E2000	4.2

Optitel PSP G280 19/1 U/12 with fully extending drawer

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSP 19/1U/24 FIBRE OPTIC PATCH PANEL

- Intended for 19" and 21" cabinets and racks.
- Number of adapter ports: 24
- Depth:
  - 200 mm - versions with half extending drawer
  - 280 mm - version with fully extending drawer
- Available front panels for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of many cables terminating.
- Space inside allows for that the minimum bend radius is exceeded.
- Ergonomic storage for pigtails.
- Tube guiding units ensure the minimum bend radius exceeding
- Sliding drawer makes installation easy and comfortable.
- Flowing regulation of depth of panel installation in cabinet
- Delivered with set of assembly hardware.
- Brackets for 21" standard, should be ordered separately.

Optitel PSP G280 19/1 U/24 with fully extending drawer

Catalogue number	Dimensions [mm]			Type of adapters	Weight [kg]
	Width	Height	Depth		
WNK-875-102	483 (19")	44 (1U)	200	SC/E2000	3.8
WNK-875-402			280	SC/E2000	4.2
WNK-875-404				ST	
WNK-875-406				FC	

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSP 19/2U/48 FIBRE OPTIC PATCH PANEL

- Intended for 19" and 21" cabinets and racks.
- Number of adapter ports: 48
- Depth:
  - 200 mm - versions with half extending drawer
  - 280 mm - version with fully extending drawer
- Available front panels for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of many cables terminating.
- Space inside allows for that the minimum bend radius is exceeded.
- Ergonomic storage for pigtails.
- Tube guiding units ensure the minimum bend radius exceeding
- Drawer makes installation easy and comfortable.
- Flowing regulation of depth of panel installation in cabinet
- Delivered with set of assembly hardware.
- Brackets for 21" standard, should be ordered separately.

OptiTel PSP G200 19/2 U/48 x SC/E2000

Catalogue number	Dimensions [mm]			Type of adapters	Weight [kg]
	Width	Height	Depth		
WNK-875-211	483 (19")	88 (2U)	200	SC/E2000	5.5
WNK-875-221			280	SC/E2000	6.0

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSN WALL-MOUNTED FIBRE OPTIC DISTRIBUTION BOX

- Mounted directly on the room's wall, where the line cable is terminated.
- Number of adapter ports: 24 or 48
- Available panel for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of many cables terminating.
- Equipped with 2 or 4 splice cassettes.
- Top and bottom cable entry.
- The rest of fibre loose tube storage in housing.
- Tube guiding units ensure that the minimum bend radius of pigtails is not exceeded.
- The case can be locked using lock, possibility of opening of the door upward and downward.
- It is possible to dismantle the housing for better access to splice cassettes.
- The distributor is equipped with delimitation lever so that the opened door can be used as montage table (when open downwards).

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSN 4/48 equipped with pigtails and E2000 and SC adapters (ordered separately)

Reference chart of OptiTel PSN distribution box

Type of distribution box OptiTel PSN									
Catalogue number	Dimensions [mm]			Type					Weight [kg]
	Width	Height	Depth	Type of adapters	Number of adapter ports	Max. number of cables	Number of splice cassettes	Pigtails' length [m]	
WNK-876-102	480	400	100	SC/E2000	24	4	2	2.5	7
WNK-876-101				SC/E2000	48		2		

OptiTel SZK, STZK CABLE RESERVE BOXES AND FRAMES

- Makes possible organization of cable reserve.
- Ensure optimal bend radius.
- Intended for telecommunication networks.

Max. storage of cable .....50 - 100 m

Material .....sheet steel 1.5 mm

Surface finish.....powder painting in RAL 7035 colour

Reference chart for OptiTel SZK, STZK cable reserve boxes and frames

Catalogue number	Type	Description	Dimensions [mm]	Weight [kg]
WNK-879-004	OptiTel SZK-1/4	box with four arms frame (wall mounted) with lockable cover	600 x 600 x 178	15.5
WNK-879-001	OptiTel STZK-2/4	four arms frame (wall mounted)	565 x 565 x 126	2.0

1) Box with four arms frame (wall mounted) with lockable cover
OptiTel SZK-1/4 - cat. no. WNK-879-004
2) Four arms frame (wall mounted)
OptiTel STZK-2/4 - cat. no. WNK-879-001

OptiTel PSS 9/96 AND PSS 12/144 FIBRE OPTIC DISTRIBUTION CABINETS

- Mounted on the rooms, where the line cable is terminated.
- Number of adapter ports: 96 or 144
- Available panels for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of cables terminating.
- Equipped with 4 splices cassettes.
- Top and bottom cable entry.
- Ergonomic storage for fibers.
- Tube guiding units ensure that the minimum bend radius is not exceeded.
- Possibility of increasing of height of the cabinet using special lengthening cover. The height of the cabinet with cover is 2600 mm.

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSS 6/96/SC/E2000 fibre optic distribution cabinet
- cat. no. WNK-405-135

Reference chart of OptiTel PSS distribution cabinet

Type of distribution cabinet OptiTel PSS									
Catalogue number	Dimensions [mm]			Type					Weight [kg]
	Width	Height	Depth	Type of adapters	Number of adapter ports	Max. number of cables	Number of splice cassettes	Pigtails' length [m]	
WNK-405-131	240	2200	240	SC/E2000	96	6	4	6	35
WNK-405-135					144	6	6		37

ADDITIONAL EQUIPMENT FOR OptiTel PSS 6/96

Lengthening cover 400 mm

- Increases height of the rack for 400 mm.
- Delivered with set of assembly hardware.

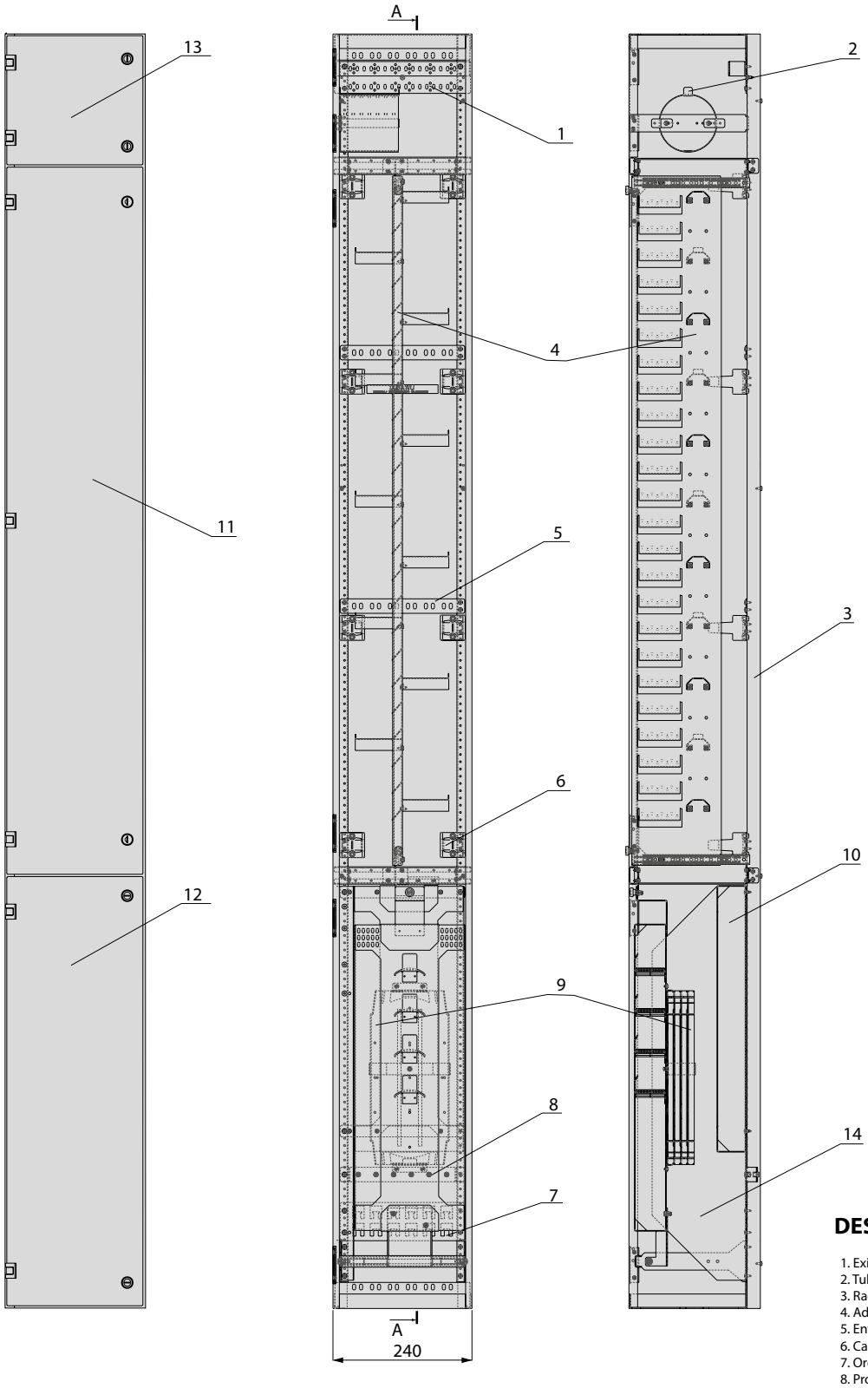
Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-878-101	240	400	240	2.75

Material: sheet steel 1.0 mm

Surface finish: powder painting in RAL 7035 colour

Lengthening cover
- cat. no. WNK-878-101

OptiTel PSS 6/96 AND PSS 6/144



DESIGN

1. Exit strip
2. Tube bracket
3. Rack's body
4. Adapter's plate
5. Entering cable organizer
6. Cable bracket
7. Organizer lath
8. Protecting lath
9. Splices cassette
10. Entering cable reserve cassette
11. Door of termination compartment
12. Door of reserve compartment
13. Door of entry compartment
14. Pigtail's cover

OptiTel PSS 12/192 AND PSS 12/288 FIBRE OPTIC DISTRIBUTION CABINETS

- Mounted on the rooms, where the line cable is terminated.
- Number of adapter ports: 192 or 288
- Available panels for all types of adapters (E2000, SC or another, according to customer's request).
- Possibility of cables terminating.
- Equipped with 8 splices cassettes.
- Top and bottom cable entry.
- Ergonomic storage for fibers.
- Tube guiding units ensure that the minimum bend radius is not exceeded.
- Possibility of increasing of height of the cabinet using special lengthending cover. The height of the cabinet with cover is 2600 mm.

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiTel PSS 12/192/SC/E2000 fibre optic distribution cabinet
- cat. no. WNK-405-136

Reference chart of PSS distribution cabinet

Type of distribution cabinet OptiTel PSS									
Catalogue number	Dimensions [mm]			Type					Weight [kg]
	Width	Height	Depth	Type of adapters	Number of adapter ports	Max. number of cables	Number of splice cassettes	Pigtails' length [m]	
WNK-405-133	480	2200	240	SC/E2000	192	12	8	6	65
WNK-405-136					288	12	12		70

ADDITIONAL EQUIPMENT FOR OptiTel PSS 12/192

Lengthening cover 400 mm

- Increases height of the rack for 400 mm.
- Delivered with set of assembly hardware.

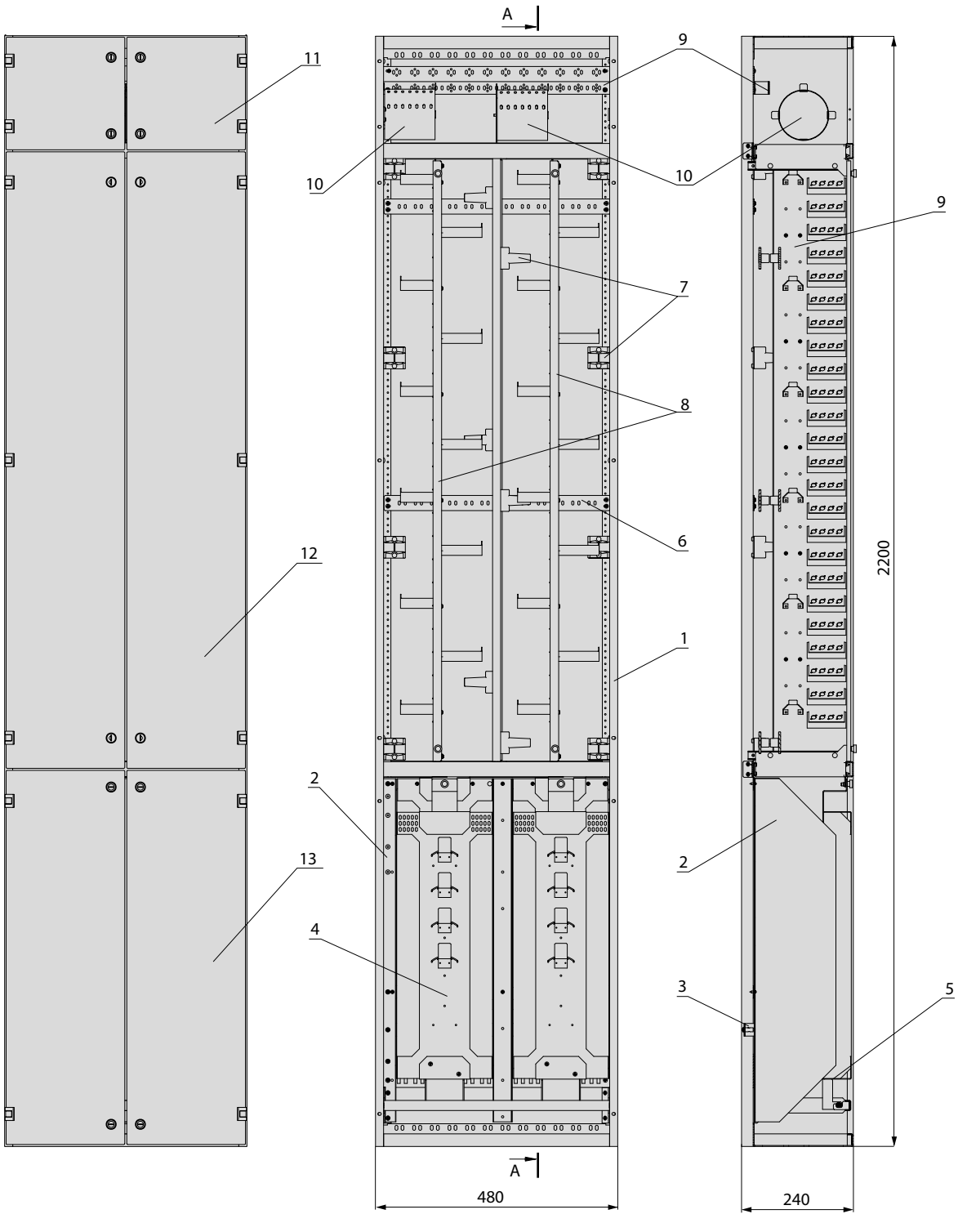
Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-878-102	480	400	240	3.65

Material: sheet steel 1.0 mm

Surface finish: powder painting in RAL 7035 colour

Lengthending cover
- cat. no. WNK-878-102

OptiTel PSS 12/192 AND PSS 12/288



DESIGN

1. Rack's body
2. Pigtail's cover
3. Protecting lath
4. Patch cord reserve module
5. Splice cassette frame
6. Entering cable organizer
7. Cable organizer
8. Adapter's plate
9. Exit lath
10. Patch cords hanger
11. Door of entry compartment
12. Door of termination compartment
13. Door of reserve compartment

MODULAR FIBRE OPTIC DISTRIBUTION PANELS

Splice module MP-19/3U

- Frame of the module is prepared for rear mounting. The brackets can be mounted in the rear, making possible mounting in any 19" constructions (with front mounting).
- Sides of frame are equipped with openings, which make possible safe organization of cables.
- Drawer is equipped with removable front plate, with lock, rear bracket, and bending basis for splice cassettes. There is possibility of storage of appropriate amount of tube reserve.
- Used system of cassettes allows elastic connection of oneline and one-part organization in configurations: cable-cable, or cable-pigtail. Cassettes are adapted for passive elements mounting in standard cases.
- Expendability to four sets of fibre splices (6 cassets SK-123 with holder).

Splice module MP-19/3U without cassettes packet 6+1
- cat. no. WNK-878-310

Catalogue number	Type	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
WNK-878-310	MP-19/3U	482	132	280	4.2

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Supply includes:
- 19" x 3 U frame,
- drawer,
- bending basis,
- 1 packet of cassettes 6+1.

Splice module MP-19/3U, with accessories (ordered separately)

Module capacity:

Cable-cable	Management	Cassettes	Fibres
Capacity of splices	one-part	24	188

Cable-pigtail	Management	Cassettes	Fibres
Capacity of splices	one-part	24	144

Supplementary splice cassettes packet -- 6 cassettes SK123 with holder
- cat. no. WNK-878-004

MODULAR FIBRE OPTIC DISTRIBUTION PANELS

Termination module MK-19/3U/72

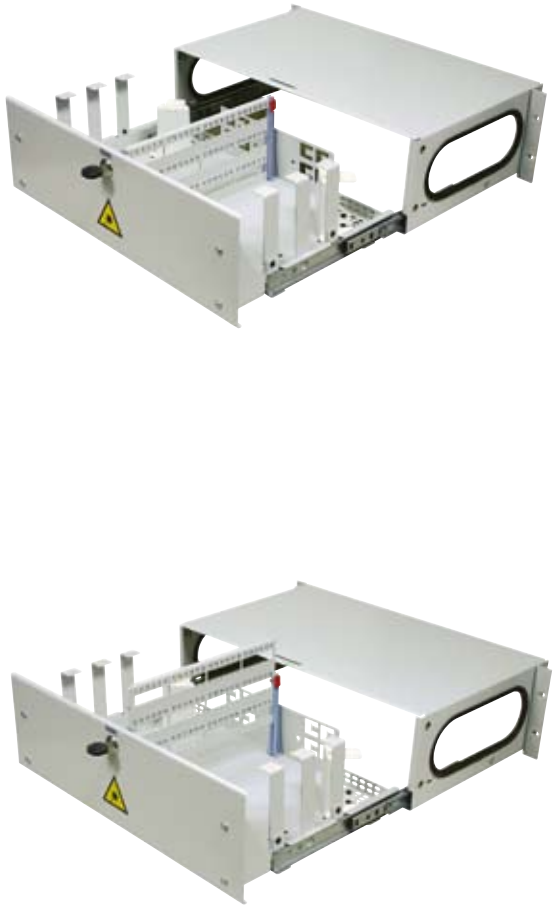
- Frame of the module is prepared for rear mounting. The brackets can be mounted in the rear of the frame, making possible mounting in any 19" constructions (with front mounting).
- Sides of frame are equipped with openings, which make possible safe organization of cables.
- Drawer is equipped with removable front plate, with lock, rear bracket, and pull-out adapter panel for 72 adapters SC or E2000.

Catalogue number	Type	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
WNK-878-330	MK-19/3U/72	483	132	280	4.1

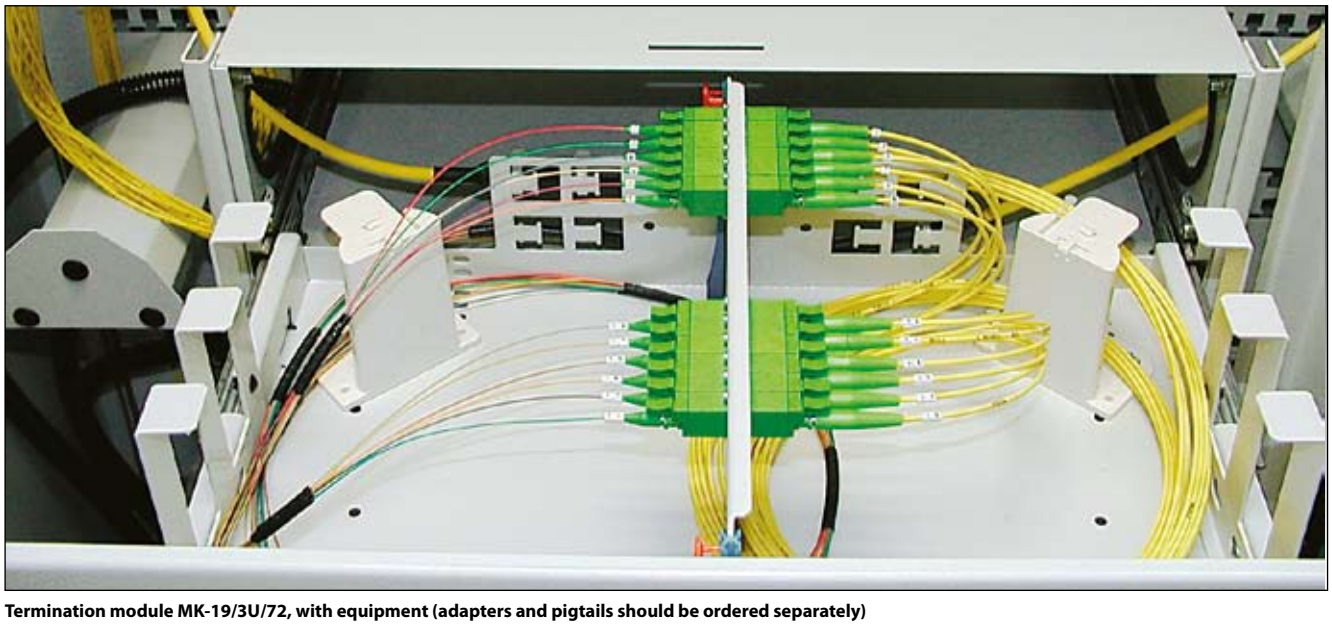
Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

Supply includes:
- 19" x 3 U frame,
- drawer,
- pull-out adapter panel 72 x SC/E2000.



Termination module MK-19/3U/72
- cat. no. WNK-878-330



Termination module MK-19/3U/72, with equipment (adapters and pigtails should be ordered separately)

MODULAR FIBRE OPTIC DISTRIBUTION PANELS

Splice and termination module MPK-19/3U/24

- Frame of the module is prepared for rear mounting. The brackets can be mounted in the rear of the frame, making possible mounting in any 19" constructions (with front mounting).
- Sides of frame are equipped with openings, which make possible safe organization of cables.
- Drawer is equipped with removable front plate, with lock, rear bracket, bending basis for splice cassettes and pull-out adapter panel for 24 adapters SC or E2000.
- There is possibility of storage of appropriate length of tube reserve. Used cassettes system enables termination of 24 fibres. Cassettes are designed for mounting of passive parts in standard cases.

Catalogue number	Type	Dimensions [mm]			Weight [kg]
		Width	Height	Depth	
WNK-878-320	MPK-19/3U/24	483	132	280	4.2

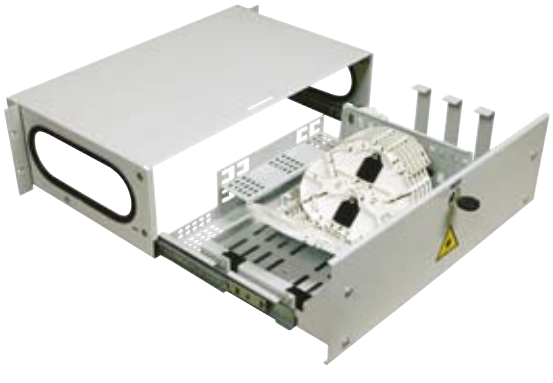
Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

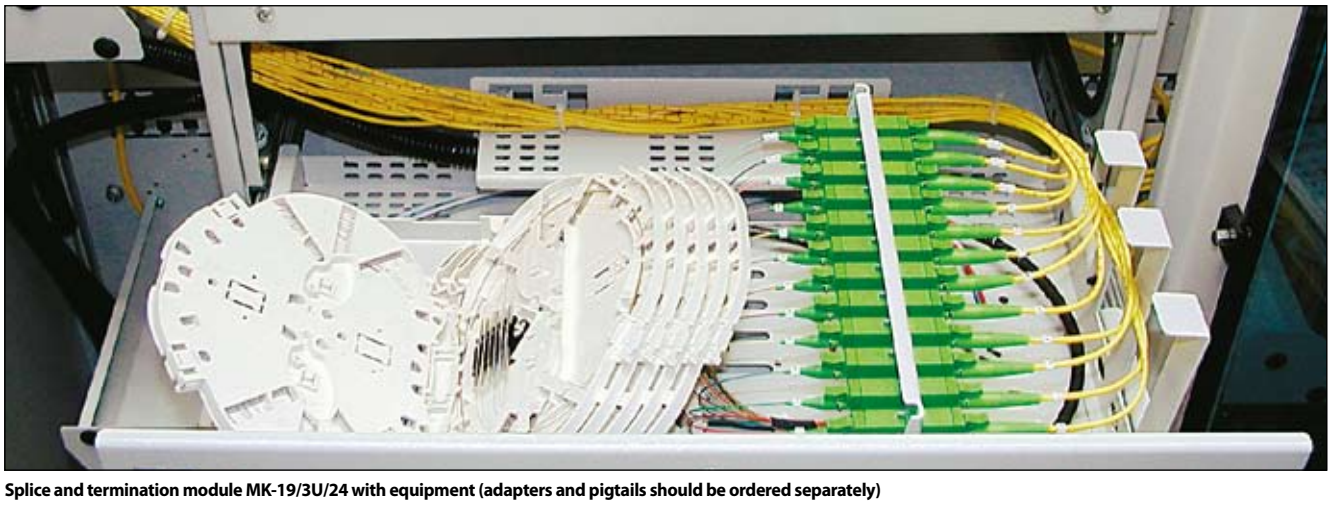
Supply includes:
- 19" x 3U frame,
- drawer,
- bending basis,
- pull-out adapter panel 24 x SC/E2000,
- 1 packet of splice cassettes 6+1.

Module capacity:

Cable-pigtail	Cassettes	Fibres
Splices capacity	12	24



Splice and termination module MK-19/3U/24
- cat. no. WNK-878-320



Splice and termination module MK-19/3U/24 with equipment (adapters and pigtails should be ordered separately)

OptiLAN PSP - FIBRE OPTIC PATCH PANELS

OptiLAN PSP 19/1U/24

- Intended for mounting in 19" cabinets and racks.
- Number of adapter ports: 24
- Available front panels for all types of adapters (E2000, SC, FC, ST, or another according to customer's request).
- Possibility of fev cables terminating.
- The rest of fibre loose tube storage in housing.
- Tube guiding units ensure that the minimum bend radius is not exceeded.
- Dismountable front cover.
- Delivery with set of assembly hardware.

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiLAN PSP 19/1U/24 fibre optic patch panel

Reference chart of OptiLAN PSP

OptiLAN PSP fibre optic patch panel									
Catalogue number	Dimensions [mm]			Type					Weight [kg]
	Width	Height	Depth	Type of adapters	Number of adapter ports	Max. number of cables	Number of splice cassettes	Pigtails' length [m]	
WNK-877-401	483 (19")	44 (1U)	280	SC/E2000	24	2	2	2.5	3.5
WNK-877-402				ST					

OptiLAN PSP II 19/1U/24

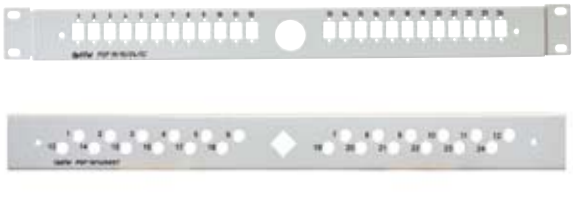
- Intended for mounting in 19" cabinets and racks.
- Number of adapter ports: 24
- Available front panel for all types of adapters (E2000, SC, FC, ST, or another according to customer's request).
- Possibility of fev cables terminating.
- The rest of fibre loose tube storage in housing.
- Tube guiding units ensure that the minimum bend radius is not exceeded.
- Delivery with set of assembly hardware.
- Front panels and splice casettes should be ordered separately.

Catalogue number	Dimensions [mm]			Type and number of adapters	Weight [kg]
	Width	Height	Depth		
WNK-877-403	483 (19")	44 (1U)	280	–	1.8
WNK-878-405	483 (19")	44 (1U)	10	SC/E2000 x 24	0.2
WNK-878-406	483 (19")	44 (1U)	10	ST x 24	0.2

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiLAN PSP II 19/1U/24 fibre optic patch panel
- cat. no. WNK-877-403



Front panels for OptiLAN PSP II 19/1U/24
- SC/E2000x24 - cat. no. T-SO-878-405
- STx24 - cat. no. T-SO-878-406

SUPPLEMENTARY ACCESSORIES FOR OptiLAN

Splice cassette

- Intended for mounting in OptiLAN, PSP, PSP II, PSN, apllyed as well in OptiTel PSP, OpiTel PSN.
- Ergonomic design

Catalogue number	Dimensions [mm]			Weight [kg]
	Width	Height	Depth	
WNK-877-050	150	7	103	0.10
WNK-877-055	150	7	103	0.10
WNK-877-052	150	2	103	0.03

Splice cassette for 12 splices with 4 holders for cascade mounting of cassettes
- cat. no. WNK-877-050

Cover for splice cassette
- cat. no. WNK-877-052

Cassette for 12 splices with holders for cascade mounting of cassettes
- cat. no. WNK-877-055

OptiLAN PSN 2/24 - WALL-MOUNTED FIBRE OPTIC DISTRIBUTION BOXES

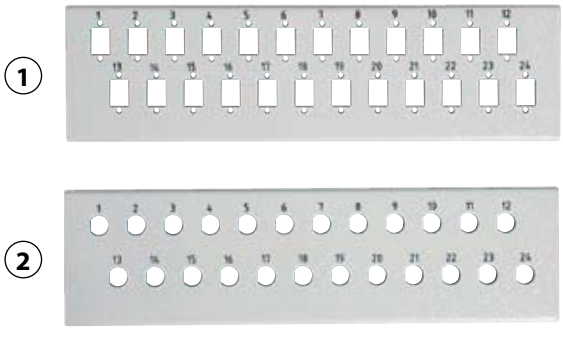
- Mounted directly on the room's wall where the line cable is terminated.
- Number of adapter ports: 24
- Available adapter panels for all types of adapters (E2000, SC, ST, or another according to customer's request).
- Possibility of fev cables terminating.
- Maximum number of splice cassettes: 2
- Possibility to enter the cable from top or bottom.
- Space inside of the distribution box allows for accommodating loose tube of fiber optic cable.
- Locked front door.

Material: sheet steel 1.5 mm

Surface finish: powder painting in RAL 7035 colour

OptiLAN PSN 4/24 wall-mounted fibre optic distribution box
- cat. no. WNK-877-303

OptiLAN PSN 4/24 distribution box - equipped with adapters and pigtails (ordered separately)



Adapter plates for OptiLAN PSN 4/24:
1) 24 x SC or E2000, 2) 24 x ST

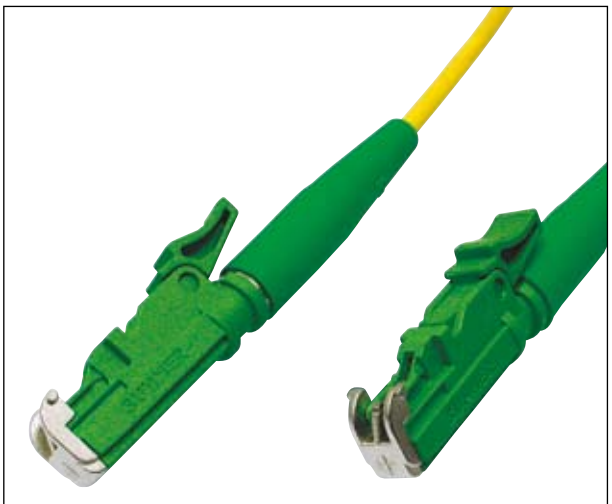
Reference chart of optiLAN PSN boxes

OptiLAN PSN distribution box									
Catalogue number	Dimensions [mm]			Type					We-ight [kg]
	Width	Height	Depth	Type of adapters	Number of adapter ports	Max. number of cables	Number of splice cassettes	Pigtails' length [m]	
WNK-877-301	344	285	80	SC/E2000	24	2	2	2.5	3.2
WNK-877-302				ST					

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

E2000 standard

- Connector with push - pull mechanism.
- Available in Premium version with typical insertion loss 0.09 dB.
- Standard connector in the transmission networks of the largest telecommunication operators.
- According to norm IEC 61 754-15, CECC 86275-801/802.



E2000 patch cords

Connectors

- Remarkable eccentricity of the hole thanks to the precision by production of the ferrule. Hole diameter tolerance from 0 to +1 µm (Premium version from 0 to +0,5 µm).
- Zirconium ferrule ensures very good resistance at the changing temperatures (operating temperature range from -40 °C to +85 °C).
- Assembly of the ferrule with an adhesive protects the fibres against impact strength.
- Machine polishing procedure ensures high quality of end face geometry and high repeatable performance.
- Each connector is adjustable, what ensures outstanding transmission parameter.
- End face geometry is controlled with an interferometer.

Adapters

- Manufactured from high quality plastic.
- The sleeve, manufactured from zirconium dioxide, ensures high precision of the connection and repeatable performance.

Connection type

The push - pull mechanism features:

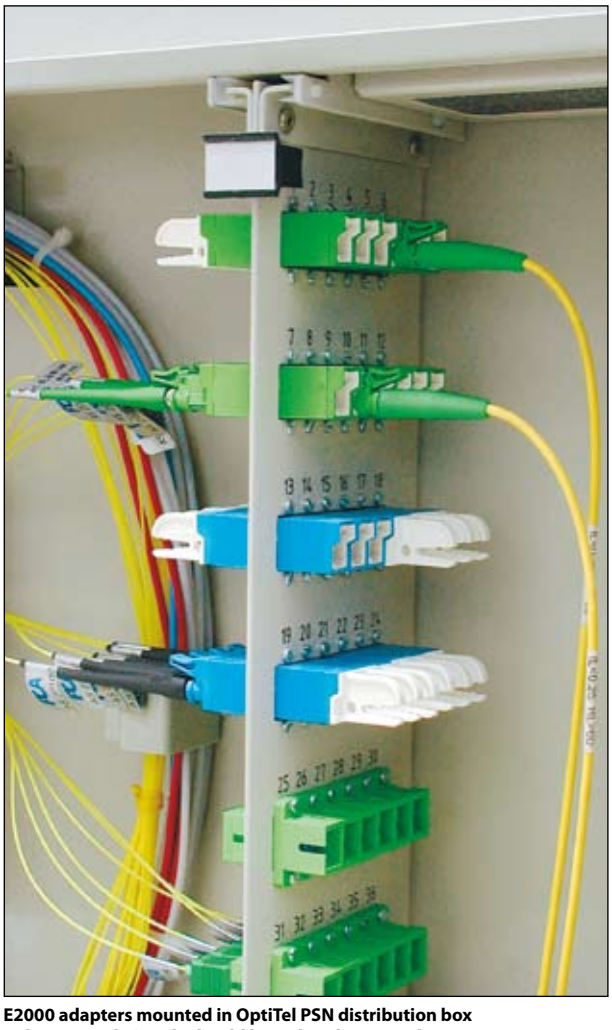
- Protection cap prevents soiling and scratching of the ferrule end face.
- An integrated protective cap provides eye protection from laser radiation.
- A cap protects the ferrule against damages by mating cycles.
- The push - pull mechanism protects the connector against rotation.

Connector type

- Single mode and multimode connectors.
- Following cables can be equipped with this connector type: 900 um tube or PVC cables with the following diameters: 1.7; 2.0; 2.4 and 2.8 mm.
- Possible polishing procedures: SuperPC, UltraPC and Angle PC.

Application

- Telecommunication, external and access networks.
- WDM networks.
- LAN/WAN networks.
- CATV networks.



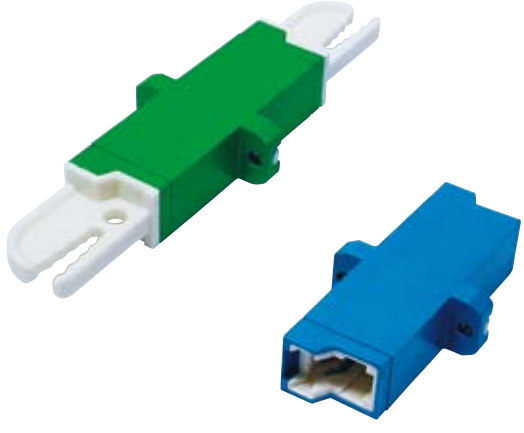
E2000 adapters mounted in OptiTel PSN distribution box (adapters and pigtails should be ordered separately)

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

E2000 standard

Connecting parameters according to BELLCORE and SEIKO measuring norms

Type	E2000/PC	E2000/APC	E2000/APC Premium
Type of fibre	single mode		
Ferula type	ceramic		
	Ø125 µm (0 to +1 µm)		Ø125 µm (0 to +0.5 µm)
Adjustable	yes		
Min. mating cycles	over 1000 cycles		
Operating temperature	-40 to +85 °C		



Adaptery E2000

Ferrule end face geometry

Polishing procedures	Radius	Fibre height	Fibre roughness
PC	10 - 25 mm	± 50 nm	< 5 µm
APC	8 - 15 mm		

Transmission Parameters

Type	E2000/PC		E2000/APC		E2000/APC Premium	
	typical	max.	typical	max.	typical	max.
Insertion loss IL	0.12 dB	0.35 dB	0.12 dB	0.35 dB	0.09 dB	0.15 dB
Return loss ORL	> 50 db	> 52 db	> 65 db	> 80 db	> 75 db	> 80 db

Catalogue numbers of pigtails and patch cords

	Type of the patch cord / pigtail		Type of connector on first end		Type of connector on second end		Type of cable		Length in meters
T-SO-		/		/		/		/	
	D - duplex		**000** - pigtail		**E2A** - E2000/APC		**JT** - buffer SM		**XXX** - length in meters
	S - simplex		**E2A** - E2000/APC		**E2P** - E2000/AC		**JK** - cable SM		
			E2P - E2000/PC		**SCA** - SC/APC		**5T** - buffer MM 50/125		
			SCA - SC/APC		**SCP** - SC/PC		**6T** - buffer MM 62.5/125		
			SCP - SC/PC		**STP** - ST/PC		**5K** - cable MM 50/125		
			STP - ST/PC		**LCP** - LC/PC		**6K** - cable MM 62.5/125		
			LCP - LC/PC		**MTRJ** - MTRJ				
			MTRJ - MTRJ		**FCP** - FC/PC				
			FCP - FC/PC						

Write appropriate position number to gray cell. Bellow you can see examples of:

- Duplex multimode **patchcord** type ST/PC-LC/PC on cable 62.5/125.2 m length – **T-SO-D/STP/SCP/6K/2**
- Simplex multimode **pigtail** type ST/PC on tube 50/125 1.5 m length – **T-SO-S/000/STP/5T/1.5**

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

ST standard

- Parts manufactured of high quality materials (metals and zirconium ceramics).
- Long term mechanical endurance.
- Stability of the transmission parameters.

ST patch cords

Connectors

- Zirconium ferrule.
- Low insertion loss.
- Hole diameter tolerance from 0 to + 1 µm.
- Short boot ensures minimal bending radius.
- Machine polishing procedure ensures high quality of end facegeometry and high repeatable performance.

Adapters

- Slotted zirconium ceramic sleeve ensures precise connection.
- High durability.
- Guarantee of the repeatable performance.

Connection type

- Twist-lock bayonet coupling with anti-rotation key.

Application

- Telecommunication.
- LAN/WAN networks.

Available versions

- Single mode and multimode connectors.
- Following cables can be equipped with this connector type: 900 um tube or PVC cables with the following diameters: 1.7; 2.0; 2.4 and 2.8 mm.

Connecting parameters according to BELLCORE and SEIKO measuring norms

Type	ST/PC	
Type of fibre	multimode	single mode
Ferula type	ceramic	
	Ø126 µm (0 to +1 µm)	Ø125 µm (0 to +1 µm)
Adjustable	none	
Min. mating cycles	over 1000 cycles	
Operating temperature	-40 to +85 °C	

Transmission parameters

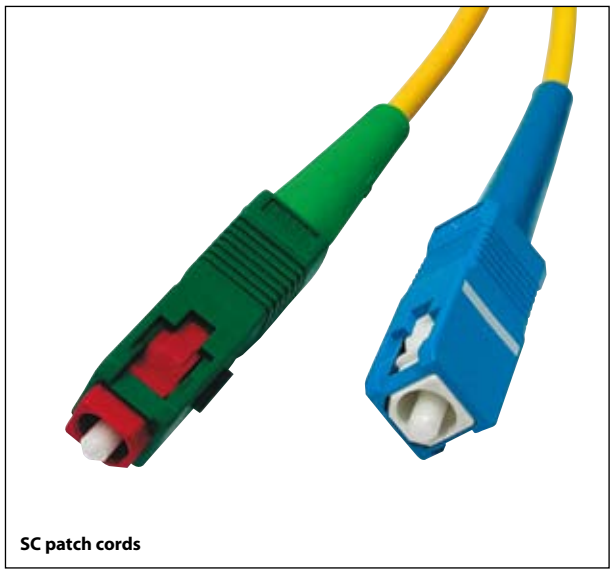
Type	ST/PC multimode		ST/PC single mode	
	typical	max.	typical	max.
Insertion loss	0,2 dB	0,4 dB	0,2 dB	0,35 dB
Return loss	-	-	> 45 dB	> 50 dB

ST adapters

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

SC standard

- Connector with push - pull mechanism.
- Available in the miniature version.
- Available in duplex version.
- For applications in the telecommunication networks.
- Standard connector in the transmission networks of the largest telecommunication operators.
- According to norm JIS C5973, NNT, IEC, TIA, Bellcore.



SC patch cords

Connectors

- Remarkable eccentricity of the hole thanks to the precision by production of the ferrule. Hole diameter tolerance from 0 to + 1 µm.
- Zirconium ferrule ensures very good resistance at the changing temperatures (operating temperature range from -40 °C to +85 °C).
- Assembly of the ferrule by using adhesive protects the fibres against impact strength.
- Machine polishing procedure ensures high quality of end face geometry and high repeatable performance.
- Each connector is adjustable; that ensures outstanding transmission parameter.
- End face geometry is controlled with an interferometer.

Adaptors

- Adapters have a zirconium sleeve for single-mode applications.
- Adapters have a zirconium sleeve for multi-mode applications.
- Adapter's sleeve is manufactured from zirconium dioxide, enabling high precision of the connection and high repeatable performance.

Connection type

- The Push - Pull mechanism protects the ferrule before twisting, which guarantees a full protection of the ferrule and connection stability.

Connector type

- Single mode and multimode connectors.
- Following cables can be equipped with this connector type: 900 um tube or PVC cables with the following diameters: 1.7; 2.0; 2.4 and 2.8 mm.
- Possible polishing procedures: SuperPC, UltraPC and AnglePC.

Application

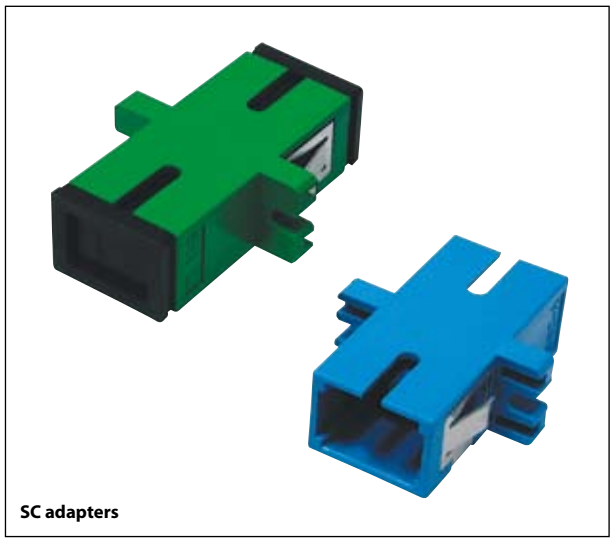
- Telecommunication, external and access networks.
- WDM networks.
- LAN/WAN networks.
- CATV networks.

Connecting parameters according to BELLCORE and SEIKO measuring norms

Type	SC/PC		SCAPC	SC/APC Premium
Type of fibre	multimode	single mode		
Ferula type	ceramic			
	Ø126 µm (0 to +1 µm)	Ø125 µm (0 to +1 µm)		Ø125 µm (0 to +0.5 µm)
Adjustable	yes			
Min. mating cycles	over 1000 cycles			
Operating temperature	-40 to +85 °C			

Ferrule end face geometry

Polishing procedures	Radius	Fibre height	Fibre roughness
PC	10 - 25 mm	± 50 nm	< 5 µm
APC	8 - 15 mm		



SC adapters

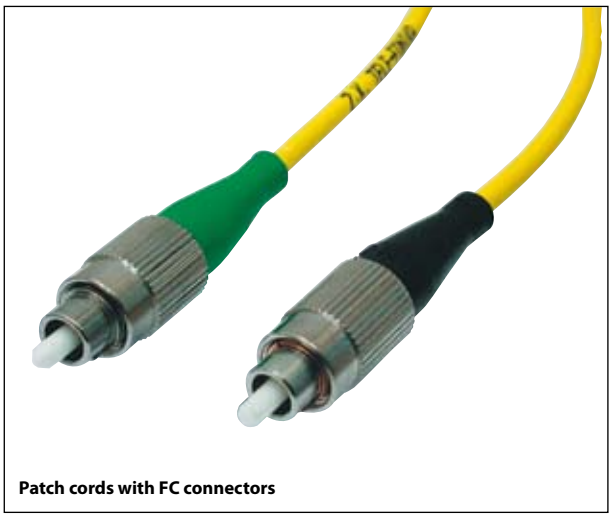
Transmission parameters

Type	SC/PC multimode		SC/PC		SC/APC		SC/APC Premium	
	typical	max.	typical	max.	typical	max.	typowa	maksymalna
Insertion loss IL	0.2 dB	0.35 dB	0.12 dB	0.35 dB	0.12 dB	0.35 dB	0.09 dB	0.15 dB
Return loss ORL	-	-	> 50 db	> 52 db	> 65 db	> 80 db	> 75 db	> 80 db

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

FC standard

- For applications in the largest telecommunication networks.
- Standard connector in the transmission networks of the largest telecommunication operators.
- According to norm JIS C5970, NNT, IEC, TIA, Bellcore.



Patch cords with FC connectors

Connectors

- Remarkable eccentricity of the hole thanks to the hole diameter tolerance from 0 to + 1 µm.
- Zirconium ferrule ensures very good resistance at the changing temperatures (operating temperature range from -40 °C to +85 °C).
- Assembly of the ferrule with an adhesive protects the fibres against impact strength.
- Machine polishing procedure ensures high quality of end face geometry and high repeatable performance.
- Each connector is adjustable, what ensures outstanding transmission parameter.
- End face geometry is controlled with an interferometer.

Adapters

- Sleeve of the adapter is manufactured from zirconium dioxide, enabling high precision of the connection.
- High durability.
- Available in SQF and D-shape version.

Connection type

- With anti-rotation key as protection of the ferrule end face against scratching or rotation by mating cycles.

Connector type

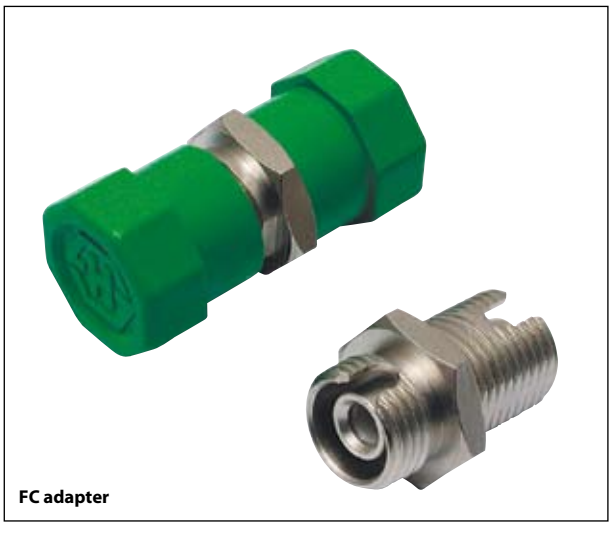
- Single mode and multimode connectors.
- Following cables can be equipped with this connector type: 900 um tube or PVC cables with the following diameters: 1.7; 2.0; 2.4 and 2.8 mm.
- Possible polishing procedures: SuperPC, UltraPC and AnglePC.

Application

- Telecommunication, external and access networks.
- WDM networks.
- LAN/WAN networks.
- CATV networks.

Connecting parameters according to BELLCORE and SEIKO measuring norms

Type	FC/PC	FC/APC
Type of fibre	multimode	single mode
Ferula type	ceramic	
	Ø126 µm (0 to +1 µm)	Ø125 µm (0 to +0.5 µm)
Adjustable	yes	
Min. mating cycles	over 1000 cycles	
Operating temperature	-40 to +85 °C	



FC adapter

Ferrule end face geometry

Polishing procedures	Radius	Fibre height	Fibre roughness
PC	10 - 25 mm	± 50 nm	< 5 µm
APC	8 - 15 mm		

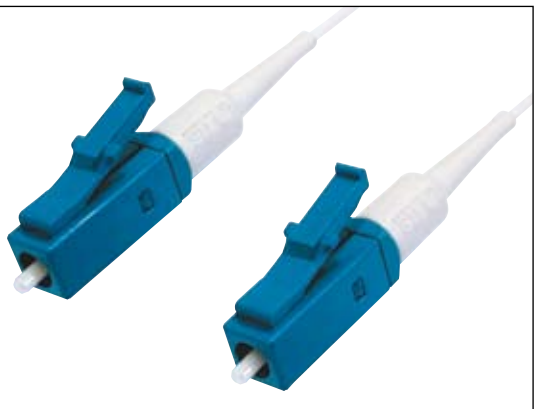
Transmission parameters

Type	FC/PC multimode		FC/PC single mode		FC/APC single mode	
	typical	max.	typical	max.	typical	max.
Insertion loss IL	0.12 dB	< 0.35 dB	0.12 dB	< 0.35 dB	> 65 dB	0.35 dB
Return loss ORL	-	-	> 50 db	> 52 db	> 0.12 db	> 80 db

FIBRE OPTIC PIGTAILS, PATCH CORDS AND ADAPTERS

LC standard

- Miniature connector with push-pull mechanism.
- Zirconia miniature ferrule 1.25 mm.
- PC polishing procedures.
- Standard connector type meets the demands of units, used in the telecommunication networks.
- Standard connector in the transmission networks and active components of the largest telecommunication operators.
- According to norm EIA/TIA 568A, FOCIS 10, IEC 11801, Bellcore.



Pigtails with LC connectors

Connector

- Twice smaller than SC or E2000 standard connector.
- Zirconia ferrule ensures very good resistance at the changing temperatures (operating temperature range from -40 °C to +85 °C).
- Machine polishing procedure ensures high quality of end face geometry and high repeatable performance.
- End face geometry is controlled with an interferometer.

Adapter

- Twice smaller than SC or E2000 standard adaptor.
- High packing density.

Connection type

- The Push - Pull coupling mechanism guarantees high protection and stability of the connection.

Connector type

- Single mode and multimode connectors.
- Simplex and duplex connectors.
- Following cables can be equipped with this connector type: 900 um tube or PVC cables with the following diameters: 1.6 and 2.0 mm.

Application

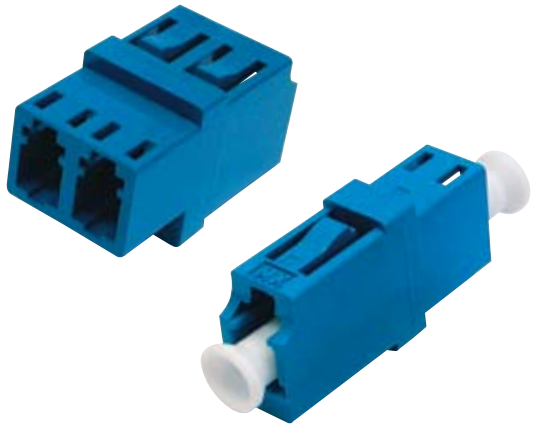
- Telecommunication, external and access networks.
- WDM networks.
- LAN/WAN networks, Fibre to the Desk - solution.
- CATV networks.

Connecting parameters according to BELLCORE and SEIKO measuring norms

Type	LC/PC	
Type of fibre	multimode	single mode
Ferula type	ceramic	
	Ø126 µm (0 to +1 µm)	Ø125 µm (0 to +1 µm)
Adjustable	yes	
Min. mating cycles	ponad 1000 cycles	
Operating temperature	-40 to +85 °C	

Transmission parameters

Type	LC/PC multi mode		LC/PC single mode	
	typical	max.	typical	max.
Insertion loss IL	0.12 dB	0.35 dB	0.2 dB	0.4 dB
Return loss ORL	-	-	> 50 dB	> 55 dB



LC adapters

CONSOLES AND KVM SWITCHES

KVM consoles are devices designed for network administrators managing multiple servers. The consoles are equipped with 15", 17" or 19" LCD displays with an TFT Active Matrix, ultraslim keyboard and touchpad. A single console occupies a height of 1 U in a 19" rack-type cabinet. The consoles secure the highest quality of image, and are compatible with dedicated KVM MER, VEN and MAR switches.

				
Console	**CORN 15**	**CORN 17**	**CORN 19**	**GEM 15**
Catalogue number	T-SO-970-101	T-SO-970-102	T-SO-970-103	T-SO-970-001
Usage	1 PC to 1 console	1 PC to 1 console	1 PC do 1 console	1 PC to 1 console
Matrix	Active TFT LCD, 15"	Active TFT LCD, 17"	Active TFT LCD, 19"	Active TFT LCD, 15"
Resolution capabilities	1024 x 768	1280 x 1024	1280 x 1024	1024 x768
Pixel pitch	0.297 x 0.297 mm	0.264 x 0.264 mm	0.298 x 0.294 mm	0.297 x 0.297 mm
Viewing angle	130° right-left view 100° up-down view	70° right-left view 60° up-down view	140° right-left view 140° up-down view	130° right-left view 100° up-down view
Contrast ratio	400 ÷ 1	450 ÷ 1	500 ÷ 1	400 ÷ 1
Brightness	250 cd/m^2	250 cd/m^2	250 cd/m^2	250 cd/m^2
Back light	2 lamps	4 lamps	4 lamps	2 lamps
Supported colors	16.7 milion colors	16.7 milion colors	16.7 milion colors	16.7 milion colors
Response time	5 ms (rising time) 11 ms (decay time)	2 ms (rising time) 14 ms (decay time)	2 ms (rising time) 10 ms (decay time)	5 ms (rising time) 11 ms (decay time)
Slots number	1	1	1	1
Ports number PC	1	1	1	1
Synchronization	45 ÷ 80 kHz	45 ÷ 80 kHz	45 ÷ 80 kHz	45 ÷ 80 kHz
Keyboard	106 buttons, PS/2, touchpad	106 buttons, PS/2, touchpad	106 buttons, PS/2, touchpad	106 buttons, PS/2, touchpad
Power consumption	16 W	25 W	25 W	16 W
Power supply	~230 V AC	~230 V AC	~230 V AC	~230 V AC
Temperature	0 °C ÷ 50 °C	0 °C ÷ 50 °C	0 °C ÷ 50 °C	0 °C ÷ 50 °C
Humidity	10 % ÷ 90 %, non-condensing	10 % ÷ 90 %, non-condensing	10 % ÷ 90 %, non-condensing	10 % ÷ 90 %, non-condensing
Certification	CE, FCC, UL, CUL, C-Tick, GOST	CE, FCC, UL, CUL, C-Tick, GOST	CE, FCC, UL, CUL, C-Tick, GOST	CE, FCC, UL, CUL, C-Tick, GOST

CONSOLES AND KVM SWITCHES

	
GEM 17	**GEM 19**
T-SO-970-002	T-SO-970-003
1 PC to 1 console	1 PC to 1 console
Active TFT LCD, 17"	Active TFT LCD, 19"
1280 x 1024	1280 x 1024
0.264 x 0.264 mm	0.298 x 0.294 mm
70° right-left view 60° up-down view	140° right-left view 140° up-down view
450 ÷ 1	500 ÷ 1
250 cd/m^2	250 cd/m^2
4 lamps	4 lamps
16.7 milion colors	16.7 milion colors
2 ms (rising time) 14 ms (decay time)	2 ms (rising time) 10 ms (decay time)
1	1
1	1
45 ÷ 80 kHz	45 ÷ 80 kHz
106 buttons, PS/2, touchpad	106 buttons, PS/2, touchpad
25 W	25 W
~230 V AC	~230 V AC
0 °C ÷ 50 °C	0 °C ÷ 50 °C
10 % ÷ 90 %, non-condensing	10 % ÷ 90 %, non-condensing
CE, FCC, UL, CUL, C-Tick, GOST	CE, FCC, UL, CUL, C-Tick, GOST

Console with KVM switch Oxca KLA-108

Catalogue number	T-SO-970-609
Usage	8 PC to 2 consoles (1+1) / stackable
Matrix	active TFT LCD, 19"
Resolution capabilities	1024 x 768
Viewing angle	140° right-left view 140° up-down view
Contrast ratio	500 ÷ 1
Brightness	260 cd/m^2
Back light	2 lamps
Supported colors	16.2 milion colors
Response time	16 ms
Types of supported PC ports (keyboard/mouse)	PS/2 or USB
Console ports	1x VGA HDB15(F)+ 2x PS/2 mini DIN 6(F), 1 widening port for the module of remote console
Available modules of the remonte console	Cat. 5 or IP
Port Daisy Chain	1x HDB15(F)
Max. ports connections	64
Max. switch connections	8 (serial)
Choice of the active PC port	keyboard shortcut / OSD / button
Display menu OSD	yes
Interval of automatic scanning ports	from 5 to 99 sec.
Max. resolution (remote console)	1600x1200 for cat. 5 module 150 m, 1024x768 for cat. 5 module 300 m, 1600x1200 for IP module
Keyboard	105 buttons, PS/2, touchpad
Power supply	~230 V AC
Temperature	0 °C ÷ 50 °C
Humidity	10% ÷ 90% non-condensing
Certification	CE
Dimensions	600 x 450 x 44 mm
Weight	19.2 kg
Guarantee	2 years
Manufacturer	Oxca

Consoles with 16-port and 1-port switches are also available.

KVM SWITCHES

Designed for connecting KVM console with workstations (servers). KVM MER, VEN and MAR switches are dedicated to CORN and GEM consoles.

Switch	 MER 8D	 MER 16D	 VEN 8D
Catalogue number	T-SO-970-201	T-SO-970-202	T-SO-970-203
Usage	8 PC to 1 user / stackable, for mounting in CORN/GEM consoles	16 PC to 1 user / stackable, for mounting in CORN/GEM consoles	8 PC to 2 users (1+1) / stackable, for mounting in CORN/GEM consoles
PC ports	8x HDB15(F)	16x HDB15(F)	8x HDB15(F)
Max. distance (KVM switch - Host)	5 m (depending on terminal type)	5 m (depending on terminal type)	5 m (depending on terminal type)
Required cabling	dedicated integrated connections	dedicated integrated connections	dedicated integrated connections
Types of supported PC ports (keyboard/mouse)	PS/2	PS/2	PS/2 or USB
Console ports	–	–	1 (one local) 1 IP-based remote console
Available modules of the remote console	–	–	Cat. 5 or IP
Port Daisy Chain	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)
Max. PC connections	64	128	64
Max. switch connections	8 (serial)	8 (serial)	8 (serial)
Choice of the active PC port	keyboard shortcut / OSD	keyboard shortcut / OSD	keyboard shortcut / OSD
Display menu OSD	Yes	Yes	Yes
Interval of automatic scanning ports	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.
Max. resolution (Local console)	1920 x 1440	1920 x 1440	1920 x 1440
Max. resolution (Remote console)	–	–	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module
Cover	metal	metal	metal
Power supply	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz
Dimensions	420 x 170 x 41.4 mm	420 x 170 x 41.4 mm	420 x 170 x 41.4 mm

KVM SWITCHES

			
VEN 16D	**MAR 8D**	**MAR 16D**	**MAR 32D**
T-SO-970-204	T-SO-970-205	T-SO-970-206	T-SO-970-207
16 PC to 2 users (1+1) / stackable, for mounting in CORN/GEM consoles	8 PC to 2 users (1+1) / stackable, for mounting in CORN/GEM consoles	16 PC to 2 users (1+1) / stackable, for mounting in CORN/GEM consoles	32 PC to 2 users (1+1) / stackable, for mounting in CORN/GEM consoles
16x HDB15(F)	8x 8p8c(F) RJ-45	16x 8p8c(F) RJ-45	32x 8p8c(F) RJ-45
5 m (depending on terminal type)	150 m with the DCC-001	150 m with the DCC-001	150 m with the DCC-001
dedicated integrated connections	twisted pair cable, category 5e, 6 or higher	twisted pair cable, category 5e, 6 or higher	twisted pair cable, category 5e, 6 or higher
PS/2 or USB	PS/2 or USB	PS/2 or USB	PS/2 or USB
1 (one local) 1 IP-based remote console	1 (one local) 1 IP-based remote console	1 (one local) 1 IP-based remote console	1 (one local) 1 IP-based remote console
Cat. 5 or IP	Cat. 5 or IP	Cat. 5 or IP	Cat. 5 or IP
1x HDB15(F)	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)
128	64	128	256
8 (serial)	8 (serial)	8 (serial)	8 (serial)
keyboard shortcut / OSD	keyboard shortcut / OSD	keyboard shortcut / OSD	keyboard shortcut / OSD
Yes	Yes	Yes	Yes
from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.
1920 x 1440	1600 x 1200	1600 x 1200	1600 x 1200
1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600x1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module
metal	metal	metal	metal
DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz
420 x 170 x 41.4 mm	420 x 170 x 41.4 mm	420 x 170 x 41.4 mm	420 x 170 x 41.4 mm

KVM SWITCHES OX 19"

Switch	KSC-108A	KSC-108B	KSC-108E	KCC-108A
Catalogue number	T-SO-970-600	T-SO-970-602	T-SO-970-604	T-SO-970-606
Usage	8 PC to 1 user / stackable	8 PC to 2 users (1+1) / stackable	8 PC to 2 users (1+1) / stackable	8 PC to 2 users (1+1) / stackable
PC ports	8x HDB15(F)	8x HDB15(F)	8x HDB15(F)	8x 8p8c(F) RJ-45
Max. distance (KVM switch - Host)	5 m (depending on terminal type)	5 m (depending on terminal type)	5 m (depending on terminal type)	150 m with Oxca DCC-001
Required cabling	dedicated integrated connections	dedicated integrated connections	dedicated integrated connections	twisted pair cable, category 5e, 6 or higher
Types of supported PC ports (keyboard/mouse)	PS/2 or USB	PS/2 or USB	PS/2 or USB	PS/2 or USB
Console ports	1x VGA HDB15(F) + 2x PS/2 mini DIN 6(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x PS/2 mini DIN 6(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x USB A(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x USB A(F), 1 widening port for the module of remote console
Available modules of the remote console	–	Cat. 5 or IP	Cat. 5 or IP	Cat. 5 or IP
Port Daisy Chain	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)
Max. PC connections	64	64	64	64
Max. switch connections	8 (serial)	8 (serial)	8 (serial)	8 (serial)
Choice of the active PC port	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button
Display of the switch number	7-sectional LED	7-sectional LED	7-sectional LED	7-sectional LED
Numbers of LED diodes of the state	16 (2 for each PC port)	16 (2 for each PC port)	16 (2 for each PC port)	16 (2 for each PC port)
Display menu OSD	Yes	Yes	Yes	Yes
Interval of automatic scanning ports	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.
Max. resolution (Local console)	1920 x 1440	1920 x 1440	1920 x 1440	1600 x 1200
Max. resolution (Remote console)	–	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for module cat. 5 module 300 m, 1600 x 1200 for IP module
Cover	19", metal	19", metal	19", metal	19", metal
Power supply	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz
Dimensions	470 x 190 x 44 mm	470 x 190 x 44 mm	470 x 190 x 44 mm	470 x 190 x 44 mm

KVM SWITCHES OX 19"

				
KSC-116A	**KSC-116E**	**KCC-116A**	**KSC-116B**	**KCC-132A**
T-SO-970-601	T-SO-970-605	T-SO-970-607	T-SO-970-603	T-SO-970-608
16 PC to 1 user / stackable	16 PC to 2 users (1+1) / stackable	16 PC to 2 users (1+1) / stackable	16 PC to 2 users (1+1) / stackable	16 PC to 2 users (1+1) / stackable
16x HDB15(F)	16x HDB15(F)	16x 8p8c(F) RJ-45	16x HDB15(F)	32x 8p8c(F) RJ-45
5 m (depending on terminal type)	5 m (depending on terminal type)	150 m with Oxca DCC-001	5 m (depending on terminal type)	150 m with Oxca DCC-001
dedicated integrated connections	dedicated integrated connections	twisted pair cable, category 5e, 6 or higher	dedicated integrated connections	twisted pair cable, category 5e, 6 or higher
PS/2 or USB	PS/2 or USB	PS/2 or USB	PS/2 or USB	PS/2 or USB
1x VGA HDB15(F) + 2x PS/2 mini DIN 6(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x USB A(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x USB A(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x PS/2 mini DIN 6(F), 1 widening port for the module of remote console	1x VGA HDB15(F) + 2x USB A(F), 1 widening port for the module of remote console
-	Cat. 5 or IP	Cat. 5 or IP	Cat. 5 or IP	Cat. 5 or IP
1x HDB15(F)	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)	1x HDB15(F)
128	128	128	128	256
8 (serial)	8 (serial)	8 (serial)	8 (serial)	8 (serial)
keyboard shortcut / OSD / button	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button	keyboard shortcut / OSD / button
7-sectional LED	7-sectional LED	7-sectional LED	7-sectional LED	7-sectional LED
32 (2 for each PC port)	32 (2 for each PC port)	32 (2 for each PC port)	32 (2 for each PC port)	64 (2 for each PC port)
Yes	Yes	Yes	Yes	Yes
from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.	from 5 to 99 sec.
1920 x 1440	1920 x 1440	1600 x 1200	1920 x 1440	1600 x 1200
–	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module	1600 x 1200 for cat. 5 module 150 m, 1024 x 768 for cat. 5 module 300 m, 1600 x 1200 for IP module
19", metal	19", metal	19", metal	19", metal	19", metal
DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz	DC power adapter 12 V DC 1 A, ~230 V AC 50 Hz
470 x 190 x 44 mm	470 x 190 x 44 mm	470 x 190 x 44 mm	470 x 190 x 44 mm	470 x 190 x 44 mm

SUPPLEMENTARY ACCESSORIES FOR CONSOLES AND KVM SWITCHES

19" keyboard KBD-106TP-USB

Catalogue number: T-SO-970-400; T-SO-970-401

Interface: PS/2 (T-SO-970-400) or USB (T-SO-970-401)

Dimensions: 437.4 x 436.6 x 44 mm

Weight: 6.0 kg

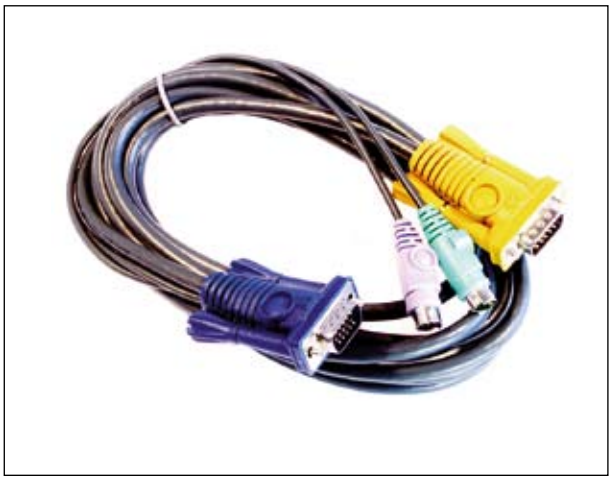
Power supply: from keyboard port

Cable HD-MD

PC ports: 1x HD-15M, 2x MD-6M

Console ports: 1x HD-15M

Cable type	Length	Catalogue number
KC-1501	1.8 m	T-SO-970-301
KC-1503	3.0 m	T-SO-970-303
KC-1505	5.0 m	T-SO-970-305



Cable HD-USB

PC ports: 1x HD-15M, 1x USB type A (M)

Console ports: 1x HD-15M

Cable type	Length	Catalogue number
KC-1501-USB	1.8 m	T-SO-970-311
KC-1503-USB	3.0 m	T-SO-970-313
KC-1505-USB	5.0 m	T-SO-970-315

SUPPLEMENTARY ACCESSORIES FOR CONSOLES AND KVM SWITCHES

Adapter for KVM cat. 5, DCC-001

Catalogue Number: T-SO-970-620

Application: Adapter RJ-45 to PS/2+VGA for KVM cat. 5

PC port: 1x VGA HDB15(F) + 2x PS/2 mini DIN 6(F)

Types of supported PC ports (keyboard/mouse):
PS/2 or USB (from CUP-101)

KVM port: 1x 8p8c(F) RJ-45

Numbers of LED diodes of the state: 1

Dimensions: 90 x 30 x 20 mm

Power supply:
from PS/2 ports, the external power supply is not necessary

Console module KVM 1+1 with cat. 5 port, type DCC -150

Catalogue number: T-SO-970-622

Application:
remote access to KVM 1+1 through the twisted-pair cable

Contain: local module, remote module

Max range: 150 m

Demand wire: twisted-pair cable cat. 5e, 6 or higher

Access control: on the level of remote console module

Local module:
Application: for the cat. 5 remote module connection
Port cat. 5: 1x 8p8c(F) RJ-45
Dimensions: 108 x 72 x 20 mm

Remote module:
Application: for the remote console connection to KVM 1+1, integrated KVM 2 PC for 1 user
PC port: 1x HDB15(F)
KVM port 1+1: 1x 8p8c(F) RJ-45
Types of supported PC ports (keyboard/mouse): PS/2 or USB
Console ports: 1x VGA HDB15(F) + 2x USB A(F)
Choice of the active PC/Cat.5 port:
keyboard shortcut / OSD / button
Number of LED diodes of the state: 2
Max. resolution: 1280 x 1024
Cover: desktop, metal
Dimensions: 160 x 70 x 25 mm
Power supply: 9 V DC 500 mA, ~230 V AC 50 Hz

SUPPLEMENTARY ACCESSORIES FOR CONSOLES AND KVM SWITCHES

Console module KVM 1+1 with IP port, type DIP-101

Catalogue number: T-SO-970-330

Application: remote access to KVM 1+1 through the IP network

Max. resolution: local 1600x1200, remote 1280x1024

IP port: 1x 10/100 Mbps RJ-45, access HTTP/HTTPS and telnet

Terminal port: 1x DB9, access to the basic configuration locally or through a modem

Line port: 1x miniUSB B(F) 2.0, remote access to the mass storage

Service of protocols: DHCP, static IP (support for DDNS), Bootp

Data encryption: SSL 256-bit

Access control: login + password, user profiles, user groups

Compatibility: IE6.0, Mozilla 1.6, Netscape 7.0, Opera 8.0

Access trough the HTTP: required installation Java RE 1.4.2

Simultaneous access of multiple users:
recommended number: not more than 15 users

Number of users accounts:
recommended number: not more than 150 accounts

Log on of events: NFS, SMTP, SNMP Trap

Dimensions: 108 x 72 x 20 mm

Software update: Yes

UPS BATTERY BACKUPS

Emergency UPS suitable for assembly in 19" rack cabinets and as free-standing tower-type units.
Tower-type UPS solutions with maximum power rating of 400 kVa (are also available on request).

Cover Partner RM

Technology: True On-Line , Double Conversion, VFI-SS-111 (according to EN 62040-3)
Power range: 1-3 kVA
Phases in/out: 1/1 (Plug&Play)
Software: UPSentry Smart 2000

Typical application:
- servers
- work stations
- graphical stations
- systems in 19" cabinets
- control and automation systems
- medical equipment

Model	Power rating	Backup time	Specification	Dimensions	Weight	Catalogue number
Cover Partner RM10	1.0 kVA	8 min 22 min 40 min 70 min	UPS UPS + 1 battery module RM 1.0 kVA UPS + 2 battery modules RM 1.0 kVA UPS + 3 battery modules RM 1.0 kVA	440 x 434 x 88 mm (2 U)	19 kg	T-SO-910-100
Cover Partner RM22	2.2 kVA	8 min 20 min 35 min 50 min	UPS UPS + 1 battery module RM 2.2 kVA UPS + 2 battery modules RM 2.2 kVA UPS + 3 battery modules RM 2.2 kVA	440 x 526 x 88 mm (2 U)	24 kg	T-SO-910-200
Cover Partner RM30	3.0 kVA	8 min 20 min 35 min 50 min	UPS UPS + 1 battery module RM 3.0 kVA UPS + 2 battery modules RM 3.0 kVA UPS + 3 battery modules RM 3.0 kVA	440 x 503 x 132 mm (3 U)	33 kg	T-SO-910-300

Accessories	Catalogue number
SNMP module - see page 62	T-SO-910-400
Environmental sensor (requires SNMP module) - see page 62	T-SO-910-401
Battery module RM 1.0 kVA, dimensions 440 x 434 x 88 mm (2 U), weight 24 kg	T-SO-910-402
Battery module RM 2.2 kVA, dimensions 440 x 434 x 88 mm (2 U), weight 22 kg	T-SO-910-403
Battery module RM 3.0 kVA, dimensions 440 x 434 x 88 mm (2 U), weight 25 kg	T-SO-910-404
External bypass switch RM	T-SO-910-405
External bypass switch RM, 19" rack mount, 1 U	T-SO-910-406
Rails for 19" rack mounting	T-SO-910-407

UPS BATTERY BACKUPS

Cover Partner RT

Technology: True On-Line, Double Conversion, VFI-SS-111 (according to EN 62040-3)
Power range: 5-11 kVA
Phases in/out: 1/1
Software: UPSentry Smart 2000

Typical application:
- servers
- work stations
- graphical stations
- systems in 19" cabinets
- control and automation systems
- medical equipment

Dimensions:
445 x 563 x 130 mm (3 U)
(concerns all UPS and battery modules)

Model	Power rating	Backup time	Specification	Weight	Catalogue number
Cover Partner RT50	5.0 kVA	- 12 min 30 min 50 min	UPS UPS + 1 battery module RT 5.0 kVA, 7 Ah UPS + 2 battery modules RT 5.0 kVA, 7 Ah UPS + 3 battery modules RT 5.0 kVA, 7 Ah	20.5 kg	T-SO-910-500
Cover Partner RT70	7.0 kVA	- 8 min 20 min 32 min	UPS UPS + 1 battery module RT 7.0 kVA, 7 Ah UPS + 2 battery modules RT 7.0 kVA, 7 Ah UPS + 3 battery modules RT 7.0 kVA, 7 Ah	20.5 kg	T-SO-910-700
Cover Partner RT90	9.0 kVA	- 8 min 17 min 26 min	UPS UPS + 1 battery module RT 9.0 kVA, 9 Ah UPS + 2 battery modules RT 9.0 kVA, 9 Ah UPS + 3 battery modules RT 9.0 kVA, 9 Ah	24.5 kg	T-SO-910-900
Cover Partner RT110	11.0 kVA	- 5 min 14 min 22 min	UPS UPS + 1 battery module RT 11.0 kVA, 9 Ah UPS + 2 battery modules RT 11.0 kVA, 9 Ah UPS + 3 battery modules RT 11.0 kVA, 9 Ah	24.5 kg	T-SO-910-910

Accessories	Catalogue number
SNMP module - see page 62	T-SO-910-400
Environmental sensor (requires SNMP module) - see page 62	T-SO-910-401
Wireless signal panel RAM Partner RT	T-SO-910-408
Battery module RT 7.0 kVA, 7 Ah, weight 69.5 kg	T-SO-910-409
Battery module RT 11.0 kVA, 9 Ah, weight 69.5 kg	T-SO-910-410
External wireless bypass RT (wall-mounted)	T-SO-910-411
External wireless bypass RT Rack (19" rack mount)	T-SO-910-412
Fire switch (REPO)	T-SO-910-413
Rails for 19" rack mounting	T-SO-910-407

UPS BATTERY BACKUPS

Cover Partner SE2

Technology: True On-Line Double Conversion
VFI - SS - 111 (according to EN 62040-3)
Power range: 1 kVA
Phases in/out: 1/1 (Plug&Play)
Software: UPSentry Smart 2000

Typical application:
- servers
- work stations
- graphical stations
- systems in 19" cabinets
- control and automation systems
- medical equipment

Model	Power rating	Backup time	Dimensions:	Weight	Catalogue number
Cover Partner 10 SE	1000 VA / 800 W	8 min	140 x 242 x 363 mm	15 kg	T-SO-910-099

Accessories	Catalogue number
SNMP module - see page 62	T-SO-910-400
Environmental sensor (requires SNMP module) - see page 62	T-SO-910-401

ACCESSORIES FOR UPS BATTERY BACKUPS

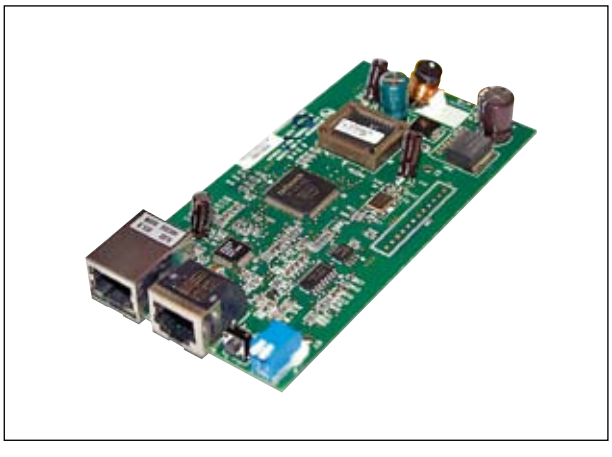
SNMP card

Catalogue number: T-SO-910-400

SNMP InsightPower card is an interface between the UPS and the computer network. The card makes it possible to obtain information about the operating status of the device and execute control commands remotely. Users can easily control the operation of the device using their Internet browser or tools based on SNMP, a popular network management protocol.

The system is complemented by the InsightPowerClient software compatible with the SNMP card. In the event of prolonged power outage, the software automatically shuts down computers working under Windows operating systems. A simpler software version called SNMP ShutdownAgent is capable of working with a wide array of popular system platforms.

Properties and functionalities:
- In-built SNMP agent and HTTP server for UPS monitoring
- Configuration through a terminal or via telnet
- Management of different user rights levels
- Firmware updating option
- UPS monitoring and control
- Recording events and parameters in the card's memory
- UPS starting, restarting and testing programme
- "Wake On LAN" feature for automatic PC start
- Sending e-mail messages and SNMP traps in the event of alarms
- Cooperation with the InsightPower Client software – the Windows platform
- Cooperation with the Shutdown Agent software for shutting down operating systems automatically (support for many leading system platforms).



Sensor of environmental conditions

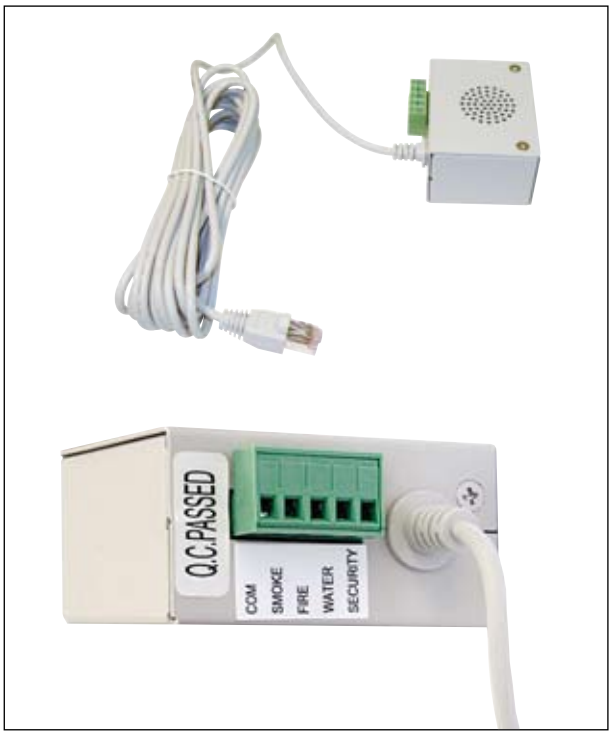
Catalogue number: T-SO-910-401

The sensor of environmental conditions makes it possible to monitor climatic conditions inside cabinets:
- temperature
- humidity
- door opening
- possibility of smoke sensor connection

All exceeded parameters are registered in the computer system and visualised on a local or remote computer through the Internet.

Connection of the sensor to the computer requires an SNMP card (see above).

The sensor connected to the SNMP card enables remote monitoring of the state of current parameters of the environment in the cabinet or in the room in which it is installed. Values of different parameters are available after connection via the Internet browser. In the same location, it is possible to preset permitted values of environmental parameters (temperature, humidity) and the status of the remaining sensors (smoke, fire, flooding, access) for the monitored room. If pre-set values are exceeded, an alarm is triggered.



GUARANTEED POWER SUPPLY – POWER GENERATORS

Power generators

We offer VISA power generators: stationary, mobile, without enclosure or housed in enclosures or containers with sound proofing and resistant to weather conditions, with power ranging from 9 kVA to 2000 kVA. The power generators have diesel engines from Perkins, Deutz, Volvo, John Deere or Mitsubishi and alternators from Marelli or Stamford.

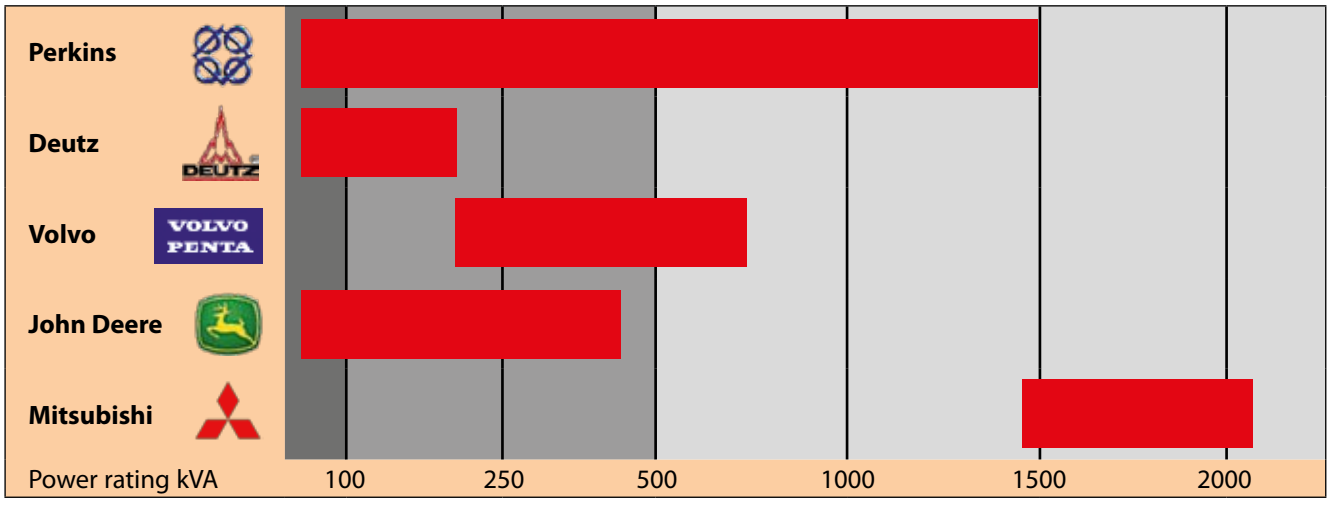
The power generators are equipped with fault-proof automatic systems which activate the generators in the event of power outage in the municipal (industrial) power supply network, as well as accessories enabling the generators to start in any weather conditions. The wide range of power generator accessory options includes remote panels of potential-free contacts, GSM control panels, software enabling control via the Ethernet, RS232, as well as the RS485 port in the Modus protocol.

The power generators have digital panels with large legible LCD displays in a range of options: for manual start-up, for automatic start-up compatible with an outside automatic transfer switching equipment (ATSE) system, for automatic start-up compatible with a dedicated automatic transfer switching equipment (ATSE) system, panels for power generator synchronization with the network and for synchronization of two power generators. Additional equipment options for the engine and the compressor increase the power generator's stability, helping to maintain constant rotational speed regardless of increase in load (i.e. keep up the frequency). AVR and AVR+PMG voltage regulators stabilize the power generator's output voltage and are resistant to sudden load surges from 0 to 100 %.

Additionally, expanding the standard internal tank of the power generator is also possible. This way, without building costly external fuel installations, the generator's operating time can be extended up to 24 hours (depending on the generator's power rating). Obviously, even the expanded fuel tank has a limited volume, being an internal tank placed on the power generator's frame.

We complete power generating systems, as well as any other additional installations required (ventilation, exhaust evacuation and fuel systems with extra fuel tanks).

Table listing power ratings of VISA power generators, depending on engine type



GUARANTEED POWER SUPPLY – POWER GENERATORS

General description of power generators

Technical specifications

VISA power generators have diesel engines from Perkins, Deutz, Volvo, John Deere or Mitsubishi and alternators from Marelli or Stamford, mounted on an anti-vibration frame. The power generators can be fully automated to enable a quick start and automatic switching of users in the event of failure in the industrial network. The power generator achieves its rate parameters within 5-15 seconds from the start. The generators can be used as emergency power supply and are compatible with uninterrupted power supply (UPS). The generators can be supplied in sound-proof enclosures. The noise level for power generators housed in sound-proof enclosures is 70-80 dB(A). The power generators also come with:

- Guard Evolution Manual control panel for starting the generator manually,
- system for charging the start-up battery during downtime to ensure full readiness for engine start-up at any time,
- integrated internal fuel tank,
- Industrial-type exhaust gas damper,
- start-up batteries,
- oil and coolant,
- electronic rotational speed regulator (depending on engine type).

Extra accessories

- **Automatic transfer switching system.** Dedicated system for network monitoring and automatic switching of load supply between the network and the power generator.
- **Residential-type exhaust gas damper.** It reduces the noise level by ca. -30 dB(A) from the power generator's own noise level.
- **Coolant heater.** The device heats up the engine block to make sure it starts in any conditions. Supplied with single-phase alternating voltage, the heater has an automatic system built in the control panel.
- **Fuel system.** The majority of power generators have an integrated internal fuel tank. Available are internal tanks of varying capacity featuring automatic or manual filling systems (option: fuel pump) and, if necessary, top/bottom level limit switches (option: 2-contact fuel sensors).
- **Water-tight and sound-proof containers.** All power generator models can be provided with separate water-tight and sound-proof container enclosures. They can be delivered in variants similar to standard containers. Moreover, models with extra sound proofing (up to ca. 50 db(A)/1m) for special applications, e.g. in hospitals, residential districts, etc. are also possible.

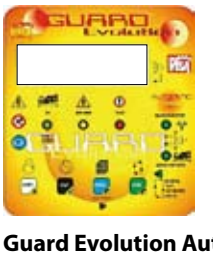
Enclosure types

- **C (Cover)** – featuring light sound-proofing and resistant to weather conditions, reducing the noise level by approx. -8 dB(A) from the power generator's own noise emission level and conforming to applicable EU standards.
- **S (Silent)** – sound-proofed and resistant to weather conditions, reducing the noise level by approx. -15 dB(A) from the power generator's own noise emission level and conforming to applicable environmental protection standards.
- **SS (Super Silent)** – extra sound-proofed and resistant to weather conditions, reducing the noise level by approx. -20 dB(A) from the power generator's own noise emission level and conforming to applicable environmental protection standards.

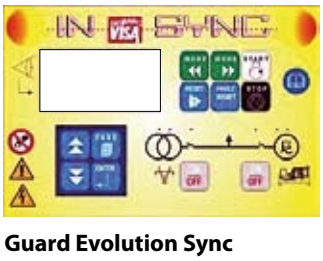
Guard Evolution control panel

Advanced microprocessor and digital control panels for power generators with manual or automatic start-up. The panels make it possible to monitor key power generator parameters such as: voltage, current, frequency, number of hours in operation, oil frequency, battery status etc.

Guard Evolution Manual
Standard manual operating mode with remote control



Guard Evolution Automatic
Standard automatic operating mode with remote control



Guard Evolution Sync
Automatic synchronization of up to 8 power generators operating in parallel as basic or back-up power supply.

GENERAL INFORMATION

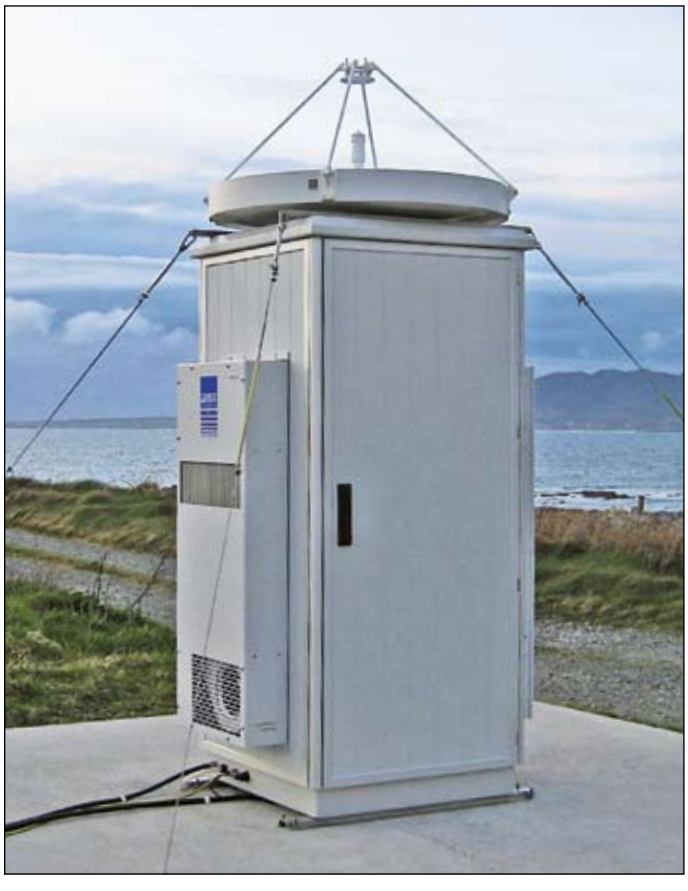
In the period of last few years, the increase of telephone-users and density of ducts surrounding cities which are endangered on easy damage, forces the manufacturers of telecommunication links to work out and use ducts under the earth-surface. Together with the increase of transferring wider frequency 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 lightening operating etc.



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

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 in esured.

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:

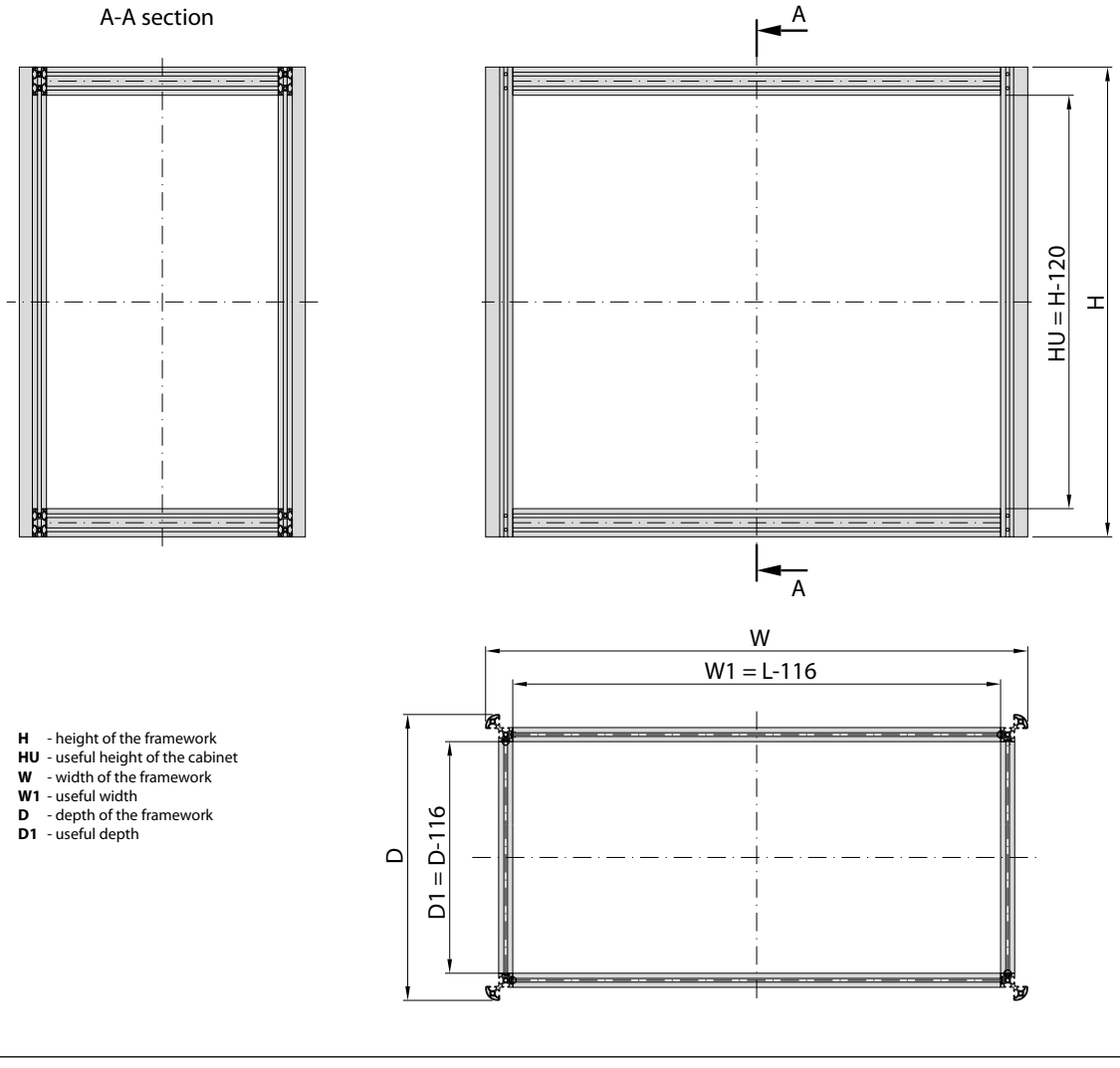
ZPAS reserves the rights to implement changes in construction. All technical solutions used in construction of SZD cabinets are reserved in Patent Office of Poland.

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.

Framework of SZD cabinet set on the plinth

Profile connection



H - height of the framework
HU - useful height of the cabinet
W - width of the framework
W1 - useful width
D - depth of the framework
D1 - useful depth

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).

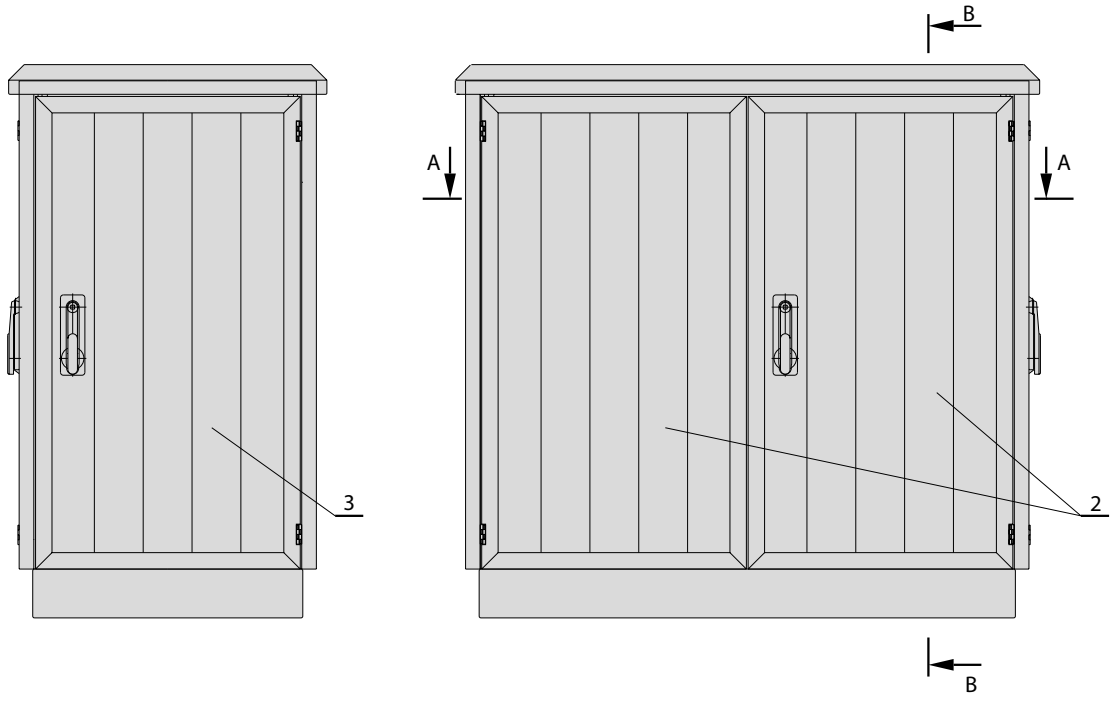
Lock - view from the inside of the cabinet

Cable entry - view from the inside of the cabinet

Cable entry - view from the outside of the cabinet

Lock - view from the outside of the cabinet

DIMENSIONS OF SZD CABINETS

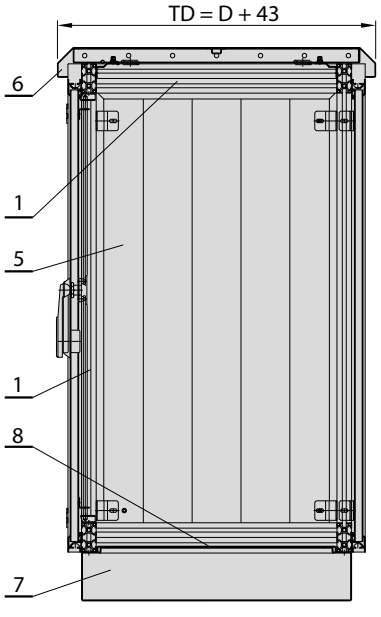


SZD cabinet has got modular construction. Main part of the cabinet is made of panels (which are fastened by latches) and aluminium profiles. Both panels and profiles can be cut for any length. This kind of construction enables to achieve each required dimension. **Every cabinet is designed and manufactured 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.

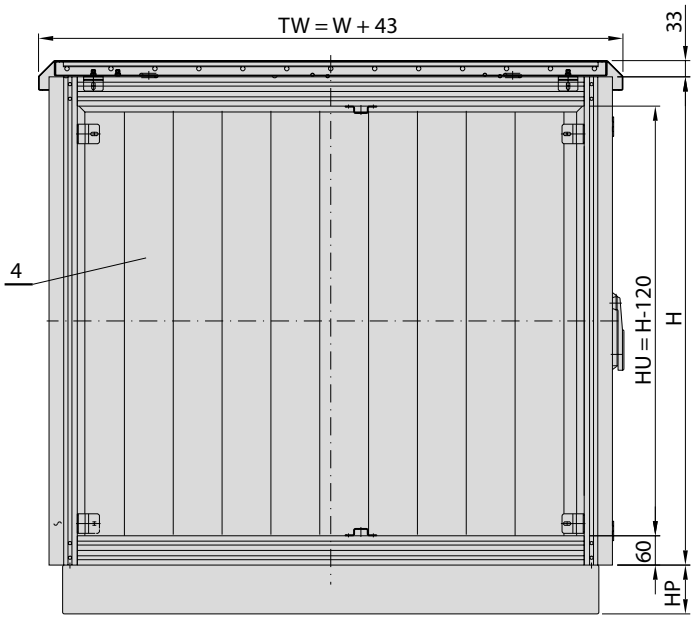
SZD cabinet set on plinth

DIMENSIONS OF SZD CABINETS

B-B section

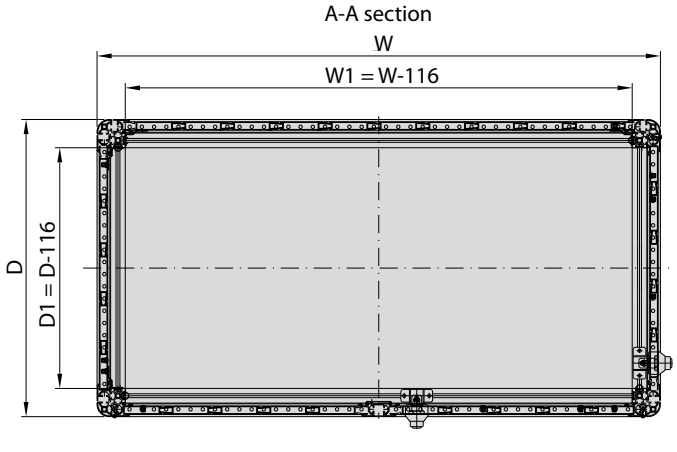


Front view without the door



Height of the plinth HP - by customer's needs

A-A section



DESIGN

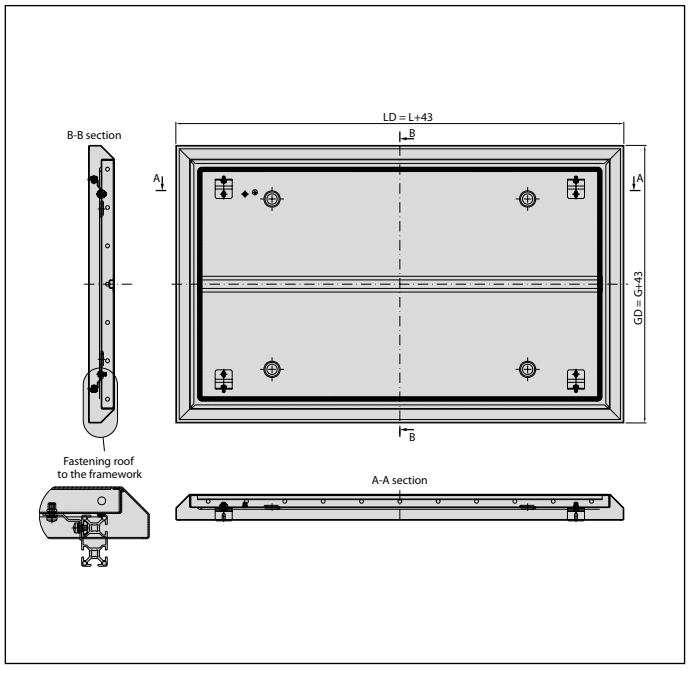
1. Framework
2. Two-wings front door
3. Side door
4. Rear shield
5. Side shield
6. Roof
7. Plinth
8. Bottom plate

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

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

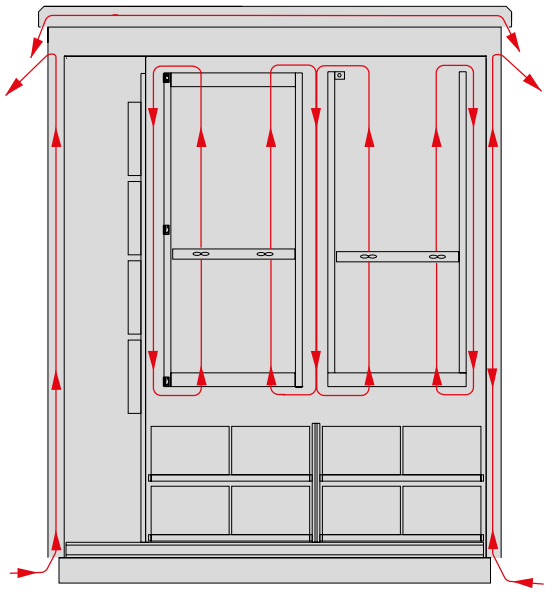
On customer request roof can be equipped into the lifting eyes.

VENTILATION SYSTEMS

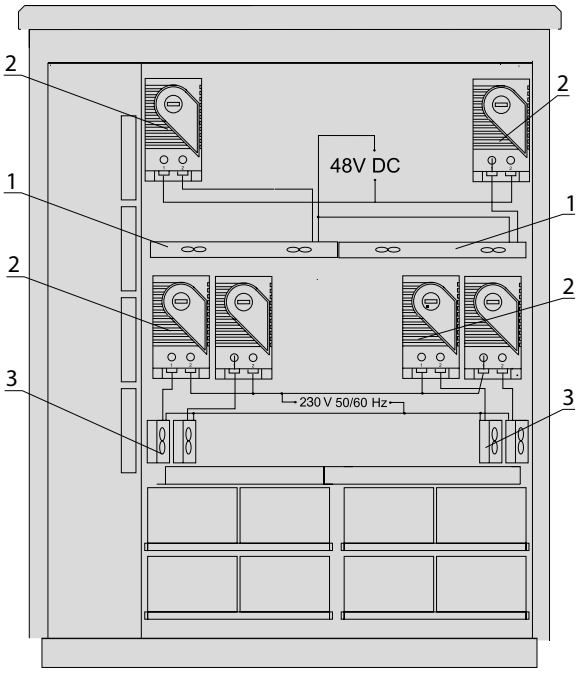
Ventilation with forced internal and free external air circulation

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



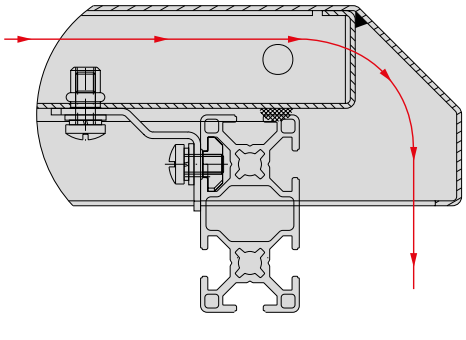
Pictorial diagram of supplying fan units PW and heaters



DESIGN

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

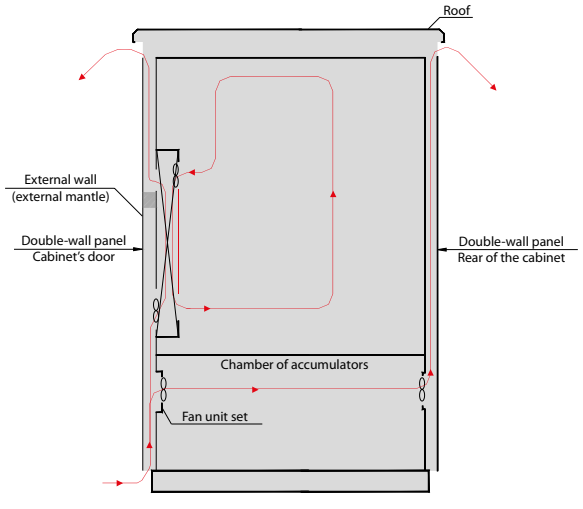
VENTILATION SYSTEMS

Ventilation based on use of heat exchanger and direct venting

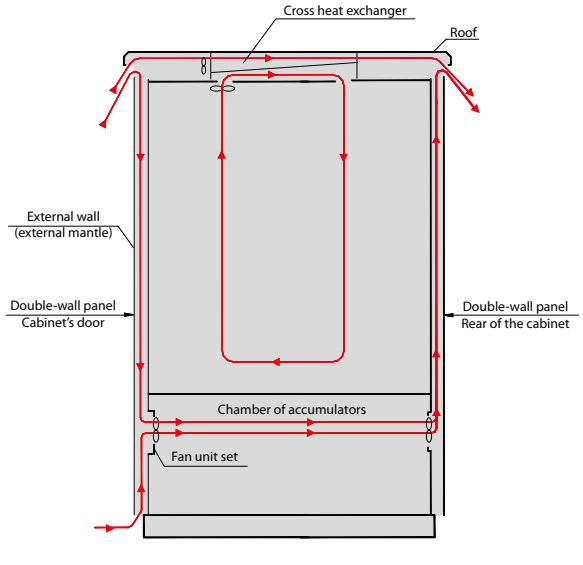
In order to intensify the cooling process in cabinets with installed equipment with high heat dissipation, there is solution based on cross heat exchanger. Heat exchanger is a type of radiator, where there are two air flows: warm from the inside of the cabinet (radiator's plates collect heat) and second 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.

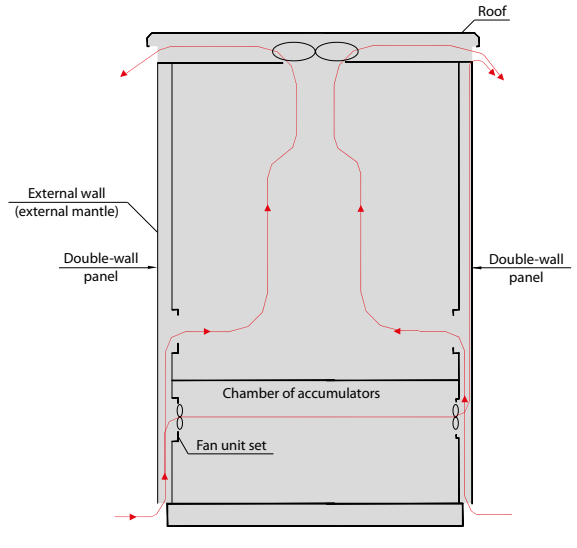
Pictorial diagram of air circulation in the cabinet with heat exchanger mounted on the door.



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

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.

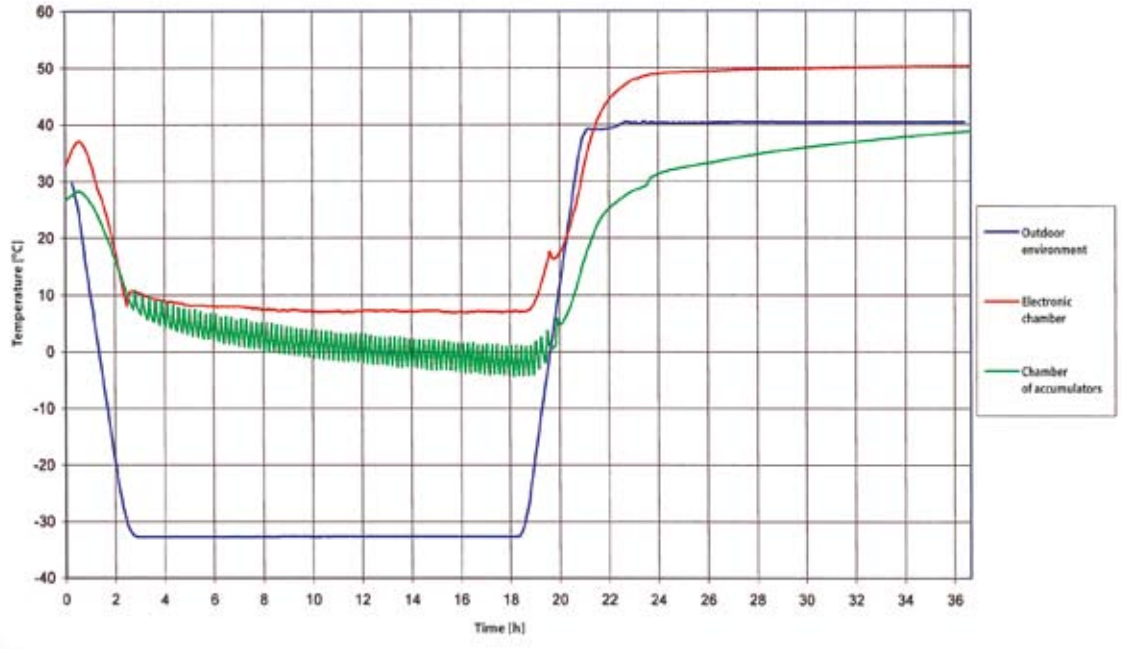
AIR CONDITIONED SZD CABINETS

CLIMATIC TESTS OF SZD

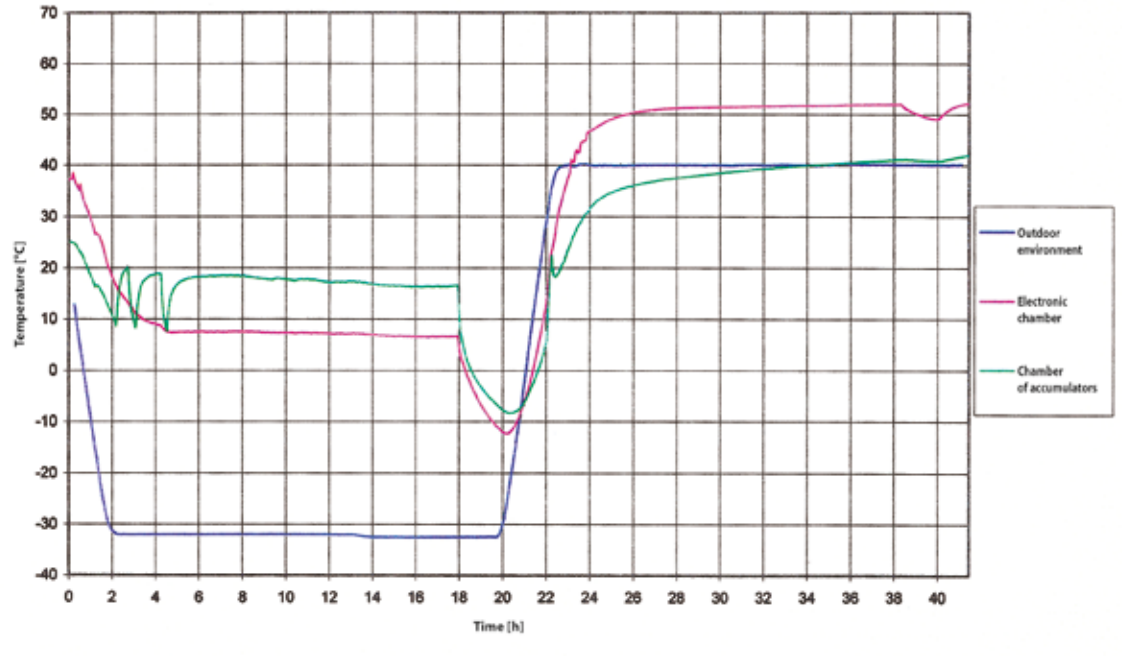
SZD cabinets equipped with access systems of different suppliers (Siemens, Ericsson, DGT, Ascom) have been climatic tested at Laboratory of Telecommunications Accessories and Devices Research in Szczecin. SZD cabinet was placed in climatic chamber, were it was first tested for 12 hours in temperature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

Below, there are some climatic diagrams.

Averaged temperatures in electronic chamber and chamber of accumulators' battery



Averaged run of temperature in electronic chamber and chamber of accumulators' battery with tests of failure power supply of the cabinet



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 Cieplnej i Elektroenergetycznej ul. Gen. J. Sowińskiego 3 44-101 Gliwice tel. (0-32) 237 63 00

ŚWIADECTWO SPRAWDZENIA
STOPNIA OCHRONY IP-65 SZAFY DOSTĘPOWEJ TYPU SZD - JEDNODRZWIOWEJ

Numer: 443/100
Data wydania: 21.03.2000r.
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 Sieciowej S.A. w Przygórzu
Oznaczenie szafy: typ SZD

2. ZLECENIODAWCA:
Zakład Produkcji Automatyki Sieciowej 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: J. Hibner | Kierownik Działu: mgr inż. A. Łupa | ZAKŁADY POMIAROWO-BADAWCZE ENERGETYKI ENERGOPOMIAR Sp. z o.o. TEL. 231-68-00, 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 Cieplnej i Elektroenergetycznej ul. Gen. J. Sowińskiego 3 44-101 Gliwice tel. (0-32) 237 63 00

ŚWIADECTWO SPRAWDZENIA
STOPNIA OCHRONY IP-65 SZAFY DOSTĘPOWEJ TYPU SZD - DWUDRZWIOWEJ

Numer: 443/200
Data wydania: 21.03.2000r.
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 Sieciowej S.A. w Przygórzu
Oznaczenie szafy: typ SZD

2. ZLECENIODAWCA:
Zakład Produkcji Automatyki Sieciowej 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: J. Hibner | Kierownik Działu: mgr inż. A. Łupa | ZAKŁADY POMIAROWO-BADAWCZE ENERGETYKI ENERGOPOMIAR Sp. z o.o. TEL. 231-68-00, FAX 231-65-42 ul. gen. Józefa Sowińskiego 3 SKR. POCZT. 402 44-101 GLIWICE (1) | Dyrektor Zakładu: mgr inż. J. Penar

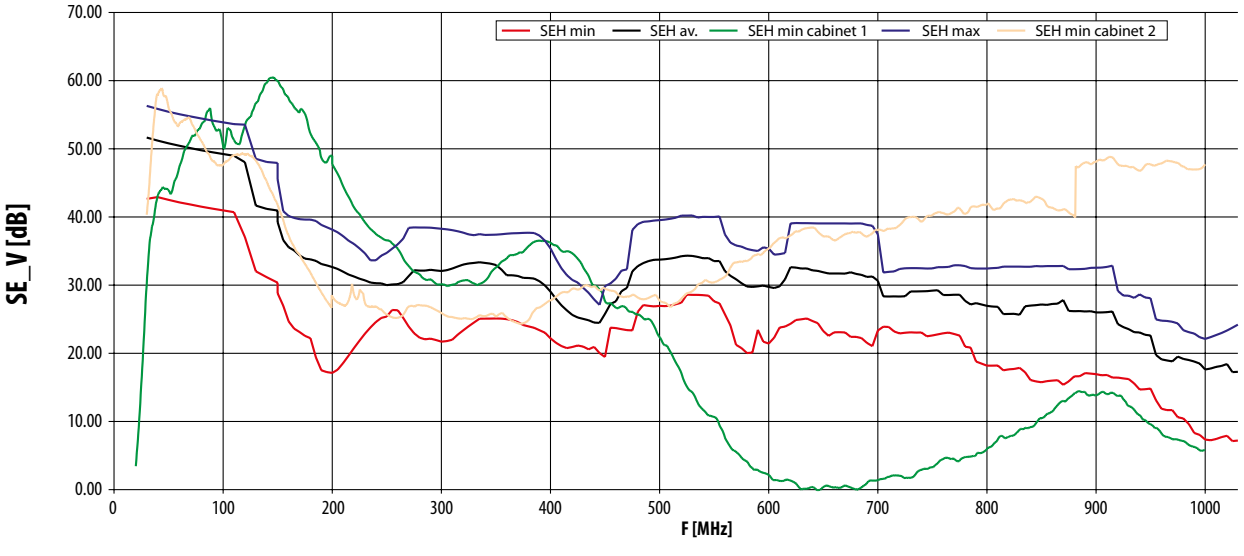
SCREENING EFFICIENCY TESTS

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:

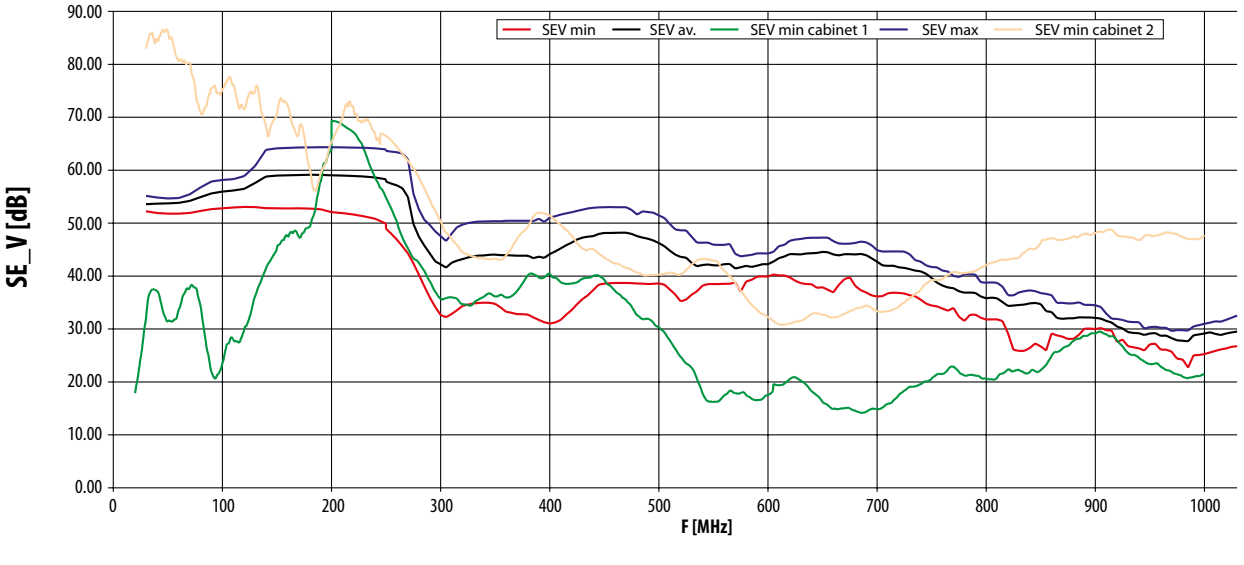
a) Screening efficiency in the frequency range of 100 kHz up to 30 MHz
   - for horizontal polarisation is included in the following limits: from 15 dB to 26 dB (average value varies from 18 dB to 22 dB),
   - for vertical polarisation is included in the following limits: from 21 dB to 44 dB (average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



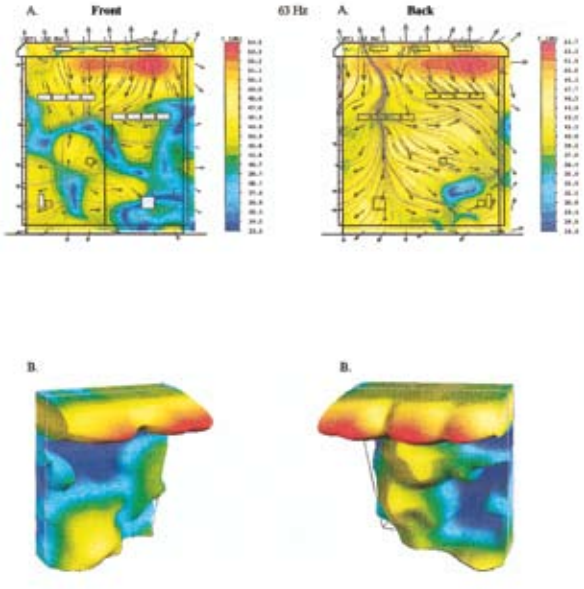
Cabinet's screening efficiency for the vertical component of the electric field



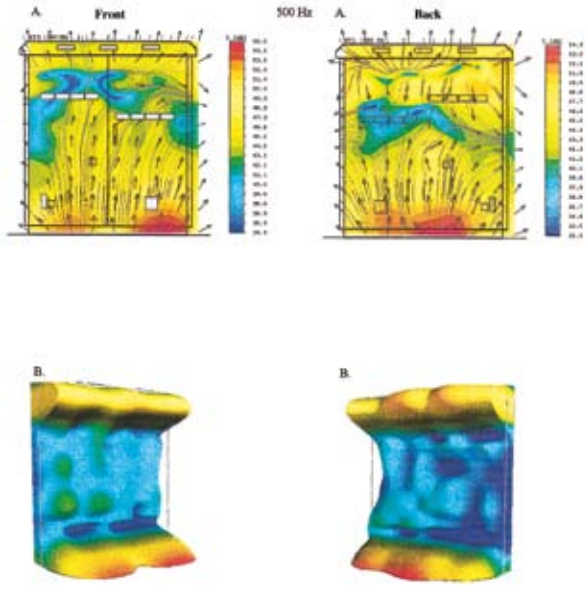
ACOUSTIC TESTS

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

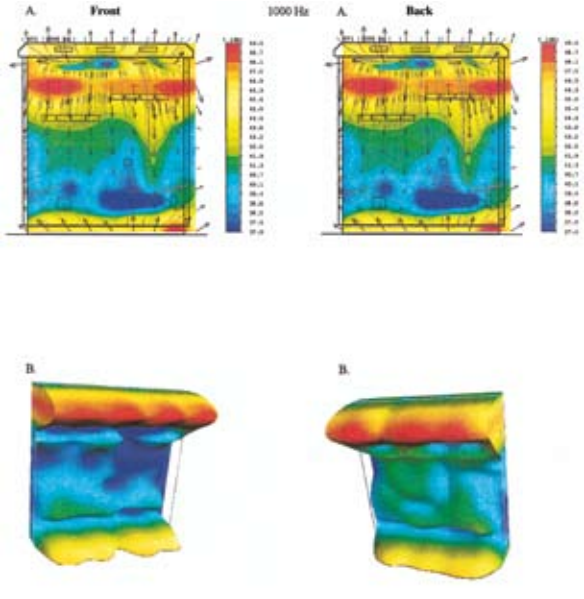
Sound diffusion for 63 Hz



Sound diffusion for 500 Hz

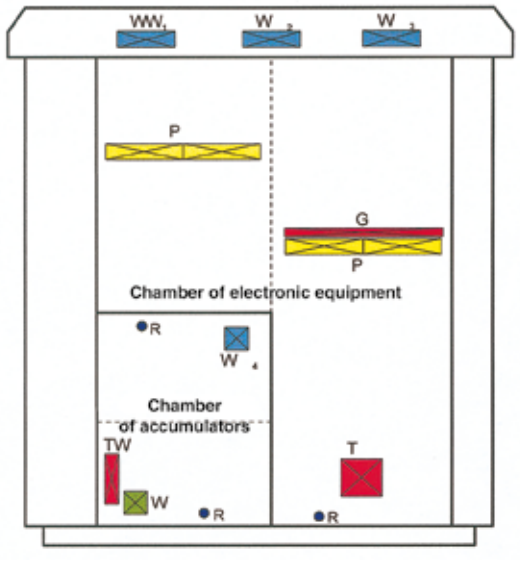


Sound diffusion for 1000 Hz



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.

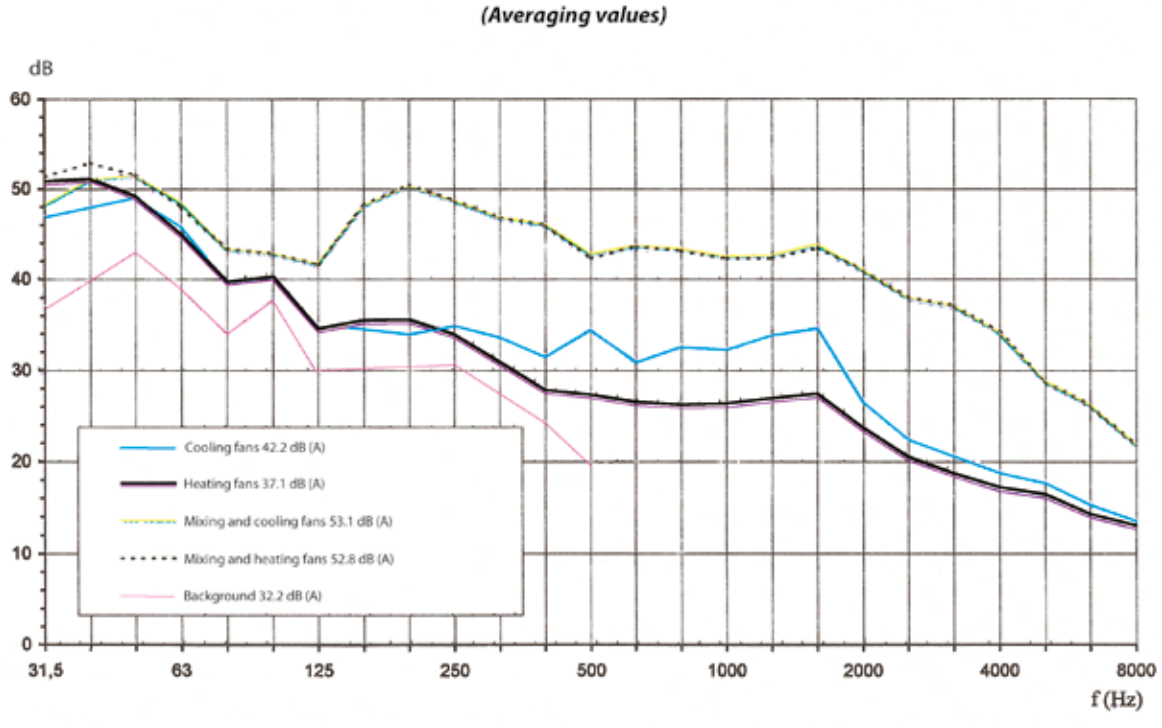
Places of fans in tested cabinet



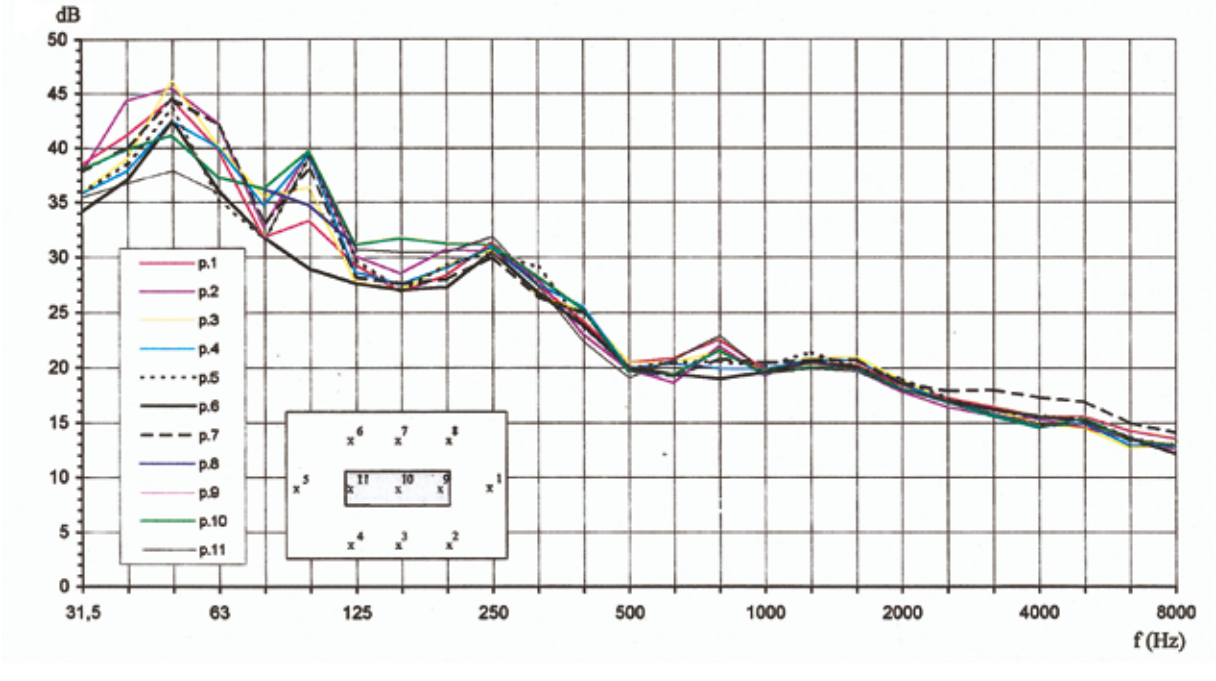
WW_1, WW_2, WW_3	- exhaust fans, placed symmetrical in the upper part of the cabinet under the roof
WW_4	- exhaust fan
WN	- downcast fan
PN	- fan units mixing air inside the cabinet
TW	- thermo fans
G	- heater of transmission shelf
R	- temperature controllers

ACOUSTIC TESTS

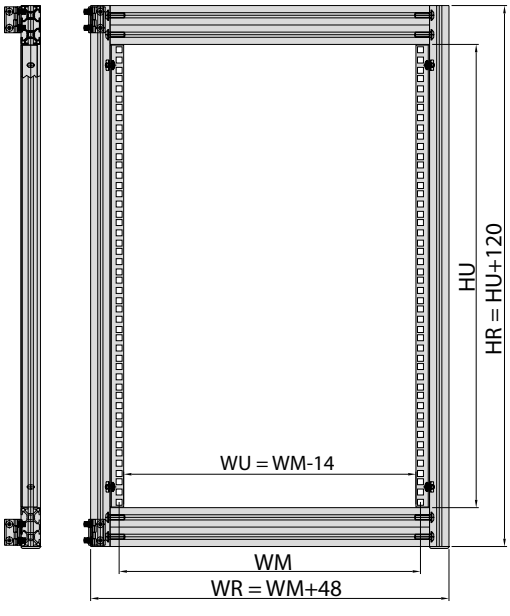
The level of noise emitted by tested SZD cabinet (average values from 11 measuring points)

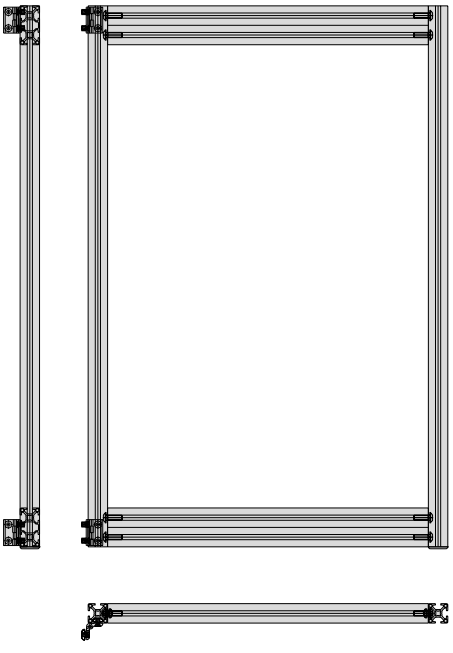


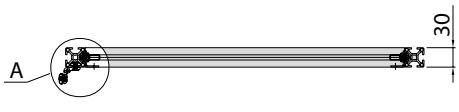
The level of background noise (the cabinet switched off)



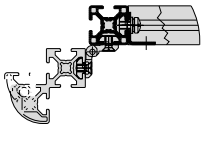
SWING FRAME







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

Fixed shelf II - 19" standard (load capacity 25 kg)
Available in depths: 550, 450, 350 and 250 mm

Pull out shelf II - 19" standard (load capacity 20 kg)
Available in depths: 555, 455, 405 and 355 mm

Pull out shelf with increased load capacity up to 100 kg (custom order)

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:

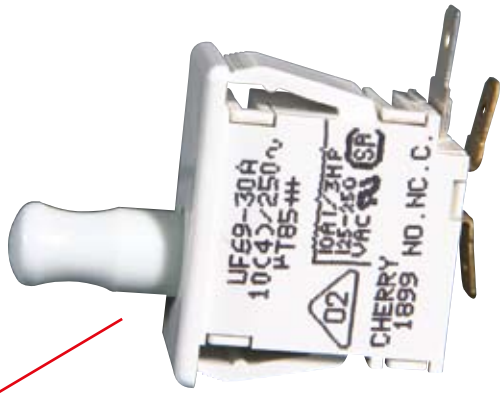
pos. 1 - unstable pushed-in (door closed)
pos. 2 - stable pushed out (door opened)
pos. 3 - "service position", pushed in manually, stable (door opened)

Example:

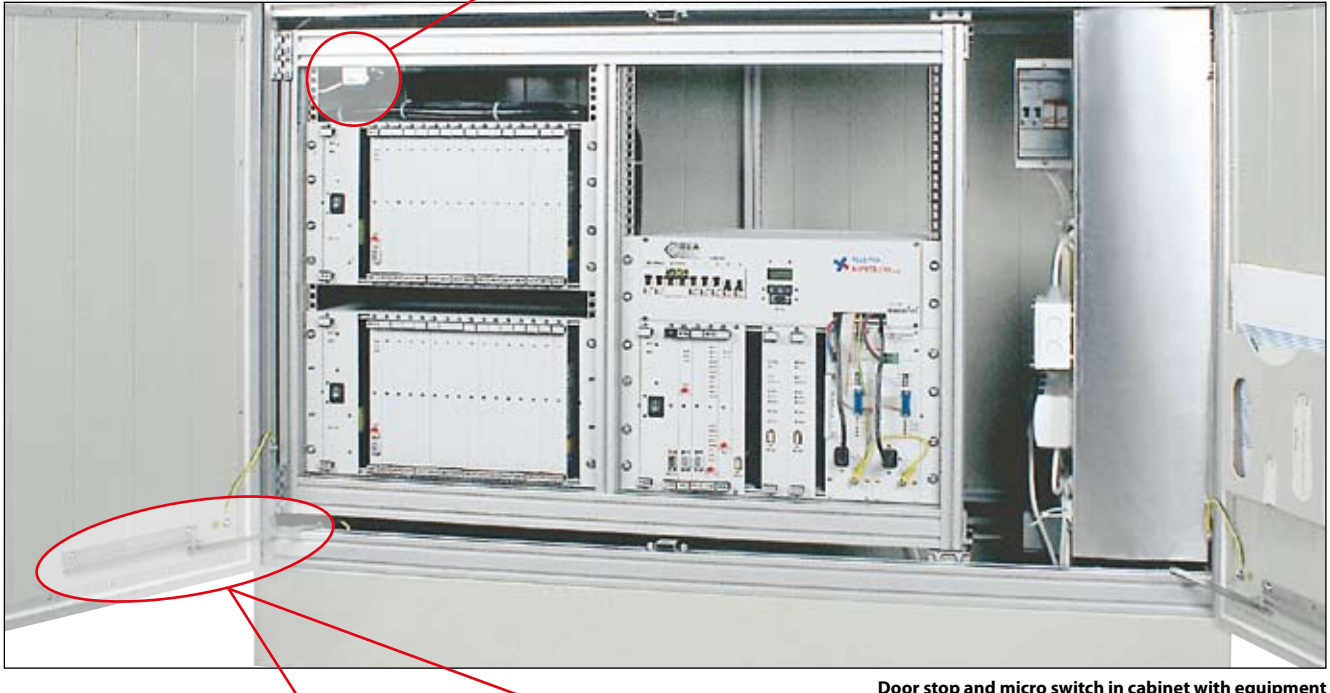
Cabinet's door closed
- option I - open circuit
- option II - closed circuit

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



3-positioned micro switch



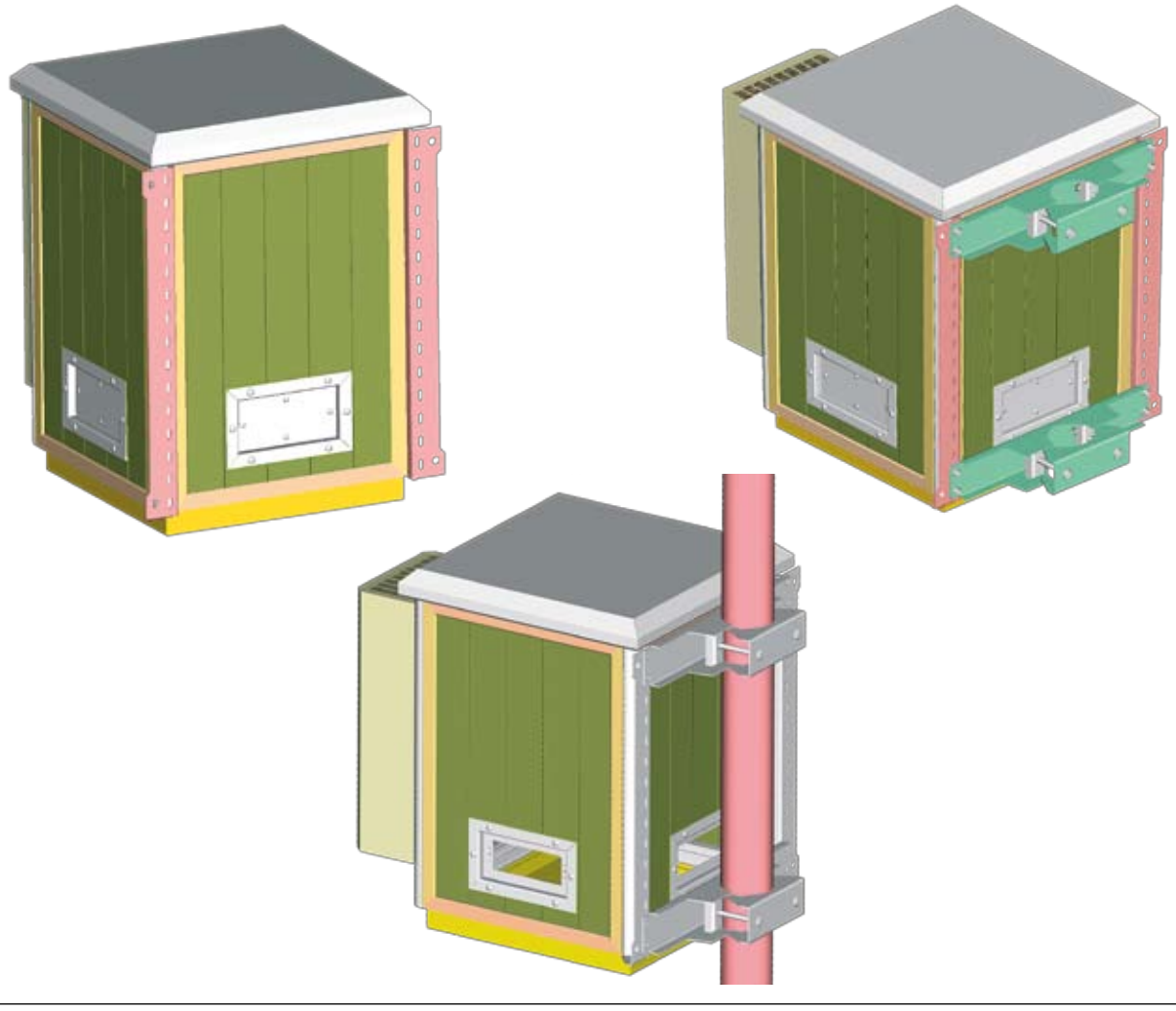
Door stop and micro switch in cabinet with equipment

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.

Cabinet with wall mounting bracket

Cabinet adapted for mounting on the column



POWER SUPPLY MAINTENANCE SYSTEMS

ZPAS-NET, a supplier of a full range of solutions, also offers complete systems of guaranteed power supply from highly reputed manufacturers: Telzas, Delta Energy Systems, Emmerson, Eltek Valere, etc.
Power supply systems are designed for uninterruptible supply of direct current to consumers with the rated voltage of 48 V in direct full-float operating mode based on rectifiers and battery packs. The systems can be supplied in the Front Terminal version with all terminals and connectors located on the front panel of the system. In the basic version, the enclosure of the power supply system is suitable for installation in 19" cabinets (racks).

Application:

- professional telecommunications systems
- end-user telecommunications systems
- IT network systems
- industrial automation systems

DC power supply systems

SDB 65 (SDB 65FT)

Input parameters:

- Input voltage .....3 x 230/400 V AC (-23.5 %; +30.4 %)
- Frequency .....45–65 Hz
- Maximum phase current .....2 A (three-phase) 24 A (single-phase)
- Power factor .....≈ 1

Output parameters:

- Range of voltage ..... 48–58 V DC
- Characteristics ..... UPI
- Stabilization of output voltage ..... ±1 %
- Maximum output current..... 72 A
- Maximum output power ..... 3200 W
- Output voltage ripples (psophometric value)..... < 2 mV

General data:

- Range of ambient temperatures .....-33... +55 °C
- Cooling .....fan-cooled
- Efficiency .....≥ 90 %
- Protection degree.....IP 20
- Electromagnetic compatibility.....PN-EN 300-386, class B
- Dimensions of the power supply system (H x W x D) .....133 x 482 x 390 mm
- System weight without rectifier units.....ca. 11.0 kg
- Dimensions of the rectifier unit (H x W x D) .....81 x 40 x 285 mm
- Weight of the rectifier .....1.1 kg

SDC 140

Input parameters:

- Input voltage.....3 x 230/400 V AC (-23.5 %; +26 %)
- Frequency .....45–65 Hz
- Maximum phase current .....24 A
- Power factor .....≈ 1

Output parameters:

- Range of voltage.....48–58 V DC
- Characteristics .....UPI
- Stabilization of output voltage .....±1 %
- Maximum output current.....140 A
- Maximum output power .....6800 W
- Output voltage ripples (psophometric value).....< 2 mV

General data:

- Range of ambient temperatures .....+5...+40 °C
- Cooling .....fan-cooled
- Efficiency .....≥ 91 %
- Protection degree.....IP 20
- Electromagnetic compatibility.....PN-EN 300-386 PN-T-83101
- Dimensions of the power supply system (H x W x D) .....134 (3U) x 483 x 300 mm 223 (5U) x 483 x 300 mm 311 (7U) x 483 x 300 mm
- System weight without rectifier units.....27 kg
- Dimensions of the rectifier unit (H x W x D) .....88 x 85.5 x 273 mm
- Weight of the rectifier .....2.4 kg

POWER SUPPLY MAINTENANCE SYSTEMS

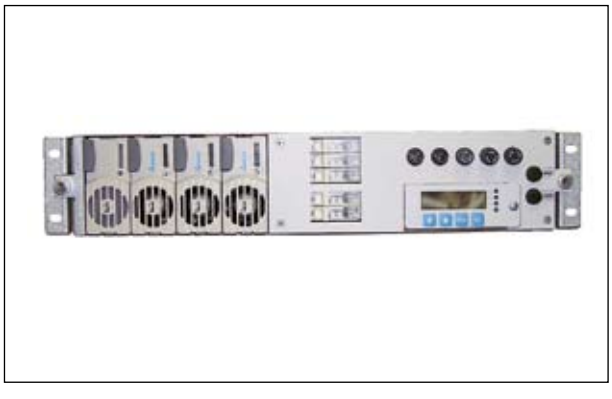
Complete rectifier power supply systems with modules

DPS 600B-48-2 19IN-1U

- Max power: 2 x 600 W
- 19" enclosure, 1 U height
- Load protection: 1 x MCB (max 16 A)
- Battery protection: 2 x MCB
- Optionally 5 x fuse protection devices: 2 battery and 3 load protective devices instead of 3 MCB
- PSC3 or PSC1 controller
- Low voltage disconnect (LVD) in the battery circuit

DPS 600B-48-4 19IN-2U

- Max power: 4 x 600 W
- 19" enclosure, 2 U height
- Battery protection: 2 x MCB
- Load protection: 3 x MCB, 5 x fuse
- PSC3 or PSC1 controller
- Low voltage disconnect (LVD) in the battery circuit



Complete rectifier power supply systems with modules

DPS 1600B-48-4 19IN-3U

- Max power: 4 x 1600 W
- 19" enclosure, 3 U height
- Load protection: 9 x MCB
- Battery protection: 2 x MCB ≤ 125 A
- PSC3 or PSC1 controller
- Low voltage disconnect (LVD) in the battery circuit

POWER SUPPLY MAINTENANCE SYSTEMS

Distribution panel + rectifier panels 4 x DPR 600B-48, 3 x DPR1600B-48 or 5 x DPR 2400B-48

DPD 150/300 19IN-4U distribution panel

- Compatible with different rectifier panels: 4 x 600 W, 3 x 1600 W or 5 x 2400 W
- Two current options: loads up to 150 A or 300 A
- 19" open structure, 4 U height
- Load protection: max 17 x MCB
- Battery protection: 4 x MCB ≤ 125 A
- PSC3 or PSC1 controller
- Low voltage disconnect (LVD) in the battery circuit
- Optional disconnector of non-critical loads

Batteries

Oerlikon

AGM technology, service life of 15 years

4x12CP25
- capacity. . . . . 25 Ah
- block dimensions WxDxH. . . . . 100x275x217 mm
- block weight . . . . . 12.5 kg

4x12CP50
- capacity. . . . . 50 Ah
- block dimensions WxDxH. . . . . 100x275x320 mm
- block weight . . . . . 21.8 kg

4x12CP80
- capacity. . . . . 80 Ah
- block dimensions WxDxH. . . . . 105x392x300 mm
- block weight . . . . . 34.5 kg

4x12CP100
- capacity. . . . . 92 Ah
- block dimensions WxDxH. . . . . 125x558x258 mm
- block weight . . . . . 40 kg

Hoppecke

AGM technology

power.com 4xSB12V60
- capacity. . . . . 63 Ah
- block dimensions WxDxH. . . . . 177x229x230 mm
- block weight . . . . . 26 kg

net.power 4x12V92
- capacity. . . . . 85 Ah
- block dimensions WxDxH. . . . . 105x392x273 mm
- block weight . . . . . 34 kg

Note: The list above only enumeratessample battery types. We also offer batteries from other manufacturers: Fiamm, Monbat etc.

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.

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

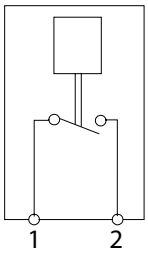
Technical data

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)

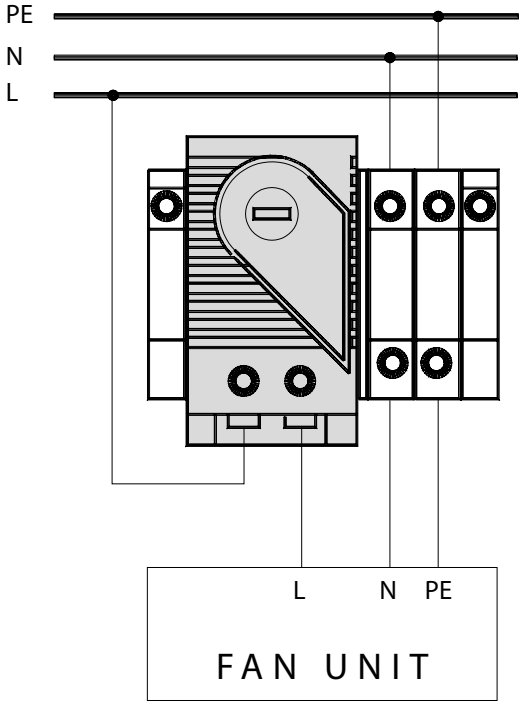
NOTE:
Depending on the way the thermostats work, we divide them into "normally open" and "normally closed".
The colour of handwheel indicates thermostat type:
- KTS 1141 thermostat (normally open)
- KTO 1140 thermostat (normally closed)

Connection diagram

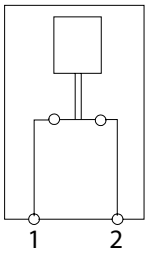
Integral diagram of KTS 1141 thermostat (normally open)



KTS 1141 switches on ventilation system (e. g. fans) at selected temperature limit



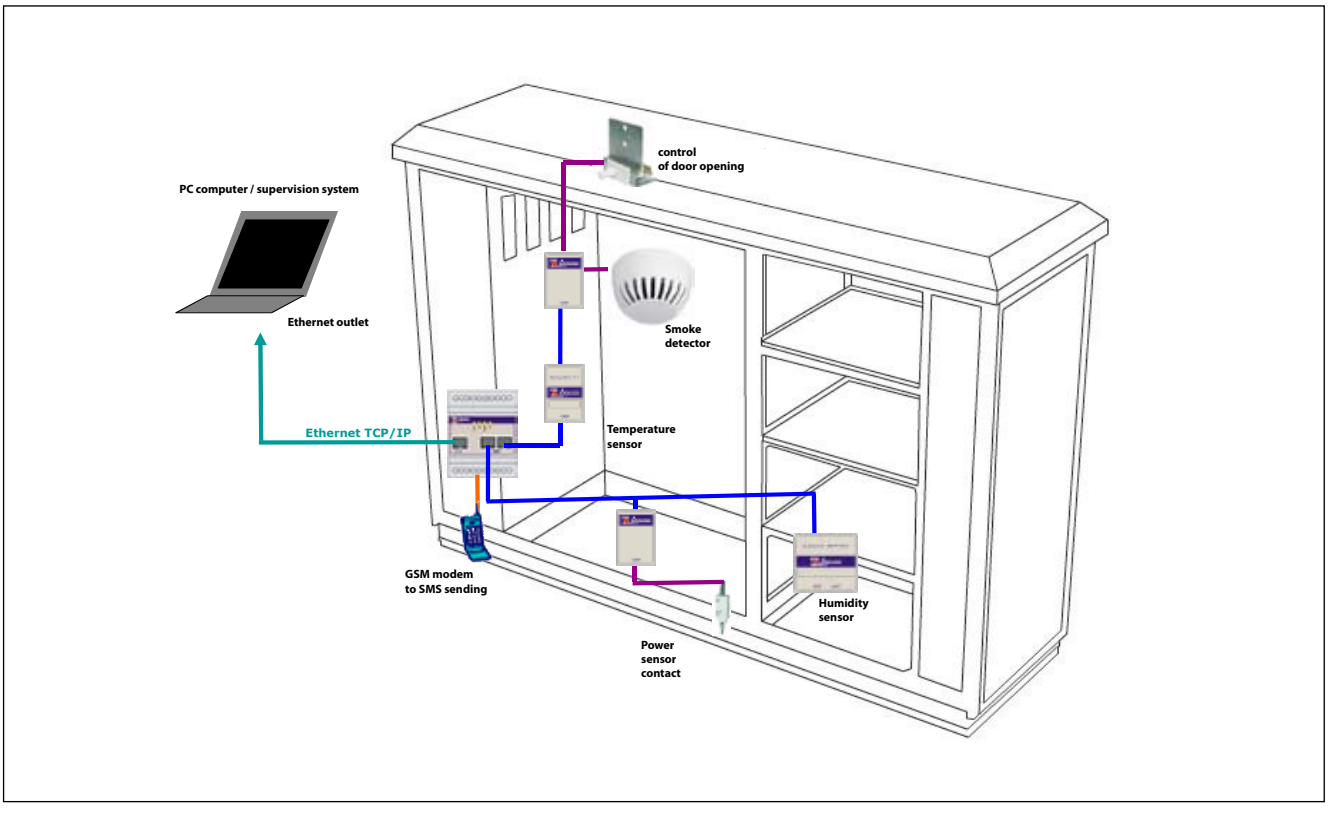
Integral diagram of KTO 1140 thermostat (normally closed)



KTO 1140 switches off devices (e. g. heaters) at selected temperature limit

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 massage 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 AND CABINET SAFETY MONITORING

Intended purpose:

The basic function of the control device is overheating and overcooling 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 sensors and accessories:

- Temperature sensor
- Integrated temperature and humidity sensor
- ERS converter RS232/Ethernet
- Connecting cable for ERS 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

Compact heating device including heating element and fan

Technical data

- voltage rating ..... 230 V AC 50-60 Hz
- heating power ..... 200/300/400 W
- fan capacity .....10 m^3 /h
- protection degree ..... IP 20

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).

APPLIANCES IN SUBSCRIBERS' ACCESS SYSTEMS

Division of cabinet's interior

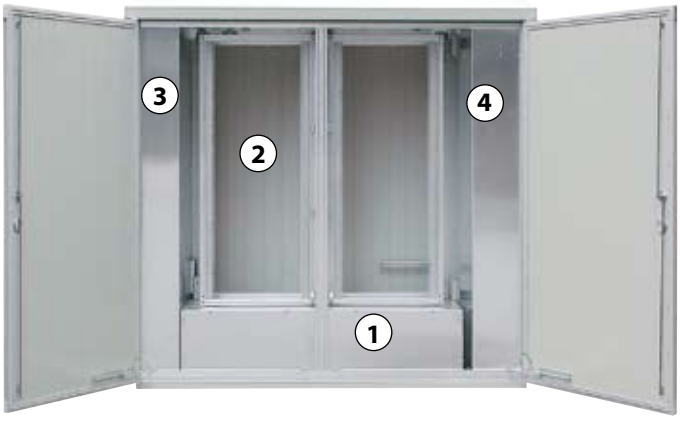
In the cabinet's construction there are four autonomous sections:

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 m^3/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.

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.

SZD CABINETS FOR EMPLOYMENT IN ENERGETIC INDUSTRIAL

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

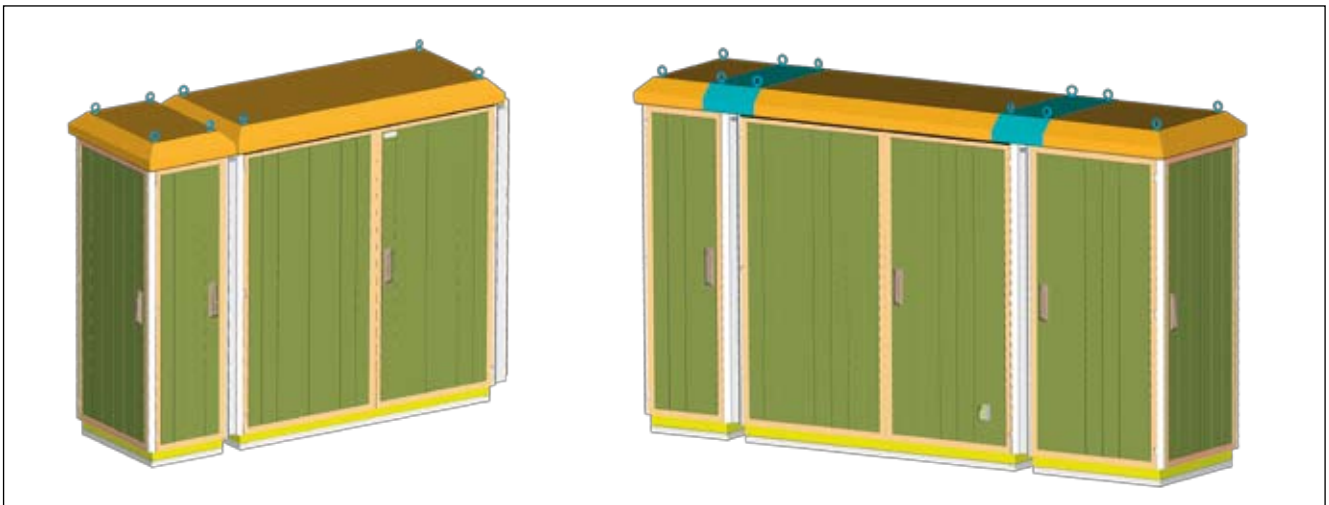
OPERATING CONDITIONS

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** **- signal voltage levels** **- voltage amplitude changes** **- voltage asymmetry** **- mains frequency changes** **- induced low-frequency voltage** **- magnetic field radiation** **- electric fields**	 normal medium normal normal normal not classfied high high	 AM-1-2 AM-2-2 AM-3-2 AM-4 AM-5 AM-6 AM-8-2 AM-9-3
Solar radiation	medium	AN2
Seismic shock	negligible	AP1
Atmospheric discharge	indirect effect	AQ2
Wind	strong	AS3

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 alredy 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.

CUSTOM SOLUTIONS

Cabinet made of stainless sheet steel

NOTES

CONTROL AND DISPATCH DESKS

REFERENCES FOR DISPATCH AND CONTROL DESKS

We have thirty years' experience in the production of control and dispatch desks. Throughout the years, we have manufactured hundreds of them. Our desks are mainly designed for power plants, heat and power generation plants, power distribution companies, sugar factories, integrated mills, railway companies, cement plants, chemical plants, gas works, coking plants, hard and brown coal mines and many other sectors of industry and business.

Our product portfolio includes universal modular desks and consoles made on special orders according to the customer's documentation or design developed by us. The product range also incorporates a series of types of standard PSL control desks with a modular design, intended for production lines, tooling centres etc. Each console may be delivered together with complete electric equipment and accessories. Assembly on site is also available on request.

Sample completed projects

- **ABB**
  - Gas compressor plants in: Kondratki, Włocławek, Ciechanów, Szamotuły, Zambrów
  - Gas mines in: Dzików, Wilków, Kuryłówka, Palikówka, Tarnów
  - Heat and power generation plants in: Gorzów, Jaworzno III (blok 6), Zgierz, Władysławowo, Siekierki, Turów, Gdańsk, Rokita, Będzin
- **ABN Russia**
  - Earthquake Research Centre
  - Gazprom
- **BELMATEX Bielsko-Biała**
- **CSC AUTOMATION – Ukraine**
- **Cukrownia Krasnystaw S.A. – Siennica Nadolna (a sugar factory)**
  - electrical dispatch room
- **Cukrownia Lublin (a sugar factory)**
  - electrical dispatch room
- **CYNK-MAL Sp. z o.o. – Legnica**
- **DAEWOO Motor Polska Sp. z o.o. – Lublin**
  - control room of the heat and power generation plant
- **EMERSON PROCESS MANAGEMENT**
  - petroleum refinery in Płock
  - Rafineria Nafty Jedlice S.A. (kerosene refinery)
  - Zakłady Azotowe Tarnów (nitrogen plant)
  - Petrochemia-Blachownia Kędzierzyn-Koźle (petroleum processing and chemical plant)
  - PKN Orlen (crude oil refiner)
  - KWB Bełchatów (a brown coal mine)
  - Elektrownia Bełchatów (a power generation plant)
- **EMPOR Kielce**
  - Detention Centre in Piotrków Trybunalski
- **Energetyka Szczecińska (a power distribution company)**
  - RDR Goleniów
- **ELEKTROBUD - BYDGOSZCZ Sp. z o.o.**
- **ELBUD – Warsaw**
  - Substation Pasikurowice
- **ELKON ELBUD – Cracow**
  - Substation Wielopole
- **ELEKTROBUDOWA S.A. in Katowice**
  - Heat and power generation plant no. 3 in Łódź
- **Heat and power generation plant II – Bydgoszcz**
  - control room
- **Heat and power generation plant GIGA Świdnik**
- **ELEKTROMONTAŻ – Katowice S.A.**
- **ELEKTROMONTAŻ – Wrocław S.A.**
- **Heat and power generation plant Kozienice**
  - control rooms for blocks 2, 3, 4, 5, 6, 7, 9, 10
  - control room for demineralisation plant
- **Electric power station Połaniec**
  - control rooms for blocks 1, 4, 5
  - control room of the station's operating engineer
  - central control room of the power blocks
- **Electric power station Rybnik**
  - control room for block 8
- **Electric power station Turów – Bogatynia**
  - control room for blocks 8, 9, 10
- **Hydroelectric power station Dychów**
- **ELPRO Leit- und Energietechnik GmbH – Berlin**
- **ELCON ELBUD**
  - Substation Wielopole
- **EL PAK**
  - Electric power station – Konin
- **ELTARG Dąbrowa Górnicza**
- **ELWRO SYSTEM Wrocław**
- **Energetyka i Technika Grzewcza TERMAL Sp. z o.o. (power and heating company)**
  - Zakład Utylizacji Odpadów – Warsaw (a waste disposal plant)
- **EnergiaPro - Wrocław**
  - Regional Electric Power Control Facility – local MV control room in Wrocław
  - Regional Electric Power Control Facility – local LV control room in Wrocław
- **ENERGOAPARATURA S.A. - Katowice**
  - EC Zabrze (heat and power generation plant)
- **ENERGOPROJEKT - Gliwice**
- **ENERGOTEST ENERGOINWEST Rybnik**
  - Electric power plant in Rybnik
- **ENERGOTEST ENERGOPOMIAR Gliwice**
  - Electric power station in Stalowa Wola
  - Electric power station in Kozienice
- **Fabryka Kotłów RAFAKO S.A. – Racibórz (a boiler manufacturing plant)**
- **GE Industrial Systems GmbH – Berlin**
- **HONEYWELL Sp. z o.o. – Warsaw**
- **INDUSTRIAL CONTROL Sp. z o.o. – Warsaw**
- **JJK ENERGIE – France**
  - consoles for the Ruwais petroleum refinery, Abu Dhabi (United Arab Emirates)
- **JJK ENERGIE – Warsaw**
  - Heat and power generation plant Opole
- **Keller – Germany**
  - modular desks for Spain and Australia
- **KGHM Polska Miedź S.A.**
  - Zakłady Górnicze Lublin (a mining company)
- **KOMSTER Sp. z o.o.**
  - modernisation of central railway control stations in Iława, Szczecin, Katowice
- **Kopalnia Węgla Brunatnego – Kleczew (a brown coal mine)**
  - dispatch room of the Kazimierz Wielki strip mine
  - dispatch room of the Lubstów strip mine
  - dispatch room of the Józefów strip mine
- **LEOLA BALT - Kaliningrad**
- **MAHLE - Krotoszyn**
- **MAGO - HURT Sp. z o.o. - Jelenia Góra**
- **MERCOMP PŁOCK Sp. z o.o.**
- **METSO Automation**
  - Electric power plant in Siekierki
  - Arctic Paper Kostrzyń
  - Electric power plant in Żerań
- **Mostostal Zabrze**
  - Electric power plant in Cieszyn
- **Neles Automation**
  - Electric power plant in Żerań
- **PHU Normatech S.C. – Starachowice**
- **PPUiH TEJA Sp. z o.o. – Ząbkowice Śląskie**
- **PSE Centrum Sp. z o.o.**
  - Control room of the Substation 220/110 kV Mory
- **PSE Operator S.A.**
  - Seat of the Transmission System Operator in Konstancin-Jeziorna
- **Prochem – petroleum refinery in Trzebinia**
- **Przedsiębiorstwo Energetyki Cieplnej Bełchatów (heat generation company)**
- **Przedsiębiorstwo Kompletacji i Montażu Systemów Automatyki – Tychy (an automatics plant)**
- **TERMALL Bełchatów**
  - Heat and power generation plant in Katowice
- **QMAC Sp. z o.o. – Tarnów**
- **Walcownia Stali Czechowice – Dziedzice (a steel rolling mill)**
- **Westinghause Poland**
  - Electric power plant in Gacko – Bosnia and Herzegovina
- **Wrocławskie Kopalnie Surowców Mineralnych S.A. (a mining company)**
- **Zakłady Azotowe Kędzierzyn (a chemical plant)**
  - Central control room of the ammonia section
  - Control room of compressors in the ammonia section
- **Zakłady Azotowe Puławy (a chemical factory)**
- **ZAPIS HARDWARE Ostrów Wielkopolski**
  - Electric power station in Połaniec
- **Zakład Energetyczny Będzin (a power distribution company)**
  - Operation control room
- **Zamojska Korporacja Energetyczna S.A. (a power distribution company)**
  - Regional operation control room - Chełm
- **Zespół Elektrowni Wodnych Porąbka-Żar S.A. in Międzybrodzie Żywieckie (hydroelectric power stations)**
  - operation dispatch room
  - control room of the carburisation section in the heat and power generation plant in Katowice
- **Zespół Elektrowni Wodnych Niedzica (hydroelectric power stations)**
  - control rooms for the power station's blocks
- **Zielonogórskie Kopalnie Surowców Mineralnych S.A. (a mining company)**
- **ZSA MERA – PNEFAL Sp. z o.o. - Warsaw**

GENERAL DESCRIPTION OF DESKS

In the area of control and dispatch desks, ZPAS-NET mainly offers products with shape and functionalities adjusted to the needs of a particular facility in which they are to be installed. Such consoles are manufactured according to the documentation supplied by the customer or prepared by our design department. Quite often our consoles are a part of complex orders incorporating matching electrical accessories, mimic boards and on-site assembly.

Because of their round-the-clock use, our desks are made of top-quality materials which guarantee high durability and visual attractiveness. To this aim, our designers co-operate with design offices, architects and ergonomics specialists.

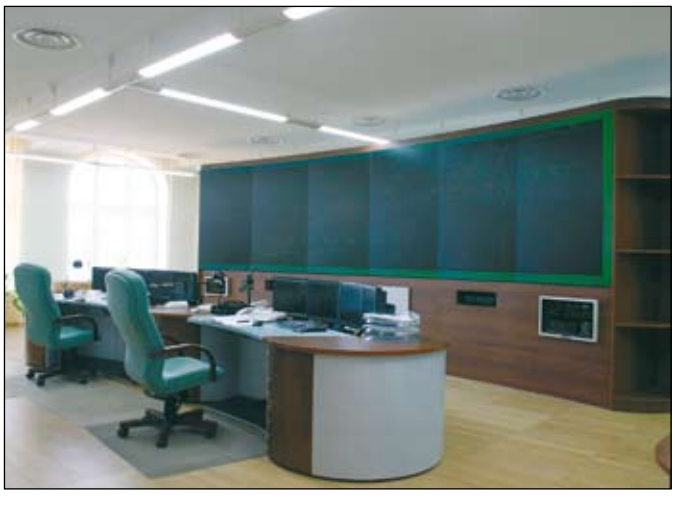
CONTROL DESKS DESIGNED FOR INDUSTRIAL FACILITIES

Control desks can be made entirely of sheet steel. Console shape and dimensions should be tailored to a particular facility and appliances in accordance with customers' individual needs and requirements.

DISPATCH AND DISPATCH/CONTROL DESKS

In the case of dispatch or dispatch/control desks which also perform a function of an operating workstation, the design comprises a base, a desktop, and – if necessary – additional tops.

Desktops are made of a wide range of materials, from wood-like boards to synthetic materials – depending on particular needs and standard requested by the customer. In simple designs which do not call for an application of expensive technologies, double-sided laminated or MDF boards are typically used, in a wide range of colours of the finishing laminate elements. Acrylic materials, such as Paracor or Corian, enable a wider range of applications.



Desktops can also be made of mimic panels which allow quick and easy changes of visual matrix diagrams and arrangements of installed instruments.

Desktops can be equipped with tops of various shapes and dimensions making it easy to install monitors, push buttons, meters, displays or other types of devices.

COLOUR SCHEMES

Metal elements of consoles can be painted, galvanised or made of plain stainless steel, without any extra surface finish. We use epoxy and polyester powder paints, textured, in all colours from the RAL catalogue.

SAMPLE CONFIGURATIONS

Thanks to regular and close co-operation with specialists from many fields, including industrial design, ergonomics and interior architecture, and an experienced manufacturing team, ZPAS-NET is able to provide customers with any configuration of control desks, present their spatial arrangement in a room and assembly the complete structure on site in a turnkey system.

With the help of dedicated computer programmes, we are able to present our customers sample dispatch/control room arrangements, including a proposal for a complete range of fittings suited to a given facility and on-site assembly.

SAMPLE CONFIGURATIONS OF DISPATCH ROOMS

PDM DISPATCH AND CONTROL DESKS

General description

The new line of dispatch and control desks produced by ZPAS-NET is based on an innovative design approach incorporating a modular structure.

The main assumption in the process of designing new modular desks was to develop and define a standard which – due to its modular construction – would enable a wide range of available combinations of system elements.

This solution, compared to traditional one-piece designs, costs less and can be delivered to the end customer within a shorter time. Now a potential customer can choose between a number of standard modules which – assembled together – make up the finished product.

An appropriate selection of elements makes it possible to adjust desktop colour to the overall colour scheme of a given room or to specific customer requests.

Moreover, the structure itself, based on a central frame, makes it possible to use different finishing materials, which gives customers a possibility to choose between more economical and more luxurious versions.

In terms of industrial design, the main idea of new modular consoles is based on the development of several interchangeable elements marked by innovative shape and construction properties.

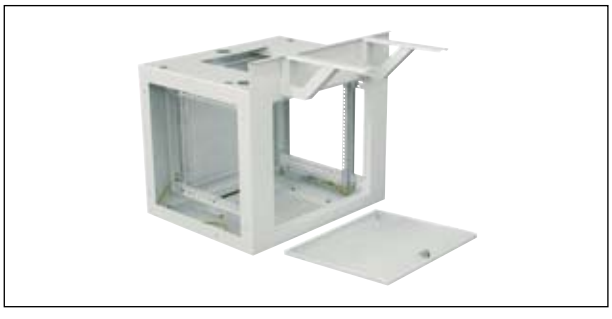
Modular structure enables to adjust consoles to virtually every dispatch/control room.

PDM DISPATCH AND CONTROL DESKS

Components

PC module

A two-tier 19" cabinet designed for installing the central unit of the system or other types of electronic devices. The upper part of the cabinet is used as a support for the operating desktop, while the lower (rear) part is designed for placing monitors. Two PC modules are designed for one workstation.



Cylinder with 8 drawers

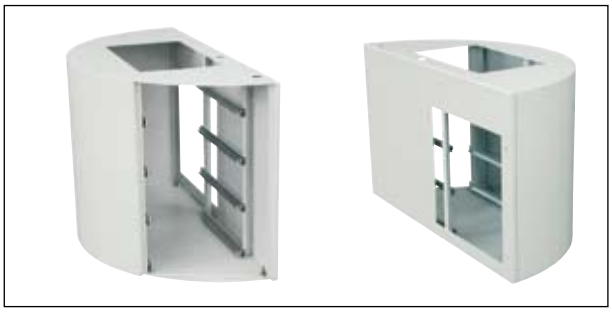
A central unit which makes it possible to arrange sets at any desired angle.

It can be connected to:
- the PC module,
- the shield joining the cylinder with the PC module

Half-cylinder with 4 drawers

A side element for closing the set.

It can be connected to:
- the PC module,
- the shield joining the cylinder with the PC module,
- the other half of the cylinder (central module)



Side wedge

An end element (without drawers).

It can be connected to:
- the PC module.

15° wedge

The wedge enables bending sets by 15°. If more than one wedge is used, then the bending angle can be increased.

It can be connected to:
- the PC module

PDM DISPATCH AND CONTROL DESKS

Rear shield

A shield for covering the rear space between the cylinder and the PC module.

It can be connected to:

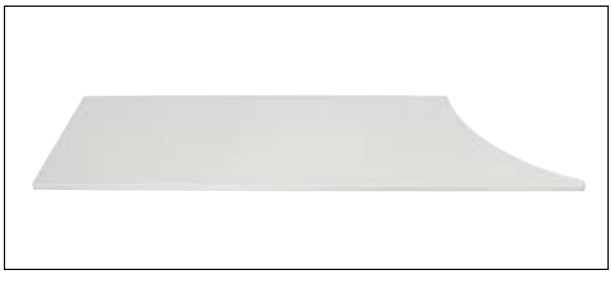
- the PC module,
- the cylinder as the central element of the console

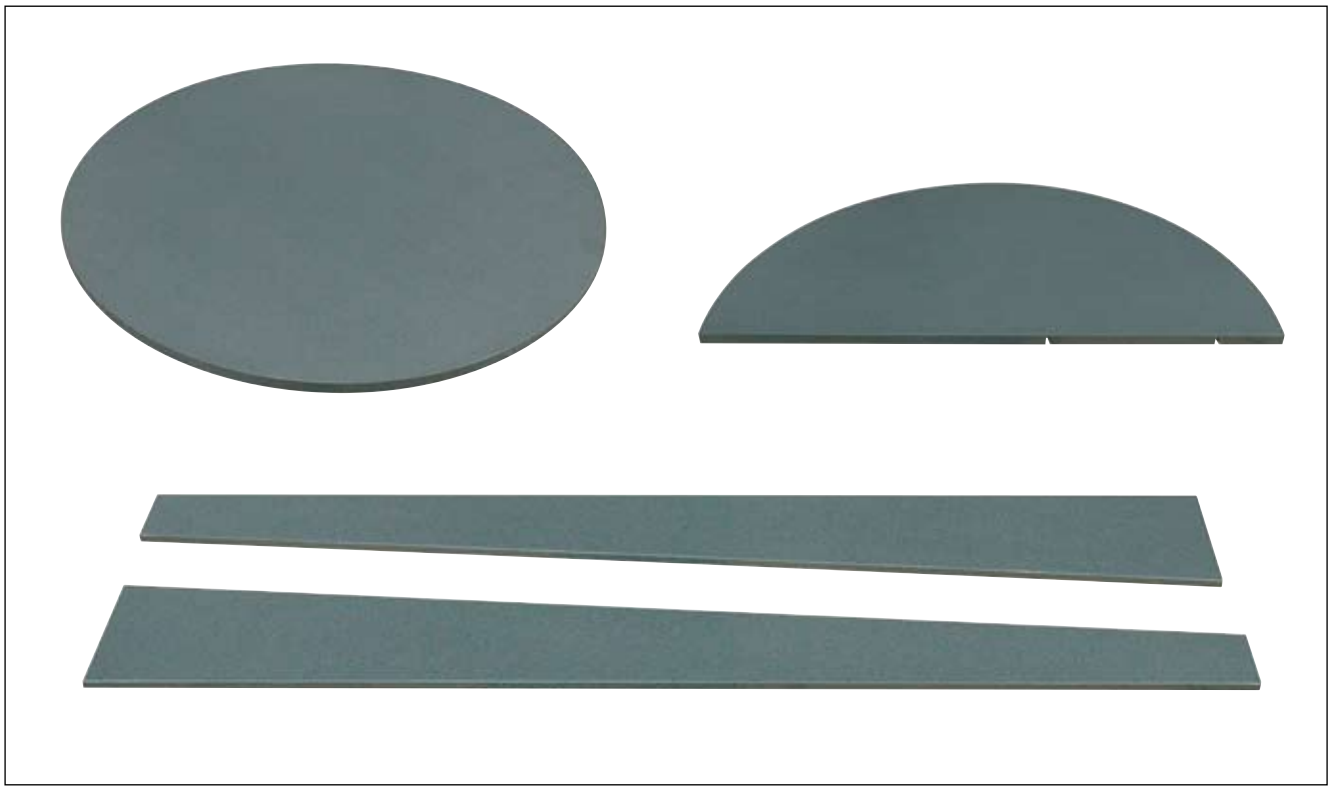
Desktops

Desktops, sides, tops and other elements of consoles can be make of modern synthetic materials - depending on customers' needs and the required standard. Given the fact that they are used round-the-clock, consoles must be made of high-quality materials ensuring long durability and visual attractiveness.

Desktops of the proposed modular control and dispatch desk are made of the following materials:

- Chipboard, laminated on both sides, with edges protected by PCV strip matching the colour of the desktop.
- MDF board, laminated, with increased resistance to abrasion, with edges protected by PCV strip matching the colour of the desktop.
- Modern synthetic materials, for example Paracor/Plexicor, Corian, SSV



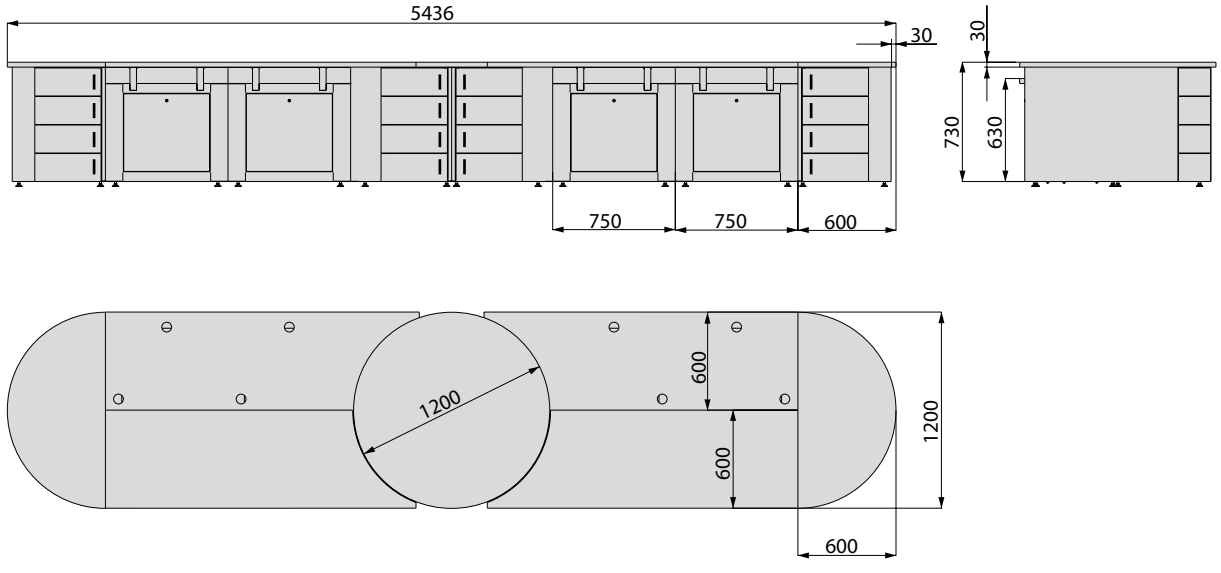


PDM DISPATCH AND CONTROL DESKS

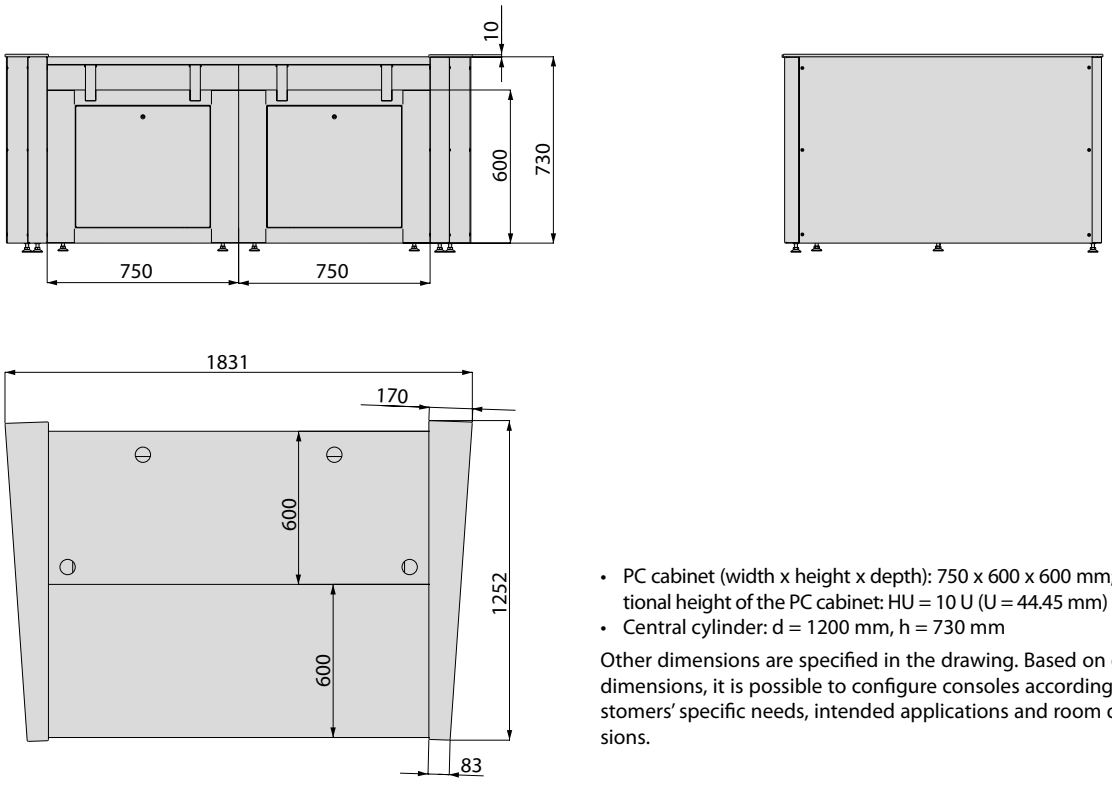
Overall dimensions of components

An appropriate configuration of the typical components described above allows to create a virtually unlimited number of operator workstations.

Straight-line double-station desk



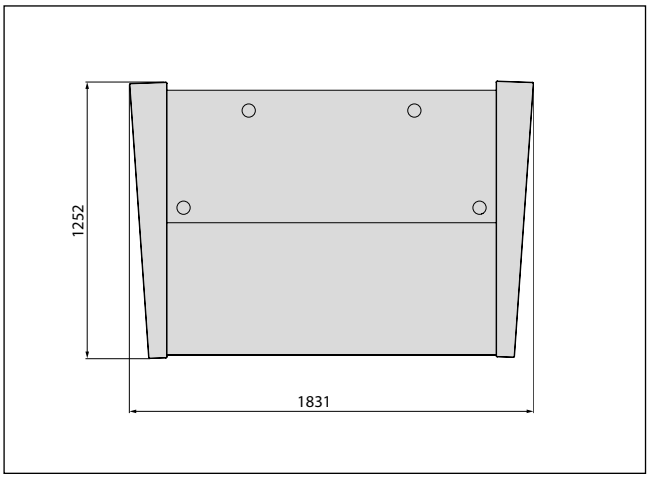
Single-station desk



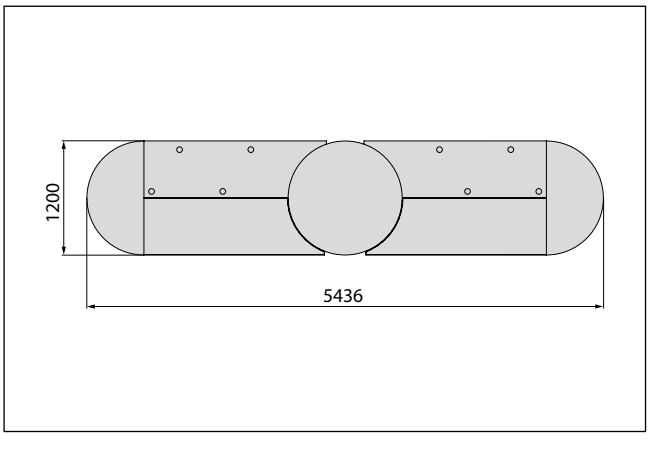
- PC cabinet (width x height x depth): 750 x 600 x 600 mm;operational height of the PC cabinet: HU = 10 U (U = 44.45 mm)
- Central cylinder: d = 1200 mm, h = 730 mm

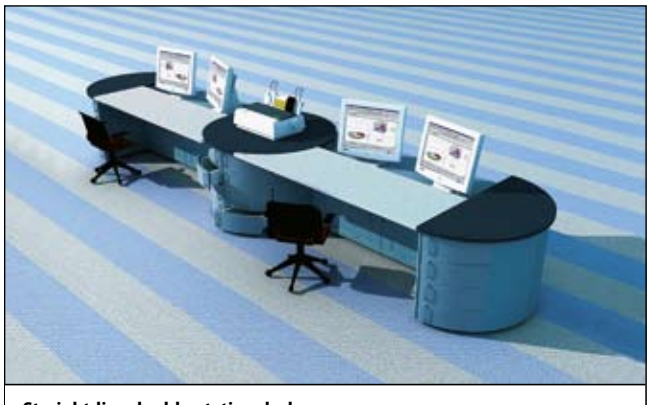
Other dimensions are specified in the drawing. Based on overall dimensions, it is possible to configure consoles according to customers' specific needs, intended applications and room dimensions.

PDM DISPATCH AND CONTROL DESKS

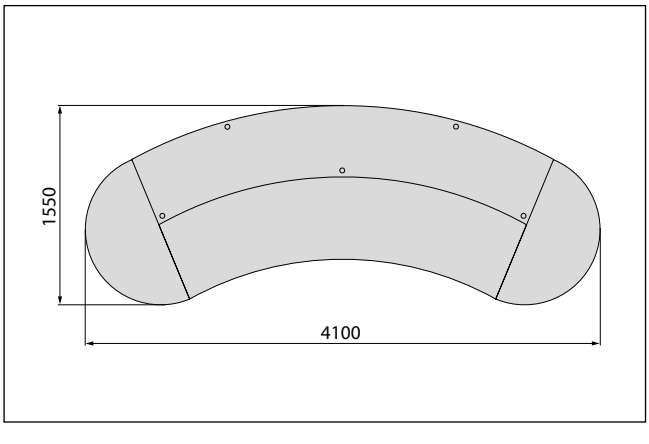


Single-station desk

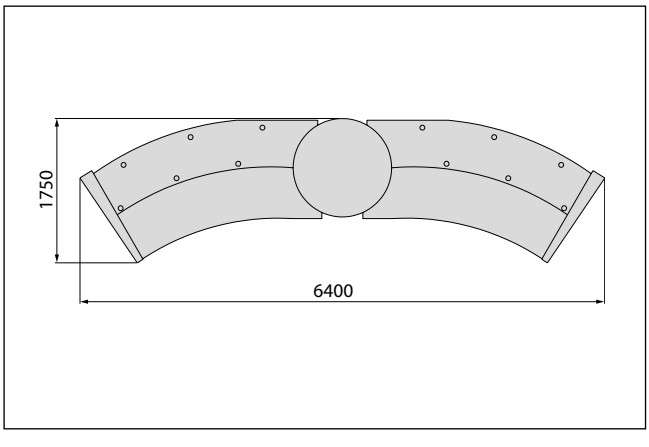




Straight-line double-station desk



Arch-shaped desk



"Broken-line" double-station desk

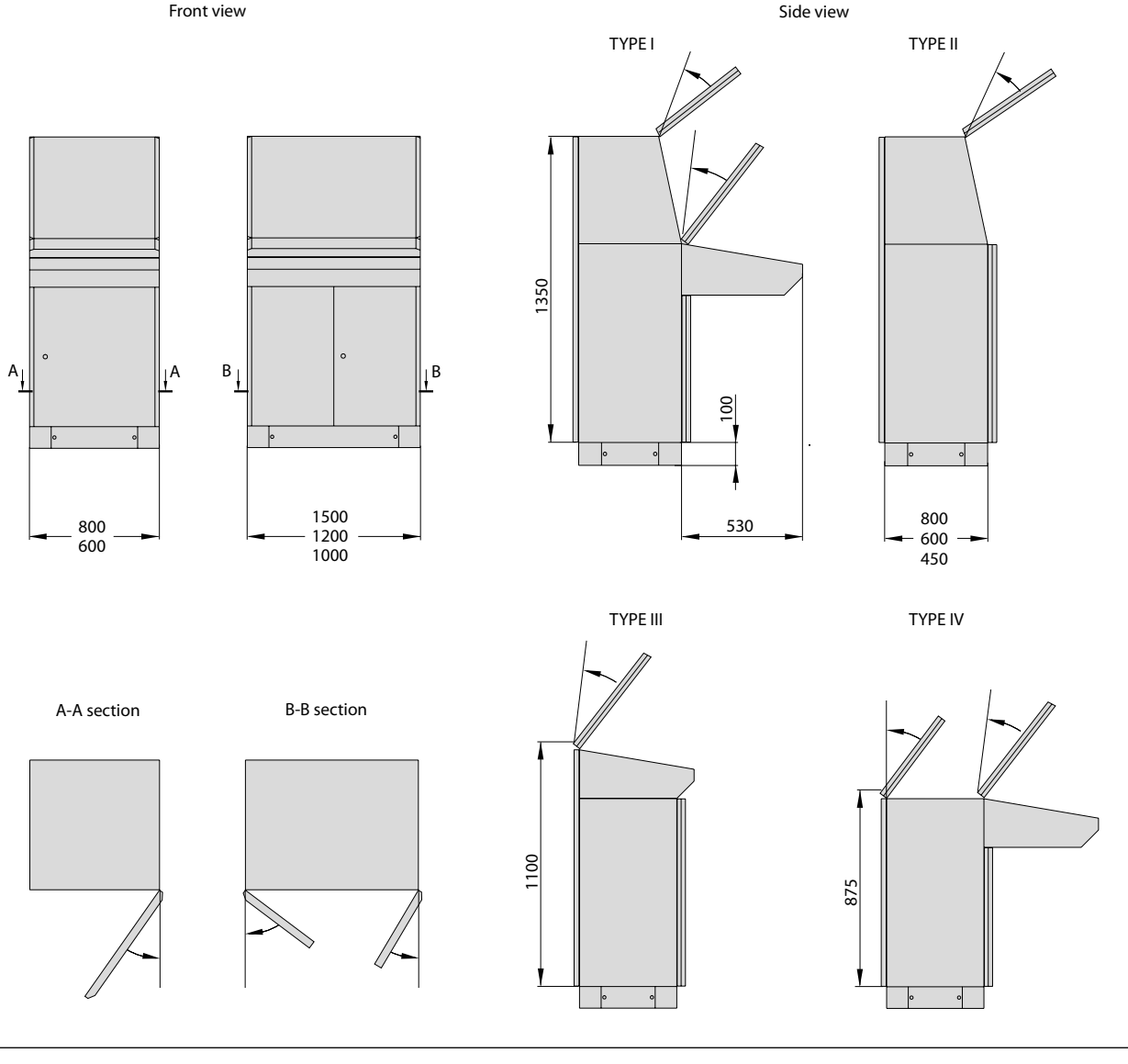
PSL CONTROL DESKS

PSL-type control desks are designed for mounting control apparatus, measurement and monitoring systems, computer equipment and visualisation devices representing production processes. They are particularly recommended for operating workstations in automated processing lines or machining centres. As a standard, PSL control desks are manufactured in four types.

Sample control desk
1. Top part, 2. Hinged panel of the front segment, 3. Top segment, 4. Front segment, 5. Bottom segment, 6. Rear shields, 7. Door, 8. Plinth

NOTE:
- Both top and bottom segments are equipped with mounting plates with adjustable mounting depth.
- Cutouts in the panels of the top and front segment can be tailored to the customer's requirements.
- Cable entries are located in the base of the bottom segment.
- Desk is set on a plinth which can be anchored to the floor.

PSL CONTROL DESKS



SAMPLE CUSTOMISED PROJECTS

Double-station control desk with a Corian desktop

Control desk incorporating a one-piece metal base with 19" frames and a double-tier desktop made of Corian. The desktop is provided with keyboard drawers and cable entries.

Stainless steel desk

A stainless steel desk supplied to GE Industrial Systems - Berlin.

SAMPLE CUSTOMISED PROJECTS

Single-station desks

Desks made up of standard 19" metal cabinets, a side element and an MDF board desktop with increased mechanical resistance and quality.

SAMPLE REALISED PROJECTS

Regional Power Dispatch Facility in Wrocław

A PDM-type modular control desk installed in the medium-voltage dispatch room.

An ARCUS-type modular control desk installed in the low-voltage dispatch room.

SAMPLE REALISED PROJECTS

Chemical plant Kędzierzyn S.A.

PDM-type modular control desks.

SAMPLE REALISED PROJECTS

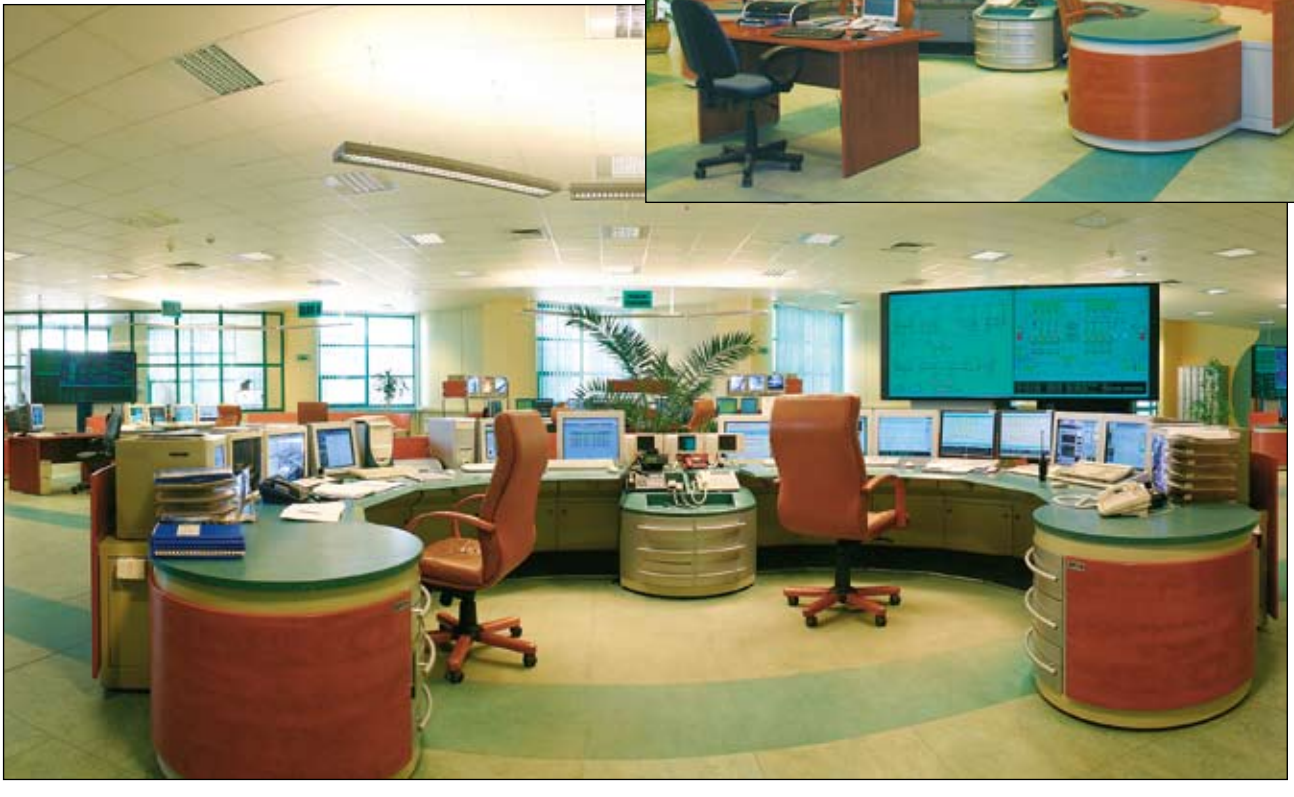
Control room of a power station in Warsaw

A PDM-type modular control desk

SAMPLE REALISED PROJECTS

Electric power station in Połaniec

ARCUS-type modular control desks installed in the central control room.
Dispatcher workstations of all power station blocks are located in one room.



SAMPLE REALISED PROJECTS

Power control room of electric power station in Skawina

PDM-type modular control desk with a mimic board undergoing modernisation.

SAMPLE REALISED PROJECTS

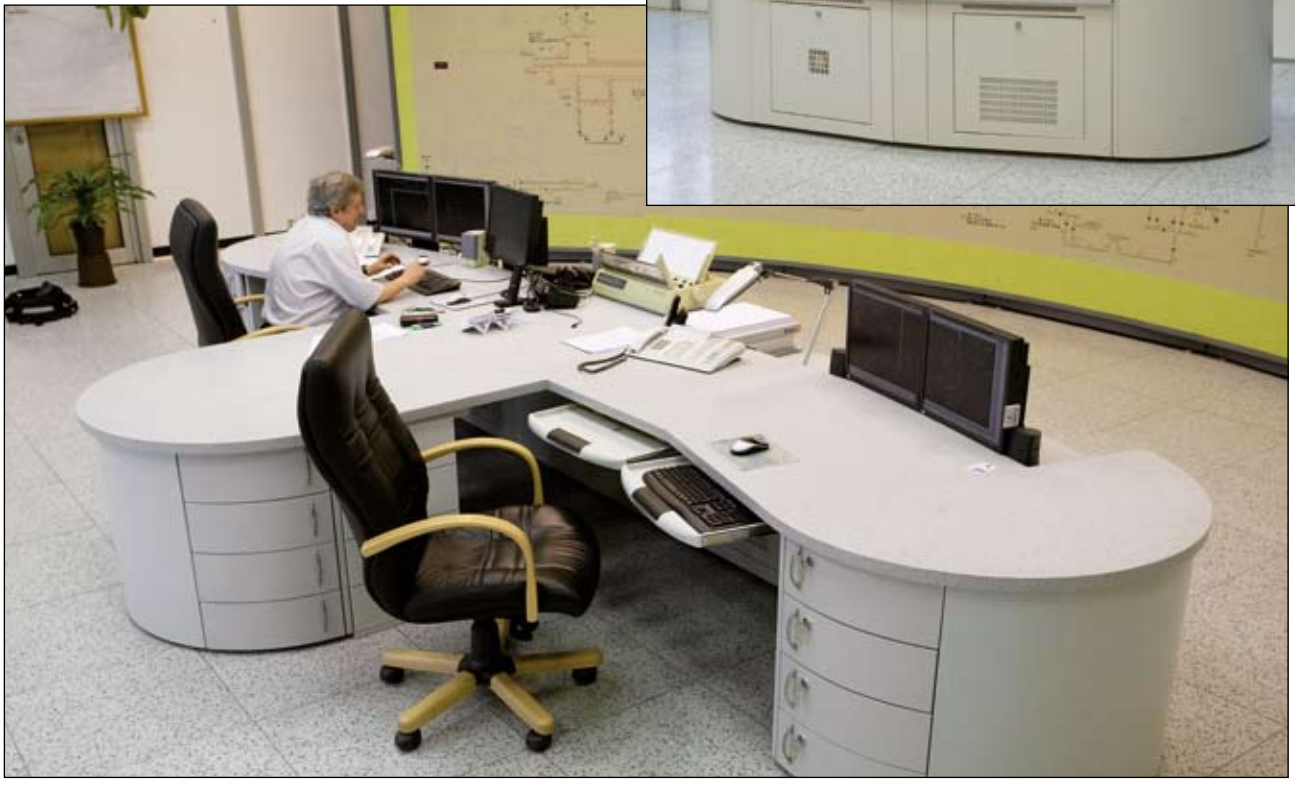
Gas compressor plant in Ciechanów

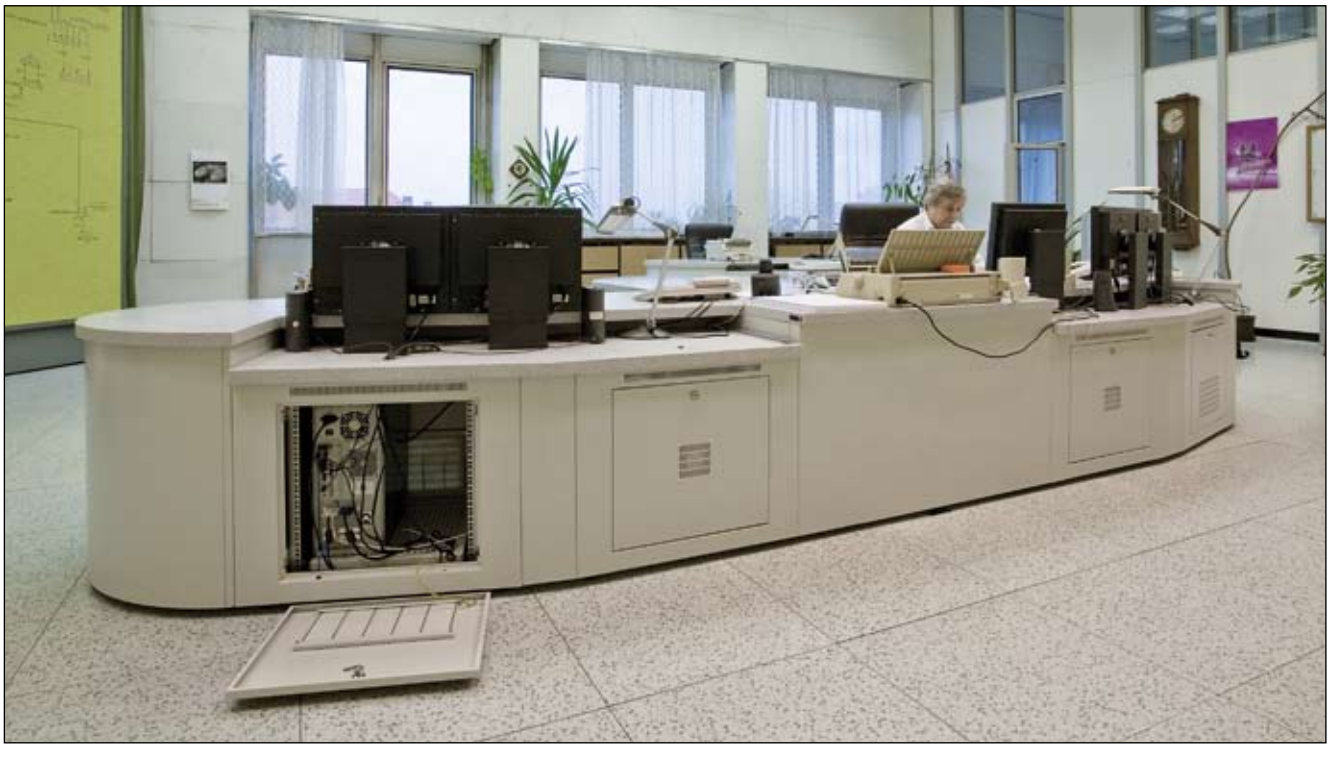
A PDM-type modular desk in the control room of the gas compressor plant.

SAMPLE REALISED PROJECTS

EnergiaPro S.A.

PDM modular desks installed at the Plant Dispatching Centre in Wrocław





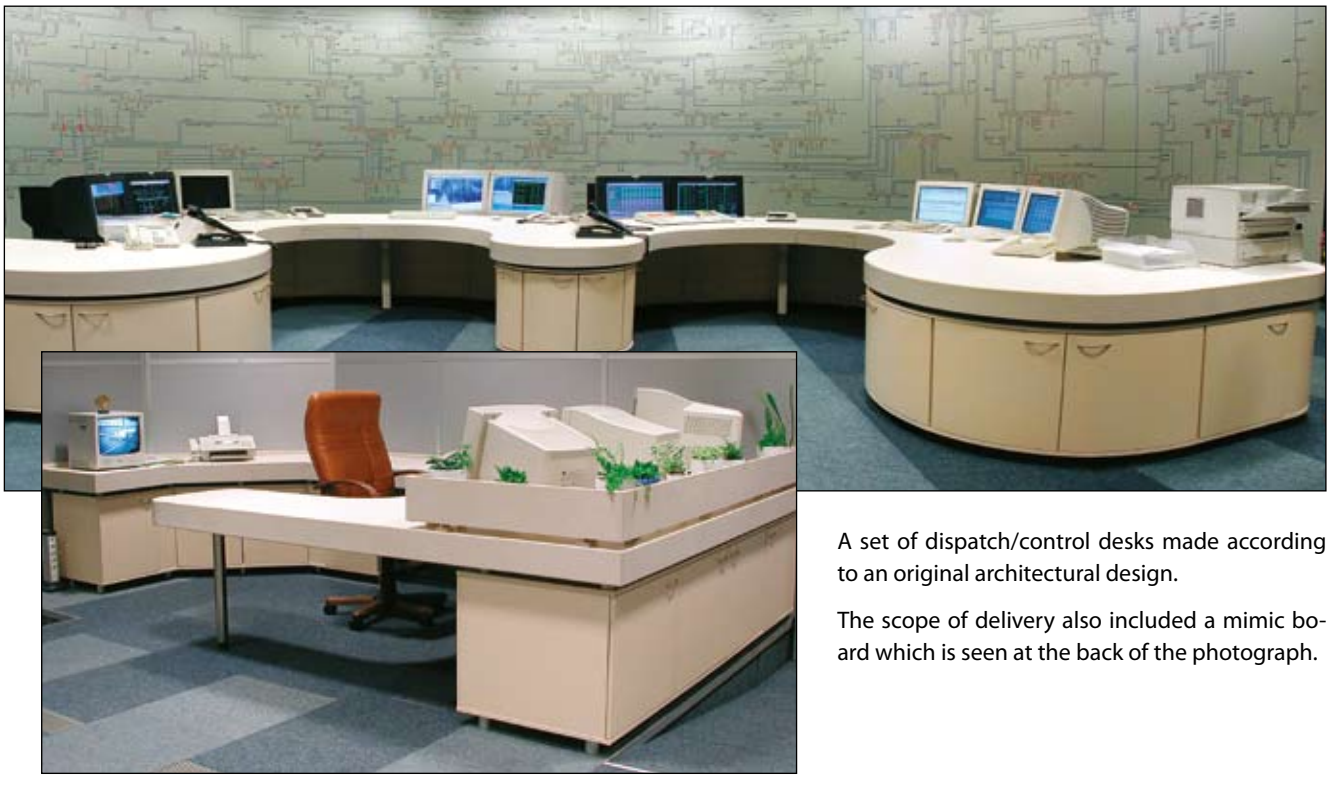
SAMPLE REALISED PROJECTS

Gas compressor plant in Kondratki

A control desk specifically designed for installing computer equipment. The desk is composed on standard 19" metal cabinets and a double-tier Corian desktop.

SAMPLE REALISED PROJECTS

Regional Power Dispatch Facility in Katowice



A set of dispatch/control desks made according to an original architectural design.

The scope of delivery also included a mimic board which is seen at the back of the photograph.

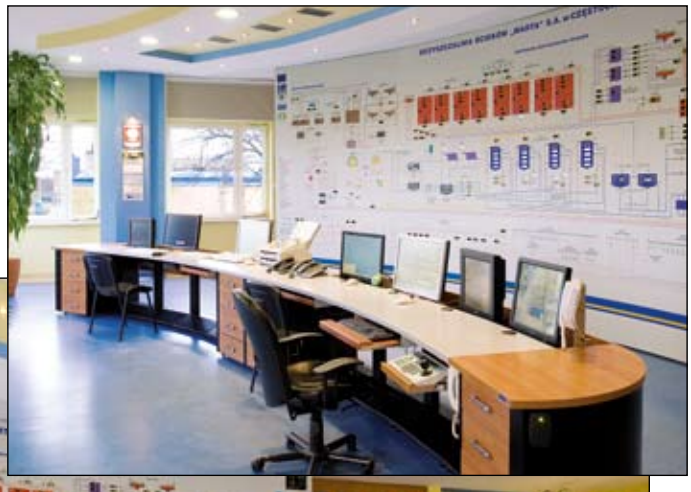
Control desk supplied to GAZPROM Russia

A set of dispatch/control desks made according to an original architectural design. The operating part of the desktop is made of Corian, while the narrower rear part is designed for installing LCDs.

SAMPLE REALISED PROJECTS

"WARTA" S.A. waste treatment plant in Częstochowa

Desk made according to an original architectural design.



SAMPLE REALISED PROJECTS

National Power Dispatch Centre (KDM)

In February 2009, ZPAS-NET completed the project consisting of the provision of equipment to dispatching centres at the main seat of PSE-OPERATOR in Konstancin-Jeziorna. The scope of works included design, architecture, interior layout and equipment, as well as technical infrastructure (structural wiring, process power supply, voice communication systems, IT network systems and visualisation systems). Works were carried out at three dispatching centres:

- KDM – National Power Dispatch Centre,

- CNOS – Control Centre for Network Facilities,

- CNOT – Control Centre for ITC Facilities.

Architectural solutions employed at KDM are also worth noting. The colour scheme adopted for the interiors, incorporating a dark blue dispatching panel (the dominating feature), uses sea green wall panels and malachite green Corian finishing elements of window sills and dispatching desks, to create a distinctive ambience of the facility, referring to the interiors of the Nautilus, a Captain Nemo's ship.

Technical solutions adopted for audio and video signal transmission, keyboard, mouse and USB are based on KVM extenders. Dispatching system workstations are accommodated in technology cabinets located in server rooms. Dispatching stations and terminals are interconnected using multi-mode optical fibers. The solution helped achieve extra free space in dispatch desks and increase the comfort of work by reducing noise and temperature levels.

SAMPLE REALISED PROJECTS

Visualisation: Krzysztof Dracz

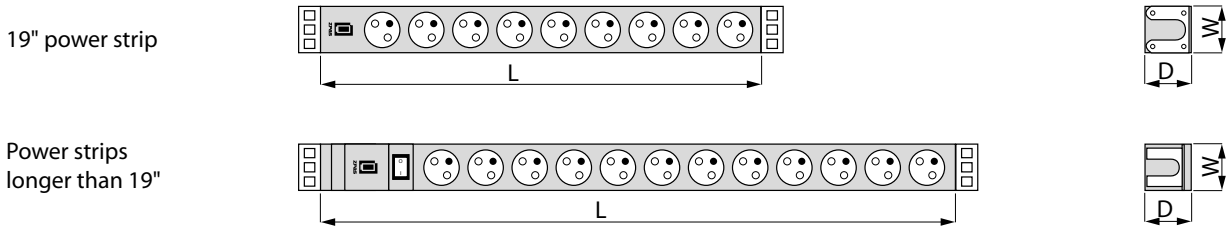
POWER STRIPS

Characteristics:
- Optimum height of 19" strips - 1 U (44.45 mm).
- Possibility of fixing the strips by different angles.
- 35° rotated position of outlet box enables unlimited usage of angular plugs (possibility of fixing strip directly one over another).
- Body of the strips made of anodized aluminium profile.
- Colour of outlets and front: light grey (RAL 7035).

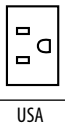
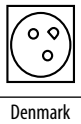
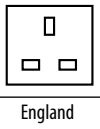
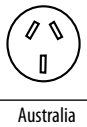
Technical data:
- Voltage rating ..... 230 V AC
- Maximum current ..... 16 A
- Attach power ..... 16 A / 3600 W
- Cable ..... 3 m, black, conductor section 1.5 mm^2
- Protection degree ..... IP 20
- Surge current ..... 6,5 kA

Scope of delivery:
Power strip with brackets and set of fixing accessories.

19" power strip with plastic mounting brackets



	Power strip type	Dimensions [mm]			Accessories					
		Lenght L [mm]	Width W [mm]	Depth D [mm]	Check lamp	Illuminated switch	Overvoltage protection with net filter	Miniature circuit breaker 2xC10	Number of plug-sockets type E (CEE 7/5)	Number of computer sockets IEC C14
19" power strips	LZI-30/9	440	44	44					9	
	LZ-30F	440	44	44		●	●		5	
	LZ-114	440	44	44	●					7
	LZ-211	440	44	44		●			6	
	LZ-214	440	44	44		●				7
	LZ-312	440	44	44	●			●	3	2
Power strips longer than 19"	LZ-221	660	52	44		●			12	
	LZ-521	830	52	44	●		●	●	9	1
	LZ-131	915	52	44	●				18	
	LZ-231	915	52	44		●			18	
	LZ-331	1040	52	44	●			●	15	3
	LZ-531	1040	52	44			●	●	15	1
	LZ-532	1090	52	44	●		●	●	12	4

Type of sockets								
Standard sockets		Sockets available on special request						
								
Type E (CEE 7/5) 230 V; 10/16 A	IEC C14 230 V; 10 A	Schuko 230 V; 10/16 A	Switzerland 230 V; 10 A	USA 125 V; 10 A	Denmark 230 V; 10 A	England 230 V; 13 A	Italy 230 V; 10/16 A	Australia 240 V; 10 A

POWER STRIPS

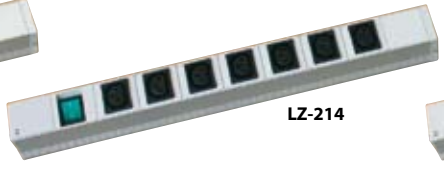
19" power strip with metal mounting brackets

LZ-30F

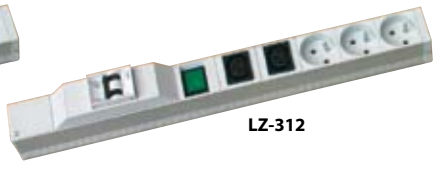
LZ-114

LZ-211

LZ-214



LZ-312

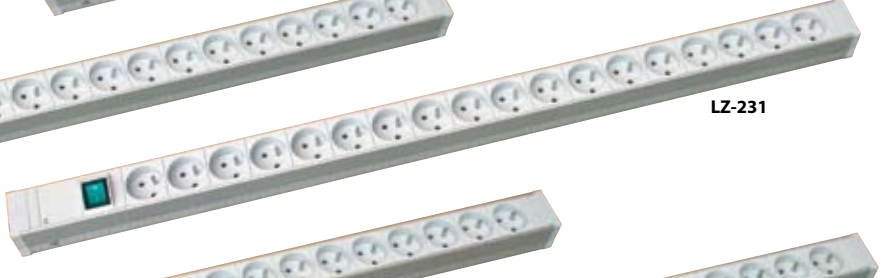


LZ-221

LZ-521

LZ-131

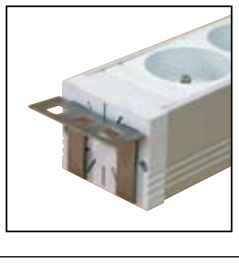
LZ-231



LZ-331

LZ-531

LZ-532



Power strips longer than 19"

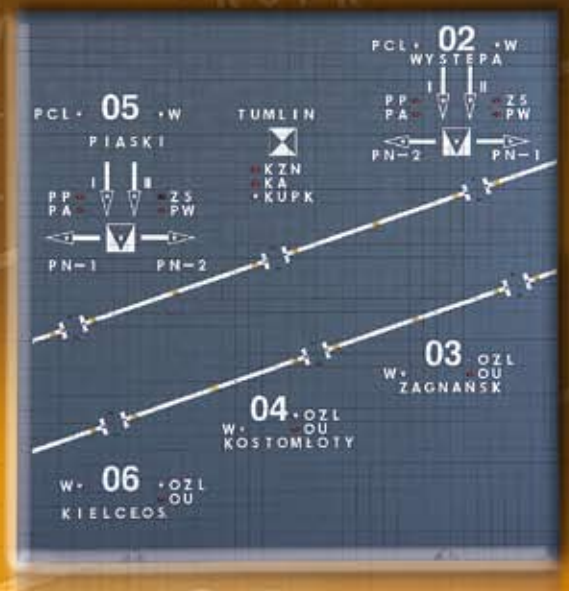
CORIAN AND STARON – MODERN FINISHING MATERIALS

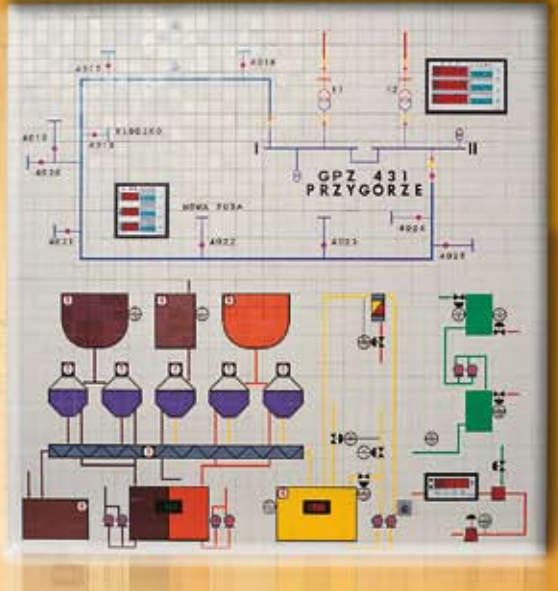
Desktops, sides, top segments and other elements of control desks can be made of modern materials such as Corian or Staron.

- The materials are acryl-mineral composites which are excellent for producing solid and hygienically clean surfaces. Manufactured in the form of boards, they provide a variety of colours with different shades and patterns. Desktops are usually made of boards 6 and 13 mm thick.
- Their homogenous structure can be easily cut, milled, planed, drilled, shaped and connected at will to meet specific requirements, which makes it possible to realise even extremely complicated projects.
- All joints and connections are made with two-ingredient glues, mixed in appropriate ratios at a temperature not lower than 15 °C. Gluing durability is at least 30 MPa.
- Corian and Staron materials are pleasing to the touch and they feel warm. Their smooth surface makes them very easy to clean.
- They do not absorb odours or liquids, nor they attract static electricity. There are no contradictions as to their contact with food. They are classified as fire retardants.
- They are resistant to the majority of chemical agents, high temperatures and mechanical damage (cracks, scratches). Any signs of wear and tear can be easily removed without a trace.
- A wide selection of more than forty colours and textures (pastel, uniform, grainy or striated) offers exceptional design and production possibilities.

Dome of the control desk made of white Corian

Sample colours of boards made of Staron (a texture resembling a stone surface).


PCL 05 W
PIASKI
PP PA ZS PW
PN-1 PN-2
TUMLIN
KZN KA KUPK
PCL 02 W
WYSTEPA
PP PA ZS PW
PN-2 PN-1
03 OZL OU
W ZAGNAŃSK
04 OZL OU
W KOSTOMŁOTY
W 06 OZL OU
KIELCE OS


GPZ 431
PRZYGORZE

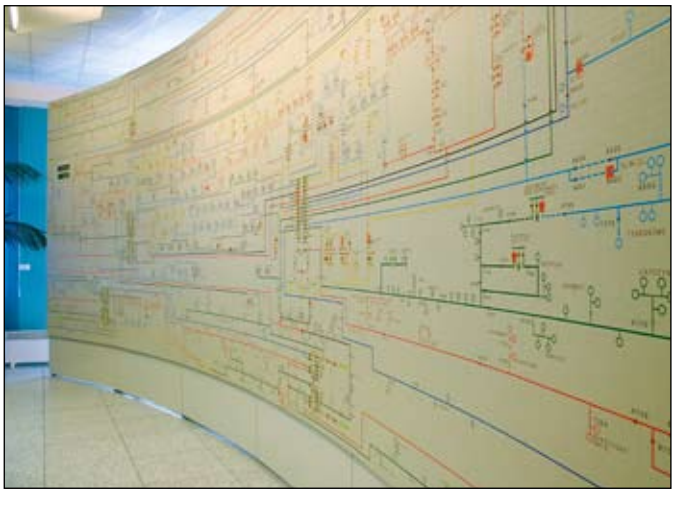
GENERAL DESCRIPTION OF MIMIC BOARDS

Mimic panels allow to graphically represent technology processes, diagrams of power networks, water supply and distribution network, gas grids, plans and other individually arranged solutions. With the application of modern, complex and automated technologies, mimic boards serve as a visualisation tool effectively supporting control and management processes. Thanks to the use of modules incorporating light components, it is possible to instantly visualise expanding and changing processes and to reflect the operating condition of devices by means of LED signalling with an option of control from front panel devices.

ZPAS-NET is a leading producer of dispatch mimic boards in Poland. Mimic matrix boards are mainly produced for the power sector, for electric power stations, heat and power generation plants, sewage treatment plants, the mining industry, chemical industry, water supply systems, monitoring systems of industrial facilities, etc. Virtually all local and regional power dispatch centres in Poland are equipped with our mimic boards.

Assembly and commissioning of mimic boards at customers' facilities are performed by teams of specialists. Our experts also expand, modernise, develop and modify existing boards. We offer quick and continuous maintenance services. ZPAS-NET keeps abreast of changing market requirements, launching innovative solutions dictated by emerging needs related to the visualisation of power networks and industrial processes.

Mimic boards are available in two dimensions: STM, with 25 x 25 mm raster, and DTM, with 24 x 24 mm raster.



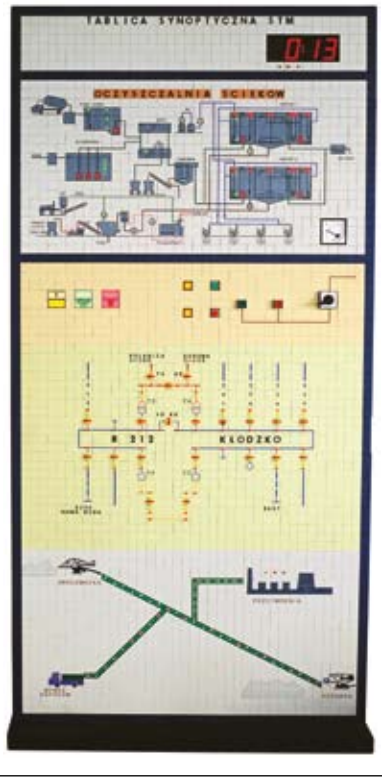
DTM boards are perfectly suited for incorporating analogue indicators without the necessity to use additional covering elements. The basic lighting components of mimic boards are LED modules (with one or many LEDs). There are also other elements fixed in the board's surface, including pushbuttons, switches, controllers, digital displays, analogue and digital meters, signal boxes, analogue and digital clocks, monitors, visual screens, etc. Updating and changing of board images is quick and easy thanks to special caps placed on the frames.

Self-latching caps used in the DTM and STM systems allow for expansion according to individual needs. The matrix surface takes one of four forms: straight, radial (polygonal), broken-type and cabinet-type (wall-mounted). Thanks to specially profiled edges, it is possible to finish boards without visible divisions between individual panels. Cycolac, the material used to make board panel elements, is highly flexible, extremely resistant to temperatures and lightweight. In addition, it has hygiene and fire retardation certificates issued by Polish Scientific Institutes. The material makes it possible to obtain products which are very resistant, flexible and visually attractive. Mimic boards with diagrams are easily adjustable and expandable depending on user needs; flexibility is the main advantage of the design offered. All clean caps can be inserted quickly and easily into any point on the board. Panels with devices and caps can be easily installed in control desks, rotary frames and control cabinet doors.

REFERENCES FOR MIMIC BOARDS

Boards for the power industry

- **NATIONAL POWER DISPATCH CENTRE**
  Warsaw and Konstancin-Jeziorna.
- **REGIONAL POWER DISPATCH FACILITIES**
  Katowice, Poznań, Radom…
- **LOCAL DISPATCH UNITS AND POWER CONTROL CENTRES**
  Białystok, Bielawa, Bielsk Podlaski, Brodnica, Chełm, Chodzież, Choszczno, Dąbrowa Tarnowska, Dębica, Dębno Lubuskie, Dzierżoniów, Gdańsk, Gdynia, Grudziądz, Kędzierzyn-Koźle, Kluczbork, Krasnystaw, Legionowo-Warszawa, Lubań, Łomża, Międzyzdroje, Myszków, Nowa Sól, Oborniki Śląskie, Ostrołęka, Piła, Poznań, Rypin, Starogard Gdański, Stargard Szczeciński, Strzegom, Tomaszów Lubelski, Toruń, Trzebnica, Wałbrzych, Wejherowo, Wielopole, Włocławek, Wyszków, Zamość…
- **IN-HOUSE DISPATCH CENTRES**
  Będzin, Białystok, Bydgoszcz, Gorzów Wielkopolski, Wałbrzych, Zielona Góra…
- **ELECTRIC POWER STATIONS**
  Bełchatów, Dolna Odra, Porąbka-Żar hydroelectric power station, Jaworzno II, Jaworzno III, Konin, Kozienice, Opole, Pątnów, Połaniec, Siersza, Skawina, Turów, Niedzica hydroelectric power stations…



Boards for technology industries

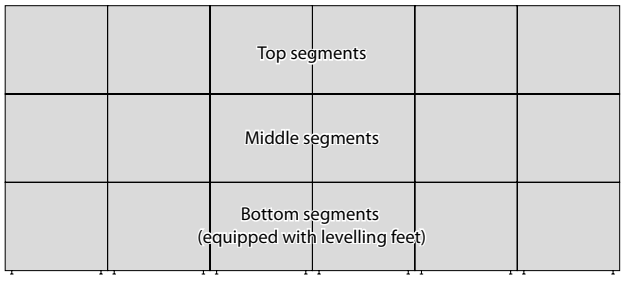
- **HEAT AND POWER GENERATION PLANTS**
  Białystok, Bydgoszcz, Cieszyn, Chrzanów, Czechnica, Gdańsk, Janikowo (Janikosoda), Kalisz, Katowice, Karolin, Kraków, Łódź, Siedlce, Siekierki, Starchowice, Tarnobrzeg, Tychy, Władysławowo, Zgierz, Żerań…
- **WATER SUPPLY/DISTRIBUTION COMPANIES AND MUNICIPAL SERVICES COMPANIES**
  Będzin, Bydgoszcz, Dziećkowice, Legnica, Łódź, Płock, Przemyśl, Puławy, Słupsk, SUW Dąbrowa in Łódź, SUW Teofilów in Łódź, SUW Kalinko in Łódź,Warsaw-Śródmieście, Zakład Wodociągów i Kanalizacji Łódź (a water supply and sanitation company) – dispatch room in the water production section, Zakład Wodociągu Praskiego in Warsaw (a water supply company), ZUN Ropica Polska, Żary…
- **WASTEWATER TREATMENT PLANTS**
  Bielsk Podlaski, Bydgoszcz, Gniewkowo, Gorzkowice, Gostyń, Gubin, Hel, Jędrzychowice, Kłaj, Knurów, Konin, Koronów, Kostrzyń, Legnica, Leszno, Mielno, Nowa Sól, Radocha near Sosnowiec, Radomsko, Radzyń Podlaski, Rawicz, Staszów, Suwałki, Ścinawka Dolna, Szlachcin, Trzemeszno, Ustka, Wałcz, Zbęszyń.
- **CENTRAL RAILWAY CONTROL STATIONS**
  Częstochowa, Iława, Kielce, Lublin, Opole, Poznań, Sopot, Warsaw…
- **CONTROL ROOMS FOR UNDERGROUND RAILWAYS AND TRAM NETWORKS**
  Warsaw Underground – stations A1-A15, Warsaw Underground at Plac Wilsona, municipal transport companies: MPK Kraków, MPK Poznań (“quick tram” line)
- **GAS COMPRESSOR PLANTS**
  Gdańsk - Gdynia, Jarosław, Kondratki, Maćkowice, Mirocin…
- **MINES**
  Hard coal mines: Bielszowice, Borek-Miechowice, Chwałowice, emergency management centres in Czeladź, Janina, Jasmos, Murdzki, Piekary, Rymer, Siemianowice, Śląsk, Szombierki-Bytom, Zdzieszowice, Ziemowit, Zofiówka.
  Brown coal mines: Adamów, Bełchatów, Sośnica, Turów…
- **SUGAR FACTORIES**

  Lublin, Łubna, Opole, Opole Lubelskie, Ostrowy, Ropczyce, Włostów, Wrocław…
- **MONITORING BOARDS**

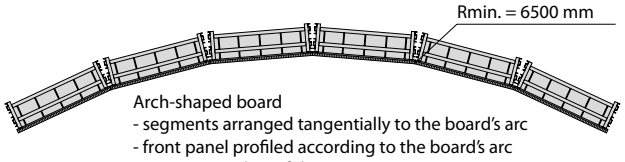
  Swimming pool in Gostyń, National Library in Warsaw, Renaissance Tower building in Warsaw, Polish-German Federation building, Polkomtel building, ELPRO in Berlin, Hotel Port Okęcie, Hotel Poznań, Hotel Zakopane, Huta Zawiercie (a steel plant), KDM in Warsaw, Okęcie Airport in Warsaw, Wrocław Airport, PFC Poznań, Supreme Court in Warsaw, Telekomunikacja Polska S.A. in Warsaw.

DESIGN OF MIMIC BOARDS

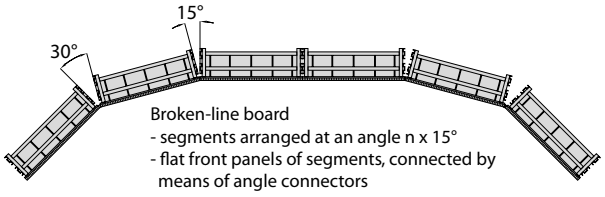
Free-standing boards



Flat board
- with evenly aligned segments
- flat front panel

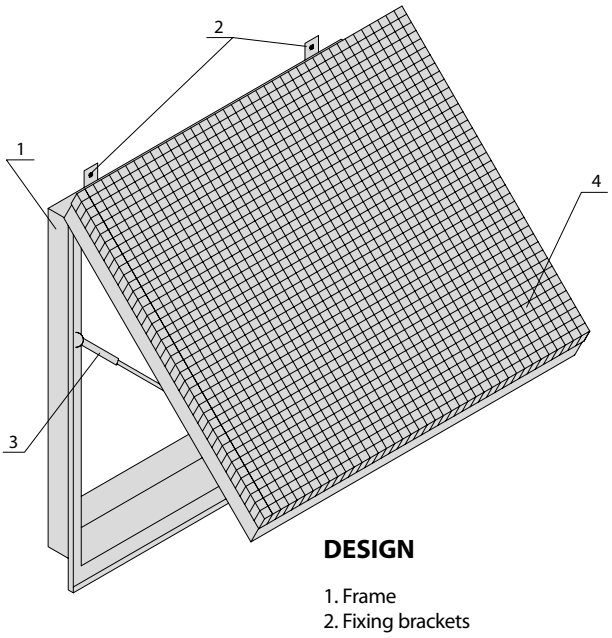


Arch-shaped board
- segments arranged tangentially to the board's arc
- front panel profiled according to the board's arc
- minimum radius of the arc R = 6500 mm



Broken-line board
- segments arranged at an angle n x 15°
- flat front panels of segments, connected by means of angle connectors

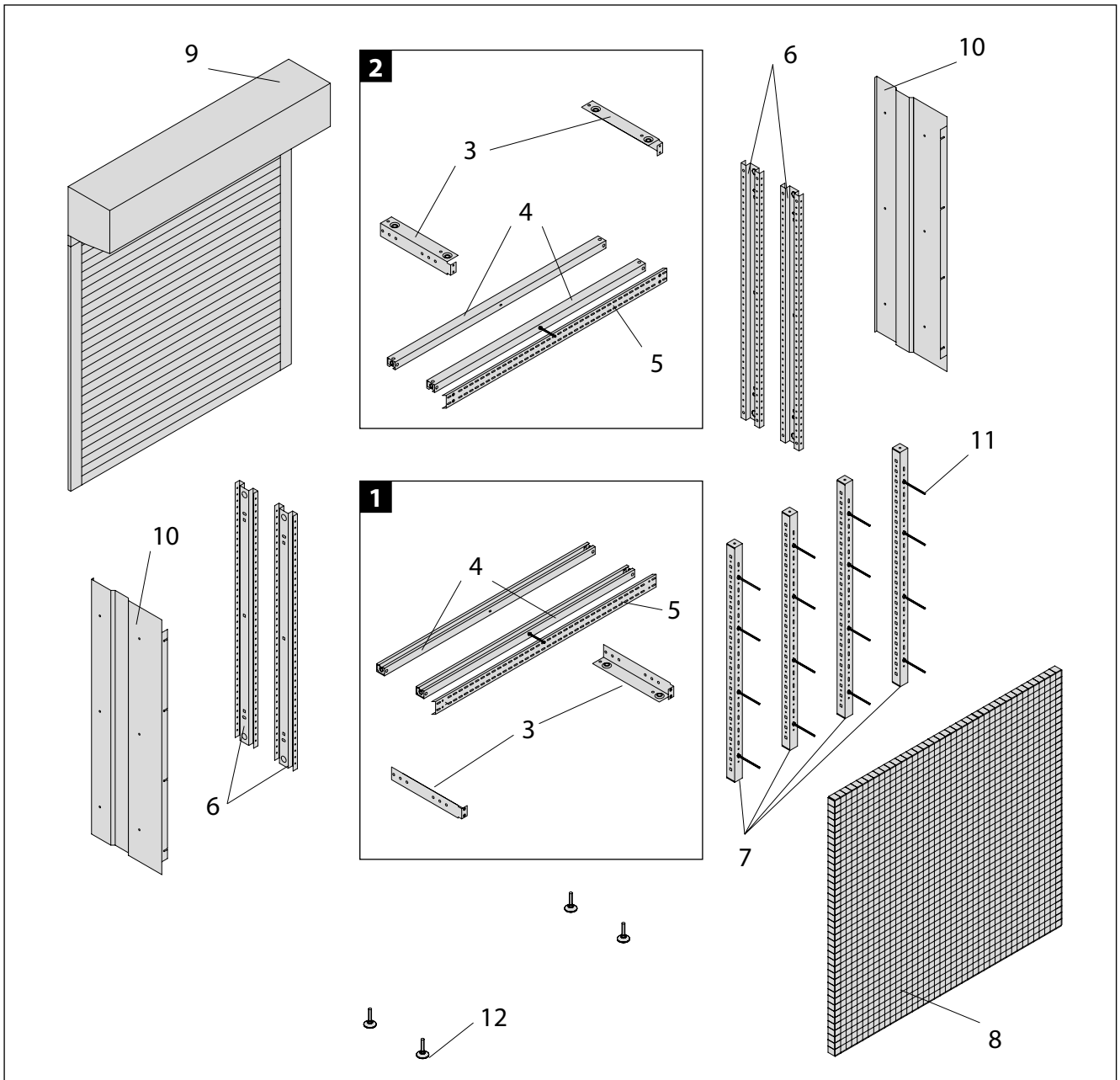
Wall-mounted cabinet-type boards

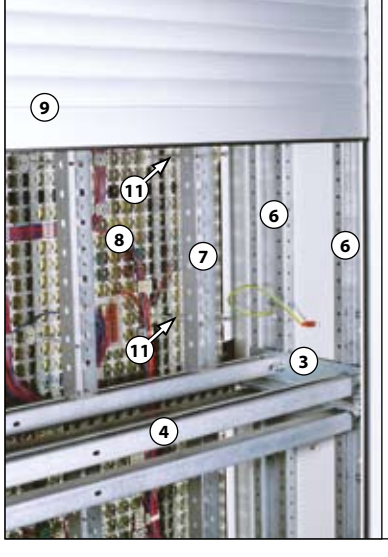


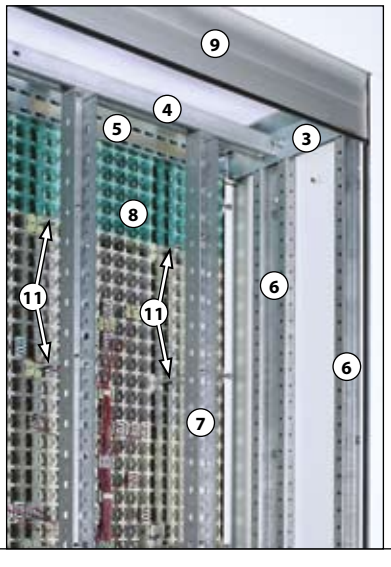
DESIGN

1. Frame
2. Fixing brackets
3. Gas shock-absorber
4. Front section with a matrix panel

ELEMENTS OF THE SUPPORT STRUCTURE OF FREE-STANDING BOARDS





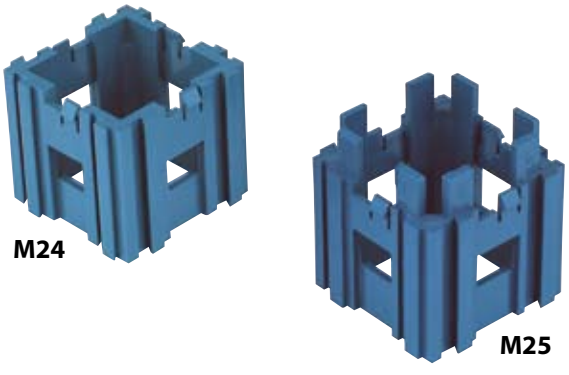


DESIGN

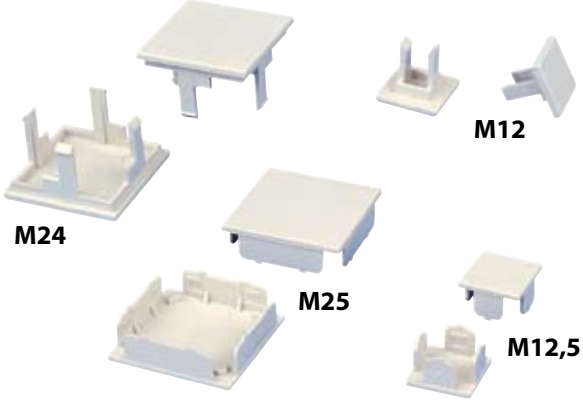
1. Lower frame
2. Upper frame
3. Angle sections
4. Connecting rails
5. Front channel section
6. Connecting sections
7. Mounting brackets
8. Truss panel made of plastic frames with 24 mm or 25 mm grid units (material: Cycolac plastic)
9. Aluminium roller shade
10. Side cover
11. Pins
12. Feet

MATRIX ELEMENTS OF MIMIC BOARDS

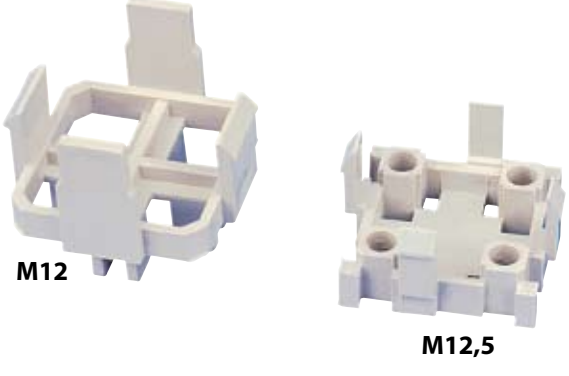
Matrix boards are available in two systems:
- DTM 24 x 24 mm, made of M24 and M12 modules,
- STM 25 x 25 mm, made of M25 and M12,5 modules.



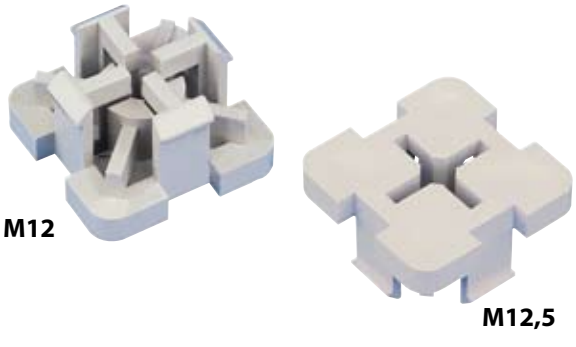
FRAME
An element of the self-supporting board structure, forming the central frame of the board's front panel into which caps are inserted.



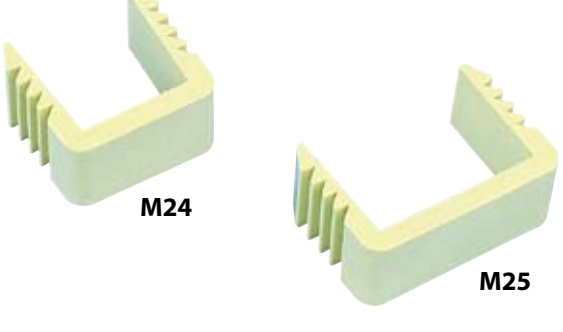
CAP
An element forming the front section of the board, featuring matrix elements plotted by screen printing.



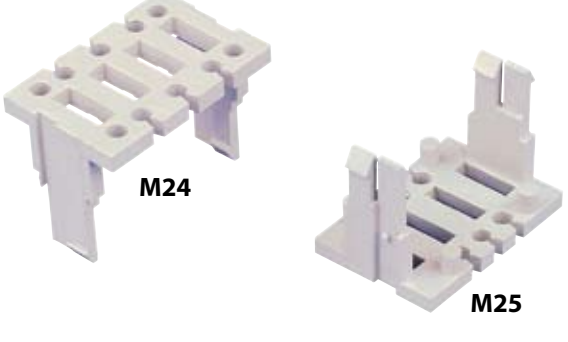
FRAME EXTENSION
Mounted inside the frame, designed for cap fixing.



FIXING CATCH
Mounted inside the frame, used to fix the board to the support structure.



CLIP
An element used to fix cable bundles on the inside of the front panel. An element cooperating with cable bundle support.



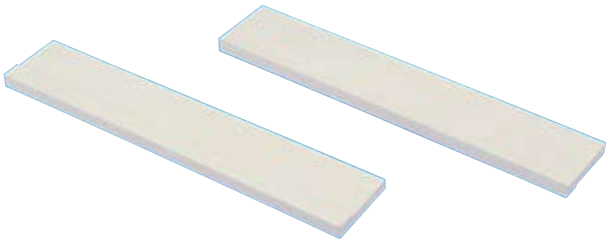
CABLE BUNDLE SUPPORT
An element cooperating with the clip, protecting conductors extending from the lighting modules in the rear section of the board.

MATRIX ELEMENTS OF MIMIC BOARDS

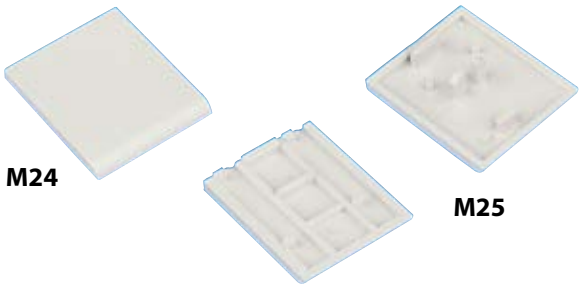
ILLUMINATED ELEMENTS
Mounted in caps. Designed for the diffusion of light emitted by LEDs.

PCB HOLDER
An element used to fix the PCB in the frame.

LED CONNECTOR
Used to fix LEDs via single-roll strips to the exclusion of PCB.

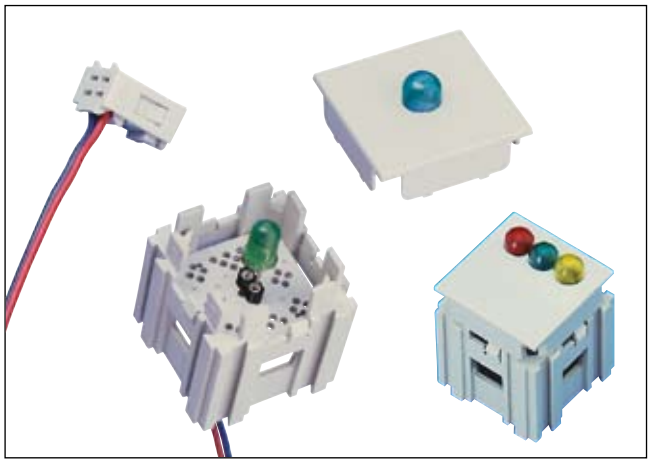


FRAME
Used to mount various meters and other devices on the board's front panel.



SIDE COVERING PANEL
Fixed on the external side walls of the board's frames.

ANGLE CONNECTOR
Used for joining elements of the board's front panel at an angle.

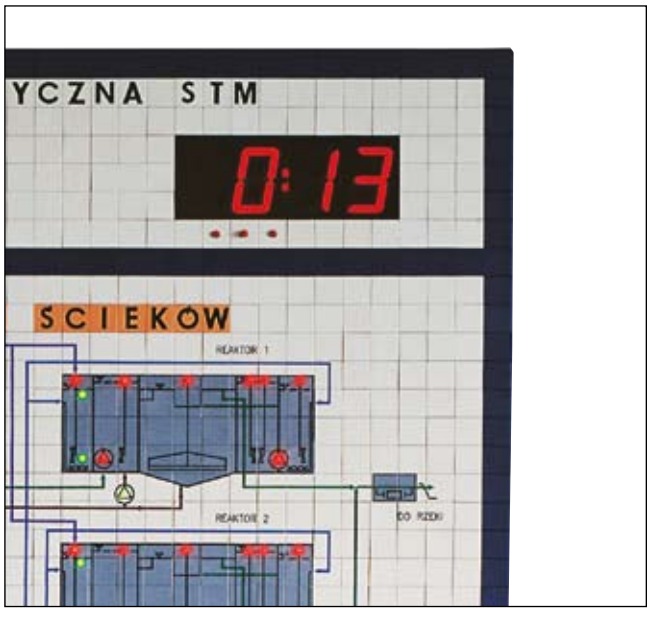


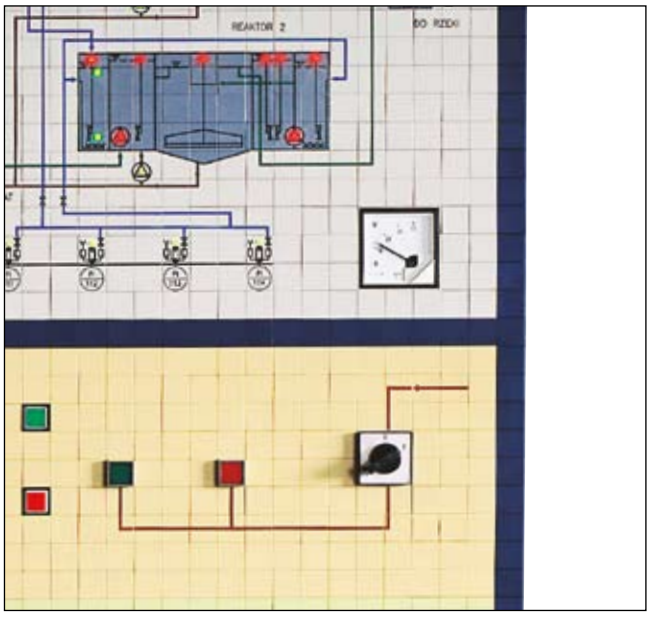
The signalling elements in STM and DTM mimic boards are LEDs. In order to ensure high effectiveness of visualisation, high-luminosity LEDs are used. A variety of LED types and dimensions are employed, depending on particular signalling requirements, e.g. red, green, yellow, blue, single- and multi-colour.

Upon customer request, LEDs are equipped with current-limiting resistors, separation diodes or other matching circuits depending on the type of controller used. Within the matrix, LEDs can be extended to the terminal strips, terminal plates or plates with ends adjusted to a particular controller type.

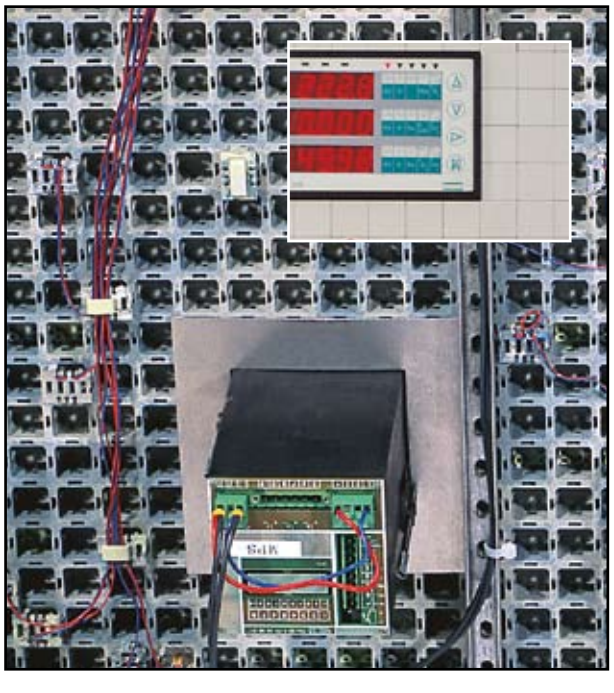
DEVICE ASSEMBLY

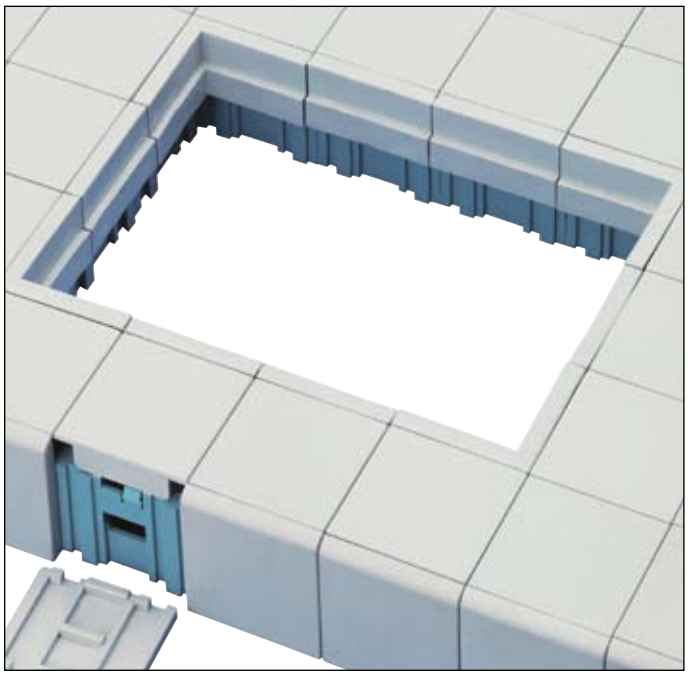
ZPAS-NET mimic boards offer a possibility of installing meters, indicators, displays, switches, controllers, etc., however in consideration of the fact that customers use a wide variety of different devices, their installation in the mimic boards is always tailored to individual needs and requirements.





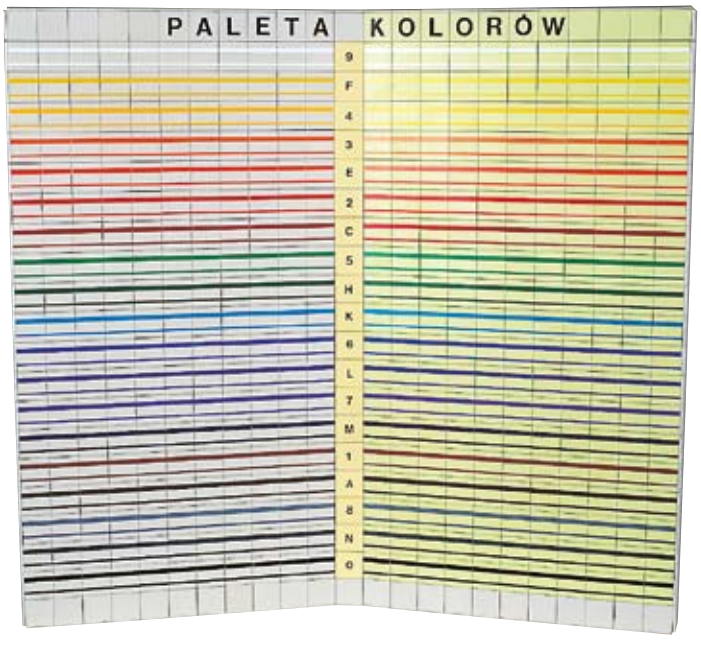
Since the majority of devices is designed for assembly on thin front panels made of sheet metal, some devices must be provided with special clamping rings or support brackets (particularly if the weight of a given device may cause front panel deformation).





If the dimensions of a device do not correspond to a multiple of the board's module, we offer a range of adaptor elements which allow for construction of a special frame helping to adjust the device to the module. Controllers and switches are usually mounted by means of adaptor plates with front sections covered with the same surface patterns as the front sections of the boards. Details concerning installation methods are individually agreed with the customer.

FRONT PANEL COLOUR SCHEMES



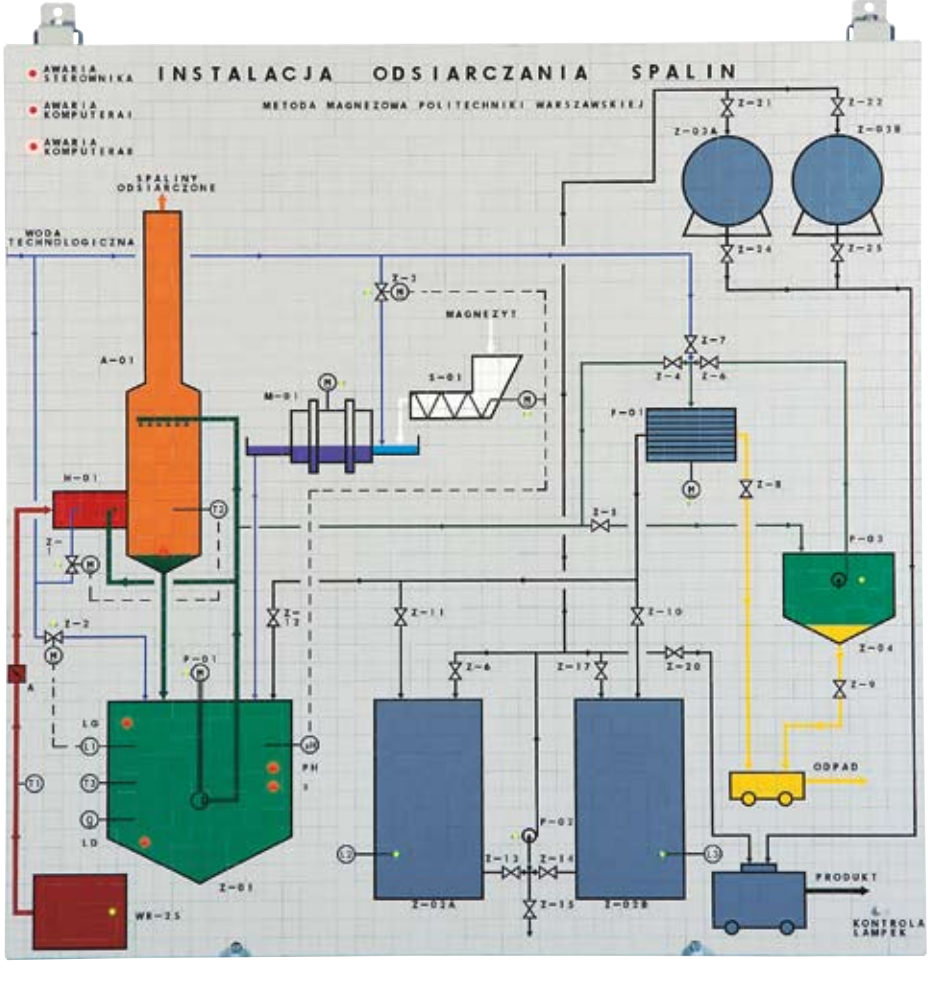
NOTE:

The background colour of the board can be freely selected, however on account of proven ergonomic properties, the following colours are recommended:

grey

light green

beige



KSD SIGNAL BOXES

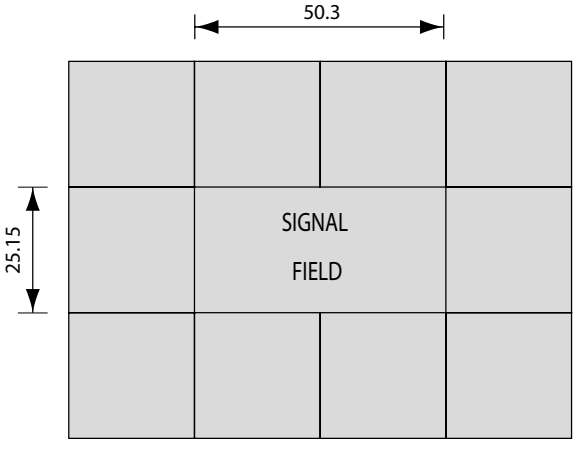
KSD-type signal boxes are designed for signalling status of the facility. They are mounted in matrix frames; caps of the signal boxes are flushed with the surface of the front panels of STM boards and control desks. Sets of signal boxes enclosed in aluminium frames can also be fixed in metal, wood-like or other plates (e.g. cabinets, desktops and top segments).

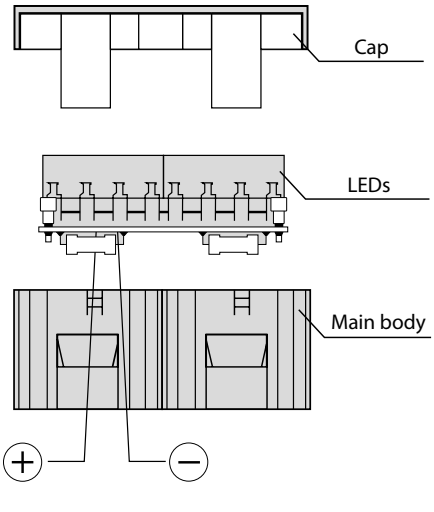
Technical data

- Control voltage	- 18-24 V DC
- Power consumption	- ca. 80 mA
- Colour of illumination	- red, green, yellow
- Dimensions	- 50.3 x 25.15 mm
- Outlets	- rack and panel connector, terminal strip or other types, based on individual arrangements

Design

Each box incorporates three basic elements: a main body, a LED plate and a cap (non-transparent white). The surface of the cap has an inscription, sign or symbol plotted by screen printing or engraved. Another possibility is the use of transparent caps with inscriptions made on mat film or tracing paper placed underneath. Signal boxes are made as single units or in multiple sets in any configuration.





KCS-1 CENTRAL SIGNAL BOX

KCS-1 central signal boxes are complete central audiovisual signalling systems designed for power industry applications or other industry sectors. The main task of central signal boxes it to inform the operating staff of an electric power station, a switching station or a production process control unit of the actuation of protective devices, breakdowns or irregularities in the operation of equipment and other undesirable events. Thanks to their modular structure, KCS-1 boxes enable operators to control any number of input channels.

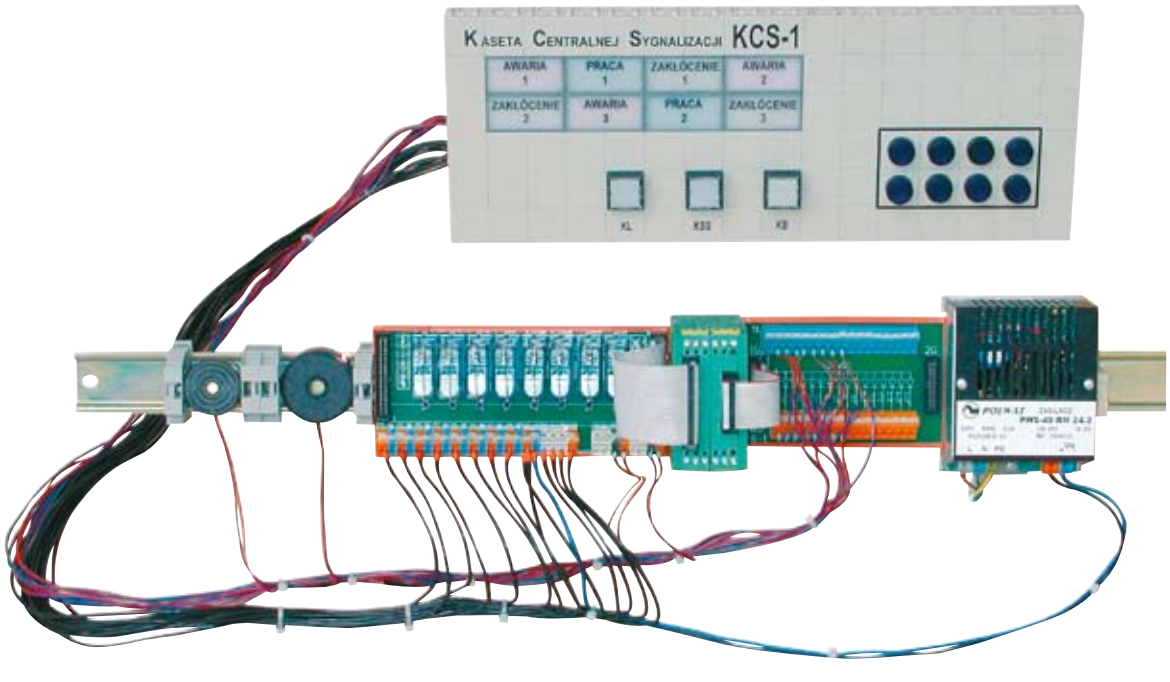
The central module of each box is provided with in-built programming functions (individually for each channel):

- emergency function with memory and delay time,
- repeater function (signalling device),
- function of engine or pump operation control,
- NOT-operation function of the input status,
- buzzer activation and deactivation,
- protection against accidental information deletion,
- blackout detection,
- interference removal system.

Input signals include voltages fed to relay coils, monitoring the achievement of boundary values of technical parameters, the flow of operating media, engine or pu

Input signals:

sound signalling **–** two piezoelectric buzzers placed directly on the TS-35 strip next to the central unit and NO-contacts of relays (with an option of connecting an additional warning horn or buzzer).
visual signalling **–** KSD signal boxes designed for mounting in the front panel of the matrix board. Sets of KSD boxes, placed within an aluminium frame, can also be installed in 19" panels, in dispatch desktops or tops. As independent elements, they can be used in the so-called distributed signalling systems.



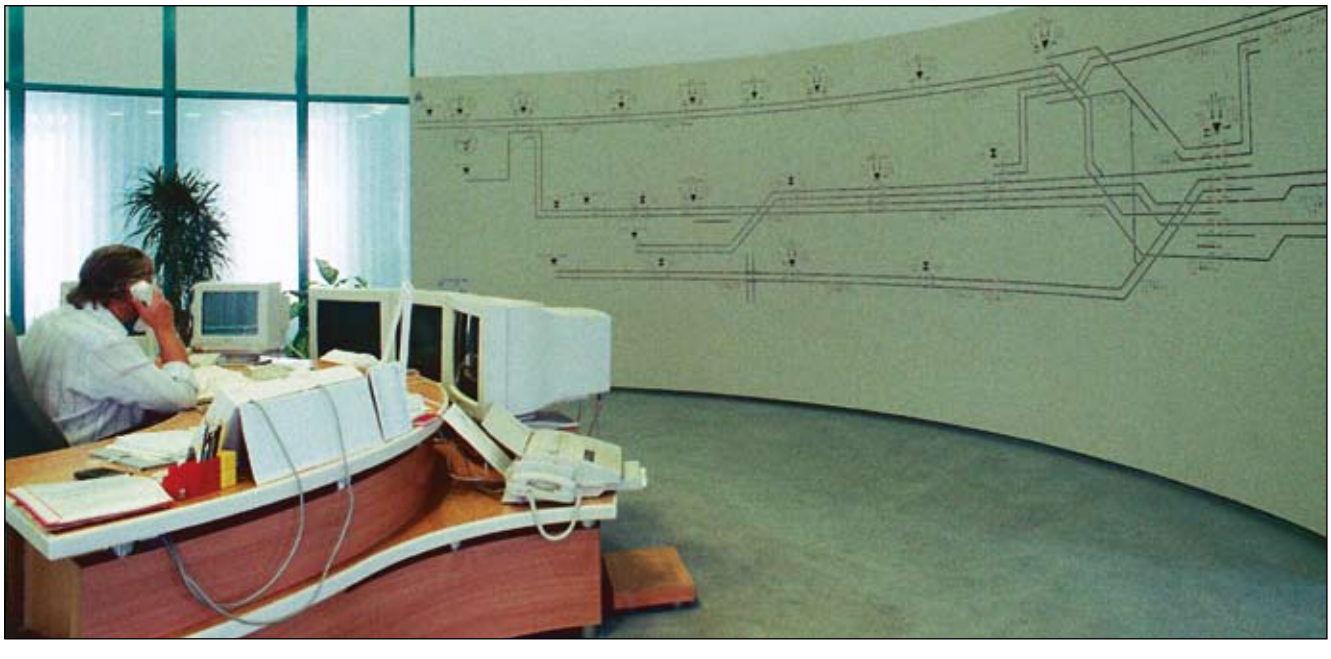
KCS-1 central signal box with accessories. Central module of the box, relaying strip, indirect strip, power unit and sound signalling buzzers are installed on the TS-35 rail; control buttons and KSD signal boxes (visual signalling) are extended to a sample element of the front panel of the matrix board.

SAMPLE REALISED PROJECTS

National Power Dispatch Centre in Warsaw

A mimic board of a non-standard spherical shape, covering an area of ca. 80 m^2.

Central rail control station in Warsaw



SAMPLE REALISED PROJECTS

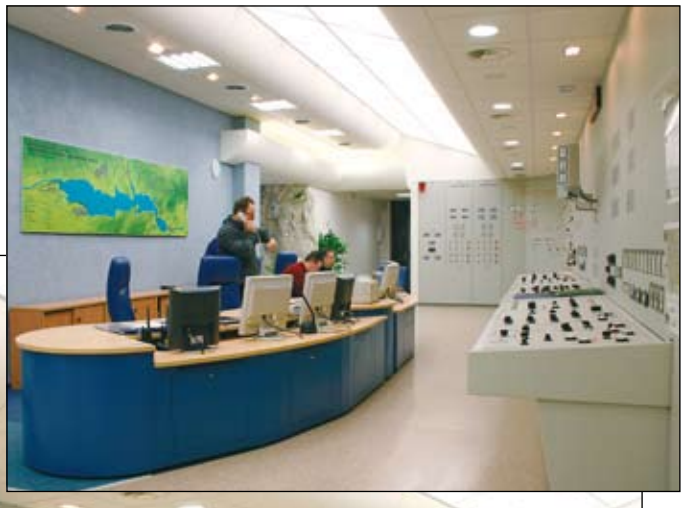
Sugar factory in Lublin

Regional Power Dispatch Facility in Katowice

SAMPLE REALISED PROJECTS

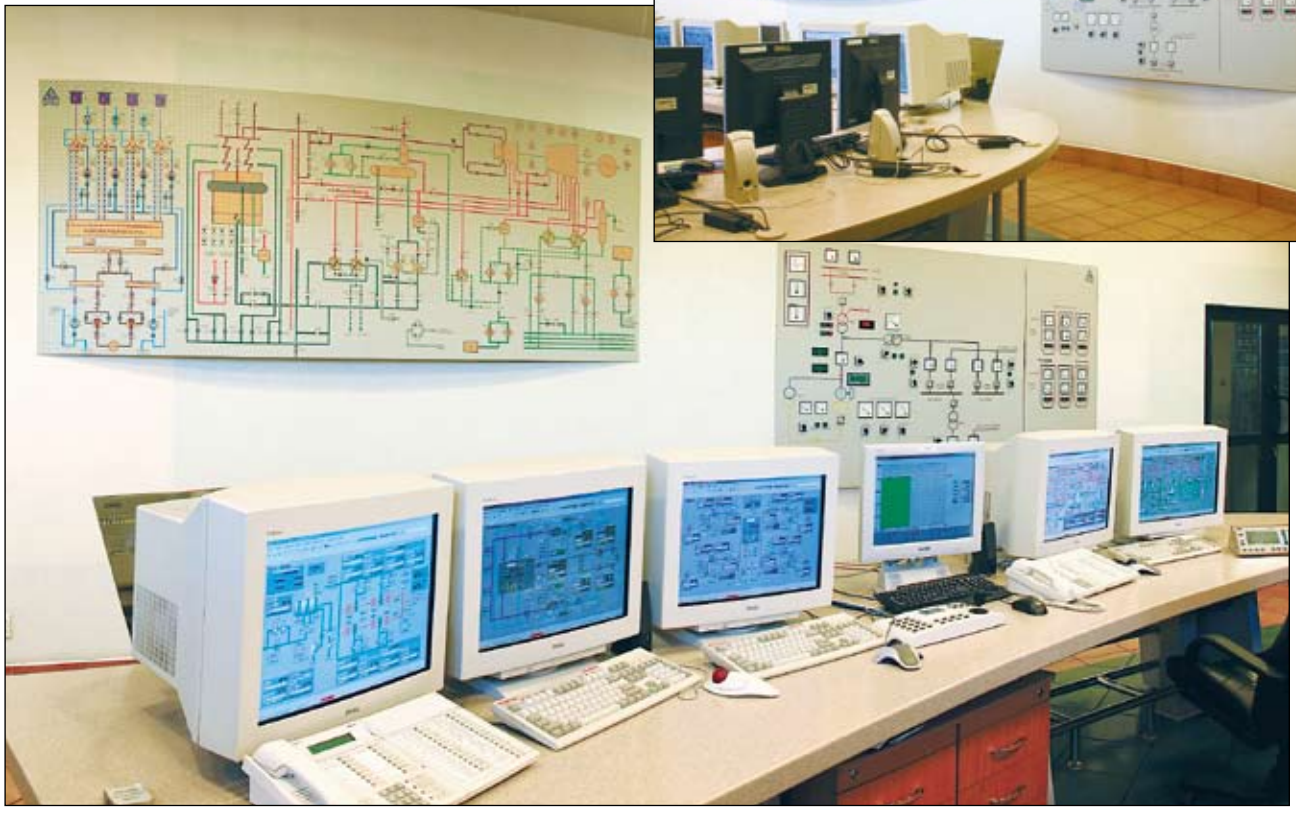
Niedzica S.A. hydroelectric power station
- block control rooms in the power stations

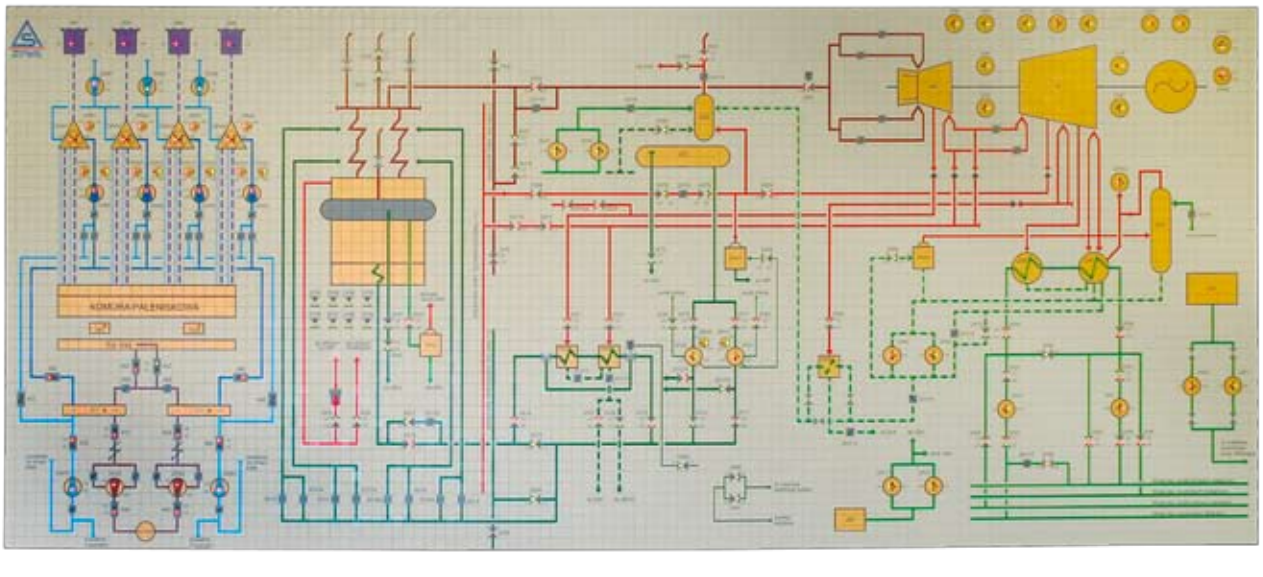
Delivery included a mimic board together with dispatch and control desks.



SAMPLE REALISED PROJECTS

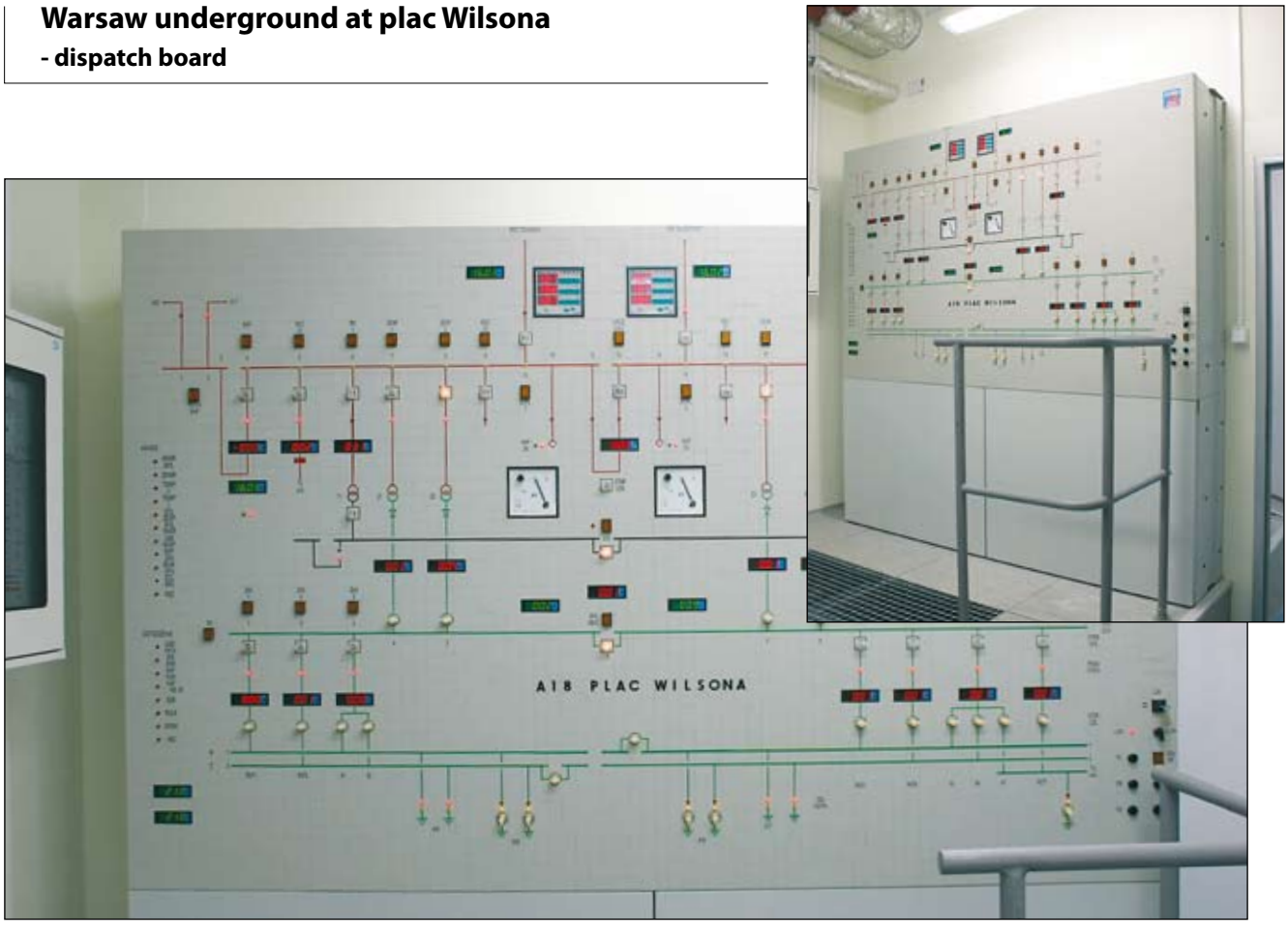
Heat and power generation plant in Białystok
- block control room





SAMPLE REALISED PROJECTS

Warsaw underground at plac Wilsona
- dispatch board



SAMPLE REALISED PROJECTS

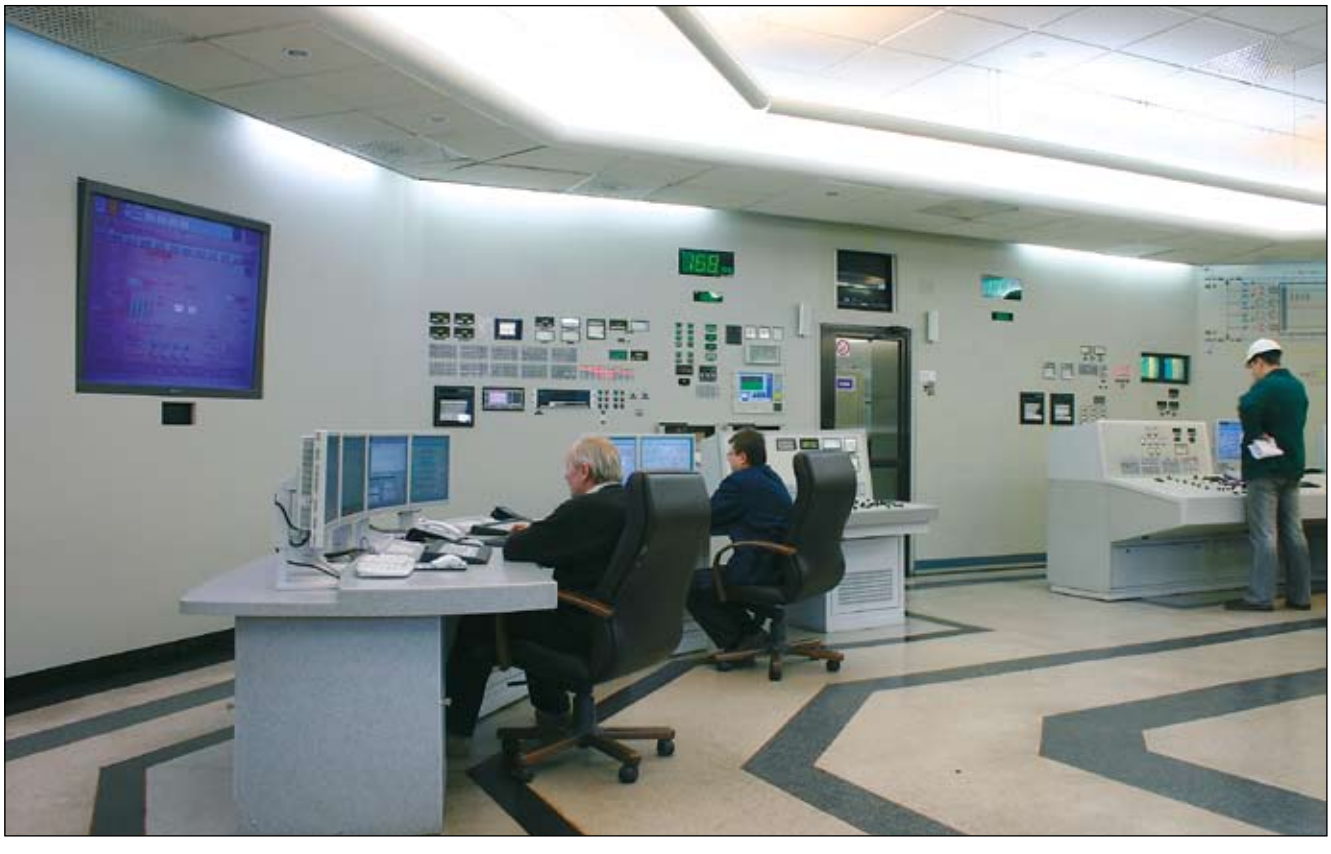
Brown coal mine in Turów

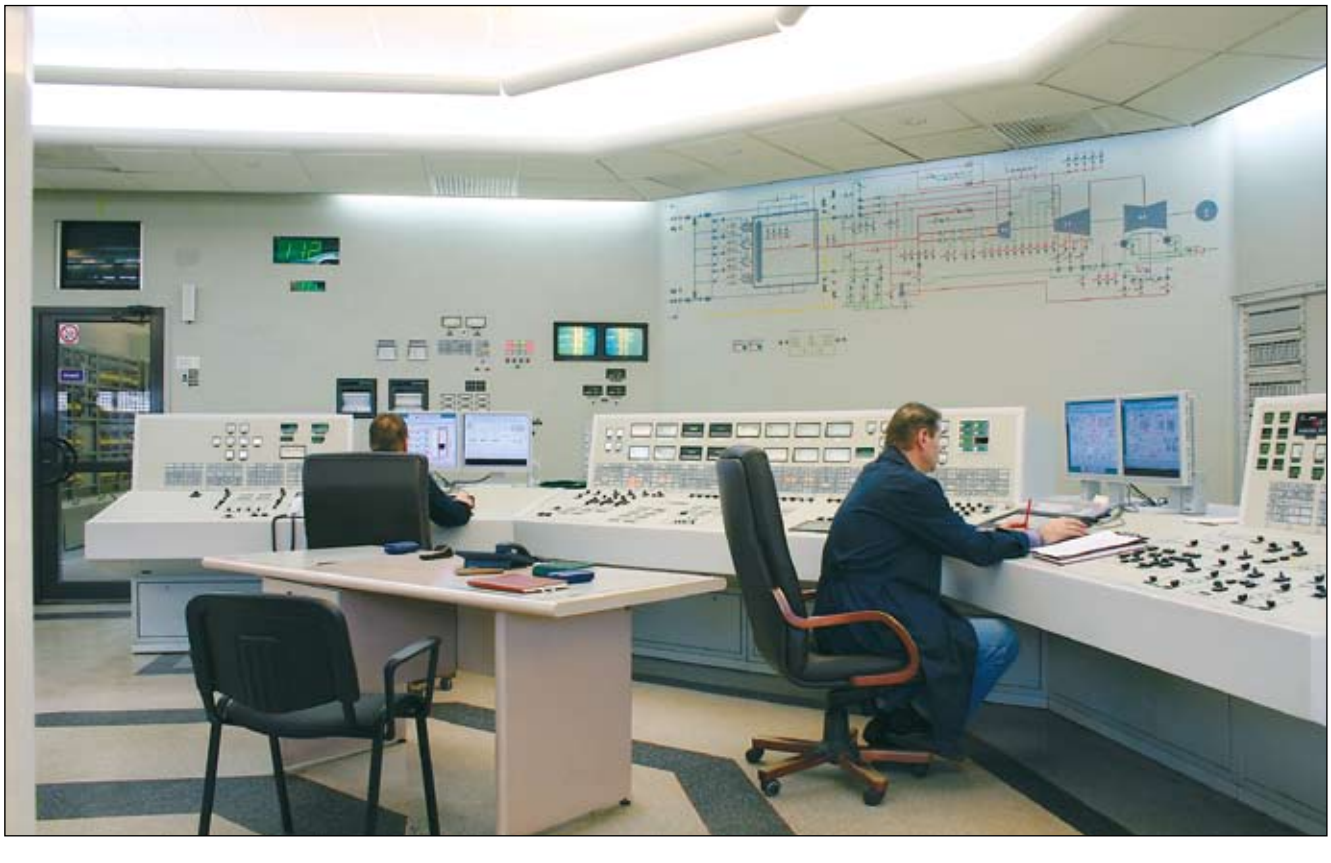
Dispatch section in the Power Distribution Company in Wałbrzych

SAMPLE REALISED PROJECTS

Electric power station in Kozienice – blocks 5 and 6

Supply of a full range of mimic boards and dispatch/control desks for block control rooms





SAMPLE REALISED PROJECTS

Electric power station in Kozienice – blocks 9 and 10

The scope of the delivery included a mimic board with dispatch and control desks.

SAMPLE REALISED PROJECTS

Regional Power Dispatch Facility in Ostrołęka

SAMPLE REALISED PROJECTS

Water supply and sanitation company in Łódź - dispatch room in the water production section

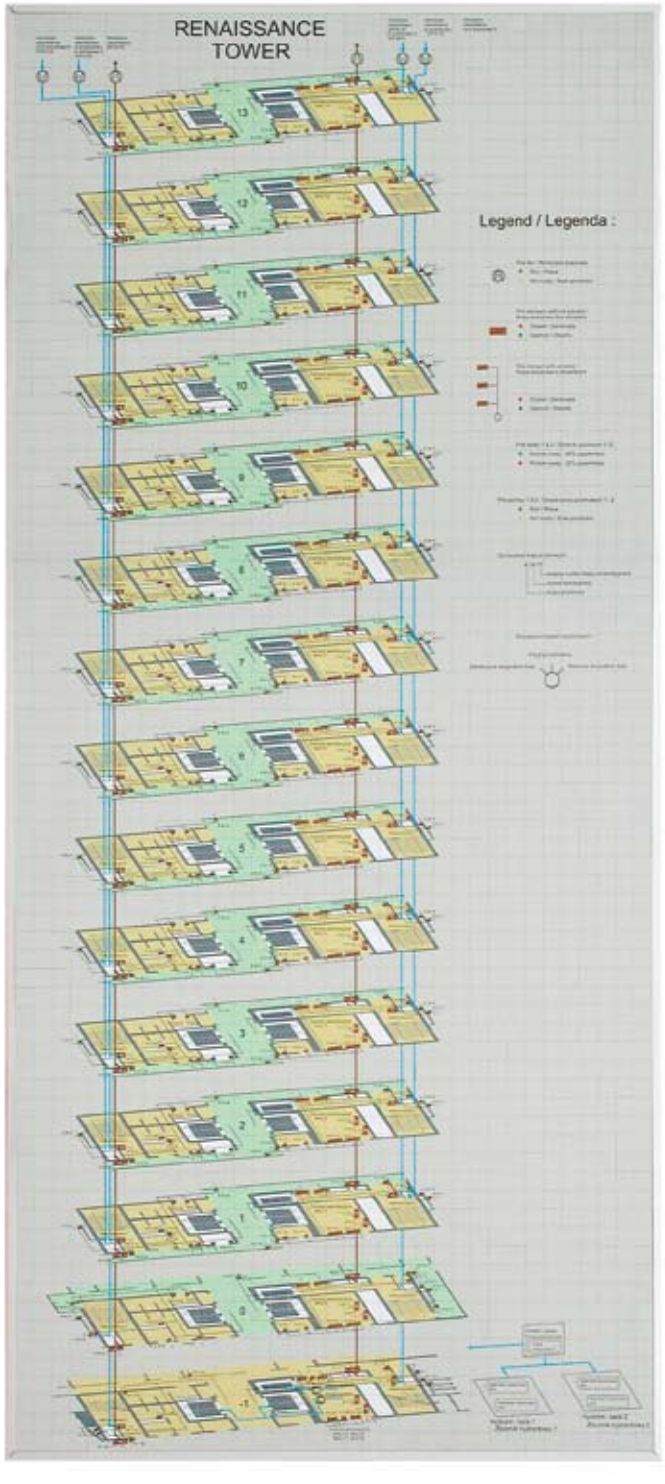
SAMPLE REALISED PROJECTS

Hydroelectric power station in Porąbka-Żar

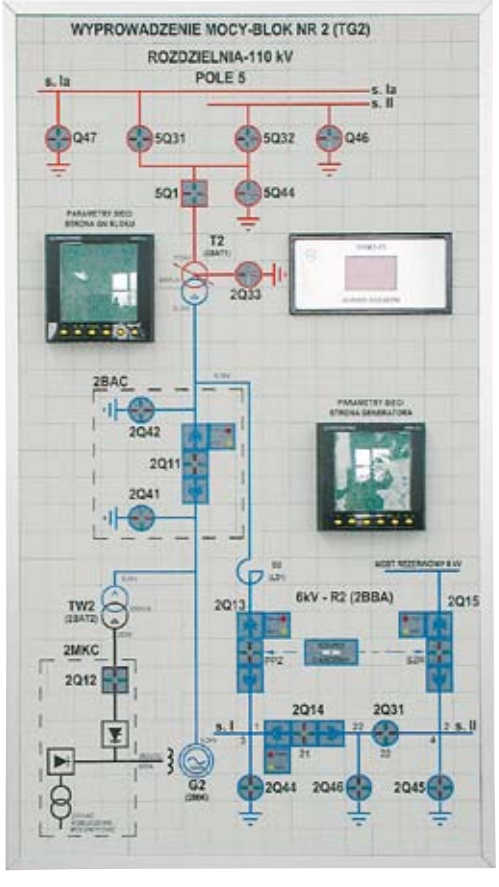
The scope of the delivery included the mimic board and control desk shown in the photographs.

SAMPLE REALISED PROJECTS

Matrix boards in aluminium frames



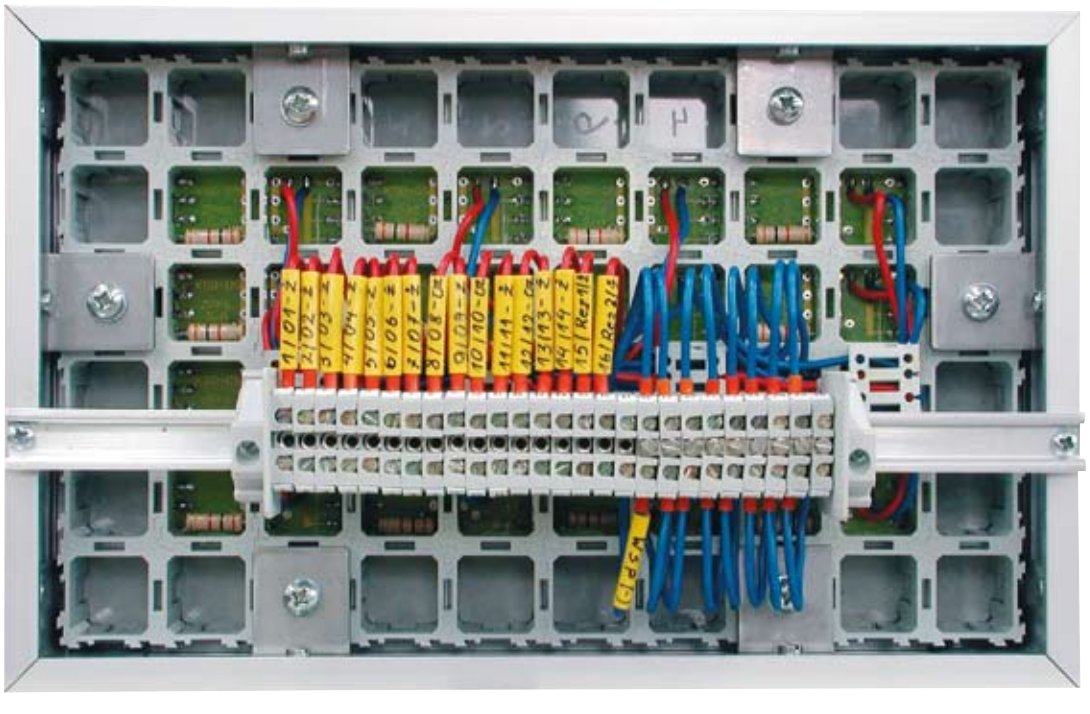
Board designed for monitoring the fire alarm system in Warsaw's Renaissance Tower



Board featuring a diagram of a power supply system

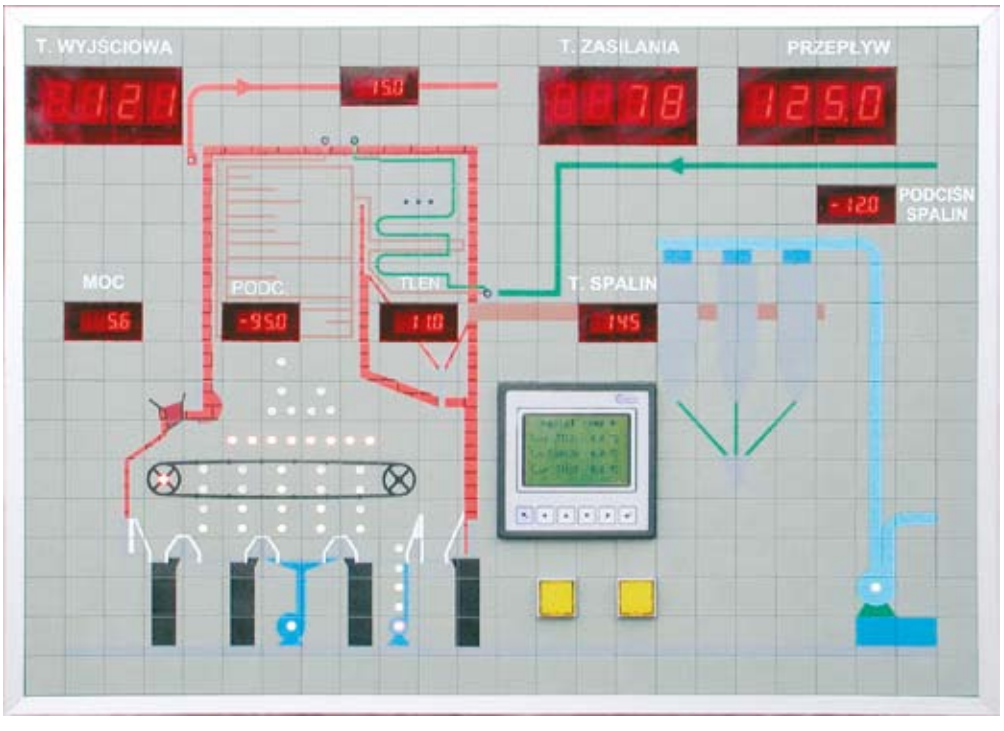
SAMPLE REALISED PROJECTS

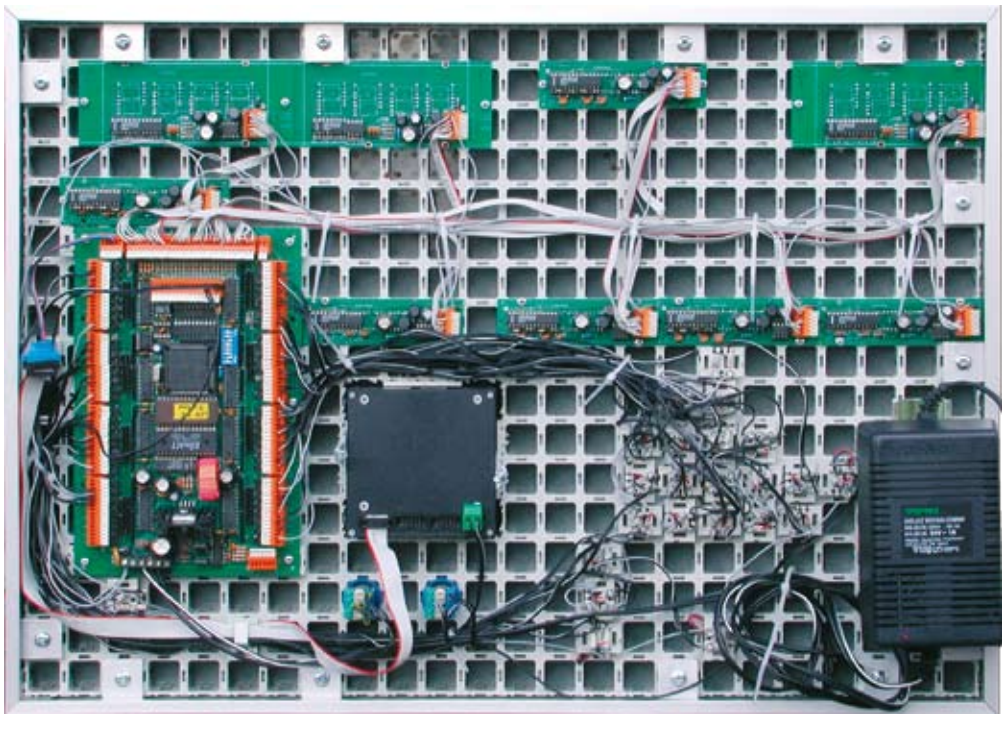
Matrix boards in aluminium frames



SAMPLE REALISED PROJECTS

Matrix boards in aluminium frames





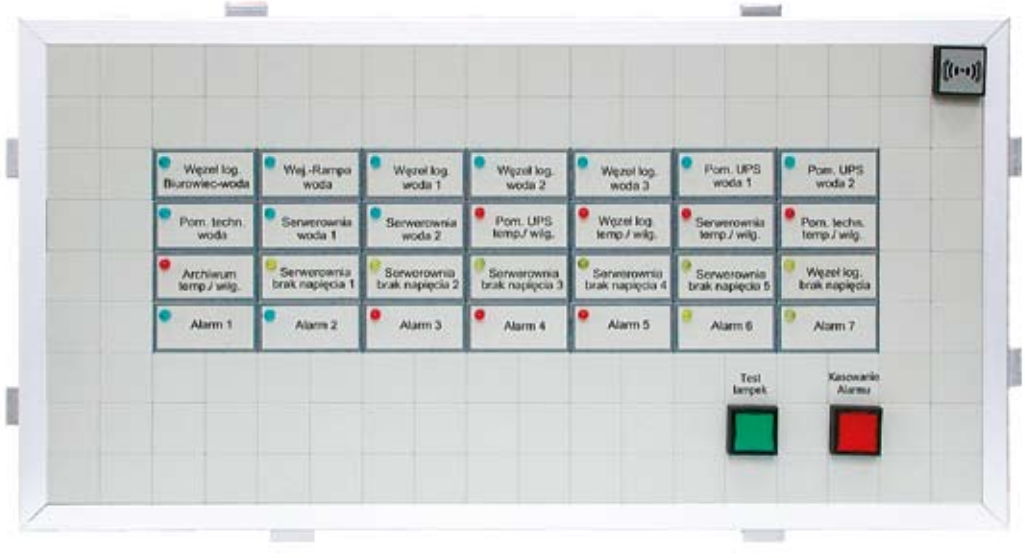
SAMPLE REALISED PROJECTS

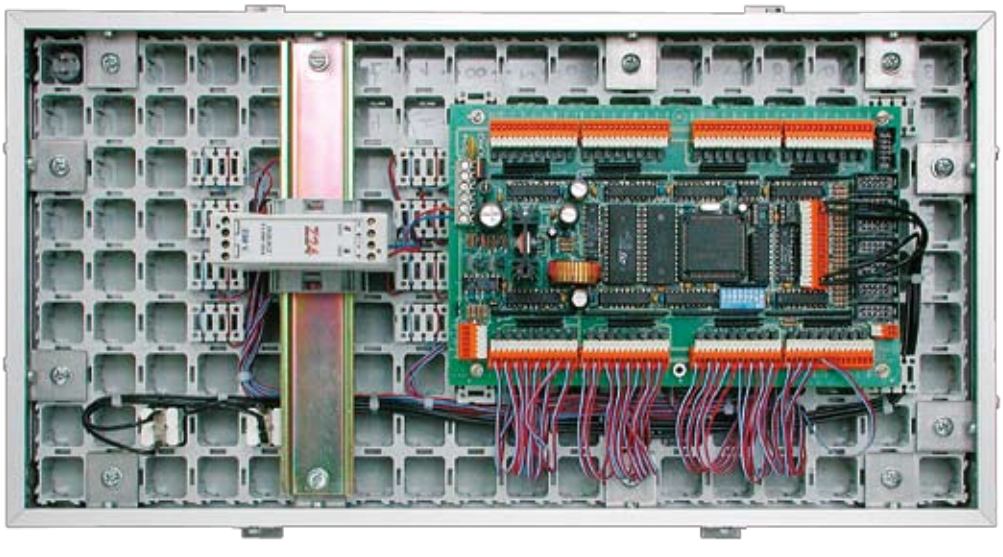
Matrix boards in aluminium frames

Boiler room control system

SAMPLE REALISED PROJECTS

Matrix boards in aluminium frames





Monitoring of climatic conditions in a server room, based on the ZPAS Control Oversee system. The system records relevant data via LAN, communicates emergency conditions by short text messages and makes it possible to visualise the facility on a computer screen and mimic board.

NOTES

Catalogue of ZPAS-NET products
Structured cabling and telecommunication accessories
Outdoor cabinets
Dispatch and control desks
Mimic boards

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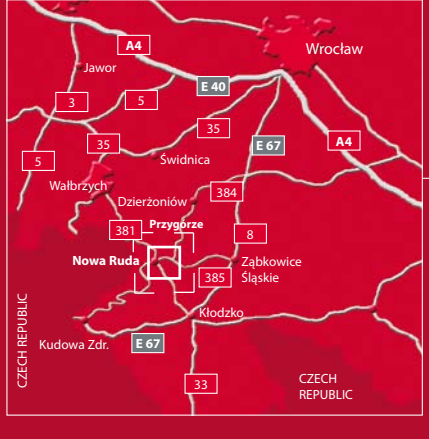

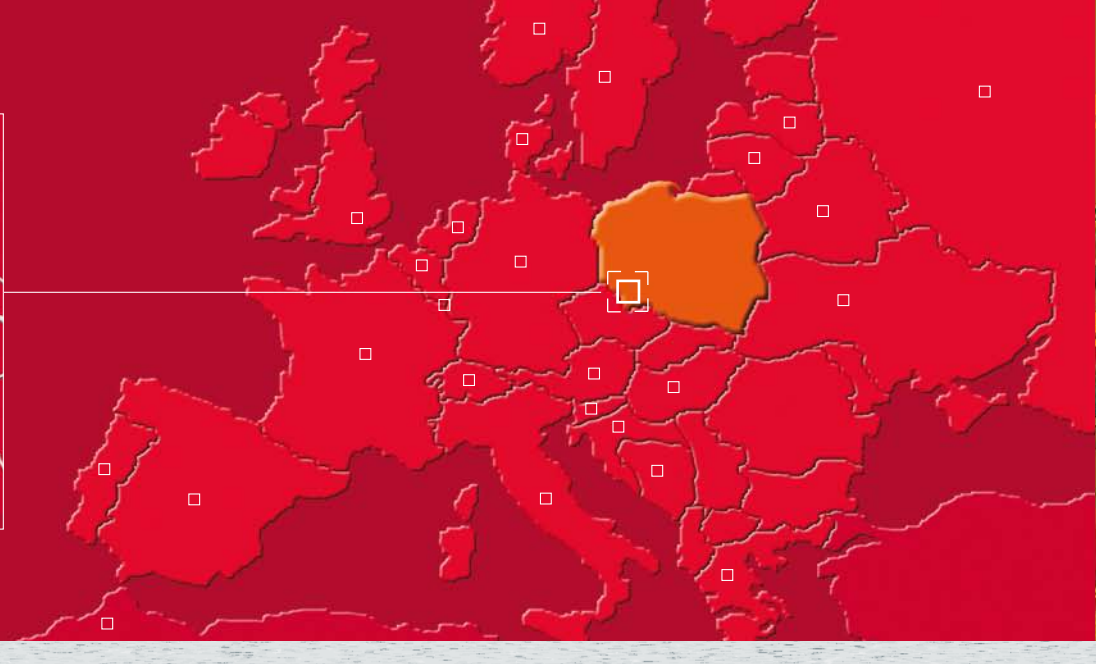

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