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ELECTRIC HEATING AND VENTILATION UNITS TERM-E



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Please read this instruction manual carefully before beginning any work.

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II. ORIGINAL INSTRUCTION MANUAL

ELECTRIC HEATING AND VENTILATION UNITS TERM-E

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1. INTENDED USE

TERM-E heating and ventilation units, are intended to heat and ventilate such compartment as: industrial halls, warehouses, workshops, other objects of similar use



The units should be used only according to the intended use.
The manufacturer is not liable for using the units against the intended use and for any damages arisen for this reason.



TERM 1; 2; 3 and 4 units cannot be used in the compartments with relative humidity larger than 95% and air dust concentration over 3mg/m³.

The compartment can be served by one or larger number of the units, also by the units of different sizes. The units can operate as heating or heating and ventilation units with added intake boxes and wall or roof intakes. The intake boxes enable to draw circulating air through grids located on either side of the box and fresh air through an inlet hole of the intake box.

2. DESIGNATIONS

Heating and ventilation unit	TERM-E	-27-D
Heating power	18, 27 kW	
Equipment	single-row grid (K); slot diffuser (N); discharge cone (D);	

Marking of unit's optional automation

Supply and control box	AT	AT-RTA
Additional elements	temperature regulator (RTA) timer (ZG) regulator and timer (RTA + ZG)	

3. DEVICE DESCRIPTION

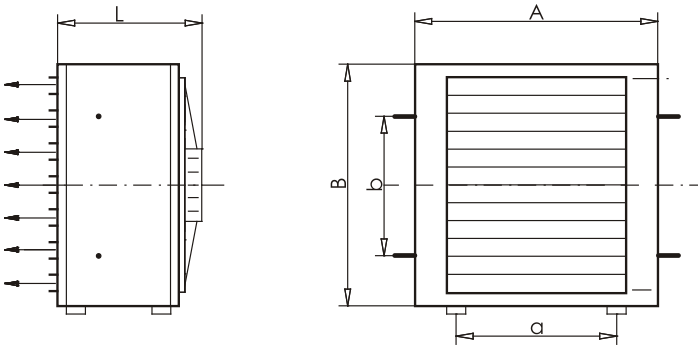
W skład aparatu wchodzi:

- » **axial fan** mounted on the rear wall of the unit with a net protecting the rotor;
- » **electric heaters** with spirally rolled aluminium finned tubes;
- » **casing** made of steel sheets with a single-row outlet grid allowing adjusting a direction of supply air. The structure of grid blades protects against an automatic rearrangement of the blades. The single-row grid can be replaced with the slot diffuser or outlet nozzle. The casing can be made of stainless steel sheets.
- » **protection net** made of galvanized steel sheet against accidental contact with heaters,

The casing variant with the following items is recommended to use with the units which are planned to be operated as ceilings ones:

- » slot diffuser - for heating a zone of human presence by a secondary air stream;
- » discharge cone - for increasing a range of supply air stream.

4. TECHNICAL DATA



Size of unit	TERM-E-18	TERM-E-27
Dimensions		
A [mm]	556	556
B [mm]	526	526
L [mm]	420	420
a [mm]	420	420
b [mm]	290	290
Weight [kg]	30	34
Unit's IP	30	30
Parameters of fans in units		
Type of fan	FE-031EQ	FE-035EQ
Revolutions [rev/min]	1400	1400
Voltage [V]	230	230
Motor power [W]	140	180
Current [A]	0,63	0,77
Parameters of heaters in units		
Voltage [V]	400	400
Power [kW]	18	27
Current [A]	27	39
Noise level dB[A]		
At distance of 1m	61	63
At distance of 5m	57	59

Noise level - sound pressure level at a distance of 1 and 5m taking account of directivity factor $Q=2$ and room absorption value $A=50\text{m}^2$.

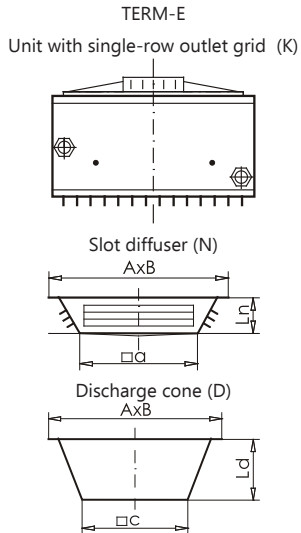
Heat output of units and air temperature rises

Size of unit	TERM-E-18			TERM-E-27		
Activation threshold of heaters	Air flow capacity [m ³ /h], heat output [kW], outlet air temperature rise [°C]					
	[m ³ /h]	kW	°C	[m ³ /h]	kW	°C
I	1400	6	8	1900	9	9
II	1600	12	17	2200	18	17
III	2100	18	25	2900	27	26

Unit environment and fan motor parameters

Unit size	Operation temperature [°C]	IP	Insulating class
TERM-E	do +60	54	F

OUTLET DIFFUSERS FOR THE UNITS



Slot diffuser (N)

Size of unit	A x B [mm x mm]	a x b [mm x mm]	Ln [mm]
TERM-E	555 x 525	355 x 355	100

Discharge cone(D)

Size of unit	A x B [mm x mm]	c x d [mm x mm]	Ld [mm]
TERM-E	555 x 525	350 x 350	190

The units are supplied with the single-row grid as a standard.

Grids have the movable blades enabling the air stream direction and reach adjustment.

Ceiling units can be equipped with:

- » slot diffusers (N) (air supply to 4 sides);
- » discharge cone (D).

Wall units can be also equipped with discharge cone (D).

Slot diffusers are enabling heating people staying zones with the secondary air stream.

Unit TERM-E with slot diffuser can be suspended on the height max. 4m.

Discharge cone enable increase of air supply range.

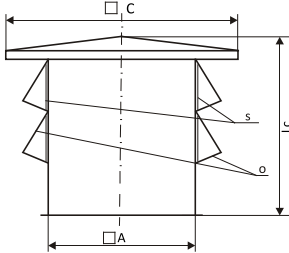
5. ADDITIONAL EQUIPMENT

ROOF INTAKE CD

The roof intakes are intended to draw fresh air from above the roof and to protect the object against precipitation.

In order to protect against pollution and insects the intakes have shields and nets installed on either side (only for CD-4 and amount of external air over 40% the intake has the shields installed on four sides).

The intakes are adapted to connect with the roof bases PD.

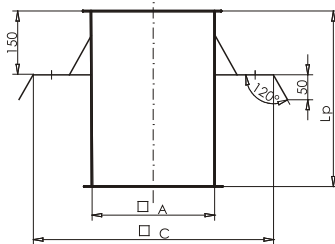


Unit size	Intake size	□ A [mm]	Lc [mm]	□ C [mm]	Weight [kg]
TERM-E	CD-1	520	580	728	20,0
S - net o - shield					

The roof intakes are whole made of galvanized steel sheets.

ROOF BASE PD

The roof bases are intended to install the roof intakes CD and intake boxes SC of the TERM units.

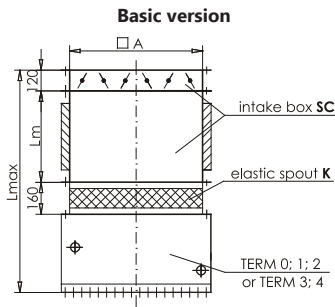


Unit size	Base size	□ A [mm]	Lp [mm]	□ C [mm]	Weight [kg]
TERM-E	PD-1	520	600	740	31

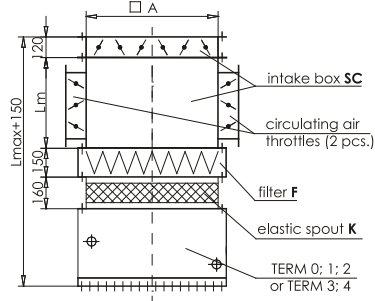
The roof bases are made of galvanized steel sheets.

INTAKE BOXES SC

For ceiling and wall heating and ventilation units



Version with additional elements: filter and circulating air throttles

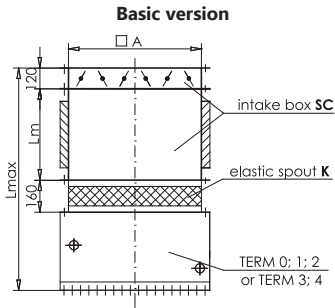


The intake boxes are used to draw and mix fresh and circulating air.

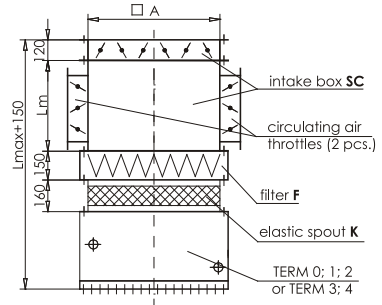
In case the intake boxes are used for the TERM units it is necessary to use (as additional equipment) elastic spout (K) allowing connecting the intake boxes with the units.

INTAKE BOXES SC

For ceiling and wall heating and ventilation units



Version with additional elements: filter and circulating air throttles



The intake boxes are used to draw and mix fresh and circulating air.

In case the intake boxes are used for the TERM units it is necessary to use (as additional equipment) elastic spout (K) allowing connecting the intake boxes with the units.

In basic version the intake boxes SC consists of:

- » fresh air throttle;
- » mixing chamber with circulating air inlet grids.

The fresh air throttle is operated a servomotor.

The mixing chamber has 2 grids (manually adjusted) in the circulating air inlet holes allowing setting a share of circulating air in the total air efficiency.

Unit size	Box size	A [mm]	Lm [mm]	Lmax [mm]	Weight [kg]	
					SC basic version	SC version with filter and throttles
TERM-E	SC-1	520	310	930	23	35

The intake boxes SC can be made with additional elements:

- » filter (F) class G3;
- » circulating air throttles (P) with servomotors.

The intake boxes with additional elements are made in consultation with the manufacturer.

In consultation with the manufacturer the intake boxes can be also made with the mixing chamber with **one circulating air inlet grid**.

Air capacity of unit equipped with the SC intake boxes in standard version

Unit size	Fan type	Air capacity [m ³ /h]
TERM-E	FE-035-4E	2340

Thermal power of the units with SC intake boxes in the standard version is decreased by about~5%.

ADJUSTMENT RANGES OF INTAKE BOXES SC IN STANDARD VERSION

The intake boxes SC in standard version are delivered for all TERM units with a constant recommended circulating air grid closing angle equal to 60°.

Adjustment ranges of fresh air, share of fresh air in total air efficiency by means of throttle at the constant recommended circulating air grid closing angle

Unit size	Box size	Adjustment range of fresh air by throttle	Circulating air grid closing angle	% share of fresh air in total efficiency	Share of fresh air [m³/h]	Total air capacity [m³/h]
TERM-E	SC-1	open-closed	60°	10% ÷ 75%	190 ÷ 1760	1940 ÷ 2340

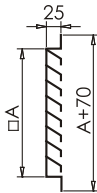
Adjustment ranges of fresh air, share of fresh air in total air efficiency by means of throttle depending on different circulating air grid closing angles

Adjustment range of fresh air by throttle	Circulating air grid closing angle	% share of fresh air in total capacity
open-closed	0°	1,5% ÷ 57%
open-closed	30°	3,5% ÷ 62%
open-closed	45°	5% ÷ 67%
open-closed	60°	10% ÷ 75%
open-closed	75°	17% ÷ 83%

When it is required to extend the adjustment of share from 100% of fresh air to 100 % of circulating air it is foreseen to replace the standard intake boxes with circulating air grids with the boxes with increased tightness throttles (2 pcs.) with servomotors.

WALL INTAKE CS

The wall intakes are intended to draw fresh air from outside the wall.



Unit size	Intake size	□ A [mm]	Weight [kg]
TERM-1	CS-1	520	7

The wall intakes are made of steel sheets protected by paint coats.

Presentation of % of share of fresh air to which wall intakes with dimensions equal to intake boxes meet a condition of air inlet speed lesser than 2,5 m/s, i.e. they will not suck rain

Unit size	□ A [mm]	Intake area [m²]	Total air capacity [m³/h]	Efficiency of fresh air at V < 2,5m/s [m³/h]	Fresh air efficiency / Total air efficiency
TERM-E	520	0,27	2340	2450	> 100 %

The TERM-E1 units can operate totally using fresh air from the wall intakes with dimensions equal to dimensions of cross-sections of intake boxes.

6. TRANSPORT

The delivered units are completely assembled, protected from outside by polyethylene foil against pollution and weather impacts.

The Product Manual is delivered along with the unit.

The intake boxes and wall intakes constitute additional equipment and they are delivered separately, protected by polyethylene foil.

The automatics elements delivered at the customer's request are packed separately.



The units should be transported in one layer in a way preventing mechanical damages.

7. SAFETY RECOMMENDATIONS



The heating and ventilation units should be used only in compliance with the instruction manual.



The start-up, mounting, connection, inspections and repairs of the unit should be executed by an authorized installer, the electric works should be executed by a person having required certificates authorized to carry out electric works.



All service and repair works should be executed when voltage is off.



Unit should be protected against moisture and do not clean the heater with a damp cloth.



Unit can only be operated when it is fully operational, in the event of a failure, immediately cut off the power supply.



Before connecting the unit, check the electrical system, especially the electrical connections.



The unit may be operated only with proper connection with grounding wire.



Unit must be permanently connected to the electric installation equipped with protective (earth) terminal, residual current device and service switch.



The thermostat protecting the heater from overheating must be included in the heater control system.



It is forbidden to switch on the unit without working fan. Every stop of air flow have to disconnect the heater.



Voltage-free status can only be obtained by turning off the service switch.



Service switch disconnecting all power lines should be located near the unit.

Due to the structure the unit does not emit harmful radiation. Although the unit was designed and manufactured in compliance with the requirements of the standards, according to their state at the moment of production launch, a probability of injury or health loss when using the unit is not to be avoided. This probability is connected with a frequency of access to the unit in the course of its use, cleaning or repair, presence of persons within a dangerous zone, acting against the safety rules specified in the instruction manual. The gravity of body injury or deterioration of health condition depends on many factors that often can be foreseen only partially, taking them into consideration in the structure of the unit, specifying them and warning against them in the instruction manual. Therefore there is a **residual risk** when the operator does not observe the recommendations and guidelines included in the instruction manual.

8. MOUNTING



The walls, ceilings or constructional elements of the object to which the unit supports or suspensions are fixed should have proper strength. It should be consulted with the designer of the object.



The bearing structures of the units or for the units with intake boxes can be freely designed observing the strength requirements.



When it is necessary to locate the unit by a partition, e.g. made of steel sheets, stiffening profiles should be used to avoid vibrations of the partition generated by the unit operation and the noise level increase in the compartment.

SUSPENSIONS (ADDITIONAL EQUIPMENT)

We can deliver the following suspensions for the units:

Unit size	Suspension type			
	Heating function		Heating and ventilation function	
	Wall units	Ceiling units	Wall units	Ceiling units
TERM-E	set of suspension elements EZ	set of suspension elements EZ	suspensions GW, GWt or supports WW, WWt	suspension on threaded bars

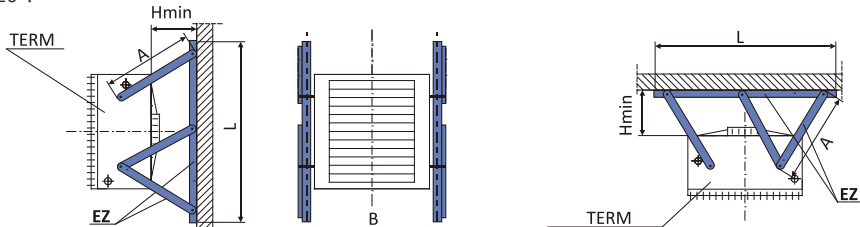
TERM-E (heating function)

Wall and ceiling units - set of suspension elements EZ

A set of elements to suspend the unit includes:

- » angle sections fastened to the construction partition - 2 pcs.
- » channel sections to suspend the unit - 6 pcs.

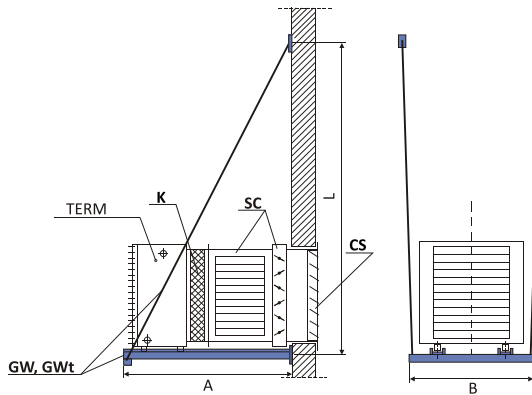
The wall unit can operate in the vertical position or in the position inclined from the plumb line up to 20°.



Unit size	a [mm]	b [mm]	l [mm]	Hmin [mm]
TERM - E	470	620	990	180

TERM-E (heating and ventilation function)

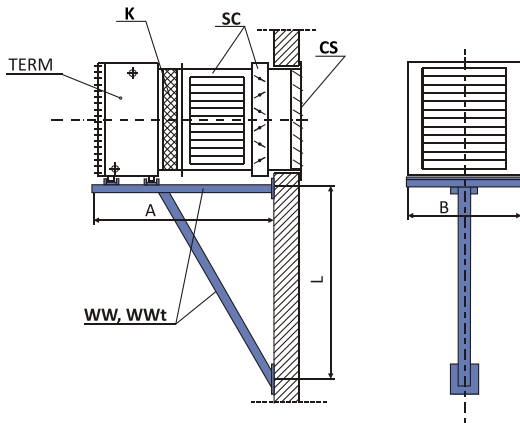
Wall units- suspensions GW i GWt



Suspension GW -intake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-E	880	700	~1315
Suspension GWt - intake box with filter			
TERM-E	1030	700	~1575

CS - wall intake
SC - intake box
K - flexible connector
GW suspension set

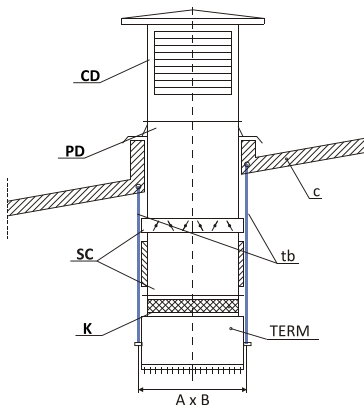
Wall units - supports WW i WWt



Support WW -intake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-E	880	560	~930
Support WWt - intake box with filter			
TERM-E	1030	560	~930

CS - wall intake
SC - intake box
K - flexible connector
GW suspension set
WW support set

Ceiling units - suspension on threaded bars



Unit size	a x b [mm]
TERM-E	620x290

CD - roof intake
PD - roof base
SC - intake box
K - flexible connector
c - ceiling
tb - threaded bars

Installing TERM-E units with intake box

When the unit with intake box is ordered the manufacturer provides the unit with flexible connectors fitted on the casing's rear wall.

For wall units, screw intake boxes to wall barrier, place the unit with flexible connector on supporting structure and screw the intake box to the unit.

Screw the unit to the supporting structure with 4 bolts through rubber pads located in the bottom of the casing.

Setting of wall units with intake boxes is done using GW, GWt suspensions, WW, WWt supports, or other suspensions or supports provided by the customer.

Each of the GW, GWt suspensions feet or WW, WWt supports feet should be screwed to the wall or structural elements of the facility with 4 bolts M10 or 4 wall plugs of adequate strength.

(Neither GW, GWt suspensions set nor WW, WWt support set comes with bolts M10 and wall plugs). The unit with intake box should be levelled.

For intake box with filter, in general connect the filter between the intake box and the unit's connector.

The filter's cover should be placed on the casing's vertical wall so it is possible to remove the filter for cleaning from the side of suspensions or supports.



Minimum required distance of the unit with intake box for removal of filtration section is 70cm.

For ceiling units, intake boxes should be screwed to the roof base.

The unit with flexible connector should be suspended on the ceiling or structural elements of the roof on 4 threaded bars M10 and connected to the intake box.

Threaded bars of suspensions are mounted to brackets (angles) attached to the unit casing's side walls. It is recommended to use rubber pads.



Threaded bars must be secured with lock nuts preventing their unscrewing.

9. WIRING SYSTEM



Electrical installation and connection of the power supply to the unit must be carried out in accordance with relevant construction standards and regulations.

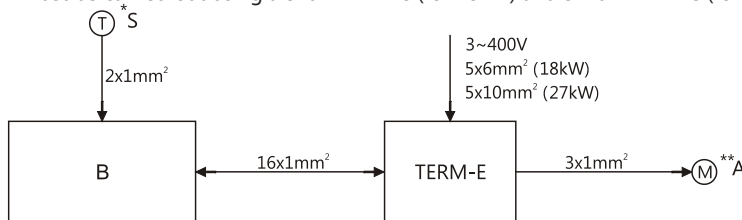


Electrical connections, and commissioning, inspection and repair works should be carried out only by an electrician with required electrical qualifications and familiarized with this instruction manual.



Before connecting make sure that the voltage and frequency rating of the power supply are in accordance with the data given on the units data plates. Otherwise, do not connect the device.

Units are intended to be supplied with 3-phase voltage: 3~400V (L1, L2, L3, N, PE). Power supply connection must be carried out using a 5x6mm² wire (for 18kW) and 5x10mm² wire (for 27kW).



B - Supply and control box

*S - Room temperature sensor - option with temperature regulator (RTA)

**A - Air damper actuator - option with intake box

10. AUTOMATICS

Standard equipment is as follows:

» **HEATING COIL THERMOSTAT** (adjacent to heating element parts) for reducing and monitoring of outlet air temperature in the event of disturbed air flow (e.g. fan failure). Set-point range for thermostat is 0°C to 200°C with a constant hysteresis of 5°C, which yields a maximum supply temperature of 80°C.

As an additional option, units can be fitted with the following automatic equipment components:

» **POWER SUPPLY AND CONTROL BOX AT** equipped with overcurrent breakers, relays and contactors, signal lamps, switches: AUTO | STOP, 3-speed power and air efficiency adjustment and HEATING | VENTILATION.

» **TEMPERATURE CONTROLLER RTA (two-speed):** to monitor and control temperature in the room.

» **PROGRAMMABLE TIMER ZG:** to program the heating coil work time.


» **DAMPER ACTUATORS NE1, NE2, NE3, NE4**

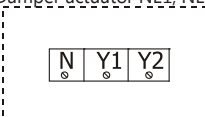
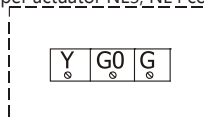
To control external air, dampers actuators are used, and they are intended to preset an air damper in a desired position and protect water heating coils against freezing. Depending on control method for dampers, actuators of the following types are used:

» open/close "on-off" NE1, NE2;

» of continuous operation 0..10V NE3, NE4. Setting of the damper in a particular position is achieved by supplying control voltage from ZW damper position presetting unit of 0...10V.

Actuator type	on/off	continuous signal
Supply voltage	230V AC	24V AC
Close / open time	150 sec.	150 sec.
Protection level	IP54	IP54



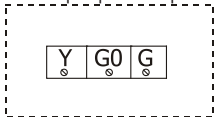
<p>Fig. 1. Damper actuator NE1, NE2 [on-off];</p>  <p>N Neutral 230V AC Y1 Control signal: open 230V Y2 Control signal: close 230V</p>	<p>Fig. 2. Damper actuator NE3, NE4 continuous signal</p>  <p>Y Control input 0...10V DV G0 Systemic zero-point G Phase, 24V AC</p>
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» **ZW DAMPER POSITION PRESETTING UNIT for actuators NE3 and NE4**

The position presetting unit enables presetting of the damper in any desired position so that the exact required air flow from the outside is established. The position presetting unit is placed inside of or on the door of the control box.

Supply voltage	24V AC
Control signal	0...10V DC
Protection level	IP42



<p>Fig. 3. ZW damper position presetting unit</p>  <p>Y Control input 0...10V DV G0 Systemic zero-point G Phase, 24V AC</p>

WS Service switch

Intended to switch off the 3~400V supply so servicing can be carried out.


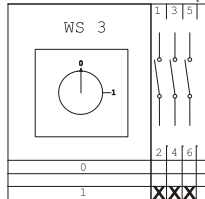
Type	WS-3	
Main circuits: poles	3-pole	
Supply circuit switch	1- and 3-phase current	
Rated continuous current	25A	
Protection rating	IP 65	

Fig. 4. WS 3 service switch (3-pole)



11. DEVICE COMMISSIONING

Before commissioning:

- » check the unit for mounting
- » check if supply voltage is in accordance with data plate
- » check additional protection of the unit fan and casing
- » check the electric motor for proper connection
- » check rotational direction of the fan.

To turn the unit on:

- » turn the electric motor supply on
- » adjust direction and range of supply air flow using blades on the outlet grille

To turn the unit off:

- » turn the fan electric motor supply off

12. REPAIR, MAINTENANCE AND WITHDRAWAL FROM USE

Rolling bearings used in the fan require no regular lubrication. However, it is recommended to perform a periodical inspection of the condition of motor bearings (fan rotor should rotate freely without any excessive plays or knocks).

If the unit starts to work with excessive noise, check the fan and the whole unit for proper mounting (including additional equipment items).

The rotor blades should be cleaned with a damp cloth, after removing the protective meshing, so as not to allow the rotor to be improperly balanced.

For any disturbances in the unit operation, please consult the technician or technical service.



Do not use high pressure washers for cleaning of the fan.



All maintenance and repair works should be carried out with voltage off.
Also protect the unit from being accidentally turned on by other personnel.

Periodically check the heating coil for cleanliness. If contaminated, blow the heating coil with compressed air.



Contamination of the heating coil will reduce the air efficiency and decrease the unit's heating capacity.

Depending on the air pollution level it is necessary to periodically check the filter in the intake box for contamination. Clean the contaminated filter (by rinsing the filter fabric ~3 times) or replace with a G3 fabric.



Contamination of the filter will reduce the air efficiency and decrease the unit's heating capacity.

Once the device is withdrawn from use, handle it to a proper waste treatment plant.

13. TROUBLESHOOTING

Trouble description	Possible trouble cause	Troubleshooting
too loud operation of the unit	minimum distance from the wall or ceiling is not maintained	use distances recommended in the instruction manual
	improper revolution direction	execute a proper electric connection
	improper parameters of the mains	use the unit only when the parameters of the mains and the unit are compliant
	air outlet is blocked by outlet grid louvres	avoid a significant closing of outlet grid louvres at high speed ratios
	fan vibrations, the blades rub against fixed elements not centric fastening of the fan in its bearing plate	check up the correctness of the fan and fastening reliability of other elements of the unit
fan does not work	incorrect or unreliable electric connections	check up or correct: 1) compliance of electric connections according to the diagrams specified in the instruction manual 2) reliability of connections on electric terminals 3) parameters of the mains
	improper parameters of the mains (lack of three phases in three-phase motors)	
	fan motor is damaged	
	fan operation control elements are damaged	

14. INFORMATION

As to all issues concerning the TERM heating and ventilation units please contact JUWENT Production Plant or Representatives



III. SAMPLE OF EC DECLARATION OF CONFORMITY

NR: 01/15

We declare under our sole responsibility that the product:

Heating and ventilation unit

Type: TERM-E --.....

serial number:

to which this declaration relates is in conformity with the following directives:

Directive number	Symbol	Directive title
2006/42/WE	MAD	Machinery safety directive
with subassemblies meeting the requirements of the following directives:		
2006/95/WE	LVD	Low voltage directive
2004/108/WE	EMC	Electromagnetic compatibility directive

and standards:

Number of standard	Date of issue
PN-EN ISO 12100	2012
PN-EN ISO 13857	2010

This CE declaration of conformity loses its validity if the heating and ventilation units are modified or reconstructed without our consent.

Year of  marking:2015

VIII. LIST OF SUBASSEMBLIES INSTALLED IN THE UNIT

No.	Name of subassembly	*)
1	Axial fan with single-phase motor	
4	18 kW heat exchanger	
5	27 kW heat exchanger	

List of subassemblies installed in additional equipment

Lp	Name of subassembly	*)
1	Fresh air damper	
2	Side damper	
3	Actuator	
4	Filter	

*) - mark proper box corresponding with the equipment variant