



FLEXIHEAT UK LTD

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FHTERM STEAM VERSION UNIT HEATERS



- I. REPRESENTATIVES
- II. ORIGINAL INSTRUCTION MANUAL
- III. SAMPLE OF EC DECLARATION OF CONFORMITY
- IV. WARRANTY TERMS AND CONDITIONS
- V. UNIT STARTUP REPORT
- VI. INSPECTION AND MAINTENANCE DOCUMENT
- VII. SERVICE NOTIFICATION
- VIII. LIST OF SUBASSEMBLIES INSTALLED IN THE UNIT



Please read this instruction manual carefully before beginning any work.

II. ORIGINAL INSTRUCTION MANUAL

FHTHERM STEAM **UNITS** MODEL - **Sizes 0-4**

Please note there are water fed unit heater details also in this manual - we have highlighted the steam unit heater details

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1. INTENDED USE

TERM heating and ventilation units, size 0÷4, 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.



FHTERM 1; 2; 3 and 4 units **cannot be used** in the areas with **relative humidity higher 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

Size	0; 1; 2; 3; 4;
Heating medium	water (W), temp. (°C) and permissible pressure (MPa); steam (P), pressure (MPa)
Heater	water metal louvre (L), number of rows (II, III) water bimetal (B) number of rows (II, III) steam bimetal (B), number of rows (II/2.8, II/5)
Equipment	single-row grid(K); slot diffuser (N); outlet nozzle (D)
Motor	three phase (T); single phase (J);

4. DEVICE DESCRIPTION

The unit includes:

- » **axial fan** mounted on the rear wall of the unit with a net protecting the rotor;
- » **water or steam heater**

The fin water heater is made of copper pipes with external diameter $D=12\text{mm}$ and aluminium fins with spacing $s=2,4\text{mm}$.

The bi-metal water heater is made of steel pipes with internal diameter $d=12.4\text{mm}$ and spirally rolled aluminium ribbing with external diameter $D=38\text{mm}$ and rib spacing $s=2.8\text{mm}$.

The connection spouts of the units with the water heaters are with internal threads.

The bi-metal **steam heater is made of steel pipes** with internal diameter $d=21.4\text{mm}$ and spirally rolled aluminium ribbing with external diameter $D=58\text{mm}$ and rib spacing $s=2.8\text{mm}$ or $s=5.0\text{mm}$, the connection spouts of the units with the steam heaters are with external threads.



For the fin water heaters the maximum temperature of heating medium is up to 110°C and the maximum operational pressure is up to 1Mpa.

For the bimetal water heaters the maximum temperature of heating medium is up to 150°C and the maximum operational pressure is up to 1,6Mpa.

For the **steam heaters the maximum operational pressure is up to 0.6 Mpa. (6 Bar)** and at special request we can offer up to 10 Bar (1 Mpa) pressure units

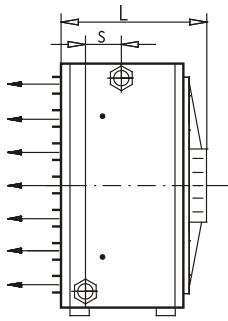


There is a risk of heating medium freeze in the heater in the compartments with the temperature below 0°C.

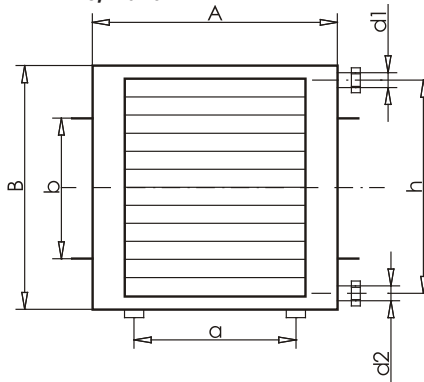
The risk can be reduced using an antifreeze thermostat (delivered at request), using antifreeze heating media or removing water from the unit.

- **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.

5. TECHNICAL DATA

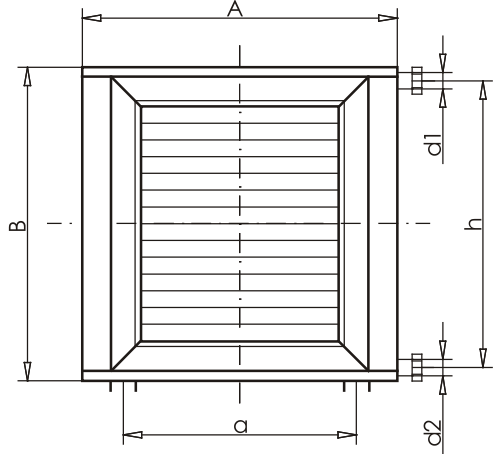
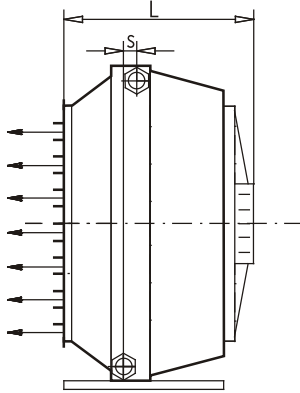


FHTERM 0, 1 and 2



Unit size	A [mm]	B [mm]	L [mm]	a [mm]	b [mm]	d1=d2		d1/d2		h [mm]	s [mm]	Weight [kg]
						II	III	II; 2,8	II; 5			
Metal louvre heater unit												
FHTERM-0	412	412	330	280	200	½"	½"	-	-	300	70	16
FHTERM-1	556	526	420	420	290	¾"	¾"	-	-	460	70	26
FHTERM-2	677	684	436	420	380	¾"	1"	-	-	620	70	46
Bi-metal water unit heaters												
FHTERM-0	412	412	330	280	200	¾"	¾"	-	-	320	60	30
FHTERM-1	556	526	420	420	290	¾"	¾"	-	-	445	60	38
FHTERM-2	677	684	436	420	380	1"	1¼"	-	-	610	45	84
Bi-metal steam unit heaters												
FHTERM-0	412	412	330	280	200	-	-	¾"/½"	¾"/½"	360	-	35
FHTERM-1	556	526	420	420	290	-	-	1"/¾"	1"/¾"	460	-	45
FHTERM-2	677	684	436	420	380	-	-	1¼"/1"	1¼"/1"	620	-	72

FHTERM-3 & 4



Unit size	A [mm]	B [mm]	L [mm]	a [mm]	d1=d2		d1/d2		h [mm]	s [mm]	Weight [kg]
					II	III	II; 2,8	II; 5			
Metal louvre heater unit											
TERM-3	1080	1017	589	800	1¼"	1½"	-	-	930	70	105
TERM-4	1350	1257	630	1000	1 ½"	2"	-	-	1160	70	157
Bi-metal water heater unit											
TERM-3	990	990	805	800	1¼"	1½"	-	-	790	40	175
TERM-4	1229	1220	890	1000	1 ½"	2"	-	-	990	30	215
Bi-metal steam unit heaters											
TERM-3	1090	1090	805	800	-	-	2"/1½"	1½"/1¼"	930		180
TERM-4	1320	1320	890	1000	-	-	2"/1½"	2"/1½"	1160		255

The table presents the weights and spacing of spouts of the units with III-row water heaters and the weights and spacing of spouts with II-row steam heaters with rib spacing 2,8 mm.

Unit environment and fan motor parameters

Unit size	Operation temperature [°C]	IP	Insulating class
TERM-0	up to +40	40	B
TERM-1	up to +60	54	F
TERM-2	up to +70	54	F
TERM-3	up to +50	54	F
TERM-4	up to +65	54	F

Max. air humidity for TERM-1; 2; 3 and 4 units - 95%.

Max. dust content - 3mg/m³.

The TERM – 0 unit should not work in the compartments with increased humidity.

The heaters of the TERM units should be supplied with water meeting the conditions specified in the Standard PN-93/C-04607

WATER QUALITY PARAMETERS IN CENTRAL HEATING INSTALLATIONS

Kind of materials used in installation	Water quality parameters							
	for installation filling and refilling				installation water			
	Installation system	General hardness mval/l (mmol/l)	Aggressive ion content mg/l	Ammonia nitrogen content mg/l ($N_{NH_4^+}$)	Inhibitor concentration	Reaction pH	Oxygen content mg/l O_2	Inhibitor concentration
Steel / cast iron	open	$\leq 4,0$ ($\geq 2,0$)	$\leq 50 \sum (Cl + SO_4^{2-})$ including $< 30 Cl^-$	x	x	8,0-9,5	$\leq 0,1$	x
			$> 50 \sum (Cl + SO_4^{2-})$		acc. to manufacturer's recommendations	x	x	acc. to manufacturer's recommendations
	closed		$\leq 150 \sum (Cl + SO_4^{2-})$ including $< 100 Cl^-$		x	8,0-9,5	$\leq 0,1$	x
			$> 150 \sum (Cl + SO_4^{2-})$		acc. to manufacturer's recommendations	x	x	acc. to manufacturer's recommendations
Steel / copper	closed	$\leq 4,0$ ($\geq 2,0$)	$\leq 50 \sum (Cl + SO_4^{2-})$ including $< 30 Cl^-$	$\leq 0,5$	x	8,0-9,0	$\leq 0,1$	x
Copper	open or closed	$\leq 4,0$ ($\geq 2,0$)	-	$\leq 0,5$	x	8,0-9,0	$\leq 0,1$	x
Steel / aluminium	open	$\leq 4,0$ ($\geq 2,0$)	$\leq 50 \sum (Cl + SO_4^{2-})$ w tym $< 30 Cl^-$	x	x	8,0-8,5	$\leq 0,1$	x
	closed		$\leq 150 \sum (Cl + SO_4^{2-})$ including $< 100 Cl^-$					
Plastic	open or closed	$\leq 4,0$ ($\geq 2,0$)	-	x	x	x	x	x

Unit operational noise level

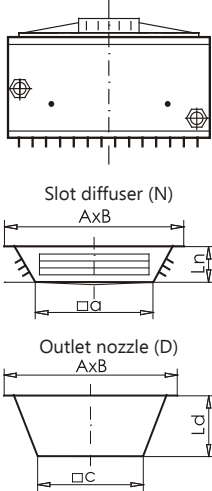
Unit size	Operational noise level in dB(A) at distance of 1m		
	with 1~230V;50Hz motor	with 3~400V;50Hz motor	
		Δ	∇
TERM-0*	53	-	-
TERM-1**	60,5	-	-
TERM-2**	65	65	61
TERM-3***	-	76	68,5
TERM-4***	-	80,5	74,5

Operational noise level – acoustic pressure level taking directivity factor $Q=2$ and dispersion factor of compartment: * $A=50m^2$; ** $A=100m^2$; *** $A=300m^2$ into consideration.

OUTLET DIFFUSER FOR THE UNITS

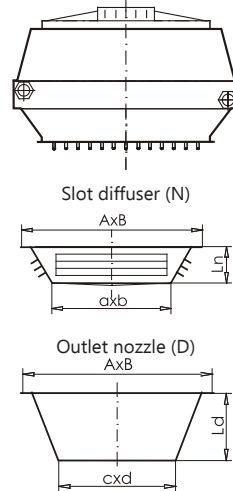
FHTERM 0; 1; 2

Unit with single row outlet grid (K)



FHTERM 3; 4

Unit with single row outlet grid (K)



Slot diffuser (N)

Unit size	A x B [mm x mm]	a x b [mm x mm]	Ln [mm]
TERM-0	412 x 412	275 x 275	83
TERM-1	555 x 525	355 x 355	100
TERM-2	677 x 684	445 x 445	135
TERM-3	886 x 1010	670 x 794	145
TERM-4	1110 x 1251	895 x 1035	145

Outlet nozzle (D)

Unit size	A x B [mm x mm]	c x d [mm x mm]	Ld [mm]
TERM-0	412 x 412	278 x 278	150
TERM-1	555 x 525	350 x 350	190
TERM-2	677 x 684	450 x 450	240
TERM-3	886 x 1010	626 x 750	360
TERM-4	1110 x 1251	850 x 990	460

All units are delivered with outlet grids as a standard.

The grids have movable blades allowing adjusting an air stream direction and range.

Ceiling units can be equipped with:

- » **slot diffusers (N)** (air supply to 4 sides);
- » **outlet nozzles (D).**

Wall units can be also equipped with outlet nozzles (D).

The slot diffusers allow heating people staying zones by secondary air stream.

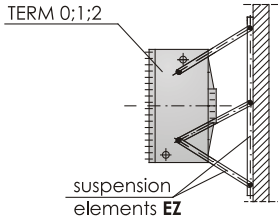
The TERM 0; 1 units with slot diffuser can be hung at the height of max. **4m**, and the TERM 2; 3; 4 units with slot diffuser can be hung at the height of max. **6m**.

The outlet nozzles allow increasing a range of air supply.

PRESENTATION OF ADDITIONAL EQUIPMENT FOR FHTERM 0, 1, 2 UNITS

Heating function

WALL UNITS

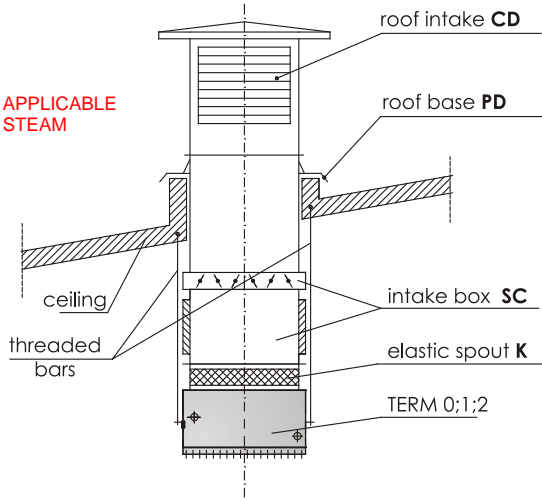


STEAM UNIT HEATERS CAN ONLY BE WALL MOUNTED,
BLOWING AIR OUT HORIZONTAL

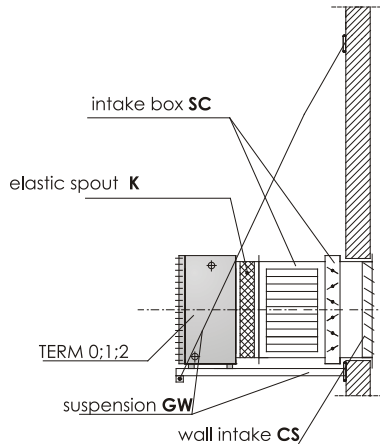
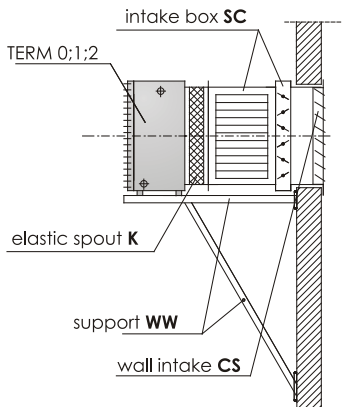
Heating and ventilation function

CEILING UNITS

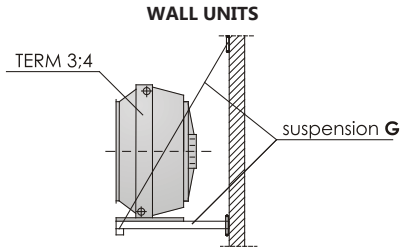
NOT APPLICABLE
FOR STEAM



WALL UNITS



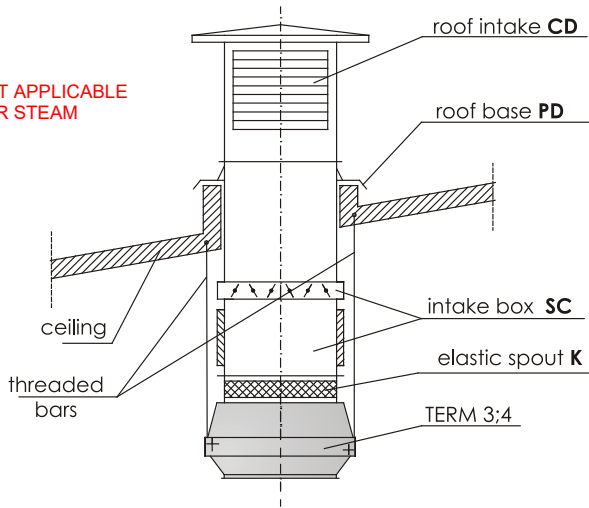
PRESENTATION OF ADDITIONAL EQUIPMENT FOR FHTERM 3 & 4 UNITS
Heating function



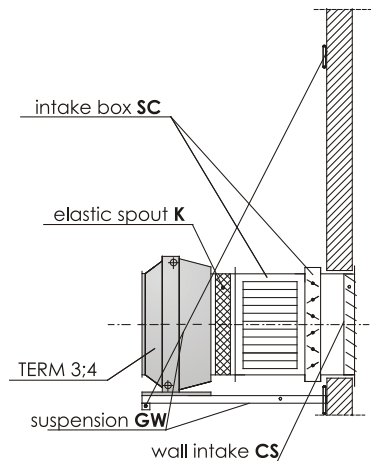
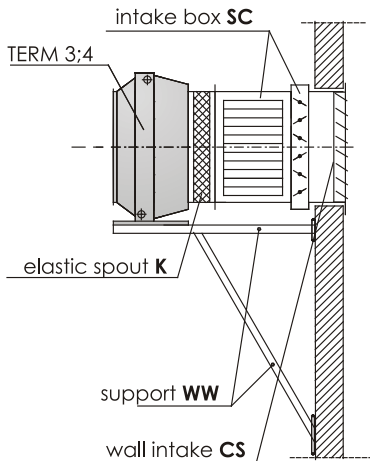
STEAM UNIT HEATERS CAN ONLY BE WALL MOUNTED,
 BLOWING AIR OUT HORIZONTAL

Heating and ventilation function
CEILING UNITS

NOT APPLICABLE
 FOR STEAM



WALL UNITS



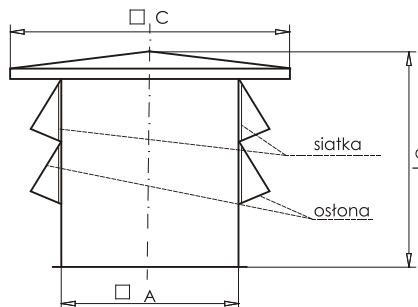
6. ADDITIONAL EQUIPMENT

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.

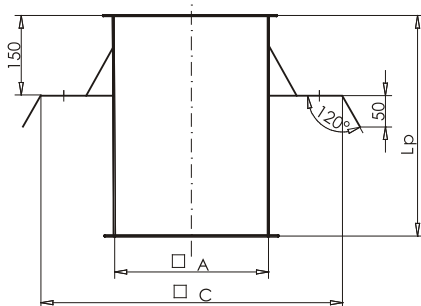


Unit size	Intake size	□ A [mm]	Lc [mm]	□ C [mm]	Weight [kg]
TERM-0	CD-0	470	530	658	16,8
TERM-1	CD-1	520	580	728	20,0
TERM-2	CD-2	660	700	924	30,0
TERM-3	CD-3	720	800	1008	46,2
TERM-4	CD-4	810	950	1134	62,4

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.

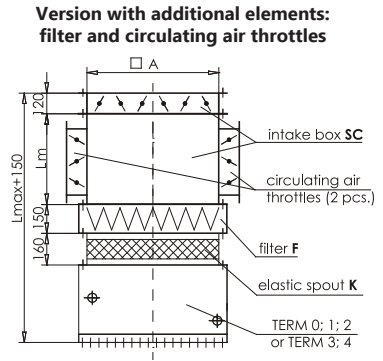
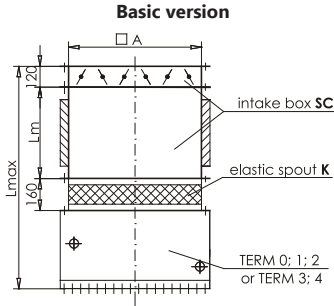


Unit size	Base size	□ A [mm]	Lp [mm]	□ C [mm]	Weight [kg]
TERM-0	PD-0	470	600	690	28
TERM-1	PD-1	520	600	740	31
TERM-2	PD-2	660	600	1000	39
TERM-3	PD-3	720	800	1080	50
TERM-4	PD-4	810	800	1170	56

The roof bases are made of galvanized steel sheets.

INTAKE BOXES SC

For ceiling and wall heating and ventilation units



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
FHTERM-0	SC-0	470	310	830	19	28
FHTERM-1	SC-1	520	310	930	23	35
FHTERM-2	SC-2	660	410	1040	30	44
FHTERM-3	SC-3	720	510	1315	36	54
FHTERM-4	SC-4	810	610	1465	41	63

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-0	HXM-300	1000
TERM-1	FE-035-4E	2340
TERM-2	FE045-4E	5310
	FE045-VD Δ connection	5400
	FE045-VD \sphericalangle connection	4140
TERM-3	FE056-VD Δ connection	9450
	FE056-VD \sphericalangle connection	7200
TERM-4	FE063-VD Δ connection	16650
	FE063-VD \sphericalangle connection	13050

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 [m ³ /h]	Total air capacity [m ³ /h]
TERM-0	SC-0	open-closed	60°	10%÷75%	80÷750	830÷1000
TERM-1	SC-1	open-closed	60°	10%÷75%	190÷1760	1940÷2340
TERM-2	SC-2	open-closed	60°	10%÷75%	450÷4050*	4480÷5400*
TERM-3	SC-3	open-closed	60°	10%÷75%	780÷7090*	7840÷9450*
TERM-4	SC-4	open-closed	60°	10%÷75%	1380÷12490*	13820÷16650*

* air efficiencies of the units with three-phase motors connected in Δ .

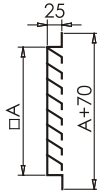
Adjustment ranges of fresh air, share of fresh air in total air efficiency by means of throttle depending on different circulating air grid closing angles

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-0	CS-0	470	6
TERM-1	CS-1	520	7
TERM-2	CS-2	660	10
TERM-3	CS-3	720	11
TERM-4	CS-4	810	13

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 [m ²]	Total air capacity [m ³ /h]	Efficiency of fresh air at V<2,5m/s [m ³ /h]	Fresh air efficiency / Total air efficiency
TERM-0	470	0,22	1000	2000	> 100 %
TERM-1	520	0,27	2340	2450	> 100 %
TERM-2	660	0,43	5400	3900	72%
TERM-3	720	0,52	9450	4700	50%
TERM-4	810	0,66	16650	5940	36%

The TERM 0 and 1 units can operate totally using fresh air from the wall intakes with dimensions equal to dimensions of cross-sections of intake boxes.

For the TERM 2; 3 and 4 units when they are to operate totally using fresh air the manufacturer selects the wall intakes (wall intakes will have larger areas).

7. 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.

8. SAFETY RECOMMENDATIONS



Solutions minimizing a possibility of hazard to persons and property were applied when designing and manufacturing the units. However, it does not eliminate all possible risks.



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.



In case of the unit failure it is necessary to switch off the power supply to the electric motor of the fan and close the heating medium supply to the heater immediately.



The unit can be used only when electric safety devices operate correctly.
It must be permanently connected to the electric installation equipped with protective (earth) terminal, residual current device and service switch.
It is necessary to pay attention not to change the protection lead to the power lead.



The operation of the unit with the fan without a protective net is forbidden.



The heaters of the units can be supplied with water or steam of very high temperature (up to 160°C) what forces the users to be particularly careful.



A correct selection of fittings (including drain valves) by the designer of the installation is a condition of safe operation of the steam heater.



Only original spare parts should be used.

Note for the user! The mounting or use of the heating and ventilation unit against the instruction manual makes the threat of unit damage, creates the hazard to persons and property and causes the loss of warranty.

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.

9. 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

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-0 TERM-1 TERM-2	set of suspension elements EZ	set of suspension elements EZ	suspensions GW, GWt or supports WW, WWt	suspension on threaded bars
TERM-3 TERM-4	suspensions G	suspension on threaded bars	suspensions GW, GWt or supports WW, WWt	suspension on threaded bars

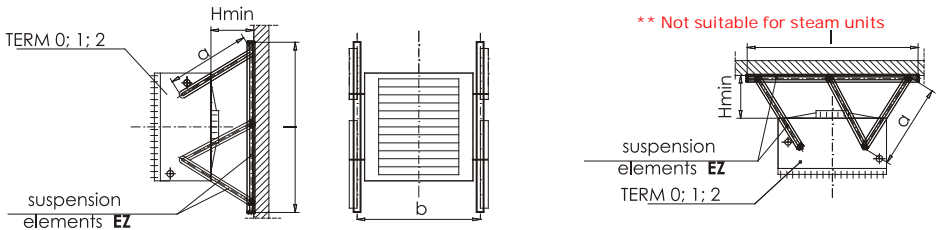
TERM 0; 1; 2 (heating function)

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 - 2pcs.
- » channel sections to suspend the unit - 6 pcs.

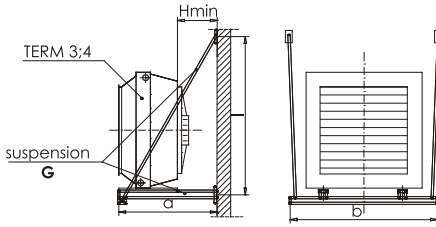
The wall unit can operate in the vertical position or in the position inclined from the plumb line up to 20°.



Unit size	a [mm]	b [mm]	l [mm]	Hmin [mm]
TERM - 0	358	470	800	160
TERM - 1	470	620	990	180
TERM - 2	575	740	1140	230

TERM 3; 4 (heating function)

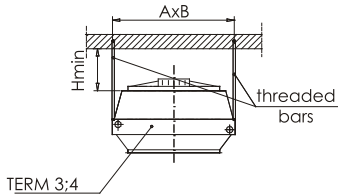
Wall units - suspension G



Unit size	a [mm]	b [mm]	l [mm]	Hmin [mm]
TERM-3	800	1200	1300	280
TERM-4	850	1550	1375	320

Ceiling units - suspension on threaded bars

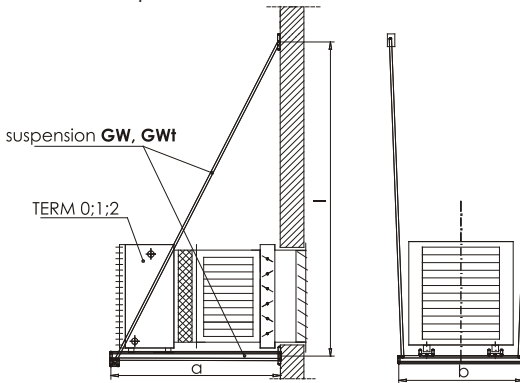
** Not suitable for steam units



Unit size	a x b [mm]	Hmin [mm]
TERM-3	860 x 987	280
TERM-4	1080 x 1227	320

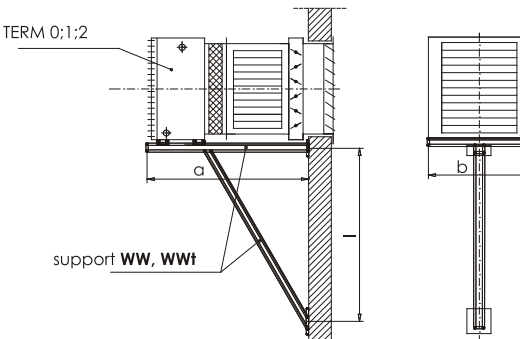
TERM 0; 1; 2 (heating and ventilation function)

Wall units- suspensions GW i GWt



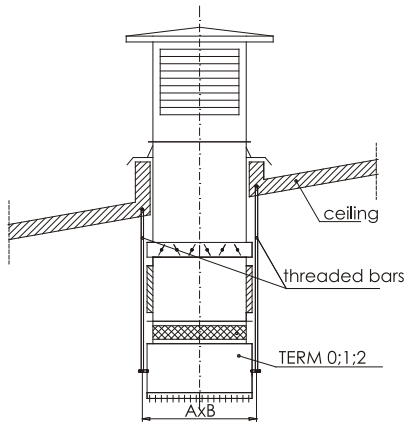
Suspension GW - intake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-0	790	550	~1230
TERM-1	880	700	~1315
TERM-2	1000	820	~1520
Suspension GWt - intake box with filter			
TERM-0	940	550	~1490
TERM-1	1030	700	~1575
TERM-2	1150	820	~1780

Wall units - supports WW i WWt



Support WW - intake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-0	790	360	~810
TERM-1	880	560	~930
TERM-2	1000	680	~1030
Support WWt - intake box with filter			
TERM-0	940	360	~810
TERM-1	1030	560	~930
TERM-2	1150	680	~1030

Ceiling units - suspension on threaded bars



Unit size	a x b [mm]
TERM-0	570x200
TERM-1	620x290
TERM-2	760x380

Mounting of TERM 0, 1, 2 units with intake box

When the unit is ordered with the intake box the manufacturer delivers the units with elastic spouts installed to the rear wall of the casing.

As to the wall units the intake boxes should be fastened to the construction partition, the unit with the elastic spout should be placed on the bearing structure and the intake box should be fixed to the unit.

The unit should be fastened to the bearing structure by means of 4 bolts through rubber cushions located at the lower part of the casing.

The suspensions GW, GWt, supports WW, WWt or other suspensions or supports prepared by the client are used to install the wall units with the intake boxes.

Each of feet of the suspensions GW, GWt or feet of the supports WW, WWt should be fixed to the wall or constructional elements of the object by means of 4 bolts M10 or 4 wall plugs with proper strength.

(A set of suspensions GW, GWt and supports WW, WWt does not include the bolts M10 and wall plugs).

The unit with the intake box should be levelled.

As to the execution of the intake box with the filter basically the connection of the filter between the intake box and the unit spout is planned.

The cover of the filter should be located on the vertical wall of the casing in such a way that the filter can be removed from the side of the suspension or supports for cleaning.



A minimal distance of the unit with the intake box necessary to remove the filtration section is -70 cm.

As to the ceiling units the intake boxes should be fastened to the roof base.

The unit with the elastic spout should be suspended to the ceiling or constructional elements of the roof by means of 4 threaded bars M10 and connected with the intake box.

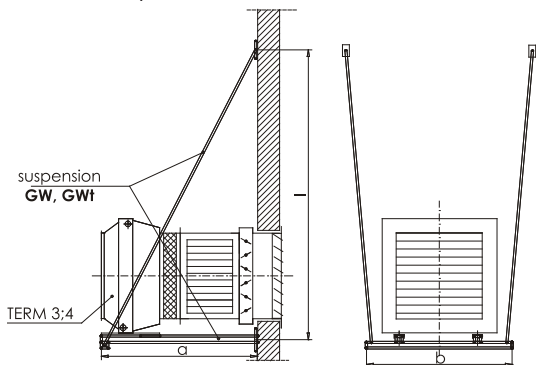
The threaded bars of the suspensions are fixed to the connection elements (angle sections) connected to the side walls of the unit casing. The use of rubber cushions is recommended.



The threaded bars must be protected by locknuts preventing their removal.

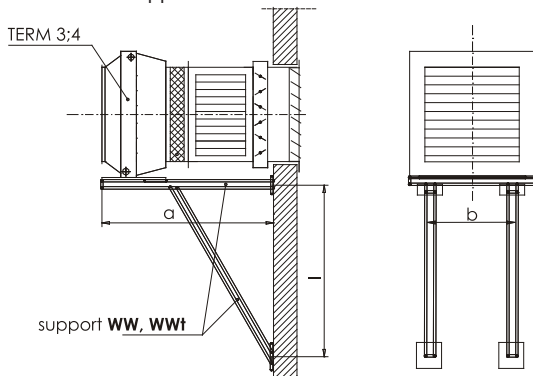
TERM 3; 4 (heating and ventilation function)

Wall units- suspensions GW i GWt



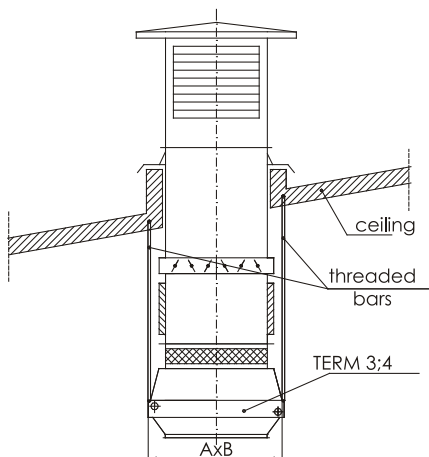
Suspension GW - intake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-3	1300	1200	~2430
TERM-4	1450	1550	~2415
Suspension GWt - intake box with filter			
TERM-3	1450	1200	~1490
TERM-4	1600	1550	~2675

Wall units - supports WW i WWt



Support WW -sintake box without filter			
Unit size	a [mm]	b [mm]	l [mm]
TERM-3	1300	800	~1290
TERM-4	1450	1000	~1425
Support WWt - intake box with filter			
TERM-3	1450	800	~1290
TERM-4	1600	1000	~1425

Ceiling units - suspension on threaded bars



Unit size	a x b [mm]
TERM-3	860x984
TERM-4	1080x1224

Mounting of TERM 3, 4 units with intake box

When the unit is ordered with the intake box the manufacturer delivers the units with elastic spouts installed to the rear wall of the casing.

As to the wall units the intake boxes should be fastened to the construction partition, the unit with the elastic spout should be placed on the bearing structure and the intake box should be fixed to the unit.

Each unit has lugs that should be fastened to the bearing structure through rubber cushions.

The suspensions GW, GWt, supports WW, WWt or other suspensions or supports prepared by the client are used to install the wall units with the intake boxes.

Each of feet of the suspensions GW, GWt or feet of the supports WW, WWt should be fixed to the wall or constructional elements of the object by means of 4 bolts M10 or 4 wall plugs with proper strength.

(A set of suspensions GW, GWt and supports WW, WWt does not include the bolts M10 and wall plugs).

The unit with the intake box should be levelled.

As to the execution of the intake box with the filter basically the connection of the filter between the intake box and the unit spout is planned.



A minimal distance of the unit with the intake box necessary to remove the filtration section is 100cm.



The threaded bars must be protected by locknuts preventing their removal.

As to the ceiling units the intake boxes should be fastened to the roof base.

The unit with the elastic spout should be suspended to the ceiling or constructional elements of the roof by means of 4 threaded bars M10 and connected with the intake box.

The threaded bars are screwed in 4 blind rivet nuts located in the casing of the unit.

10. WATER INSTALLATION

It is recommended:

- » to connect the unit to the heating network by means of the lower spout of the heater and the return of the heating medium by means of the top spout;
- » to use cut-off valves upstream and downstream the unit to enable its dismantling without the necessity to drain the supply installation.

The venting and draining of the heaters of the units is foreseen centrally in the network.

The vents and drain valves located in the installation outside the unit should be used.

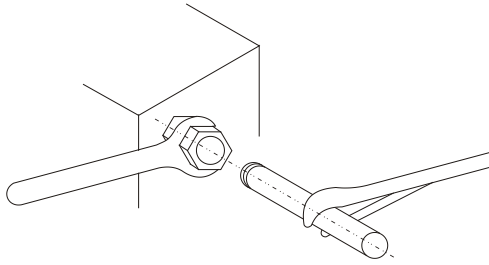


The imprecise venting of the heater can be a reason for which the unit does not reach planned parameters.



The weight of installation pipes should not rest on the spouts of the heater.

When connecting the heater to the heating network the spouts of the heater should be protected against breaking in a way presented in the picture.



The heater damages arisen for the afore-mentioned reason are not covered by the warranty.

11. STEAM INSTALLATION

The spouts of the steam heater are adapted to connect with the heating installation by welding. The steam heaters should be supplied from the top.



A correct selection of fittings (including drain valves) by the designer of the installation is a condition of safe operation of the steam heater.

12. ELECTRICAL INSTALLATION



The electric installation and the connection of power to the unit must be executed according to the relevant requirements of the standards and construction regulations.



The electric connections, start-up, inspections and electric repairs may be executed only by an electrician who has required certificates to carry electric works and got acquainted with the instruction manual.



Before the connection it is necessary to make sure whether the voltage value and power system frequency are compliant with the data specified on the rating plates of the units. In case of noncompliance the unit should not be connected.

The units are equipped with single (1~230 V/50 Hz) or three-phase (3~400 V/50 Hz) motors with internal thermal contacts TK. The units should be powered from the main switchboard equipped with a main switch, differential protection device, protective (earth) terminal and overload and short-circuit protection devices (motor switches). The setup of overload protection cannot be higher than rated current of the motor (specified on the rating plate of the motor of the unit).



The lack of required motor safety devices and non-connection of thermal contact TK to the control circuit cause the loss of warranty.

The lead powering the motor of the fan should be inserted to the terminal box and fastened to the protective net or fan supports by means of clamp bands. The thermal contact (TK or TP) of the fan should be connected to the circuit that controls the power supply of the fan.

The electric connection of the motor must be compliant with the electric diagrams located on the terminal box. (Fig. 1, 2, 3).

Fig. 1. Motor connection plate:
TERM-0-J

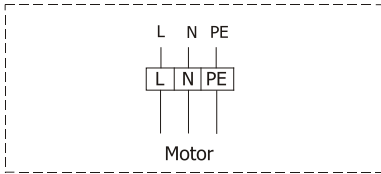


Fig. 2. Motor connection plate:
TERM-1-J; TERM-2-J;

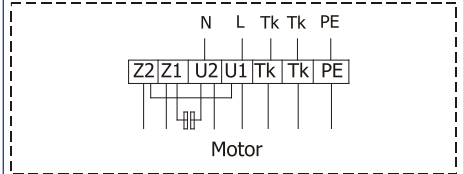
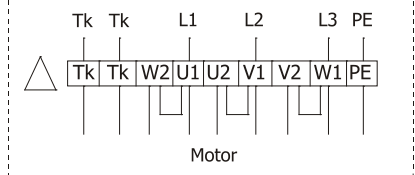
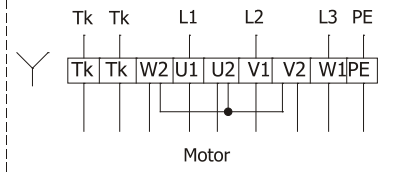
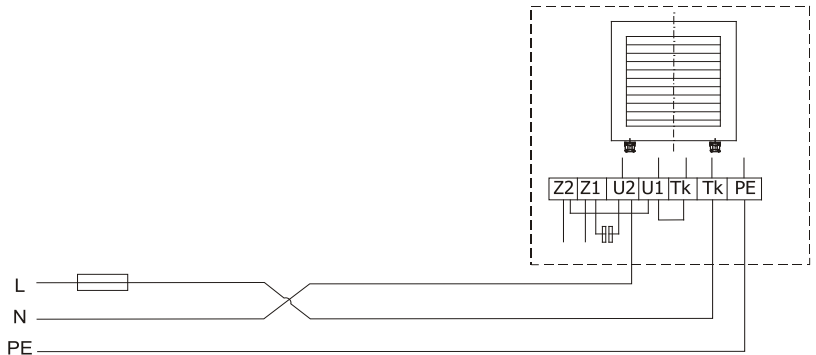


Fig. 3. Motor connection plate:
TERM-[2-3-4]-T;

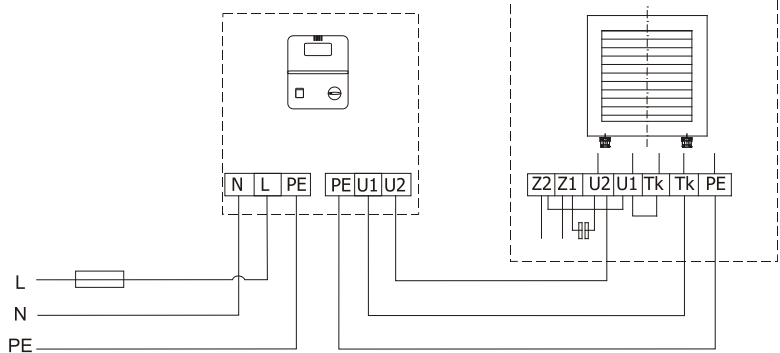


Exemplary electric diagrams of TERM unit connections and control

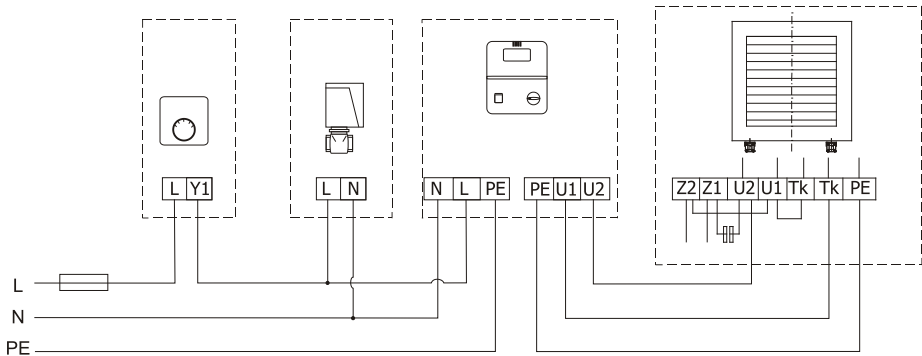
1. Diagram of electric connections without automatics



2. Diagram of electric connections with revolution controller



3. Diagram of electric connections with automatics (thermostat controls the revolution controller, valve servomotor and fan operation).



13. AUTOMATICS

We can deliver the following items to the units:

1. Revolution controllers (5-step) - voltage 1~230V

Controller type	ARW-1,2	ARW-3
Unit type	TERM-0÷1-J	TERM-2-J
Protection rating	IP21	IP21
Height [mm]	123	173
Width [mm]	77	90
Depth [mm]	71	89



2. Revolution controllers (5-step) - voltage 3~400V

Controller type	RTRD-2	RTRD-4	RTRD-7
Unit type	TERM-2-T	TERM-3-T	TERM-4-T
Protection rating	IP54	IP21	IP21
Height [mm]	255	309	309
Width [mm]	190	162	162
Depth [mm]	135	160	160

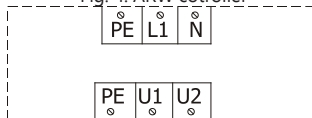


No more than one device should be connected to one revolution controller, remembering not to exceed rated currents of the specified controller because it can cause its damage.

The RTRD controllers have a thermal protection circuit of the motor controlled by a signal from a sensor TK installed in the motor windings.

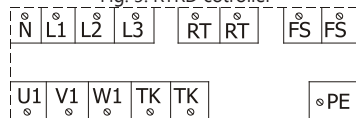
The controllers should be powered with voltage from the main switchboard equipped with a main switch and residual current circuit breakers.

Fig. 4. ARW cotroller



PE-L1-N Input voltage (230V AC)
PE,U1,U2 Output (control) voltage

Fig. 5. RTRD cotroller




L1-L2-L3 Input voltage (400V AC)
U1,V1,W1 Output (control) voltage
TK-TK Thermal protection circuit of motor
RT-RT Remote switching on/off - (thermostat TP or TPP)
FS-FS Antifreeze thermostat

3. Three-way valves

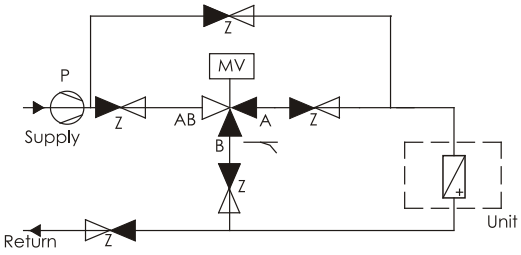
The directional valves found a wide application in the units for the adjustment of heating medium flow through the heaters.

The used three-way valves can be divided into:


» directional valves with the connection with internal threads V20 (on/off). The valves should be installed in the supply line, the flow is admissible only in the marked direction AB->A or AB->B.

Symbol	DN	k_{vs} , m ³ /h	t[°C]	PN	Unit type	
V20	20	3,5	1...110	16	TERM-0÷2	

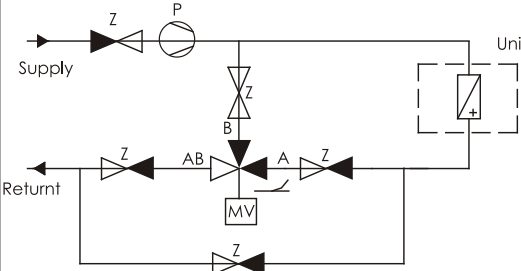
FITTINGS:
 Z: cut-off valve: manual
 P: circulating pump
 MV: three-way control valve controlled by servomotor



» mixing valves with the connection with internal threads V32, V40. The valves should be installed in the return line, the flow is admissible only in the marked direction A and B->AB.



Symbol	DN	k_{vs} , m ³ /h		t[°C]	PN	Unit type	
		on/off	continuous signal				
V32	32	16	16	1...110	16	TERM-3	
V40	40	25	25	1...110	16	TERM-4	

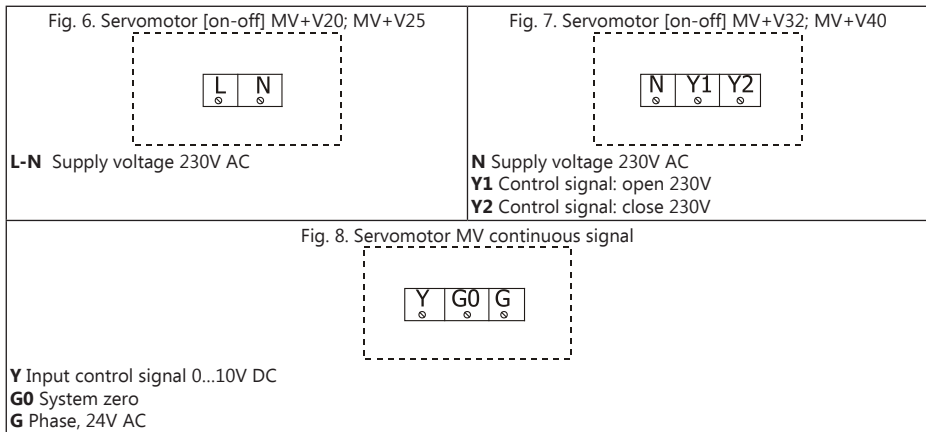
FITTINGS:
 Z: cut-off valve: manual
 P: circulating pump
 MV: three-way control valve controlled by servomotor



4. Valve servomotors

The servomotors that allow controlling the valves "continuous-0÷10V DC" (by means of controller RT) or "on-off" (by means of thermostat TP or TPP) are used for a direct installation on the valves. Therefore a position (protrusion) of the servomotor stem is proportional to the value of control signal from the controller or thermostat.

Servomotor type	on/off		continuous signal	
Supply voltage	230V AC		24V AC	
Closing / opening time	180 s		150 s	
Protection rating	IP40		IP43	



5. Room thermostat

A room thermostat (on-off) TP allows setting the required temperature in the room within the range of 8...30°C by means of a knob, however, the room thermostat (on-off) TPP allows setting the required temperature in the room within the range of 8...35°C in the day and night mode on the liquid-crystal display.

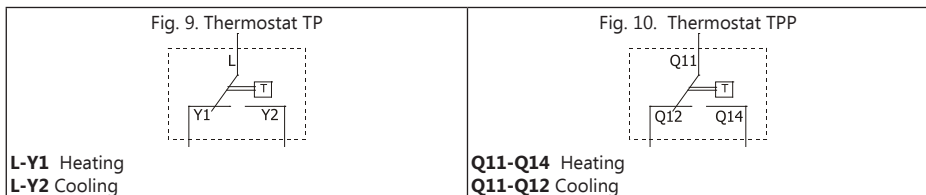
The loss of temperature in the room below the set value causes that the thermostat applies a signal to open the valves and switches on the fan. However, if the temperature in the room exceeds the set value then the thermostat toggles itself applying a signal to close the valves and switches off the fan. The thermostat can be used in the circulating and external air system.

TP or TP/IP65 thermostat

Supply voltage	24..250V AC	24..250V AC	
Measurement range	8...+30°C	8...+35°C	
Contact rating	6(2)A	10(1,5)A	
Protection rating	IP30	IP65	

TPP thermostat with time programmer

Supply voltage	2 batteries 1,5V	
Measurement range	5...+35°C	
Contact rating	5(2)A	
Protection rating	IP30	



6. Antifreeze thermostat

The heater protection system against freezing (antifreeze thermostat) is a recommended part of the control system in the heating and ventilation units with the water heaters operating in the external air system.

The thermostat has a capillary evenly unrolled along the field of the heater that – after the reduction of the air temperature (even on a short section of the capillary) below the boundary temperature (5°C) – transmits a signal to the supply and control box which – to the thermostat response – signals the alarm state by the lamp "HEATER ALARM", switches off the fan, closes the external air throttle and opens completely the heating water valve of the heater. The system returns to the normal operational mode automatically when the heater temperature is increased.

The antifreeze thermostat TPZ1W is used in the system with the room thermostat TP(TPP), however, the antifreeze thermostat TPZ2 is used in the system with the temperature controller RT.

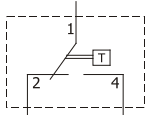
TPZ1 controller

Supply voltage	24...230V AC	
Measurement range	-5...+15°C	
Factory setting	5°C	
Contact rating	10(2)A	
Protection rating	IP54	

TPZ2 controller

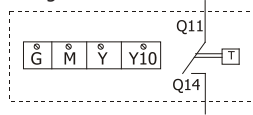
Supply voltage	24...230V AC	
Measurement range	-5...+15°C	
Factory setting	5°C	
Contact rating	0...10V DC	
Protection rating	IP42	

Fig. 11. Thermostat TPZ1



- 1-2** Freeze alarm
- 1-4** Normal operational mode

Fig. 12. Thermostat TPZ2




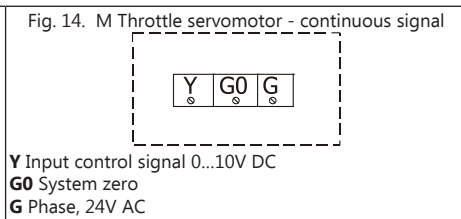
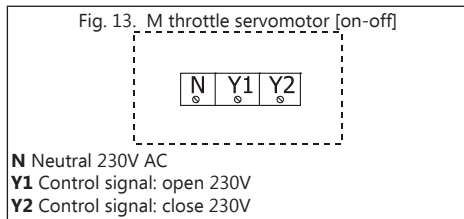
- G** Supply voltage 24V AC
- M** Supply earth
- Y** Valve control signal input from controller RT, 0...10V DC
- Y10** Valve control signal output from controller RT, 0...10V DC
- Q11-Q14** Fan operation contact

7. M Throttle servomotors

The servomotors whose task is to set the air throttle in the required position and to protect water heaters against freezing are used to control external air throttles. Depending on a throttle control method we use the servomotors of the following type:


- » open/close "on-off"
- » with continuous operation 0...10V. The setup of the throttle in the specified position is achieved by applying the control voltage from the throttle ZW position controller of the value 0...10V.

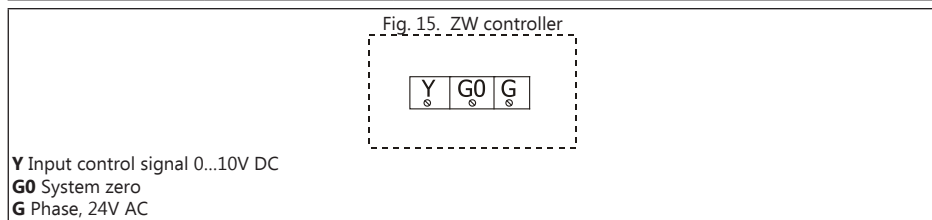
Servomotor type	on/off	continuous signal	
Supply voltage	230V AC	24V AC	
Closing / opening time	150 s	150 s	
Protection rating	IP54	IP54	



8. ZW throttle position controller


The position controller allows setting the throttle in each required position therefore we can determine an exact amount of air flow from outside. The controller is located inside or on the door of the control cabinet.

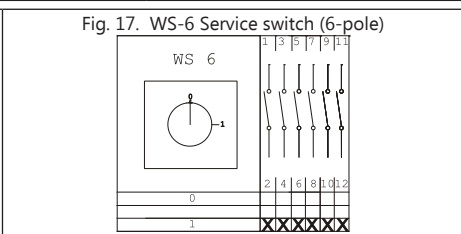
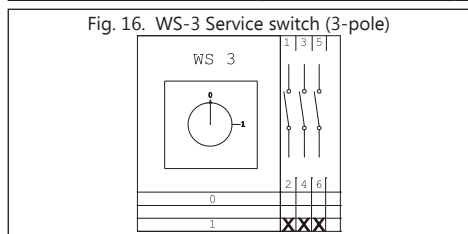
Supply voltage	24V AC	
Control signal	0...10V DC	
Protection rating	IP42	



8. WS Service switch

It is intended to switch off the fan motor in order to carry out service works. The use of the switch WS prevents an unexpected activation of the motor that could cause the risk during the service works.

Type	WS-3	WS-6	
Main circuits: poles	3-pole	6-pole	
Supply circuit switch	1- and 3-phase current	3-phase current	
Rated continuous current	25A	25A	
Protection rating	IP 65	IP 65	



9. Supply and control boxes

The supply and control boxes (equipped with a main switch, overcurrent circuit breakers, short-circuit protection devices, signalling lamps) are intended to cooperate and control the elements of automatics, as above.

One control box allows controlling a group of the units by means of single thermostat.

The single (1~230V/50Hz) or three-phase (3~400V/50Hz) power supply of the supply and control box should be from the main switchboard equipped with a main switch and differential protection device.

When the automatics are ordered with the unit the electric diagrams of the unit and automatics are delivered by the company as well.

14. DEVICE STARTUP

Prior to the startup it is necessary to:

- » check up the fastening state of the unit
- » check up the leak tightness of water or steam connections
- » check up the supply voltage according to the electric plate
- » check up the additional protection of the fan and unit casing
- » check up the correctness of the electric connection of the motor
- » check up the revolution direction of the fan.

To switch on the unit it is necessary to:

- » open the valves of heating medium (the valve in the steam supply line should be opened gradually)
- » switch on the current supply to the electric motor
- » adjust the supply air stream direction and range by means of the outlet grid blades

To switch off the unit it is necessary to:

- » limit the heating medium flow to the water heater of the unit (or cut off the steam supply)
- » switch off the current supply to the electric motor of the fan



In case of long standstills of the unit or breaks of heating network operation the heater should be drained and the cut-off valves should be closed, if need be.

15. REPAIR, MAINTENANCE AND WITHDRAWAL FROM SERVICE

The applied rolling bearings of the fan do not require a periodical lubrication. However, it is recommended to check periodically a condition of the motor bearings (the rotor of the fan should rotate freely without excessive backlashes and knocks).

When the noise level of the unit operation is increased it is necessary to check up the correctness of fastenings of the fan and the whole unit (including the elements of additional equipment).

The rotor blades should be cleaned with a damp cloth after removing the protective net not to allow unbalancing the rotor.

In case of any disturbances in the unit operation it is necessary to contact with the installer or the service.



The use of high pressure washers to clean the fan is forbidden.



All repair and maintenance works should be executed when voltage is off. The unit should be protected against an accidental activation by other persons as well.

The heater contamination state should be checked up periodically. The contaminated heater should be blown through with compressed air.



The heater contamination reduces the air efficiency and heating power of the unit.

Depending on the air pollution degree the filter contamination state in the intake box should be checked up periodically. The contaminated filter should be cleaned (possible triple filtrating fabric washing) or replaced with the G3 class fabric.



The contaminated filter reduces the air efficiency and heating power of the unit.

After withdrawal from service the unit should be passed over to the specialized collection point of recyclable materials.

16. TROUBLESHOOTING

Trouble description	Possible trouble cause	Troubleshooting
heat exchanger leakage	mechanical damage of heat exchanger (it may easy appear when the unit is connected to the installation without taking care)	use a locking spanner to mount with the installation definitely
	exceedance of admissible heating medium parameters	connect the unit with the heating installation protected against the excessive pressure and temperature growth
	heat exchanger freeze	use an antifreeze thermostat, antifreeze heating fluids or remove water from the unit within the period of standstill and freeze risk
	use of the unit in the aggressive environment	
too load 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	
Revolution controller ARW/RTRD does not work	correctness of electric connections (whether the leads are just clamped in the electric terminals)	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
	only 1 controller can be connected to 1 unit	
Servomotor does not open the valve	correctness of thermostat operation (characteristic "tick" when switching)	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 4) whether the servomotor reacts to an electric pulse. If the servomotor damage is stated, the damaged element should be claimed.
Room thermostat does not apply the signal	more than one unit is connected directly to the thermostat (larger number means the thermostat overload)	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 4) if there is no characteristic "tick", the thermostat is mechanically damaged and should be claimed.
	mounting place of the thermostat in the room	



III. SAMPLE OF EC DECLARATION OF CONFORMITY

NR: 01/13

We declare under our sole responsibility that the product:

Heating and ventilation unit

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

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
97/23/WE	PED	Pressure equipment 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 14121-1	2008
PN-EN ISO 13857	2010

and the manufacturing technology of the heat exchangers approved by the following documents:

Approval report acc. to PN-EN 13134:2004	BPAR Nr IS/ZT/113; -114; 115/05 dated 10.10.2005
Qualification reports acc. to PN-EN ISO 15613:2005(U) PN-EN ISO 15614-8:2005	WPQR No. IS/ZT/105 ÷ 112; -122; -123/05 dated 14.11.2005 issued by the Institute of Welding in Gliwice Identification No. 1405

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

Year of  marking:2013

Ryki

.....
date of issue

AKW department manager

.....
Adam Filipek, MSc. Dipl. Eng.

TYPE OF UNIT:	
FACTORY NUMBER:	
YEAR OF PRODUCTION:	

V. UNIT STARTUP REPORT

Date of startup	Executor of startup stamp / name and signature	Motor current [A]	User's representative stamp / name and signature	Remarks

VI. INSPECTION AND MAINTENANCE DOCUMENT

Date of inspection	Executor of inspection stamp / name and signature	Service activity range	Remarks

* Inspection of the unit in accordance with the section "Repair and Maintenance" in the instruction manual

VII. SERVICE NOTIFICATION

Date:

Notification type WARRANTY POST-WARRANTY PAID

Unit's user (name)	
Contact person	
User's address	
Phone, fax, and email	
Type of unit	
Factory No.	
Year of production	
Startup executed by	

Description of defect:

NOTE: AFTER COPYING AND FILLING IN SEND THE NOTIFICATION BY FAX OR EMAIL TOGETHER WITH A COPY OF THE STARTUP REPORT.

FLEXIHEAT Company accepts notifications filled legibly and completely.

When the lodged claim is not justified, the claimer will be burdened with service costs.

Date of warranty issue

Order No.

(company's stamp)

.....

.....

VIII. LIST OF SUBASSEMBLIES INSTALLED IN THE UNIT

No.	Name of subassembly	*)
1	Axial fan with single-phase motor	
2	Axial fan with three-phase motor	
3	Metal louvre II-row heat exchanger	
4	Metal louvre III-row heat exchanger	
5	Bimetal II-row heat exchanger	
6	Bimetal III-row heat exchanger	
7	Steam heat exchanger (rib spacing 2,8mm)	
8	Steam heat exchanger (rib spacing 5,0mm)	

*) - mark proper box corresponding with the equipment variant



FLEXIHEAT UK LTD

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