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POLAND

## TROPIC HEATING UNIT



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



**Please read this instruction manual carefully before beginning any work.**

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## I. CONTACTS



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## II. ORIGINAL INSTRUCTION MANUAL

### TROPIC HEATING UNITS Size 1, 2

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## 1. INTENDED USE

TROPIC heating units, size 1 and 2, are intended to heat such compartment as:

- » shopping centres;
- » fashion houses;
- » churches;
- » sports and entertainment facilities;
- » car showrooms.

As well as in places where traditional heating units are used, i.e. in warehouses, factory halls, workshops, greenhouses, etc.



The units cannot be used in the compartments with relative humidity larger than 90% and air dust concentration over 3mg/m<sup>3</sup>.

The compartment can be served by one or larger number of the units, also by the units of different sizes.

## 2. DESIGNATIONS

Heating unit	TROPIC- 1 -II
Size	1; 2
Number of heater rows	I; II

## 3. DEVICE DESCRIPTION

The units are adapted to operate in the horizontal position as ceiling units and in the vertical position as wall units.

The heaters of the units are designed in such a way that they are completely vented both operating in the horizontal and vertical position.

The unit includes:

- » **axial fan** mounted on the rear wall of the unit with a net protecting the rotor.
- » (I or II row) **fin water heater** in the frame made of galvanized steel sheet.
- » **casing** made of high quality plastic with a single-row outlet grid allowing adjusting a direction of supplied air. The structure of grid blades protects against an automatic rearrangement of the blades.

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

The connection spouts of the units have external threads.



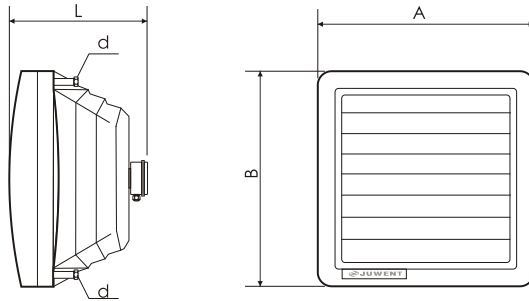
For the fin water heaters the maximum temperature of heating medium is up to 150°C and the maximum operational pressure is up to 1,5Mpa.



**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.

#### 4. TECHNICAL DATA



Unit size	TROPIC-1	TROPIC-1
<b>Dimensions</b>		
<b>A[mm]</b>	560	690
<b>B[mm]</b>	520	670
<b>L[mm]</b>	380	480
<b>d</b>	1/2"	3/4"
<b>Weight (I-row exchanger) [kg]</b>	15	32
<b>Weight (II-row exchanger) [kg]</b>	17	33,5
<b>Parameters of fans in units</b>		
<b>Voltage [V]</b>	230	230
<b>Motor power [kW]</b>	0,13	0,61
<b>Current [A]</b>	0,59	2,8
<b>Revolutions [rpm]</b>	1400	1310
<b>Protection rating</b>	IP54	IP54
<b>Insulation class</b>	F	F
<b>Operational temperature</b>	do +70°C	do +60°C
<b>Operational noise level</b>		
<b>Noise level [dB(A)]</b>	54*	60**

\*operational noise level of the unit of the size 1 – acoustic pressure level taking dispersion factor of compartment A=50m<sup>2</sup> and directivity factor Q=2 at the distance of 5m into consideration.

\*\*operational noise level of the unit of the size 2 – acoustic pressure level taking dispersion factor of compartment A=100m<sup>2</sup> and directivity factor Q=2 at the distance of 5m into consideration.

#### 5. TRANSPORT

The delivered TROPIC units are completely assembled in the cardboard packets protecting them against pollution and weather impacts.

The Product Manual is delivered along with the unit.

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



The units should be transported maximally in two layers using separators preventing mechanical damages.

## 6. 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.



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.



Only original spare parts should be used.



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

### **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.

## 7. MOUNTING

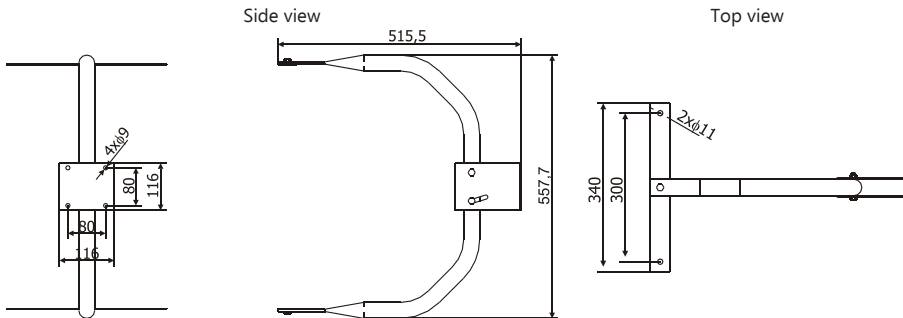
### Suspension of the unit

The units can be hung on the wall or suspended to the ceiling.

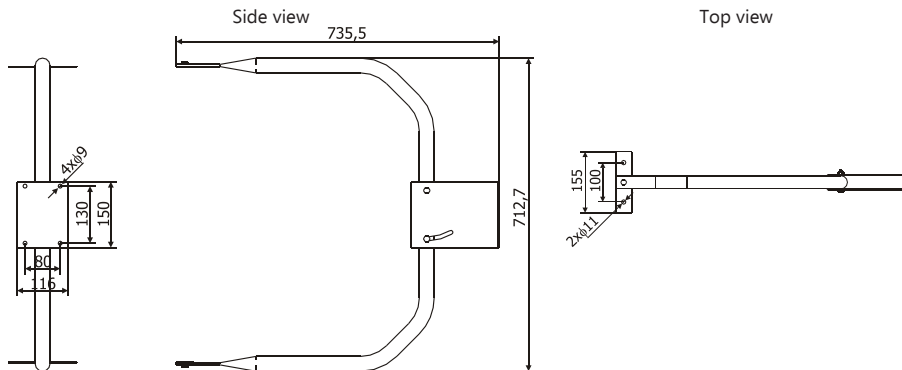
A mounting console is used to install the unit on the wall.

The length of the bolts fastening the unit to the console – max. 20mm.

**TROPIC-1**

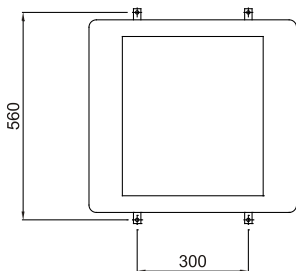


**TROPIC-2**

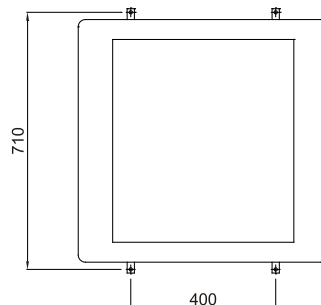


The units can be suspended to the ceiling using 4 bars with M8 thread with spacing according to the following picture.

**TROPIC-1**



**TROPIC-2**







A minimal distance of the unit to the wall or ceiling necessary to ensure a free air supply to the fan is: 18cm for TROPIC-1 units, 25cm for TROPIC-2 units



When it is necessary to hang the unit on 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.



A minimal distance of the heating unit to the construction partition from the unit sides is about 20cm.

## 8. 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 solenoid valves should be connected in the heating medium supply line from the unit. 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 heaters of the units in the ceiling option mounting cannot be drained centrally.

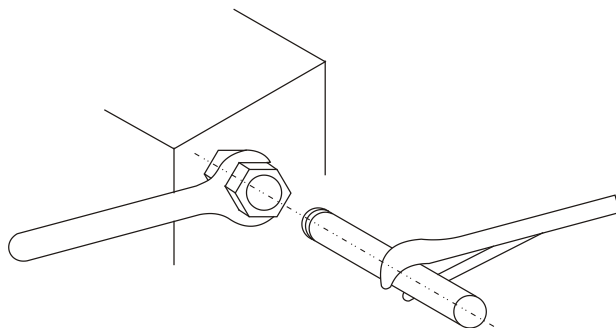


The imprecise venting of the heater can be a reason for which the unit does not reach planned parameters.



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.**

## 9. 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 of the unit may be executed only by an authorized electrician who 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) fans with internal thermal contacts TK (brought to the terminal box or stuck in the motor circuit permanently). The electric connection of the fan should be executed taking a service switch (WS) and overload and short-circuit protection devices in the supply and control box into consideration.



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 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 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. The exemplary connection and control diagram of the units are presented in the picture 1.

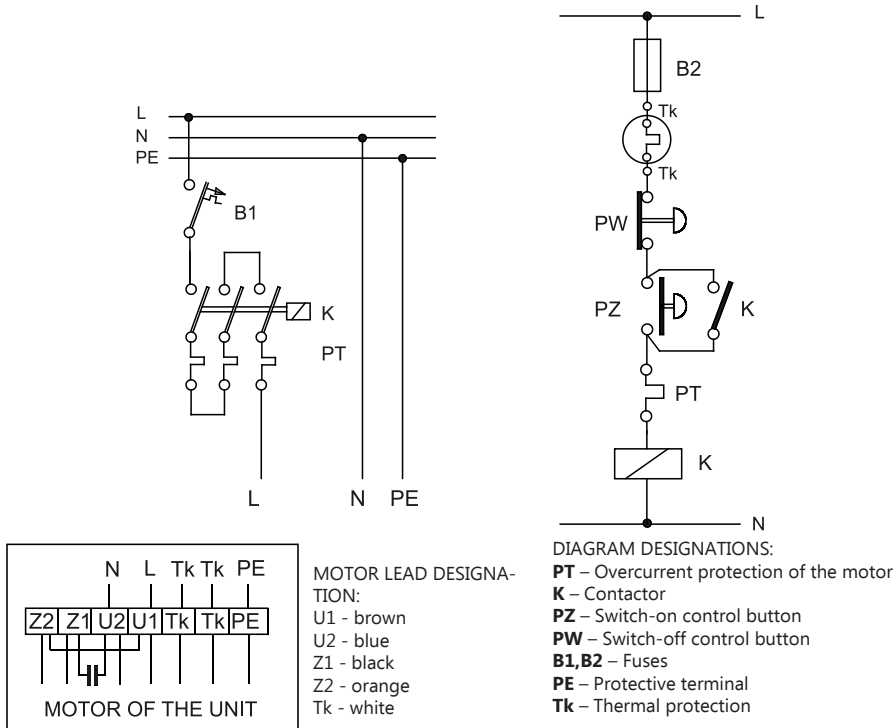


Fig. 1. TROPIC unit connection and control diagram

## 10. AUTOMATICS

We can deliver the following items to the units:

- **Supply and control box:** Surface-mounted in the closed casing (equipped with a main switch, overcurrent circuit breakers, short-circuit protection devices, signalling lamps), intended to cooperate and control the elements of automatics.

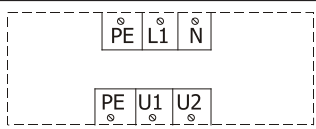

One control box allows controlling a group of the units by means of single thermostat in the AUTOMAT|MANUAL operation mode.

The supply and control box (1~230V/50Hz) 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.

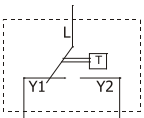

The exemplary connection diagrams of the units with single-phase motors are presented in the pictures 2, 3, 4 and 5.

- **Rotational speed controllers** of the fan: The transformer 5-step rotational speed controllers ARW (1~230V/50Hz) allow controlling the air delivery and thermal power. The individual rotational speed steps are selected manually.

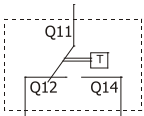

<b>Controller type</b>	ARW-1,2	ARW-3		
<b>Voltage [V]</b>	230	230		
<b>Protection rating</b>	21	21		
<b>Height [mm]</b>	123	173		
<b>Width [mm]</b>	77	90		
<b>Depth [mm]</b>	71	89		
			<b>PE-L1-N</b> Input voltage (230V AC)	
			<b>PE,U1,U2</b> Output (control) voltage	

- **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.

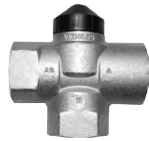
Thermostat TP or TP/IP65

<b>Supply voltage</b>	24..250V AC	24..250V AC		
<b>Measurement range</b>	8...+30°C	8...+35°C		
<b>Contact rating</b>	6(2)A	10(1,5)A		
<b>Protection rating</b>	IP30	IP65		
			<b>L-Y1</b> Heating	
			<b>L-Y2</b> Cooling	

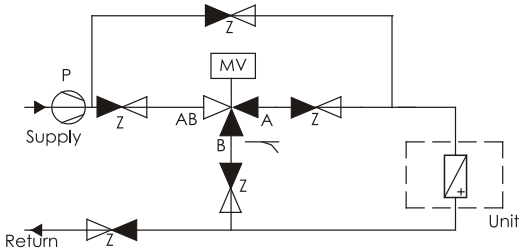
Thermostat with time programmer TPP

<b>Supply voltage</b>	2 batteries 1,5V			
<b>Measurement range</b>	5...+35°C			
<b>Contact rating</b>	5(2)A			
<b>Protection rating</b>	IP30			
			<b>Q11-Q14</b> Heating	
			<b>Q11-Q12</b> Cooling	



- **Three-way valves V:** The directional valves found a wide application in the curtains for the adjustment of heating medium flow through the heaters. The three-way directional valves with the connection with internal threads V20 (on/off) are used. 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 <sup>3</sup> /h	t[°C]	PN	Unit type	
V20	20	3,5	1...110	16	Tropic-1 Tropic-2	


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



- **Valve MV 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.

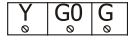
Servomotor type	on/off		continuous signal	
Supply voltage	230V AC		continuous signal	
Closing / opening time	180 s		150 s	
Protection rating	IP40		IP43	

Servomotor [on-off] MV+V20




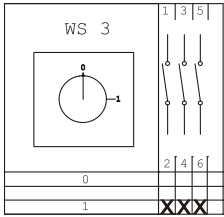
**L-N** Supply voltage 230V AC

Servomotor MV - continuous signal



**Y** Input control signal 0...10V DV  
**G0** System zero  
**G** Phase, 24V AC

- **Service switch WS:** 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		
Poles	3-pole		
Supply circuit switch	3-phase		
Rated continuous current	25A		
Protection rating	IP 65		

## Exemplary connection and control electric diagrams of the TROPIC units

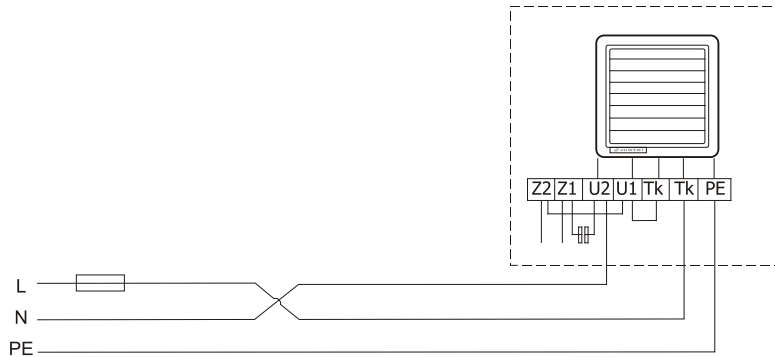


Fig. 2. Electric connection diagram without automatics

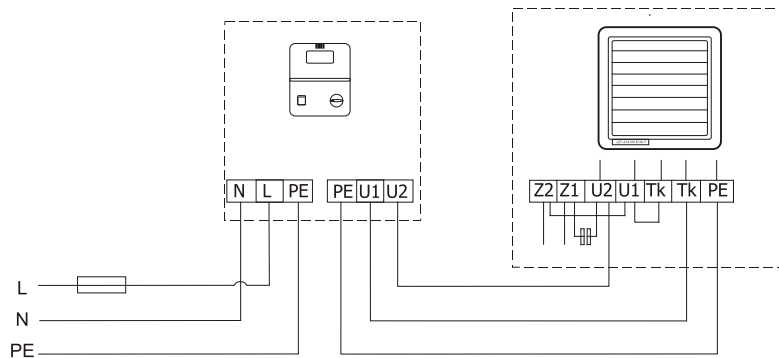


Fig. 3. Electric connection diagram with revolution controller

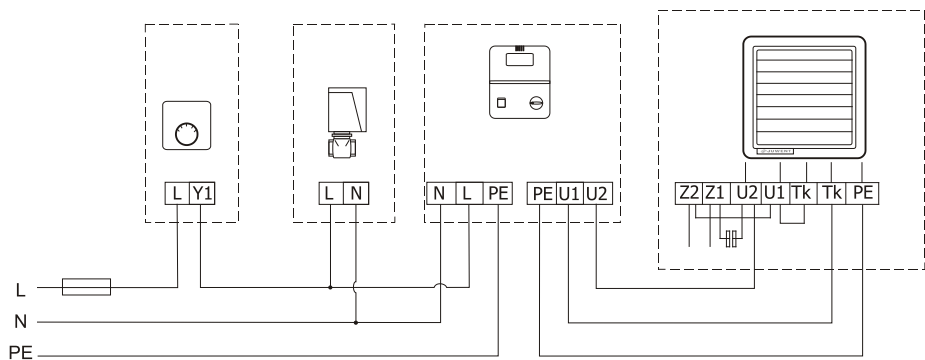


Fig. 4. Electric connection diagram with automatics (revolution controller, valve servomotor and fan operation are controlled by thermostat)

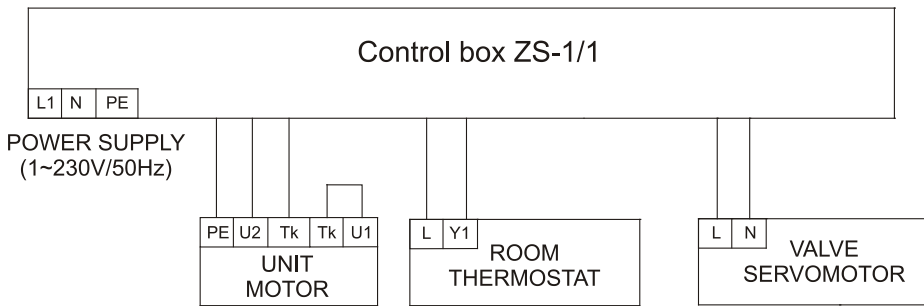


Fig. 5. Connection diagram of unit automatics without controller ARW

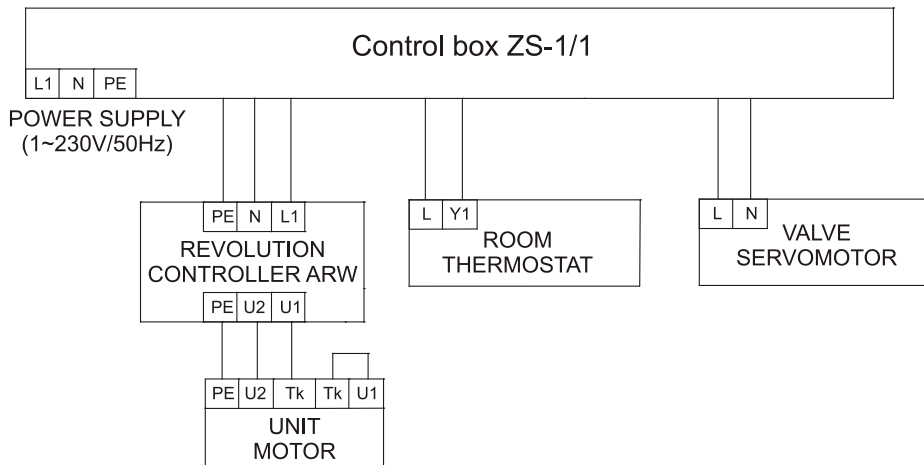


Fig. 6. Connection diagram of unit automatics with controller ARW

## 11. 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.

To switch on the unit it is necessary to:

- » open the valves of heating medium;
- » 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 heater of the unit;
- » 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.

## 12. 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.

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

Do not use high pressure washers to clean the fan.

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



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 dust contamination state should be checked up periodically. In case of excessive dust accumulation the heater should be blown through with compressed air.



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

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

## 13. TROUBLESHOOTING

Trouble description	Possible trouble cause	Troubleshooting
heat exchanger leakage	mechanical damage of heat exchanger (it may easily 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	

## 14. INFORMATION

As to all issues concerning the TROPIC heating units please contact JUWENT Production Plant or Representatives



### III. WARRANTY TERMS AND CONDITIONS

1. JUWENT Szymański, Nowakowski General Partnership, headquartered in Ryki at 31 Lubelska Str., hereinafter referred to as the Warrantor, grants the Customer a warranty of proper operation of the unit with reservation of the requirement of its use in accordance with the conditions determined in the instruction manual and the terms and conditions specified below.
2. The warranty has been granted for a period of 24 months from the purchase date demonstrated in this warranty document with a possibility of its special extension according to a separate agreement and specified in the Special Warranty Terms and Conditions.
3. The warranty covers the removal of technical defects of the unit arisen as a result of its use in accordance with the instruction manual, revealed within the warranty period. The warranty provisions are valid in the territory of the Republic of Poland.
4. By virtue of the granted warranty the Warrantor is not liable for the loss of expected profits and costs resulting from a periodical impossibility of the use of the unit incurred by the Customer.
5. To realize the Customer's rights resulting from the warranty it is required to deliver the claimed unit with the warranty document to the Warrantor at his expense.
6. The claimer delivers the unit in an original factory packing, in case there is no factory packing the claimed unit should be delivered by the Customer for the repair in a way ensuring a safe transport. The risk of accidental damage of the unit during the transport burdens always the party that dispatches the parcel.
7. The defects revealed with the warranty period will be removed by the Warrantor free of charge. A method selection of the realization of obligations resulting from the warranty granted to the Customer belongs to the Warrantor that may remove a defect by the repair or the replacement of the damaged subassembly or by the replacement of the unit. The property of the unit withdrawn from service and / or defective subassemblies is transferred to the Warrantor.
8. The warranty is extended by a period for which the Customer has been deprived of a possibility to use the unit.
9. The Warrantor will make efforts that the repair is executed without further delay within the time-limit of up to 14 working days from the delivery date of the unit. In reasonable cases of which the Customer will be informed by the Warrantor, this time-limit may be extended, e.g. by the time of provision import or when there is a necessity to execute an expertise or laboratory tests in specialized institutions.
10. The Warrantor is liable exclusively for the defects inherent in the sold unit. The damages arisen after its sale for other reasons are not covered by the warranty, in particular:
  - a) mechanical damages (including also damages caused by microparticles occurring in the working environment of the unit), thermal damages, chemical damages and aleatory damages or damages caused by the atmospheric factors,
  - b) damages occurred as a result of non-observance of typical rules or the rules required by the instruction manual related to the operation and mounting of the unit or the use of the unit against the intended use and other damages caused by the Customer's activity or omission,
  - c) damages being a result of defective operation of the system in which the unit has been built or used,
  - d) damages occurred as a result of non-execution of the actions to which the Customer has been obliged in accordance with the instruction manual, e.g. periodical cleaning, maintenance, adjustment, etc.,
  - e) damages occurred due to the use of materials or parts subject to a normal operational wear other than the materials recommended by the Warrantor in the instruction manual,
  - f) damages being a result of use of power supply of the unit (of the system in which this unit functions) incompliant with the standard, and in case the unit is also supplied with water, damages being a result of use of water (supply water and / or boiler water) with parameters other than the parameters foreseen in the valid standard (PN-93/C-04607),
  - g) damages occurred as a result of operation and / or maintenance of the unit in a way incompliant with the instruction manual and / or executed by the unauthorized persons.
11. The warranty does not cover as well:
  - a) activities executed by the Customer in accordance with the recommendations included the instruction manual of the unit within the framework of normal maintenance and inspections,
  - b) travel and work costs of the Warrantor's service or an entity delegated by the Warrantor in case when a warrant call turns out to be groundless.
12. An annotation made by a trained employee in the Inspection and Maintenance Document of the unit is a confirmation of time-limit holding and range of activities foreseen for the maintenance of the unit.
13. The Warrantor is not liable for damages incurred by the Customer or third parties caused the run of the unit occurred in particular as a result of non-observance of the afore-mentioned terms and conditions by the Customer.
14. In case the service works are executed by the Warrantor at the place where the unit is mounted, the Customer will make available a free access to the rooms where the units are located to the Warrantor.
15. In case the units are mounted at the height making an access from the floor surface impossible, the Customer will ensure the scaffolding compliant with the OHS regulations or mobile lifting platforms and vertical transport equipment.
16. The equipment from the electric and / or hydraulic system is disassembled by the Customer.
17. The claims should be lodged at the Warrantor's address in writing / by fax / email using a service notification form.
18. The Warrantor refuses to execute the warranty activities (periodical service works or repair) in case the price for the unit or previous service work is not paid for the benefit of the Warrantor.

**DATE OF SALE**

**STAMP AND SIGNATURE**

Special Warranty Terms and Conditions:

Warranty period extension up to ..... months.

Other:

**STAMP AND SIGNATURE**

<b>TYPE OF UNIT:</b>	
<b>FACTORY NUMBER:</b>	
<b>YEAR OF PRODUCTION:</b>	

#### IV. UNIT STARTUP REPORT

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

#### V. INSPECTION AND MAINTENANCE DOCUMENT

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

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

## VI. SERVICE NOTIFICATION

Date:

Notification type WARRANTY  POST-WARRANTY  PAID

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

Description of defect:

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

JUWENT 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)

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## VII. LIST OF SUBASSEMBLIES INSTALLED IN THE UNIT

No.	Name of subassembly	*)
1	Axial fan with single-phase motor	
2	Metal louvre I-row heat exchanger	
3	Metal louvre II-row heat exchanger	

\*) - mark proper box corresponding with the equipment variant