

MANDIK®

HOT WATER AIR HEATER UNIT MONZUN TE



These technical specifications define the design and performance ranges of the hot water air heater unit MONZUN - TE. They are valid for manufacturing, designing, ordering supplies.

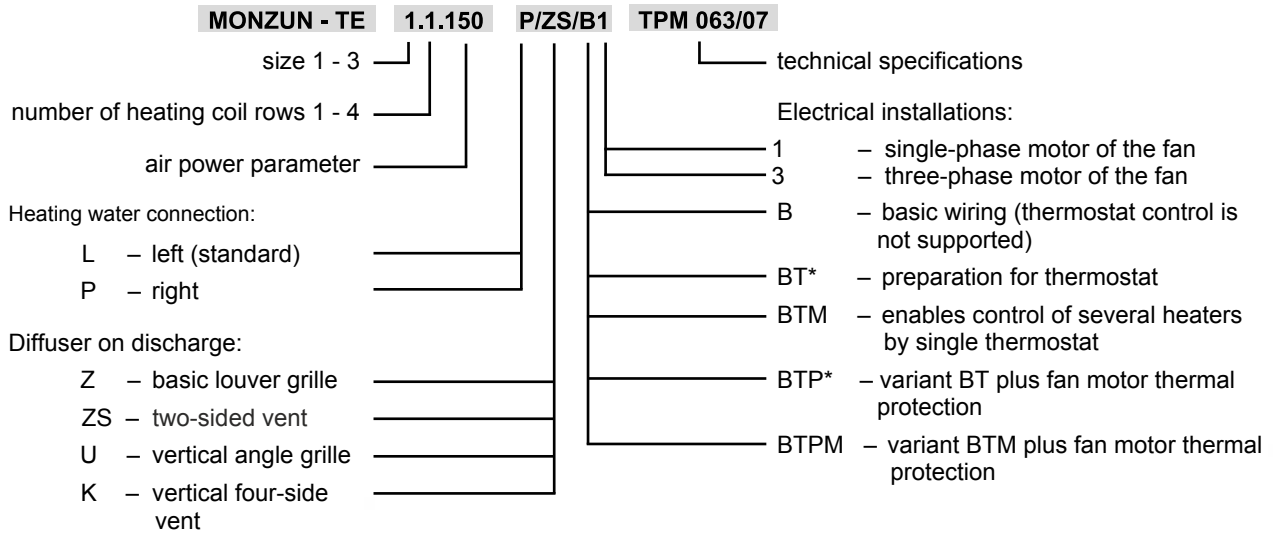
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II. ORDERING INFORMATION

1. Ordering key

1.1. Hot water air heater unit MONZUN - TE



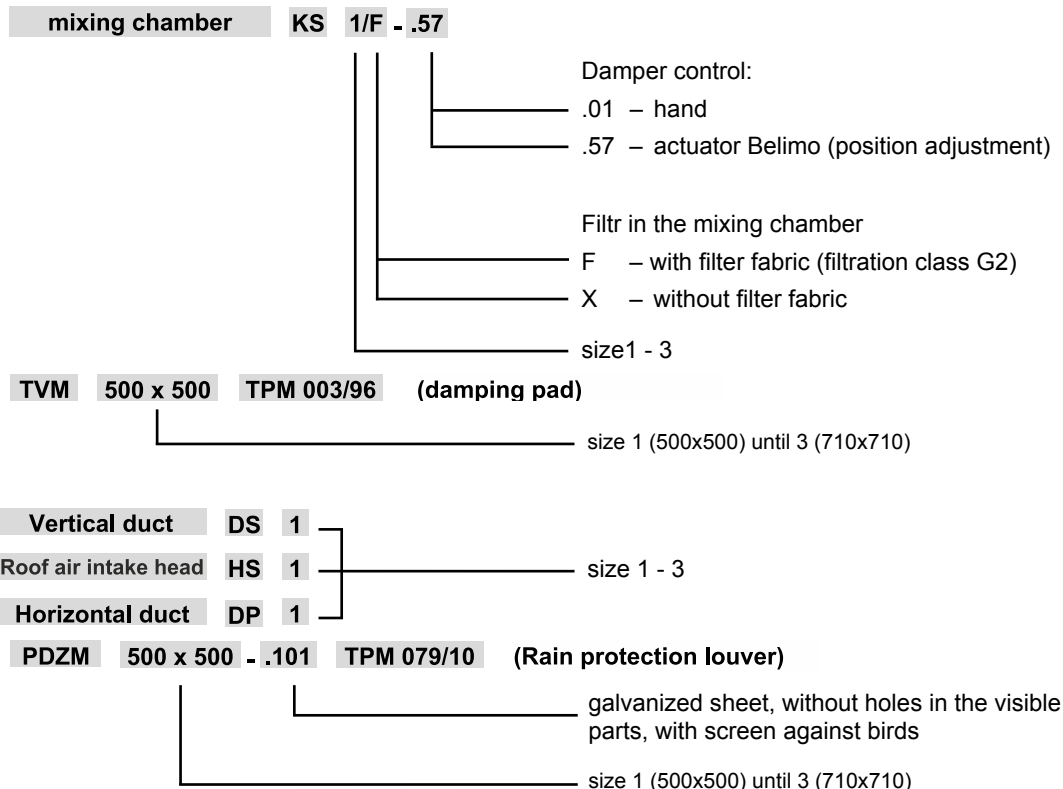
* For 1-phase fan only

Example of marking for an order:

MONZUN - TE 1.1.150 P/ZS/B1 TPM 063/07

Hot water air heater unit Monzun - TE size 1, single-row heating coil, air output parameter 150 (1500 m³.h⁻¹), connection to the heating water right, diffuser two-sided vent, basic wiring (thermostat control is not supported), with single-phase motor of the fan.

1.2. Ventilation set with hot water air heater unit MONZUN - TE



Requirement for different variant PDZM must be specified according to TPM 079/10.

Example of marking for an order:

MONZUN - TE 1.1.150 P/ZS/B1 TPM 063/07

mixing chamber KS 1/X-.01

horizontal duct DP 1

PDZM 500x500-.101 TPM 079/10

Hot water air heater unit Monzun - TE viz 2.1., mixing chamber size 1 without filter fabric hand control, horizontal duct size 1, rain protection louver size 1 galvanized sheet without holes in the visible parts with screen against bird mesh.

III. GENERAL INFORMATION

2 Description

- 2.1.** The MONZUN - TE units are designed for ecological hot-air heating of rooms and halls, the heating medium is hot water. Three sizes of heaters are produced, each size with single-row to four-row heating coil. The air is driven through the heating coil by axial fan. The heaters can be installed horizontally on walls or vertically below the ceiling. The power range is from 9.6 kW to 88,7 kW (with the airflow from 1500-7500 m³.h⁻¹).

Optional accessories for installation, air distribution, ventilation and unit control are supplied. Forming ventilation set with mixing chamber, the units can be used for ventilation (Fresh air supply).

- 2.2.** The Monzun-TE units are intended for environment protected against weather impacts with the classification of climatic conditions class 3K5, without condensation, frost, ice formation, and without water even from other sources than rain according to EN 60 72133, change A2, with temperature range from 0°C to +40°C, and for the spaces without explosion hazard.

The air passing through the unit must not contain solid, fibrous, sticky, or aggressive particles.

The maximum heating water temperature at the heater inlet is to 100°C and the maximum heating pressure is 1.4 MPa. The unit has IP54 enclosure protection.

- 2.3.** The fans used in the Monzun units comply with Directive ErP 2015.

3. Design

- 3.1.** Design of hot water air heater unit MONZUN - TE
- MONZUN TE units are produced in three sizes (1, 2, and 3).
 - The heaters are produced with one- row to four - row heating coil.
 - The units are delivered with the following diffusers at the discharge.
 - basic louver grille
 - two-sided vent
 - vertical angle grille
 - vertical four-sided vent
 - The units can be connected to heating water distribution through
 - left-side connection (standard version)
 - right-side connection (must be specified in the order)

- 3.2.** The units can be supplied in terms of the electrical installations:

variant B – basic wiring (thermostat control is not supported)

variant BT – enables control of the heater by thermostat, each heater has to have its own thermostat

variant BTM – enables control of several heaters by single thermostat

variant BTP – variant BT plus fan motor thermal protection

variant BTPM – variant BTM plus fan motor thermal protection.

With variants without integrated fan motor protection (B, BT, BTM), external motor protection modules are recommended, see chapter XI optional accessory or other alternative solution.

- 3.3.** The units can be equipped with other optional accessories, see chapter XI.

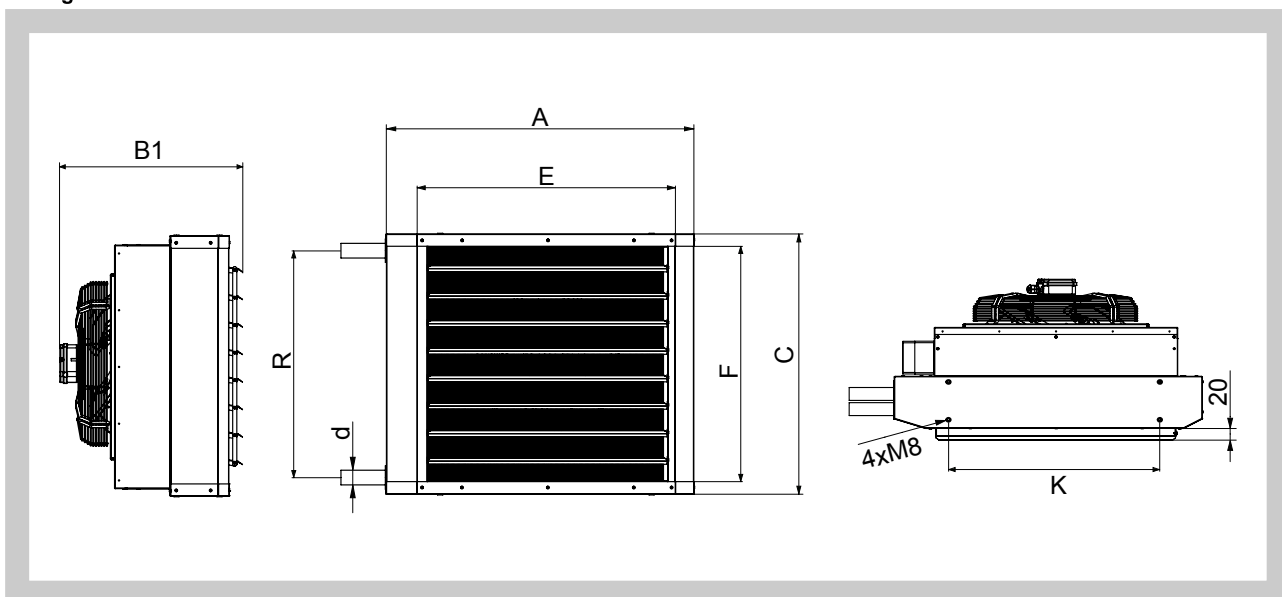
Fig. 1 Model MONZUN - TE, basic louver grille, left connection



4. Dimensions and weights

4.1. Dimensions

Fig. 3 MONZUN - TE



Tab. 4.1.1. Dimensions of units MONZUN - TE

Dimensional series	Dimensions (mm)							
	A	B1	C	d	E	F	K	R
1	595	380	530	G3/4"	470	460	340	430
2	720	420	610	G1"	585	535	440	500
3	900	410	760	G5/4"	750	680	615	660

4.2. Weights

Tab. 4.2.1. Weights of units MONZUN - TE including basic louver grille

MONZUN - TE	Weight [kg]	MONZUN - TE	Weight [kg]	MONZUN - TE	Weight [kg]
1.1.150	22	2.1.200	32	3.1.450	55
1.1.180	23	2.1.250	34	3.1.600	56
1.1.220	22	2.1.400	36	3.1.800	58
1.2.150	25	2.2.250	36	3.2.420	58
1.2.200	24	2.2.320	38	3.2.500	59
1.2.250	25	2.2.420	38	3.2.700	61
1.3.180	26	2.3.220	39	3.3.400	62
1.3.220	27	2.3.280	39	3.3.500	63
-	-	2.3.400	41	3.3.600	65
1.4.150	29	2.4.200	41	3.4.350	65
1.4.180	29	2.4.250	41	3.4.450	66
-	-	2.4.350	43	3.4.520	68

5. Type of diffusers

5.1. The diffusers are made of galvanized sheet steel and powder coated.

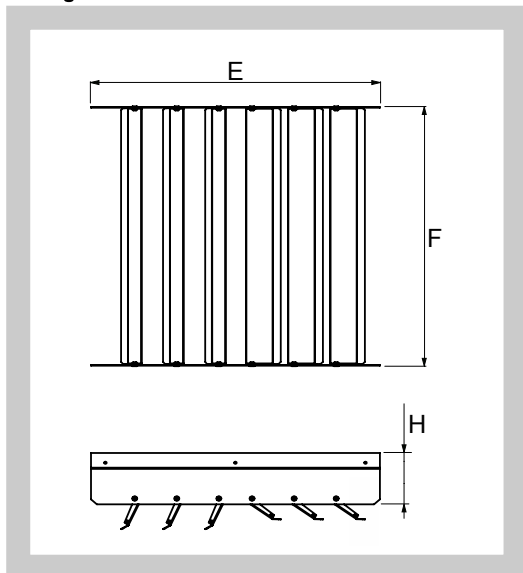
5.2. Basic louver grille

It is standard installed on the air outflow of the Monzun TE and Monzun-TEC hot-air heater for horizontal installation. Its adjustable horizontal blades direct the air flow elevation, see Fig. 1.

5.3. Two-sided vent

It is designed to direct the air flow from horizontally installed Monzun TE heater sideways. It can be installed on the air outflow side of the Monzun-TE heater behind the Basic louver grille. Is intended for vertical installation on wall.

Fig. 3 Two-sided vent



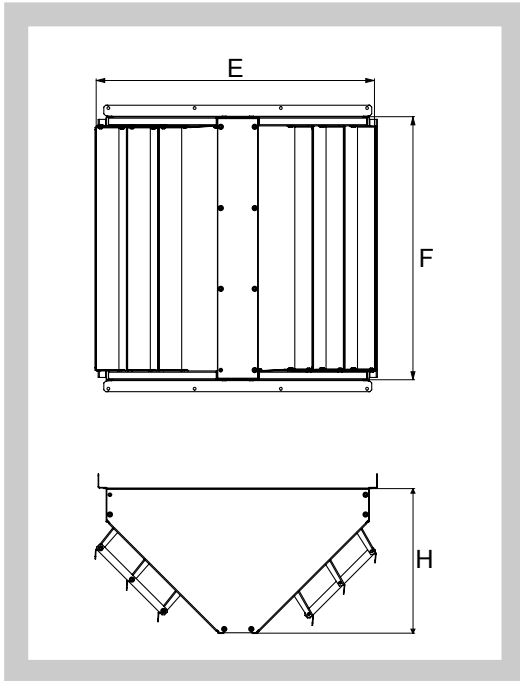
Tab. 5.3.1. Dimensions and weights

Dimensional series	Dimensions			Weight [kg]
	E	F	H	
1	425	451	67,6	2,3
2	522	525	72,6	3,0
3	700	680	72,6	4,8

5.4. Vertical angle grille

It is designed for vertical installation of the Monzun TE heater. It can direct the hot air outflow vertically or sideways. Each blade of the grille can be adjusted individually.

Fig. 4 Vertical angle grille



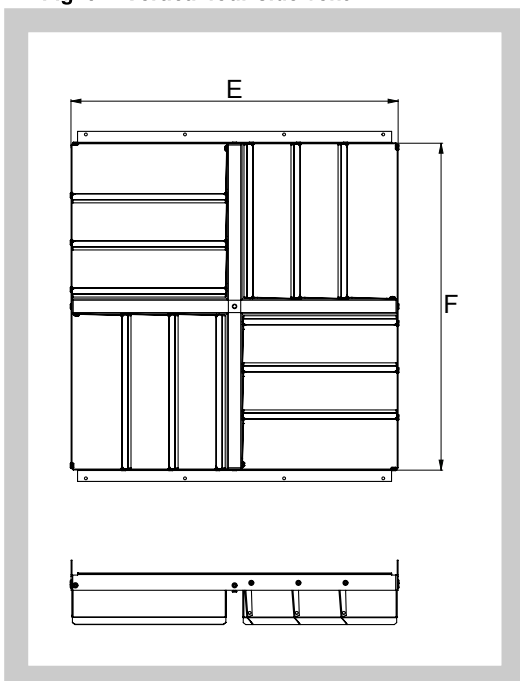
Tab. 5.4.1. Dimensions and weights

Dimensional series	Dimensions			Weight [kg]
	E	F	H	
1	452	425	234	4,8
2	525	524	283	6,5
3	680	700	360	9,0

5.5. Vertical four-side vent

is designed for vertical installation of Monzun TE heater. It directs the air outflow to four sides. The vent is fitted to the front of the heater for ceiling installation. (The basic diffuser is not fitted).

Fig. 5 Vertical four-side vent



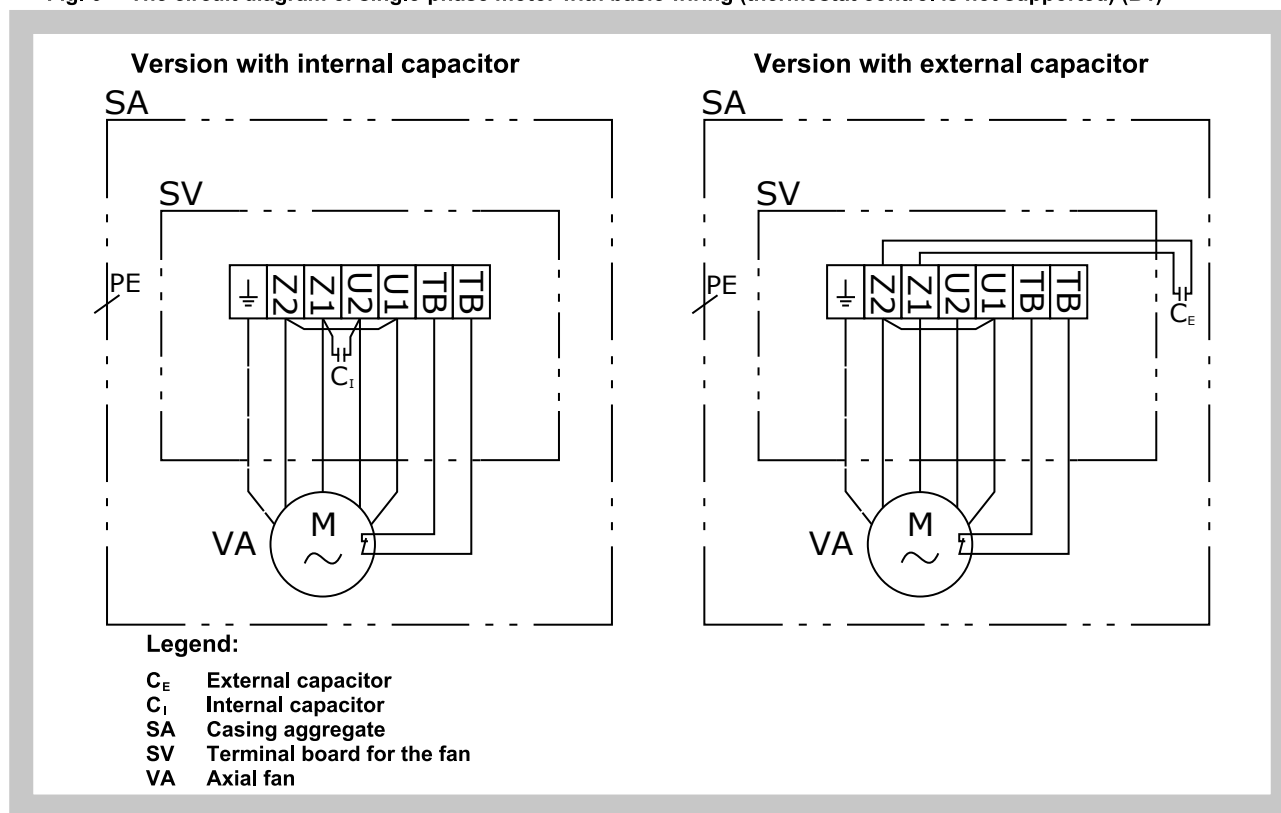
Tab. 5.5.1. Dimensions and weights

Dimensional series	Dimensions		Weight [kg]
	E	F	
1	425	425	2,0
2	525	525	3,0
3	700	700	5,0

6. Electrical installation units MONZUN - TE

6.1. Eletrical installation units MONZUN -TE - with single-phase motor

Fig. 6 The circuit diagram of single-phase motor with basic wiring (thermostat control is not supported) (B1)



The capacitor is always part of delivery. According to the type of fan is internal or external.

Fig. 7 The electrical installation enables control of the heater by thermostat (with single-phase motor (BT1))

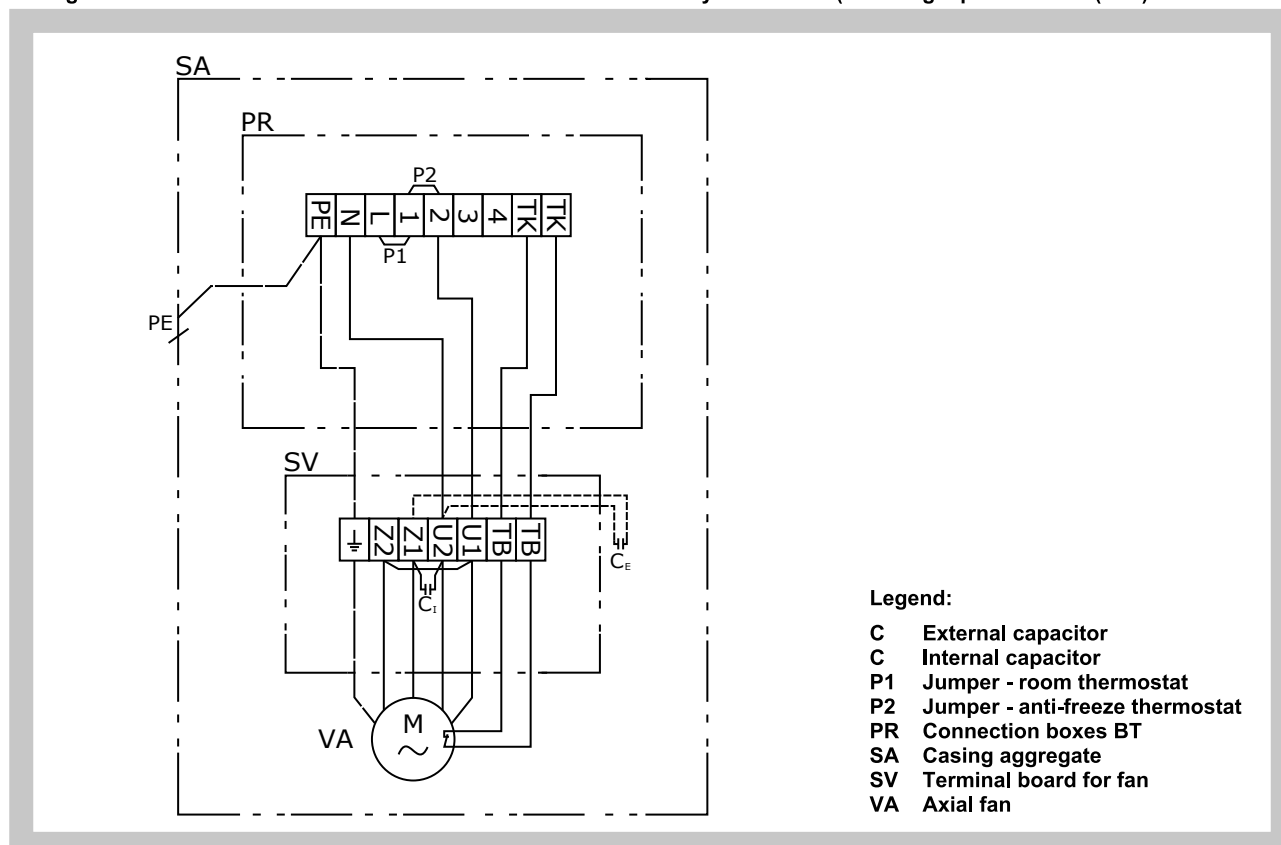


Fig. 8 The electrical installation that enables control of one heater by single thermostat and containing thermal protection of the single-phase fan (BTP1)

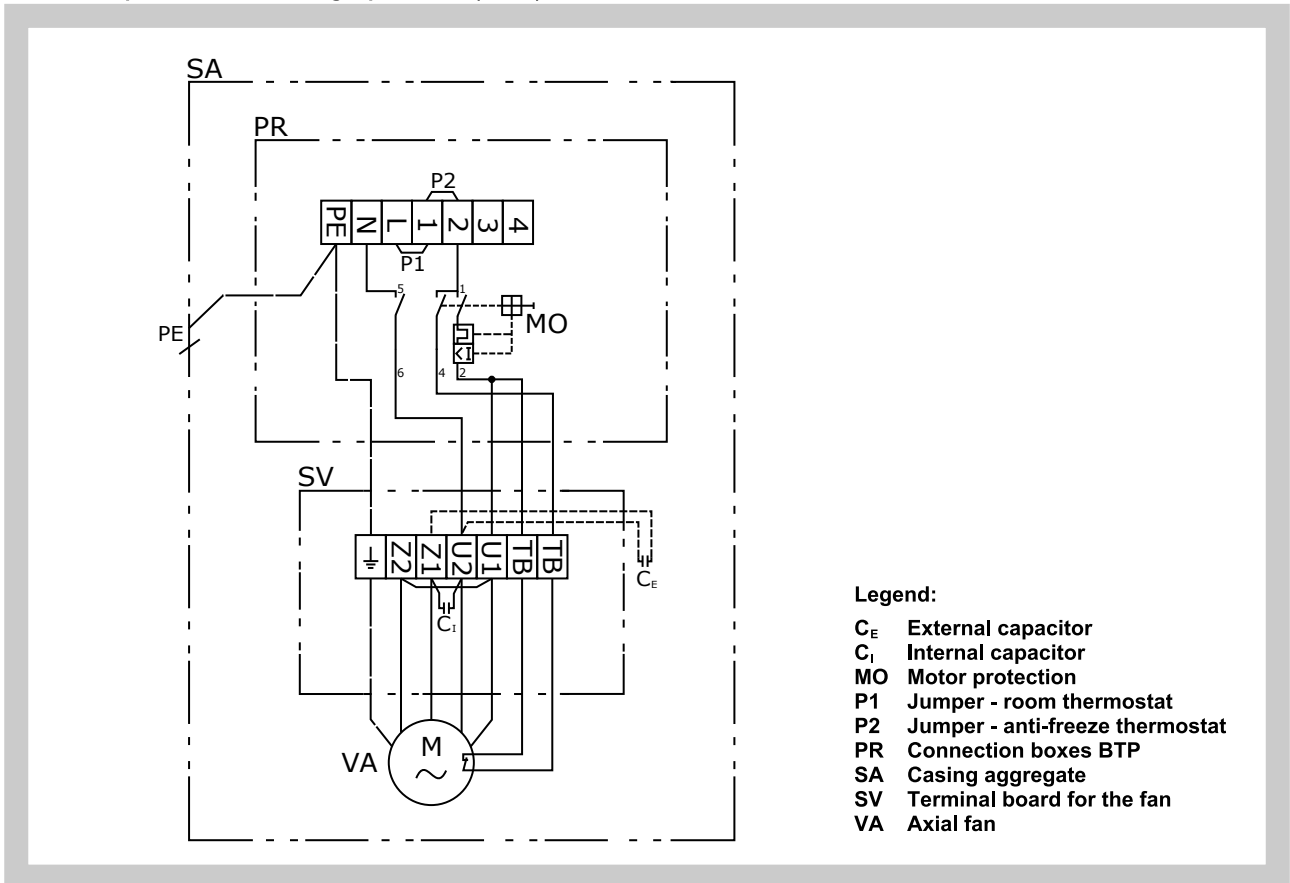


Fig. 9 The electrical installation allowing control of multiple units at the same time using one thermostat (BTM1)

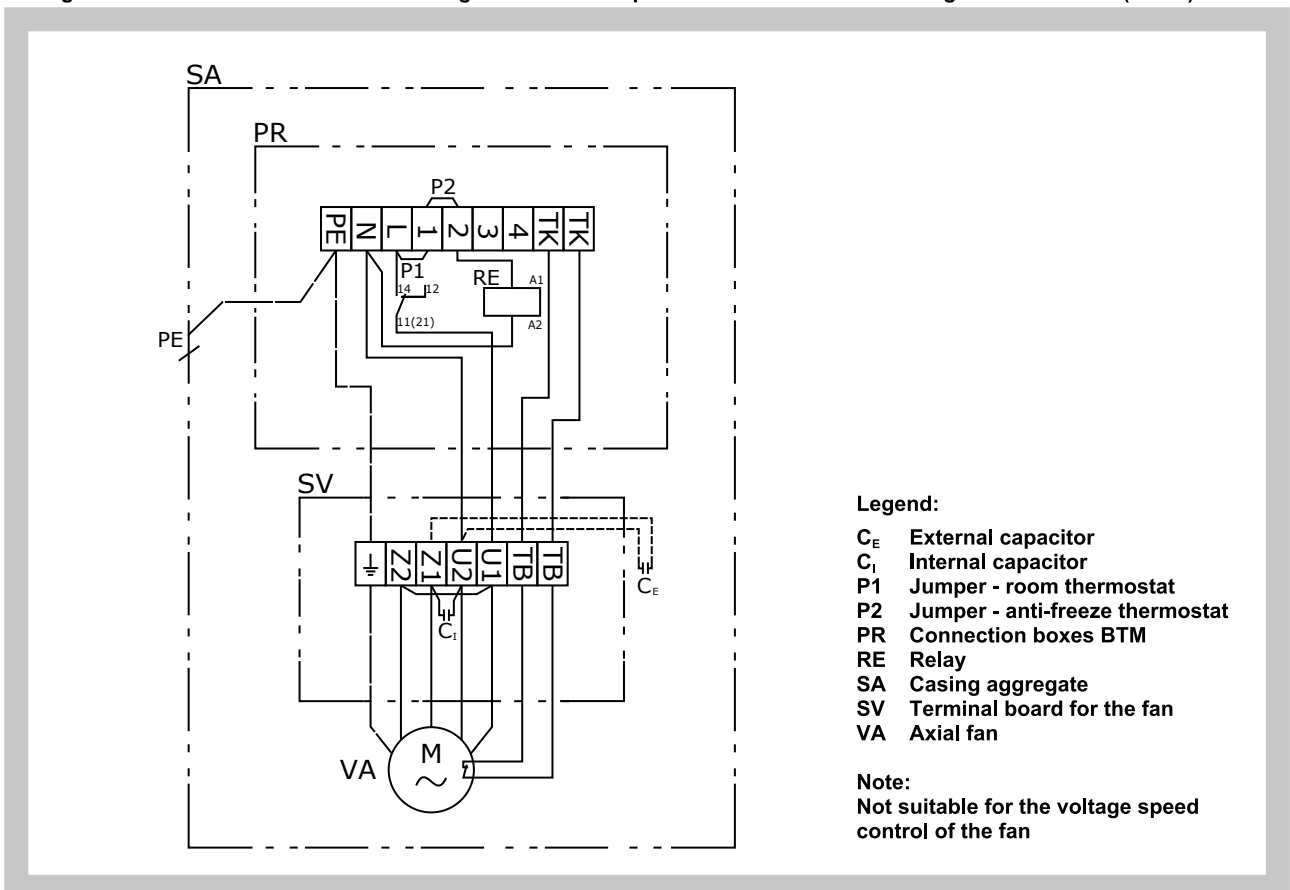
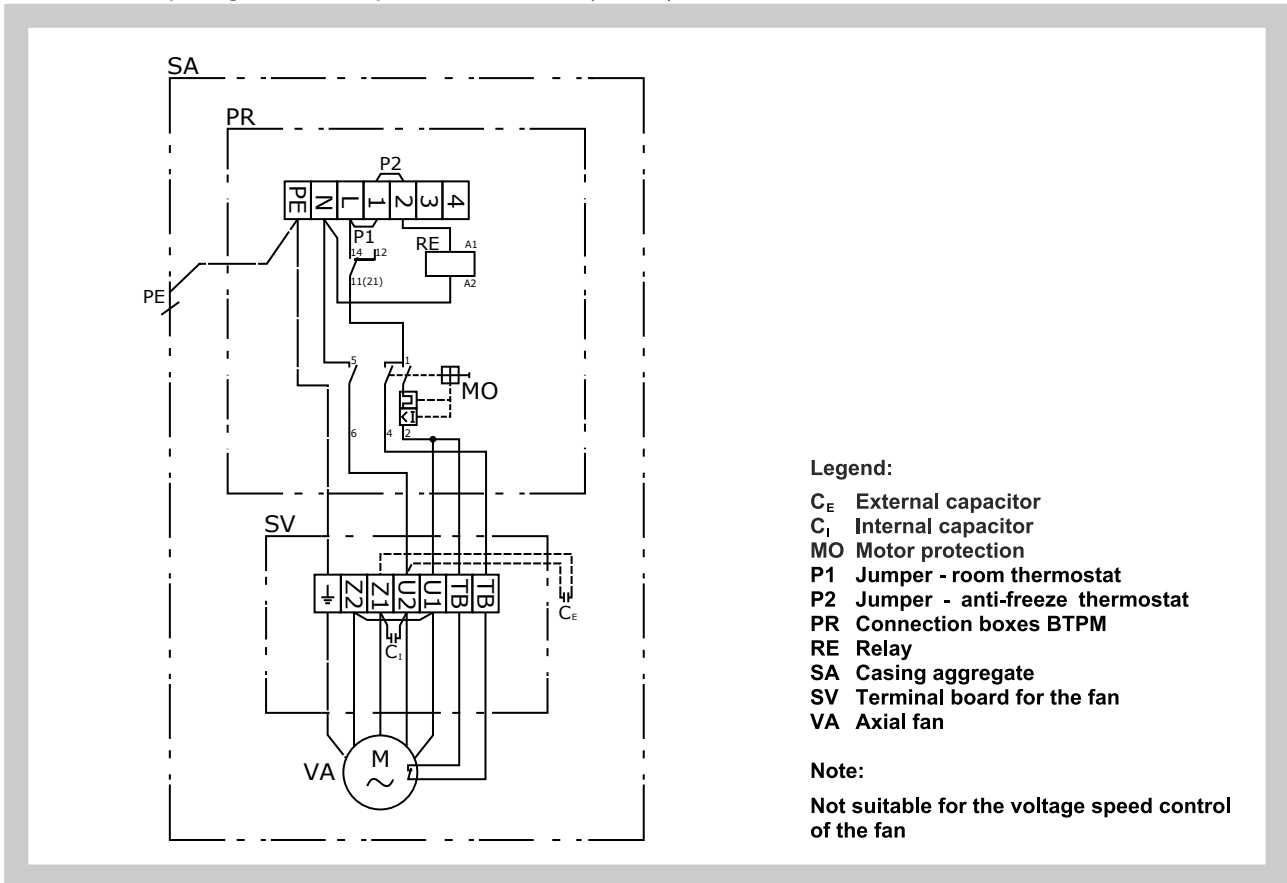


Fig. 10 The electrical installation allowing control of multiple units at the same time using single thermostat and comprising the thermal protection of the fan (BTPM1)



6.2. Electrical installation units MONZUN -TE - with three-phase motor

Fig. 11 The circuit diagram of three-phase motor with basic wiring (thermostat control is not supported) (B3)

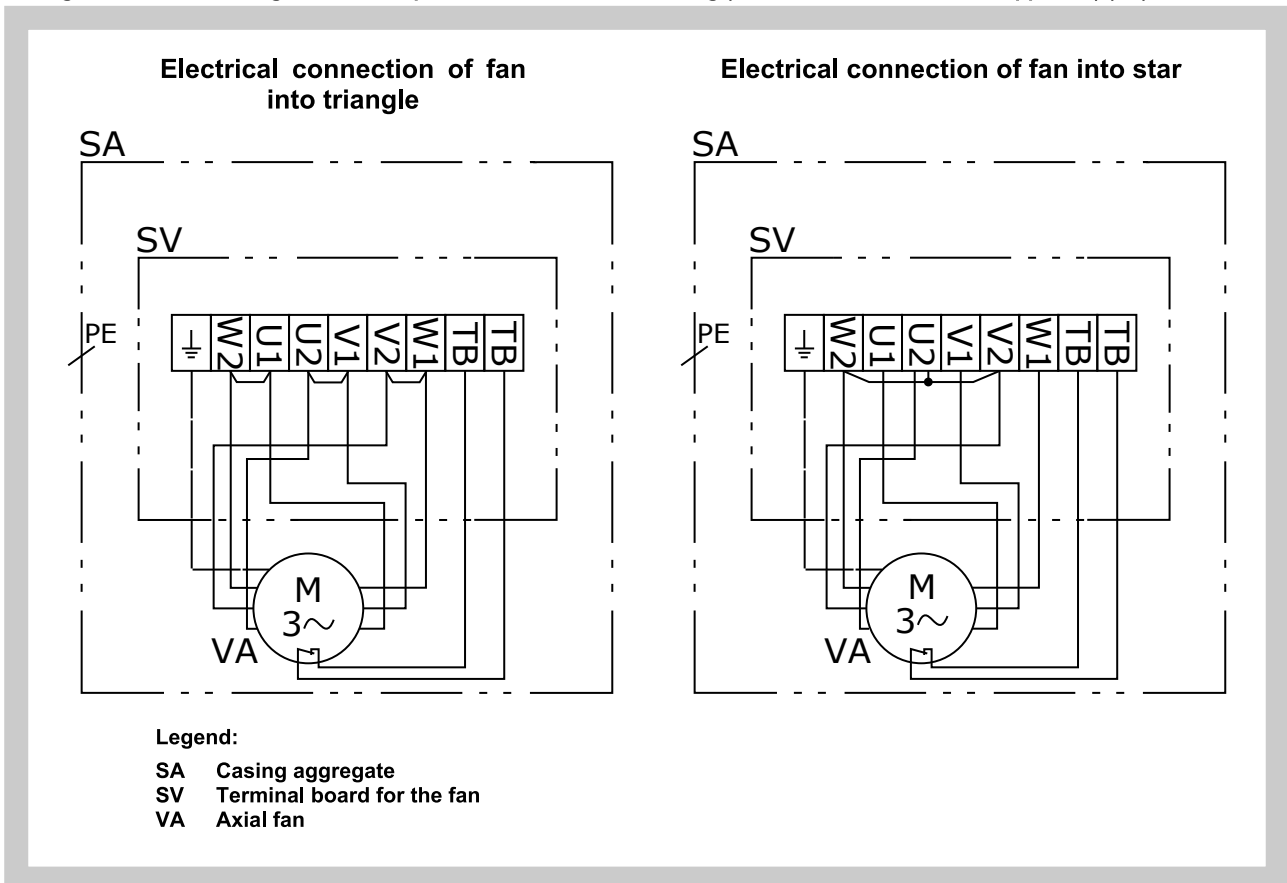


Fig. 12 The electrical installation enables control of several heaters by single thermostat (with three-phase motor (BTM3))

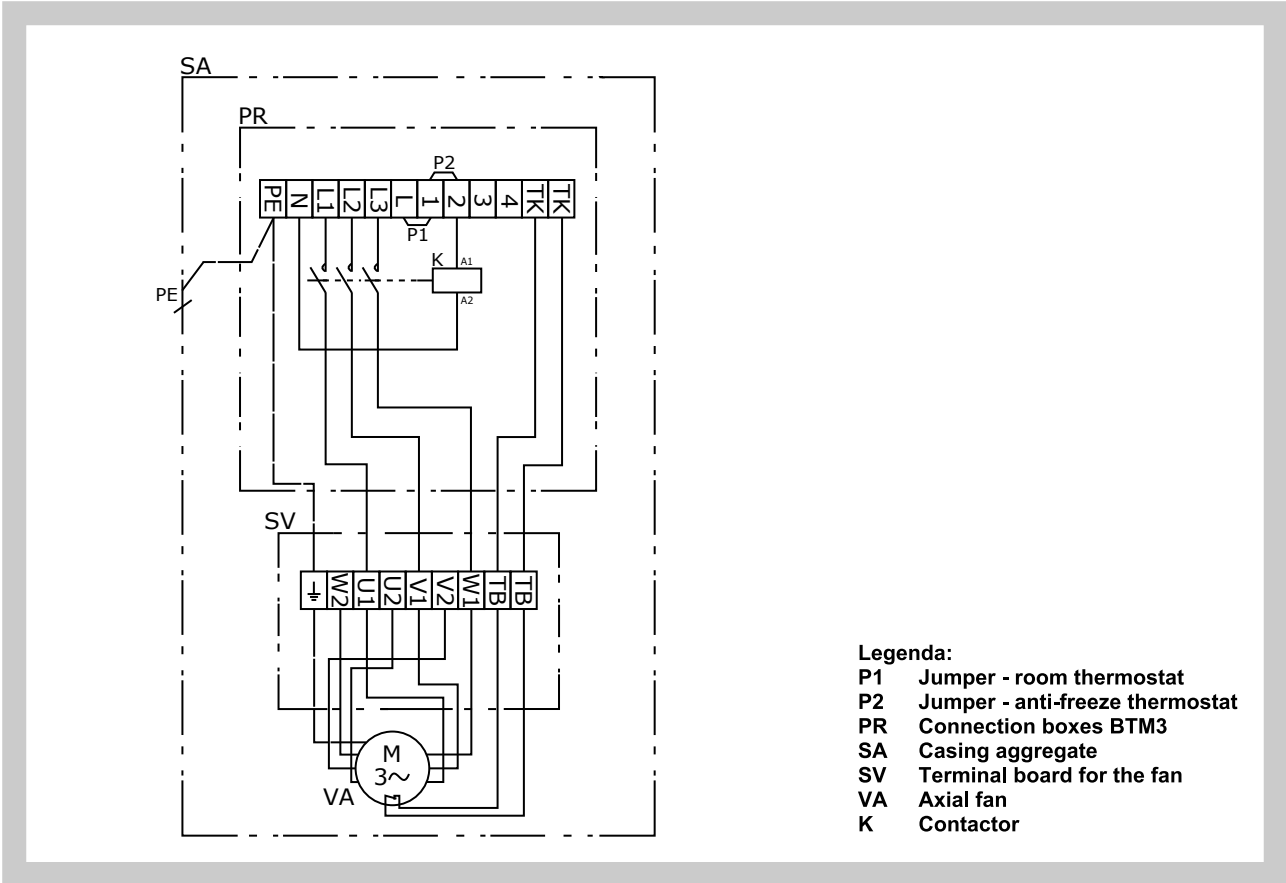
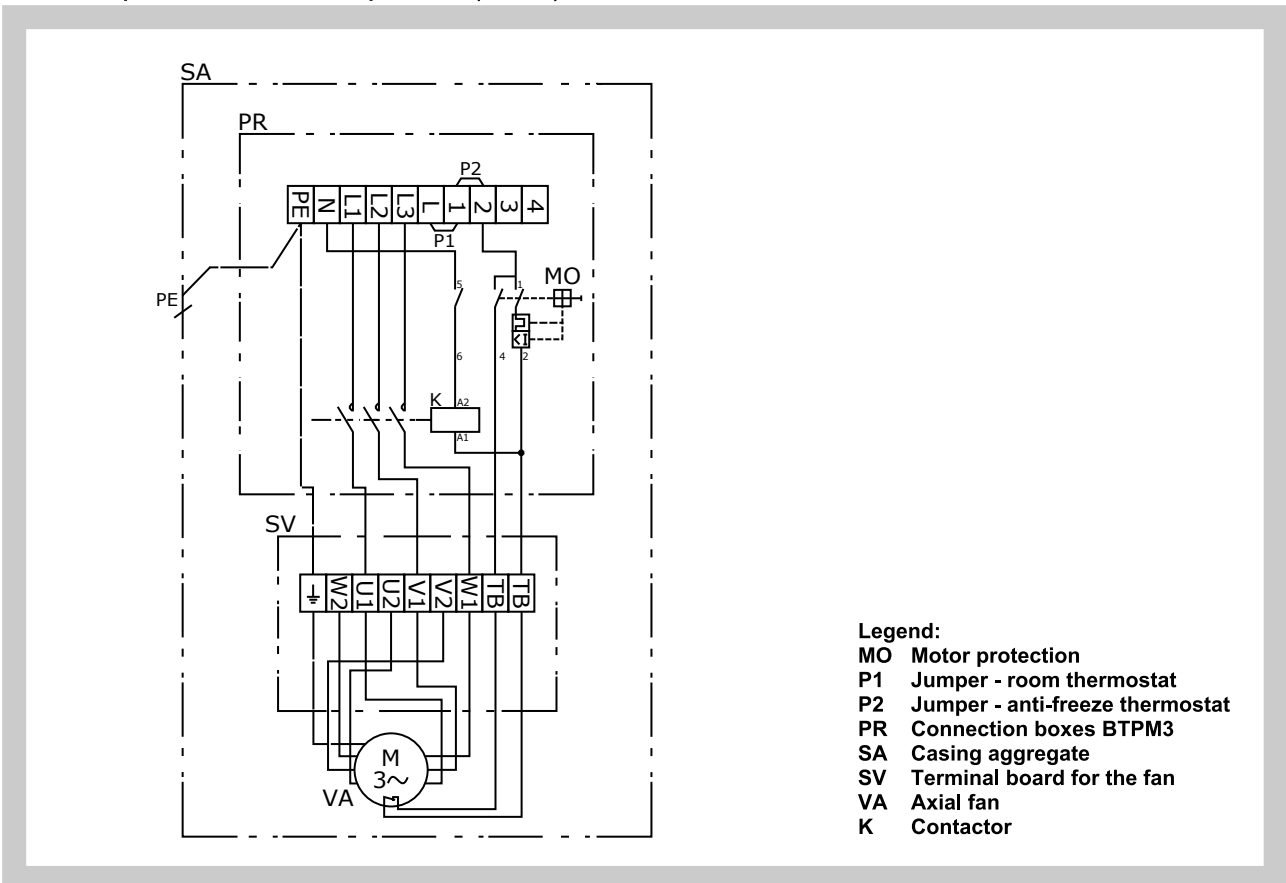


Fig. 13 The electrical installation that enables control of several heaters by single thermostat and containing thermal protection of the three-phase fan (BTPM3)



7. Function

7.1. The heater starts operation switching-up the fan. The fan blows heated air through the heating coil into the heated or cooled area. The air may be drawn in directly from the room or from outside through the mixing chamber, see Chapter XI optional accessory (in this case, fresh air into the room can be supplied).

8. Placement and installation

8.1. Dimensions for installation MONZUN-TE

The unit MONZUN - TE has four fixation points on the top and four on the bottom panel, where it can be fixed to supporting structure. It can be installed on the wall using a bracket or below the ceiling by hanger, see chapter XI optional accessory.

Tab. 8.1.1. MONZUN - TE - Mounting dimensions

Dimensional series	Dimensions [mm]						
	A	B	B1	C	K	T	min Z*
1	595	315	380	530	340	350	2300
2	720	325	420	610	440	350	2300
3	900	334	410	760	615	350	2300

* dimension Z is for particular units in Tab. 9.1.1. to Tab. 9.3.2.

Fig. 16 Installing the unit MONZUN - TE on the wall bracket

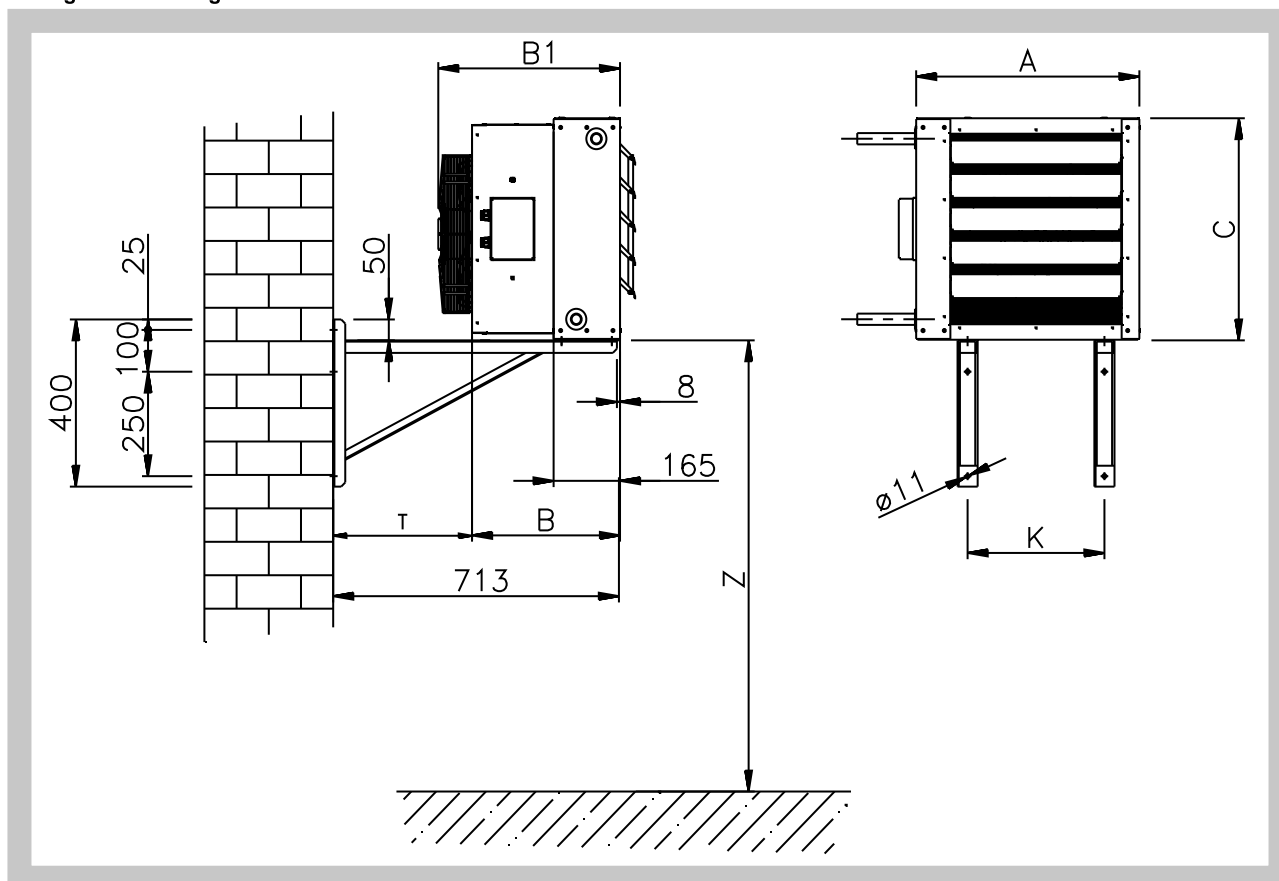
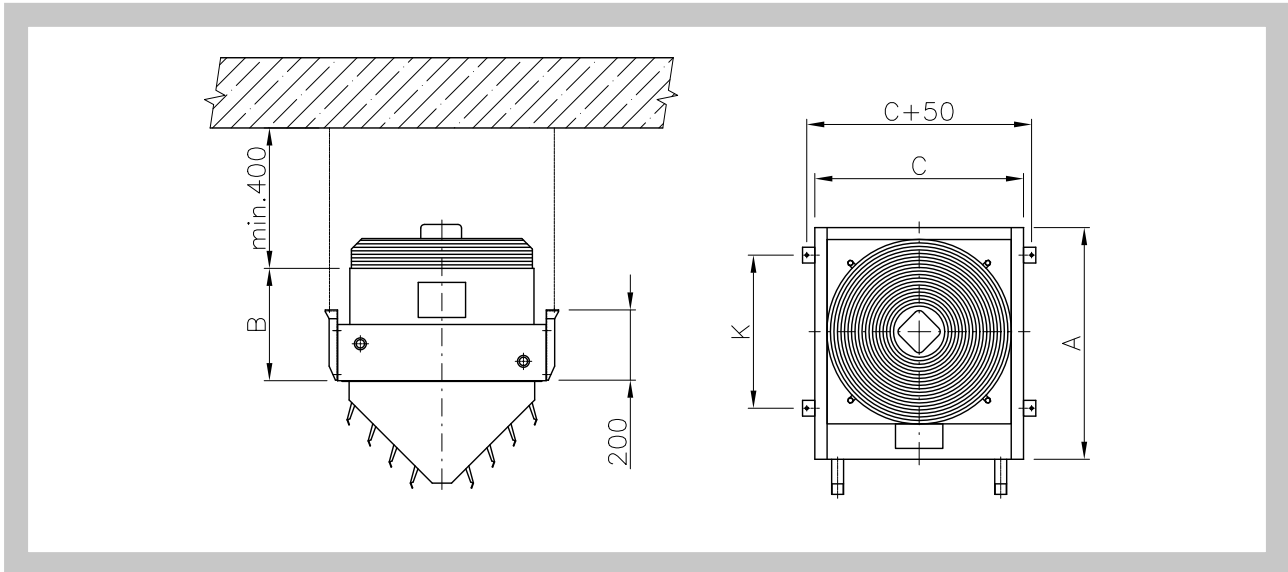


Fig. 15 MONZUN - TE vertical installation dimensions



IV. MATERIALS, FINISHING

9. Material

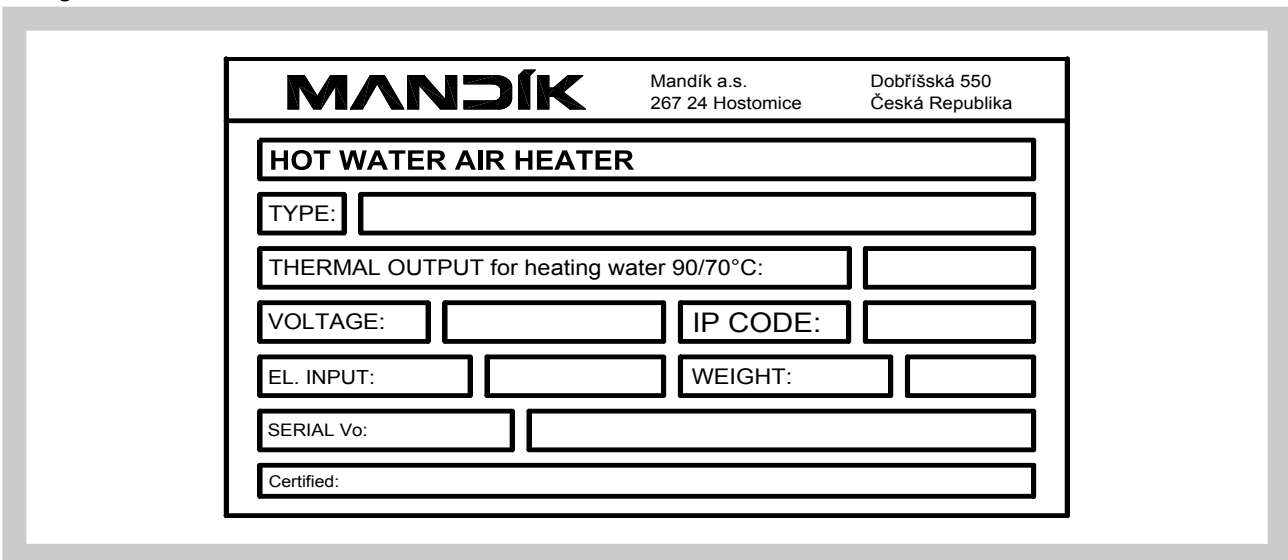
- 11.1. The casing of MONZUN-TE and MONZUN-TEC is made of galvanized sheet powder coated RAL 7040. Vent blades and diffusers are coated RAL 7016.
- 11.2. The heating coil frame for MONZUN-TE is made of galvanized steel sheet, copper heating tubes, aluminium fins, manifolds with steel connecting pipes.

V. PRODUCT INFORMATION

10. Product data label

- 10.1. The product data label is located on the rear side of the unit cabinet.

Fig. 16 Product data label for units MONZUN - TE



VI. INSPECTION, TESTING

11. Inspection

- 11.1. The equipment is inspected by the manufacturer, its operation is dependent on the correct installation.
- 11.2. All devices are tested in terms of safety and operability after production.

VII. PACKING, TRANSPORT, STORAGE

12. Logistical data

- 12.1. The heaters and accessories are supplied freely loaded and are wrapped into the packing foil. Other methods of packaging must be agreed in advance with the manufacturer.
- 12.2. The heaters are transported by freight cabinet vehicles. Units must be protected against mechanic damages when transported and manipulated. There must not occur any sharp shocks and ambient temperature must not exceed +50°C.
- 12.3. If not otherwise agreed, the handover is considered when the goods is forwarded to the carrier.
- 12.4. The units must be stored in the indoor environment without any aggressive vapours, gases or dust. Indoor temperature must be in the range from -5 °C to +40 °C and maximum relative humidity 80%. Units must be protected against mechanic damages when transported and manipulated.
- 12.5. The delivery includes MONZUN - TE, the certificate of quality and completeness with stamp checks and the instructions for installation, operation and maintenance.

VIII. ASSEMBLY, MANIPULATION, MAINTENANCE AND REVISIONS

13. Assembly

Control of hot air unit MONZUN must be carried out person educated and responsible for this activity. Children must not use the MONZUN heater, must not play with it.

- 13.1. The heaters must be installed in accordance with the applicable standards and regulations. Safety of operation must comply with EN ISO 12 100-2. For units MONZUN - TE, which are designed for external air supply, the heating coil must be protected by anti-freeze thermostat which prevents water freezing. Manufacturer recommends installing this thermostat for all heaters.

The conditions for commissioning for units MONZUN - TE and TEC:

- Units MONZUN - TE and TEC and their accessories must be installed in accordance with applicable installation instructions, which are issued by the equipment manufacturer.
- Units and their accessories must be connected only to a mains voltage of 230V /50Hz or 3x400 V / 50Hz.
- The electrical system to which the units are connected shall fulfil applicable regulations.
- Must be enabled access into the secondary (electric) switchboard to which the heaters are connected.

During installation, it is necessary to respect the applicable standards relating to:

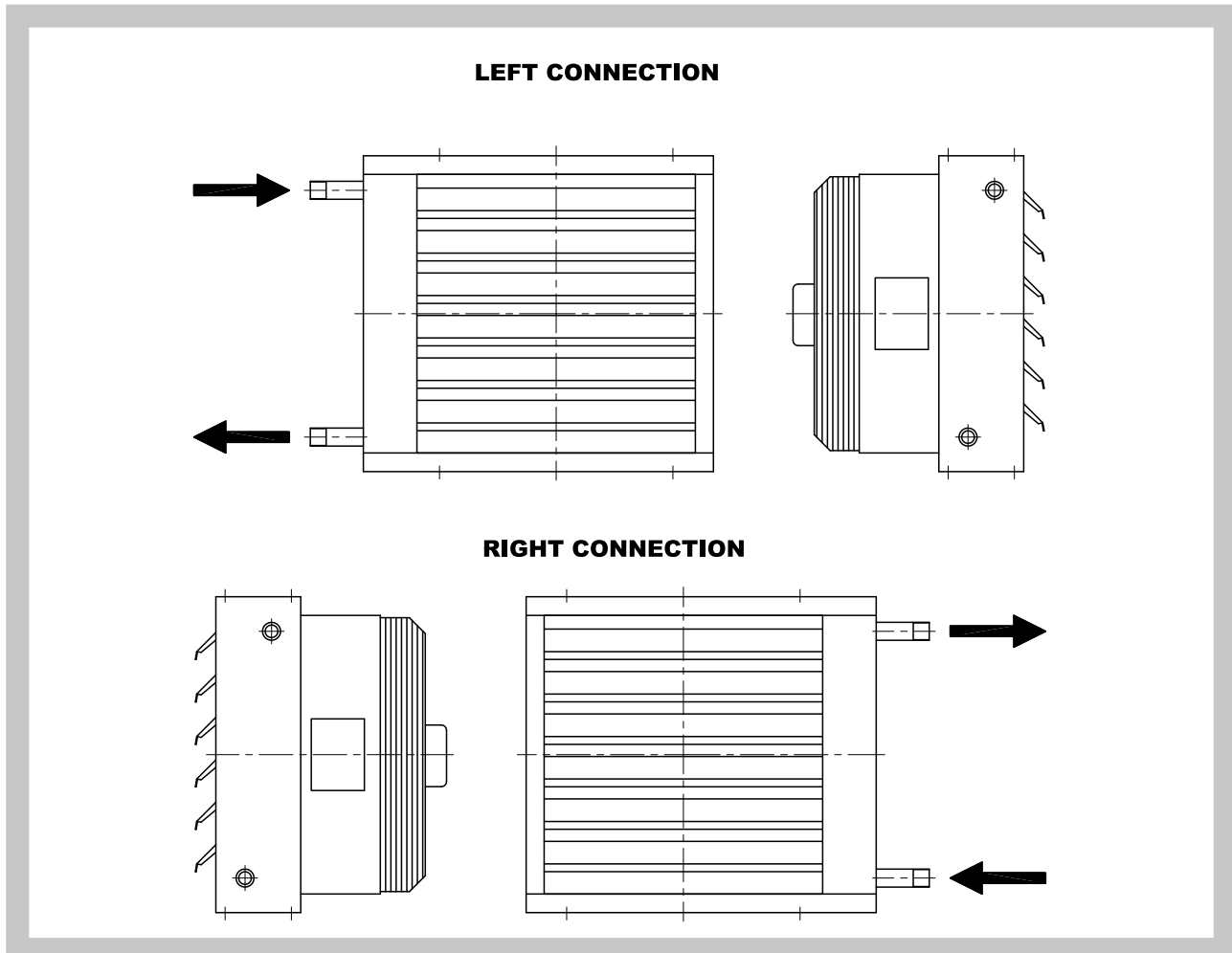
- fire protection
- electrical installation

USE OF UNITS IN CORROSIVE ENVIRONMENTS IS PROHIBITED!

14. Connecting to networks

14.1. Connecting the unit to the hot (cool) water supply

Fig. 17 Connecting the units in counterflow



With parallel flow connection does not apply information from Tab. 16.1.1. to Tab. 16.5.6., The heating power is lower.

14.1.1. The connecting pipe of units MONZUN - TE are with external thread:

- heater size 1 - G3/4";
- heater size 2 - G1";
- heater size 3 - G5/4".

14.2. Electrical connection

The units MONZUN - TE and TEC must be connected according to applicable standards. The power input must include the prescribed securing according to CSN 33 2000-5-54 and CSN 34 1610.

The units MONZUN - TE and TEC are electric appliances class I according to EN 61140. They are provided with clamp for connection of the protective wire. This clamp must be connected according to the above mentioned standard.

In the connection to the electric grid must be included switch that disconnects all operating conductors. Electrical power supply is connected into the clamps which are housed in the connection box or in the fan terminal box.

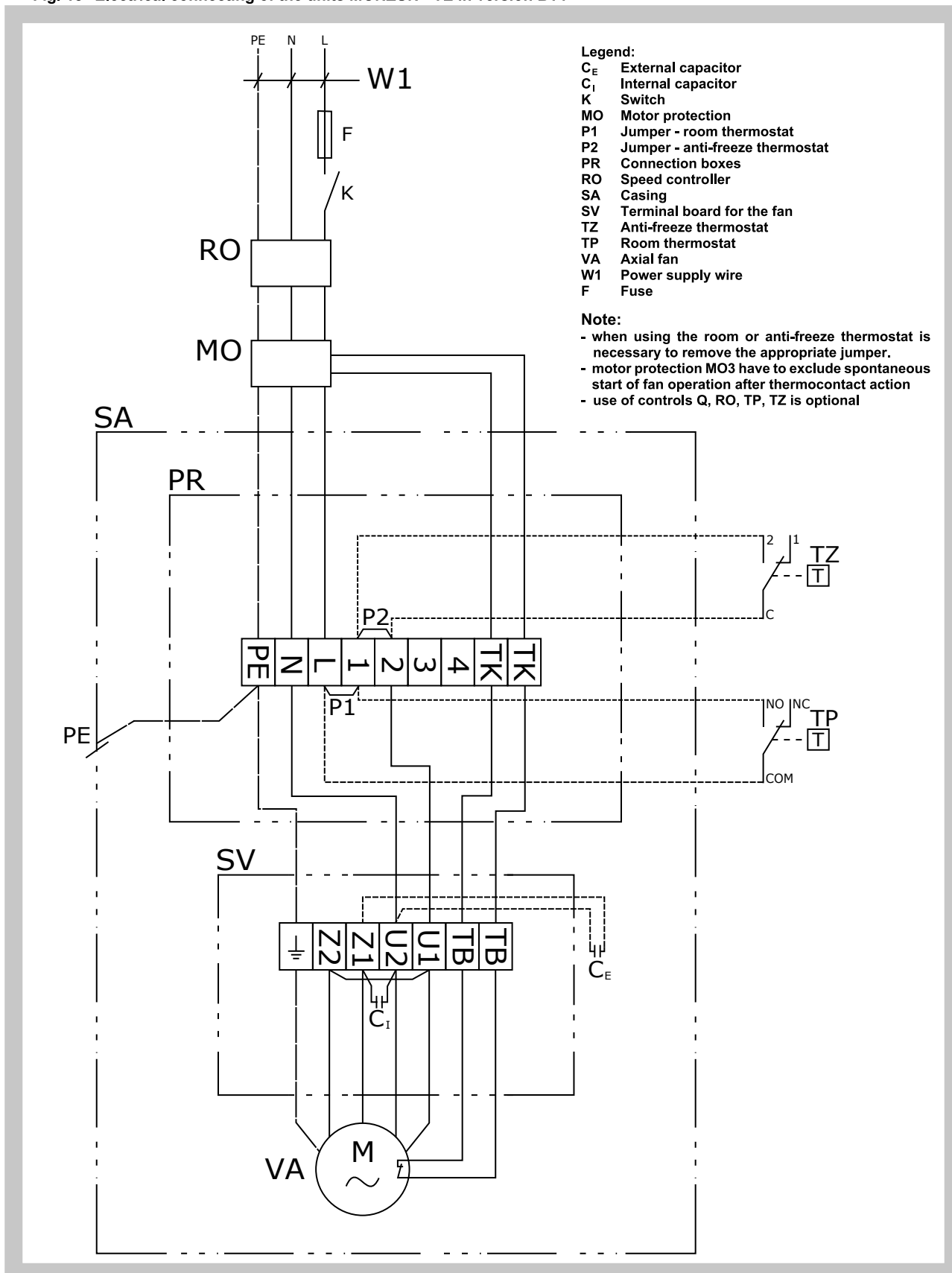
The installation of electrical connection must be done by authorised person only.

14.2.1. Electrical connecting of the units MONZUN - TE in version B1

The electrical power supply is connected to the terminals of the fan, see Fig. 6 (page 8).

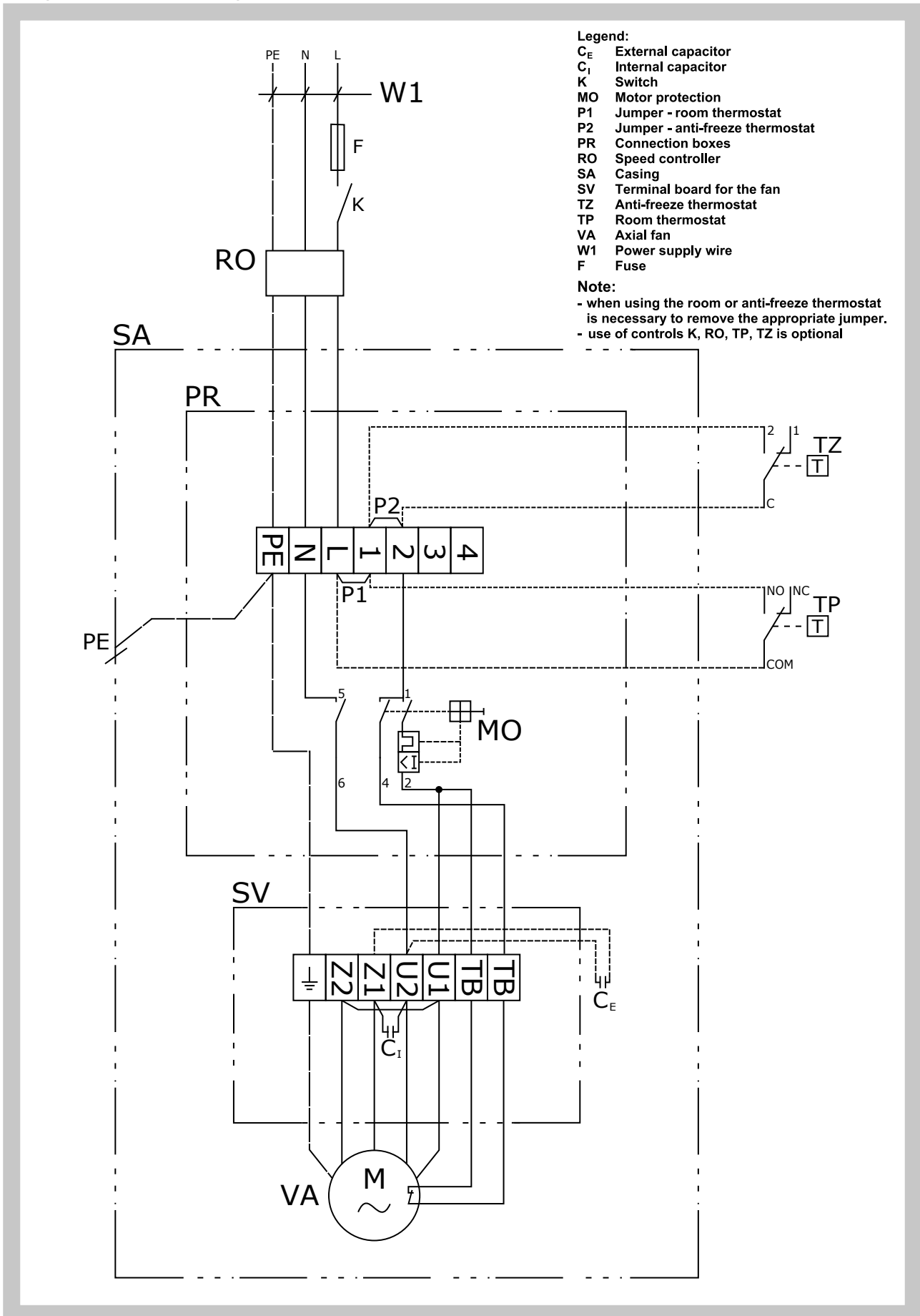
14.2.2. Electrical connecting of the units MONZUN - TE in version BT1

Fig. 18 Electrical connecting of the units MONZUN - TE in version BT1



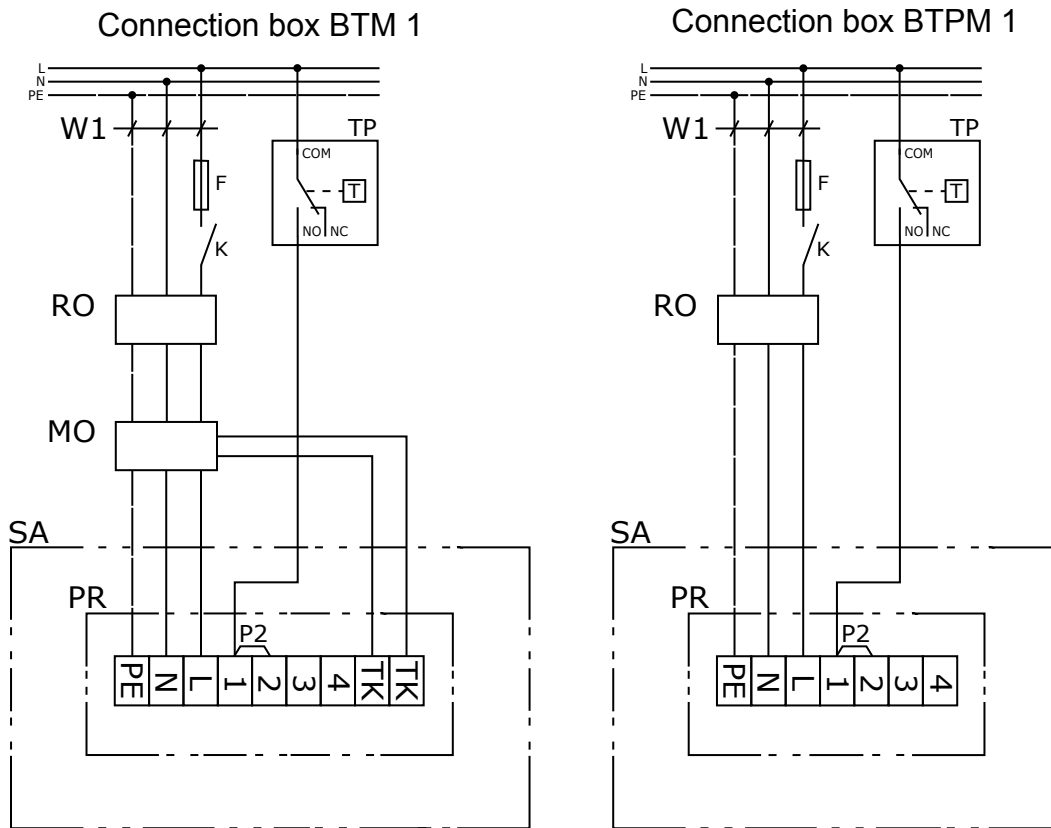
14.2.3. Electrical connecting of the units MONZUN - TE in version BTP1

Fig. 19 Electrical connecting of the units MONZUN - TE in version BTP1

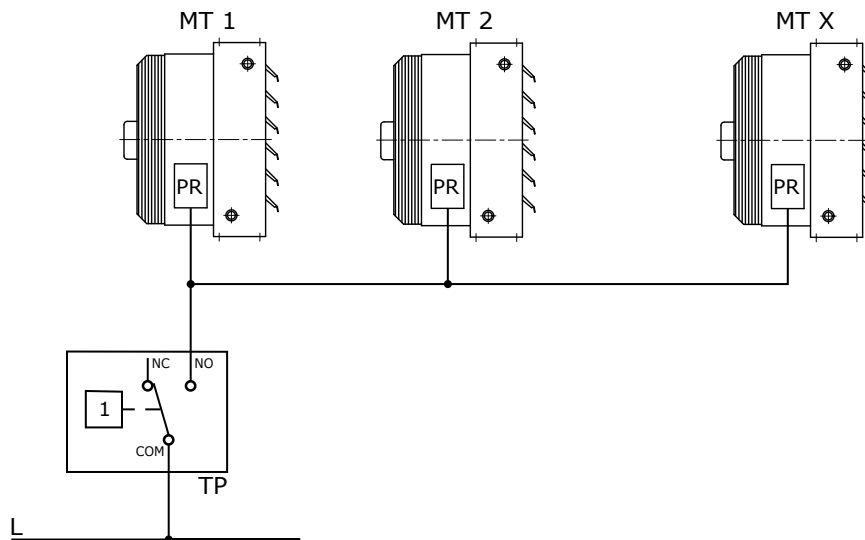


14.2.4. Electrical connecting of the room thermostat to the unit MONZUN - TE in version BTM1 and BTPM1

Fig. 20 Electrical connecting of the room thermostat to the unit in version BTM1 a BTPM1



A practical example of the connection to boxes BTM and BTPM

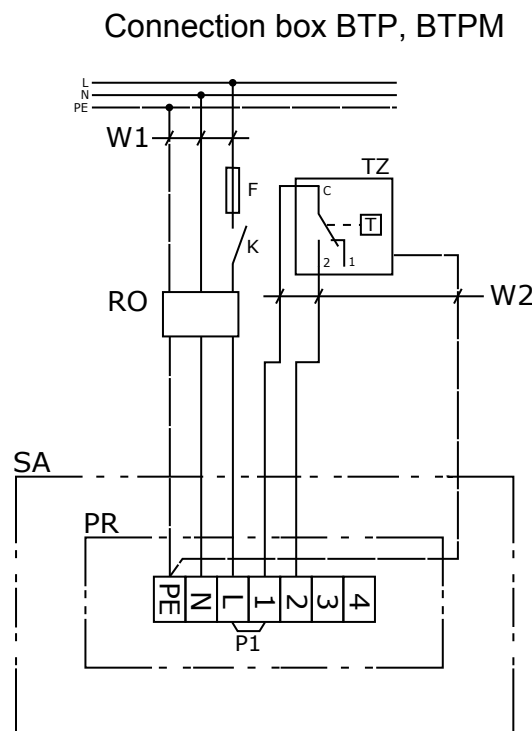
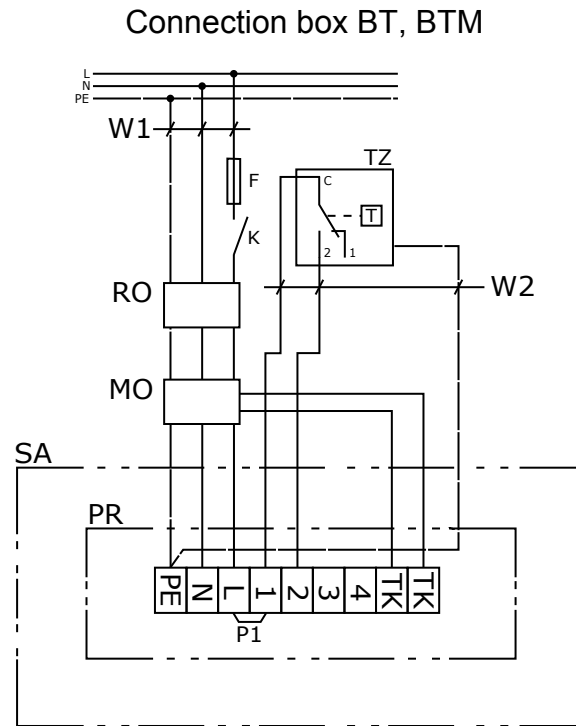


- Legend:
- K Switch
 - MO Motor protection
 - MT Monzun TE
 - P2 Jumper - anti-freeze thermostat
 - PR Connection boxes
 - RO Speed controller
 - SA Casing
 - TP Room thermostat
 - W1 Power supply wire
 - F Fuse

- Note:
- when using the room or anti-freeze thermostat is necessary to remove the appropriate jumper.
 - motor protection MO3 have to exclude spontaneous start of fan operation after thermocontact action
 - use of controls K, RO, TP, TZ is selectable
 - connection boxes BTM and BTPM are not suitable for voltage speed regulators

14.2.5. Electrical connecting of the anti-freeze thermostat to the unit MONZUN - TE in version BT1, BTM1, BTP1 a BPM1

Fig. 21 Electrical connecting of the anti-freeze thermostat to the unit MONZUN - TE in version BT1, BTM1, BTP1 a BPM1



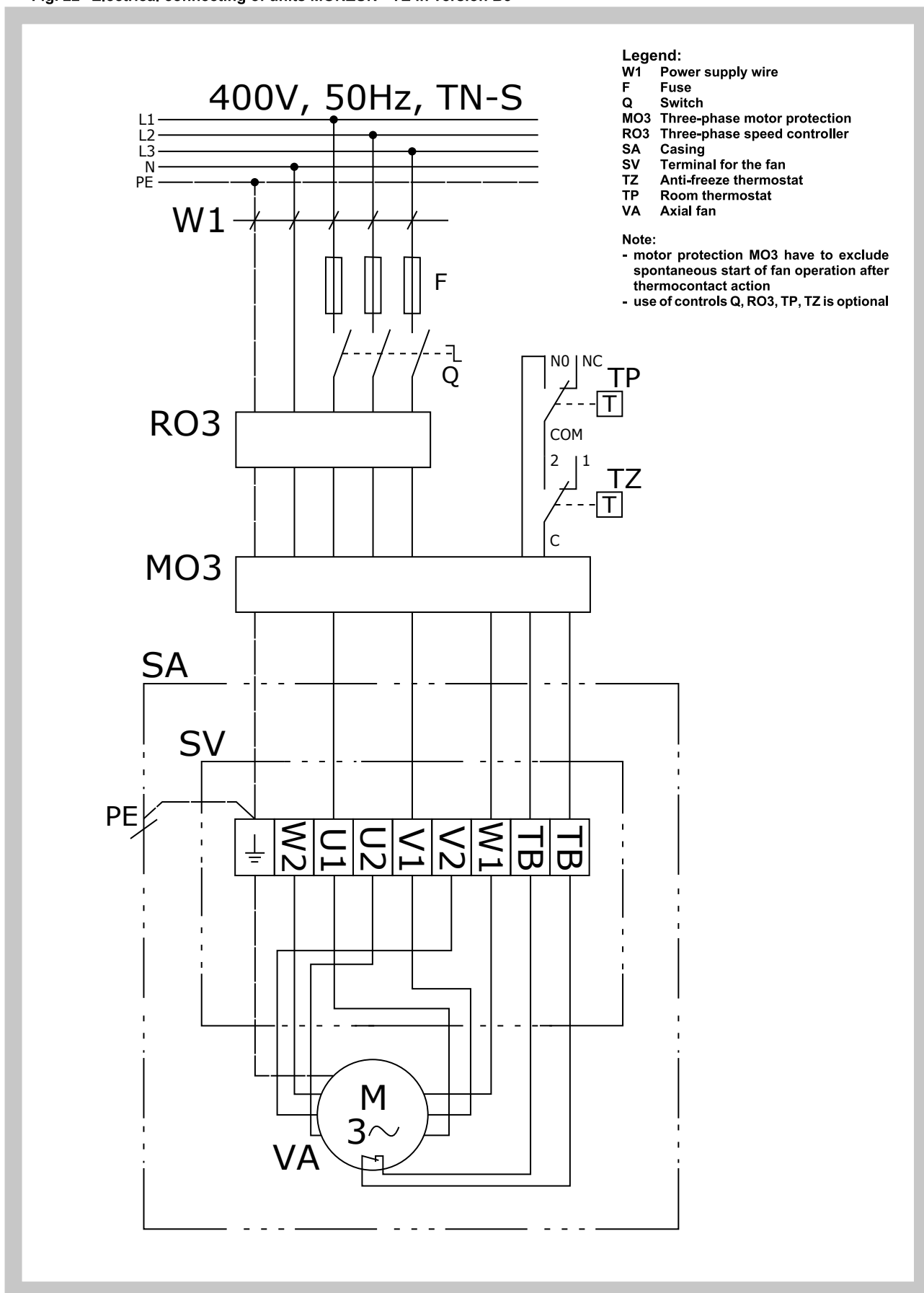
- Legend:**
- K Switch
 - MO Motor protection
 - MT Monzun TE (TEC)
 - P1 Jumper - room thermostat
 - P2 Jumper - anti-freeze thermostat
 - PR Connection boxes
 - RO Triac speed controller
 - SA Casing
 - TZ Anti-freeze thermostat
 - W1 Power supply wire
 - W2 Connecting wire
 - F Fuse

- Note:**
- when using the room or anti-freeze thermostat is necessary to remove the appropriate jumper.
 - motor protection MO3 have to exclude spontaneous start of fan operation after thermocontact action
 - use of controls K, RO, TP, TZ is optional
 - connection boxes BTM and BPM are not suitable for voltage speed regulators

14.2.6. Electrical connecting of the units MONZUN - TE in version B3

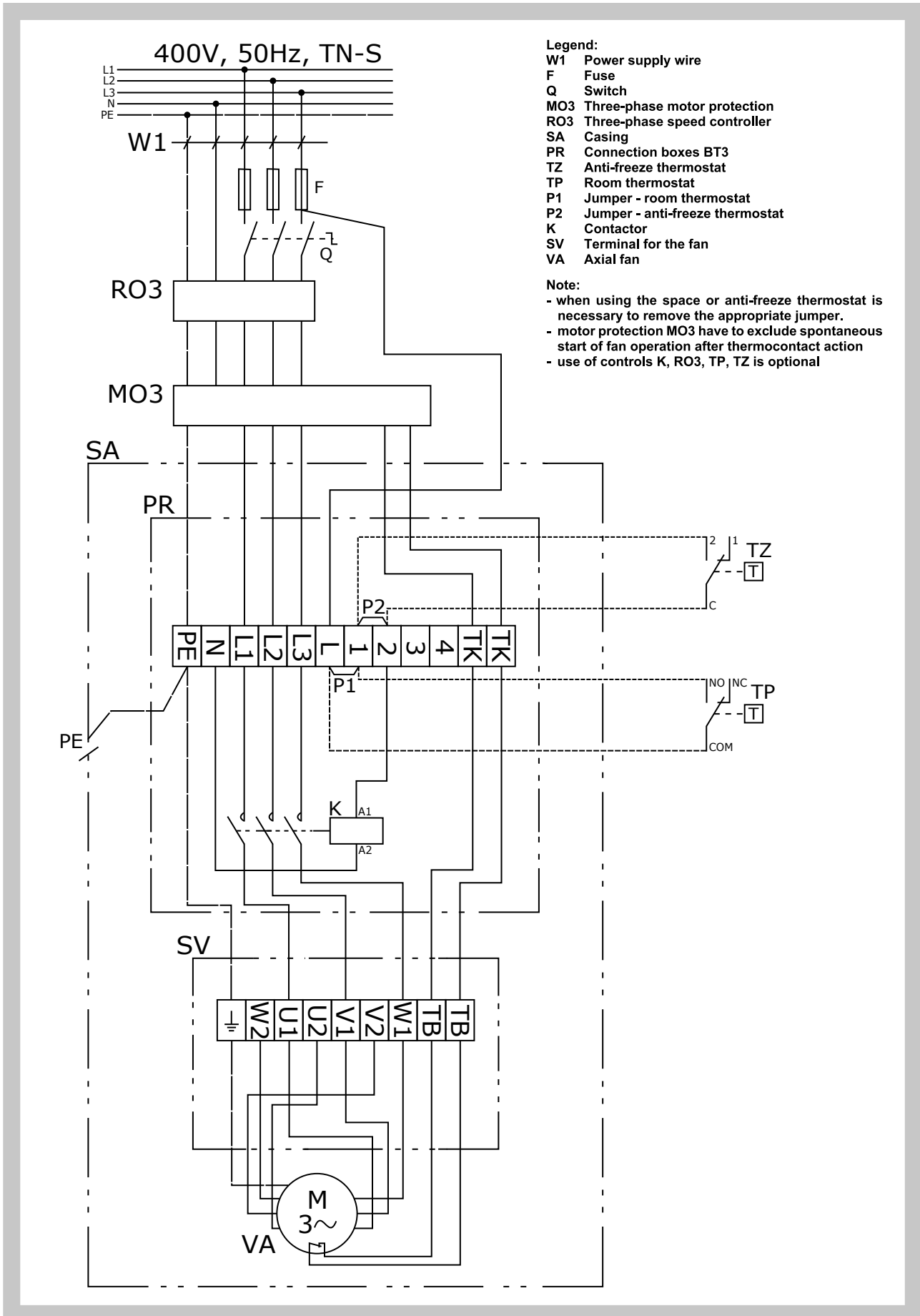
The electrical power supply is connected to the terminals of the fan, see Fig. 10 (page 10).

Fig. 22 Electrical connecting of units MONZUN - TE in version B3



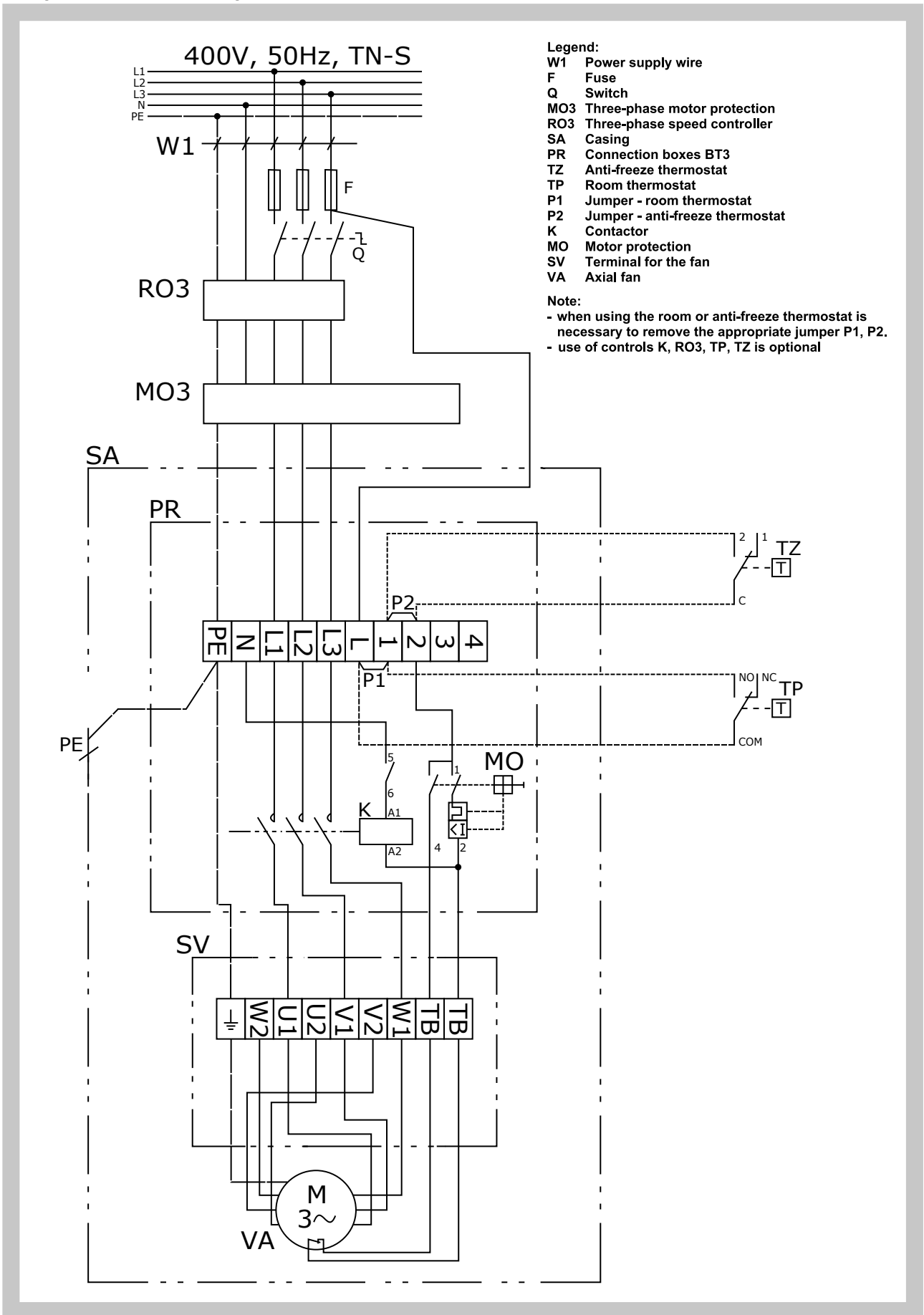
14.2.7. Electrical connecting of the units MONZUN - TE in version BTM3

Fig. 23 Electrical connecting of the units MONZUN - TE in version BTM3



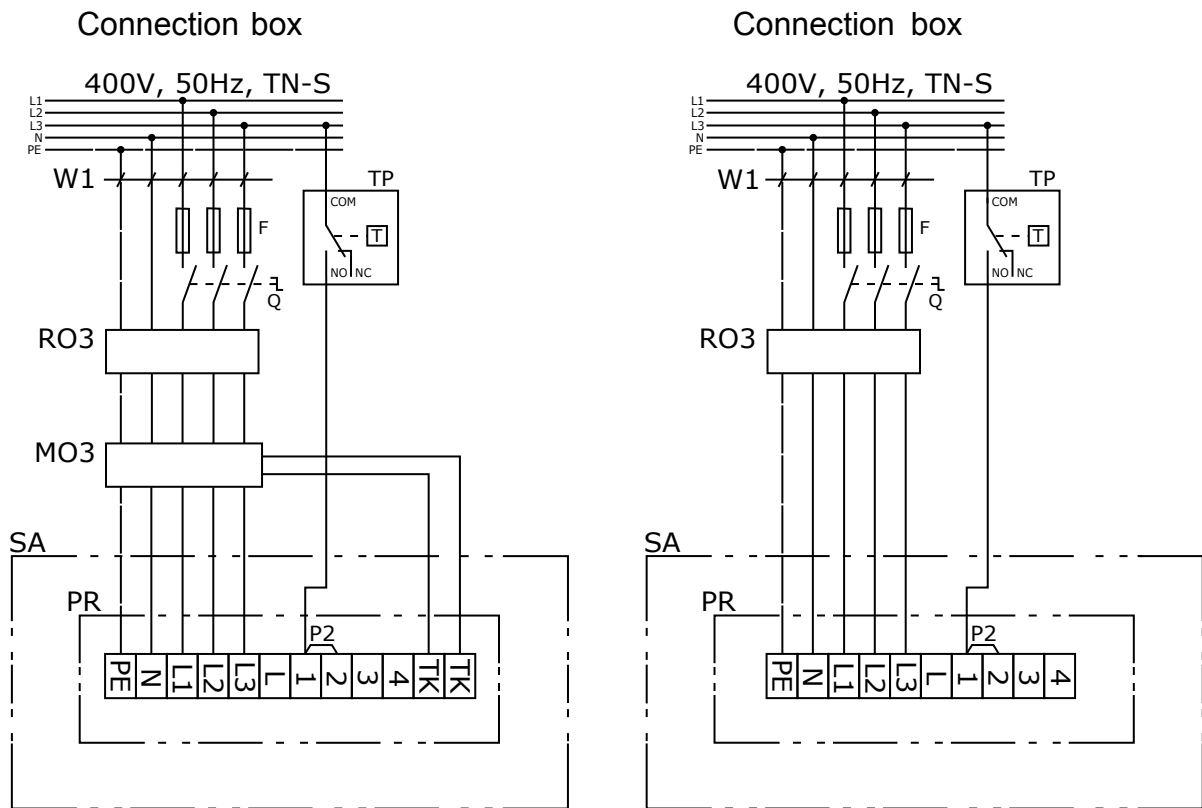
14.2.8. Electrical connecting of the units MONZUN - TE in version BTM3

Fig. 24 Electrical connecting of the units MONZUN - TE in version BTM3

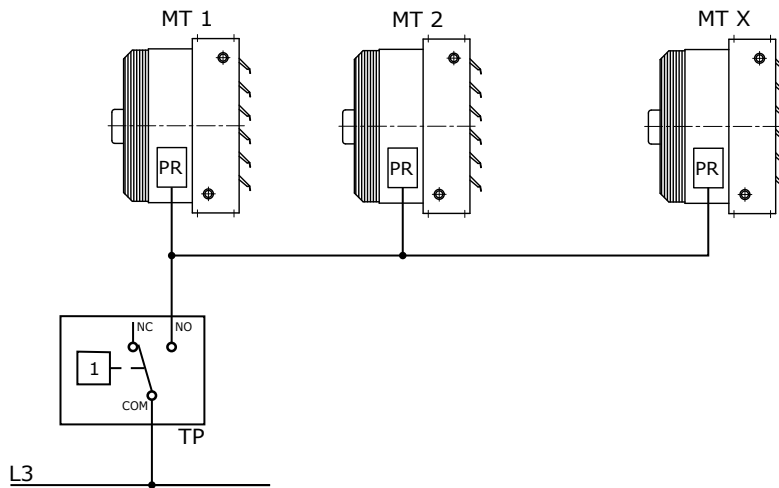


14.2.9. Electrical connecting of the room thermostat to the unit MONZUN - TE in version BTM3 and BTPM3

Fig. 25 Electrical connecting of the room thermostat to the unit in version BTM3 and BTPM3.



A practical example of the involvement connection boxes BTM3 and BTPM3



- Legend:**
- W1 Power supply wire
 - F Fuse
 - Q Switch
 - TP Room thermostat
 - MO3 Three-phase motor protection
 - RO3 Three-phase speed controller
 - SA Casing
 - PR Connection boxes
 - P2 Jumper - anti-freeze thermostat
 - MT Monzun TE

- Note:**
- when using the room or anti-freeze thermostat is necessary to remove the appropriate jumper.
 - motor protection MO3 have to exclude spontaneous start of fan operation after thermocontact action
 - use of controls K, RO, TP, TZ is optional
 - connection boxes BT and BTP are not suitable for voltage speed regulators

IX. SPECIFICATIONS

15. Technical parameters

15.1. The electrical and technical parameters of the units MONZUN - TE, size1

Tab. 15.1.1. The electrical and technical parameters of the units MONZUN - TE, with single phase fan, size 1

Heating coil	Single-row			Double-row			Three-row		Four-row	
Type of unit	1.1.150	1.1.180	1.1.220	1.2.150	1.2.200	1.2.250	1.3.180	1.3.220	1.4.150	1.4.180
Heating power* [kW]	9,6	10,0	11,0	17,1	19,5	21,5	22,0	24,2	26,0	27,7
Air flow volume [m ³ .h ⁻¹]	1500	1650	1950	1450	1750	2050	1650	1900	1600	1750
Electrical connection [V/Hz]	230/50									
Electric input [W]	90	85	120	85	120	150	120	150	120	150
Protection [A]	6									
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]	9	11	14	10	12	15	10,8	13	10	12
The recommended installation height Z [m]	3,5	3,6	4,5	2,9	3,9	4,9	3,3	4,3	2,9	3,6
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]	66	61	62	58	61	61	62	62	61	61

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air t_{v1}=15°C.

Tab. 15.1.2. The electrical and technical parameters of the units MONZUN - TE, with three phase fan, size 1

Heating coil	Single-row			Double-row			Three-row		Four-row	
Type of unit	-	1.1.180	1.1.220	1.2.150	1.2.200	1.2.250	1.3.180	1.3.220	1.4.150	1.4.180
Heating power* [kW]	-	10,5	11,7	17,5	20,6	23,7	22,4	25,8	24,8	28,3
Air flow volume [m ³ .h ⁻¹]	-	1850	2200	1500	1900	2400	1700	2100	1500	1800
Electrical connection [V/Hz]	3x 400/50									
Electric input [W]	-	180	180	180	180	190	180	190	180	190
Protection [A]	6									
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]	-	11,4	16,0	10,0	13,0	16,0	10,8	13,8	10,0	12,1
The recommended installation height Z [m]	-	3,6	4,5	2,9	3,9	4,9	3,3	4,3	2,9	3,6
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]	-	60	62	60	62	67	62	67	62	67

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air t_{v1}=15°C.

15.2. The electrical and technical parameters of the units MONZUN - TE, size 2

Tab. 15.2.1. The electrical and technical parameters of the units MONZUN - TE, with single phase fan, size 2

Heating coil	Single-row			Double-row			Three-row			Four-row		
Type of unit	2.1.200	2.1.250	2.1.400	2.2.250	2.2.320	2.2.420	2.3.220	2.3.280	2.3.400	2.4.200	2.4.250	2.4.350
Heating power* [kW]	13,1	14,8	17,2	25,5	30,4	35,0	31,8	36,5	44,3	36,4	42,2	48,1
Air flow volume [m ³ .h ⁻¹]	2100	2600	3500	2300	3100	3900	2250	2800	3700	2150	2650	3200
Electrical connection [V/Hz]	230/50											
Electric input [W]	120	150	260	150	260	480	150	260	480	150	260	480
Protection [A]	6											
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]	12	16	21	14	20	23	13	18	22	12	15	20
The recommended installation height Z [m]	3,6	4,4	5,2	4,2	4,7	5,3	3,9	4,5	5,0	3,4	4,3	4,8
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]	60,5	61	65	62	64	70	62	65	70	62	64	70

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air $t_{v1}=15^{\circ}\text{C}$.

Tab. 15.2.2. The electrical and technical parameters of the units MONZUN - TE, with three phase fan, size 2

Heating coil	Single-row			Double-row			Three-row			Four-row		
Type of unit	2.1.200	2.1.250	2.1.400	2.2.250	2.2.320	2.2.420	2.3.220	2.3.280	2.3.400	2.4.200	2.4.250	2.4.350
Heating power* [kW]	12,4	13,9	18,5	26,0	29,3	35,5	31,3	35,0	44,8	35,1	39,4	49,1
Air flow volume [m ³ .h ⁻¹]	1900	2350	4000	2400	2900	4000	2200	2600	3750	2050	2400	3300
Electrical connection [V/Hz]	3x 400/50											
Electric input [W]	180	180	430	140	190	450	140	190	450	140	190	450
Protection [A]	6											
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]	11	14	22	15	19	24	13	17	22	12	14	21
The recommended installation height Z [m]	3,6	4,4	5,2	4,2	4,7	5,3	3,9	4,5	5,0	3,4	4,3	4,8
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]	60	62	68	63	64,5	72	63	68	72	63	67	71

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air $t_{v1}=15^{\circ}\text{C}$.

15.3. The electrical and technical parameters of the units MONZUN - TE, size 3

Tab. 15.3.1. The electrical and technical parameters of the units MONZUN - TE, with single phase fan, size 3

Heating coil	Single-row			Double-row			Three-row			Four-row		
Type of unit	3.1.450	3.1.600	3.1.800	3.2.420	3.2.500	3.2.700	3.3.400	3.3.500	3.3.600	3.4.350	3.4.450	3.4.520
Heating power* [kW]												
	25,8	29,7	32,2	45,0	54,5	60,0	51,5	61,5	68,0	61,1	73,5	80,3
Air flow volume [m ³ .h ⁻¹]												
	3900	5100	6000	3600	4800	5600	3550	4600	5400	3500	4500	5100
Electrical connection [V/Hz]												
	230/50											
Electric input [W]												
	260	480	570	260	480	570	260	480	570	260	480	570
Protection [A]												
	6											
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]												
	16	20	23	15	19	22	15	18	21	14	17	20
The recommended installation height Z [m]												
	4,2	4,4	5,2	4,0	4,6	5,2	3,9	4,5	5,0	3,4	4,1	4,7
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]												
	70	71	73	70	71	73	69	70	72	69	70	72

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air t_{v1}=15°C.

Tab. 15.3.2. The electrical and technical parameters of the units MONZUN - TE, with three phase fan, size 3

Heating coil	Single-row			Double-row			Three-row			Four-row		
Type of unit	3.1.450	3.1.600	3.1.800	3.2.420	3.2.500	3.2.700	3.3.400	3.3.500	3.3.600	3.4.350	3.4.450	3.4.520
Heating power* [kW]												
	28,8	29,5	36,0	50,5	56,0	66,0	57,0	64,5	74,5	68,8	74,7	88,7
Air flow volume [m ³ .h ⁻¹]												
	4800	5000	7500	4300	5000	6600	4100	4900	6200	4050	4600	5900
Electrical connection [V/Hz]												
	3x 400/50											
Electric input [W]												
	430	450	840	430	450	840	430	450	840	430	450	840
Protection [A]												
	6											
Airflow reach in open space, the residual speed 0,25 m.s ⁻¹ [m]												
	16	20	23	15	19	22	15	18	21	14	17	20
The recommended installation height Z [m]												
	4,3	4,4	5,2	4,2	4,6	5,2	4,0	4,5	5,0	4,0	4,1	4,7
Average sound pressure level at 1 m distance from the unit in free field [dB(A)]												
	71	74	74	71	73	74	70	73	73	70	73	73

* The data correspond to the temperature gradient of the heating water 90/70 ° C and the temperature of of the intake air t_{v1}=15°C.

15.4. Thermal parameters of the units MONZUN - TE

Tab. 15.4.1. Thermal parameters of the units MONZUN-TE with the single-phase fan, size 1

Heating coil Type of unit	Single-row						Double-row						Three-row						Four-row					
	1.1.150		1.1.180		1.1.220		1.2.150		1.2.200		1.2.250		1.3.180		1.3.220		1.4.150		1.4.180					
	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]				
\dot{V}_v [m ³ h ⁻¹]	1500		1650		1950		1450		1750		2050		1650		1900		1600		1750					
t_{w1}/t_{w2} [°C/°C]	55/40		70/50		80/60		90/70		95/80		0		5		10		15		18					
	0	6,8	13,5	7,2	13,0	7,8	11,9	12,2	25,0	13,9	25,0	22,2	15,7	28,3	17,2	26,9	18,5	34,4	19,7	33,5				
	5	6,0	16,9	6,4	16,5	6,9	15,5	11,0	27,5	12,3	25,9	24,7	13,2	28,8	14,5	27,7	16,3	35,3	17,4	33,5				
	10	5,2	20,3	5,4	19,9	5,9	19,0	9,4	29,3	10,6	28,0	27,0	12,0	31,6	13,2	30,6	14,2	36,3	15,1	35,6				
	15	4,3	23,5	4,5	23,1	4,9	22,5	7,9	31,2	8,9	30,1	29,1	10,2	33,4	11,2	32,5	12,0	37,3	12,8	36,7				
	18	3,8	25,5	4,0	25,2	4,3	24,6	7,0	32,3	7,9	31,4	30,5	8,6	33,7	9,9	33,5	10,7	37,8	11,3	37,2				
	0	8,7	17,2	9,1	16,4	9,9	15,1	15,5	31,8	17,6	29,9	28,1	20,0	36,0	21,9	34,2	23,5	43,8	25,1	42,6				
	5	7,9	20,6	8,3	19,9	9,0	18,7	14,3	34,3	16,2	32,5	30,8	17,3	36,1	19,0	34,7	21,4	44,7	22,8	43,7				
	10	7,0	24,1	7,4	23,3	8,1	22,2	12,9	36,4	14,4	34,4	33,2	16,3	39,3	18,0	38,1	19,2	45,7	20,5	44,7				
	15	6,2	27,3	6,4	26,5	7,0	25,7	11,3	38,2	12,5	36,4	35,1	14,5	41,4	15,9	40,0	17,1	46,7	18,1	45,8				
	18	5,6	29,1	5,9	28,6	6,4	27,8	10,4	39,3	11,6	37,7	36,6	13,4	42,1	14,6	40,8	15,8	47,2	16,7	46,4				
	0	10,4	20,6	11,0	19,8	11,9	18,1	18,5	37,9	21,2	36,0	33,8	23,8	42,9	26,1	40,8	28,1	52,2	29,9	50,8				
	5	9,7	24,2	10,1	23,2	11,1	21,9	17,2	40,2	19,7	38,4	36,3	21,0	42,8	23,0	41,0	25,9	53,1	27,6	51,9				
	10	8,8	27,4	9,2	26,6	10,1	25,4	15,8	42,4	18,0	40,6	38,8	20,2	46,4	22,0	44,4	23,7	54,1	25,3	52,9				
	15	7,8	30,4	8,3	29,9	9,0	28,7	14,3	44,3	16,0	42,2	40,7	18,2	47,8	20,0	46,3	21,6	55,0	23,0	54,0				
	18	7,4	32,7	7,7	31,9	8,4	30,8	13,4	45,5	15,1	43,6	42,1	17,0	48,6	18,8	47,4	20,3	55,6	21,6	54,6				
	0	12,1	24,0	12,8	23,0	14,0	21,3	21,6	44,3	24,4	41,4	39,3	27,6	49,7	30,3	47,4	32,5	60,4	34,7	58,9				
	5	11,4	27,6	12,0	26,6	13,1	25,0	20,3	46,6	23,0	44,0	42,0	24,5	49,1	27,0	47,2	30,4	61,4	32,4	60,0				
	10	10,5	30,8	11,1	30,0	12,1	28,4	18,9	48,7	21,4	46,3	44,2	24,0	53,2	26,2	51,0	28,2	62,3	30,0	61,0				
	15	9,6	34,0	10,0	33,0	11,0	31,8	17,1	50,0	19,5	48,1	46,2	22,0	54,6	24,2	52,8	26,0	63,3	27,7	62,0				
	18	9,1	36,0	9,5	35,1	10,4	33,8	16,3	51,4	18,5	49,4	47,6	20,9	55,6	22,9	53,8	24,7	63,9	26,3	62,7				
	0	13,7	27,1	14,5	26,1	15,8	24,1	24,2	49,6	27,4	46,5	43,9	30,8	55,5	33,9	53,0	36,1	67,1	38,7	65,8				
	5	13,1	30,9	13,7	29,7	15,0	27,9	22,9	51,9	25,8	48,8	46,3	27,8	55,1	30,5	52,7	34,0	68,1	34,6	66,8				
	10	12,1	34,0	12,7	32,9	14,0	31,3	21,5	54,1	24,2	51,1	49,0	27,2	59,0	30,0	56,9	31,9	69,3	34,1	67,9				
	15	11,2	37,2	11,7	36,1	12,8	34,5	19,6	55,2	22,3	52,9	50,9	25,2	60,4	27,8	58,5	29,8	70,2	31,8	68,9				
	18	10,6	39,0	11,2	38,2	12,2	36,6	18,9	56,7	21,3	54,2	52,3	24,1	61,4	26,5	59,4	28,5	70,8	30,4	69,5				

Tab. 15.4.2. Thermal parameters of the units MONZUN-TE with the three-phase fan, size 1

Heating coil		Single-row			Double-row			Three-row			Four-row						
		1.1.180	1.1.220	1.2.150	1.2.200	1.2.250	1.3.180	1.3.220	1.4.150	1.4.180							
Type of unit	$V_v[m^3h^{-1}]$	1850	2200	1500	1900	2400	1700	2100	1500	1800							
t_{w1}/t_{w2} [°C/°C]	t_{v1} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]	Q_T [kW]	t_{v2} [°C]						
55/40	0	7,5	12,4	8,3	11,2	12,5	24,8	14,6	22,8	16,8	20,8	18,5	26,2	17,6	35,0	20,1	33,2
	5	6,6	15,9	7,4	15,0	11,2	27,2	13,0	25,3	14,9	23,4	15,6	27,1	15,6	35,9	17,7	34,3
	10	5,7	19,4	6,3	18,5	9,7	29,2	11,2	27,5	12,9	26,0	14,1	29,9	13,5	36,8	15,4	35,4
	15	4,7	22,8	5,2	22,0	8,0	30,8	9,3	29,5	10,7	28,2	11,9	31,8	11,5	37,7	13,0	36,5
	18	4,2	24,9	4,6	24,2	7,2	32,3	8,3	31,0	9,5	29,8	10,6	33,0	10,1	38,0	11,6	37,1
70/50	0	9,5	15,7	10,5	14,2	15,9	31,5	18,6	29,1	21,4	26,5	20,4	33,2	22,5	44,6	25,6	42,3
	5	8,7	19,4	9,6	18,0	14,6	33,9	17,0	31,6	19,5	29,1	17,6	35,8	20,4	45,5	23,2	43,3
	10	7,7	22,7	8,6	21,6	13,1	35,9	15,2	33,8	17,5	31,7	16,5	38,3	19,2	46,4	20,9	44,4
	15	6,7	26,1	7,4	25,0	11,5	37,8	13,3	35,8	15,2	33,8	14,9	41,0	17,0	47,3	18,5	45,5
	18	6,2	28,2	6,8	27,2	10,6	39,0	12,2	37,1	14,0	35,3	13,7	41,9	15,6	47,8	17,1	46,2
80/60	0	11,5	19,0	12,7	17,2	18,9	37,4	22,3	34,9	25,6	31,7	24,3	42,5	27,8	53,1	30,5	50,4
	5	10,6	22,5	11,8	20,9	17,6	39,9	20,6	37,2	23,9	34,6	21,4	42,4	24,6	54,0	28,2	51,5
	10	9,7	26,0	10,7	24,4	16,2	42,1	18,9	39,6	21,8	37,0	20,6	46,0	23,6	54,9	25,8	52,5
	15	8,7	29,4	9,6	28,0	14,6	43,9	16,9	41,4	19,5	39,1	18,5	47,3	21,5	55,8	23,4	53,6
	18	8,1	31,4	8,9	30,0	13,7	45,1	15,8	42,7	18,2	40,5	17,4	48,4	20,1	56,3	22,0	54,3
90/70	0	13,4	22,1	14,8	20,0	22,0	43,6	25,9	40,5	29,9	37,0	28,1	49,1	32,3	61,5	35,4	58,5
	5	12,6	25,8	13,9	23,8	20,7	46,0	24,4	43,2	28,2	39,9	25,0	48,7	28,7	62,4	33,0	59,5
	10	11,6	29,1	12,9	27,4	19,2	48,0	22,5	45,2	26,0	42,2	24,5	52,8	28,0	63,3	30,6	60,6
	15	10,5	32,3	11,7	30,8	17,5	49,7	20,6	47,2	23,7	44,3	22,4	54,1	25,8	64,2	28,3	61,6
	18	9,9	34,3	11,1	33,0	16,6	50,9	19,5	48,5	22,4	45,7	21,3	55,2	24,4	64,7	26,8	62,3
95/80	0	15,1	24,9	16,8	22,7	24,7	48,9	28,8	45,0	33,6	41,6	31,5	55,0	36,3	68,3	39,5	65,3
	5	14,4	28,8	16,0	26,6	23,4	51,3	27,3	47,7	31,8	44,4	28,2	54,3	32,5	69,2	37,2	66,3
	10	13,4	32,1	14,9	30,1	22,0	53,6	25,6	50,0	29,8	46,9	27,6	58,2	32,0	70,1	34,8	67,4
	15	12,3	35,3	13,6	33,4	20,2	55,0	23,6	51,9	27,4	48,9	25,8	60,1	29,6	71,0	32,4	68,5
	18	11,7	37,3	13,0	35,6	19,3	56,2	22,4	53,0	26,2	50,4	24,6	61,0	28,3	71,8	31,0	69,1

Tab. 15.4.3. Thermal parameters of the units MONZUN-TE with the single-phase fan, size 2

Heating coil	Single-row						Double-row						Three-row						Four-row						
	2.1.200		2.1.250		2.1.400		2.2.250		2.2.320		2.2.420		2.3.220		2.3.280		2.3.400		2.4.200		2.4.250		2.4.350		
	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	
Type of unit	2100	2600	3500	2300	3100	3900	2250	2800	3700	2150	2650	3200	2250	2800	3700	2150	2650	3200	2250	2800	3700	2150	2650	3200	
\dot{V}_v [m ³ h ⁻¹]	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18
t _{w1} /t _{w2} [°C/°C]	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18	0	5	10	15	18
55/40	9,2	10,4	11,9	12,0	10,2	17,9	23,1	21,6	20,7	18,8	22,7	30,0	26,2	27,8	31,7	25,5	26,0	36,0	30,2	33,8	34,4	31,9	33,2	34,5	35,7
70/50	8,2	9,1	10,6	10,6	14,0	15,7	25,3	18,8	23,0	21,3	20,1	31,5	23,1	29,5	28,0	27,5	23,1	36,9	26,7	34,9	30,4	33,2	34,5	35,7	36,5
80/60	7,1	7,9	9,1	9,1	17,7	13,5	27,4	16,2	25,5	24,0	17,4	33,0	20,4	31,6	24,1	29,4	20,1	37,7	23,2	36,0	26,4	34,5	35,7	36,5	37,3
90/70	5,9	6,6	7,6	7,6	21,5	11,3	29,6	13,5	27,9	26,7	14,9	34,7	17,2	33,3	20,5	31,5	17,1	38,6	19,7	37,1	22,3	35,7	36,5	37,3	38,1
95/80	5,1	5,7	6,5	6,5	23,5	9,2	30,1	11,9	29,4	28,2	13,4	35,7	15,4	34,3	18,2	32,6	15,3	39,1	17,6	37,8	19,9	36,5	37,3	38,1	38,9
	11,8	13,2	15,1	15,3	13,0	22,9	29,6	27,5	26,4	24,0	28,9	38,2	33,4	35,4	40,3	32,4	33,1	45,8	38,4	43,1	43,7	40,6	41,8	43,1	44,4
	10,7	12,0	13,9	13,9	16,8	20,6	31,6	24,8	28,8	26,6	26,4	39,9	30,5	37,4	36,6	34,4	30,1	46,6	34,9	44,1	39,7	41,8	43,1	44,4	45,7
	9,6	10,7	12,3	12,3	20,4	18,4	33,8	22,0	31,1	29,0	23,6	41,2	27,5	39,2	33,0	36,5	27,1	47,5	31,4	45,2	35,7	43,1	44,4	45,7	47,0
	8,4	9,4	10,8	10,8	24,2	16,2	35,9	19,3	33,5	31,8	21,0	42,7	24,5	41,0	29,0	38,3	24,1	48,4	27,9	46,3	31,7	44,4	45,7	47,0	48,3
	7,7	8,6	10,0	10,0	26,5	14,8	37,1	17,7	35,0	33,4	19,3	43,5	22,5	41,9	26,8	39,5	22,3	48,9	25,8	46,9	29,2	45,1	46,4	47,7	49,0
	14,2	15,9	18,2	18,5	15,7	27,5	35,5	33,1	31,7	28,9	34,3	45,3	39,8	42,2	47,9	38,5	39,3	54,3	45,6	51,1	52,0	48,2	49,5	50,8	52,1
	13,1	14,7	17,0	17,0	19,4	25,3	37,7	30,4	34,1	31,5	31,8	47,0	36,5	43,7	44,0	40,8	36,3	55,1	42,1	52,2	47,9	49,5	50,8	52,1	53,4
	12,0	13,4	15,5	15,5	23,2	23,0	39,7	27,7	36,5	34,4	29,0	48,3	33,6	45,7	40,5	42,5	33,3	56,0	38,6	53,3	43,9	50,8	52,1	53,4	54,7
	10,8	12,1	14,0	14,0	26,9	20,8	41,9	25,0	39,0	36,7	26,4	49,9	31,2	47,0	36,8	44,5	30,3	56,9	35,1	54,3	39,9	52,1	53,4	54,7	56,0
	10,1	11,3	13,1	13,1	29,1	19,5	43,2	23,4	40,4	38,3	24,8	50,7	28,7	48,5	34,5	45,7	28,5	57,4	33,0	55,0	37,5	52,8	54,1	55,4	56,7
	16,6	18,7	21,4	21,7	18,4	31,9	41,2	38,8	37,2	33,9	39,7	52,4	46,0	48,8	55,0	44,2	45,3	62,6	52,7	59,1	60,1	55,8	57,1	58,4	59,7
	15,5	17,4	20,2	20,2	22,1	29,5	43,1	36,0	39,5	36,5	37,0	53,9	43,0	50,6	51,3	46,2	42,3	63,5	49,2	60,2	56,1	57,1	58,4	59,7	61,0
	14,3	16,0	18,7	18,7	25,9	27,5	45,5	33,4	42,0	38,9	34,4	55,4	40,0	52,4	48,0	48,8	39,3	64,4	45,7	61,2	52,1	58,3	59,6	60,9	62,2
	13,1	14,8	17,2	17,2	29,6	25,5	47,9	30,4	44,1	41,7	31,8	57,0	36,5	53,7	44,3	50,6	36,4	65,2	42,2	62,3	48,1	59,6	60,9	62,2	63,5
	12,5	13,9	16,2	16,2	31,8	24,0	49,0	29,0	45,8	43,1	30,2	57,9	34,8	54,9	42,0	51,7	34,6	65,8	40,1	63,0	45,7	60,4	61,7	63,0	64,3
	18,8	21,1	24,1	24,6	20,9	36,0	46,5	44,0	42,2	38,5	44,1	58,2	51,3	54,4	61,4	49,3	50,1	69,2	58,3	65,4	67,0	62,2	63,5	64,8	66,1
	17,7	19,9	22,7	23,2	24,7	33,7	48,5	41,0	44,3	41,2	41,7	60,1	48,4	56,4	58,0	51,6	47,1	70,1	55,1	66,7	62,9	63,4	64,7	66,0	67,3
	16,5	18,5	21,1	21,5	28,3	31,5	50,7	38,2	46,6	43,5	38,7	61,1	45,0	57,7	54,0	53,4	44,1	71,0	51,6	67,8	58,9	64,7	66,0	67,3	68,6
	15,4	17,2	20,0	20,0	32,0	29,2	52,7	35,5	49,0	46,2	36,2	62,8	42,0	59,6	50,4	55,5	41,1	71,9	48,0	68,9	54,9	66,0	67,3	68,6	70,0
	14,6	16,4	19,1	19,1	34,2	27,8	53,9	34,2	50,8	47,7	34,5	63,6	40,2	60,7	48,0	56,5	39,4	72,4	46,0	69,6	52,5	66,7	68,0	69,3	70,6

Tab. 15.4.4. Thermal parameters of the units MONZUN-TE with the three-phase fan, size 2

Heating coil	Single-row						Double-row						Three-row						Four-row					
	2.1.200		2.1.250		2.1.400		2.2.250		2.2.320		2.2.420		2.3.220		2.3.280		2.3.400		2.4.200		2.4.250		2.4.350	
	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]	Q _T [kW]	t _{v2} [°C]
Type of unit	1900		2350		4000		2400		2900		4000		2200		2600		3750		2050		2400		3300	
\dot{V}_v [m ³ h ⁻¹]	1900		2350		4000		2400		2900		4000		2200		2600		3750		2050		2400		3300	
t _{w1} /t _{w2} [°C/°C]	1900		2350		4000		2400		2900		4000		2200		2600		3750		2050		2400		3300	
0	8,8	13,8	9,8	12,4	12,8	9,5	18,4	22,8	20,7	21,2	18,6	22,4	30,2	25,1	28,7	32,0	25,4	25,2	36,5	28,2	34,9	35,1	31,6	
5	7,7	17,0	8,7	16,0	11,3	13,4	16,1	24,9	18,0	23,4	21,2	19,8	31,7	22,1	30,3	28,2	27,4	22,3	37,3	24,9	35,8	31,0	32,9	
10	6,7	20,5	7,5	19,5	9,6	17,1	13,9	27,2	15,5	25,9	18,7	17,2	33,2	19,2	31,9	24,4	29,3	19,4	38,1	21,7	36,8	26,9	34,2	
15	5,6	23,8	6,3	23,0	8,1	21,0	11,6	29,4	13,0	28,3	15,5	14,7	34,9	16,5	33,9	20,6	31,3	16,5	38,9	18,4	37,8	22,8	35,5	
18	4,8	25,5	5,4	24,8	6,9	23,1	9,7	30,0	11,5	29,8	13,6	13,2	35,8	14,7	34,8	18,4	32,6	14,8	39,4	16,5	38,4	20,6	36,5	
0	11,2	17,5	12,5	15,8	16,3	12,1	23,5	29,1	26,4	27,0	31,9	28,5	38,5	31,9	36,5	40,5	32,1	32,1	46,4	35,8	44,4	44,6	40,2	
5	10,1	20,8	11,4	19,4	14,8	16,0	21,2	31,2	23,8	29,4	28,6	26,0	40,1	29,0	38,1	37,0	34,3	29,1	47,2	32,6	45,3	40,5	41,5	
10	9,1	24,2	10,2	22,9	13,2	19,8	18,9	33,4	21,2	31,7	25,6	23,3	41,5	26,0	39,7	33,3	36,4	26,2	48,0	29,3	46,3	36,4	42,8	
15	8,0	27,5	9,0	26,4	11,5	23,5	16,6	35,5	18,7	34,2	22,3	20,6	42,8	23,3	41,6	29,4	38,3	23,3	48,8	26,1	47,3	32,2	44,0	
18	7,3	29,4	8,2	28,4	10,6	25,9	15,2	36,8	17,0	35,4	20,5	19,1	43,8	21,5	42,6	27,0	39,4	21,6	49,3	24,1	47,8	29,8	44,8	
0	13,4	21,0	15,1	19,1	19,8	14,7	28,3	35,0	31,9	32,7	38,5	33,8	45,6	37,9	43,3	48,4	38,3	37,9	55,0	42,5	52,6	53,1	47,8	
5	12,4	24,4	13,9	22,6	18,2	18,5	25,9	37,1	29,2	34,9	35,3	31,3	47,3	35,0	45,0	44,8	40,5	35,0	55,8	39,3	53,6	48,9	49,1	
10	11,3	27,7	12,7	26,1	16,6	22,3	23,6	39,2	26,7	37,4	32,2	28,6	48,6	32,1	46,7	41,0	42,5	32,2	56,6	36,0	54,6	44,8	50,4	
15	10,2	30,9	11,4	29,4	15,0	26,1	21,3	41,4	24,0	39,6	28,8	26,0	50,1	29,0	48,1	37,0	44,3	29,3	57,4	32,8	55,5	40,7	51,7	
18	9,6	33,0	10,7	31,5	13,9	28,3	19,9	42,6	22,5	42,1	27,0	24,4	51,0	27,4	49,3	34,8	45,6	27,6	57,9	30,8	56,1	38,3	52,5	
0	15,8	24,7	17,7	22,4	23,1	17,2	32,7	40,5	37,3	38,2	45,2	39,1	52,8	43,8	50,0	55,5	44,0	43,6	63,1	49,1	60,8	61,4	55,3	
5	14,6	37,8	16,5	25,9	21,6	21,0	30,3	42,5	34,5	40,3	42,0	36,4	54,2	41,0	51,8	52,0	46,2	40,9	64,3	45,9	61,8	57,3	56,6	
10	13,5	31,1	15,2	29,2	19,9	24,8	28,4	45,2	32,0	42,8	38,5	33,8	55,6	38,0	53,4	48,7	48,6	38,0	65,1	42,6	62,7	53,2	57,9	
15	12,4	34,4	13,9	32,6	18,5	28,7	26,0	47,2	29,3	45,0	35,5	31,3	57,3	35,0	55,0	44,8	50,5	35,1	65,9	39,4	63,7	49,1	59,2	
18	11,8	36,5	13,2	34,7	17,3	30,8	24,2	48,6	27,8	46,5	33,6	29,8	58,2	33,2	55,9	42,5	51,7	33,4	66,4	37,4	64,3	46,6	60,0	
0	17,8	27,8	20,1	25,4	26,4	19,6	37,0	45,8	41,7	42,7	51,4	43,4	58,6	48,7	55,6	61,9	49,0	48,4	70,1	54,3	67,2	68,4	61,6	
5	16,7	31,1	18,8	28,8	24,8	23,4	34,8	48,1	39,0	45,0	48,1	41,0	60,4	46,0	57,6	58,5	51,3	45,5	70,9	51,1	68,2	64,3	62,9	
10	15,6	34,4	17,5	32,1	23,0	27,1	32,2	49,9	36,8	47,7	44,8	38,2	61,6	43,0	59,1	54,7	53,3	42,6	71,7	47,8	69,2	60,2	64,2	
15	14,5	37,7	16,3	35,6	21,6	31,0	30,0	52,1	34,2	50,0	41,8	35,6	63,1	40,0	60,7	51,0	55,4	39,7	72,6	44,6	70,1	56,1	65,5	
18	13,8	39,6	15,5	37,6	20,5	33,2	28,7	53,5	32,7	51,5	39,7	34,0	63,9	38,4	61,9	48,5	56,4	38,0	73,1	42,8	71,0	53,6	66,3	

Tab. 15.4.5. Thermal parameters of the units MONZUN-TE with the single-phase fan, size 3

Heating coil Type of unit	Single-row			Double-row			Three-row			Four-row		
	3.1.450	3.1.600	3.1.800	3.2.420	3.2.500	3.2.700	3.3.400	3.3.500	3.3.600	3.4.350	3.4.450	3.4.520
	3900	5100	6000	3600	4800	5600	3550	4600	5400	3500	4500	5100
\dot{V}_v [m ³ h ⁻¹]												
t_{w1}/t_{w2} [°C/°C]	t_{w1} [°C]	t_{w2} [°C]	t_{w2} [°C]	t_{w1} [°C]	t_{w2} [°C]	t_{w2} [°C]	t_{w1} [°C]	t_{w2} [°C]	t_{w2} [°C]	t_{w1} [°C]	t_{w2} [°C]	t_{w2} [°C]
	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]	Q_T [kW]
55/40	0	5	10	15	18		0	5	10	15	18	
	18,5	14,1	12,4	21,3	18,8	16,0	20,4	15,1	28,5	26,4	24,3	39,2
	16,4	17,5	16,0	20,4	18,8	17,7	18,8	22,4	21,4	32,7	30,8	25,5
	14,2	20,8	19,5	17,7	25,0	27,6	33,2	27,6	33,2	28,8	30,3	30,3
	12,0	24,1	23,0	14,9	22,4	24,6	33,8	31,3	25,0	31,3	32,2	23,0
	10,7	26,2	25,2	13,3	24,6	28,9	33,8	31,3	25,0	31,3	32,2	23,0
	23,5	17,9	15,7	29,4	14,6	40,9	33,8	49,8	54,5	28,9	30,8	49,8
	23,5	17,9	15,7	29,4	14,6	40,9	33,8	49,8	54,5	28,9	30,8	49,8
70/50	0	5	10	15	18		0	5	10	15	18	
	19,1	24,5	22,0	22,8	23,8	21,8	33,6	37,7	41,0	35,4	38,8	42,5
	16,9	27,9	19,4	26,3	21,0	25,4	30,0	39,8	36,3	37,5	34,5	43,9
	15,6	29,9	17,9	28,4	19,4	27,6	28,0	41,1	33,3	38,6	37,5	30,6
	28,0	21,3	32,2	18,8	35,0	17,3	48,5	40,0	59,0	36,5	34,5	56,0
	25,8	24,7	29,7	22,3	32,3	21,0	45,0	42,1	54,5	38,7	36,8	37,5
80/60	0	5	10	15	18		0	5	10	15	18	
	23,6	28,0	27,0	27,0	29,5	24,6	41,0	43,8	50,0	40,9	43,2	50,1
	21,3	31,2	24,6	29,3	26,8	28,3	37,5	45,9	45,5	43,2	41,6	50,1
	20,0	33,2	23,0	31,4	25,0	30,4	35,2	47,0	42,6	44,4	42,8	46,8
	32,3	24,6	37,4	21,8	40,5	20,1	56,0	46,2	67,5	41,8	39,8	75,0
	30,3	28,1	34,8	25,3	37,7	23,7	52,5	48,3	63,0	44,0	42,1	70,0
90/70	0	5	10	15	18		0	5	10	15	18	
	28,0	31,3	32,3	28,8	35,0	27,3	48,6	50,1	59,0	46,5	44,5	65,0
	25,8	34,7	29,7	32,3	32,2	30,9	45,0	52,1	54,5	48,7	46,8	60,0
	24,4	36,6	28,2	34,4	30,5	33,1	42,5	53,1	51,6	49,9	48,2	57,0
	36,3	27,7	41,8	24,4	45,3	22,4	62,0	51,2	75,0	46,4	43,8	82,5
	34,0	30,9	39,2	27,8	42,8	26,2	58,5	53,3	70,5	48,6	46,4	78,0
95/80	0	5	10	15	18		0	5	10	15	18	
	31,6	34,1	36,6	31,3	40,0	29,8	54,5	55,0	66,0	50,9	48,7	73,0
	29,5	37,5	34,0	34,8	37,0	33,3	51,0	57,1	61,5	53,1	51,1	68,0
	28,2	39,5	32,6	37,0	35,4	35,5	48,8	58,3	59,0	54,5	52,7	65,4

Tab. 15.4.6. Thermal parameters of the units MONZUN-TE with the three-phase fan, size 3

Heating coil	Single-row			Double-row			Three-row			Four-row		
	3.1.450	3.1.600	3.1.800	3.2.420	3.2.500	3.2.700	3.3.400	3.3.500	3.3.600	3.4.350	3.4.450	3.4.520
Type of unit	4800	5000	7500	4300	5000	6600	4100	4900	6200	4050	4600	5900
\dot{V}_v [m ³ h ⁻¹]												
t_{w1}/t_{w2} [°C/°C]												
0	20,6	21,1	25,7	36,3	40,4	47,5	41,0	46,0	54,0	49,6	53,8	63,8
5	18,2	18,6	22,8	32,5	35,7	42,0	36,5	40,8	48,0	44,0	47,7	56,5
10	15,8	16,2	19,6	28,2	31,0	36,6	31,8	35,6	41,8	38,4	41,6	49,3
15	13,3	13,6	16,6	23,9	26,2	31,0	27,0	30,5	35,4	32,8	35,6	41,9
18	11,9	12,1	14,7	21,5	23,5	27,5	23,2	26,3	30,3	29,5	31,9	37,6
0	26,1	26,7	32,7	45,9	51,0	60,5	52,4	58,5	69,0	63,0	68,3	81,1
5	23,8	24,3	29,7	42,4	46,5	55,0	47,5	53,5	62,5	57,4	62,2	73,8
10	21,3	21,9	26,6	38,2	42,0	49,5	43,0	48,0	56,1	51,8	56,1	66,5
15	18,8	19,3	23,4	33,8	37,0	43,5	38,0	43,0	50,0	46,2	50,4	59,2
18	17,4	17,8	21,6	31,3	34,3	40,4	33,8	38,0	44,4	42,8	46,4	54,6
0	31,3	31,9	39,0	54,5	60,5	72,0	61,5	69,5	81,0	74,3	80,7	95,9
5	28,8	29,3	36,0	50,3	56,0	66,0	57,0	64,5	74,5	68,8	74,6	88,6
10	26,2	26,8	32,8	46,4	51,3	60,5	52,5	58,8	68,5	63,2	68,5	81,3
15	23,8	24,4	29,7	42,5	46,6	55,0	47,7	49,6	62,5	57,6	62,5	74,0
18	22,4	22,8	27,8	39,8	43,8	51,5	42,8	48,0	56,4	54,3	58,8	69,6
0	36,2	37,0	45,3	63,0	69,5	83,0	74,0	80,0	93,0	85,2	93,0	110,6
5	33,7	34,5	42,5	58,5	65,0	77,0	66,6	75,0	87,0	80,0	86,9	103,3
10	31,2	32,0	39,0	54,5	60,5	72,0	61,5	69,5	81,0	74,4	80,8	96,0
15	28,8	29,5	36,0	50,5	56,0	66,0	57,0	64,5	74,5	68,8	74,7	88,7
18	27,2	27,8	34,0	48,0	53,0	62,5	51,8	58,0	68,0	65,5	71,1	84,3
0	40,5	41,4	51,0	70,0	77,0	92,0	78,5	89,0	104,0	94,2	102,4	122,5
5	38,0	38,8	47,5	66,0	72,0	87,0	74,0	83,5	97,0	88,6	96,3	115,2
10	35,6	36,4	44,3	61,5	68,0	81,0	69,0	78,0	91,0	83,0	90,2	107,9
15	33,0	33,8	41,5	57,5	63,0	75,5	64,5	73,0	84,6	77,5	84,5	100,6
18	31,5	32,2	39,8	54,8	60,5	72,0	61,5	68,0	78,0	74,1	80,9	96,3

16. Calculation and selection of MONZUN - TE

16.1. Quantity of water flow

$$\dot{V}_w = \frac{\dot{Q}_T}{4,186 \cdot (t_{w1} - t_{w2})}$$

16.2. Pressure loss on the water side

Chart 16.2.1. TI. Pressure loss on the water side - size 1

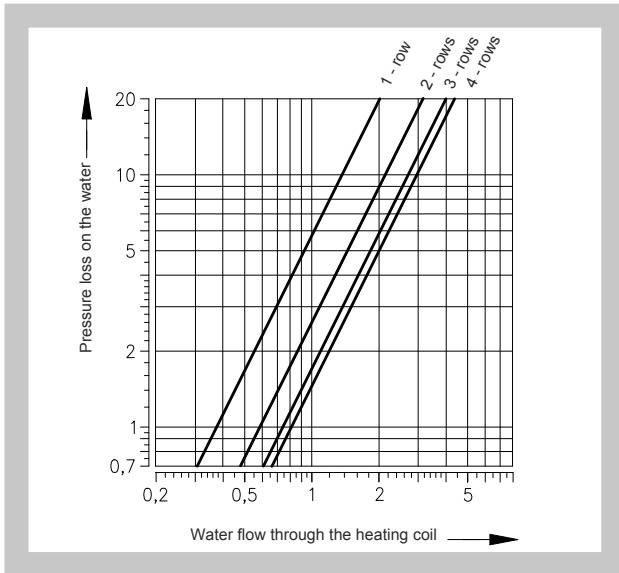


Chart 16.2.2. TI. Pressure loss on the water side - size 2

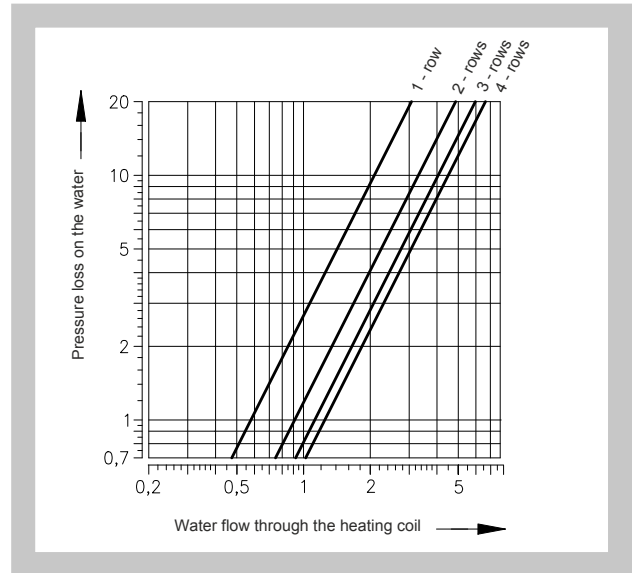
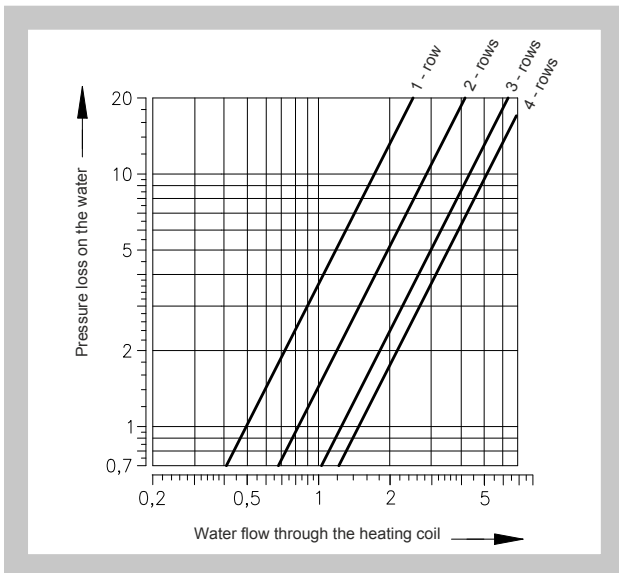


Chart 16.2.3. TI. Pressure loss on the water side - size 3



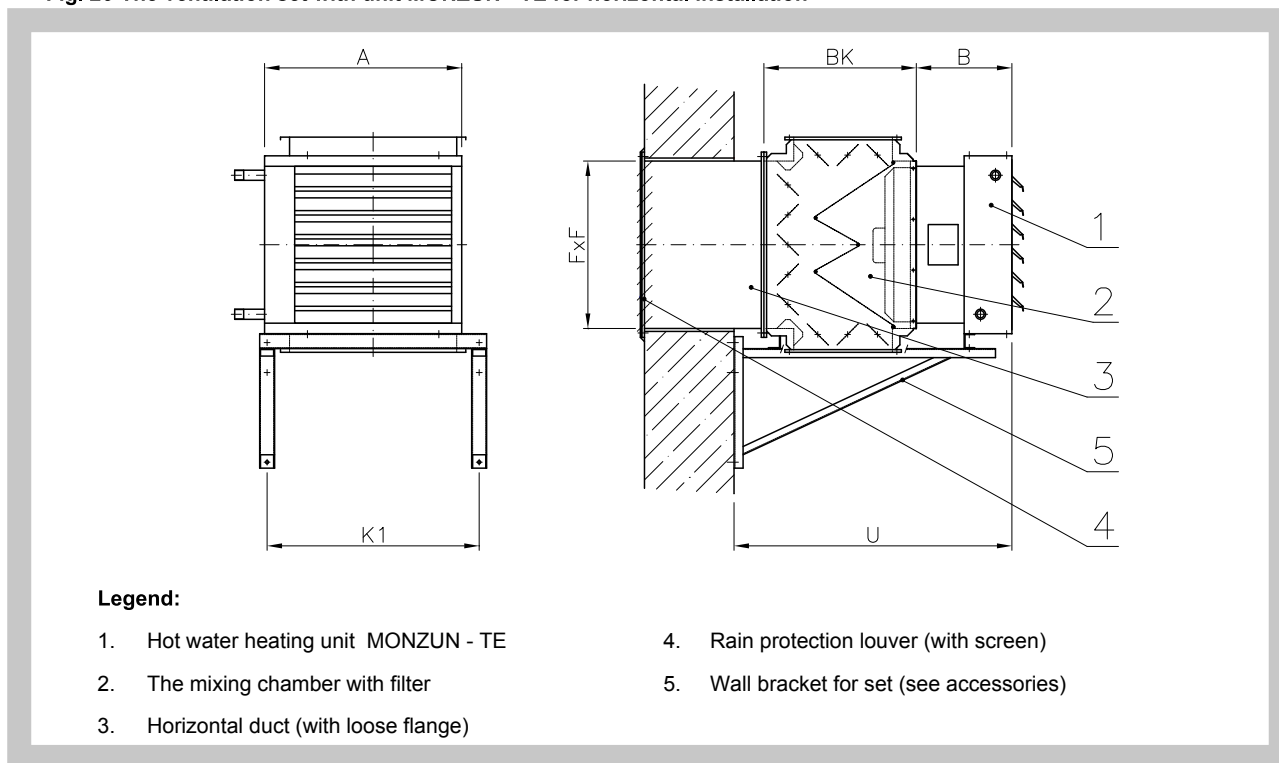
- \dot{V}_v [m³.h⁻¹] volumetric airflow through the unit
- \dot{V}_w [kg.s⁻¹] water flow
- \dot{Q}_T [kW] heating power
- Δp_{zw} [Pa] pressure loss on the water side
- t_{v2} [°C] outlet air temperature
- t_{v1} [°C] inlet air temperature
- t_{w2} [°C] outlet water temperature
- t_{w1} [°C] inlet water temperature

X. VENTILATION SETS WITH HEATERS

17. Ventilation sets with unit MONZUN - TE

17.1. The ventilation set with MONZUN - TE for horizontal installation.
The set is designed for heating and ventilation with heated air. It is installed on the wall.

Fig. 26 The ventilation set with unit MONZUN - TE for horizontal installation

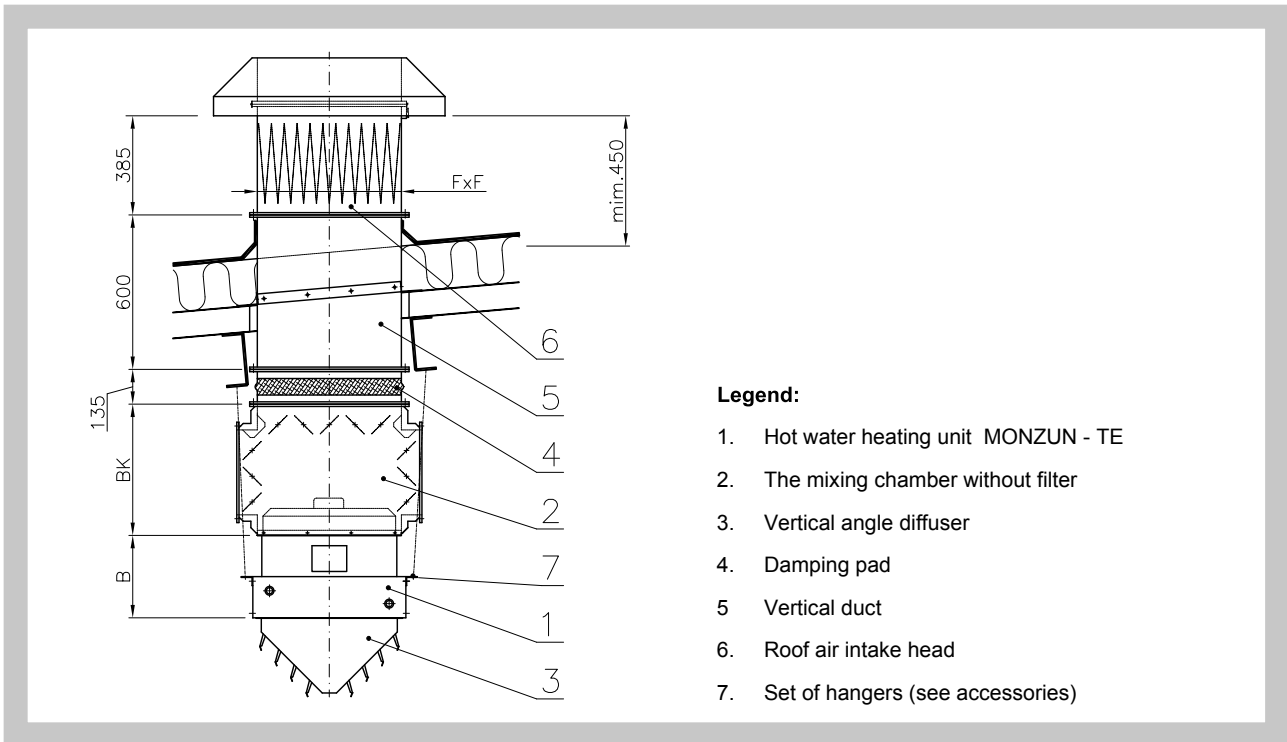


Tab. 17.1.1. Air flow for horizontal sets MONZUN - TE

MONZUN TE	Air flow [m³.h⁻¹] for fan of the unit		MONZUN TE	Air flow [m³.h⁻¹] for fan of the unit		MONZUN TE	Air flow [m³.h⁻¹] for fan of the unit	
	Single-phase	Three-phase		Single-phase	Three-phase		Single-phase	Three-phase
1.1.150	500	x	2.1.200	800	700	3.1.450	1900	2400
1.1.180	800	900	2.1.250	900	800	3.1.600	2500	2500
1.1.220	1000	1200	2.1.400	1300	1500	3.1.800	3000	3600
1.2.150	750	850	2.2.250	1100	1200	3.2.420	1700	2200
1.2.200	950	1000	2.2.320	1600	1600	3.2.500	2400	2500
1.2.250	1000	1200	2.2.420	2100	2000	3.2.700	2800	3500
1.3.180	850	900	2.3.220	1300	1250	3.3.400	1600	2200
1.3.220	950	1100	2.3.280	1600	1500	3.3.500	2350	2400
x	x	x	2.3.400	2100	2200	3.3.600	2700	3500
1.4.150	900	900	2.4.200	1200	1200	3.4.350	1600	2150
1.4.180	1050	1100	2.4.250	1600	1400	3.4.450	2300	2400
x	x	x	2.4.350	1900	2100	3.4.520	2650	3500

17.2. The ventilation set with MONZUN - TE heater for vertical installation
 The set is designed for heating and ventilation with heated air. It is installed below the ceiling.

Fig. 27 The ventilation set with unit MONZUN - TE for vertical installation



Tab. 17.2.1. Air flow for vertical sets MONZUN - TE

MONZUN TE	Air flow [m ³ .h ⁻¹] for fan of the unit		MONZUN TE	Air flow [m ³ .h ⁻¹] for fan of the unit		MONZUN TE	Air flow [m ³ .h ⁻¹] for fan of the unit	
	Single-phase	Three-phase		Single-phase	Three-phase		Single-phase	Three-phase
1.1.150	600	x	2.1.200	900	900	3.1.450	2000	2400
1.1.180	900	1000	2.1.250	1000	1100	3.1.600	2600	2600
1.1.220	1100	1400	2.1.400	1300	1800	3.1.800	3100	3700
1.2.150	600	900	2.2.250	1200	1300	3.2.420	1900	2300
1.2.200	1000	1000	2.2.320	1700	1700	3.2.500	2450	2550
1.2.250	1200	1300	2.2.420	2200	2200	3.2.700	2900	3600
1.3.180	1000	950	2.3.220	1150	1250	3.3.400	1750	2250
1.3.220	1300	1200	2.3.280	1700	1650	3.3.500	2400	2500
x	x	x	2.3.400	2200	2100	3.3.600	2800	3550
1.4.150	950	1000	2.4.200	1200	1200	3.4.350	1700	2200
1.4.180	1100	1200	2.4.250	1700	1500	3.4.450	2350	2400
x	x	x	2.4.350	2000	2050	3.4.520	2700	3500

17.3. The ventilation set with unit MONZUN - TE, the dimensions for installation

Tab. 17.3.1. The set with unit MONZUN - TE, the dimensions for installation

Size	Dimension					
	A	B	BK	K1	U	F
1	595	315	480	650	827	500
2	720	325	510	710	837	560
3	900	334	565	850	846	710

17.4. Heating power for set

$$Q_{TS} = 1,1 \cdot Q_T \cdot \frac{\dot{V}_{VS}}{\dot{V}_V}$$

\dot{V}_V	[m³.h ⁻¹]	Air flow through the unit
\dot{V}_{VS}	[m³.h ⁻¹]	Air flow through the set
Q_T	[kW]	Heating power for unit
Q_{TS}	[kW]	Heating power for set

18. Components for ventilation set with MONZUN - TE

18.1. Mixing chamber KS

It is intended to mix the outdoor air and circulation air. The mixing chamber is made of galvanized steel with louver dampers at both the fresh and the circulating air intake.

The dampers are coupled to set the fresh air/circulating air rate from 0 to 100%. The fresh air damper is tight, the circulating air damper is not tight.

The dampers can be adjusted manually (version .01) or with electric actuator (version .57). The mixing chamber can be supplied with or without integrated filter.

18.1.1. Dimensions and Weight

Tab. 18.1.1. Dimensions and weights

Size	Dimension				Weight (kg)
	F	BK	CK	G	
1	500	480	655	300	24
2	560	510	755	330	28
3	710	585	930	405	40

Fig. 28 Mixing chamber - version without filter fabric with manual control

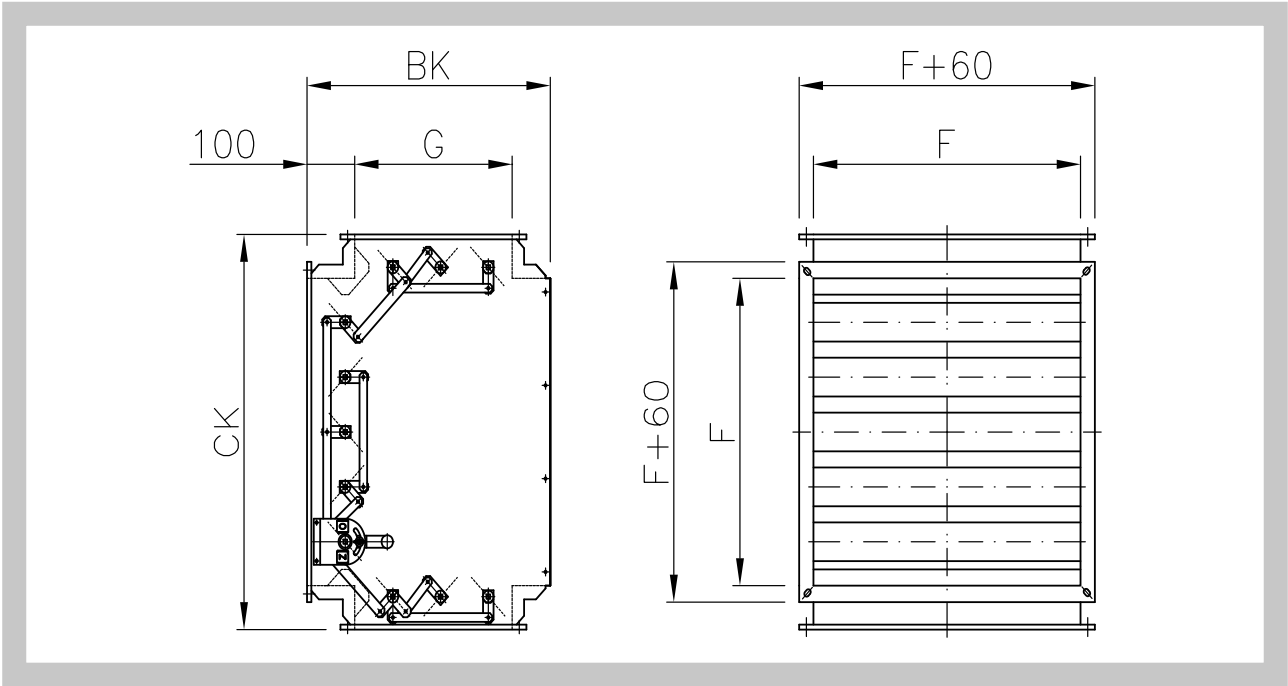
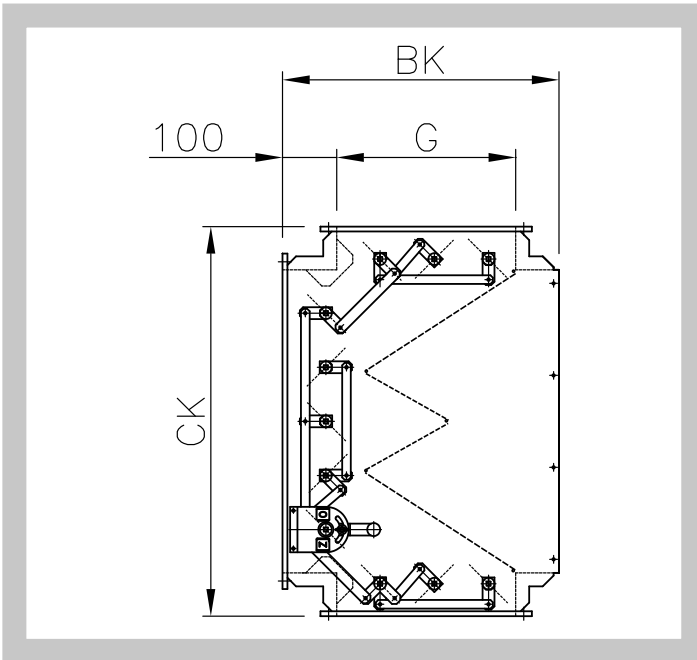
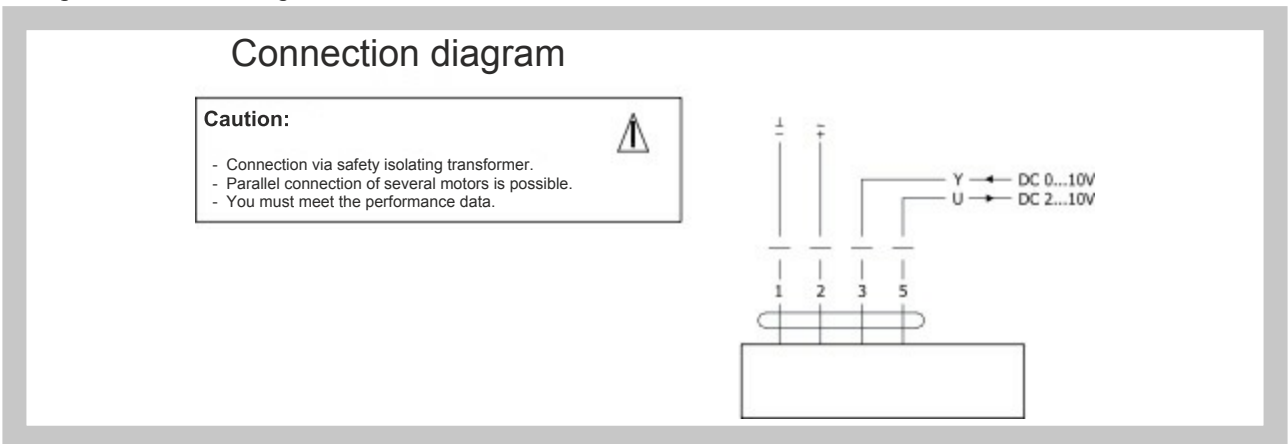


Fig. 29 Mixing chamber - version with filter fabric and with manual control



18.1.2. Electric actuator Belimo

Fig. 30 Connection diagram of electric actuator Belimo SM 24A-SR



Tab. 18.1.2. Actuator Belimo SM 24A-SR

Electric actuator BELIMO	SM 24A-SR
Supply voltage	AC 24V/50Hz
Power input - in operation - in the rest position	2,5 W 1,5 W
Dimensioning	5 VA (Imax 8,3 A @ 5 ms)
Control signal	DC 0 ... 10 V @ Ri 100 kΩ
Positioning time	150 s
Operating temperature	- 30 °C ... + 50 °C
Weight	1050g

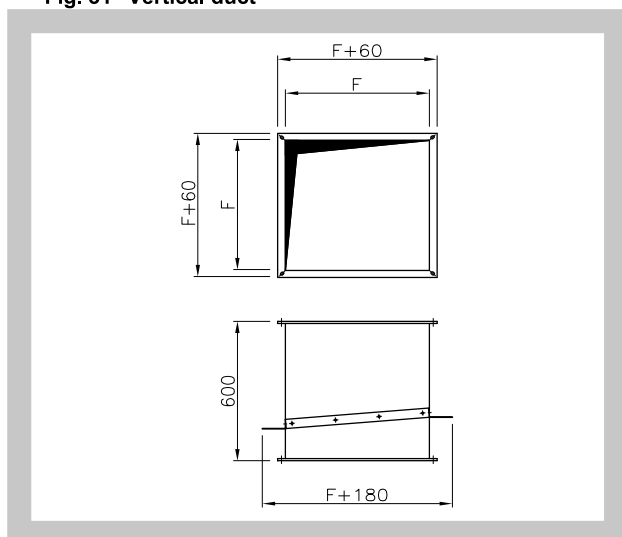
With actuator Belimo SM 24A-SR is supplied a control cabinet SGF 24VM (optional accessory), which provides power supply for actuator and also allows the damper position adjustment. The control box is connected to the 230V / 50Hz. Alternatively, after agreement, actuator Belimo SM 230A-SR (supply voltage 230V / 50Hz; control signal 0 ... 10 V DC) can be supplied.

18.2. Vertical Duct DS

Is installed into the roof opening. It is a rectangular fresh air intake duct, 600 mm long with 4 moulding bars which are fixed to the duct and roof by the installer according to roof slope. The whole is made of galvanized steel. Usually, the roof air intake head is installed on the top of vertical duct.

18.2.1. Dimensions and Weights

Fig. 31 Vertical duct



Tab. 18.2.1. Dimensions and Weights

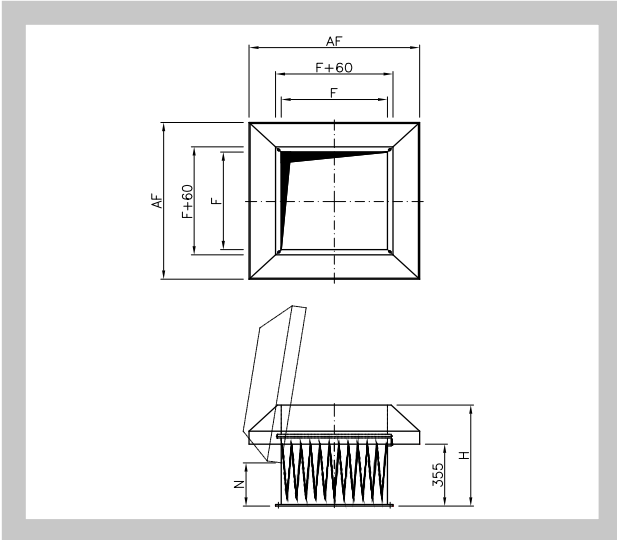
Dimensional series	Dimension F	Weight (kg)
1	500	14
2	560	16
3	710	21

18.3. Roof air intake head HS

Is designed for fresh air intake above the roof. It consists of head body and hinged roof. The entire is made of galvanized steel. In the head body a bag filter is installed. Filter pollution is signalised by differential pressure switch.

18.3.1. Dimensions and Weights

Fig. 32 Roof air intake head



Tab. 18.3.1. Dimensions and Weights

Dimensional series	Dimension				Weight (kg)
	F	AF	H	N	
1	500	840	590	252	24
2	560	900	590	252	27
3	710	1100	650	227	37

18.4. Horizontal duct DP

Is designed for installation into the wall opening for horizontal installation of Monzun TE ventilation set. The duct is rectangular, dimensions as fresh air flange of the mixing chamber, with one free flange, the supplied length is 1 m, made of galvanized steel. The precise length is adjusted on site by the installer.

18.4.1. Dimensions and Weights

Tab. 18.4.1. Dimensions and Weights

Size	Dimension F	Weight (kg)
1	500	13
2	560	14,5
3	710	23

18.5. Rain protection louver PDZM

Is installed at the end of horizontal duct into the wall. Standard version is made of galvanized steel, for other possible variants refer to technical brochure TPM 079/01.

18.5.1. Dimensions and Weights

Tab. 18.5.1. Dimensions and Weights

Size	Dimension F	Weight (kg)
1	500	4,5
2	560	5,4
3	710	7,8

XI. OPTIONAL ACCESSORIES

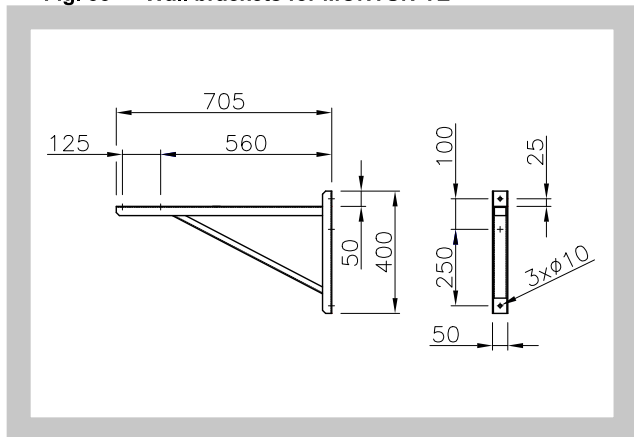
19. Optional mechanical accessories

19.1. Wall brackets

Wall brackets are used to install hot water air heaters MONZUN - TE on the wall. It consists of a two cantilevers riveted from galvanized U profile.

19.1.1. Dimensions

Fig. 33 Wall brackets for MONTUN-TE



19.1.2. Example for ordering.

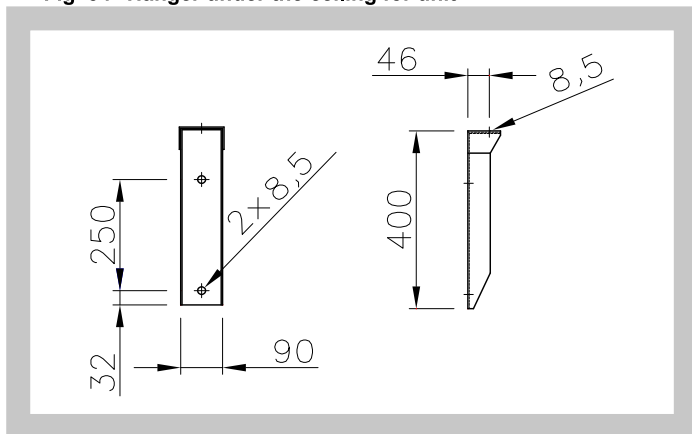
Wall brackets for unit **KJ**

19.2. Suspender for heater vertical installation under ceiling ZJ

Is designed to install MONZUN - TE heater under horizontal structure. It consists of four hangers made of galvanized steel profile.

19.2.1. Dimensions

Fig. 34 Hanger under the ceiling for unit



19.2.2. Example for ordering.

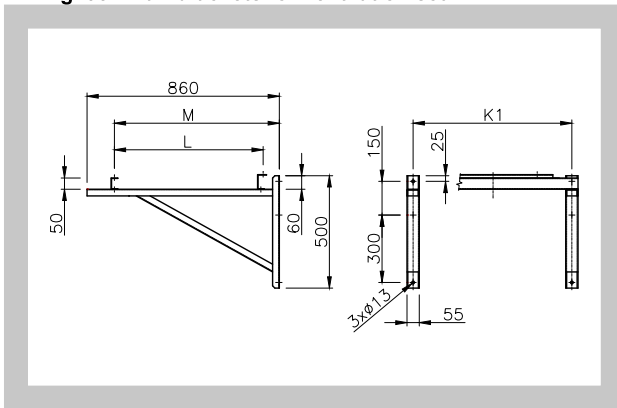
Suspender under the ceiling for unit **ZJ**

19.3. Wall brackets for ventilation set KS

Wall brackets for ventilation set are used to install ventilation set with hot water air heaters MONZUN - TE on the wall. It consists of a pair of cantilevers welded from steel U-profile and two transverse beams which are joined by screws. The cantilevers are powder-coated RAL 9005 (black).

19.3.1. Dimensions and weights

Fig. 35 Wall brackets for ventilation set



Tab. 19.3.1. Dimensions and weight

Dimensional series	Dimension			Weight (kg)
	K1	L	M	
1	650	613	728	12,5
2	710	653	728	13
3	850	755	828	17,5

19.3.2. Example for ordering.

Wall brackets for ventilation set

KS 1

_____ size 1 until 3

19.4. Suspender for ventilation set vertical installation under ceiling ZS

Is designed to install ventilation set with MONZUN - TE heater under horizontal structure. It consists of two hangers made of galvanized steel profile.

19.4.1. Example for ordering.

Suspender under the ceiling for set

ZS 1

_____ size 1 until 3

20. Electrical accessories

20.1. Room thermostat

It is designed to control the fan depending on the temperature of the heated space. The required temperatures can be programmed for a week. Multiple units can be controlled by single thermostat, number of units is dependent on the current capacity of the thermostat (every heater needs 200mA to be switched).

Connection diagrams see chapter 14.

20.2. Anti-freeze thermostat

It is designed to stop the fan, when output water temperature falls below 6 °C. It also sends a signal to close the regulating damper, which is controlled by the actuator (version .57). The anti-freeze thermostat is placed on outlet water pipe and it is connected to terminal box after removing the jumper P2 (connects terminals 1, 2) to terminals 1, 2.

Connection diagrams see chapter 14.

20.3. The thermal protection disconnects the fan from the power supply after opening the thermal contact, which is integrated in the fan motor. The thermal protection prevents starting the fan again after the motor temperature decrease. Turning on the fan must be done by the operator.

20.3.2. Protection S-ET10E (IP20)

20.3.1. Protection S-ET10 (IP55)

Fig. 36 S-ET10 (IP55)

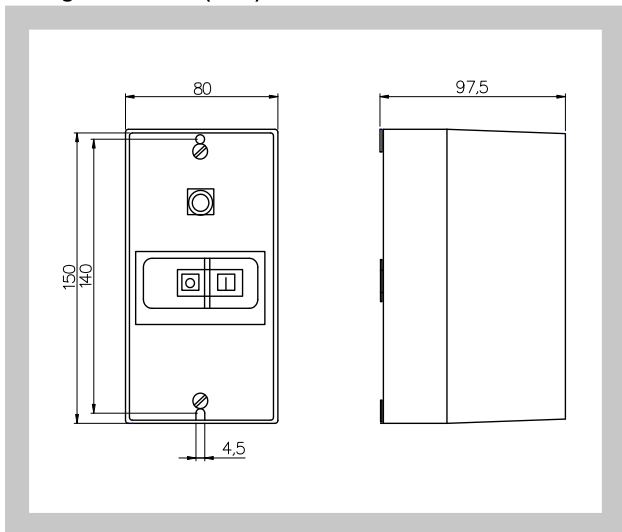
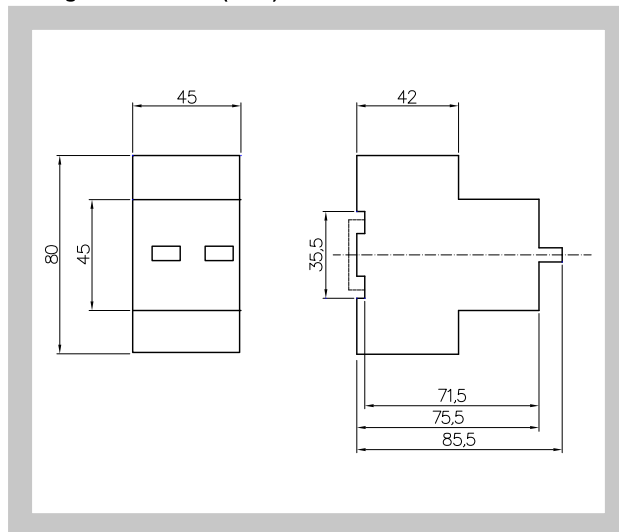


Fig. 37 S-ET10E (IP20)



20.3.3. Connection diagram S-ET10E(S-ET10) see chapter 17

20.4. Speed regulators

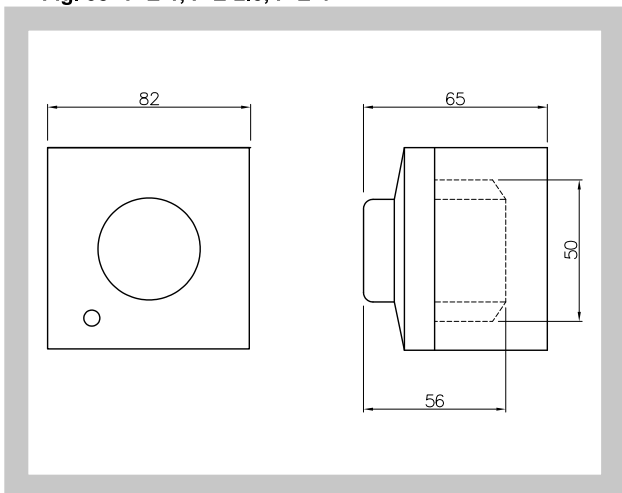
20.4.1. Speed regulator P-E-1, P-E-2.5 and P-E-4 (only for the one-phase fan)

Speed adjustment is performed continuously by using the rotary switch, which also has a shutdown function. Starting fan is always on full speed. The controller can be supplied as separate control box with IP54 protection class. Status of the controller is indicated by built-in LED.

Tab. 20.4.1. Technical data

Type	P-E-1	P-E-2.5	P-E-4
Nominal current	1 A	2,5 A	4 A
Min. motor current	0,1 A	0,2 A	0,4 A
Internal fuse	F 1.25A-H	F 3.15A-H	F 5.00A-H
Weight	240 g	300 g	360 g

Fig. 38 P-E-1, P-E-2.5, P-E-4



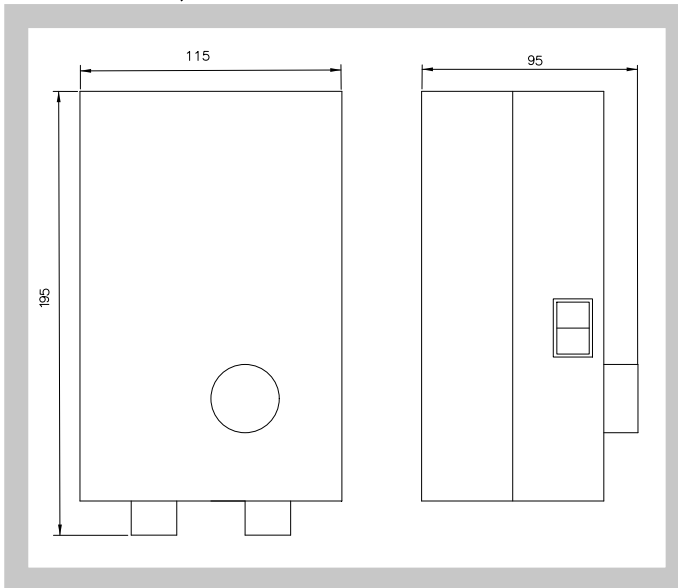
20.4.2. Speed regulator P-E-6 and P-E-10 (only for the one-phase fan)

Speed adjustment is performed continuously by using the rotary switch. Separate illuminated ON/OFF switch. Starting fan is always on full speed. Then the speed drops to the set value. The controller can be supplied as separate control box with IP54 protection class.

Tab. 20.4.2. Technical data

Type	P-E-6	P-E-10
Nominal current	6 A	10 A
Min. motor current	0,5 A	1 A
Internal fuse	F 8A-H	F 16A-H
Weight	680 g	740 g

Obr. 39 P-E-6, P-E-10



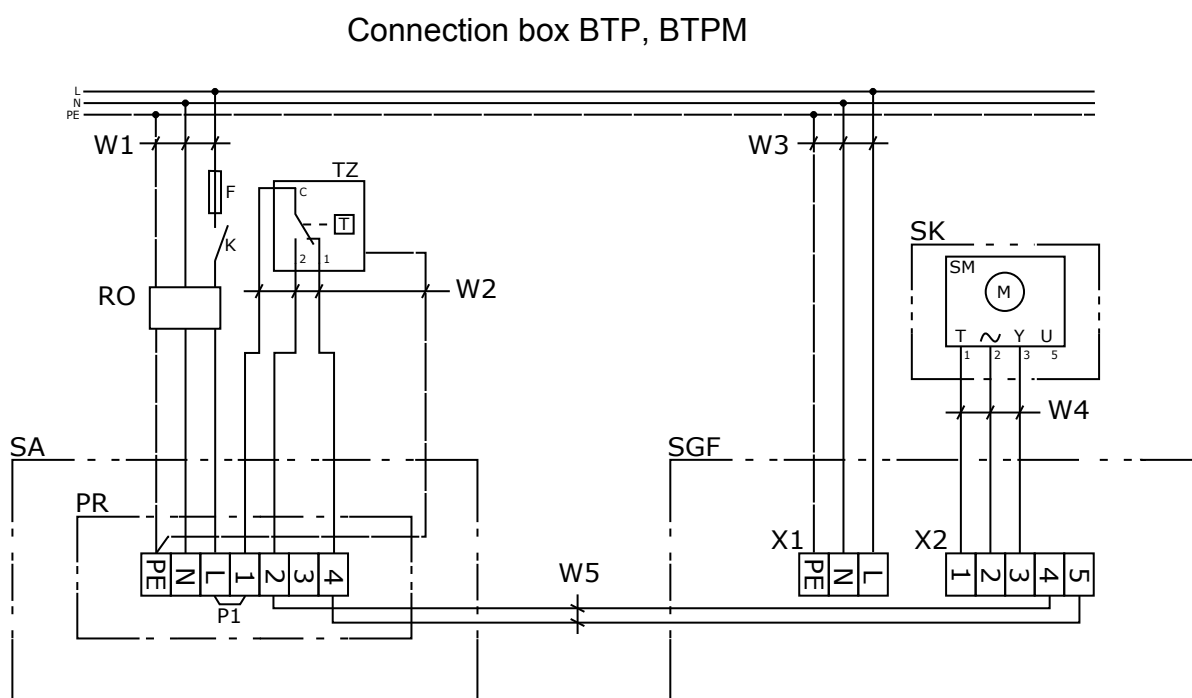
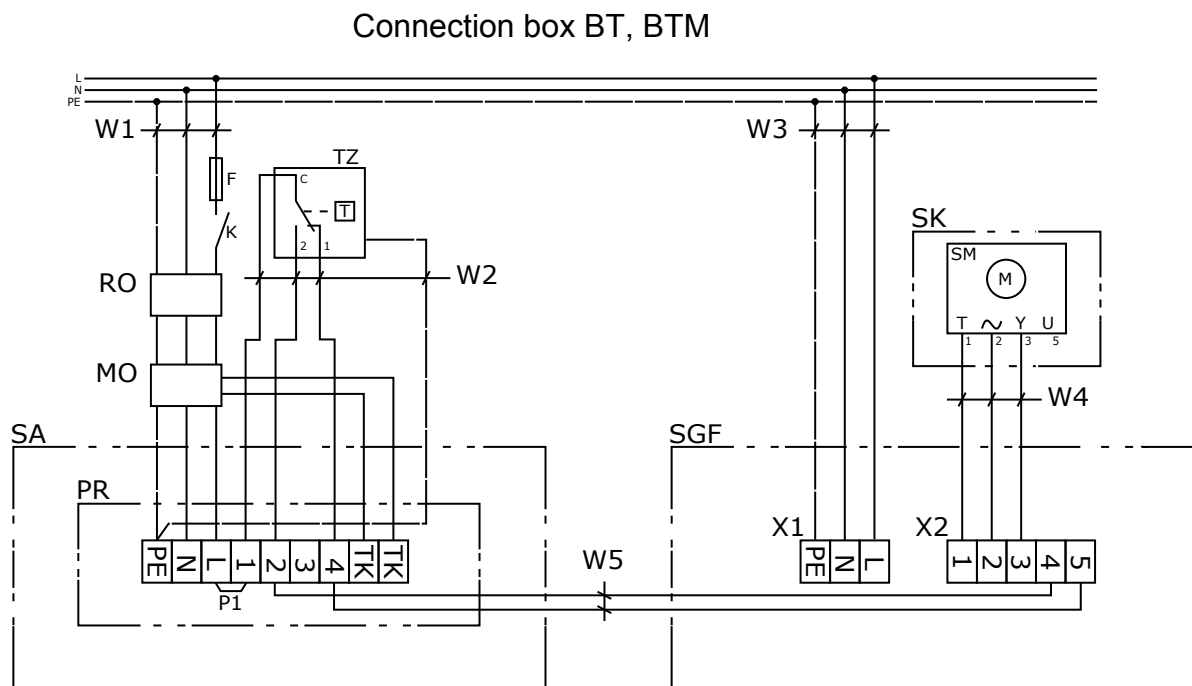
20.5. Control box SGF 24 VM

It used to control the mixing chamber SK with actuator Belimo SM 24A-SR. Control box provides power supply control of the actuator. With anti-freeze thermostat it ensures protection against water freezing in the heating coil. (When output water temperature drops below 6 ° C external air regulating damper shall close. This breaks the air supply from outside. Frost protection indicator will light.).

The control box SGF 24 VM is connected to the 230V / 50Hz.

Control box protection class is IP 54. Protection class of the thermostat depends on the thermostat used.

Fig. 40 MONZUN - TE connection with the control box of the mixing chamber SGF 24VM



- Legend:**
- W1 Power supply wire
 - W3 Power supply wire
 - F Fuse
 - K Switch
 - MO Motor protection
 - RO Triac speed controller
 - TZ Anti-freeze thermostat
 - W2 Connecting wire
 - W4 Connecting wire
 - W5 Connecting wire
 - SA Casing
 - PR Connection boxes
 - P1 Jumper - room thermostat
 - SGF Control box for the mixing chamber SGF 24VM
 - SK Mixing chamber
 - SM Actuator
 - VA Axial fan

- Note:**
- when using the room or anti-freeze thermostat is necessary to remove the appropriate jumper.
 - motor protection MO3 have to exclude spontaneous start of fan operation after thermocontact action
 - use of controls K, RO, TP, TZ is optional
 - connection boxes BTM and BTPM are not suitable for voltage speed controllers

MANDÍK, a.s.
Dobříšská 550
26724 Hostomice
Czech Republic
Tel.: +420 311 706 706
E-Mail: mandik@mandik.cz
www.mandik.com

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