CONTROL ACCESSORIES

••• more than just heat

ABOUT US

ZERTIFIKAT ◆ CERTIFICATE ◆ ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

Certification Body Management System No. 3053
TÜV SÜD Czech s.r.o.

certifies that

MINIB

MINIB,a.s.
Střešovická 465/49
CZ – 162 00 Praha 6 - Veleslavín
Ident. No.: 25732153

has established and applies
a Quality Management System for

fan coil manufacture

An audit was performed, Report No. 06.482.081
Proof has been furnished that the requirements
according to

ČSN EN ISO 9001:2009

are fulfilled. The certificate is valid until 11.03.2016
Certificate Registration No. 06.477.172

ABOUT THE COMPANY

MINIB, a.s. is an entirely Czech business which ranks among the leading manufacturers of convectors in the Czech Republic. It currently exports its products to thirty countries in Europe, Asia, Australia, and America.

Since 1999, MINIB has been systematically innovating production technology and its products, and it invests quite considerable amounts in its own development and design, with the goal of offering its customers advanced technical and esthetic solutions.

MINIB, a.s. is an economically stable company which has been consistently generating profit. This allows us to invest funds in research and development, technology, and above all, human resources in order to ensure the long-term successful development of our company.

ABOUT THE MANUFACTURING PROCESS

The manufacturing facility is located in Býkev near Mělník, and has excellent road connections. It is furnished with state-of-the-art manufacturing technology. Most manufacturing operations are carried out on CNC machines, which allows us to meet the most sophisticated requirements of our demanding customers.

Based on individual requirements of our customers, we are able to make also various non-typical products to meet their specific need.

All products are made only from high-quality materials with long life cycle, which allows us to offer ten-year warranty on the heat exchangers and the stainless steel convector troughs.

MINIB, a.s. is a holder of an ISO 9001:2009 certificate and numerous utility models and patents.

Out entire portfolio is subjected to testing in an independent, accredited testing chamber of HEATEST, s.r.o., pursuant to EN 442-2, which allows us to guarantee the stated heating and cooling output.

ABOUT THE PRODUCTS

Minib's product portfolio includes more than 70 types of convectors. Customers can therefore choose the suitable convector for any interior environment.

The main benefit of convectors is that they are effective, modern, efficient and esthetic heating units designed for dry and wet environment. Significant energy savings are achieved by the low water consumption for immediate heating or cooling of the room. The low water consumption results in low consumption of energy needed for water heating. In addition to the energy and water savings, the great heating and cooling dynamics is also important. Another benefit of these products is undoubtedly low space requirements. Convectors do not disturb the esthetic experience of the room, offer modern design, and are safe thanks to the 12 V power supply.

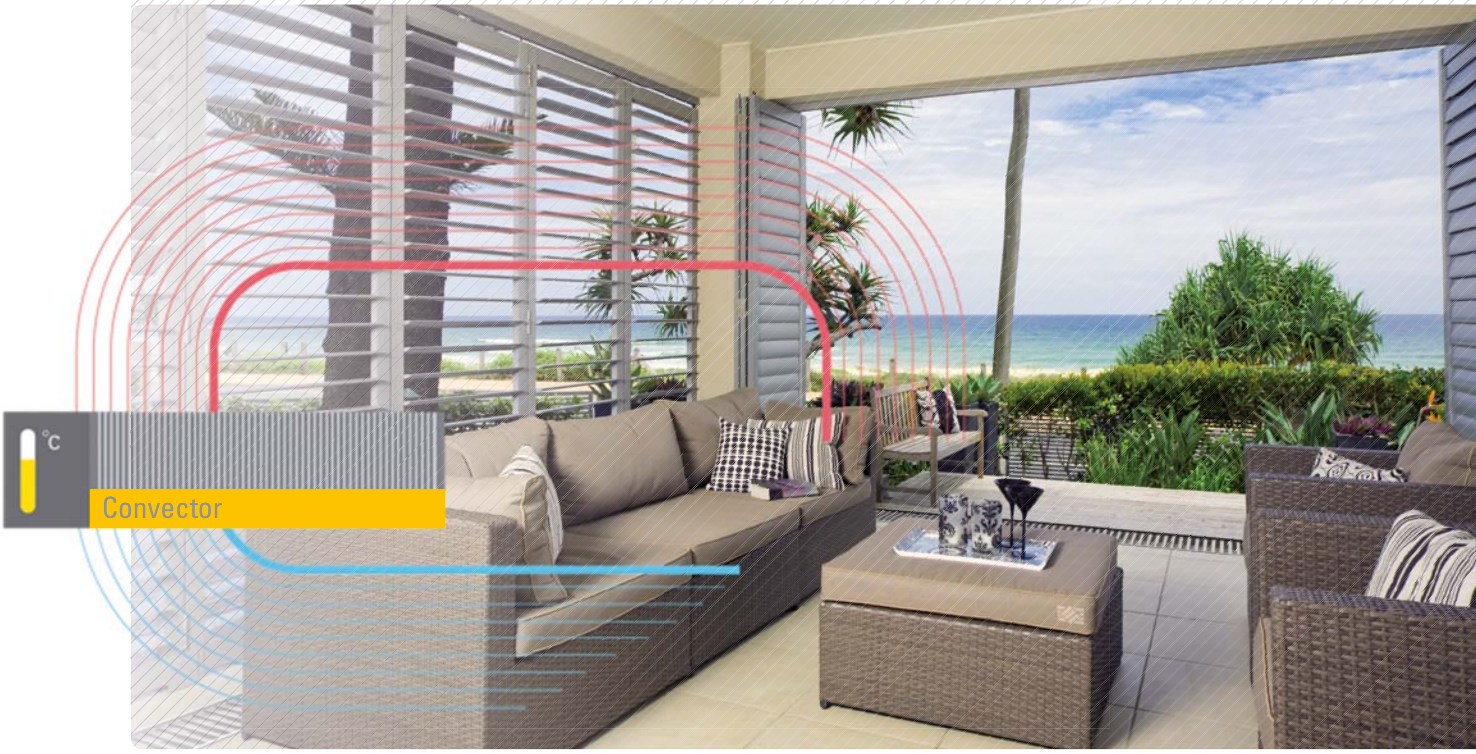
The product range includes different types of convectors:

- FLOOR convectors without fan which use the natural convection principle. The forced convection principle is used by convectors with fan.
- FREE-STANDING AND WALL-MOUNTED convectors with and without fans are also available. Heating benches with granite and wooden top panels are available for wet environments (swimming pools, bathrooms).
- DESIGN convectors are a unique patent series that use both the convection and heat radiation principle for heating. These convectors have aluminum composite front panels available in a number of modern designs made of smooth glass with various colors or glass with sand blasted decorations. We also offer granite front panels.

MINIB's advantage is its ability to satisfy also specific non-typical requirements of customers and to produce convectors exactly according to their wishes, for example, curved or angular forms with various joints. MINIB pursues high standard of user comfort. All products are easy to install and maintain

A broad selection of accessories is available for each convector type. MINIB has received a number of national and international awards for its products.

CONTENTS



The heating output of convectors is controlled by opening / shutting off the heating or cooling water supply to the heat exchanger. The supply is controlled either manually (thermostatic head), or automatically by the convector electronics (electrothermic head). The output of convectors with fans is also controlled by adjusting the fan speed.

OUTPUT CONTROL – CONVECTORS FOR STANDARD (DRY) ENVIRONMENT

Since 2005 MINIB has been using 12 V DC brushless motors in its fans intended for standard environment. The advantage of these motors consists in significantly lower power consumption compared to commonly used AC motors. Moreover, the DC motors are characterized by low noise and long-term reliability.

The microprocessor speed control for DC motors with feedback is new for all control unit types. The benefits of the new solution include:

- stable output of convectors throughout their life cycle – the output does not decrease even with gradual soiling and wear of the rotating components
- optimized output setup based on requirements from the control circuits
- very silent operation at lowest speeds
- electronic isolation of the motor in the event of fan blockage (e.g., by an item that has fallen into the convector); in such case the motor is protected against overheating and damage
- simplified installation and reduced costs of the wiring

Speed control for each motor within the fan-coil is provided by an electronic unit (EB) included in the convector. In addition to mutually independent motor control, the EB circuits also monitor the control signal at their input and adjust the fan speed accordingly.

THE ELECTRONIC UNIT IS USED FOR THE FOLLOWING BASIC CONTROL TYPES:

EB-A control (heating mode)

Simple control of fan operation by a thermostat; the fan speed can be adjusted manually by the potentiometer located on the wall in the room near the thermostat. The EB electronic control unit is set up for stepless speed control. (Potentiometer can be used independently without a thermostat).

EB-B control (heating mode)

Fan speed (low, medium, high) is adjusted automatically by the firmware in the EB control unit in order to achieve required convector output. When the thermostat is turned on the speed is always set to level one. The speed is switched to a higher level always after 15 minutes of thermostat operation (without reaching the required temperature).

EB-C control (heating/cooling mode)

Fan speed (low, medium, high) is adjusted automatically by the firmware in the EB control unit in order to achieve required convector output. When the thermostat is turned on the speed is always set to level one. The speed is switched to a higher level always after 15 minutes of thermostat operation (without reaching the required temperature); the maximum speed, however, is determined by the position of the speed switch on the thermostat (e.g., TH0482).

The required control type does not have to be adjusted in any way; the unit automatically evaluates the control signal character and adjusts the fan speed control accordingly. The relevant contacts only need to be connected using a jumper in the electronic unit for stepless speed control by voltages ranging between 0 and 10 V (EB-A control or control by a superior system).

If multiple convectors are supplied from one source in a room, the control element (thermostat, potentiometer) can be connected to any convector for all control types. The parallel connection of EB inputs enables simultaneous control of convectors from any location. All control modes also enable use of 12 V DC voltage on the EB connector as a thermostat power supply, provided that the thermostat supports 12 V DC power supply (for example type TH0482).

A wireless thermostat can be used for EB-A and EB-B control modes. In such case, the thermostat-transmitter is installed at the most suitable location in the room and the receiver is located near the 230 V AC or 24 V AC power supply line, depending on the supply type required by the receiver. The switching contact of the receiver is connected to the respective control signal terminals of the nearest convector in the same manner as in the case of a conventional thermostat.

A new feature in all control types is the possibility of using electrothermic heads located on the inlet valve of the convector which - if the valves are closed by the electronic control unit – shut off the heating (cooling) water supply to the heat exchanger thus reducing the heating (cooling) output to zero (EB-A shutting off immediately, EB-B, EB-C in 30 minutes after the thermostat has been switched off). Once the heating (cooling) output is required (for example, upon thermostat switching) the valve opens automatically and the fans start.

The 12 V DC NO head can be connected directly to the terminal bar of the EB unit within the convector as it is factory-prepared for this purpose. No additional conductors are therefore required. The convector electronic control unit will take care of everything.

All control modes use an electronic temperature sensor which is adapted for use in convectors intended for both heating and cooling. When heating is required, the EB unit firmware is set to run the fans whenever the heating water temperature exceeds 30 °C. Similarly, when cooling is required, the fans run if the cooling water temperature is lower than 18 °C; the fans are idle under all other conditions.

WIRING

The electric power lines are as follows in the control types intended for heating only (EB-A, EB-B): The lines from the power source to the convectors use a CyKy 0 three-conductor cable (3x1.5mm) with black-brown-grey cores. The black and brown conductors are used for 12V AC voltage distribution from TT100, TT240 or TT300 source; the grey conductor is used for connecting the EB control inputs. In control types intended for cooling and heating (EB-C) it is necessary to use a CyKy five-conductor cable (5x1.5) in order to distribute the C-COOL and GND signals between individual EB units. The EB units must not be connected when energized!

The conductor cross-sections are chosen according to current loading and supply cable length. Thermostats are connected to the control circuits of fan-coils with any cables (including communication cables, for example) with a suitable color coding of individual conductors.

CONNECTION OF EB CONTROLS TO A NON-STANDARD THERMOSTAT CONTROLLING ADDITIONAL HEATING/COOLING EQUIPMENT – **use of the ADA-EB adaptor.**

Fan speed is controlled by 0–10 V DC voltage in all control modes. In some cases, however, it is not possible to connect fan-coil controls directly to the thermostat output terminals. This applies in particular to situations where the thermostat is supplied with 24 V AC or 230 V AC and this voltage is used to control some other system (boiler, thermal pump, etc.). In such situations it is necessary to use an ADA-EB adaptor with size (50x46x35 mm) which converts the voltage signals from 24 V AC or 230 V AC to the control voltage level suitable for the control electronics of fan-coil units (0 to 10 V DC). If the thermostat does not enable speed control it is possible to include a relay before the EB terminals and connect its contacts according to the EB-B control mode.

An example of a solution with an ADA-EB adaptor is shown in the diagram. The three-position thermostat switch provides three levels of speed control (low, middle, high). The adaptor input (Heat) is connected to the thermostat terminal whose voltage controls for example the boiler. Closing the thermostat contact activates the boiler and starts the fans in the fan-coils. The fans are idle if the switch is off or if the thermostat contact is open. The ADA-EB adaptor must not be placed directly in the convector; if the ADA-EB adaptor is used the EB control must be switched to EB-A control. The required control mode is set up using jumpers in the EB unit.

It is recommended that you consult the possibility of using and connecting an ADA-EB adaptor in all other cases with MINIB's technical or service staff.

EB unit EBI-2e

Control of MINIB convectors **with a single-circuit heat**

The EBI-2e electronic unit (a part of the convector) is intended to control the direct current (DC) low voltage brushless motors used as drives for heating convector fans with a single-circuit heat exchanger. This is a microprocessor controlled unit on a double-sided printed circuit board (PCB) with dimensions of 57x53 mm and fitted with aluminum casing which also acts as a radiator. EB unit is supplied by safety transformer 230 V AC/12V AC. It is possible to choose between three output versions TT100, TT240 and TT300 (VA). EB unit must not be connected when energized!

EB UNIT EBI-2E WORKS IN TWO MODES

HEATING

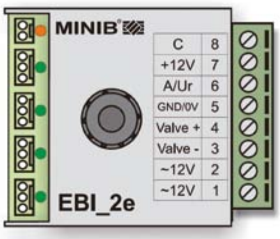
If the thermistor temperature sensor detects that the temperature of the heating water flowing in the heat exchanger is higher than +30 °C and at the same time the condition of a switched-on thermostat or connected control voltage higher than 2 V is fulfilled, the convector fans will start turning. If the temperature of the heating water flowing in the heat exchanger is lower than 30 °C the fans will not start turning even if the thermostat is switched on and the control voltage is higher than 2 V. The speed can be controlled steplessly within the range of the analog control signal A/Ur between 2 and 10 V DC. Subject to fulfillment of these conditions the electrothermic head for controlling the heat exchanger circuit will open.

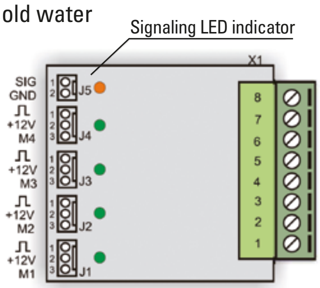
COOLING

The EB unit will switch to this mode by switching the +12 V DC voltage from terminal 7 to terminal 8 - C (COOL). If the temperature of the cooling water is lower than +18 °C the thermostat is switched on and at the same time the control voltage is higher than 2 V, the fans will start turning. The speed can be controlled steplessly within the range of the analog control signal A/Ur between 2 and 10 V DC. Subject to fulfillment of these conditions the electrothermic head for controlling the heat exchanger circuit will open.

A more detailed description of the control signals is found in section entitled Convector control by means of a superior system (EBI-2e).

- EB unit power supply: AC and DC
- 4x outlet for DC motor
- 1x outlet for valve, short-circuit resistant
- 1x input for thermistor temperature sensor
- 0-10 V DC analog signal control
- Input for distinguishing between heating and cooling mode
- Selection of connected motors and control method
- Jumper setup
- Possible firmware upgrade
- Motor speed detection
- Optical indication of motor speed synchronization
- Optical indication of sufficiently hot/cold water





CONNECTION

MOTORS

Connector	Contact	Function
J1-J4	1	Speed signal
	2	+ 12 V
	3	Motor x

TEMPERATURE SENSOR

Connector	Contact	Function
J5	1	Temperature signal
	2	GND

TERMINAL BAR

Bus	Contact	Function
X1	1	12 V ACa
	2	12 V ACb
	3	Valve – (GND)
	4	Valve + (+12 V)
	5	0V/GND
	6	A/Ur (analog input 0–10 V)
	7	+12 V
	8	COOL (input +12 V)

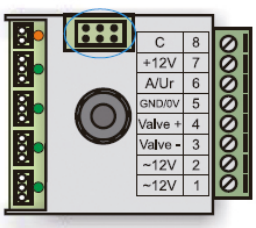
MAXIMUM VALUES

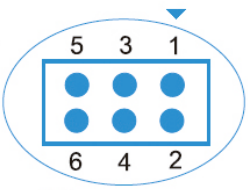
Symbol	Parameter	Value	Unit
Vcc AC	AC supply voltage	15	V
Vcc DC	DC supply voltage	20	V
I out 1-4	Output current for 1 motor	2,5	A
I out 5	Output current for the valve	0,3	A
I max	Sum of output currents	4,5	A
Tj	Operating temperature	0-85	°C
Tstg	Storage temperature	-55 to +105	°C

EB-A CONTROL TYPE

Description	Jumper position
Voltage output (without speed detection)	-
Fan 65 mm	1-2
Fan 50 mm	3-4
Fan 30 mm	5-6

TABLE OF JUMPERS OF THE EB UNIT (EBI-2E AND EBI-2R)





SV1 programming connector

EB-B AND EB-C CONTROL TYPES

Description	Jumper position
Voltage output (without speed detection)	2-4
Fan 65 mm	1-3
Fan 50 mm	3-5
Fan 30 mm	4-6

EB unit EBI-2r

Control of MINIB convectors **with a two-circuit heat exchanger (4P)**

Unlike EBI-2e, the EBI-2r electronic unit (a part of the convector) offers the option to connect two electrothermic heads and two temperature sensors for each circuit of the heat exchanger separately. These properties are used in 4P convectors which are equipped with a heat exchanger with two independent circuits (heating/cooling). EB unit is supplied by safety transformer 230 V AC/12 V AC. It is possible to choose between three output versions TT100, TT240 and TT300 (VA). EB unit must not be connected when energized!

EB UNIT EBI-2R WORKS IN TWO MODES

HEATING

If the thermistor temperature sensor detects that the temperature of the heating water flowing in the heat exchanger is higher than +30 °C and at the same time the condition of a switched-on thermostat or connected control voltage higher than 2 V is fulfilled, the convector fans will start turning. If the temperature of the heating water flowing in the heat exchanger is lower than 30 °C the fans will not start turning even if the thermostat is switched on and the control voltage is higher than 2 V. The speed can be controlled steplessly within the range of the analog control signal A/Ur between 2 and 10 V DC. Subject to fulfillment of these conditions the electrothermic head for controlling the heating circuit will open and the head for controlling the cooling circuit will remain closed.

COOLING

The EB unit will switch to this mode by switching the +12 V DC voltage from terminal 7 to terminal 8 - C (COOL). If the temperature of the cooling water is lower than +18 °C the thermostat is switched on and at the same time the control voltage is higher than 2 V, the fans will start turning. The speed can be controlled steplessly within the range of the analog control signal A/Ur between 2 and 10 V DC. Subject to fulfillment of these conditions the electrothermic head for controlling the cooling circuit will open and the head for controlling the heating circuit will remain closed.

A more detailed description of the control signals is found in section entitled Convector control by means of a superior system (EBI-2r).

- EB unit power supply: AC and DC
- 3x outlet for DC motor
- 2x outlet for valve, short-circuit resistant
- 2x input for thermistor temperature sensor
- 0–10 V DC analog signal control
- Input for distinguishing between heating and cooling mode
- Selection of connected motors and control method
- Jumper setup
- Possible firmware upgrade
- Motor speed detection
- Optical indication of motor speed synchronization
- Optical indication of sufficiently hot/cold watery

CONNECTION

MOTORS

Connector	Contact	Function
J1-J3	1	Speed signal
	2	+12 V
	3	Motor x

COOL TEMPERATURE SENSOR + COOL HEAD

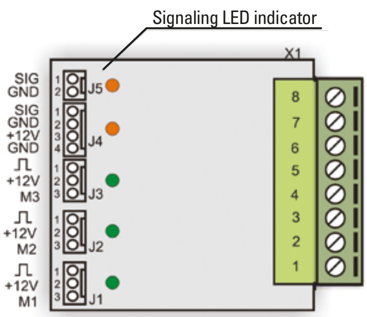
Connector	Contact	Function
J4	1	Cool temperature signal
	2	GND
	3	Valve – (GND) Cool
	4	Valve + (+12 V) Cool

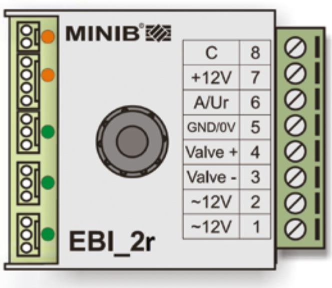
HEAT TEMPERATURE SENSOR

Connector	Contact	Function
J5	1	Heat temperature signal
	2	GND

TERMINAL BAR

Bus	Contact	Function
X1	1	12 V ACa
	2	12 V ACb
	3	Ventil – (GND) Heat
	4	Ventil + (+12 V) Heat
	5	0V/GND
	6	A/Ur (analog input 0–10 V)
	7	+12 V
	8	COOL (input +12 V)





MAXIMUM VALUES

Symbol	Parameter	Value	Unit
Vcc AC	AC supply voltage	15	V
Vcc DC	DC supply voltage	20	V
I out 1-3	Output current for 1 motor	2,5	A
I out 5	Output current for the valve	0,3	A
I max	Sum of output currents	4,5	A
Tj	Operating temperature	0-85	°C
Tstg	Storage temperature	-55 to +105	°C

EB-A

for the heating mode

Simple control of fan operation by a thermostat; the fan speed can be adjusted manually by the potentiometer located on the wall in the room near the thermostat. The EB electronic control unit is set up for stepless speed control. (Potentiometer can be used independently without a thermostat).

Transformers which can be used: TT100, TT240, TT300

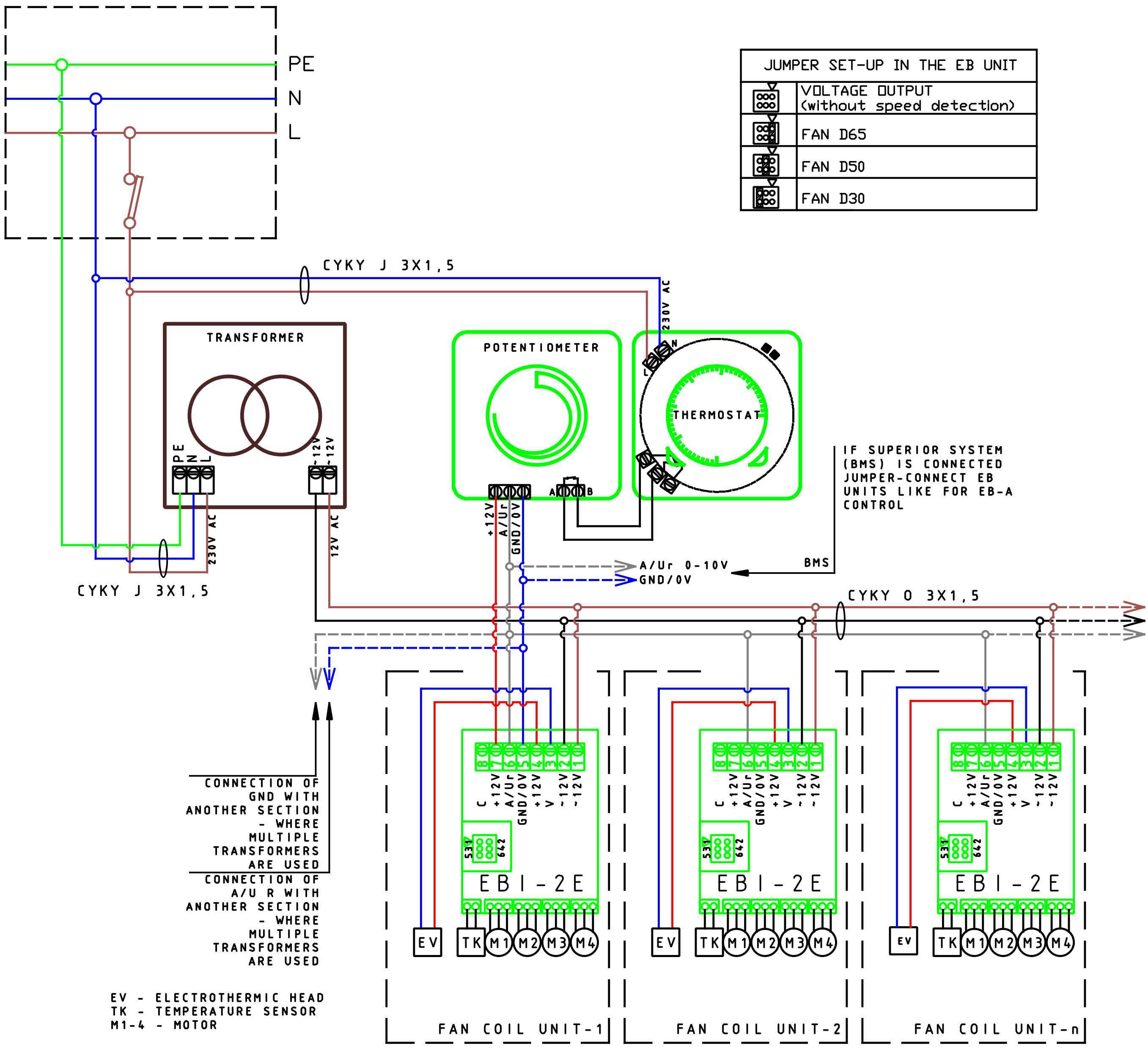
Use with convectors with a single-circuit heat exchanger, EB unit EBI-2e.

Control: 1. potentiometer MINIB + Thermostat ABB

2. only potentiometer MINIB

Optional electrical accessories: electrothermic head 12 V DC NO

EB-A CONTROL (potentiometer)



When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

EB-B

for the heating mode

EB-B CONTROL (CH110 or CH150)

Fan speed (low, medium, high) is adjusted automatically by the firmware in the EB control unit in order to achieve required convector output. When the thermostat is turned on the speed is always set to level one. The speed is switched to a higher level always after 15 minutes of thermostat operation (without reaching the required temperature).

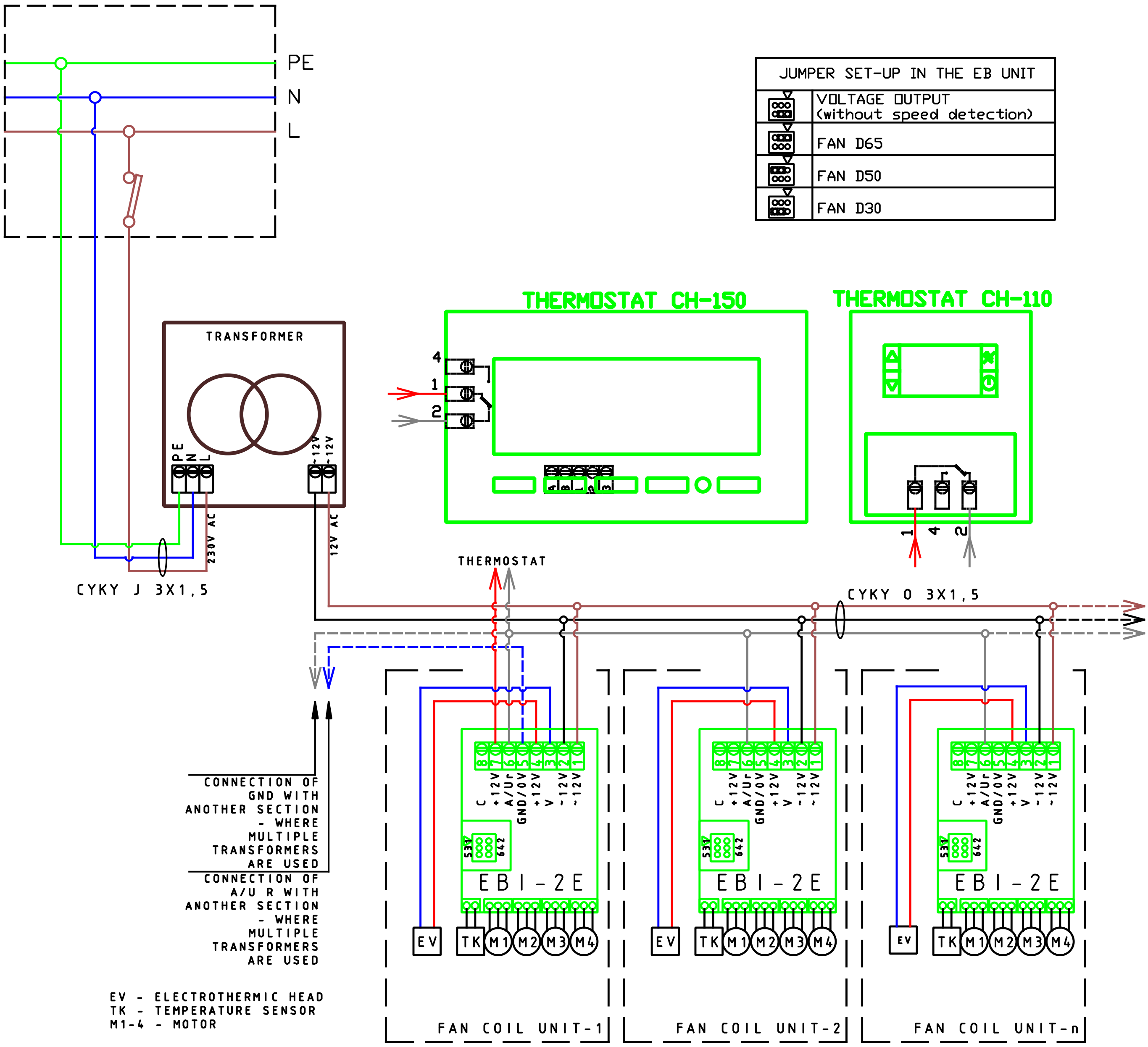
Transformers which can be used: TT100, TT240, TT300

Use with convectors with a single-circuit heat exchanger, EB unit EBI-2e.

Control: 1. thermostat CH110

2. thermostat CH150

Optional electrical accessories: electrothermic head 12 V DC NO



When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

EB-C

for the heating/cooling mode

Fan speed (low, medium, high) is adjusted automatically by the firmware in the EB control unit in order to achieve required convector output. When the thermostat is turned on the speed is always set to level one. The speed is switched to a higher level always after 15 minutes of thermostat operation (without reaching the required temperature); the maximum speed, however, is determined by the position of the speed switch on the thermostat (e.g., TH0482).

Transformers which can be used: TT100, TT240, TT300

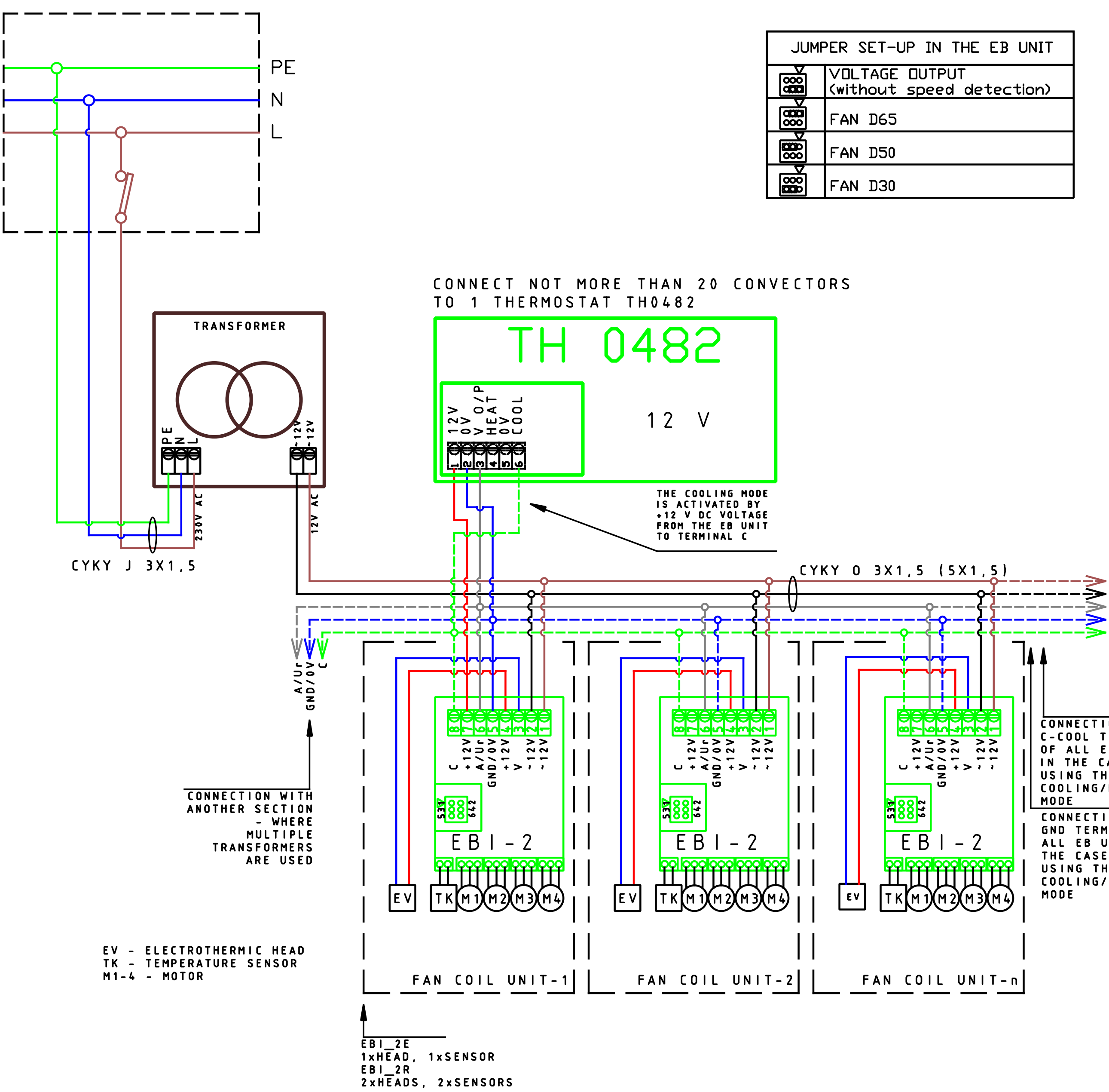
Use with convectors with a single-circuit and two-circuit heat exchanger, EB unit EBI-2e or EBI-2r.

Control: thermostat TH0482

Optional electrical accessories: electrothermic head 12 V DC NO

EB-C CONTROL (TH0482)

JUMPER SET-UP IN THE EB UNIT	
	VOLTAGE OUTPUT (without speed detection)
	FAN D65
	FAN D50
	FAN D30



When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

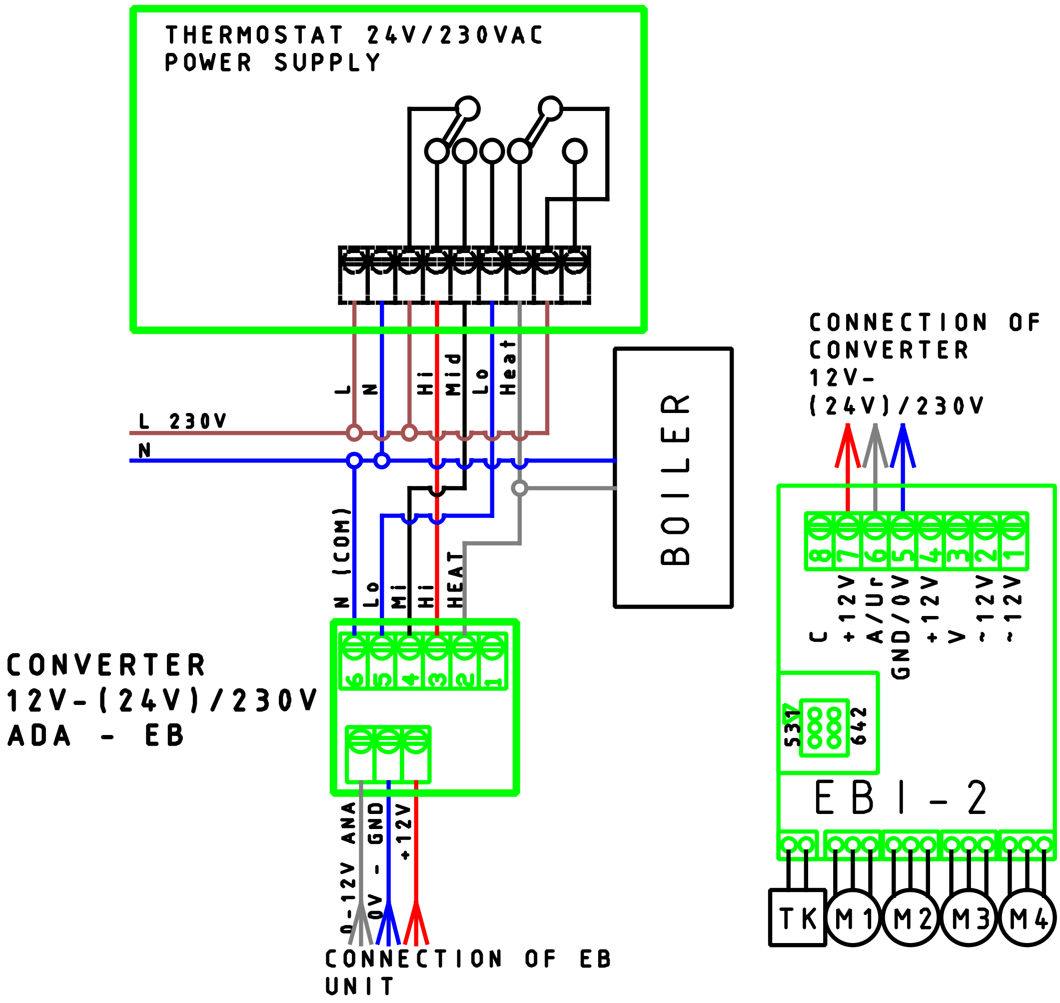
Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

ADA-EB

for the heating mode

Connection of the fan coil units control using an ADA-EB adaptor to a non-standard thermostat with 230/24 V AC power supply and control of a boiler, if applicable.

CONTROL CONNECTION USING THE AUXILIARY ADA-EB ADAPTOR, heating



When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

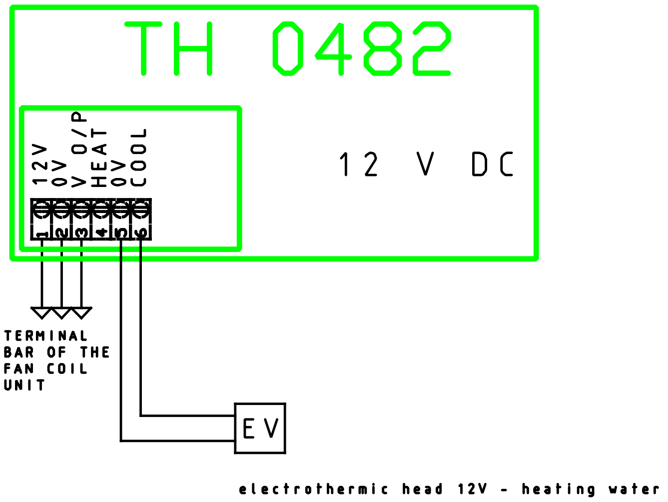
Manual control of the supply of the heating (cooling) water using

TH0482 12 V

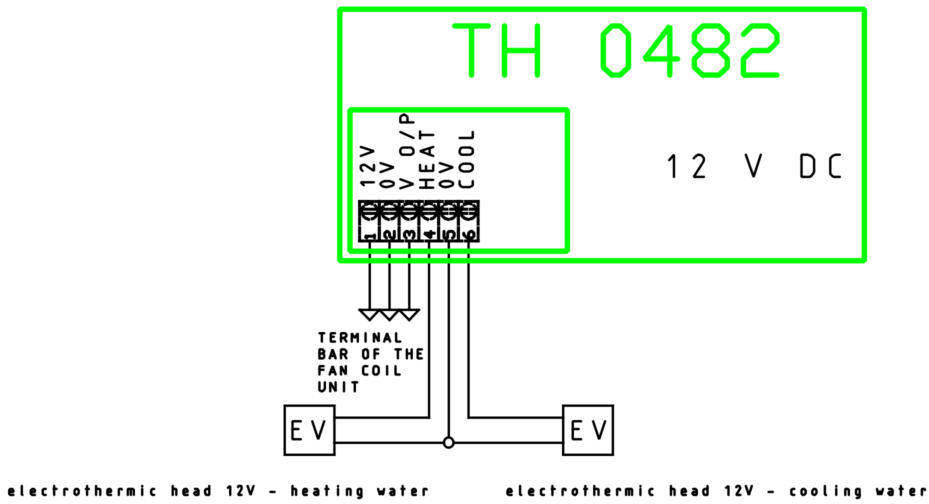
The electrothermic head opens the valve at power supply with 12 V DC voltage.

The 12 V DC output can be used as an impulse for the auxiliary relay (not supplied by MINIB) which switches any kind of equipment (boiler, pump, head, etc.). Warning: the impulse with 12 V DC will appear after manual switching from OFF to HEAT/COOL (no automatic switching based on the required/current temperature).

Manual control of the supply of the heating/cooling water to the convector



Manual control of the supply of the heating water to the convectors using an electrothermic head (2-pipe systems)



Manual control of the supply of the heating/cooling water to the convectors using an electrothermic heads (4-pipe systems)

convector control using

a superior system (BMS)

When control by a superior system is used the EB unit must be set to EB-A control.

Transformers which can be used: TT100, TT240, TT300

Optional electrical accessories: electrothermic head 12 V DC NO

EBI-2e CONTROL by a superior system (BMS) heating-cooling, convectors with a single-circuit heat exchanger

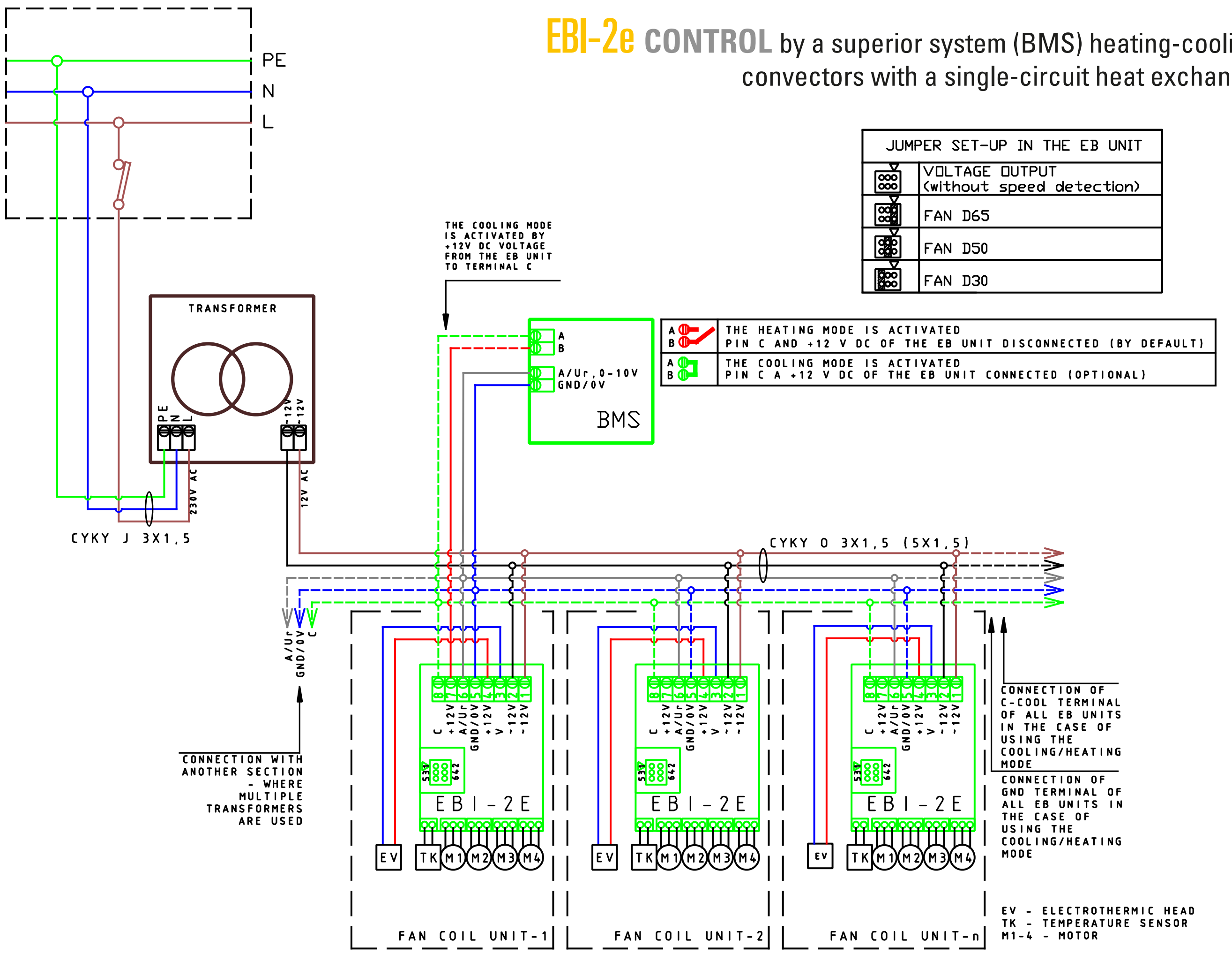


TABLE OF CONTROL SIGNALS OF EBI-2E WHEN USING BMS, CONTROL PRINCIPLE

HEATING	
(A/UR)	**EB UNIT PIN C and +12 V DC DISCONNECTED (Function)**
0–1 V	Heating OFF, cooling OFF, Thermoelectric head (EV) is CLOSED, Fans OFF
1–2 V	Heating ON, cooling OFF, Thermoelectric head (EV) is OPEN, Fans OFF (natural convection)
2–10 V	Heating ON, cooling OFF, Thermoelectric head (EV) is OPEN, Fans ON (2 V minimum – 10 V maximum)
COOLING	
(A/UR)	**EB UNIT PIN C and +12VDC CONNECTED**
0–1 V	Heating OFF, cooling OFF, Thermoelectric head (EV) is CLOSED, Fans OFF
1–2 V	Heating OFF, cooling ON, Thermoelectric head (EV) is OPEN, Fans OFF (natural convection)
2–10 V	Heating OFF, cooling ON, Thermoelectric head (EV) is OPEN, Fans ON (2 V minimum – 10 V maximum)

When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

EBI-2r CONTROL by a superior system (BMS) heating-cooling, convectors with a two-circuit heat exchanger

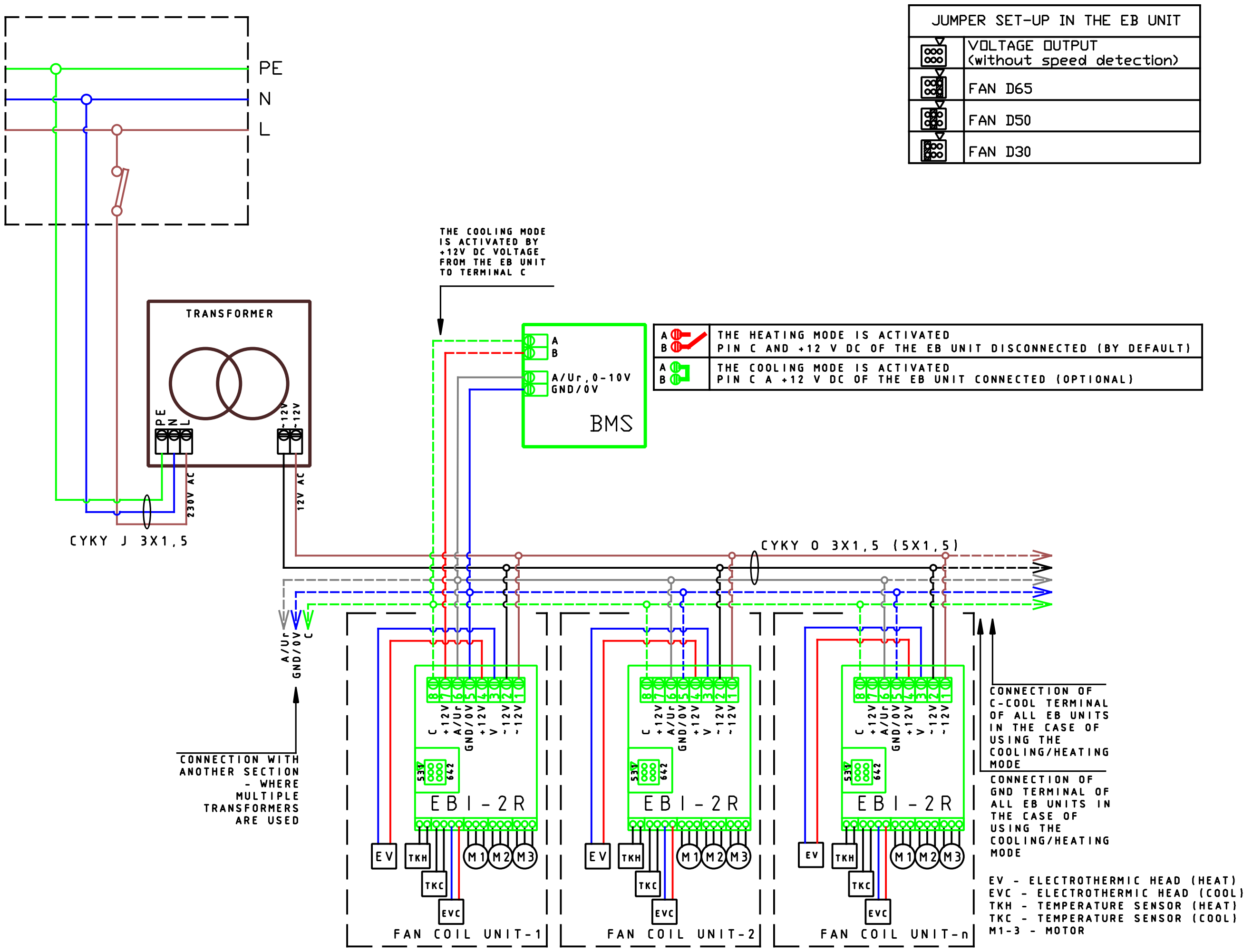


TABLE OF CONTROL SIGNALS OF EBI-2R WHEN USING BMS, CONTROL PRINCIPLE

HEATING

(A/UR)	EB UNIT PIN C and +12VDC DISCONNECTED (Function)
0 –1 V	Heating OFF, cooling OFF, Thermoelectric head (EVH) is CLOSED, Thermoelectric head (EVC) is CLOSED, Fans OFF
1–2 V	Heating ON, cooling OFF, Thermoelectric head (EVH) is OPEN, Thermoelectric head (EVC) is CLOSED, Fans OFF (natural convection)
2–10 V	Heating ON, cooling OFF, Thermoelectric head (EVH) is OPEN, Thermoelectric head (EVC) is CLOSED, Fans ON (2 V minimum – 10 V maximum)

COOLING

(A/UR)	EB UNIT PIN C and +12VDC CONNECTED
0 –1 V	Heating OFF, cooling OFF, Thermoelectric head (EVH) is CLOSED, Thermoelectric head (EVC) is CLOSED, Fans OFF
1–2 V	Heating OFF, cooling ON, Thermoelectric head (EVH) is CLOSED, Thermoelectric head (EVC) is OPEN, Fans OFF (natural convection)
2–10 V	Heating OFF, cooling ON, Thermoelectric head (EVH) is CLOSED, Thermoelectric head (EVC) is OPEN, Fans ON (2 V minimum – 10 V maximum)

The new feature is that the BMS system can be used also for controls in wet environment. See the E2 control wiring diagram.

When connecting more than five convectors to one transformer it is necessary to connect the thermostat to the convector which in the branch that is closest to the transformer.

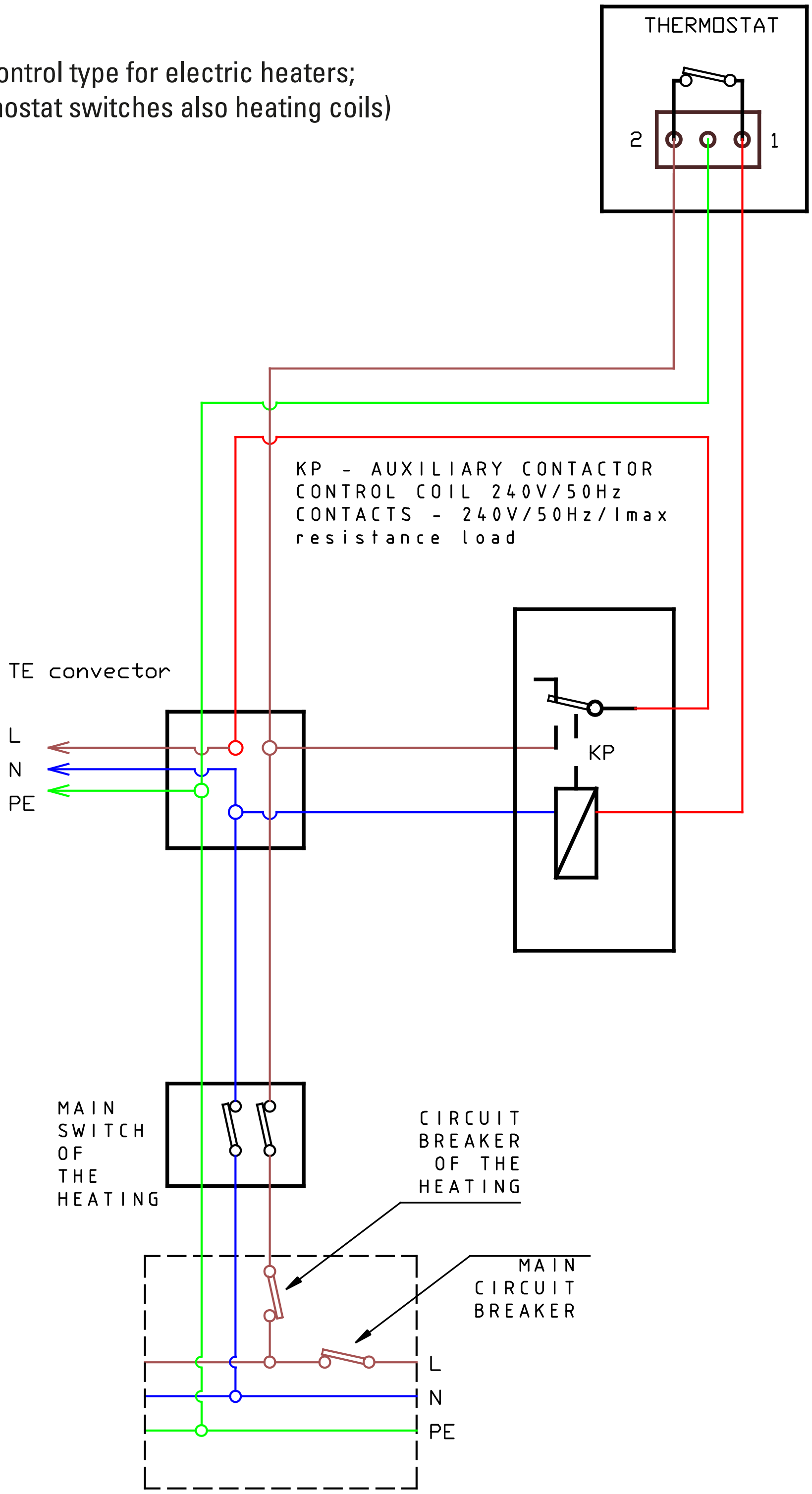
Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

TE

Thermostat contacts must be rated to 230 V/50 Hz voltage and to current corresponding to that of the auxiliary relay or contactor coil

KP - auxiliary contactor. Control coil ~240 V/50 Hz Contacts ~240V/50Hz/Imax resistance load. Current Imax is determined by the total input power of all switched elements. Three-phase contactor can be also used; in such case, the entire length of convectors can be divided into three identical parts, each connected to one phase. The contactor coil can be naturally supplied from any phase.

TE CONTROL (Off/On control type for electric heaters; the thermostat switches also heating coils)



CONTROL OF CONVECTORS DESIGNED FOR HUMID AND WET ENVIRONMENT

MINIB uses 12 V AC motors as fan drives for convectors located in humid and wet environment. AC motors have been proven to work well also in such demanding conditions. The following two convector output control types are available: A1 and E2

CONTROL A1 – Thermostat contact switches power supply sources TT240 (TT300); motors are connected to source output; their speed can be firmly set by connection to the selected terminal (7–9–12 V AC).

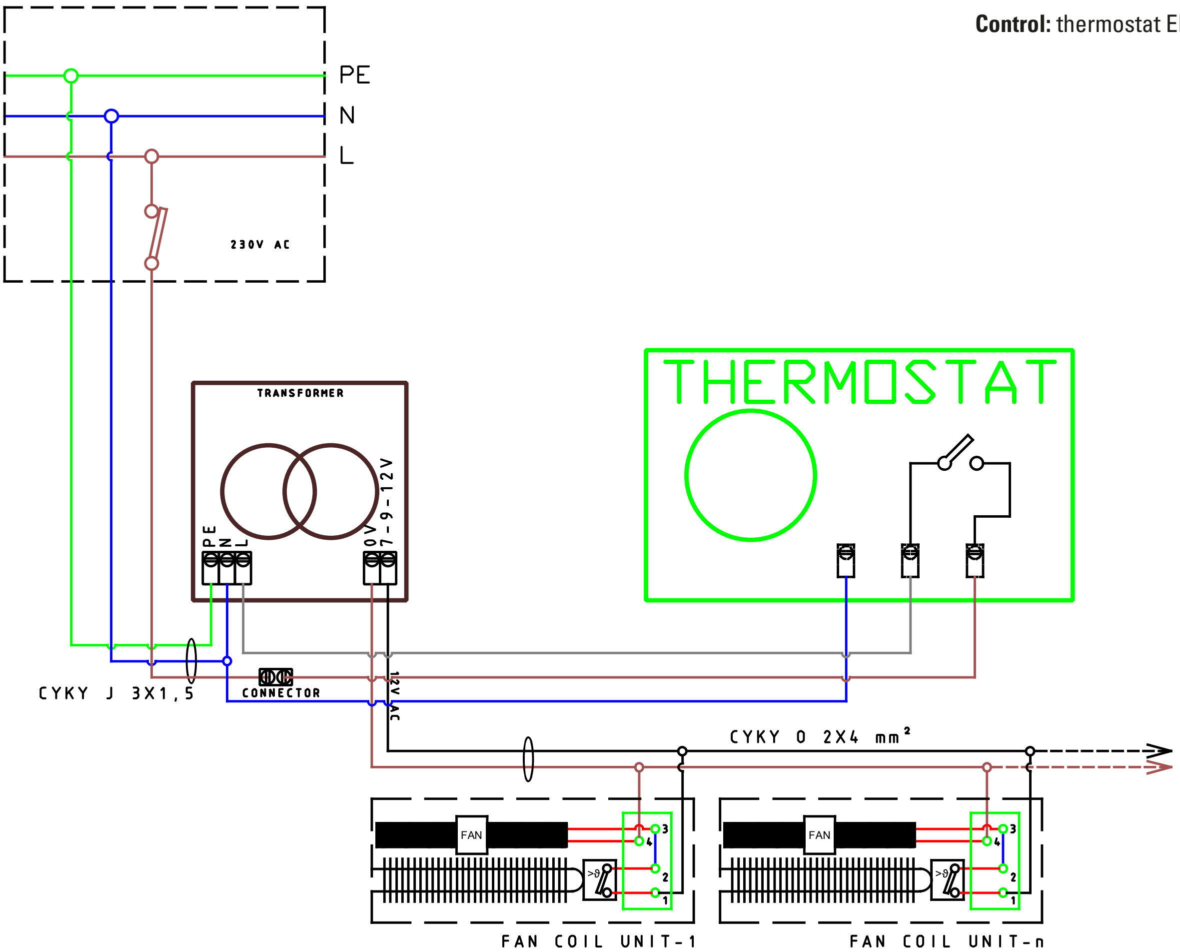
CONTROL E2 – Manual three-increment speed control using thermostat TH0482 or a MINIB potentiometer.

A1

A1 CONTROL (wet environment, ON/OFF)

Transformers which can be used: TT100, TT240, TT300

Control: thermostat EBERLE 524



Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

E2

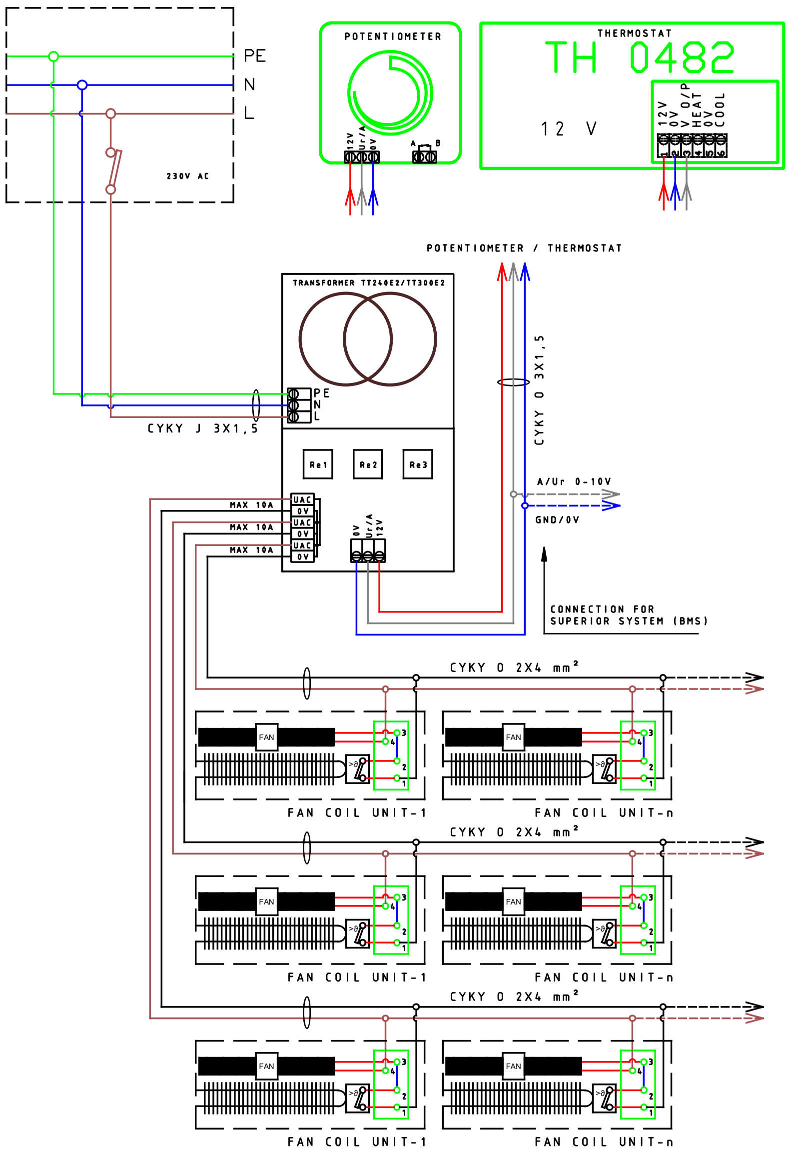
Convectors can be arranged in a series provided that the distance from the transformer is short. The star configuration connection is advantageous if the distance to the last or, more precisely, the most distant convector exceeds 20 m. Branching can be made in an EMK junction box in the wall or using WAGO terminals directly under the convector cover. In terms of electro-technical safety, the thermostat can be located also in a humid environment because it is supplied with 12 V DC power supply and motors are supplied from safe 12 V AC power source. It is recommended, however, that the thermostat be installed in locations without air humidity condensation in order to prevent corrosion.

Transformers which can be used: TT240-E2, TT300-E2

Control: 1. thermostat TH 0482

2. potentiometer MINIB

E2 CONTROL (wet environment, manual three-step speed control)
MINIB potentiometer/thermostat TH0482, heating



Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

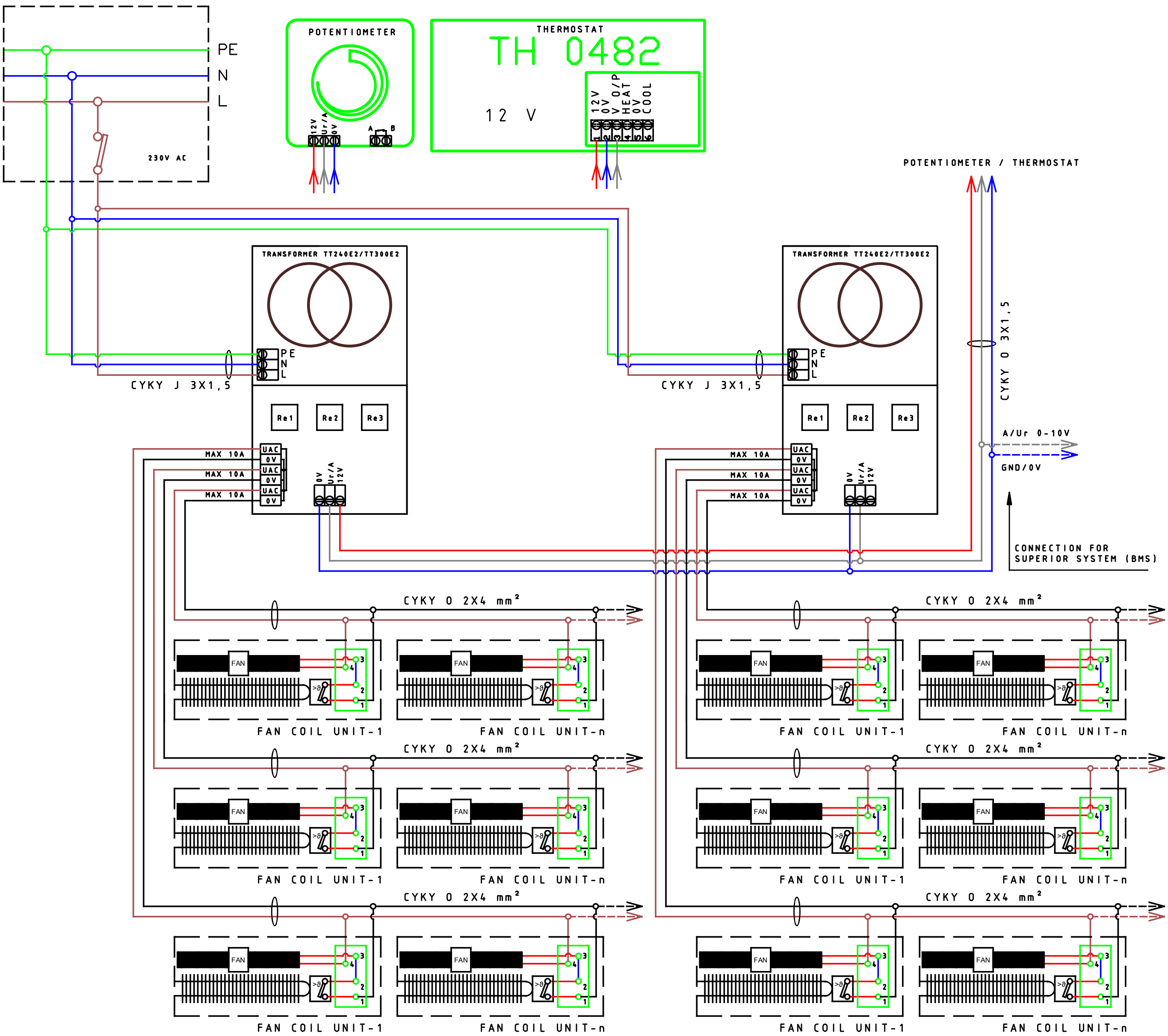
E2 with multiple transformers

CONTROL PRINCIPLE/POSSIBLE USE OF BMS

HEATING

(A/UR)	Function
0–2 V	Heating OFF, Fans OFF
2–5 V	Heating ON, Fans ON, LOW SPEED
5–9,5 V	Heating ON, Fans ON, MEDIUM SPEED
9,5–10 V	Heating ON, Fans ON, HIGH SPEED

E2 CONTROL (wet environment, manual three-step speed control) MINIB potentiometer/thermostat TH0482, heating



Conductor cross-sections are chosen according to current loading and the supply cable length. When using the conductor cross-sections specified in this material, the maximum acceptable distance between the convector and transformer is 15 m.

Procedure for selection of suitable control

- selection of control type according to the environment and client's comfort
- number and type of transformers to be determined according to the sum of the required power inputs of the convectors (see the catalog sheet)
- follow the wiring diagrams for controls intended for both dry and wet environments

Examples of selection of suitable control

ASSIGNMENT: WE NEED TO FIND A SOLUTION TO CONTROL 8 CONVECTORS IN A ROOM.

Convector types MINIB COIL T80, 2 convectors: length 2500 mm, 1 convector: length 3000 mm, 6 convectors: length 1000 mm, and convector type MINIB COIL KT, 1 convector: length 2000 mm and 3 convectors: length 3000 mm.

PROCEDURE

1. **Control selection** – we can choose from three control types intended for a dry environment: EB-A, EB-B and EB-C. As we want to choose the maximum fan speeds while also being able to select an automatic mode for greater comfort, we choose EB-C control.
2. **Determination of the number of transformers** – according to the assignment, we calculate electric power inputs of individual convectors (the values can be found in the table for the particular convector).
   Convector T80 2500mm = 12 VA i.e., 2x12=24 VA,
   Convector T80 3000mm = 16 VA i.e., 1x16=16 VA,
   Convector T80 1000mm = 4 VA i.e., 6x4=24 VA,
   Convector KT 2000mm = 36 VA i.e., 1x36=36 VA,
   Convector KT 3000mm = 48 VA i.e., 3x48=144 VA => T80 convectors have a total power input of 64 VA. KT convectors have a total power input of 180 VA.
3. **Determination of the number of transformers** – the transformer is to be chosen with a 20 % output reserve with regard to possible transmission loss due to varying conductor lengths (up to 15m), i.e., T80 64 VA + 20% = 77 VA in total and KT 180 VA + 20% = 216 VA in total; the consumption of all convectors is counted as 293 VA.
   The power input of 293 VA must be covered with the output of one transformer TT300.
4. **Another step is to order all control elements** – a standard supply for the order: 1x Thermostat TH0482/ EB-C control + 1x transformer TT300. Optionally it is possible to install an electrothermic head 12 V DC NO in each convector.

Example of selection of suitable control for humid environment

ASSIGNMENT: WE NEED TO FIND A SOLUTION TO CONTROL 4 CONVECTORS IN A SWIMMING POOL AREA.

Convector types MINIB COIL KO, 2 convectors: length 2500 mm, 2 convectors: length 3000 mm.

PROCEDURE

1. **Control selection** – we can choose from two control types intended for a humid environment => A1, E2. We choose E2 for greater comfort.
2. **Determination of the number of transformers** – according to the assignment, we calculate electric power inputs of individual convectors (the values can be found in the table for the particular convector).
   Convector KO 2500 mm = 106 VA i.e., 2x106=212 VA,
   Convector KO 3000 mm = 111 VA i.e., 2x111=222 VA => KO convectors have a total power input of 434 VA.
3. **Determination of the number of transformers** – the transformer is to be chosen with a 20% output reserve with regard to possible transmission loss due to varying conductor lengths (up to 15m), i.e., KO 434 VA + 20% = 521 VA in total; the consumption of all convectors is counted as 521 VA.
   The power input of 521 VA must be covered with the output of two transformers TT300-E2.
4. **Another step is to order all control elements** – a standard supply for the order::
   1x Thermostat TH0482/ E2 control + 2x transformer TT300-E2.

ACCESSORIES

SCREW FITTING

Angular

Straight

1/2"

3/8"

1/2"

3/8"

THERMOSTATIC VALVES

Angular

Straight

1/2"

3/8"

1/2"

3/8"

MULTILUX 1/2"

M-PR-01 1/2"

M-RO-02 1/2"

BALL VALVES

1/2''

3/8''

HOSES

Flexible hose WS110 65 mm ½“

Flexible hose WS110 41 mm ½“

Flexible hose WS110 65 mm 3/8“

Flexible hose WS110 41 mm 3/8“

GASKETS

Klingersil C4400 1/2'' and 3/8''

THERMOSTATIC HEADS

IVAR T3000

IVAR T1000

HEIMEIER DX CHROME

MULTILUX 4 SET CHROM

Danfoss RAE-K-5036
with remote sensor and 2 m capillary

Heimeier K - white
with capillary and removable sensor

Heimeier Thermostatic head F
with remote set-up

Electrothermic head

IVAR 12 V 2 W NO

TRANSFORMERS

for wet environment

TT240 E2 165x305x75 mm

TT300 E2 165x305x75 mm

TRANSFORMERS

for dry environment

TT100 (100VA) 145x170x75 mm

TT240 (240VA) 165x210x75 mm

TT300 (300VA) 165x210x75 mm

THERMOSTATS

Potentiometer MINIB EB-A

Thermostat ABB EB-A

Thermostat TH0482

Thermostat CH110

Thermostat CH150

Thermostat EBERLE 524

Converter

230 V or 24 V/12 V ADA-EB

REINFORCEMENT

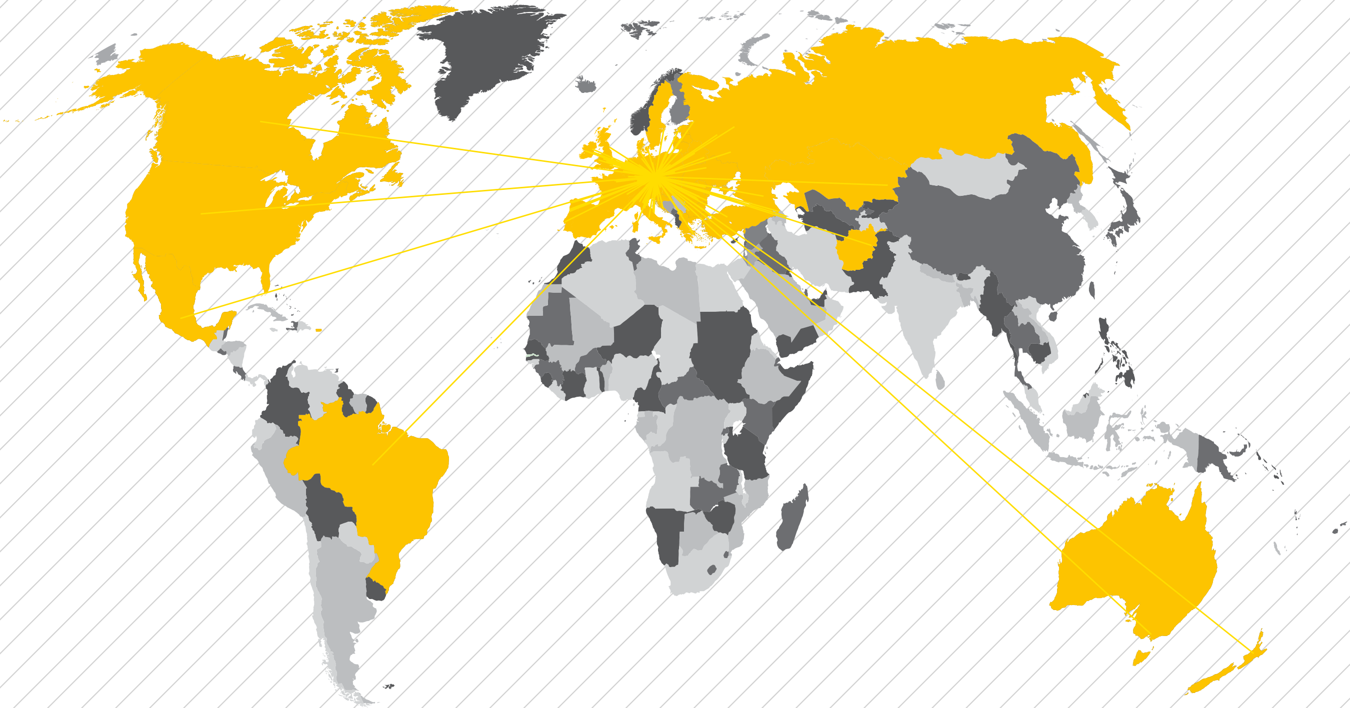
Reinforcement for convectors for installation in hollow floor

ANTI-VIBRATION SHEET

Anti-vibration sheet, thickness 2 mm

MINIB®

••• more than just heat



HEAD OFFICE

MINIB, a.s.
Střešovická 465/49, 162 00 Praha 6
Czech Republic

FOREIGN TRADE:

Phone: +420 220 180 809
Cell Phone: +420 734 614 540
Cell Phone: +420 734 700 736
E-mail: export@minib.cz, www.minib.com

PRODUCTION

Manufacturing plant of MINIB, a.s.
Býkev u Mělníka 84, 276 01 Býkev
Czech Republic

02/2016