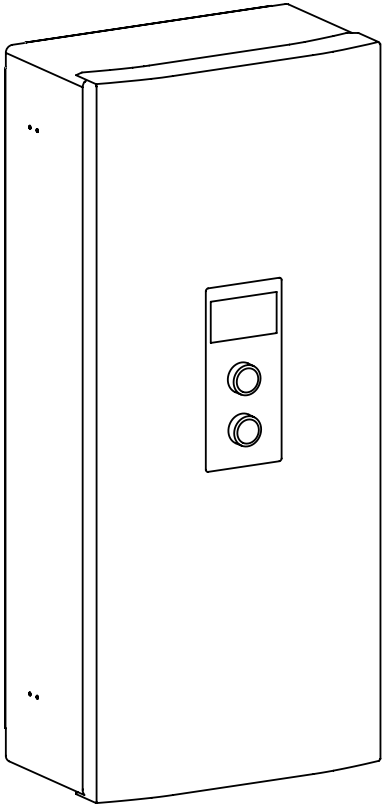
KOSPEL

Electric Central Heating Flow Boiler



EKCO.M3
EKCO.MN3

Assembly and operating instructions

EKCO.M3 ver. 2
EKCO.MN3 ver.2

This appliance can be used by children aged from 3 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance.

Cleaning and user maintenance shall not be made by children without supervision.

Used product can't be treated as general communal waste. Disassembled appliance has to be delivered to the collection point of electrical and electronic equipment for recycling. Appropriate utilisation of used product prevents potential negative environmental influences that may occur as a result of inappropriate handling of waste. In order to get more detailed information about recycling this product you should contact the local government unit, waste management service or the shop where this product has been purchased.

Safety instructions

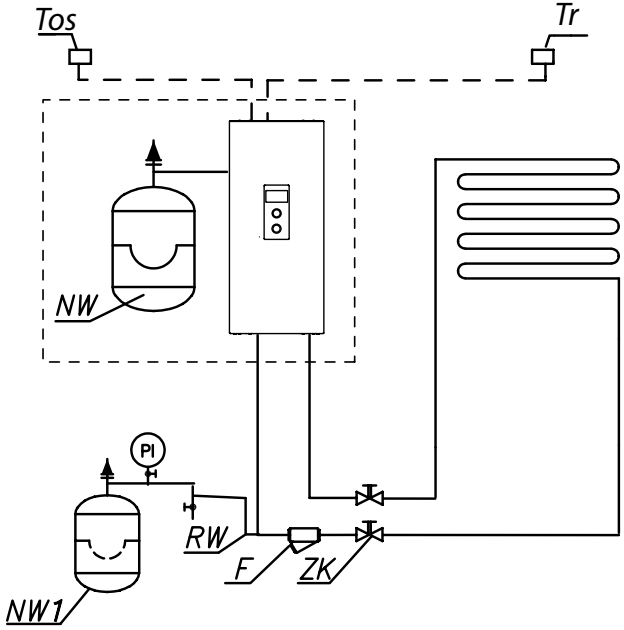
1. Read and strictly follow this installation and operating instructions to ensure a long life and reliable boiler operation.
2. An efficient electrical installation which has been completed in accordance with the binding norm of electric installation.
3. Central heating system equipped with an appropriate expansion vessel completed in accordance with binding norm of hydraulic installation.
4. Rinse the heating installation thoroughly before installing the boiler.
5. Do not install any barrier fittings (e.g. valves) on the outlet of the safety valve.
6. Boiler can only be installed on the flat surface.
7. Boiler must not be installed in a humid place, in a place exposed to the danger of explosion, or in which the temperature may drop below 0°C.
8. Boiler installation and all electrical and hydraulic work must be performed by a qualified professional installer in accordance with the manufacturer's instructions.
9. All installation work must be performed when the power and water supply is turned off.
10. Electric installation should be equipped with residual current protective devices and other solutions which will ensure disconnecting the heater from the source of power (intervals between all their poles should not be less than 3mm).
11. Boiler is preset by the manufacturer to work with the central heating system. Change the factory settings in the advanced settings to shift to boiler's cooperation with DHW Cylinder.
12. Electronically controlled boiler is a electrical surge sensitive device, therefore the electrical installation must contain surge protection devices.
13. Do not drain the water from central heating system after the heating season.
14. Leave the controller in stand-by mode and do not cut off power supply between.

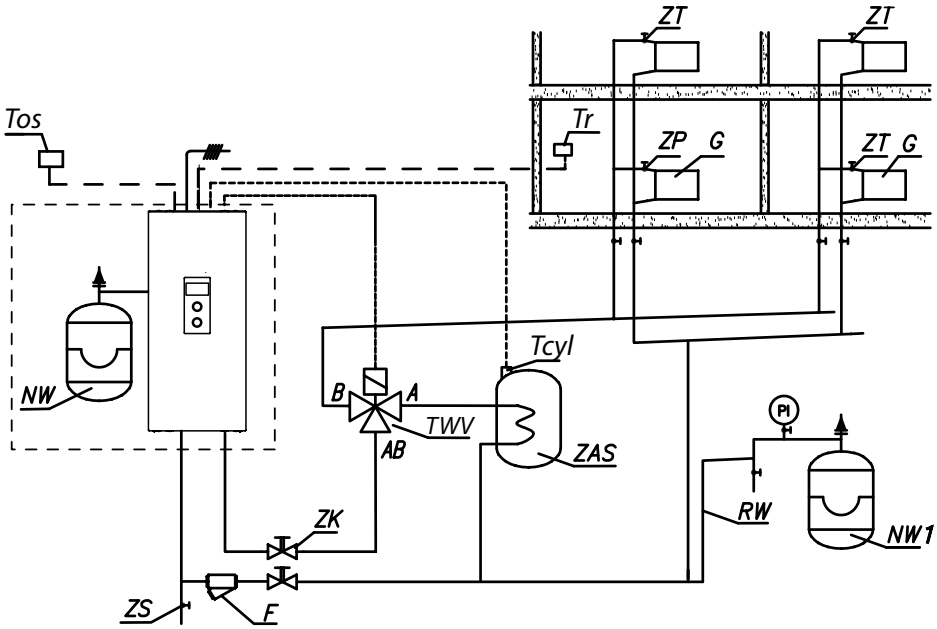
EKCO.MN3 boilers are equipped with an expansion vessel (capacity: 5l, pressure: 1,5 bar). The expansion vessel is sufficient for following capacities of the heating system at given temperatures of the medium and central heating system pressure.

Temperature of heating medium (feed and return)	Capacity of central heating system	Pressure in central heating system
[°C]	[l]	[bar]
85/70	56	1,5
70/55	80	
55/45	127	
50/40	153	
45/35	188	

Shall the capacity of the wet central heating installation be larger, an extra expansion vessel should be installed on it as applicable in accordance with binding norm

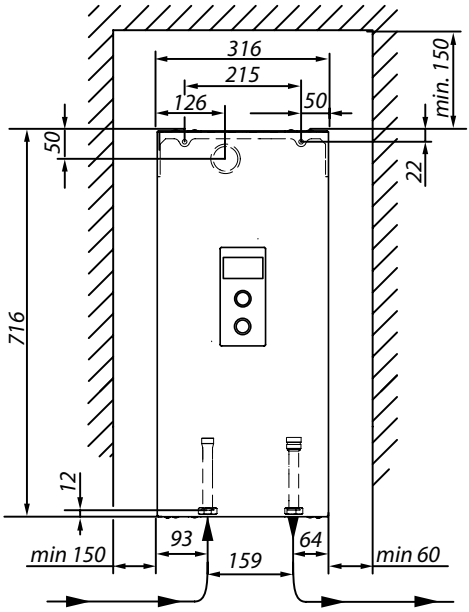
Boiler connection to the central heating system





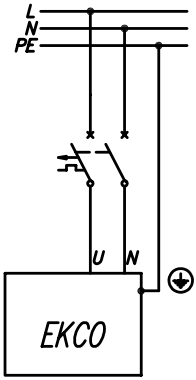
PI - manometer
ZK - cut-off valve
RW - expansion pipe
NW - built-in expansion vessel (EKCO.MN3)
NW1 - expansion vessel
ZT - thermostatic valve
ZP - passage valve
F - filter
G - radiator
ZS - drain valve
TWV - three-way valve
ZAS - DHW Cylinder
Tr - regulator of room temperature
Tcyl - DHW cylinder temperature sensor
Tos - outside temp. sensor

The filter should be installed that the heating medium flow direction matches the arrow cast on the hull, and the cover was at the bottom of the filter. Filters can be mounted on horizontal and vertical pipelines. It is recommended to use shut-off valves immediately behind and ahead of the filter, which will make cleaning and replacing trhe insert filter easier.

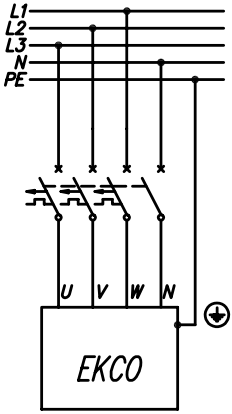


1. Hang the boiler up in a vertical position on fixing screws with the inlet and outlet pipes to the bottom, maintaining clearances from the walls and the ceiling.
2. Connect the boiler to the central heating system equipped with a cut-off valves.
3. Fill the central heating system with treated water or non-freezing liquid what influences on the durability of immersion heaters.
4. Vent the central heating system.
5. Connect a boiler to the electrical system.
6. Assembly and connect the room regulator sensor and other devices cooperating, according to the „Connection point external sensors and devices".
7. After completing the above steps start the boiler, set up boiler language and maximum output and vent the pump *[Configuration> Pump> Venting> Turn on]*.
8. Set the maximum temperature factor in the installation *[Configuration> Central heating> Max boiler temp.]*.

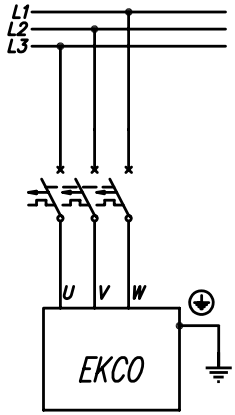
Depending on the model of purchased boiler and the electrical installation on site, the boiler should be connected in accordance with the drawings below.



2, 4, 6, 8 kW 230V 1N~

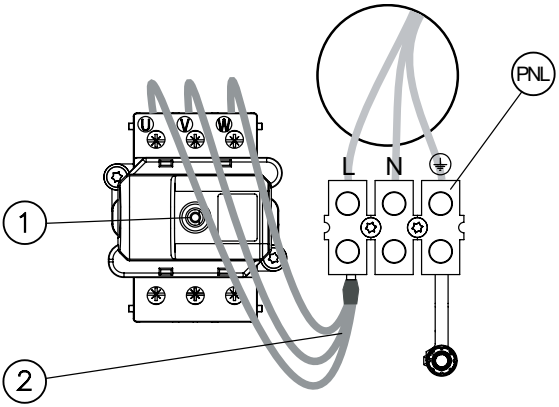


4 to 24kW 400V 3N~



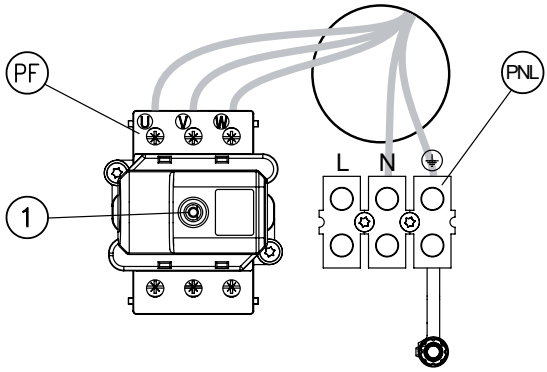
230V 3N~

Single phase connection 230V 1N~



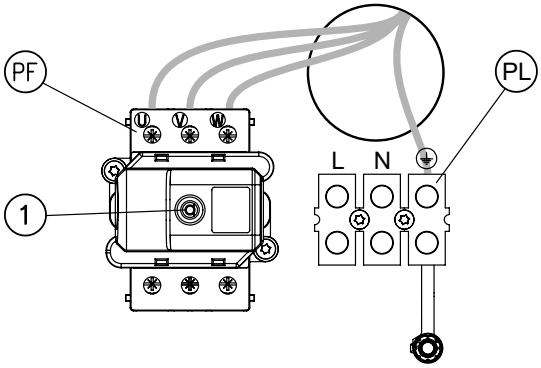
PNL - connection points of neutral, protective and phase conductors
[1] - temperature limiter
[2] - additional conductors (for one-phase system only)

Three phase connection 400V 3N~



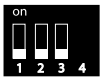
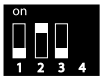
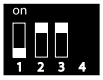
PNL - points of neutral and protective conductor connection
PF - points of phase conductors connection
[1] - temperature limiter

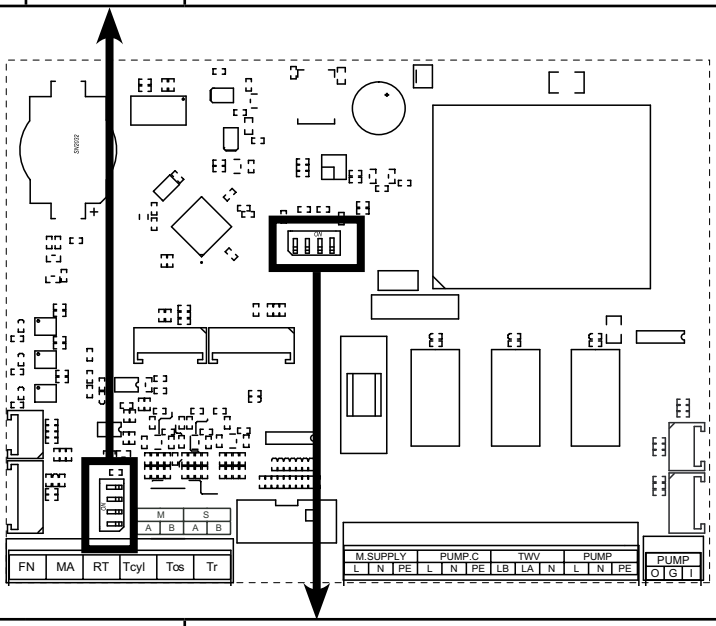
Three phase connection 230V 3N~

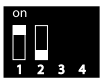


PL - points of neutral and protective conductor connection
PF - points of phase conductors connection
[1] - temperature limiter

Before turning on the power ensure that the switch settings are in compatible configuration with the boiler's model and the type of installation.

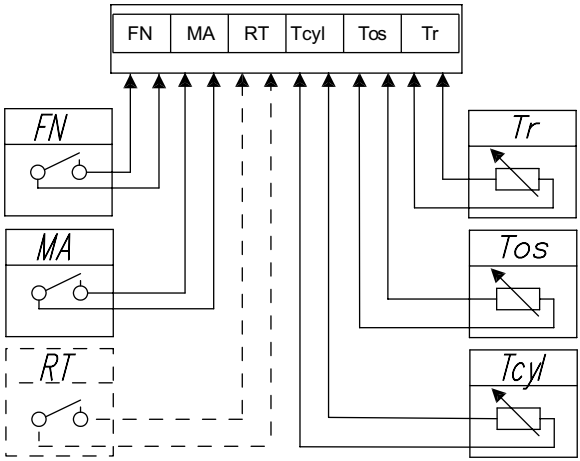
Switch setting		Rated power and type of installation
	1 - OFF 2 - OFF 3 - OFF	12 / 16/ 20 / 24 kW, three phase 400V 3N~
	1 - OFF 2 - OFF 3 - ON	4 / 6 / 8 kW, three phase 400V 3N~
	1 - OFF 2 - ON 3 - OFF	2 / 4 / 6 / 8 kW, single phase 230V 1N~
	1 - OFF 2 - ON 3 - ON	6,9 / 9,2 / 11,5 / 13,8 kW, single phase 230V~
	1 - ON 2 - OFF 3 - OFF	9 / 12 / 15 / 18 kW, three phase 230V 3~



Switch setting		Function
	1 - ON 2 - OFF	EKCO.M3 boiler in stand-alone mode or master in cascade operation
	1 - OFF 2 - OFF	EKCO.M3 slave boiler in cascade operation mode (EKCO.S3)

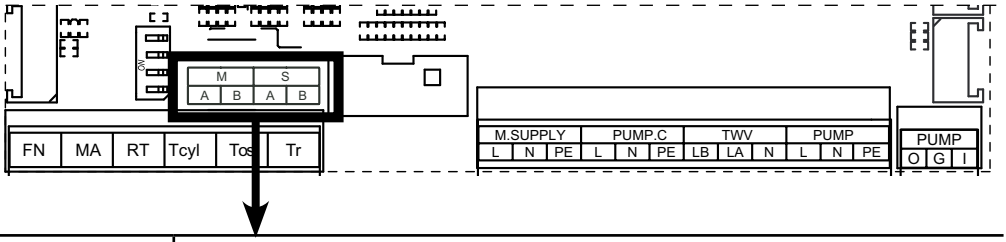
Connection of external control signals

Do not connect any voltage into FN, MA, RT, Tcyl, Tos, Tr entries! This can result in permanent controller damage.



entry symbol	function
FN	External forcing of temperature change or work algorithm *[Configuration> FN entry].*
MA	In order to limit the power used, i.e. the boiler can cooperate with other appliances such as an electric water heater. In order to do so, an electrician should install in line an extra open contact to the MA entry, so that when a master appliance gets on, the contact opens, and the boiler switches off- it results in heating blockage and pump's standstill.
RT	Optional control of the boiler's operation with an external temperature regulator. Entrance RT must be activated *[Configuration> Room temperature> Temp. sensor RT]*, short circuit voltage-free contact will turn on the heating of the CH system. In case of activation of the RT input, the built in functions of timer and room regulator will not be available.
Tcyl	DHW cylinder temperature sensor. Optionally, it can be replaced with an external contact thermostat. To do this, activate the external DHW thermostat. *[Configuration> Hot water > Regulation> Outside]*. Short circuit of the Tcyl input will result in switching on the DHW cylinder heating. When an external DHW regulator is activated., the built-in functions of timer and temperature regulator will not be available.
Tos	Outside temperature sensor (Tos). It should be installed in a shaded place, on the north or north-west facade of the building, away from windows and ventilators.
Tr	Room temperature sensor (Tr). It should be installed in a representative location of the facility, away from heaters, windows, doors and communication routes.

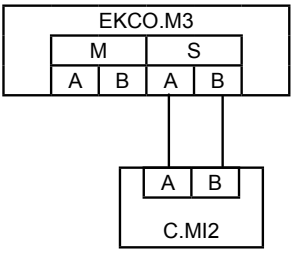
Communication bus RS485



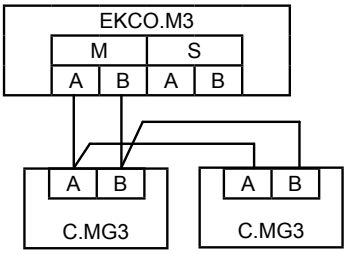
entry symbol	entry functions
S	• boiler in a stand-alone mode or master boiler in cascade mode - connection only for internet module C.MI2. • slave boilers in cascade mode - connection to the master boiler.
M	connection of heating modules and boilers in slave mode.

Connecting external devices via communication bus

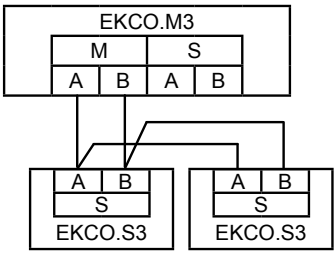
Internet module C.MI2



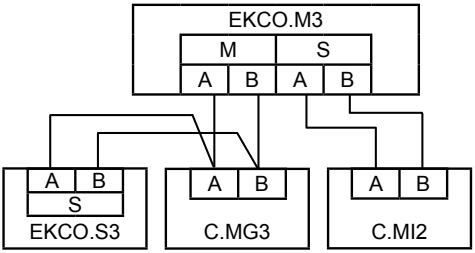
Heating module C.MG3



Slave boilers EKCO.S3 in cascade mode



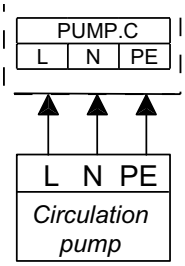
Internet module C.MI2, heating module C.MG3, slave boiler EKCO.S3 in cascade mode



Note, each device connected to the communication bus must have a unique identification number set.

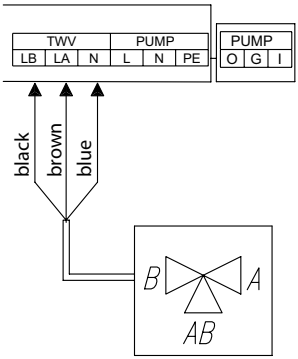
Connection of actuators

PUMP.C – circulation pump



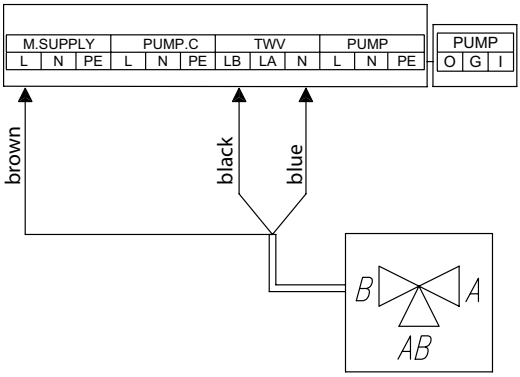
TWV - three-way valve connection
Depending on the type of drive control used (SPDT or SPST), select the appropriate valve connection diagram. The LA contact is active (the relay gives the voltage to the output) while the boiler is heating to CH. The LB contact is active at the time when the boiler is heating up on the DHW cylinder.

SPDT

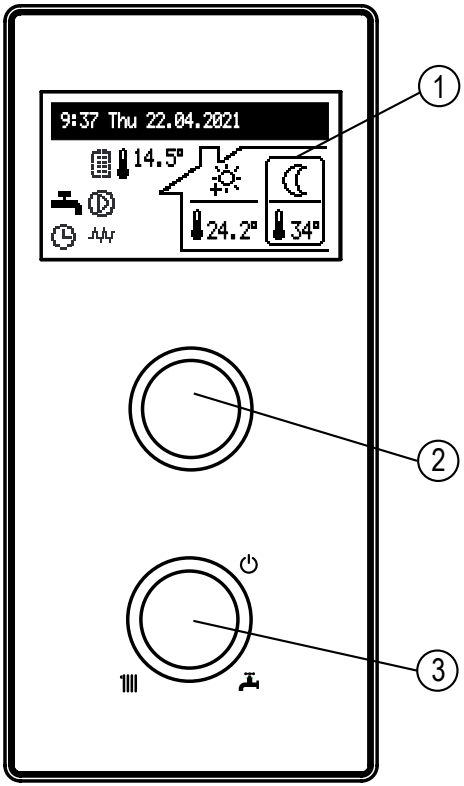


VCZMH6000E
VC6013ZZ00

SPST



AZV 642



1 - display
2 - navigation dial
3 - operating dial

By turning the operating dial [3] left or right, you can set the operating modes: stand-by ⏻ , CH, DHW, CH + DHW .By turning the navigation dial [2] (left or right) in all modes except stand-by, the function screens will apper on the display [1]. C.MG3 circuit screens are also available in the display.

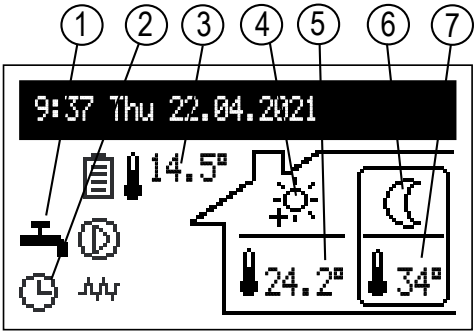
- Main screen: informs about the basic parameters of the boiler (details in the table),
- Preview of parameters: information about the conditions and values of the boiler parameters,
- Statistics: information about energy consumption,
- Settings: adaptation of the boiler parameters to the user's preferences,
- Configuration: configuration of the heating system to the requirements of the facility,
- Service: (available for the installation company and specialized services after entering the access code),
- Fast modes: switching the boiler to special modes.

Entering individual functions takes place after selecting a corresponding function screen and pressing the navigation dial.

Boiler's error is signalled on the main function screen Err . After pressing the navigation dial [2], the list of detected errors is displayed.

MAIN SCREEN:

1 - heat reception signalling
2 - heating program execution
3 - outdoor temperature
4 - work in accordance to CH schedule, the symbol indicates current temperature
5 - room temperature
6 - work in accordance to DHW schedule, the symbol indicates the current temperature.
7 - DHW cylinder temperature



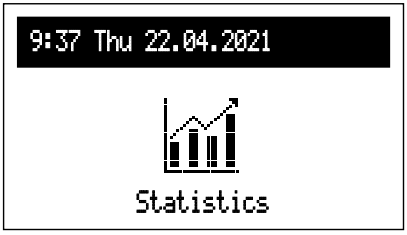
Heat reception:	
	Hot water heating / DHW cylinder
	CH system heating
	Buffer charging
Heating program execution:	
	According to the daily/weekly schedule
	PARTY – maintaining a comfortable temperature in the room and the DHW cylinder
	HOLIDAY - maintaining a comfortable economical or anti-freeze temperature in the room or anti-freeze protection in the DHW cylinder
	MANUAL - keeping the set room/DHW cylinder temperature, (preset schedule inactive)
	TURBO - heating up to the maximum parameters until the set room temperature is reached
	DHW cylinder disinfection
	Circulation pump venting
MA	Heating blocked by signal from master device

Temperature settings for the room:	
	Frost protection
	Economy temperature
	Comfort temperature
	Comfort temperature plus
	Comfort temperature minus
	Request for heating from room regulator (connected to RT entry)
	Buffer schedule - loading off
	Buffer schedule - loading on
23.5°	Executed temperature value - working in manual CH mode

DHW cylinder temperature settings:	
	Frost protection
	Economy temperature
	Comfort temperature
	Request for heating from outside regulator (connected to Tcyl entry)
47°	Executed temperature value - working in manual DHW mode

Signaling other settings:	
Err	Device's error indication
	Circulation pump operation indication (pulsating means that minimum flow is not provided) For boilers wit rated power up to 8kW, the minimum flow rate is 3.5 l/min, for higher powers 4,5 l/min.
	Heating on indication
	The PV energy limit is on. If all the power is used, the displayed battery symbol is empty.
	Symbol placed next to room temperature value - room temperature control enabled. Symbol placed next to the outside temperature value - temperature control according to the heating curve.
	Symbol placed next to room temperature value - room temperature control disabled. Symbol placed next to the outside temperature value -constant heating parameters, independent of external temperature

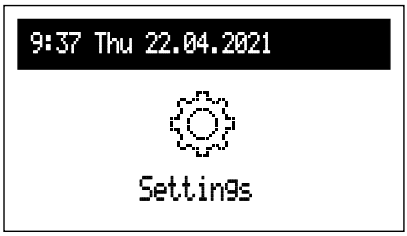
STATISTICS:



Current and historical energy consumption data.

- Daily counters: energy consumed on individual days of the month.
- Monthly counters: energy consumed in each month.
- Remaining energy (visible when the energy consumption limit is set up *[Configuration > PV options > Energy limit: Yes]*): amount of energy to consume.
- Consumed energy: total energy consumed by the device.
- Energy cur. week: energy consumed in the current week.
- Energy prev. week: energy consumed in the previous week.
- Energy cur. year: energy consumed in the current year.
- Energy prev. year: energy consumed in the previous year.

SETTINGS :



Adjusting boiler parameters to user preferences.

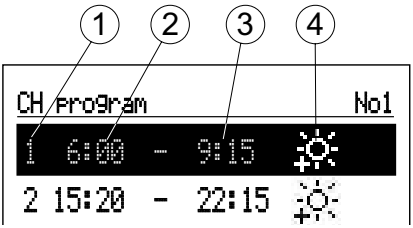
- Boiler temperature: Target CH temperature (only available in basic mode and setting the constant parameters of CH *[Configuration> Central heating> Regulation> Constant]*.

- Room temp.: setting the requested room temperature, available with activated Tr sensor *[Configuration> Room temp.> Temp. sensor> Tr]*.
  - Economy temp. ☾, Comfort minus ☼, Comfort ☼, Comfort plus ☼ : setting room temperature values available in schedules,
  - PARTY, HOLIDAY: select temperature parameters for programs: PARTY & HOLIDAY.

- DHW temperature: setting requested teperature of the DHW cylinder, (available only with activated inside regulation. *[Configuration> DHW cylinder > Regulation> Inside]*):
  - Economy temp. ☾, Comfort ☼: setting hot water temperature values available in schedules

- Energy [kWh]: The counter of available energy. If energy consumption is to be reduced, the amount of available energy (e.g. surplus from PV production) should be set. When the declared amount of energy is exhausted, the boiler will not turn the heating on. This function is available when the power limit is on > *[Configuration> PV options: Energy limit: Yes]*. Note that the function is not available in cascading mode.
  Note, the rated parameters of the device are used to calculate the energy consumption, in case of deviations, there will be slight discreptancy from the indications of the measuring devices of the grid operator.

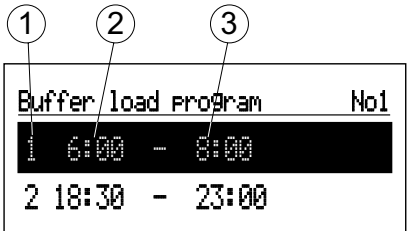
- CH program (only available in basic mode with activated sensor Tr) *[Configuration> Room temp.> Temp. sensor> Tr]:*
  - No. 1...No. 8 > setting 8 daily programs. In each daily program there are 5 editable time frames, which can have one of the room temperature sets (❄☼☼☼). In any other case, the economy temperature will be activated (☾).



1 - no. of time frame according to schedule (max 5)
2 - time of starting the selected temperature
3 - time of finishing the selected temperature
4 - temperature selection: ❄☼☼☼

  - Weekly: assigning for each day of the week one of the previously set daily programs. Setting up daily programs procedure is described in **Daily Schedule paragraph**.

- Buffer load program (only available in buffer mode *[Configuration > Working mode: Buffer]*).
  - No.1...No.8 - setting of 8 daily programs, in each daily program there are available 5 time frames in which the buffer will be charged.

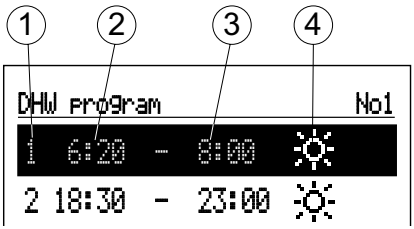


1 - the number of the time interval (max.5)
2 - buffer charging start time
3 - buffer charging finish time

  - Weekly: assigning for each day of the week one of the previously set daily programs. Setting up daily programs procedure is described in **Daily Schedule paragraph**.

- DHW program (only available in DHW cylinder systems with internal adjustment activated *[Configuration > DHW cylinder > Regulation> Inside]*).

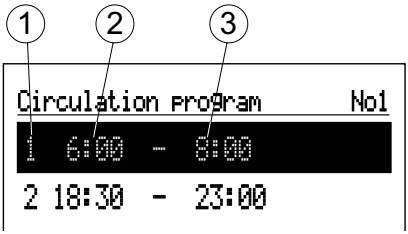
- No. 1...No. 8 > setting 8 daily programs. In each daily program there are 5 editable time frames, which can have one of the cylinder temperature sets (❄,☼)In any other case, the economy temperature will be activated (☾).



1 - the number of the time frame (max.5)
2 - start time of the selected temperature
3 - finish time of the selected temperature
4 - temperature selection: ❄,☼

- Weekly: assigning for each day of the week one of the previously set daily programs. Setting up daily programs procedure is described in **Daily Schedule paragraph**.

- Circulation program: DHW circulation pump schedule, available only within active circulation in DHW system *[Configuration > Circulation > Yes].*
  - No. 1 ... No. 8> setting of 8 daily programs in each daily program. There are 5 adjustable time frames in which the circulation pump will work.



1 - no. of time frame according to schedule (max 5)
2 - start time of circulation pump operation
3 - finish time of circulation pump operation

- Weekly: assigning for each day of the week one of the previously set daily programs. Setting up daily programs procedure is described in **Daily Schedule paragraph**.

- Disinfection (only available in systems with DHW cylinder):
  - Temperature: the value of the temperature in the tank during disinfection,
  - Week day: the day for disinfection during automatic program,
  - Hour: the time of disinfection in automatic program,
  - Working time: time of disinfection (calculated from the moment the temperature has reached disinfection value),
  - Automatic mode: automatic start of disinfection at the set time (time, day of the week),
  - Ciculation: disinfection of the entire DHW installation or only the DHW cylinder (available only with active circulation),
  - Activate now: manual start of disinfection (independent of the day or time set).

- Time/Date:
  - - setting of the current system time (YEAR / MONTH/ DAY / HOUR).

- Interface:
  - Brightness min: setting the brightness of the display in stand-by mode.
  - Brightness max: setting the brightness of the display during the work.
  - Sound: Yes> On / No> Off
  - Dial sensitivity: 1 - high / 4 - low.

- Language:
  - menu language setting

- System:
  - Type: EKCO.Mx3 (ID)
  - MSK program: boiler's driver version
  - PW program: the version of panel's program
  - Max rated power: boiler's set rated power
  - Pump type: type of pump installed in the CH system
  - Reset: boiler's start-up
  - Factory settings: restore to factory settings

CONFIGURATION:

Configuration: adaptation of the boiler to the heating system in the facility.

** Changes in the configuration menu are possible after entering an access code. When prompted for an access code, turn the navigation dial to the required code and confirm the code by pressing the dial. If you want to retract from the code request screen, hold the navigation dial or wait until automatic return to main function screen.*

Code : 987

- Buffer (available only in buffer mode *[Configuration > Working mode: Buffer]*):
  - Buffer temp.: temperature of the buffer charging medium.
  - Load off-program:
    Yes - consent to work outside the schedule with parameters according to the needs of the heating modules
    No-charging in time frames according to program

- Central heating:
  - Weather comp.*: Choice of heating curve.
  - Offset*: offset of the heating curve.
  - Max boiler temp.: maximum CH temperature.
    Attention: adjustment of too high temperature parameters not compatible with the type of building, central heating installation and building's insulation may lead to high exploitation costs.
  - Set boiler temp.: Temperature in CH installation when cooperating with constant parameters and in emergency conditions.
  - Regulation: Per curve / Constant.
    Per curve > temperature in CH installation is calculated on the basis of outside temperature and heating curve parameter.
    Constant > temperature in CH installation is equal to SET BOILER TEMP
  - Frost protection: frost protection of the building ON.

* not available in buffer mode

- Boiler protection:
  Yes - if the temp of the inside sensor of the boiler drops below 5*C, the circulation pump will turn on
  No-protection turned off

• Outside temp: the configuration parameters of the outside temperature sensor.
- Sensor Tos:
  Yes - sensor on, all functions related to external temperature will be active,
  No-sensor inactive - disables the function Emergency out. temp.. In the absence or failure of the sensor, the error Tos is not displayed.
- Outside temp off: the value of the outside temperature after which the heating of the CH circuit is switched off. The histeresis equals 2°C. For example, for a setting of 15°C, the heating will be switched off if the outside temperature reaches 15°C, the heating will be switched on if the outside temperature drops to 13°C. Parameter available with active Tos sensor.
- Emergency out temp: the parameter used to calculate the heating curve in the event of a failure of the outside temperature sensor
- Tos calibration: calibrating the value of the indicated outside temperature. Depending on the character, the parameter is added or subtracted from the measured value. Parameter available with active Tos sensor.

• DHW CYLINDER:
- Control: selection of the three-way valve control pattern:
  - A-DHW B-CH
  - A-CH B-DHW
- DHW coil temperature: coil's feed temperature
- Regulation: DHW cylinder temperature control:
  Inside>performance according to the internal controller (built into the device), the time programmer and the measured temperature in the cylinder. To work in internal controller mode, Tcyl sensor is required.
  Outside> according to external thermostat (in OUTSIDE setting the following modes are not available: DHW CYLINDER TEMPERATURE, DHW CYLINDER PROGRAM, DISINFECTION and MANUAL DHW).
- Cancel: turning off the DHW function.

• Circulation: enabling or disabling the DHW circulation pump control and DHW system circulation function.

- Room temp.:
  - Temp. Sensor: choosing the type of room thermostat
    RT -external room controller (heating order by short-circuiting the contact at RT entry),
    Tr - internal room controller, room temperature sensor connected to the Tr input.
  - Tr control: room temperature control
    Yes - heating turned off after reaching set room temperature.
    No-Tr control turned off, room temperature reading does not affect the CH
    Parameter active and visible only at the *[Room sensor: Tr]* setting.
  - Tr hysteresis: room temperature hysteresis with Tr control enabled *[Configuration > Room temp > Tr control: Yes]*.
  - Tr calibration: calibration of the indicated room temperature. Depending on the character, the parameter is added or subtracted from the measured value.

- Aut. Turbo mode:
  - Switching on the full heating power in case of a large difference between the set and current room temperature (Tr). The boiler heats at full power until the set temperature is reached and then enters the set operating mode.
  - Tr hysteresis: a drop in room temperature which triggers the turbo function.
  - DHW cylinder
    No - DHW priority in Turbo mode turned off
    Yes - DHW priority in Turbo mode turned on
  - CANCEL - turns off automatic Turbo mode.

  * If Turbo mode is off - menu will only show a possibility to turn it on.

- Pump:
  - Pump over run: time to turn the pump on for a short time at a longer standstill (protection against blocking).
  - Automatic mode:
    Yes - the pump operates according to demand,
    No - the pump operates continuously.
  - Regulation:
    Const p - constant pressure
    Variable p - variable pressure
    In the regulation mode (CONST P.), the pressure difference produced by the pump is maintained at a constant set level in terms of performance to pump's maximum characteristics. This type of regulation is recommended for floor heating or older heating systems with pipes of larger diameters, as well as for all applications with constant characteristics.
    In the regulation mode (VARIABLE P.) the pressure difference produced by the pump is maintained at the level of settings changing linearly between 1/2H and H. Setting pressure differences decreases or increases depending on the flow. This regulation type is recommended for heating systems with heaters, thanks to which flow noise in thermostatic valves is reduced.

- CH venting:
  Turn on: start the process of venting the installation in the CH circuit,
  Turn off: venting process terminatiot.
- DHW venting:
  Turn on: start the venting process of the installation in the DHW circuit,
  Turn off: venting process termination.
  During the venting procedure (10 min), the pump operates alternately at maximum and minimum rotational speed. Thanks to this, air bubbles are amassed, which facilitates their removal from the system. Once the process is complete, it will automatically shut down. During venting, the heating process is blocked.
- H max. [m]: the height of the pump lift. Adjust the parameter value according to the CH installation and boiler's power. The parameter directly affects the value of the factor flow through the installation. Too high or too low flow rate directly affects the economy of the CH installation and the power consumption.

• Boiler rated power: setting rated power for paticular work types:
- Max rated power: setting maximum power reate
- CH limit: maximum heating power set for CH
- DHW limit: maximum heating power set for DHW, available only with DHW cylinder function turned on
- PV limit: maximum heating power in PV mode. Available only in working modes:
  - Standard [Configuration > Working mode: Standard],
  - Buffer *[Configuration > Working mode: Buffer]* with cascade disabled *[Configuration > Cascade: No]* and FN entry set to PV *[Configuration > Entry FN: PV]*.

• Entry FN: : selection of boiler mode for short-circuit Entry FN.
- Off: entry FN inactive.
- ☾: forcing the economic temperature in CH and DHW circuits,
- ❄: forcing the anti-frost temperature in CH and DHW circuits,
- PV: forcing the PV mode based on off-schedule heating with power limited by the user.

• Communication:
- Device number: device's number in the bus.

- Pressure sensor:
  No - turning the control off
  Yes - turning the control on
  Pressure control should be switched off only when boiler works in an open CH system.

- Working mode:
  Standard: boiler is the only device that controls CH system.
  Source: the boiler acts only as a heat source and the heating system is controlled by heating modules.
  Buffer: the boiler controls the function of charging the buffer, buffer discharge is controlled by the heating modules

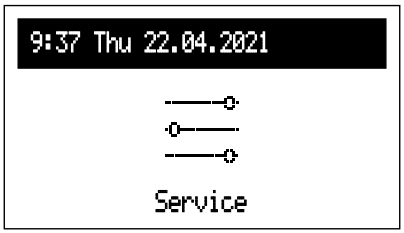
- PV options:
  - Energy limit:
    Yes - energy limit turned on
    No - energy limit turned off
  - Tr offset: the value by which the boiler can increase the room temperature at the time of PV energy production (Entry FN short circuit). This feature is available when cascading is disabled *[Configuration > Cascade: No]*, the boiler runs in satndard mode [Configuration > Working mode: Standard] and FN entry set to PV *[Configuration > Entry FN: PV]*.

- Cascade:
  No - disabled operation in the cascading mode,
  Yes - enabled operation in the cascading mode.
  Cascading boiler connection is not available in buffer mode.

Exit any menu item by pressing „END" or by pressing and holding the navigation dial. When not operated by the user, main function screen will appear after about 3 min.

If CMG.3 heating modules are connected to the boiler, additional options will be displayed in the configuration menu. A detailed description can be found in the module manual.

SERVICE:



Diagnostic tools, access for the installation company and specialized services after entering the access code.

FAST MODES:

Fast switching algorithm of work depending on the needs.

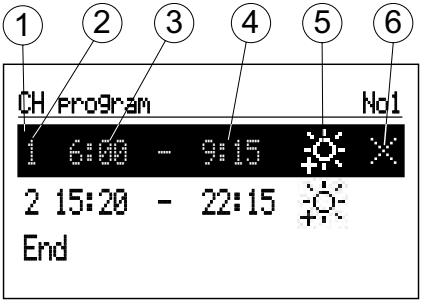
- Party: setting the mode's duration (from 1 to 24 hours or until cancellation). During party mode, the boiler will provide heat to the CH installation accordingly to the user's defined room temperature setting *[Settings > Room temp. > Party]*, and the DHW installation with comfort temperature.
- Holiday: mode duration (from 1 to 60 days or until cancellation). During the holiday mode, the boiler will provide heat to the CH installations accordingly to the user's defined room temperature setting *[Settings > Room temp. > Holiday]*, and the DHW installation with anti-frost temperature.
- CH manual: setting the room temperature to be executed by the control system. In manual mode, the timer's work is suspended until cancellation.
- DHW manual: setting the DHW cylinder's temperature to be executed by the control system. In manual mode, the timer's work is suspended until cancellation. Mode available only with active DHW cylinder.
- Turbo: heating the facility with maximum parameters until the set room temperature is reached. Turbo mode is available if the room temperature drops by set hysteresis value.

If a specific mode is enabled, an icon ☑ is displayed. Once enabled, enter the mode in order to turn it off. In manual CH or DHW modes, the set temperature can be changed. Manual CH and manual DHW modes can be set simultaneously. Any other combination of two or more modes is not possible, setting the second mode disables the mode currently running. The exception is the turbo mode, which works independently of other modes.

Start-up

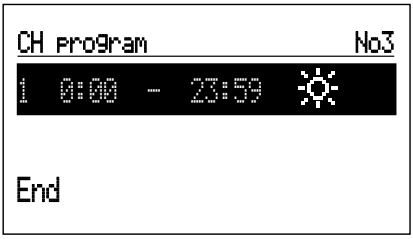
With the first start-up of the boiler or after restoring to factory settings it is necessary to select the language and boiler's rated power. the boiler is ready to work properly only after selection of these parameters.

Daily schedule:

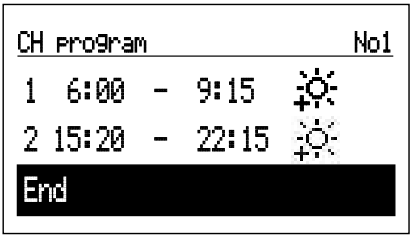


1 - time period panel
2 - no. of time frame according to schedule (max 5)
3 - start time
4 - finish time
5 - temperature selection (CH and DHW cylinder)
6 - command (active when editing):
- ☑ *accept*
- ☒ *delete*
- ⊞ *add*

In daily schedule CH circuit and DHW cylinder have defined starting time (3) and finishing time (4) of maintaining selected temperature value (5) in the room (CH) or DHW cylinder. Outside defined time frames economy temperature will be maintained in the room/cylinder. For circulation circuit within the schedule there is an adjustment of start time (3) and finish time (4) of circulation pump's operation. In buffer mode there is an adjustment of start time (3) and finish time (4) of buffer's charging. To change the parameters for the daily schedule select chosen program number and press navigation dial.
The first parameter flashes (start time) - use the navigation dial to set the new time frame value (hour and minutes separately) by turning the dial left/right and confirm it by pressing the dial again. At the same time next screen starts to flash allowing edition of next parameters (finish time). Last editable position is a command. In order to save changes select command „save" and press the dial ☑ to finish editing. To delete selected time frame start editing chosen time frame and by pressing the dial go to command position, select command „delete" and press the dial ☒. To add new time frame, select last defined time frame and by pressing the dial go to command position, select command „add" and press the dial ⊞ to add new time frame (edition of new time frames described above) .



If there are no defined time frames, then after selecting „new" the time frame 00:00am to 23:59pm will be set , which should be edited in accordance with user's needs.



The daily program will be saved to the boiler's settings by pressing the command „END".

Turbo mode

If the facility is cold and it is necessary to heat it up quickly, there is a possibility to turn on the TURBO function. This function, when conditions to turn on the heating are fulfilled, starts central heating installation with maximum parameters and continues until required temperature is reached in a room. This function can start automatically when room's temperature falls down by the set value of Tr hysteresis. Automatic work is set in menu *[Configuration > Aut. turbo mode.]* Selection of „DHW cylinder- NO" will result in switching off hot water heating priority for the time of using Turbo function. In fast modes menu it is possible to turn on this function manually (without hot water heating up priority), in condition that the room's temperature is lower than the programmed one. Tr sensor is required to turn on the Turbo function.

Building anti-frost protection

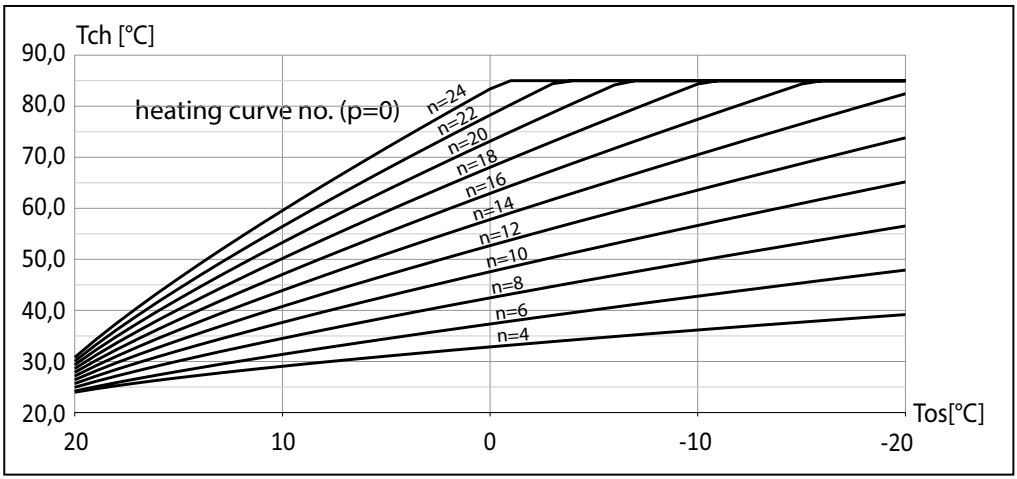
Function's activation *[Configuration > Central heating > Frost protection > Yes].*
The frost protection function does not allow the building to cool down drastically. The protection program starts the CH process if the following conditions are met:

- the boiler is in standstill mode or DHW mode,
- the outside temperature drops below 2°C. In case of failure of the Tos sensor, this condition will always be met,
- the room temperature drops below 5°C. In case of failure of the Tr sensor, the frost protection program will not turn heating on.

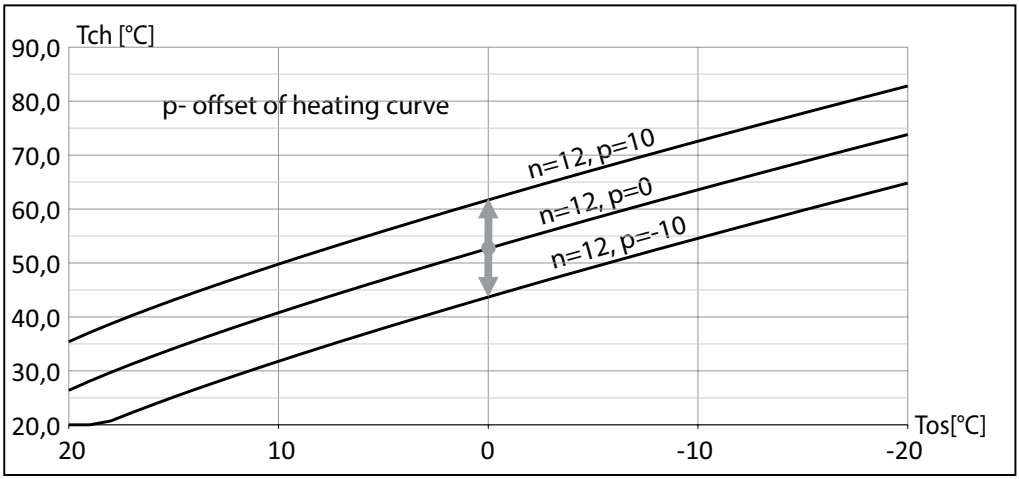
Depending on the type of regulation, the temperature setting of the heating medium will be set accordingly to the calculations for the heating curve or manual setting. If the outside temperature rises to at least 3°C or the room temperature rises to at least 6°C, the CH will be switched off. The building protection function is inactive when controlling the boiler with an external room controller connected to the RT entry.

Heating curve

Boiler's controller is responsible for maintaining proper temperature in central heating installation depending on the outside temperature. While the temperature outside the facility is low, heat demand within the facility is higher, whereas while the temperature outside is high, analogically, there's no need to maintain high temperature within the installation. Correlation between outside temperature and heating installation's temperature can be presented in a graphical form of so called heating curve. The diagram below presents a compilation of heating curves for the set point of room temperature equal 22°C. Depending on the facility characteristics, climate zone, and the type of heating installation one must select appropriate heating curve.



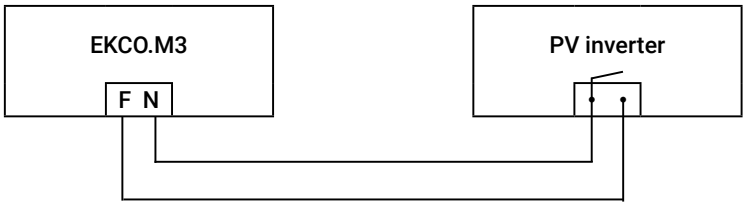
In case of the need to offset the heating curve, it is necessary to change the parameter *[Configuration > Central heating > Offset]*. The diagram below presents heating curve no. 12 with the offset -10°C and 10°C.



Cooperation with PV installation

Photovoltaic systems are usually equipped with software controlling the external load in order to increase the degree of energy self-consumption within the internal (home) network. High self-consumption means consuming as much energy as possible produced by PV system. Depending on the performance of the inverter, the external power control can be carried out on the basis of the power generated or the excess power generated. Control on the basis of excess power generated is the optimal solution, as the energy that would be returned to the operator's grid will be consumed within the internal network. However, this requires a complex inverter measuring system. In case of power-based control, the level of energy consumption within the internal grid is unknown, therefore energy from the operator's grid may be selected.
Inverter's cooperation with the boiler means modifying the operating algorithm of the device in order to convert the excess energy produced into a controlled increase in the temperature in the building or an increase in the temperature of domestic hot water in the DHW cylinder.

How to connect the inverter to the boiler is shown in the diagram below:



The relay output of the PV inverter for external load management must be connected to the boiler's FN entry. If the inverter has a voltage output, use an appropriate intermediate relay. In order to activate the boiler's PV functions, it is necessary to:

1. Set the FN entry to PV mode: [Configuration >Entry FN: PV].
2. Set the working mode to Standard or Buffer: [Configuration > Working mode: Standard/Buffer],
3. Turn off cascade mode: [Configuration > Cascade: No].
4. Set the power limit for PV function: [Configuration > Boiler rated power > PV limit].

The set value indicates the maximum boiler power to be switched on in PV mode.

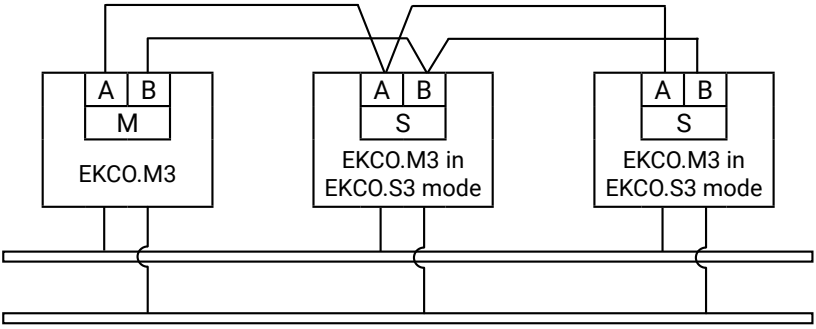
In the inverter, set the power at which the relay will be shorted and the power at which the relay will be open. Depending on the degree of sophistication of the management function, other parameters may be available, i.e. minimum relay switching time. A prerequisite for switching the boiler to PV mode is the short circuit of the FN entry by the inverter (after meeting the power production criteria). In this case, limited power heating (PV power limit) occurs if:

- the temperature of DHW will reach the set point resulting from the schedule or manual setting,
- the room temperature reaches the set value resulting from the schedule or manual setting.

If the DHW cylinder is being heated in PV mode, the process will be completed when it reaches 60°C. For CH, when the temperature resulting from the schedule or manual setting is reached, the heating will continue to the temperature resulting from the Tr offset *[Configuration > PV options > Tr offset]*. For example, for a comfort temperature set at 22°C and Tr offset of 1°C, after reaching the setting, the heating will continue with the power limit *[Configuration > Boiler rated power > PV limit]*. At 23°C, the heating will be switched off or continued in normal mode with room temperature control off. In buffer mode, the buffer tank will be charged off schedule with PV power set, in case of heating request by schedule or heating circuits, the boiler will start heating with full available power.

Cascade mode

In order to increase the power of the heating system, boilers can be combined into a cascade.



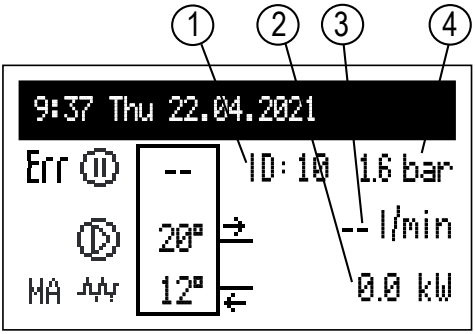
EKCO.M3 master boiler controls EKCO.M3 boilers set in slave operating mode EKCO.S3 (see position of switches in cascading mode - chapter Installation). In order to activate the cascade mode, it is necessary to:

- set the configuration switches of master boiler to the EKCO.M3 position, set configuration switches of slave boiler to the EKCO.S3 position,
- set individual identification numbers for each device *[Configuration> Communication> Device number]*. If the same numbers are given, there will be irregularities in communication, which will prevent proper operation,
- activate the cascade mode in the master boiler *[Configuration> Cascade> Yes]*,
- connect the communication bus according to the above drawing.

Note that cascade mode is not available in buffer working mode.

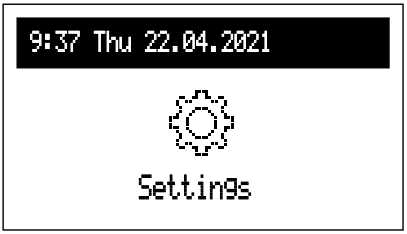
SLAVE BOILER'S MAIN SCREEN

1 - boiler's ID
2 - rated power
3 - flow l/min
4 - pressure in the system



Settings signalization:	
Err	Device's error indication
MA	Heating blocked by signal from master device
	Slave boiler performance paused
	Circulation pump operation indication (pulsating means that minimum flow is not provided)
	Heating on indication

SETTINGS:



Adjusting boiler parameters to user preferences.

- Interface:
  - Brightness min: setting the brightness of the display in stand-by mode.
  - Brightness max: setting the brightness of the display during the work.
  - Sound: Yes> On / No> Off
  - Dial sensitivity: 1 - high / 4 - low.

- System:
  - Type: EKCO.Sx3 (ID)
  - MSK program: boiler's driver version
  - PW program: the version of panel's program
  - Max rated power: boiler's set rated power
  - Pump type: type of pump installed in the CH system
  - Reset: boiler's start-up
  - Factory settings: restore to factory settings

CONFIGURATION:

Configuration: adaptation of the boiler to the heating system in the facility

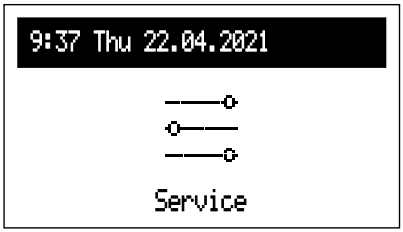
.

**Changes in the configuration menu are possible after entering an access code. When prompted for an access code, turn the navigation dial to the required code and confirm the code by pressing the dial. If you want to retract from the code request screen, hold the navigation dial or wait until automatic return to main function screen.*

Code: 987

- Communication:
  - Device number: device's number in the bus.

SERVICE:



Diagnostic tools, access for the installation company and specialized services after entering the access code.

Technical data

Max. pressure		MPa	0,3 (3 bar)
Min. pressure		MPa	0,05 (0,5 bar)
Outlet flow temperature		°C	20 ÷ 85
Max. temperature		°C	100
Dimensions (height x width x depth)	EKCO.MN3	mm	716 x 316 x 235
	EKCO.M3		716 x 316 x 191
Weight	EKCO.MN3	kg	~20,5
	EKCO.M3		~15,8
Boiler’s connections			G 3/4" (inside thread)
Expansion vessel	EKCO.MN3	l	~5
Safety class			IP 22

Boiler		4 / 6 / 8						
Rated power	kW	2	4	6	8	4	6	8
Rated voltage		230V~				400V 3N~		
Rated current	A	8,7	17,4	26,1	34,8	3x5,8	3x8,7	3x11,6
Min. power supply cable cross-section	mm^2	3x2,5		3x4	3x6	5x2,5		
Max. power supply cable cross-section	mm^2	5 x 16						
Max. allowed network impedance	Ω		0,27	0,17	0,15			0,27

Boiler		12 / 16 / 20 / 24			
Rated power	kW	12	16	20	24
Rated voltage		400V 3N~			
Rated current	A	3x17,4	3x23,1	3x28,8	3x34,6
Min. power supply cable cross-section	mm^2	5 x 2,5	5 x 4		5 x 6
Max. power supply cable cross-section	mm^2	5 x 16			
Max. allowed network impedance	Ω			0,27	0,13

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