Microprocessor-based controller
for blowers, central heating (CH) circulating pumps
and pumps filling hot utility water (HUW) tanks –
version with **EXTERNAL CONTROL**

MTS 10z

Installation and Operation Manual

Applications

MTS 10z is a microprocessor-based controller designed for the control of blowers installed at central heating (CH) boilers, circulating pumps and pumps filling hot utility water (HUW) tanks. The controller protects the tank and heaters from being cooled down by an excessively cold boiler. The device may operate in two modes: WINTER or SUMMER. In the version equipped with external control, the device is used for maintaining preset temperature in residential buildings to improve thermal comfort and reduce energy consumption. Instead of the factory-supplied room sensor, the controller may be connected to a room thermostat (either wired or wireless). The controller is equipped with an "anti-stop" function and dynamic blower control capability.

Technical specifications

Supply voltage	230V / 50Hz
Maximum load of outputs	3 x100VA
Temperature measurement range	0-99°C
Alarm	below 9°C and above 92°C

Factory settings

Boiler temperature adjustment range: 20- 90°C	50°C
Room temperature adjustment range: 10-35°C	21°C
Temperature adjustment range for HUW tank: 30-80°C	45°C
Activation temperature of CH pump: 20-80°C	30°C
Activation temperature of pump filling HUW tank: 20-70°C	30°C
Maximum blower output: from 100% to the minimum value (at 10% increments)	100%
Minimum blower output: 20%, 30%, 40%, 50% or 100%	40%
Blow-through duration: 0-30 sec	6 sec
Interval between blow-through operations: from 10 sec to 30 min (in min)	5 min
Boiler extinguishing temperature: 20-50°C	35°C
Firing duration: 0.5-4 hrs (at 0.5 hr steps)	2 hrs
Extinguishing duration: 0-4 hrs (at 0.5 hr steps)	1 hr
Temperature of emergency CH pump activation at room temp. in the SUMMER mode (60-90°C)	80°C
Frequency of switching temperature displays from "inactive" to 60 sec	inactive
Blower hysteresis: 0.5- 5°C	0.5°C
CH pump hysteresis: 1-15°C	2°C
HUW tank hysteresis: 1-30°C	3°C
"Anti-stop" function (pump protection against "jam-stopping") – activation for 30 sec every 14 days	
Reduced risk of system freeze – activation of CH pump below 9°C	

Example installation
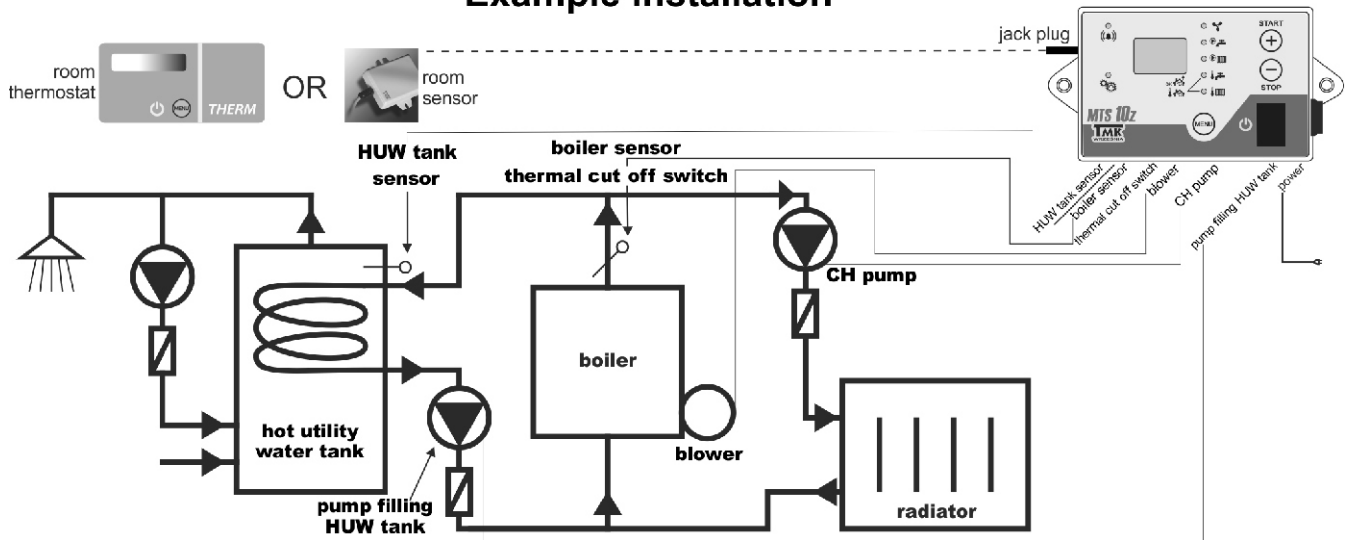
INSTALLATION

1. Controller mounting
Mount the controller on a suitable wall using 6 mm wall plugs (the plugs complete with screws are a part of the delivery set).

2. Mounting of boiler sensor and thermal cut-off switch
Mount the sensor and thermal cut-off switch on a non-insulated pipe going out of the central heating boiler.
Fasten the sensor and the thermal cut-off switch to the pipe using two clamps (included in the delivery set) so that they adhere properly to the pipe.
It is advisable to wrap the pipe with the sensor and the thermal cut-off switch with thermal insulation material.

3. Mounting of tank temperature sensor
Mount the sensor in a location recommended by the tank's manufacturer.

Note: The sensors and thermal cut-off switch are not suited for being used directly in the liquid!

4. Installation of room sensor (optionally)
Mount the room sensor on an internal wall which is located away from sunlight, in the most frequented room of the house. Select a location with undisturbed air circulation, away from sources of heat (heaters, cookers, refrigerators, TV sets, etc.) at a height of ca. 1-1.5 m from the floor level. Connect the MTS 10z sensor to the room sensor by means of the jack plug at the end of the sensor cable. The jack socket is located on the left-side wall of the controller (see the diagram on page 1).

5. Installation of room thermostat (optionally)
Mount the room thermostat as specified in the operation manual. Connect the MTS 10z sensor to the room thermostat by means of the jack plug (included in the delivery set) and a two-wire cable. The jack socket is located on the left-side wall of the controller (see the diagram on page 1).
In the room thermostat connect the two-wire cable to the COM and NC terminals which are closed when the thermostat's heating indicator is inactive.

Wireless thermostats are also compatible.

6. Connection of the supply cable to the blower, CH pump and HUW tank filling pump
Connect the green-yellow wire (protective neutral conductor) of the 3-wire supply cable to the protective neutral terminal of the motor (marked with an appropriate symbol);
Connect the brown and blue wires to the **L** and **N** terminals of the motor;
In the version equipped with an IEC coupler make sure to join the connectors of the controller and the controlled device.

Note: Always ensure that regulator installation is performed by a properly qualified electrician.

7. Connection of the controller

Connect the supply cable to a **230 V, 50 Hz power outlet with an earth contact.**
The ambient temperature in the controller mounting location may not exceed 40°C.

Note: The connection cable of the regulator may only be replaced by the manufacturer.
Note: MTS controller is only able to operate when the system is filled with water. If the system is empty, the controller must be disconnected from the mains supply. Otherwise the pump may become damaged.

CONTROLLER OPERATION

Switch the controller on using the mains switch ⏻.
Press the ⊕ **START** button – this is required when the function of automatic boiler firing at power supply connection (*F4*) is activated.

The process of **FIRING** is initiated and indicated by pulsating green indicator ⚙. The blower slowly accelerates to reach the preset maximum level.

If during the **FIRING time** (*F2*) the temperature of the boiler falls below the **EXTINGUISHING temperature** (*F1*), the controller does not switch the blower off. Instead, it makes repeated attempts at boiler firing.

After the elapse of the **FIRING time** (*F2*) the controller goes into the **OPERATING** status indicated by the continuous light of the green indicator ⚙.

Both in the **FIRING** status and in the **OPERATING** status, the closer to the desirable temperature, the slower the operation of the blower, since the burning process is the most economical when the blower operates on a continuous basis at a low output.

When the temperature exceeds the preset level, the blower is deactivated, however it becomes periodically activated for short periods defined by the user – **BLOW-THROUGH**.

If the blower must be deactivated, e.g. for adding coal to the furnace, press the ⊖ **STOP** button (the ⚙ indicator goes out). Pressing again the ⊕ **START** button resumes the operation of the blower.

If during the **OPERATING** status the boiler temperature falls below the **EXTINGUISHING temperature** (*F1*), the controller enters the **EXTINGUISHING** status, continuous operation of the blower is discontinued and only **BLOW-THROUGH** remains active.

When the **EXTINGUISHING time** elapses *(F3)*, the controller automatically changes the working status into **STOP** (the ⚙ indicator goes out).

The **EXTINGUISHING** status is not activated if the **FIRING time** has not elapsed yet *(F2)*.

The controller activates and deactivates the CH pump and the HUW tank filling pump according to settings. The ⊕ **START** and ⊖ **STOP** buttons do not affect pump operation.

The HUW tank filling pump becomes activated when the preset **tank temperature** (*P3*) is not achieved and the temperature of the boiler is at least 5°C higher than the tank temperature (which serves as a means of protecting the tank from cooling).

The CH pump becomes activated in the **WINTER mode** and with deactivated **HUW tank priority** (*F8*). With activated HUW tank priority, the CH pump operates if the tank temperature has been achieved. In the **SUMMER mode** the CH pump remains deactivated unless emergency conditions arise (*F5*).

OPERATION WITH ROOM SENSOR

When the room temperature achieves the preset value (*P2*), the corresponding indicator ᴏᴋ🏠 lights up (a dot in the bottom right corner of the display).

The controller interrupts the operation of the blower and CH pump, simultaneously ensuring the combustion of accumulating gases – **BLOW-THROUGH**.

The CH pump is activated on an emergency basis at the preset temperature *(F5)*.

To maintain thermal comfort in the rooms, the controller periodically releases batches of hot water into the heaters according to settings entered by the user (*F6, F7)*.

When the temperature in the room drops, the controller resumes the operation of the blower and the CH pump. The corresponding indicator ᴏᴋ🏠 turns off.

When the room sensor cable is disconnected, the controller operates in its basic function, maintaining preset boiler temperature.

OPERATION WITH ROOM THERMOSTAT – WIRED OR WIRELESS

When the room temperature achieves the value set in the room thermostat, the ОК🏠 indicator on the controller lights up (a dot in the bottom right corner of the display). The thermostat indicates the achievement of the temperature by turning off the heating indicator.
The controller interrupts the operation of the blower and CH pump, simultaneously ensuring the combustion of accumulating gases – **BLOW-THROUGH**.
The CH pump is activated on an emergency basis at the preset temperature *(F5)*.
To maintain thermal comfort in the rooms, the controller periodically releases batches of hot water into the heaters according to settings entered by the user *(F6, F7)*.
When the temperature in the room drops, the controller resumes the operation of the blower and the CH pump. The corresponding indicator ОК🏠 turns off.
When the room thermostat is disconnected, the controller operates in its basic function, maintaining preset boiler temperature.

CHANGE OF DISPLAYED TEMPERATURE

The controller makes it possible to monitor temperatures measured by the sensors. Switching between displayed temperatures of the boiler and tank, and room temperature, can be performed by pressing the **MENU** button.

🚰 indicator is lit – the current temperature of the HUW tank is displayed.

🌡 indicator is lit – the current boiler temperature is displayed.

🏠 both indicators at the bottom are lit – the current room temperature is displayed (if the room sensor is connected).

There is also a possibility for activating automatic switching between displayed temperatures – see the *F9* function.

BASIC PARAMETERS MENU

Pressing and holding the **MENU** button for one (1) second displays the *P1* symbol on the screen.
To change parameter number, use the ⊕ or ⊖ button. To edit a selected parameter, use the **MENU** button.
The following parameters are available:

P1 - boiler temperature (20-90°C)[1, 2]
P2 - room temperature (10-35°C)
P3 - temperature of the hot utility water tank (30-80°C)
P4 - CH pump activation temperature (20-80°C)
P5 - activation temperature of the pump filling the HUW tank (20-70°C)
P6 - maximum blower output (from 100% to the minimum value at 10% increments)[6, 7]
P7 - minimum blower output (20%, 30%, 40%, 50% or 100%)[6, 7] – the indicator is pulsating
P8 - duration of blow-through (0-30 s)[3]
P9 - frequency of blow-through operations (from 10 sec to 30 min – in minutes)[4, 5]
- - - exit from the **MENU** with saving of changes (after pressing the **MENU** button)

To change parameter values, use the ⊕ or ⊖ button.
Pressing the **MENU** button during the editing of a parameter causes the display to return to the number of the edited parameter.
The controller exits the **MENU** and saves any changes that have been made if no other button is pressed during the following 60 seconds.

***Notes to the MENU**[1-7]:*
1. The controller increases boiler temperature 5°C above the tank temperature setting for the duration of the process of tank heating.
2. The maximum setting of the EXTINGUISHING temperature is at least 5°C lower than the boiler temperature setting.
3. The "0" setting denotes blow-through deactivation (**not recommended for reasons of safety**).
4. The time includes blow-through time.
5. For periods shorter than 1 min time is specified in tenths of a second (e.g. "0.1" = 10 sec).
6. The blower becomes activated to make it possible to assess its actual rotating speed.
7. The "99" display represents 100% output.

SERVICE FUNCTIONS MENU

In order to edit SERVICE FUNCTIONS, disconnect the controller from the mains supply ⏻, press the **MENU** button and – without releasing it – switch on the controller.
The screen displays *F1.*
Menu functions are the same as in the **BASIC PARAMETERS MENU**.
The following functions are available:

F1 - extinguishing temperature (20- 50°C)[2]
F2 - firing time (0.5-4 hrs, at 0.5 hr increments)
F3 - extinguishing time (0-4 hrs, at 0.5 hr increments)
F4 - automatic boiler firing at power supply connection: 0 - NO, 1- YES (factory setting)
F5 - temperature of emergency CH pump activation at the achieved room temperature
       and in the SUMMER mode (60-90°C)
F6 - releasing of batches of hot water into the radiators at the achieved room temperature (0 –2.5 min)
F7 - frequency of releasing batches of hot water at the achieved room temperature (5-60 min)
F8 - HUW tank priority: 1 - YES, 0 - NO (factory setting)
F9 - frequency of automatic switching between displayed temperatures (from inactive "-" to 60 seconds)
H1 - blower hysteresis (0.5- 5°C)
H2 - CH pump hysteresis: (1-15°C)
H3 - HUW tank hysteresis (1-30°C)
H4 - controller software version number (read-only)
- - - exit from the **MENU** with saving of changes (after pressing the **MENU** button)

SWITCHING BETWEEN WINTER/SUMMER MODES

To change the WINTER/SUMMER mode, disconnect the controller ⏻ from the mains supply press the ⊖ button and, without releasing it, switch on the controller.

ZA – WINTER mode (factory setting)
LO – SUMMER MODE
To change the mode, use the ⊕ or ⊖ buttons. To exit and save the changes, press the **MENU** button**.**

RESTORATION OF FACTORY SETTINGS

In order to restore factory settings, disconnect the controller from the mains supply ⏻, press the ⊕ button and – without releasing it – switch on the controller.

DESCRIPTION OF INDICATOR SYMBOLS – during controller operation

- the blower is activated

- the HUW tank pump is activated

- the CH pump is activated

- the current HUW tank temperature is displayed

- the current boiler temperature is displayed

- the current room temperature is displayed (both indicators at the bottom are lit)

- the room temperature has been reached (a dot is lit in the bottom right corner of the display)

DELIVERY SET

controller
clamps (2 pcs.)
6 mm wall plugs (2 pcs.)
jack plug
room sensor 10m (optionally)

SAFETY DEVICES

The controller, blower motor and pump motors are protected by means of a 1.6 A fuse which blows up in emergency situations (e.g. short-circuit in the motor or controller).
An additional protective device installed in the controller is the thermal cut-off switch which disconnects the blower independently of the controller when the temperature of the boiler exceeds 90°C (the thermal cut-off switch is reconnected after temperature drops by ca. 30°C).
The situations may occur in the event of pump failure or controller failure.

NOTE

For the controller to maintain preset temperature it may be necessary to seal the boiler.
Otherwise the temperature may rise uncontrollably, especially during windy weather.

WARRANTY

TMK sp.j. grants the user a warranty for the MTS 10z controller. The warranty period is 3 years from the date of purchase of the device, however not longer than 4 years from the date of manufacture.

WARRANTY TERMS AND CONDITIONS

Warranty claims shall be accepted provided that the terms and conditions of warranty, and general rules of operation of electronic devices, are complied with as required. TMK sp.j. guarantees appropriate workmanship, high quality and reliable operation of the controller. In the event of any faults in the controller's operation, or defects which can be attributed to the manufacturer, TMK sp.j. shall repair or replace the faulty controller with a defect-free device within 14 working days from the date of returning the controller (in person or through post).The warranty scheme explicitly excludes all defects arising due to the user's fault and, particularly, defects caused by mechanical damage, faulty mounting, water ingress or operation of the device contrary to the general rules of operation of electronic devices.
The warranty is only valid with a proof of purchase.

DATE OF SALE: ……………………
day, month, year

MANUFACTURER:
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Szosa Witkowska 105
tel./fax +48 61 437 97 60
www.tmk.com.pl

……………………………
Seller's stamp and signature

………………………
DATE OF MANUFACTURE