MASTER
Smart Home ...take control!

2 YEARS WARRANTY

ST-520/R

SMART THERMOSTAT WITH INTEGRATED MULTIFUNCTIONAL TOUCH SCREEN 4"

FOR RESIDENTIAL AND COMMERCIAL APPLICATIONS

Installation and Operating Manual

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Product Description

The ST-520/R thermostat of the "MASTER Smart Home" series is a complete solution for controlling and managing heating and cooling systems in both residential and commercial applications, with full support for fan coil unit control.

In addition, it features a multifunctional touch screen with integrated software, allowing the user to manage all connected devices of the "MASTER Smart Home" system through the local wireless (Wi-Fi) network — without the need for additional hubs or equipment. Its modern and elegant design, combined with stylish frame colors, makes it ideal for any interior décor, whether in homes or professional spaces. The ST-520/R offers a wide range of features that adapt to the user's needs, ensuring excellent performance, maximum energy efficiency, and providing both convenience and flexibility in indoor climate control.

Key Features of ST-520/R

- **4" Color Touchscreen**
  User-friendly interface in both Greek and English, providing intuitive navigation and easy access to all functions of the thermostat and the smart home system.
- **Voice Control**
  Compatible with Google Assistant and Amazon Alexa for hands-free control via voice commands, offering convenience and comfort.
- **Wi-Fi Connectivity without Hub**
  Direct wireless connection via the "MASTER Smart Home" app, available for smartphone, tablet, or PC – no central hub required.
- **Secure Connection**
  Supports WEP/WPA/WPA2 and IPv4 security protocols, ensuring safe network access and data protection.
- **Automatic Firmware Updates**
  The device automatically updates with the latest software enhancements and features for optimal performance.
- **Accurate Temperature and Humidity Monitoring**
  Built-in sensors provide real-time, precise readings, with the option to measure from a different location using the wireless ST-520RF (RF Sensor).
- **Smart Operating Modes**
  Predefined profiles such as Economy, Away, Comfort, and Night can be fully customized to suit your preferences and optimize energy use.
- **Weekly Scheduling**
  Customize heating or cooling schedules for each day of the week with flexible temperature settings to match your lifestyle.
- **TPI Algorithm (Time Proportional & Integral)**
  An adaptive control algorithm that learns your system and fine-tunes performance to ensure maximum energy efficiency and comfort.
- **Antifreeze Protection**
  Automatically activates the heating system at low temperatures to protect pipes and equipment from freezing.
- **Master/Slave Functionality**
  Set one thermostat as the MASTER to centrally control up to 18 connected SLAVE thermostats across multiple zones.
- **Wireless HVAC and Fan Coil Control**
  Supports 2/4 pipe fan coil systems with full control of fan speeds (Low, Medium, High, Auto, ON/OFF, 0–10V) via the ST-520FC Smart Controller.
- **3-Level Lock Function**
  Allows locking of the touch screen, user settings, and advanced settings to prevent unauthorized changes or accidental misconfigurations.

MASTER ELECTRONIC ELECTRIC

ΤΣΙΤΣΙΚΑΣ ΑΡ. & ΣΙΑ Ο.Ε.
ΒΙΟΤΕΧΝΙΑ ΗΛΕΚΤΡΟΛΟΓΙΚΟΥ ΥΛΙΚΟΥ
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EU Declaration of Conformity

- We hereby declare that the radio equipment of the product **ST-520/R**, manufactured by **AR. TSITSIKAS & CO**, complies with the essential requirements and relevant provisions of the following European Union directives:**2014/30/EU (EMC), 2014/35/EU (LVD), 2014/53/EU (RED)**.
- The full text of the EU Declaration of Conformity is available at the following internet address:**https://www.master-electric.gr/downloads**

- The technical specifications, features, and availability of the ST-520/R thermostat are subject to change without prior notice.The manufacturer reserves the right to modify the product, firmware, and accompanying Android and iOS applications for improvement purposes, without any obligation to inform previous purchasers.
- When the product reaches the end of its life cycle, it must be disposed of in accordance with national legislation and environmental protection requirements.

Included Components

Thermostat Front Panel (1 piece)	This is the main part of the thermostat, which includes the 4" touch display and integrated control electronics. It connects directly to the base plate.
Thermostat Base Plate (1 piece)	This is the rear part of the thermostat that is mounted to the wall. It includes the terminal connections for wiring. Ensure the direction arrow (TOP) is facing upward during installation.
Mounting Accessories (1 set)	Includes 2 x M3x10mm screws for fastening the front panel to the base plate, and 2 x 4x25mm wall screws with 2 wall plugs for fixing the base plate to the wall.
User Manual (1 piece)	Contains basic installation instructions and an overview of the product. A more detailed version of the manual is available for download at www.master-smarthome.com.

Package Contents – ST-520/R

Upon opening the packaging, ensure that all of the following components are included:

- Thermostat front unit

- Thermostat mounting base

- Installation and operation guide in English.

- Stainless steel mounting plate

1x Set of Screws and Plastic Wall Plugs
For mounting the stainless steel plate to the wall.

1x M3x15mm Screw Set
For securing the thermostat connection base to the stainless steel mounting plate.

Note: If any component is missing or damaged upon delivery, please contact your supplier or point of purchase immediately.

Important Safety Instructions

- Please keep this manual in an accessible location for the user.
- Read all safety instructions carefully before using the thermostat.
- The precautions described in this manual are categorized as WARNING and CAUTION.

WARNING

1. This product must be installed according to the relevant installation regulations and preferably by a qualified electrician.
2. Do not attempt to repair, disassemble, reinstall, or modify the thermostat yourself, as this may result in electric shock or fire.
3. If the thermostat is not functioning correctly (e.g., no heating or cooling is produced), the issue may lie with the boiler. Do not operate the thermostat until authorized personnel verify and repair the malfunction.
4. Prolonged exposure to extreme heating or cooling from the thermostat may be hazardous to your health.
5. If the thermostat malfunctions, contact your qualified electrician or service provider. Continued use under such conditions may cause damage, electric shock, or fire.

CAUTION

1. This device is not intended for use by young children or vulnerable individuals without supervision, as it may pose health or safety risks.
2. Do not leave children unsupervised near the device, and prevent them from playing with the thermostat or the mobile/tablet app.
3. Do not hit or apply excessive force to the thermostat screen, as this may cause damage to the product.
4. Before cleaning the thermostat, switch off the device and disconnect it from the power supply. Failure to do so may result in electric shock or injury.
5. This device is not intended for use by individuals with reduced physical, sensory, or mental capabilities, or by those lacking experience or knowledge of the product, unless they are supervised or instructed by a person responsible for their safety.
6. To prevent electric shock, do not operate the device with wet hands.
7. Do not wash or splash the thermostat with water, as this could lead to electric shock or fire.

Installation Instructions

Follow the steps below for the proper installation of the ST-520/R thermostat. Ensure installation is performed by a qualified technician.

1. Preparation

- Switch off the power supply from the electrical panel before starting the installation.
- Choose an appropriate location, away from heat sources, air conditioning vents, or direct sunlight.
- The thermostat should be mounted approximately 1.5 meters (5 feet) above floor level for accurate temperature readings.

2. Mounting the Metal Support Plate

- Fix the metal mounting plate to the wall using the screws and plastic wall plugs provided in the package.
- Make sure the plate is aligned properly and securely fastened.
- Ensure that the "TOP" arrow is pointing upward.

3. Wiring Connections

- Attach the terminal base to the metal mounting plate using the included M3x10mm screws.
- Connect the wires to the appropriate terminals on the base according to the printed wiring diagram on the connector.

Main Terminal Descriptions:

Relay 1 – Heating

- COM: Common terminal (Q12)
- NO: Normally Open – Heating output (Q14)
- NC (optional): Normally Closed – For circuit interruption (Q11)

Relay 2 – Cooling or Domestic Hot Water (DHW)

- COM: Common terminal (Q21)
- NO: Normally Open – Cooling or DHW output (Q24)
- NC (optional): Normally Closed – For circuit interruption (Q22)

4. Attaching the Touch Screen

- Mount the touchscreen panel onto the base connector.
- Ensure it is firmly and correctly aligned with the base.

5. Powering the Thermostat

- Turn the power supply back on at the electrical panel.
- The thermostat will start automatically, and the touchscreen will display the main setup options.

Installation Location Guidelines – ST-520/R Smart Thermostat

To ensure optimal performance of the ST-520/R thermostat and efficient operation of your heating and cooling system, follow these placement guidelines when selecting an installation location:

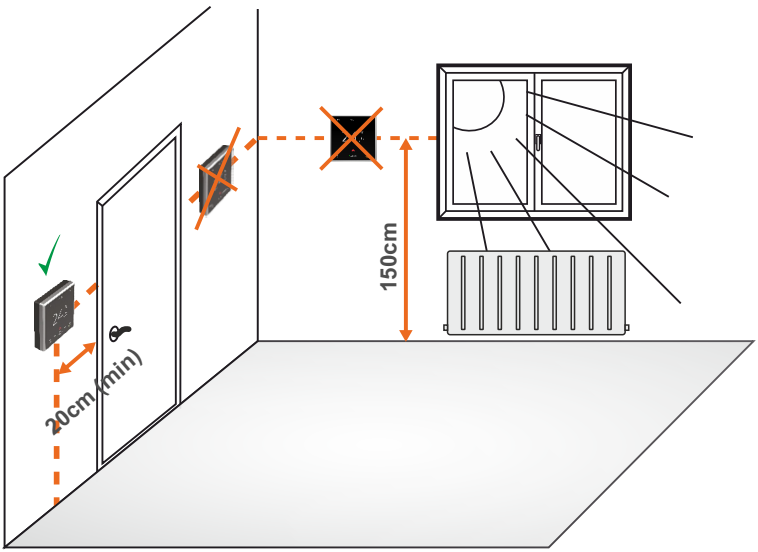
1. Frequently Used Areas
Install the thermostat in a central location within a commonly used area, such as the living room or dining area, where occupants spend most of their time. This helps regulate the temperature based on the most relevant comfort zones in the home.

2. Avoid Direct Sunlight
Do not install the thermostat where it will be exposed to direct sunlight, as this may affect the accuracy of temperature readings due to external heat sources.

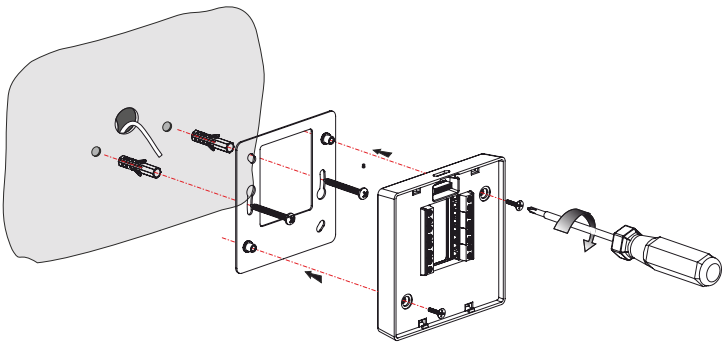
3. Away from Heat or Cooling Sources
Avoid placing the thermostat near radiators, air conditioners, vents, or other devices that emit heat or cold air. Proximity to such sources can lead to incorrect temperature measurements and inefficient system operation.

4. Proper Height
The ideal mounting height is approximately 150 cm (5 feet) above the floor. At this height, the thermostat can accurately measure ambient air temperature at the level most relevant to human comfort.

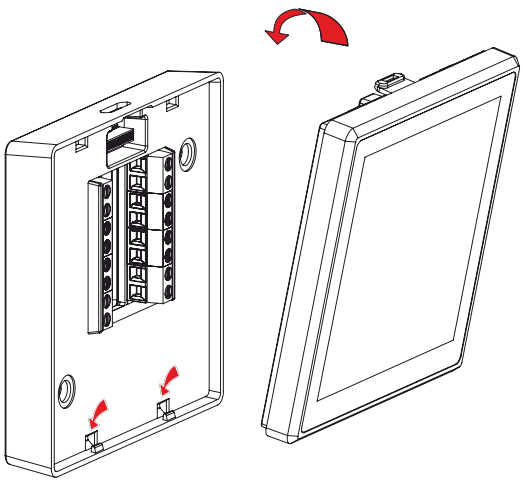
By following these guidelines, you will maximize the accuracy of temperature sensing and the overall efficiency of your heating and cooling system, achieving a more comfortable and energy-efficient indoor environment.



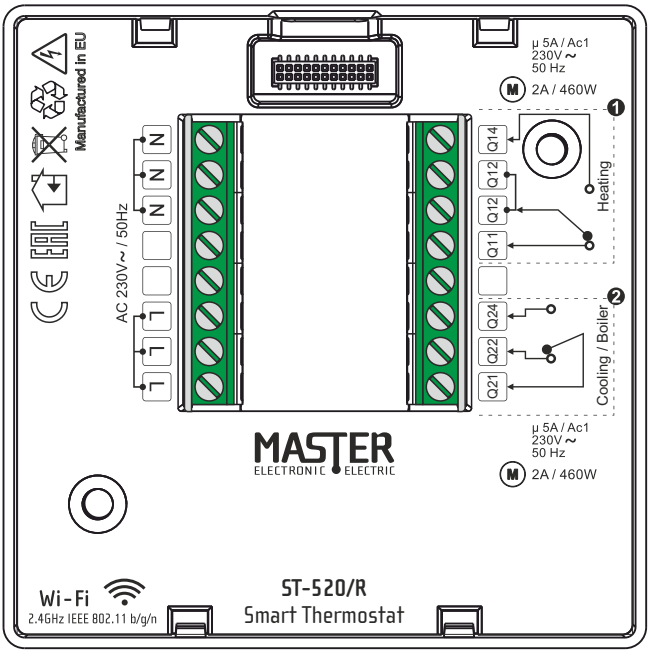
Wall-mounting illustration (Base)



Display mounting illustration



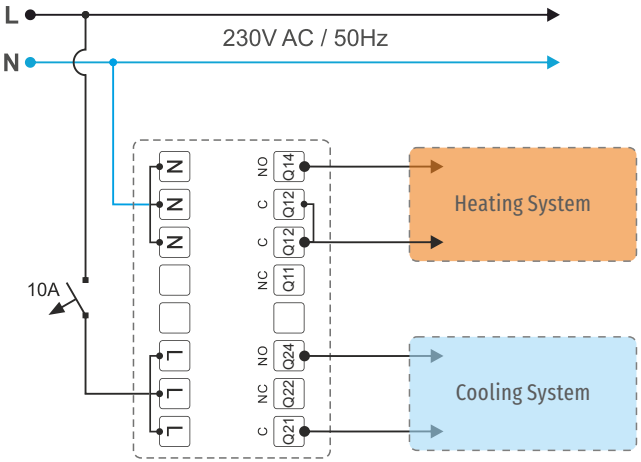
Wiring Diagrams



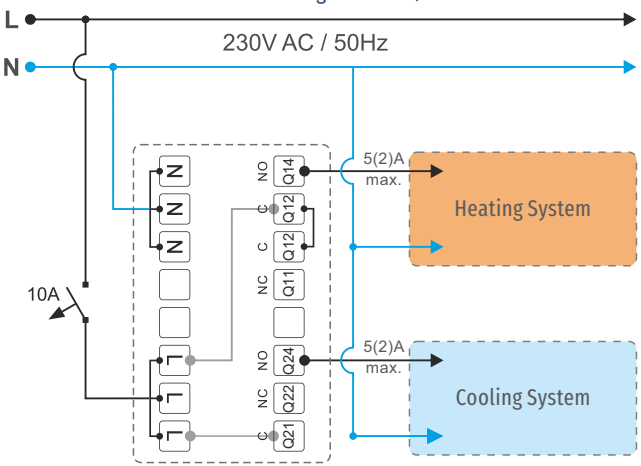
Technical Characteristics

THERMOSTAT (SMART)	Heating / Cooling / DHW
OPERATING VOLTAGE	180 - 230V AC
FREQUENCY	50Hz
STANDBY POWER CONSUMPTION	≤ 2W
RELAY CONTACT RATING	5(2)A max (Dry Contact Switching)
FREQUENCY BAND / MAX Wi-Fi	2414-2472MHz / 20dBm (max)
SECURITY PROTOCOL	WEP/WPA/WPA2. Protocol Ipv4
ENVIROMENTAL CONDITIONS	Setpoint Temperature Range: +08°C to +40°C Storage Temperature Range: -20°C to +60°C
TEMPERATURE SETTING RANGE	Heating: 8°C – 30°C (Adjustable in 0.5°C steps) Cooling: 16°C – 40°C (Adjustable in 0.5°C steps)
WIRING TERMINALS	Solid - Stranded conductors Ø0.75 mm to Ø1.5 mm
MOUNTING	Wall-mounted

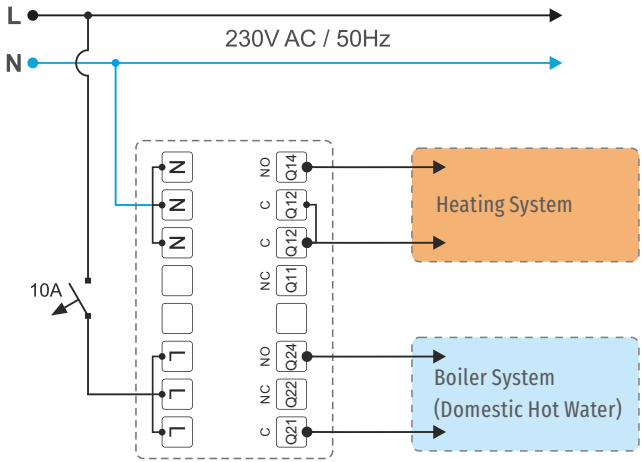
Independent systems (Heating / Cooling)
with dry contact operation [NO]



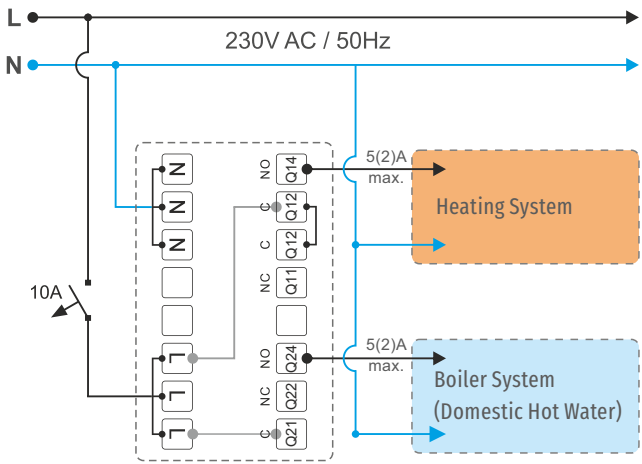
Independent systems (heating/cooling) with contact [NO]
and control with mains voltage 230V AC / 50Hz



Independent Systems (Heating / DHW)
with dry contact [NO] Relay Function



Independent Systems (Heating / DHW)
with [NO] Relay Contact and Control via 230V AC / 50Hz

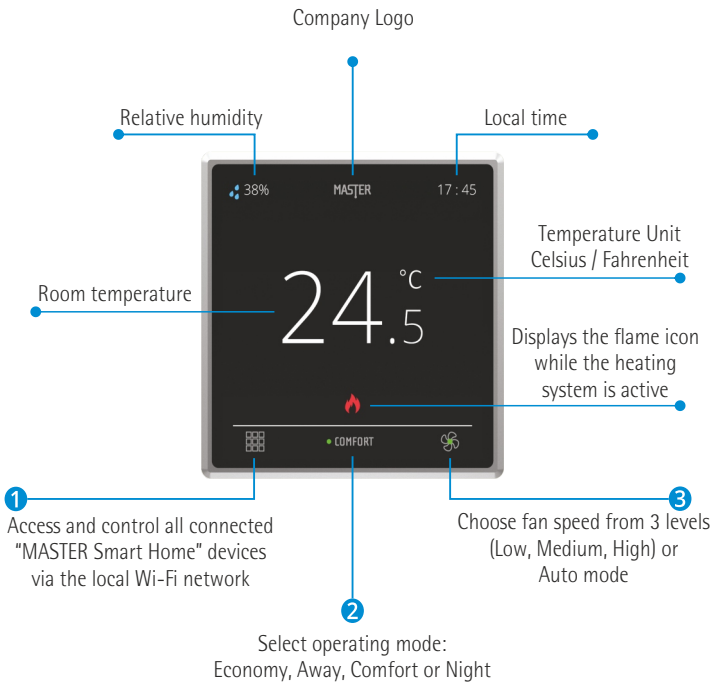


Operation and Settings
ST-520/R Smart Thermostat

Firmware Version 05.3 - Date Feb 11 2025

Home Screen

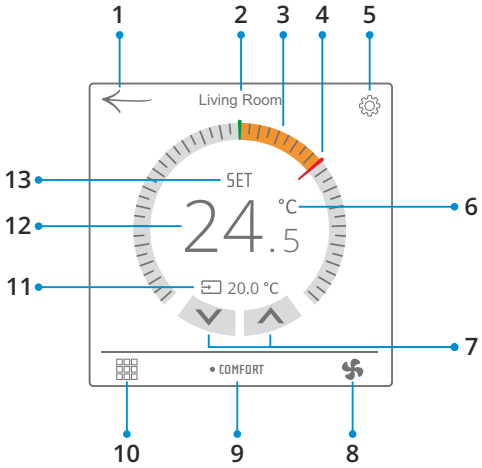
On the device's home screen, the current room temperature and relative humidity are displayed, along with the local time and the operating status of the heating/cooling systems.



At the bottom of the screen, three interactive icons are displayed, each leading to a different control environment:

1. **Left:** Access to the integrated management software for all connected "MASTER Smart Home" devices via the local Wi-Fi network.
2. **Center:** Manual selection of operation modes (Economy, Away, Comfort, and Night) by the user.
3. **Right:** Full control of the Fan Coil unit or the Domestic Hot Water (DHW) system, depending on the installation setup.

Explanation of the Temperature Control Screen Icons



1. **Return to Previous Screen:** Button to navigate back to the previous menu..
2. **Device Name:** Displays and allows customization of the thermostat's name for easy identification in environments with multiple devices.
3. **Temperature Difference Range:** Indicative display of the difference between the current room temperature and the user's desired setpoint..
4. **Sliding Button (Red Arrow):** Quickly adjust the room temperature by sliding the red indicator around the circular scale on the screen.
5. **Settings Access:** Provides access to basic (User Settings) and advanced settings (Advanced Settings) for the configuration of the thermostat.
6. **Temperature Unit Display:** Shows the temperature in Celsius (°C) or Fahrenheit (°F), depending on the selected setting.
7. **Temperature Adjustment Buttons:** Precisely set the desired room temperature using the up/down arrow buttons.
8. **Fan Coil Speed Control:** Choose between three fan speeds (Low, Medium, High) or enable Auto mode for automatic adjustment.
9. **Mode Selection (Modes):** Select the operation mode that suits your needs, such as Economy, Away, Comfort, Night, or OFF, for optimal comfort and energy savings.
10. **Access to "MASTER Smart Home":** Manage and control all connected "MASTER Smart Home" devices through the local Wi-Fi network.
11. **Current Room Temperature Display:** Real-time display of the current room temperature.
12. **Setpoint Temperature Display:** Shows the user-defined target temperature during adjustment.
13. **"SET" Indicator:** Pulsates during temperature setting to indicate that the value is being adjusted.

Temperature Setting Screen

This screen offers direct and easy control of the temperature in your space.

With a single touch on the home screen, you are transferred to the device's temperature setting screen.

Here, you can quickly adjust the desired room temperature and access the "User Settings" and "Advanced Settings" menus for additional customization.

Temperature Adjustment Methods

Dragging the red line: Touch and drag the red line around the circle to manually increase or decrease the temperature.

Using the "up/down" buttons: Press the "up" and "down" buttons to precisely adjust the temperature in 0.5°C increments.

Selecting a preset profile (Mode): Choose one of the five preset operation profiles to set the temperature:

ECONOMY: Energy-saving mode for reduced power consumption.

AWAY: Absence mode to maintain a lower temperature.

COMFORT: Setting for maximum comfort in your space.

NIGHT: Ideal temperature for resting during nighttime.

MANUAL: Manual temperature adjustment according to your preferences.

Note: The manually set temperature will remain constant until changed manually or until a programmed schedule becomes active.

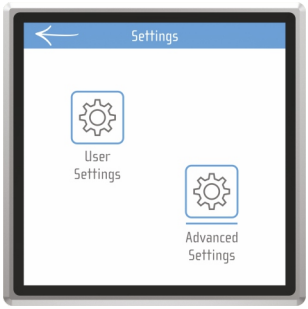
Additional Functions on the "Select Mode" Screen

ON / OFF (Activation / Deactivation): Selecting "OFF" completely deactivates the heating and cooling systems, except for the antifreeze function (Antifreeze), if enabled by the user. Selecting "ON" restores the system to the mode that was active before it was turned off, maintaining the last selected Mode (Economy, Away, Comfort, Night).

Antifreeze (Frost Protection): At the bottom right of the screen, the "Antifreeze" indicator with a checkbox allows you to enable or disable the system's frost protection.

Return to the previous screen: At the top left of the screen, the **(Back)** arrow allows you to return to the thermostat's main screen.

User Settings & Advanced Settings

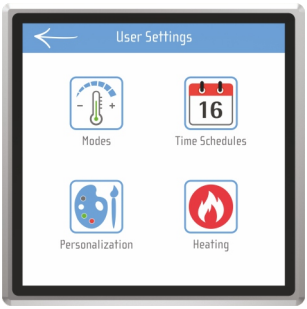


The ST-520/R thermostat offers two levels of settings – User Settings and Advanced Settings – to meet different usage needs.

User Settings: Basic options for adjusting temperature, scheduling, and display appearance according to your daily needs.

Advanced Settings: Specialized configurations for greater control, performance optimization, and adapting the thermostat to the heating or cooling system.

User Settings



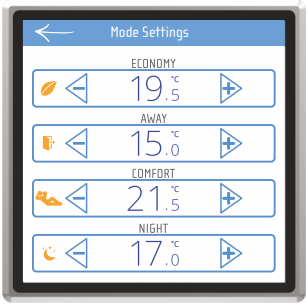
Temperature Settings (Modes): Set the target temperature for the predefined modes (Economy, Comfort, Away, and Night) either manually or through the "Time Schedules" programming.

Weekly Scheduling (Time Schedules): Create different temperature programs for each day of the week, adjusting the heating or cooling system's operating hours.

Personalization: Customize the ST-520/R thermostat according to your preferences and needs, ensuring maximum comfort and ease of use.

Mode Selection (Heating / Cooling): The ST-520/R thermostat allows you to select the operation mode that suits your space, ensuring ideal conditions throughout the year.

Temperature Settings (Modes)



By pressing the "Mode" button, the screen opens where you can set the temperature for the predefined modes (Economy, Comfort, Away, and Night).

Temperature adjustment is simple, using the **(+)** button to increase and the **(-)** button to decrease the value.

The target temperature for each mode can be individually set, tailored to your needs and preferences.

- **Economy:** Set the temperature for energy-saving operation, ideal for times when the space does not require maximum comfort.
- **Comfort:** Define your preferred temperature for maximum comfort in your space, whether for heating or cooling.
- **Away:** Maintain the temperature at lower levels when you are away for an extended period, ensuring savings and protection of the premises.
- **Night:** Adjust the temperature that best suits your needs during nighttime for a restful and peaceful sleep.

Weekly Scheduling (Time Schedules)

By pressing the "Time Schedules" button, the screen opens where you can easily view, configure, and add new schedules quickly and easily.

Additionally, you can enable or disable the application of schedules through the "Active" button.

These functions offer flexibility and adaptability in system management, ensuring maximum comfort and energy efficiency.

Scheduling Functions:

- **View Schedules:** Monitor the flow of already registered schedules by day and time, with color-coded indications for each operating mode (Comfort, Economy, Night, Away).
- **Enable/Disable:** Manage the activation status of the schedules using the "Active" button according to your needs.
- **Add/Edit:** Customize the schedules for each day of the week via the "Edit Program" button, setting the desired time intervals for each mode.

Detailed Time Scheduling Functions

1. Day Selection
In the "Edit Program" screen, select the day you want to edit or add a new schedule.

Tap on the name of the day (e.g., Monday) and use the < / > arrows to navigate through the other days of the week.

2. Create or Edit a Schedule
Tap "Edit" to modify an existing schedule, or tap the (+) symbol to create a new one.

3. Schedule Settings
When creating or editing a schedule, set the start time and choose the operating mode:

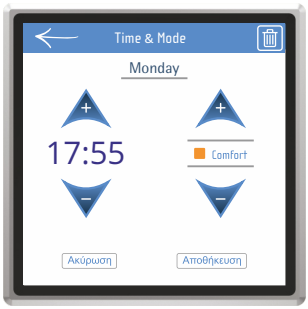
- Economy (Energy-saving mode)
- Comfort (Comfort mode)
- Away (Absence mode)
- Night (Night mode)

4. Save
Tap the "Save" icon to save your settings.

5. Delete a Schedule
Tap the "Delete" (trash bin) icon at the top right of the screen to remove an unnecessary schedule.

6. Copy and Paste Schedules
Tap "Copy" to duplicate the schedules of the current day.

Tap "Paste" to apply them to other days of the week, saving setup time.



7. Return to the Previous Screen
Tap the (Back) arrow at the top left of the screen or the "Cancel" icon to return to the previous menu.

Note: The ST-520/R thermostat saves separate scheduling profiles for heating and cooling modes.This allows you to configure different temperature settings depending on the season and your space's needs.

Easily create, modify, and manage the thermostat's schedules to ensure automatic temperature control and energy savings.

Personalization

By pressing the **"Personalization"** button, the screen opens where you can customize the **ST-520/R** thermostat according to your preferences and needs.

The available personalization options allow you to adjust the appearance and operation of the device, ensuring maximum comfort and ease of use.

The following options appear in the **Personalization** menu:

Screen Theme Selection: Customize the screen's appearance by selecting the theme that best matches your space's aesthetics.

Screen Brightness: Adjust the brightness level for ideal visibility, adapting the screen illumination according to day or night conditions.

Touch Sound: Enable or disable the touch button sounds based on your preference.

Touch Screen Lock: Activate the touch lock to prevent accidental changes to the device settings.

Temperature Unit Selection: Choose between Celsius (°C) or Fahrenheit (°F) as the unit of temperature measurement, according to your needs.

Language Selection: Set the interface language for easier navigation and operation.

Mode Selection (Heating / Cooling)

By pressing the **"Heating" / "Cooling"** button, the indicator alternates between a flame (for heating) and a snowflake (for cooling), adjusting the operation of the **ST-520/R** thermostat according to the season and the needs of your space. This feature ensures ideal temperature conditions throughout the year.

Σημείωση:

In cases where the installation does not include a cooling system but does have a boiler for Domestic Hot Water (DHW), the ST-520/R thermostat offers the flexibility to switch between heating and DHW operation.

This capability makes the ST-520/R thermostat ideal for installations that feature either a cooling system or a DHW boiler, providing complete control and optimized energy efficiency.

Advanced Settings

In the "Advanced Settings" screen, you can configure specialized parameters of the ST-520/R thermostat.

The following sections allow you to manage technical details and customize the thermostat, ensuring maximum performance, flexibility, and security:

- Lock
- Configuration
- Wi-Fi Connection
- (RF) Sensor
- Time Zone
- About Device

Lock

Enable password protection to prevent unauthorized access to the thermostat's settings, allowing you to lock the "User Settings" and "Advanced Settings" sections either individually or entirely.This feature ensures that only authorized users can make changes to the device's settings, providing added security and control.

Steps for Password Management:

- Create a Password

During the initial setup of the thermostat, press the "Lock" button to open the screen where you will be prompted to set a six-digit security code.

Select "Create Password", enter your desired code, and press "OK".

Then, you will be asked to confirm the new code by entering it again and pressing "OK" to activate it.

- Password Entry:

After setting the password, every time you access the **"Lock"** menu, you will be prompted to enter the previously created password to proceed.

- Device Locking:

Upon entering the password, you will gain access to the **"Lock"** menu, where you can choose to lock either the **"User Settings"**, the **"Advanced Settings"**, or both.

In the same menu, you can also **change the security password** that you initially created.

Configuration

The **"Configuration"** settings allow you to control technical parameters and configure the thermostat according to the specific requirements of your system.

These settings ensure maximum performance, flexibility, and compatibility with your heating, cooling, and Domestic Hot Water (DHW) systems.

Available Settings in the Configuration Menu:

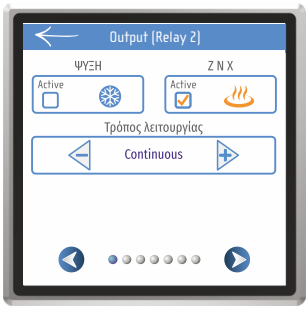
- Relay 2 Output
- Equipment Connection
- Temperature Limits
- Protection and Maintenance
- TPI Algorithm
- Switching Times
- Operating Mode Selection (MASTER / SLAVE)

The second output **(Relay 2)** of the ST-520/R thermostat offers great flexibility, allowing it to be used either for controlling Domestic Hot Water (DHW) or for managing the cooling system, depending on the requirements of the installation.

This feature makes the ST-520/R thermostat an ideal choice for setups that include **either a cooling system or a DHW boiler.**

Mode Selection: "DHW" (Domestic Hot Water)

Activating the DHW mode enables you to select the Domestic Hot Water operating method between **"Continuous"** and **"Countdown"**.



- Continuous

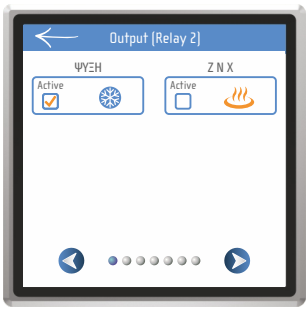
The Continuous mode allows for uninterrupted DHW operation, with full control by the user from the thermostat's main screen. It can also be incorporated into the weekly schedule for automated activation and deactivation.

- Countdown

The Countdown mode allows the user to program a specific operating time for the DHW system, with full control from the main screen and the ability to integrate it into the weekly scheduling.

Note: Countdown mode is recommended because it ensures automatic shutdown of the DHW system at the end of the preset time, providing maximum energy savings.

Mode Selection: "Cooling"



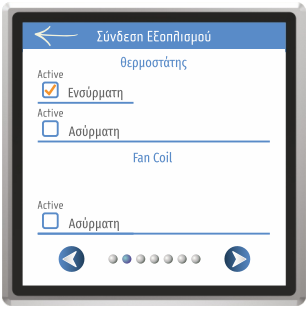
Activating the Cooling mode adjusts the operation of the ST-520/R thermostat to control your cooling system, maintaining a stable temperature according to your settings.

The operating Modes (Economy, Comfort, Away, Night) store separate temperature settings for Heating and Cooling functions, allowing full customization of your preferences depending on the selected operating mode.

Select between wired and wireless connection of the ST-520/R thermostat with the Heating/Cooling systems.

This flexibility allows you to adapt the connection based on the installation requirements and the capabilities of your space, ensuring seamless and reliable operation in every situation.

Wired Connection of the ST-520/R Thermostat



This option allows you to connect the ST-520/R thermostat via wiring to heating and cooling systems.

The wired connection requires the electrical installation of cabling from the thermostat to the installed heating and cooling systems.

Note: The wired connection of the ST-520/R thermostat can operate in parallel with the wireless connection, if it serves an automation function towards the connected heating and cooling systems.

Wireless Connection of the ST-520/R Thermostat with the ST-520RV (Smart Receiver)

Select the wireless connection option for the **ST-520/R** thermostat and the Heating/Cooling systems.

This flexibility allows you to adapt the connection based on the installation needs and the capabilities of your space, ensuring seamless and reliable operation in every case.

To enable wireless connection with Heating/Cooling systems, the additional **installation of the ST-520RV (Smart Receiver) is required.**

The ST-520/R thermostat can be connected to **up to 5 wireless ST-520RV (Smart Receivers)**, allowing simultaneous management of valve groups in different areas of the space.

At the same time, a single **ST-520RV (Smart Receiver) can be connected to multiple ST-520/R thermostats**, enabling the shared activation of a Heating/Cooling system from different thermostats.

This functionality **provides great flexibility for multi-zone installations**, ensuring that a Heating/Cooling system can be activated and controlled simultaneously by more than one thermostat.

Pairing the ST-520RV (Smart Receiver) with the Smart Thermostat ST-520/R

The ST-520RV (Smart Receiver) communicates with the ST-520/R thermostat via the **ESP-NOW wireless protocol at 2.4 GHz frequency**, offering stable and reliable long-range communication.

Steps for Connection:

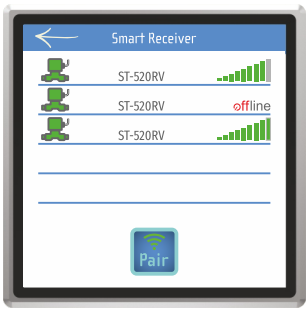
1 Navigate to **Advanced Settings > Configuration > Equipment Connection** and activate the **"Wireless"** pairing option in the "Thermostat" section.

Select the **"Gear"** icon and press the **"Pair"** button.

2 Set the **ST-520RV (Smart Receiver)** to pairing mode by pressing the **"Pair"** button on the device until the indicator light starts flashing green.

3 Device Detection & Registration

The thermostat will detect the ST-520RV and display a successful pairing confirmation on the screen..



4 Completing the Connection

The ST-520RV is now connected and ready to execute commands from the ST-520/R thermostat.

After initial pairing, the communication remains active even in the event of a power outage, without the need for re-pairing.

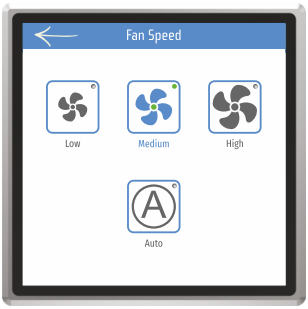
Managing Connected Devices

Tapping on a connected ST-520RV (Smart Receiver) in the device list opens the **"Device Information"** screen, where the following options appear:

- **Active:** Activate or deactivate the two **independent inputs**, Input 1 and Input 2, suitable for connecting window magnetic contacts and presence sensors in the space.
- **Delete ST-520RV:** To delete a connected ST-520RV (Smart Receiver) that is no longer needed, press and hold the trash bin icon **(Delete)** located at the top right of the screen **for 4 seconds**. The ST-520RV will then be removed from the list of connected devices.
- **Return to Previous Screen:** Press the **(Back)** arrow at the top left to return to the previous menu.

Pairing the ST-520FC (Smart Controller) with the Smart Thermostat ST-520/R

Select the wireless connection option on the ST-520/R thermostat to achieve full control of Fan Coil units.



This flexibility allows you to adapt the connection according to the installation needs and capabilities of your space, ensuring seamless and reliable operation with the use of Fan Coil units.

To enable wireless connection and control of Fan Coil units, it is required to install the **ST-520FC (Smart Controller)**, which works exclusively with the ST-520/R thermostat, providing:

- **Fan Coil fan speed control with selectable options:** Low, Medium, High, or Automatic (Auto).
- **Valve management** for selecting between Heating and Cooling operation.

The ST-520/R thermostat can be connected to **up to 5 wireless ST-520FC (Smart Controllers)**, allowing the management of multiple Fan Coil units located at different points within the space.

This functionality provides great flexibility in **multi-zone installations**, ensuring that a Fan Coil unit can be activated and controlled simultaneously by multiple thermostats according to the needs of the space.

Pairing the ST-520FC (Smart Controller) with the Smart Thermostat ST-520/R

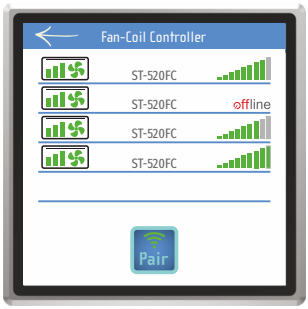
The **ST-520FC (Smart Controller)** communicates with the ST-520/R thermostat **via the ESP-NOW wireless protocol at 2.4 GHz** frequency, offering stable and reliable long-range communication.

Pairing Steps

1 Navigate to the menu **Advanced Settings > Configuration > Equipment Connection** and enable the "Wireless" pairing function under the **"Fan Coil"** section.

Select the **"Gear"** icon and press the **"Pair"** button.

2 Set the **ST-520FC (Smart Controller)** into pairing mode by pressing the **"Pair"** button on the device until the indicator light starts flashing green.



3 Device Detection & Registration

The thermostat will detect the ST-520FC and display a successful pairing message on the screen.

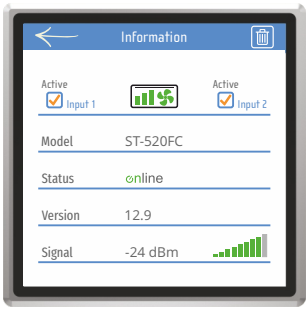
4 Completing the Connection

The ST-520FC is now connected and ready to receive commands from the ST-520/R thermostat.

After the initial pairing, the communication remains active even in the event of a power outage, without requiring re-pairing.

Managing Connected Devices

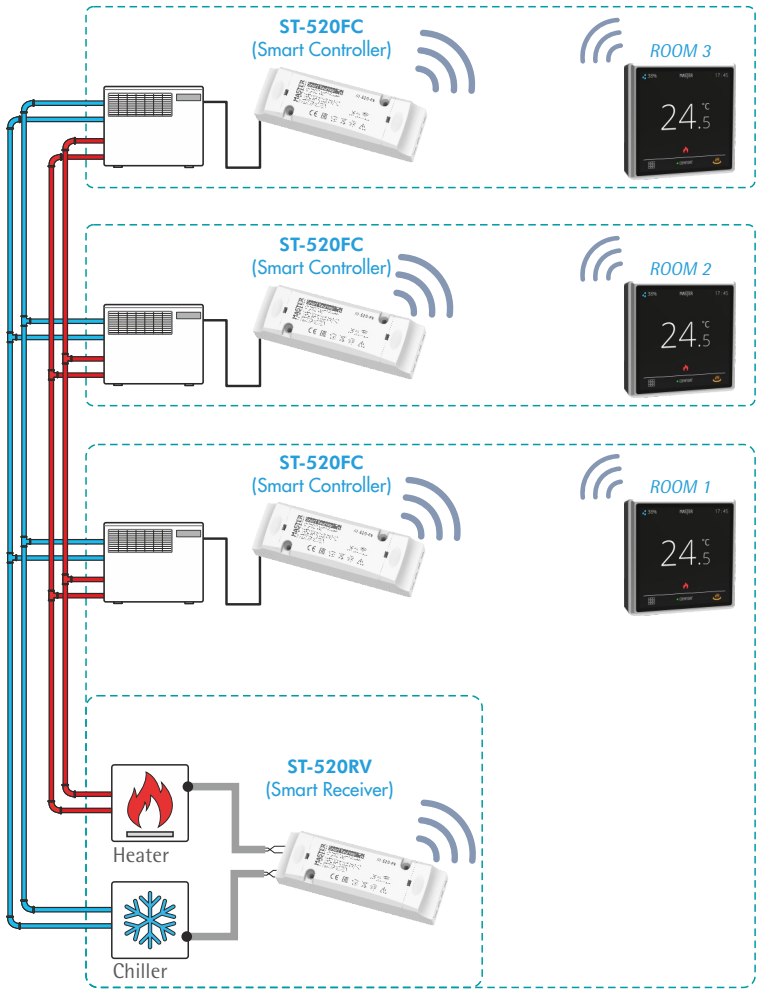
By tapping on an **ST-520FC (Smart Controller)** in the list of connected devices, the **"Device Information"** screen opens, showing the following options:



- **Active:** Activate/deactivate the two independent inputs **(Input 1 and Input 2)**, suitable for connecting window magnetic contacts and presence sensors in the space.
- **Delete ST-520FC:** To remove a connected **ST-520FC (Smart Controller)** that is no longer needed, **press and hold the "Delete"** bin icon located at the top right of the screen for **4 seconds**. The ST-520FC will be removed from the list of connected devices.
- **Return to Previous Screen:** Tap the **"Back"** arrow at the top left to return to the previous menu.

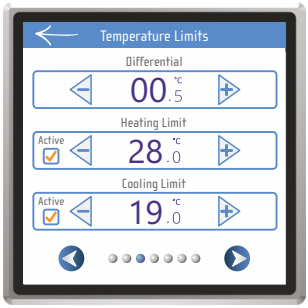
Wireless Communication Diagram
Four-pipe heating and cooling system with Fan Coil and 3 zones

Installation of wireless communication of ST-520/R thermostats with ST-520FC controllers for Fan Coil control, as well as the parallel activation of independent Heating and Cooling systems from different thermostats through the ST-520RV receiver.



Temperature Limits

This setting allows you to set the minimum temperature that can be reached, ensuring comfort and avoiding excessive cooling, while helping to save energy.



- **Differential Switching:** Set the temperature switching range of the ST-520/R thermostat to determine when the heating or cooling system turns on or off. With this setting, you can configure the sensitivity of the thermostat, ensuring a stable temperature and greater energy efficiency.
- **Maximum Limit (Heating):** Set the maximum allowable limit for the temperature rise in the room. This setting allows you to specify the maximum temperature that can be reached during heating operation.
- **Minimum Limit (Cooling):** Set the minimum allowable limit for temperature reduction in the room. This setting allows you to specify the minimum temperature that can be reached during cooling operation.

Service - Protection

- **Antifreeze:** Set the minimum temperature at which the heating system will automatically activate to protect pipes and equipment from freezing. The ST-520/R thermostat's Anti-Frost function is automatically activated when the room temperature falls below the preset threshold. The heating system will continue to operate until the temperature rises above this threshold, ensuring that piping and equipment remain protected from the risk of freezing.
- **Component maintenance (Kick Cycle / h):** Set the time interval in hours in which the ST-520/R thermostat will activate the peripheral systems of the installation (such as valves, circulator, boiler, etc.) for maintenance. This function ensures proper operation and prevents problems that may arise from prolonged inactivity of components.

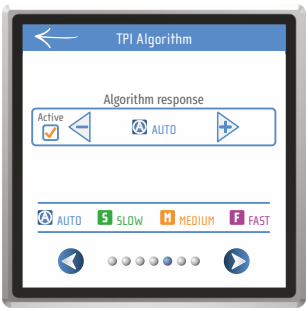
Note: In areas where the water hardness is high, it is recommended to reduce the frequency of maintenance to prevent salt accumulation and ensure the smooth operation of the systems.

TPI Algorithm

Set the operating parameters of the **TPI (Time Proportional & Integral)** algorithm for the ST-520/R thermostat. The TPI algorithm optimises the performance of the heating/cooling system, adjusting its operation according to your needs for better energy efficiency and temperature stability.

TPI Algorithm Settings:

Algorithm Response: Select the algorithm response based on the heating/cooling system design, insulation and outdoor temperatures.



The available options are:

- **SLOW:** For a more gradual response, suitable for systems with higher inertia.
- **MEDIUM:** Balanced response for systems with moderate inertia.
- **FAST:** Fast response for systems requiring immediate temperature regulation.
- **AUTO:** Automatic selection that dynamically adapts to room conditions.

Switching Times

Switching Times define the time delay between the activation and deactivation of the heating and cooling systems, and the transition between them.

Available Switching Time Settings are:

- **Heating [minutes]:** Sets the time interval required to start or stop the heating system.
- **Cooling [minutes]:** Sets the time interval required to start or stop the cooling system.
- **Heating < = > Cooling [minutes]:** Specifies the time interval between the change from heating to cooling and vice versa.

The correct setting of these parameters is important for:

1. Avoid frequent switching on/off, which can wear out the equipment.
2. Optimise energy efficiency, reducing unnecessary energy consumption.
3. Ensuring a constant temperature, without sudden fluctuations.

The ST-520/R thermostat supports the "Master/Slave" function, allowing the management of multiple thermostats in a centrally controlled system.

This feature is useful when you want one master thermostat to control multiple units or zones, imposing restrictions such as temperature limits, and hiding the "Advanced Settings" menu from connected thermostats configured as "SLAVE".

Setting steps "MASTER"

To set a thermostat as "MASTER", follow the steps below:

1. Go to the "Advanced Settings" menu of the ST-520/R thermostat which will operate as "MASTER".
2. Select "Configuration" > "Master / Slave".
3. Activate the "Active" indicator, enabling the "Master/Slave" mode.
4. Set the thermostat as "MASTER" using the selection arrows.
5. The thermostat is now ready to accept coupling with "SLAVE" thermostats.

Setting steps "SLAVE" and Coupling with "MASTER»

To connect a "SLAVE" thermostat to the "MASTER", follow the steps below:

1. Go to the "Advanced Settings" menu of the ST-520/R thermostat which will operate as "SLAVE".
2. Select "Configuration" > "Master / Slave".
3. Activate the "Active" indicator and set the thermostat as "SLAVE" by selecting the corresponding arrow option.
4. Press the "Gear" button to display the list of available "MASTER" thermostats.
5. Select the "MASTER" thermostat from the list for pairing and press the "Save" button.
6. Coupling completion: The "SLAVE" thermostat will connect to the selected "MASTER" , by locking the "Advanced Settings" menu, following the settings and restrictions set by the "MASTER" .

Example of "MASTER" thermostat list with the controlled "SLAVE»

- The maximum number of thermostats that can be defined as "MASTER" is 18.
- A "MASTER" can control up to 18 "SLAVE" thermostats.
- The "MASTER" has the ability to impose or remove restrictions on "SLAVE" thermostats from the list by selection.
- The "Master/Slave" coupling is maintained even after a power failure.

Example of thermostat list "SLAVE" for selection and control by "MASTER»

- In installations with more than one "MASTER", you can select the desired "MASTER" from the list during pairing.
- A "SLAVE" can only be connected to a "MASTER".
- The "Master / Slave" coupling is maintained even after a power failure.

Wi-Fi Connection

How to connect to your local Wi-Fi network

Manage the Wi-Fi settings for connecting the thermostat to your home network, allowing remote control via the "MASTER Smart Home" app by following the steps below on the touch screen:

- Touch the home screen.
- Tap the "Gear" (Settings) icon at the top right of the screen.
- Select the "Advanced Settings" icon and then select the "Wi-Fi Connection" icon

Search available networks:

- Press the "Magnifying glass" icon and the thermostat will scan the available Wi-Fi networks.
- Select the SSID (network name) you want to connect to.

Enter your password:

- Tap the "Pencil" icon and enter the password of the selected network.
- Make sure the password is entered correctly, taking into account upper/lower case letters and symbols.
- Press "Connect" to connect the thermostat to the Wi-Fi network. The screen will display a successful connection message when the process is complete.

Notes on connecting the ST-520/R via Wi-Fi and the Internet:

- Check connection: if the connection fails, check the SSID and password again. If your network is in range and working properly, check the SSID and verify that the connection is working.
- Check and Test: Check that all connections are correct and that the thermostat is working properly.
- Local Wi-Fi network: a local Wi-Fi network is required to connect the ST-520/R to your smartphone. For remote control, in addition to the installation site, Internet access is required.
- Responsibility for providing a connection:The use of the Internet for the connection depends on the customer's contract with the Internet Service Provider (ISP) and is the sole responsibility of the customer.
- Remote Control: to use and remotely control the ST-520/R, you need to install the "MASTER Smart Home" app on your smartphone.

Factors Affecting Performance:

- The quality of the Wi-Fi signal affects the performance of the connection.
- The quality of mobile phone signals may affect the remote operation of the thermostat.

(RF) Sensor

The ST-520/R thermostat supports the wireless temperature measurement function, allowing the temperature to be read from a different point in the room, other than its installation location.

This feature offers flexibility, allowing you to customize the reference temperature measurement point according to the room configuration and installation needs.

Thus, the thermostat takes temperature data from the point you deem most representative for controlling the heating or cooling system, ensuring more accurate operation and energy efficiency.

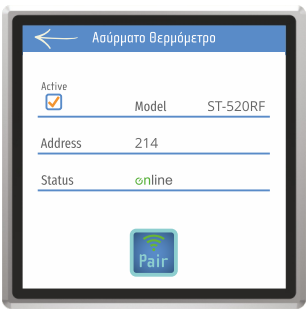
To enable this feature, the ST-520RF (wireless thermometer) device is also required, which communicates with the thermostat via a wireless connection.

Coupling of the ST-520RF (RF Sensor) with the ST-520/R Smart Thermostat

The ST-520RF (RF Sensor) communicates with the ST-520/R thermostat wirelessly at 433 MHz, providing stable and reliable long-range communication.

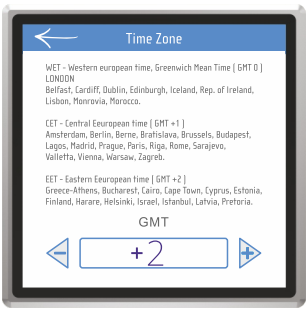
Steps to coupling

- Go to Advanced Settings > RF Sensor > and enable the "Active" mode.
- Insert the AA alkaline batteries into the ST-520RF wireless thermometer.



- Set the ST-520/R thermostat in pairing mode by pressing the "Pair" button.
- The screen will display the successful login message "Status online" when the process is complete.

Time Zone



Set the time zone of the ST-520/R thermostat to display the local time correctly and synchronize it accurately with programmed functions, such as weekly scheduling.

Adjusting the time zone is easy, using the buttons (+) to increase and (-) to decrease the value.

About Device

In the "About Device" screen, you can check and manage specific software (Firmware) parameters of the ST-520/R thermostat.

The following sections allow you to control technical details and configure the thermostat, ensuring optimum performance, flexibility and safety:

- Factory Reset
- Information
- Firmware Update

Factory Reset

The "Factory Reset" option only resets the thermostat to factory settings, deleting all stored settings, schedules and wirelessly connected devices. However, the settings and connected devices of the "MASTER Smart Home" on the multifunction display remain saved.

To reset the thermostat to factory settings, follow the steps below:

1 Press the "Factory Reset" button on the "About Device" screen.

2 The Factory Reset screen opens, displaying the following warning message: " Warning! The reset will erase all saved settings. Continue? "

3 Two options are displayed at the bottom of the screen:

- [X] Cancel the action and return to the previous screen.
- [OK] Confirm and perform the factory reset.

Note: The procedure cannot be reversed. After the reset, you will need to reset the thermostat.

Information

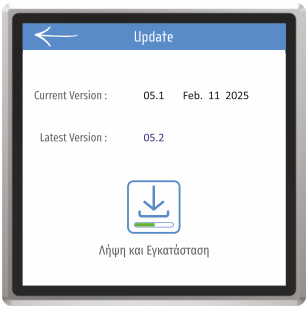
The **"Information"** screen displays technical information about the device, such as:

- **Model** Model of the device.
- **Admin** Administrator or user profile of the device.
- **Time Zone** Time Zone setting.
- **Date / Time** Current date and time of the device.
- **IP** The IP address of the device on the local network
- **SSID** The name of the Wi-Fi network to which the thermostat is connected
- **BSSID** The physical address (MAC Address) of the wireless network
- **RSSI** Wi-Fi signal strength indicator (the higher the value, the better the connection)

In addition, the **"Information"** screen includes an indication of compatibility with **Google Assistant** & **Amazon Alexa**, as well as a QR Code that links to the **"MASTER Smart Home"** web platform for more information and settings.

Firmware Update

The **"Update"** section allows updating the software of the ST-520/R thermostat, ensuring optimized performance and compatibility with the latest functions.



Contents of the **"Update"** screen

- **Current Version:** Displays the current software version (Firmware) installed on the device, along with its release date.
- **Latest Version:** Displays the latest available version that can be installed on the thermostat.
- **"Download and Install"** button: pressing the button with the download icon starts the upgrade process.

Important: The device must be connected to a Wi-Fi network with internet access to download the update.

During the upgrade, do not turn off the thermostat. After successful installation, the device will automatically reboot to apply the changes.

Multifunctional display

The ST-520/R device, in addition to its function as a thermostat, also has a multifunctional display with integrated software, offering the ability to control all connected devices of the "MASTER Smart Home" system.

The **multifunctional display of the ST-520/R** device is an integrated central control panel, allowing the user to easily and quickly monitor, configure and manage all the connected devices of the "MASTER Smart Home" system via the local Wi-Fi network.

With simple navigation and user-friendly functions, the system can be managed directly, without the need for additional equipment or an external hub.

In the multifunctional screen environment, the user can:

- Switch appliances on or off, adjust the intensity and hue of lighting, control the operation of blinds and shading systems, and manage air conditioners with one touch.
- Create and manage operating scenarios by device category, facilitating everyday use.
- Monitor the operating status of each device in real time.
- Program automatic actions via timers, maximising comfort and energy savings.

Explanation of Multifunctional Screen Icons

Select the multifunctional screen icon at the bottom left of the home screen to get to the "My devices" management interface.

There you can manage all connected devices of the "MASTER Smart Home" system.

1. Lighting: Adjust the intensity and colour of lighting in the selected rooms.
2. Electrical Appliances: Switch on or off the connected electrical appliances.
3. Timers: Activate the default schedules of your devices.
4. Rolls: Raise, lower or adjust the position of blinds, shutters or similar shading systems.
5. Tents: Expand or collapse the electric awnings for shading according to your needs.
6. Sockets: Check the status of the smart socket outlets by turning the connected devices on or off.
7. Air conditioners: Manage temperature, air speed and cooling/heating mode.
8. Thermostats: Monitor and adjust the temperature on all connected thermostats.
9. Orders: Perform scheduled actions or give direct commands to control connected devices.
10. Return to the previous screen: Button to return to the previous menu.
11. Adding a device: Button to add a connected device to the multifunctional screen interface.

Adding a Device

To enter the connected "MASTER Smart Home" devices into the multifunctional display, follow the steps below on the touchscreen:

- Tap the **(+)** icon at the top right of the screen. The screen will display a list of all available devices.
- Select the devices you want to import. The devices will then be automatically listed in the corresponding categories as defined in the "MASTER Smart Home" application.
- Tap the arrow icon **(Back)** at the top left of the screen to return to the main control interface of the multifunction screen.

Note:

1. Make sure that the devices you are going to import are connected to the same local Wi-Fi network as the ST-520/R device.
2. The outline of the category icon turns blue when at least one connected device is added. When one or more devices in the category are switched on, the indicator light shall turn green and remain off when all devices are switched off.

Creating and Managing Scenes

In each category of connected devices, you can create and manage three scenarios, tailored to your needs. To create a new scenario, follow the steps below:

Select the category: Tap the icon of the device category for which you want to create a scenario (e.g. Lighting).

Adjust the devices: Set all devices to the desired state. If there are several registered devices, the selection arrows are additionally displayed for navigation.

Enter script: Press and hold for 5 seconds the key of the scenario (e.g. "Scene 1") you are going to save. The current state of the devices will automatically be saved to that scenario.

In the same way you can replace already saved scripts with new ones.

Select Scene: To activate a saved scenario, click on the corresponding icon (e.g. "Scene 1"). All devices in the selected category will switch to their saved state.

Note: The scripts remain stored in the device even in the event of a power failure.

Multifunctional Display Indicative Functions

The following are indicative functions of the multifunctional display for controlling and managing connected devices.

General Guideliness

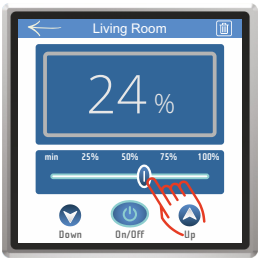
- Select the desired device category from the multifunctional screen.
- Tap and hold the device you want to check to access its options.

Operation of Roller Control and Shading Systems

- Press the **(+)** button to raise or the **(-)** button to lower the roller or shade system.
- Alternatively, you can drag the graphic of the roller blind or shading system for precise positioning. The rate indicator at the bottom of the screen displays their real-time position accurately.
- Tap the **(Pause)** icon to stop the movement at the desired position.

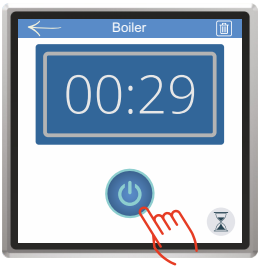
Air conditioning control function

- Select mode **(Auto, Cool, Dry, Fan, Heat)** and air intensity **(Auto, Loud, Medium, Low)**.
- Set the desired temperature by pressing **(Up)** or **(Down)** buttons.
- Press the **"ON/OFF"** button to turn the air conditioner on or off.



Lighting Control Function

- Adjust the light intensity with the arrow keys or by dragging the pointer to the desired percentage.
- Press the **"ON/OFF"** button to switch the lighting on/off.
- If you have RGB lighting, select the desired shade from the colour palette that is also displayed on the screen.



Boiler Control Operation

- Press the **"ON/OFF"** button to turn the boiler on or off.
- The boiler will automatically switch off after the preset operating time has elapsed.

Checking the ST-520/R with the application MASTER Smart Home

GET IT ON Google Play

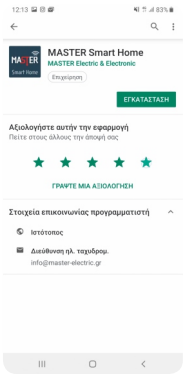
Available on the App Store

Συμβατό με φωνητικές εντολές μέσω Google Assistant και Amazon Alexa

works with the Google Assistant

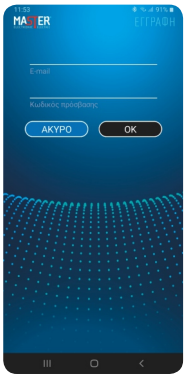
NEW SERIES MASTER Smart Home

Δημιουργία Λογαριασμού (User)



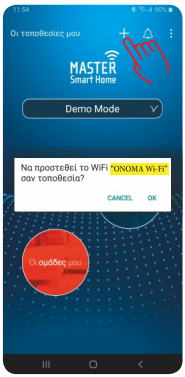
Βήμα 1°

Βήμα 2°



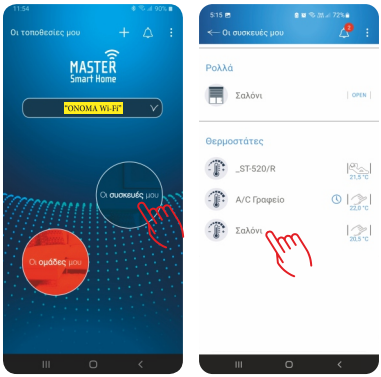
Βήμα 3°

Δημιουργία Τοποθεσίας



Βήμα 4°

Σύνδεση Νέας Συσκευής



Βήμα 5°

Step 1: Download the "MASTER Smart Home" app from Google Play or the App Store.

Step 2: Open the app and tap «SIGN UP».

Step 3: Enter your details, press «OK» and follow the account activation instructions in the email you received.

** First, make sure your Smartphone or Tablet is connected to your local Wi-Fi network.*

Step 4: Make Login to the "MASTER Smart Home" app and press «+» to create your location.

** The name of the location initially displayed is the name of your Wi-Fi local area network.*

Step 5: From the home page of the application, select «My devices». The "Thermostats" category will display all ST-520/R devices connected to the Wi-Fi local network.

Ways of Temperature Control

By dragging the red line: Touch and drag the red line around the circle to manually increase or decrease the temperature.

Using the "up/down" buttons: Press the buttons marked "up" and "down" to adjust the temperature precisely in 0.5°C increments.

Lower Function Keys

- **Settings (Gear):** Tap the gear icon to go to the thermostat settings and configure advanced options such as programs or functions.
- **Select Profile (Select Mode):** Tap the Mode icon (inside the frame) to select one of five predefined temperature profiles:

ECONOMY: Economical operation for lower energy consumption.

AWAY: Absence mode to maintain low temperature.

COMFORT: Adjustment for maximum comfort in your space.

NIGHT: Temperature ideal for resting during the night.

MANUAL: Manual temperature setting according to your preferences.

Note: The temperature you set manually will remain constant until you change it or until a time schedule is activated on the device.

Additional Functions on the "Select Mode" Screen

ON / OFF: By selecting **"OFF"**, the operation of the heating and cooling systems is completely deactivated, except for the antifreeze function (Antifreeze), if it is activated by the user. By selecting **"ON"**, the system reverts to the mode that was active before it was switched off, keeping the last selected Mode (Economy, Away, Comfort, Night).

Antifreeze: At the bottom right of the screen, there is an **"Antifreeze"** indicator with a box to activate or deactivate the system's antifreeze protection.

Back to previous screen: At the top left of the screen, there is an arrow **(Back)**, which allows you to return to the previous screen.

- Activation/Deactivation of the DHW

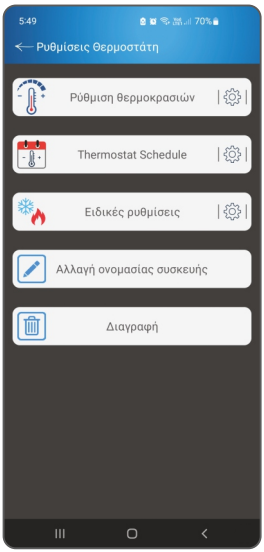
Press the steam icon to activate or deactivate the DHW function if the installation includes a DHW boiler.

Additional indications on the temperature setting display

- **Humidity level:** Shows the current humidity level in the room (%).
- **Current room temperature:** Shows the actual room temperature.
- **Weather Indication:** Shows the current weather conditions at the thermostat's installation location (e.g., sunshine, cloudy, rain).

Thermostat Settings

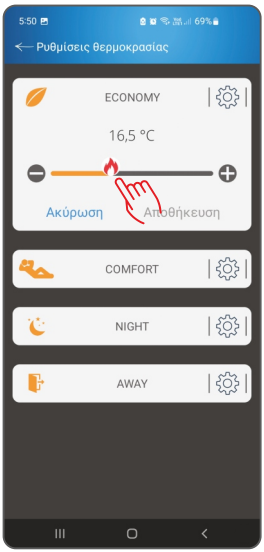
By tapping the **"Gear"** icon, you go to the settings, where you can configure basic and advanced operation options of the ST-520/R thermostat.



- **Temperatures (Modes)**
- **Weekly Scheduling (Time Schedules)**
- **Special Settings**
- **Change Device Name**
- **Delete Device**

Temperatures (Modes)

The ST-520/R thermostat allows individual temperature setting for each operating mode.



Available Temperature Modes

Comfort – For maximum thermal comfort when you are in the room.

Economy – For a balance between comfort and energy savings.

Night – For a lower temperature during sleep.

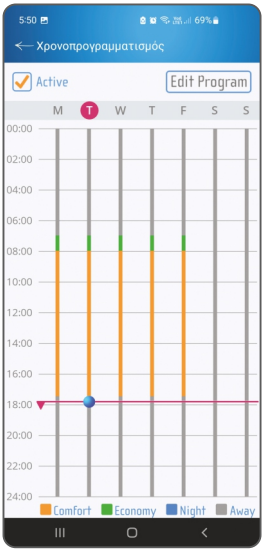
Away – For times when no heating or cooling is required, saving energy.

Temperature setting in Mode

- Select the Mode you want to set from the list.
- Tap the gear icon next to the selected Mode to enter its settings.
- Set the desired temperature using the (+) and (-) buttons.
- Press "Save" to enter the new setting.
- If you want to cancel the change, press "Cancel".

Weekly Time Schedules (Time Schedules)

The ST-520/R thermostat has a weekly scheduling function, allowing the temperature to be set automatically according to the user's preferences for each day of the week.



1. **Activate Scheduling.** To activate weekly scheduling, select **"Active"**. When enabled, the thermostat automatically follows the programmed operating schedule. If the option is disabled, the thermostat operates manually, using the settings you have set.

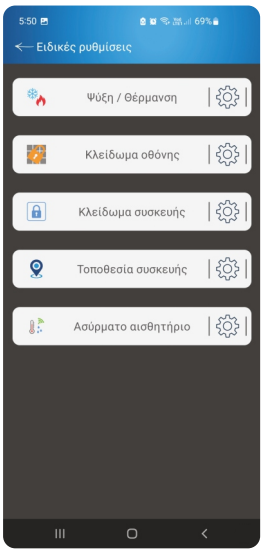
2. **Edit Program.** Press the **"Edit Program"** button to configure the week's schedule.

3. **Temperature Zone Programming.** You can set the temperature in four different modes, which are shown in different colours on the graph:

- Comfort – Orange
- Economy – Green
- Night – Blue
- Away – Grey

Notes: The red line with the blue marker indicates the current time and active mode.

Special Settings



The **"Special Settings"** screen provides advanced configuration options for the ST-520/R thermostat, allowing the user to customize the operation of the device according to their needs.

- **Cooling / Heating:** select between heating and cooling mode.
- **Lock Screen:** Prevents unauthorized use of the thermostat by activating the touch lock.
- **Device Lock:** Ensures that only authorized users using a password can modify the thermostat settings.
- **Device Location:** Indicates the location of the thermostat in the "MASTER Smart Home" system, allowing easier management of multiple devices.
- **Wireless Sensor:** Enables the ability to measure temperature wirelessly through the ST-520RF sensor, taking data from a different location in the room.

ΒΙΟΤΕΧΝΙΑ ΗΛΕΚΤΡΟΛΟΓΙΚΟΥ ΥΛΙΚΟΥ

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