M-TEC
ENERGY FOR FUTURE

User manual

AHPC

27 / 412 / 618

Note:
All texts, data, drawings, and illustrations have been compiled with the utmost care.
M-TEC accepts no liability for errors or changes.

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M-TEC Energy for Future
Aumühlweg 20 | A-4812 Pinsdorf
www.mtec-systems.com | office@mtec-systems.com
+43 7612/20805-0

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1. Introduction

Thank you for buying a quality product from M-TEC!

1.1. General information

This document is primarily intended for customers who use M-TEC heat pumps. Please read this document carefully.

This manual is part of the product and must be kept for the entire life of the product and, if necessary, passed on to subsequent owners or users of the product. All illustrations and images used in this document are sample graphics!

1.2. Not included in this document

- Information on the planning and maintenance of the system.
- Information on the installation of the system
- Instructions for setting the correct parameters in the control system.

1.3. Additional documents

None.

1.4. Symbols used

Danger	Indicates a high-risk hazard that, if not avoided, could result in serious injury or death.
Warning	Indicates a medium-risk hazard that, if not avoided, could result in serious injury or death.
Attention	Indicates a low-risk hazard that, if not avoided, could result in minor or moderate injury.
Hint	Indicates a situation that, if not avoided, could result in damage to the device and components, data loss, or degraded device performance.
Tip	Points out additional information, highlighted content, or tips that can be helpful in solving problems or saving time.

2. About this product

2.1. General information

This heat pump is part of the AHPC series.

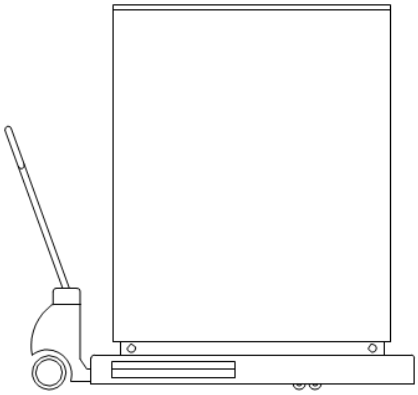
The heat pumps in the AHPC series are machines with full inverters whose optimally dimensioned high-performance components promote the efficiency of the systems. They use the natural refrigerant R290 (propane), which enables environmentally friendly operation but should not be released into the atmosphere as it is highly flammable.

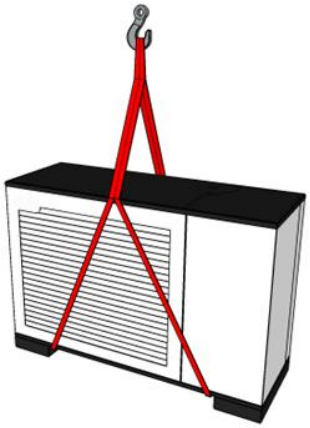
The internally installed components are monitored by temperature and pressure sensors, thus ensuring error-free and efficient operation of the system. The heat pump is controlled via a remote control (AP440 terminal), which is used to monitor the operation of the machine, set target temperatures and change the operating mode of the system (summer/winter).

2.2. Notes for transport

Note	Do not tilt the heat pump more than 45° (in any direction) during transport! Otherwise, anomalies in the cooling circuit may occur during subsequent operation. In the worst case, damage may occur inside the unit.

The heat pump should be transported to the installation site either with a pallet truck or forklift truck, with the heat pump remaining on the pallet; or with a crane, with the heat pump secured with a transport bracket..





The following points should be observed to ensure safe transport:

- Lifting excessive weights can cause injuries, e.g. to the spine.
- When transporting heavy loads, observe the applicable guidelines and regulations.
- The transport lock must be removed before the heat pump is put into operation.
- The suction and pressure area must not be reduced or covered.
- The dirt trap, which is not included in the scope of delivery but can be supplied at the customer's request, must be installed on the heating return upstream of the heat pump.
- Observe the regulations applicable in the respective countries.
- Observe the specific building regulations of the country in which the unit is installed.

2.3. Storage until use

- Storage must be outside of buildings.
- The storage location must not be near ignition sources (heat sources, open flames, sparks, hot surfaces, etc.).
- There must be no ventilation pipes (air intake of the ventilation system) in the storage area.

- Storage in closed or underground rooms (e.g. garage, cellar, etc.) is prohibited.
- Storage in shaft yards and public places is prohibited.
- Only store upright. Do not store the heat pump in an elevated position.
- The heat pump must be protected against mechanical damage, falling over, falling down, excessive heating, ignition sources and fire.
- The heat pump must not be stored in a damp or dusty environment.

3. Safety instructions

The installation and commissioning of the heat pump and all maintenance and repair work on the heat pump system must be carried out exclusively by M-TEC specialist personnel and its partners.

The heat pump system must not be used for any other purpose than that specified in the contract. It is also forbidden to use any part of the system for any other purpose than that for which it was designed. Any modifications to the heat pump system must only be carried out by specialists from M-TEC or its partners, and only after consultation with M-TEC.

Danger	The heat pump is filled with the non-toxic, odourless and colourless, but flammable refrigerant R290 (propane). If it leaks, there is a risk of explosion. In the event of a leak, keep away from ignition sources and contact M-TEC customer service.
	The heat pump must never be drilled, punctured or incinerated.

Warning	If refrigerant escapes from any part of the heat pump system, for whatever reason, ensure adequate ventilation and avoid contact with naked lights or fire. Leave the danger area immediately and inform M-TEC.

Note	If you notice unusually loud noises when the compressor is in operation, this could indicate that the direction of rotation is incorrect. In this case, shut down the system and contact M-TEC customer service. The compressor can be damaged if it is constantly rotated in the wrong direction!
	When using an inverter or emergency power generator as a power supply, it must be ensured that the voltage provided consistently corresponds to the mains requirement of the heat pump according to the data sheet.
	If faults occur in the heat pump or if there is a risk of frost in the building, the heat pump system switches to frost protection mode. If the heat pump is installed in buildings that are not permanently occupied (e.g. holiday homes), the user is responsible for ensuring that the system is always supplied with power so that it can switch to frost protection mode if there is a risk of frost.

3.1. Intended use of the heat pump

The heat pump may only be used for room heating, room cooling and for heating the hot water supply. The heat pump may only be operated within the limits specified in the respective technical data sheets.

Commercial or industrial use for purposes other than room heating, room cooling or supplying a hot water heater is not permitted (e.g. for production processes, cold rooms or cold stores, food cooling, etc.). Misuse of the device or improper operation (e.g. opening the heat pump) is not permitted and will result in the exclusion of liability.

3.3. Safety devices

Hint	Due to the use of the refrigerant R290 (propane), it is recommended that the heat utilisation system not be equipped with an automatic ventilation system inside the building, or that this be removed.

The heat pump is equipped with a pressure relief valve to prevent damage to the heat consumer in the event of excess pressure in the system.

The heat pump is equipped with an anti-freeze system that prevents the water pipes connected to the heat pump from freezing at low outside temperatures. The frost protection is always active as soon as the heat pump is supplied with power – i.e. as long as the heat pump is connected to a power source (e.g. public grid), the circulation pump can be switched on if necessary, even if the operating state of the heat pump has been switched off or changed to standby.

3.4. Condensate drain

In heating operation, condensation collects on the evaporator fins and may also freeze on the evaporator, depending on the outdoor temperature. If necessary, this ice formation is removed by reversing the cooling circuit (defrosting), i.e. the evaporator is heated. This causes melt water to form under the evaporator, which collects in the integrated condensate tray and can thus be drained centrally from the heat pump.

Attention	Frozen condensation on the road or footpaths can cause slippery surfaces that can lead to falls. Make sure that the condensation does not run off onto the road or footpath and freeze there.

Hint	To prevent deposits (e.g. rust) in the heat pump's condenser, the use of suitable dirt and sludge separators is recommended.

3.5. Working area

Information on the minimum and maximum operating limits can be found in the technical data sheet for your heat pump.

Note	Operating the heat pump at a system temperature that is too low can lead to frost damage despite the antifreeze system!

4. Scope of delivery

The delivery consists of the heat pump and the AP440 display and is delivered on a pallet. Please check the system for completeness and damage immediately upon receipt of the heat pump!

Tip	Please refer to the delivery note for the exact scope of delivery. If you notice any damage or incompleteness of the delivery, please inform M-TEC immediately, as a later complaint is no longer possible!

5. Operation and display AP440

5.1. User levels

The visualisation has several user levels that can be divided into three modes – 'Simple', 'Advanced' and 'Expert' – which are intended for specific user groups. Depending on the user level, certain menus and settings are accessible and special information and setting parameters are displayed. The end customer can operate the heating system and adapt it to their individual needs. The service technician can configure the heating system and put it into operation.

Level	Mode	User	Functionalities
1	Simple	End user	Minimal setting options, no user password required.
2	Advanced	End user	Additional settings require user password '100'.
10	Expert	Technician	Access to all parameters. Password for service technician required.

5.2. Display and operating elements

Status display

This indicator shows whether a particular parameter/option is set (orange status light) or not (white status light).

Selection wheel

Use the wheel to set values (in specific increments). The value displayed in the centre is the currently selected value. Tap the dial and move it up or down to select a new value.

Open submenu

This button indicates that there is a sub-screen for the corresponding entry, which can be opened here.
In addition, input fields for the individual parameters are opened.

Back to previous

Use this button to return to the screen from which you accessed the current screen. The name of the original screen appears to the right of the button.

ON/OFF switch

Certain settings and system options can be enabled or disabled here.

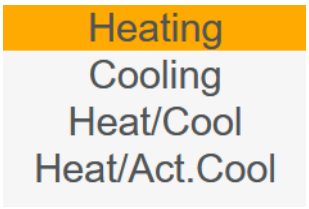
Scroll bar

If there are more entries for a screen than can be displayed on the screen, you can scroll through the screen (using the up and down arrows and by moving the scroll bar between the arrows). The screen entries are scrolled through line by line.

'Closed/Open/Closed' slide control

This is a slider that is used in conjunction with certain setting parameters to select one of three states: closed, off (deactivated) and open.

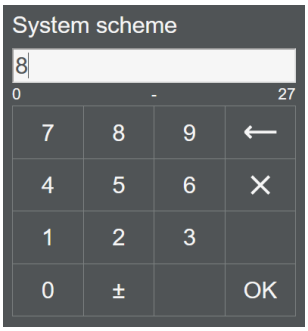
'Text Selection' menu



This is used to select a status. The number and type of status texts varies depending on the parameter.
After selecting an entry, the selection menu closes automatically and the selected status text appears in the parameter field.

Input field

Touching a field automatically opens the keyboard for the respective input field. Text input fields are linked to the alphanumeric input field. The text entered here is displayed in the edit line.
After confirming with OK, the value is adopted from the input line and updated. Press the ALT key to switch to the keyboard layout with additional characters.



Numeric input fields are linked to the numeric input field. The range of values within which an entry is possible is displayed below the processing line.
If a value is entered that exceeds the displayed range, the value cannot be accepted with 'OK' and the value range is highlighted in red.
In general, the exact name of the parameter for which the panel is currently open is displayed in the title bar.

You can use ✕ to exit an input field without accepting the values entered. Entries in the input line can be deleted with ⟵.

5.3. Visibility

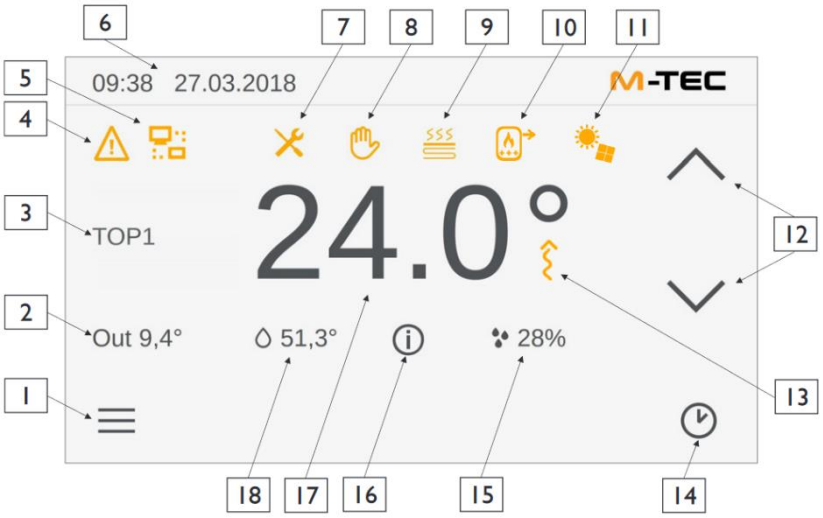
Some screens or submenus of the details menu are only visible if the corresponding modules (heating circuit, hot water tank, solar circuit, etc.) were activated when the heat pump was started up or if the system plan was adapted in the system settings.

Some screens (e.g. brightness) can only be accessed via the local visualisation directly on the AP440.

6. User interface - simple

6.1. Home screen

The home screen provides a clear overview of the most important values, including the current indoor and outdoor temperature and the current operating mode of the heating circuit.



1 Detail menu
2 Outdoor temperature
3 Select heating circuit
4 Alarm/warning active
5 Remote maintenance active
6 Date / Time
7 Link to the detail menu
8 Manual mode active
9 Drying of screed active
10 Additional heat source active
11 PV surplus energy active
12 Change room temperature
13 Heating/cooling mode active
14 Operating mode of the heating circuit
15 Humidity of the heating circuit
16 Overview menu
17 Room temperature
18 Hot water temperature

The heating circuit can be selected using the left selection wheel (3), and the set temperature can be changed using the arrow keys (12) on the right side.

Hint	The room temperature of a heating circuit can only be set within a range of 5°C above and below the temperature set for the respective operating modes under Detail menu ▶ Heating circuit.

Example: Setting the daytime setpoint temperature

If the daytime setpoint temperature has been set to 22°C in the heating circuit detail menu, the desired daytime temperature can be set directly on the home screen in the range of 17°C to 27°C. Setting the temperature via the home screen does not change the normally sect daytime setpoint temperature in the detail menu.

Warnings active (4)

The symbol on the start screen indicates that an error has been detected in the system and must be rectified or acknowledged (i.e. noted). Clicking on this symbol opens the 'Warnings' screen and displays detailed information about the respective warning. Depending on the type of error, it can be acknowledged here.

Further information / overview menu (16)

The symbol ⓘ opens the 'Additional Information' window, which displays further current information about the system. If the system includes a hot water tank, clicking on this symbol opens the settings menu for the hot water tank temperature.

Operating modes (8-11)

Depending on the current operating mode, the following activity icons appear above the room setpoint temperature:

vacation		manual operation		Additional heat source active	
chimney sweep		screed heating		PV surplus active	

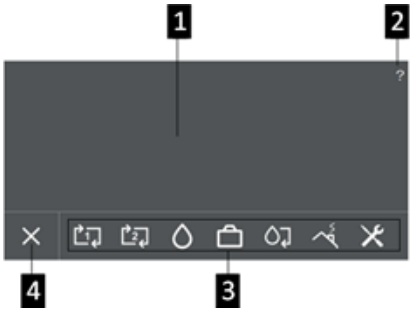
Operating mode of the heating circuit

The operating mode of the current heating circuit can be selected and activated using the symbol in the lower corner (14).

Icon	Mode	Description
	Party	In this operating mode, night mode is ignored until the time specified in the detail menu and the normal temperature set for day mode is maintained accordingly.
	Day	Activate day mode (normal temperature).
	Timer	Automatic changeover between day and night based on the preset daily heating times (individually according to the day of the week).
	Night	Activation of night mode (set-back operation).
	Standby	Switching the currently selected heating circuit on and off. When a heating circuit is deactivated, the frost protection function remains active.

6.2. Detail menu

More detailed settings can be made in the detailed menu. Among other things, the daily target temperatures of the individual heating circuits or – if available – the target temperature of the hot water tank can be set here.



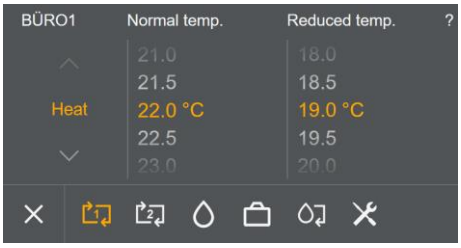
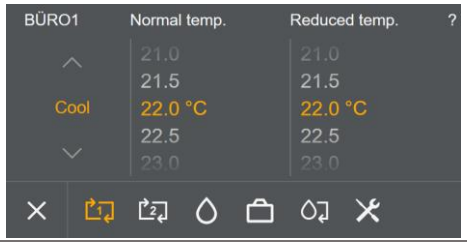
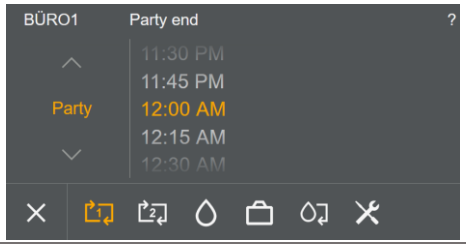
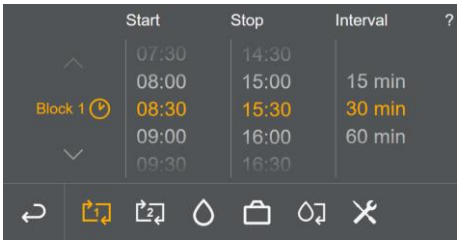
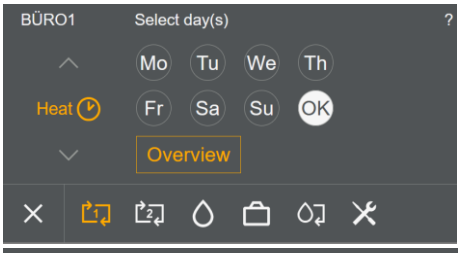
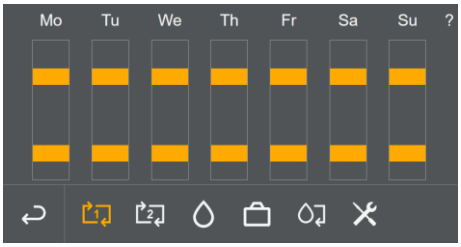
1 Display area of the current menu
2 Help screen
3 Menu bar
4 Close settings

6.2.1. Helper mask

Clicking on the question mark button 'Help' opens a window with a short description of the settings possible in the current window.

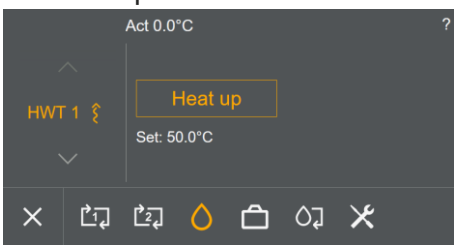
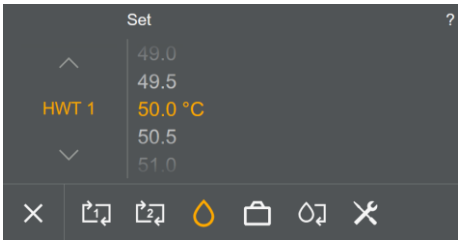
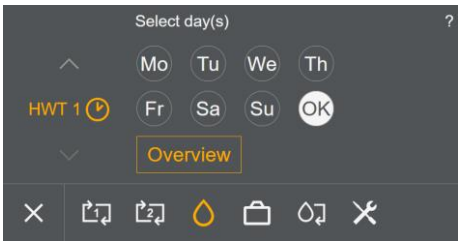
6.2.2. Heating circuit

The desired temperatures for each operating mode can be set here for the selected heating circuit. You can switch to the next operating mode using the arrow keys in the first column. The operating mode of the respective heating circuit is not activated here, but on the start screen (icon in the bottom right corner).

Operating mode	Description
Heating  Cooling  	This is where you can set the room temperature for both day mode (daytime temperature/normal temperature) and night mode (night-time temperature/reduced temperature). The temperatures can be set in the range from 10°C to 30°C. The cooling function works in the same way as heating. The setpoint set here can then be adjusted in the home screen in a range of ±5°C.
Party  	This allows a single heating period to be set for the daytime temperature (and a possible interruption of the night-time temperature cycle) without permanently changing the general settings. The 'Party End' time is set using the right-hand dial. The daytime temperature is now maintained constantly until this time. The heating circuit then returns to its original operating state.
Timer    	The timer can be used to determine the periods on certain days of the week when the setpoint temperatures for the respective operating mode (heating/cooling) are to be reached and maintained. To do this, select the desired weekdays, click on 'OK' and then define up to a maximum of 3 time blocks – the settings are adopted when you exit using the back button. A time block can be deactivated by setting the same time for the start and stop time. The normal temperature set for the operating mode is maintained within the defined time blocks, and the set-back temperature is maintained during the 'inactive' periods. The active time blocks can be viewed graphically using 'Overview'.

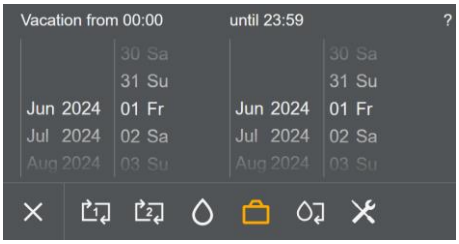
6.2.3. Hot water tank

This screen only appears if hot water tanks are included in the system. As with the heating circuits, the setpoint temperatures of the individual hot water tanks can be specified here for each operating mode.

Operating mode	Description
Actual temperature 	In this menu, the actual temperature and the specified target temperature of the hot water tank are shown. The 'Heat up' button in the middle is used to heat up the hot water tank to the setpoint temperature explicitly and just once, provided that the actual temperature is still below it.
Target temperature 	The target temperature of the hot water tank can be set here.
Timer 	The timer for the hot water tank works in exactly the same way as the timer for the heating circuits, so please refer to the relevant chapter on heating circuit settings.

6.2.4. Vacation

Enables a one-time temporary adjustment of the temperature settings for a period of several days without changing the normally used day and night temperatures.



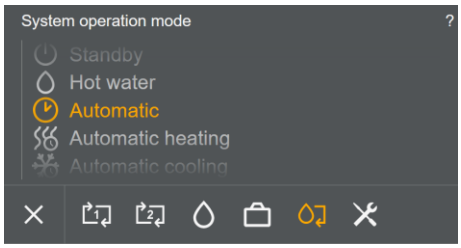
Use the selection switches to enter a start date (from) and an end date (to) for the holiday mode. The holiday mode begins at 00:00 on the start date and ends at 23:59 on the end date.

During the set period, the specified setpoint temperature is maintained and the symbol  is displayed on the home screen. Once the end date is reached, the heating circuit returns to its original operating mode and uses the temperature values stored for that operating mode.

Hint	The target temperature for holiday mode can be set using the '**Room temp. holiday**' parameter under the following submenu in the detail menu: Detail menu ► Heating circuits ► Heating circuit x ► Parameters ► Heating/cooling.

6.2.5. System operation mode.

The operating mode of the entire system is selected using this screen. The operating modes available here depend on the installed system – for example, if there is no hot water tank in the system, the 'Hot water' operating mode does not appear.



The AP440 controller offers the following operating modes:

- Standby and setup
- Automatic (heating and/or cooling)
- Hot water

- **Standby** mode is the default system operating mode. In this mode, the set operating modes for all heating circuits, hot water tanks, etc., as well as the heat generator itself, are deactivated. Only the frost protection is active – the system is switched off in this operating mode.
- **Setup** mode is activated automatically when system settings have been made – the settings made are only adopted when you switch to an active system operating mode.

To activate the settings made for the heating circuits, you must switch to an active system operating mode. You can choose between **automatic mode** and **hot water mode**:

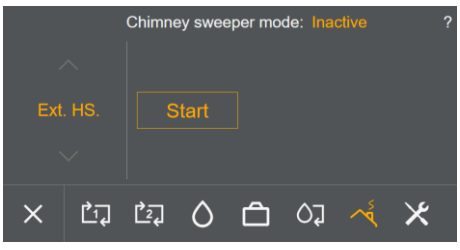
- In **hot water operation**, the heating circuits are deactivated (frost protection remains active) and the hot water tank, solar systems and photovoltaics are switched on instead.
- In **automatic mode**, heating and cooling circuits, hot water tanks, solar systems, photovoltaics and frost protection are activated. The two variants **Automatic Heating** and **Automatic Cooling** are also available from this system mode, which have only one type of temperature distribution circuit (heating or cooling) and one type of buffer (heating or cooling).

6.2.6. Chimney sweep

This menu is used to start the chimney sweep mode by pressing the 'Start' button. The screen also displays the remaining time and the corresponding status icon in the activity bar of the home screen.

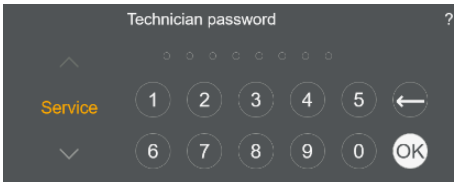
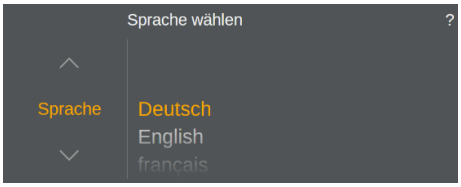
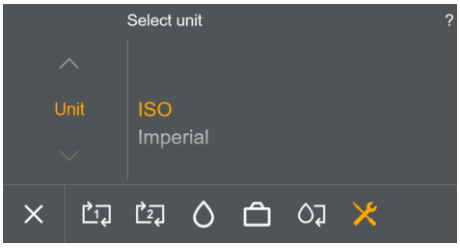
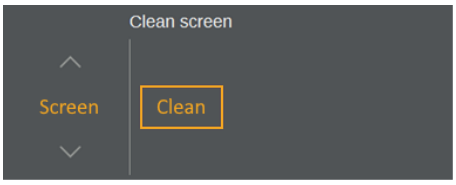
The chimney sweep mode is used to measure pollutant emissions when an emission-producing external heat source, such as a gas or pellet boiler, is present in the system.

Hint	The chimney sweep mode or the 'Ext. WQ.' submenu is only visible if an external heat source exists in the system and the option 'Generates emissions' is activated under Detail menu ► External heat source ► Parameters.

Operating Mode	Description
External heat source (Ext. H. S.) 	When the chimney sweep mode is started, the actual heat generator is stopped and the external heat source is operated at maximum power for up to 2 hours (see displayed remaining time). The chimney sweep function can be terminated by the operator at any time; otherwise, the function ends automatically after the specified remaining time has elapsed and the system returns to the original operating mode.

6.2.7. Settings

In this screen, the following submenus can be selected using the selection wheel on the left side:

Submenu	Description
Service 	Entering the correct password here will open the advanced details menu for the respective user level. If you wish to exit advanced mode prematurely (which happens automatically after 30 minutes of inactivity), you can end it explicitly by entering 0 or another incorrect password here.
Language 	You can select the language in this menu. The selected language is not adopted until you exit the menu. It may take 1-2 minutes to update the texts.
Unit 	Here you can select the unit system, namely ISO and Imperial, in which the device is to operate. The setting is adopted when you exit this screen.
Screen 	Only available directly on the AP440 display. After clicking the 'Clean' button, the display is locked for 10 seconds to clean the screen without the touchscreen responding to touch.

CAUTION:

Never clean the touch screen with solvents, abrasive cleaners or scouring pads. These can damage the surface of the touch screen! Use a soft cloth lightly dampened with water or a mild detergent. The cleaner should always be sprayed directly onto the cloth, not directly onto the surface of the touch screen.

7. Web application

You can operate your M-TEC heat pump either directly via the control unit or via a web interface. You can make all the settings there as described in the operating instructions, in line with the user interface of your control unit. There are two ways to access the web interface:

7.1. Access via local network

The 'local network' is defined as the internal home network of your building. The heat pump and the device you want to use to access the heat pump (e.g. PC, notebook, smartphone) are located in the same network. You can therefore access the heat pump directly via the IP address of the heat pump. To do this, the heat pump requires a network connection either via a LAN cable or a WLAN stick.

After connecting the heat pump to your network, we recommend that you restart the heat pump so that the device is assigned an IP address by your network router.

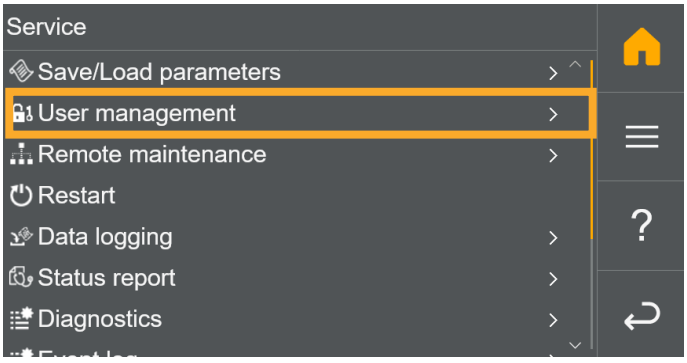
You can then read the IP address on your control unit in the detail menu ► service ► network ► LAN (or, if you are using the WLAN socket, under 'WLAN'). Enter this IP in the address line of the browser and the visualisation will be displayed after a few seconds.

Hint	**From software version 2.9:** In order to access the heat pump via the local IP address, **at least one user** must be created!

7.1.1. User management

With software version 2.9, there is a new menu: Detail menu ► Service ► User management in the heat pump control, **which can only be found via the touch display AP440.**

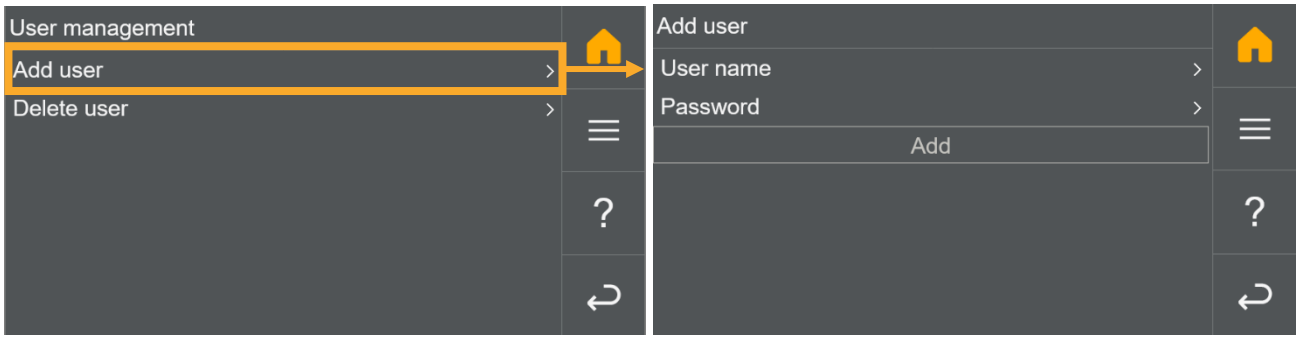
Any number of users for the heat pump can now be added or deleted here.



Hint	The menu "User management" can be accessed from user level 2 (password 100) or higher.

7.1.2. Adding a user

To add a user, click on „Add user“ and define a user name and password:

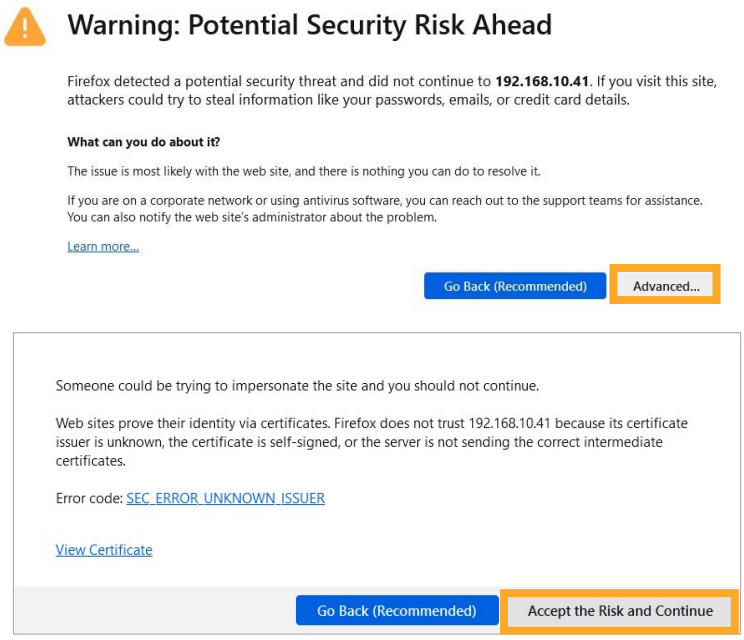


Hint	**At least one user must be created before you can access the heat pump via the IP address!**

7.1.3. Accessing the heat pump via IP address

When you access the IP address of the heat pump (which you can see only over the network settings directly on the AP440 display), a window will now appear with a warning about a possible security risk.
Click on ‘Advanced...’ here.

Tip	If the heat pump cannot be reached by entering the IP address, explicitly enter “https://” in the search bar beforehand - e.g. “https://192.168.0.116”.



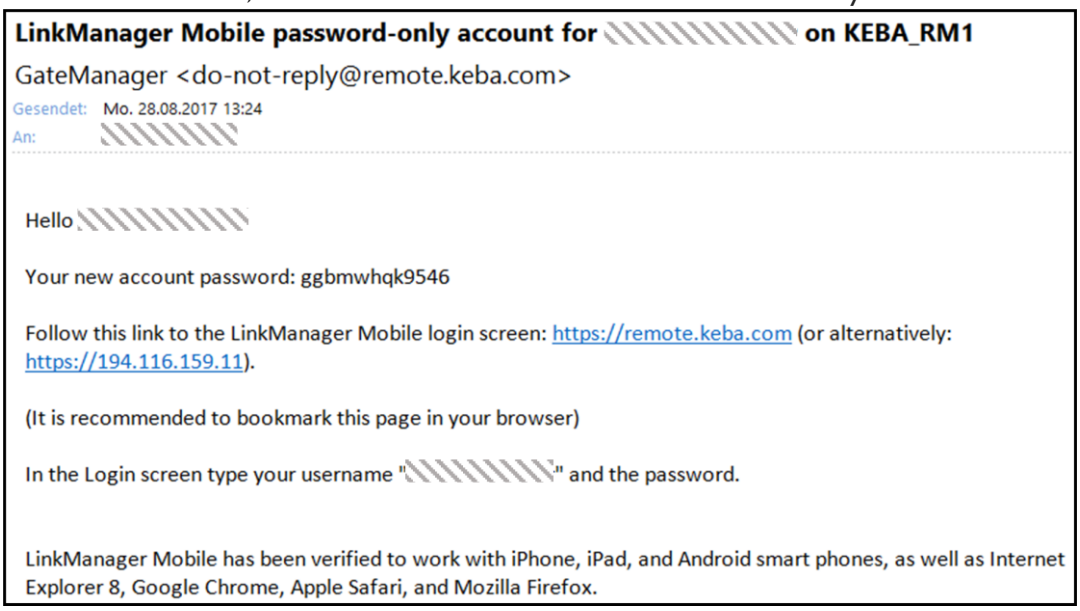
A username and password are now required here due to the new guideline – enter the data of one of the users previously created in the User management and click on ‘Login’ to access the heat pump.

7.2. Access via external network

With access from an external network, you can access your M-TEC heat pump from anywhere in the world and adjust settings. The heat pump must be equipped with an active internet connection (via LAN cable or WLAN stick) and an active remote maintenance licence must have been ordered.

Hint	Even if the heat pump has remote access, access is not automatically activated. **In order to access the heat pump, the company that installed it (heating engineer, plumber) must request or order** it.

After access has been activated, an e-mail with the access data is sent automatically. It looks like this:



LinkManager Mobile password-only account for [redacted] on KEBA_RM1

GateManager <do-not-reply@remote.keba.com>

Gesendet: Mo. 28.08.2017 13:24

An: [redacted]

Hello [redacted]

Your new account password: ggbmwhqk9546

Follow this link to the LinkManager Mobile login screen: https://remote.keba.com (or alternatively: https://194.116.159.11).

(It is recommended to bookmark this page in your browser)

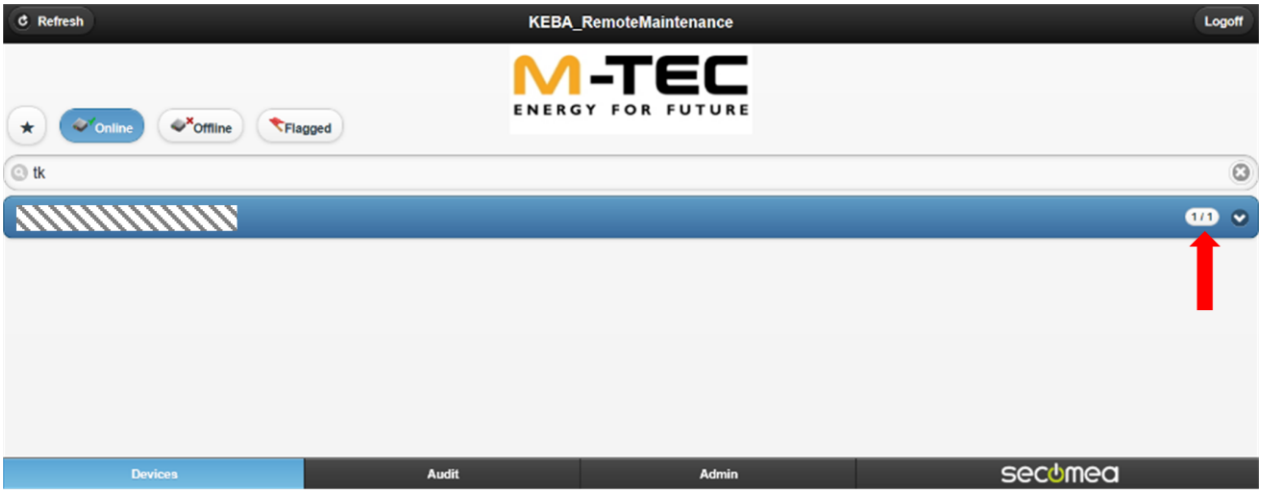
In the Login screen type your username "[redacted]" and the password.

LinkManager Mobile has been verified to work with iPhone, iPad, and Android smart phones, as well as Internet Explorer 8, Google Chrome, Apple Safari, and Mozilla Firefox.

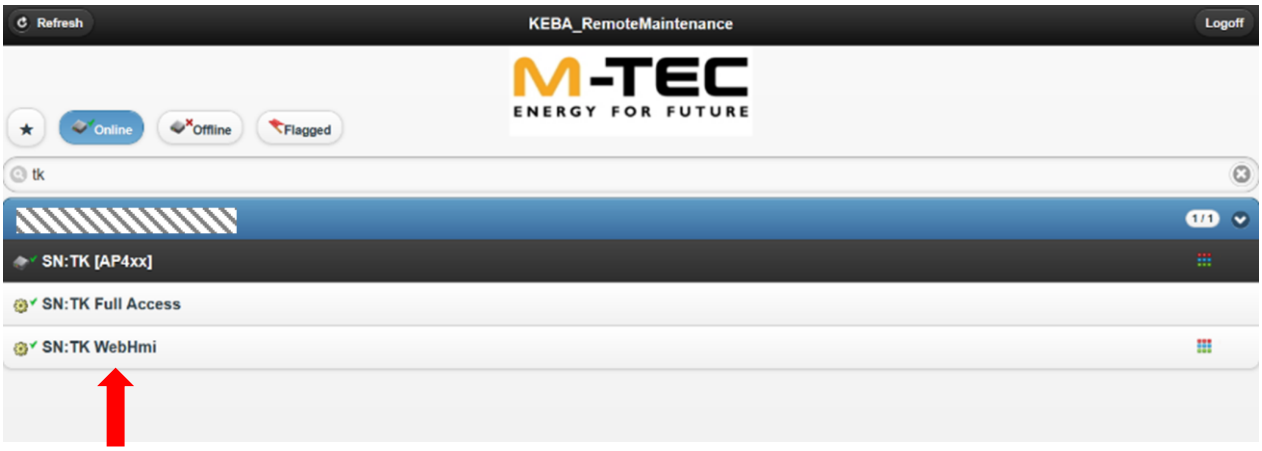
After setting up the portal access, the access data will be sent to your e-mail address. Follow the instructions in the e-mail.

Hint	**The password in the email can only be used once.** When you log in for the first time, you will be asked to choose a new password. It is therefore necessary that you complete the initial registration process, as the given password of the email will immediately become invalid.

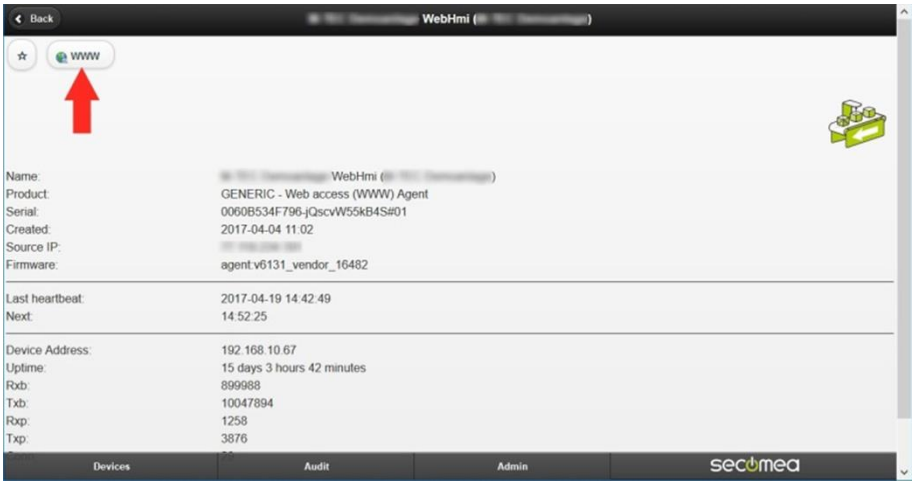
1. Click on the relevant attachment:



2. Click on "WebHmi":



3. Click on "www" and you will get access to the visualisation:



8. Maintenance and care

The end customer or operator is responsible for checking the entire system for correct operation **once a month** to prevent faulty operation or damage!

Regular maintenance is necessary to keep the heat pump operating correctly and efficiently and to reduce wear and tear and deterioration of components. The frequency of the interventions is determined by the user and depends mainly on two factors:

- **Type of use:**
  M-TEC recommends annual maintenance if the machine is only operated in one mode (heating or cooling) and six-monthly maintenance if the machine is used in both modes (heating and cooling).
- **Installation site:**
  If the unit is installed in locations with a particularly high level of dirt or particles, the evaporator may become clogged. M-TEC recommends constant monitoring of the operation and, if necessary, frequent maintenance.

Attention	Before maintenance, disconnect the machine from the power supply to avoid dangerous accidents caused by the activation of operating modes.

Hint	All maintenance work must be recorded in the heat pump's **test and system logbook**, which must be kept at the end customer's premises.

8.1. General maintenance instructions

- Dirt can be removed from the surface with a damp cloth and standard cleaning agents.
- Lubricant and sealant residues and oxidation can contaminate the heating water. The heating water must therefore be checked at regular intervals. If contamination is detected, the heating water must be cleaned.
- The heating system may only be cleaned by an authorised specialist company.
- The water pressure in the heating system must be checked regularly, as it is not possible to operate the system without problems if the heating water is too low.
- If a pressure drop is detected, the system should be refilled with water.
- In a tank with an anodic corrosion protection, the anode must be checked at least once a year. Replace the anodic corrosion protection if it is used up. Check the anode more often if the water is aggressive.

8.2. Cleaning the condensate drain

Make sure that the condensate drain pipe is not blocked and is in the correct position so that the condensate that forms on the evaporator during heat pump operation can drain away correctly.

8.3. Cleaning the hydraulic parts

To clean the filter, the hydraulic circuit of the filter is pressurised to atmospheric pressure, the filter is unscrewed and cleaned.

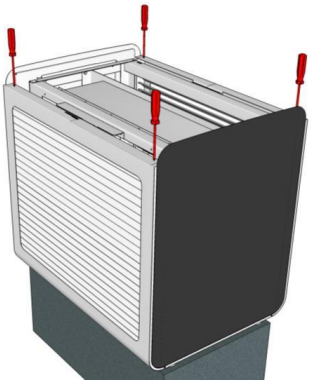
To reassemble, follow the same steps in reverse order, making sure that the sieve is correctly installed and that the screw connection is tight.

8.4. Cleaning the outdoor evaporator

During operation, the fins of the outdoor evaporator can become partially clogged with leaves or various types of incrustation, which can cause the heat pump to malfunction.

The evaporator can be cleaned in parallel in the direction of the fins using compressed air.

It is also advisable to remove any deposits between the evaporator and the fan. To access the finned pack, you only need to remove the top cover of the evaporator and any screws, as shown below for compact heat pumps and simple outdoor evaporators.



Attention	Avoid contact with the evaporator fins, as this may cause lacerations. The evaporator fins must not be bent, as this will affect the performance of the unit. If the fins are bent, contact an authorised service technician.

9. Information on the warranty

Hint	Detailed information on warranty claims and warranty periods can be found in the valid warranty conditions of M-TEC GmbH. These are available for download in the webshop.

If one or more of the following points apply, M-TEC cannot be held liable by third parties for its products. The guarantee becomes null and void if:

- Maintenance and servicing have not been carried out in accordance with the instructions, repairs have not been carried out by M-TEC system partners or have been carried out without the prior written consent of M-TEC.
- changes have been made to the system without the prior written consent of M-TEC.
- settings and safety devices have been changed without the prior written consent of M-TEC.
- refrigerants or lubricants other than the original or prescribed ones have been used.
- the system has not been installed and/or connected in accordance with the installation instructions.
- the system has been used improperly, negligently or not as intended.

10. Disposal

The operator is responsible for the proper disposal of the heat pump and all operating and cleaning agents. The industry-specific and local regulations for the disposal of the various substances must be observed. The heat pump may only be dismantled and disposed of by specialist personnel.

- Disconnect the heat pump from the supply lines/cables (water and electricity). Ensure that no other devices are affected.
- Ensure that all supply lines/cables to be disconnected are de-energised and depressurised.
- Remove all operating and auxiliary materials (e.g. refrigerants) and dispose of them in an environmentally friendly manner.
- Dismantle the heat pump until all system components can be assigned to a material group and disposed of accordingly.
- Dispose of the heat pump in an environmentally friendly manner. Observe national regulations.

Note	When disposing of the system, be aware of the hazards of the flammable refrigerant R290 (propane).

11.Safety data sheet R290

Since this is a closed refrigerant circuit, a refrigerant leak is not to be expected. However, should a refrigerant leak occur, please observe the information in the following safety data sheet.

Safety data sheet R290

1 - IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name

R290

Trade name

Propane

Ingredients/impurities

Contains the following components:

100% propane (R290) {F+; R12} {CAS No. 74-98-6}

Relevant identified uses

Industrial, professional. Refrigerants.

Carry out a risk assessment before use.

Identification of the company

AGATEX Feinchemie Gmb, Aichham 11, A-4650 Lambach/Edt

E-mail address labor@agatex.at

Emergency telephone number (24 hours): 112, +43 1 406 4343

2 - HAZARD IDENTIFICATION

GB-CLP Regulation

Flam. Gas 1; H220

Hazard information

H224 - Extremely flammable liquid and vapour

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233 Keep container tightly closed.

P240 Ground and bond containers and receivers.

P241 Use explosion-proof electrical, ventilation and lighting equipment.

P242 Use non-sparking tools.

P243 Take action to prevent static discharges.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

P501 Dispose of contents/container to an appropriate recycling or disposal facility.

P303+P361+P353

IF ON SKIN (or hair):

Take off immediately all contaminated clothing. Rinse skin with water or shower.

P370+P378

In case of fire: Use sand, extinguishing powder or alcohol-resistant foam to extinguish the fire.

P403+P235

Store in a well-ventilated place. Store in a cool place.

3 - COMPOSITION/INFORMATION ON INGREDIENTS

Contains the following components:

Propane (R 290) 100%.

CAS No.: 74-98-6, **EINECS No.:** 200-827-9

Does not contain any other ingredients or impurities that affect the classification of the product.

4 - FIRST AID MEASURES

Inhalation

Remove the affected person from the danger area and lay them down. Provide fresh air. If breathing is irregular or has stopped, give artificial respiration. Call a doctor immediately.

Skin contact

Wash with plenty of water. Remove contaminated clothing and wash it before reuse. In case of frostbite, wash with plenty of water. Do not remove clothing.

Eye contact

Immediately flush cautiously and thoroughly with eyewash solution or water. In case of contact with eyes, immediately flush eyes with plenty of flowing water for 10 to 15 minutes with eyelids open and consult an ophthalmologist.

Ingestion

Rinse mouth immediately and drink 1 glass of water. Rinse mouth thoroughly with water. Do NOT INDUCE vomiting**.**

Acute and delayed symptoms and effects

Dyspnoea; frostbite; unconsciousness

5 - FIRE-FIGHTING MEASURES

Suitable extinguishing media

Water spray, carbon dioxide (CO2), foam, dry powder, water fog.

Suitable extinguishing media

Full water jet.

Special hazards arising from the substance or mixture

Highly flammable liquids and vapours. Vapours may form explosive mixtures with air. Heating causes a rise in pressure with a risk of bursting. In case of fire, the following can be released: Carbon oxides; Combustible. Vapours may form explosive mixtures with air. Heating causes a rise in pressure with a risk of bursting. Vapours are heavier than air and spread along the ground. Vapours or gases can travel long distances to the source of ignition and ignite again.

Advice for firefighters

In case of fire: Wear self-contained breathing apparatus. Use a suitable breathing apparatus. Cool endangered containers with a water spray from a protected location. Do not allow contaminated fire extinguishing water to enter drains.

Use water spray to protect personnel and to cool endangered containers.

6 - ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions

General precautions

Eliminate all ignition sources.

Precautions for non-emergency personnel

Remove people to a safe area. Ventilate the area, especially low or confined spaces where heavy vapours may collect.

Precautions for emergency responders

Do not allow uncontrolled discharge of product into the environment. Explosion hazard. Suppress gases/vapours/mists with water spray.

Personal protective equipment

Eye/face protection

Wear eye/face protection. Wear chemical goggles or fully enclosed chemical-resistant safety goggles. Eye protection should comply with EN 166 or ANSI Z87.1.
Also wear a face shield if face may come in contact with this material as a result of splashing, spraying, or while airborne.

Hand protection

When handling chemical substances, protective gloves must be worn with the CE marking, including the four control numbers. The quality of the chemical-resistant protective gloves must be chosen according to the specific workplace concentration and quantity of hazardous substances. Material: Cold-resistant gloves. Protective gloves according to EN 374 or US-OSHA guidelines.

- For special purposes, it is recommended to check the chemical resistance of the protective gloves mentioned above together with the supplier of these gloves.

The suitability for use at the workplace should be discussed with the manufacturer of the protective gloves. The selection of the suitable gloves does not only depend on the material, but also on further quality characteristics and varies from manufacturer to manufacturer.

- Follow the glove supplier's instructions for permeability and breakthrough time. Also take into account the specific local conditions under which the product is used, such as the risk of cuts, abrasion and contact time.

Skin protection

Protective clothing that is difficult to ignite.
Wear antistatic footwear and clothing.

Respiratory protection

Wear respiratory protection when ventilation is inadequate. If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Filter type: AX

Thermal hazards

Flame-retardant protective clothing.
Wear antistatic footwear and clothing.

6.2 Environmental precautions

Do not allow uncontrolled discharge of product into the environment. Explosion hazard.
Suppress (knock down) gases/vapours/mists with water spray. Do not discharge into surface water or sanitary sewer system.
Dispose of waste according to applicable legislation.

Contaminated packaging

Wash with plenty of water. Completely emptied packagings can be recycled.

Notes

M-TEC

ENERGY FOR FUTURE

M-TEC Energy for Future
Aumühlweg 20 | A-4812 Pinsdorf
www.mtec-systems.com | office@mtec-systems.com
+43 7612/20805-0