

OPERATING INSTRUCTIONS HYDRONIC AQUASYSTEM



Hydronic air and water heating system for recreational vehicles

Chapter	Chapter title	Page
	Chapter contents	
1	Introduction	
1.1	Please read first	4
1.2	Reference documents	4
1.3	Special text formats and presentations	4
1.3.1	Lists	4
1.4	Picture symbols	4
1.5	Safety instructions for operation	4
1.6	Intended use	5
1.6.1	Range of applications	5
1.7	Non-intended use	5
1.8	Disclaimer	5
1.9	Target groups for this document	5
1.10	Instruction obligation of the target groups	6
1.11	Product listing	6
2	Operating Instructions	
2.1	Description of the heating system	7
2.2	Heating with diesel or gasoline	7
2.3	Fuel types permitted	7
2.4	Heating with electricity	8
2.5	Heating system fluid (coolant)	8
2.5.1	Glycol mixture	8
2.6	Getting to know the display / user interface	9
2.6.1	General information	9
2.6.2	Product properties	9
2.6.3	Description of touch screen elements	9
2.6.4	Settings menu navigation	10
2.6.5	System status indicators	11
2.6.6	Display sleep / wake	11
2.7	Operating and configuring the system	11
2.7.1	System activation / deactivation	11
2.7.2	Air heating activation	12
2.7.3	Water heating activation	12
2.7.4	Air temperature adjustment	12
2.7.5	Fan speed adjustment	12
2.7.6	System info at a glance	13
2.7.7	Heat source selection	13
2.7.8	Scheduled air heating	14
2.7.9	Air heating options	14
2.7.10	Water heating options	15
2.7.11	Air temperature sensor offset	15
2.7.12	Units, time, date, and display settings	15
2.7.13	System details	16
2.7.14	Fault codes, Hydronic S3 coolant heater	16
2.7.15	Operating counters, Hydronic S3 coolant heater	17
2.7.16	Priming fuel lines	17

Chapter	Chapter title	Page
	Chapter contents	
2.8	Winterization and storage	17
2.8.1	Safety test after storage	18
2.9	Disconnecting power	18
2.10	Operation at higher altitudes	18
2.11	Control and safety services	18
2.12	Emergency stop - EMERGENCY OFF	18
3	Troubleshooting / Maintenance / Service	
3.1	Troubleshooting	19
3.1.1	Hydronic S3 coolant heater	19
3.1.2	Touchscreen	19
3.1.3	Controller	19
3.1.4	Additional troubleshooting support	19
3.2	Maintenance	19
3.3	Service	19

1 Introduction

1.1 Please read first

Before you start with the setting up and / or operation of the system please read these operating instructions through carefully.

The operating instructions contain important information you require for the setting and safe operation of the heating system.

Please keep the operating instructions in a safe place for future reference.

1.2 Reference documents

Hydronic S3 coolant heater reference:

1 Technical description

Contains the information necessary for installation and operation of the coolant heater.

2 Spare parts list

Contains the information necessary for ordering spare parts for the coolant heater.

3 Repair instructions

Contains the necessary information for troubleshooting and for repair of the coolant heater.

4 Installation recommendation

Describes vehicle-specific installation situations.

5 Technical specification / User manuals

Describe in detail electrical capabilities of the devices and information not specific to this system.



Note

Reference documents can be obtained from Eberspächer or Eberspächer trained Service and Installation companies.

1.3 Special text format and presentations

Special text formats and picture symbols are used in these instructions to emphasize different situations and subjects. Refer to the following examples for their meanings and appropriate action.

1.3.1 Lists

- This dot (▪) indicates a list or action step, introduced by a heading.
 - If an indented dash (–) follows a “dot”, this list/action step is a sub-section/secondary step of the black dot

1.4 Picture symbols



Regulation!

This information indicates a statutory regulation. Any violation of these regulations results in expiry of the type-approval and exclusion of any guarantee and liability claims against Eberspächer Climate Control Systems.



Danger!

“Danger” indicates a situation that can directly result in death or serious injuries if not avoided.

→ This arrow indicates the appropriate measures to avert the imminent danger.



Warning!

“Warning” indicates a situation that can potentially result in death or serious injuries if not avoided.

→ This arrow indicates the appropriate measures to avert the potential danger.



Caution!

“Caution” indicates a situation that can potentially result in minor or slight injuries or damage to the device.

→ This arrow indicates the appropriate measures to avert the potential danger.



Note

This note contains recommendations for use and useful tips for the operation, installation and repair of the product.

1.5 Safety instructions for operation



Danger!

Risk of injury, fire and poisoning!

- Risk of fire/deflagration due to ignition. Hazardous situations can occur if the heater is operated in the immediate vicinity of flammable materials, gases, fumes, liquids or dust.

Do not use the system if the heater to be activated is in an environment in which flammable materials (e.g.: dry grass, leaves, paper), gases, fumes, liquids or dust are present or could be present, e.g. near a

 - fuel depot
 - coal depot
 - wood depot
 - grain storage and similar
- Switch off the system before refuelling.
- Risk of poisoning due to escaping exhaust gases. Hazardous situations can occur during operation of the heater in enclosed rooms.

→ Do not use the system if the activated heater is located in enclosed rooms, e.g. in a garage or a multi-story car park.

**Warning!****Scalding by hot water!**

- Water temperatures over 52°C (125°F) can cause severe burns instantly or death from scalding.
 - Water temperature at the heat exchanger can be up to 85°C (185°F) during operation and possibly higher in the event of a malfunction.
- Use a temperature limiting valve to limit the hot water temperature at the faucet or shower.
- Feel water before bathing / showering. Exercise additional care when bathing children.

**Warning!****Water quality**

- Only potable water is to be heated.
 - The user is responsible for the quality of water used and the sanitization of the water delivery system used with this heater.
- Take precautions to keep the water system free of debris and sanitized to prevent the growth of microorganisms.

**Warning!****Emergency electrical shut-off location!**

Being aware of the location of the emergency shut-off is vital to safe operation of the heater.

- Emergency shut-off location is vehicle and installation specific.
 - Consult with the vehicle's instructions / manual for details.
- User must be aware of the location of the emergency power isolation
- If information is not readily available contact the party responsible for the heater installation for information.

1.6 Intended use

1.6.1 Range of applications

The Hydronic Aquasystem is intended for use in Recreational Vehicles (RVs) to provide heating of the interior air and heating of water for the sinks and/or showers.

**Note**

- Only use and operate the heater within the scope of the intended use stated by the manufacturer and in compliance with all documentation.
- Any installation or service tasks must be performed according to local codes.

1.7 Non-intended use

The system is not approved for the following applications:

- Long-term continuous operation, e.g. for heating:
 - Residential rooms
 - Garages
 - Work huts, weekend homes and hunting lodges
 - Houseboats, etc.
- Heating or drying of:
 - Living creatures (people or animals) by blowing hot air directly at them
 - Objects
 - Blowing hot air into containers

**Warning!****Risk of hypothermia!**

- The system does not replace a temperature-monitored and controlled heating system, which ensures that a constant temperature is maintained and thus ensures survival in adverse weather conditions. It is not suitable for the continuous heating of vehicle interiors at low outdoor temperatures.
 - Use, operation and deployment of the product outside the intended use stated by the manufacturer can cause considerable injuries to people and/or damage to machinery and property.
- Only use the product for the stipulated purpose and in the approved area of use.

1.8 Disclaimer

The manufacturer is not liable for damage caused by improper use or incorrect operation. Failure to comply with the safety instructions makes the guarantee null and void and this leads to the exclusion of any liability of Eberspächer Climate Control Systems.

1.9 Target groups of this document

This document is intended for the following target groups:

Service company

The “service company” target group includes all service companies trained by Eberspächer that purchase heaters and air-conditioners and their control units, accessories and spare parts from Eberspächer or the trade and install, repair or service these on behalf of an end user.

Installation company

The “installation company” target group includes all companies trained by Eberspächer that purchase heaters or air conditioning systems and their control units, accessories and spare parts from Eberspächer and install, repair or service these on behalf of another company (normally the motor vehicle manufacturer / body builder).

End user

The “end user” target group includes all natural persons who operate a heater or air conditioning system using a control unit, irrespective of whether as a consumer or as part of their job.

1.10 Instruction obligation of the target groups

Each of the above-mentioned target groups must unconditionally observe its instruction obligation. The instruction obligation includes the passing on of technical documents.

Technical documents are all documents published for the installation, operation, maintenance or repair of heaters or air conditioning systems and their control units, accessories and spare parts from Eberspächer.

**Note**

- Unless otherwise expressly stipulated below, the technical documents may be passed on in printed form, on a data medium or by Internet download.
- The latest technical documents are available for download via the Eberspächer website.

Responsibility of the installation company

The installation company must pass on the following technical documents to the contracting company, which in turn is obliged to pass the documents on to the end user:

- Technical description.
- Operating instructions.

Responsibility of the service company

The service company must pass on the following technical documents to the end user, even if they employ a sub-contractor:

- Technical description.
- Operating instructions.

**Note**

The above-mentioned target groups must ensure that the end users are provided with the operating instructions for the product prepared by the manufacturer in printed form and in the end user's national language. If necessary, this can be an abridged form of the complete operating instructions that is additionally included with the product on a data medium or is available via internet download.

1.11 Product listing**Production listing**

This product has been tested and is listed for use in recreational vehicles.



2 Operating instructions

2.1 Description of the heating system

The heating system is designed to heat the air in the living area and provide hot water. It works on the principal of heating and circulating a heated coolant and utilizing heat exchangers to heat the air and/or water.

Air is heated by means of heat exchangers with integrated fans which circulate the heated air. The standard system consists of units with 2 fans each. In the standard configuration they work in conjunction with the controller and included diode assembly to provide adjustable fan speed.

Water heating is accomplished via a thin plate double walled heat exchanger. Cold water is pumped into the plate heat exchanger when needed. There it absorbs heat from the system coolant. The resultant heated water is passed through a thermostatic mixing valve, to regulate the temperature, before going on to the fixtures. As water is heated only when needed there is no hot water storage tank.

The primary heat source for the system is a diesel or gasoline burning coolant heater (Hydronic S3). In addition, there is also an auxiliary electric heating element (if installed) that can provide additional heat when connected to a 120 VAC power source.

When in operation the coolant heater (Hydronic S3) works to maintain a constant coolant temperature by adjusting its output as needed. If there is little or no heat being extracted from the system the coolant heater will automatically switch off, turning back on again when needed.

The coolant heater's combustion process is adjusted based on atmospheric pressure measured by the system. Compensation will take place up to altitudes of 3000 m (9,800 ft.).

The main components of the system include: a touchscreen display, control unit, Hydronic S3 coolant heater, coolant circulating pump, air heat exchangers / blowers, a water heat exchanger (plate type), thermostatic mixing valve, altitude adjustment module, and coolant reservoir with integrated heating element and thermostat.

2.2 Heating with diesel or gasoline



Danger!

Risk of fire, explosion, poisoning and injury! Caution when handling fuel.

- Switch off the vehicle engine and the heater before refuelling and before working on the fuel supply.
- No naked flames.
- Do not smoke.
- Do not inhale fumes.
- Avoid any contact with the skin.

When the fuel burning coolant heater (Hydronic S3) is selected as the heat source it will be activated whenever a heating function (air or water heating) is activated. The heater will go through an ignition cycle and then work to maintain the system coolant at an operating temperature.

If the coolant heater experiences a fault a notification will be displayed on the user interface. If the heater fails to ignite or loses its flame while running it will attempt to restart before generating a fault.

The fuel for the heater is taken either from the main vehicle fuel tank or from a separate auxiliary fuel tank.



Note

Be aware of the fuel level at which the heater fuel pick-up becomes uncovered to avoid unexpected stoppages in heater operation

→ Take precautions so that the heater is not able to fully drain the vehicles primary fuel tank.

2.3 Fuel types permitted

Only use the fuel type specified for the specific fuel operated heater model. Refer to the Technical Description document of the specific model of Hydronic S3 coolant heater used in your system for additional information.

Diesel Heaters:

For diesel heaters use standard commercially available diesel fuel (EN 590).

DO NOT USE GASOLINE, CRANKCASE OIL, OR ANY OIL CONTAINING GASOLINE.

Gasoline heaters:

For gasoline heaters use only standard commercially available gasoline (DIN EN 228).

2.4 Heating with electricity

The coolant reservoir of the system is equipped with a 1,500 W (5,100 BTU/h) electric element wired in series with a thermostat switch and a standard 15-amp grounded plug.

The system also provides an output for switching the electric element through a switched receptacle or similar device. This output (12 VDC) is activated when the electric heat source is selected and there is a heat demand on the system.

When in operation the in-series thermostat installed in the coolant reservoir will regulate the coolant temperature at a level lower than the operating temperature of the fuel burning coolant heater. As such when both the electric element and fuel burning coolant heater are activated together the electric element will not be active once the coolant becomes sufficiently heated.

The intended usage of the electric element is situations where the heating requirements are low and when access to an electric grid is available. It may not have sufficient capacity to maintain a comfortable room temperature in colder ambient temperatures or supply sufficient quantities of heated water. In such scenarios the higher capacity fuel burning heater should be utilized.



Warning!

Do not operate the electric element while the heating element or thermostat is exposed to air. Risk of damage and overheating.

- If the element is heated while exposed to the air its sheath can become over heated and burst.
- The thermostat is unable to regulate the electric element if both it and the element are not submerged in coolant.
- Only operate the electric heating element when submerged in coolant.
- Check the coolant level in the reservoir regularly and top up as required.



Caution!

Do not connect the electric heating element to an unswitched receptacle.

- Doing so will result in the element being energized whenever 120 VAC is available, increasing the chances of unintentional activation and potential damage.



Note

- Consult the system installer for additional detail on the 120 VAC switching device being used.
- The 120V switching device is not supplied by Eberspächer.

2.5 Heating system fluid (coolant)

The system utilizes a mixture of de-ionized water and glycol to transfer heat around the system.

The fluid level must be checked regularly and the reservoir tank should be kept close to full. Due to the expansion of the system and the variability of system configurations the exact maximum fill level will vary according to the installation.



Warning!

Risk of scalding and burns. Do not open the coolant reservoir while it is hot.

- When hot the coolant level will rise and can spill.
- If the overflow drain becomes clogged hot fluid may spurt from the fill opening when opened.
- Wait until system is cool before checking and adjusting fluid level.



Note

- Regularly check the system coolant level while the system is cool.
- System should remain full even when placed into storage.
- Fluid should be regularly replaced according to the fluid manufacturer's recommendations.
- Consult the system installer for the exact minimum and maximum cold fill levels for your vehicle.

2.5.1 Glycol mixture

The recommended fluid for use in the heating system is a mixture of commercially available deionized water and glycol at a ratio 60:40 (de-ionized water : glycol).

Ensure that the glycol selected is safe for use with the components that are likely to be present in the heating system which include, steel, aluminum, brass, rubber (natural and synthetic), and plastics.

For colder temperatures this mixture can be adjusted beyond the mixture recommended but the resultant increase in fluid viscosity may affect the flow rate of coolant within the system.



Caution!

Do not mix different types of glycol together. This can lead to:

- Deterioration of the fluid.
- Buildup of material within the system.
- Only add fluid identical to that already present.
- If changing fluid completely flush the old coolant from the system.

Note

- Periodically check the glycol concentration using a commercially available tool.
- Estimated freezing points for a water / glycol mixture.

Water: Glycol	Freezing point (estimated)
60 : 40	-23°C / -10°F
50 : 50	-36°C / -34°F

Note

Too low a fluid flow rate will result in operational issues, including:

- Poor heat distribution.
- Overheating of the coolant heater (Hydronic S3).

2.6 Getting to know the display / user interface

2.6.1 General information

All basic functions for day to day use are available through the 4.3" touch screen display.

If the power supply in the vehicle is interrupted (e.g. the battery is disconnected) the system's controller retains all the basic settings, including date and time, thanks to an onboard battery.

2.6.2 Product properties

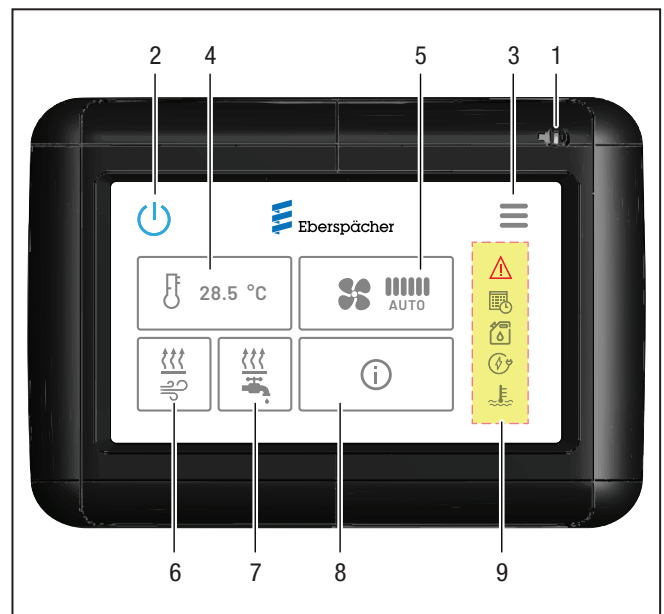
The touchscreen display is a permanently installed and works in conjunction with the primary control unit, liquid fuel burning coolant heater, and other system components to provide heated air and water.

The controlling elements of the heating system (touch screen display, control unit, and coolant heater ECU) communicate with each other using a CAN bus protocol while taking in information and controlling the other elements of the system.

Although the control system at its base is modular and expandable it has been preprogrammed and set-up to meet the needs of the RV users.

2.6.3 Description of touch screen elements

Main screen



1 Power indicator

Red LED flashes when the touchscreen display is powered.

2 System activation button

Turn heating system ON / OFF.

3 Menu access button

Access additional functions and settings.

4 Air temperature setting

Displays the current air temperature set point.
Press to change interior air temperature setpoint.

5 Fan speed settings

Displays current fan setting (LOW, MED, HIGH, AUTO) and current fan speed (bars).
Press to change fan speed setting.

6 Air heating button

Activate / deactivate air heating.

7 Water heating button

Active / deactivate water heating.

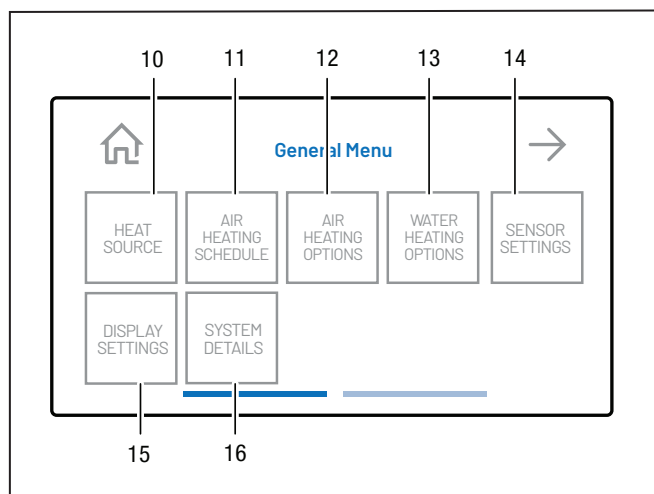
8 System info button

Access additional system status information.

9 System status indicators

Display system status at a glance (see section 2.6.5).

General menu



10 Heat source

Select which heat sources will be used for air and water heating (fuel burning coolant heater and/or electric element).

11 Air heating schedule

Activate / deactivate / set a start and stop time for air heating.

12 Air heating options

Air heating specific settings.

13 Water heating options

Water heating specific settings.

14 Sensor settings

Interior air temperature sensor offset.

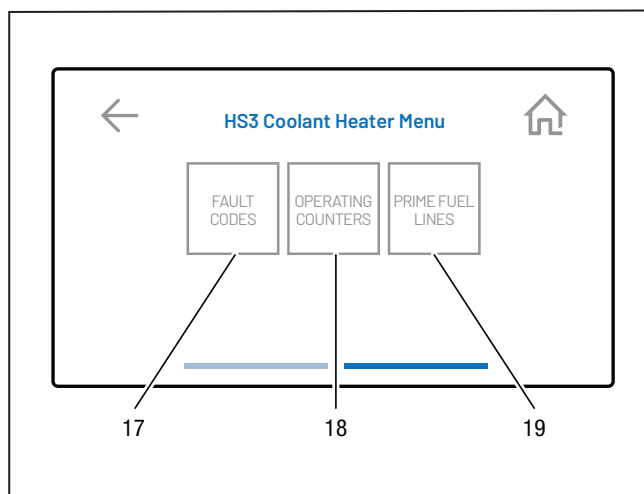
15 Display settings

Adjust general display settings such as units (°C / °F), time, time format (12 / 24 hour), date, and screen brightness.

16 System details

Software version and technical support contact information.

Hydronic S3 coolant meater menu



17 Fault codes

Read and erase Hydronic S3 diagnostic trouble codes (DTCs).

18 Operating hours

Read the recorded operating times form the Hydronic S3 coolant heaters ECU.

19 Prime fuel lines

Operate the fuel pump to fill fuel lines without starting the heater.

i Note

“HS3 Coolant Heater Menu” is only accessible when the system is ON and the system status is “Stand By”. (see section 2.7.6 for how to check system status)

2.6.4 Settings menu navigation

The settings menu screens can be accessed from the main screen and provide additional options and information to the user.

Menu navigation symbols	Description
	Settings menu screen
	Main screen
	Next / previous menu screen
	Back to previous menu level

2.6.5 System status indicators

There are 5 indicators on the main screen. They will become illuminated based on the system settings and status.

Indicator symbol	Description
	The coolant heater (Hydronic S3) is reporting an active fault (for more information on checking faults and troubleshooting see sections 2.7.14 and 3.1.1)
	Air heating schedule is active. Air heating function will turn on / off according to the set times.
	The Hydronic S3 fuel burning coolant heater will be used when air or water heating is activated.
	The 120 VAC electric heater will be used when air or water heating is activated.
	System coolant is at operating temperature.

2.6.6 Display sleep / wake

The display backlight will turn off if there has been no user interaction for 60 seconds. Touch the screen to turn it back on.

2.7 Operating and configuring the system

2.7.1 System activation / deactivation

The heating system is turned ON and OFF from the main screen (Item 2, sections 2.6.3).

The system must be ON in order to enable heating and diagnostic functions. Some menus and settings can be accessed with the system OFF.

All heating functions can be quickly switched off by setting the system button to OFF. This will turn off any heating related function while permitting the system to complete a cooldown cycle (if required).

System button state	Description
	System is OFF
	System is ON

Warning!

Do not remove power while the system is active.

Removing electrical power from any part of the system may not allow for the necessary cooldown cycle to occur. This can result in overheating and boiling of the coolant which can overflow and cause scalding injuries.

- Always switch the system off from the user interface.
- Do not remove power until the system is OFF and any required cooldown cycles have completely finished.

Note

- If a scheduled air heating start time has been set air heating will not start while the system is OFF.
- If the system is switched OFF while a heating function is active the coolant heater and coolant pump may continue to operate while carrying out their cooldown cycle. All component will switch off once the cooldown is complete.

2.7.2 Air heating activation

Air heating can be activated from the main screen. Pressing the air heating button (Item 6, sections 2.6.3) will activate or deactivate air heating.

Air heating button state	Description
	Air heating is OFF
	Air heating is ON
	Air heating is not available (system is OFF)

i Note

- System must be ON to activate air heating (see section 2.7.1).
- Air heating may be automatically switched ON or OFF if a schedule has been set (see section 2.7.8).

2.7.3 Water heating activation

Water heating can be activated from the main screen. Pressing the water heating button (Item 7, sections 2.6.3) will activate or deactivate water heating.

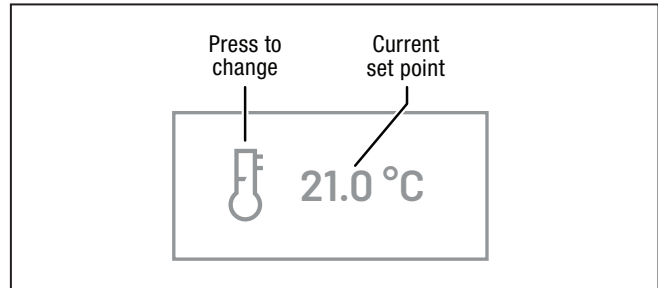
Water heating button state	Description
	Water heating is OFF
	Water heating is ON
	Water heating is not available (system is OFF)

i Note

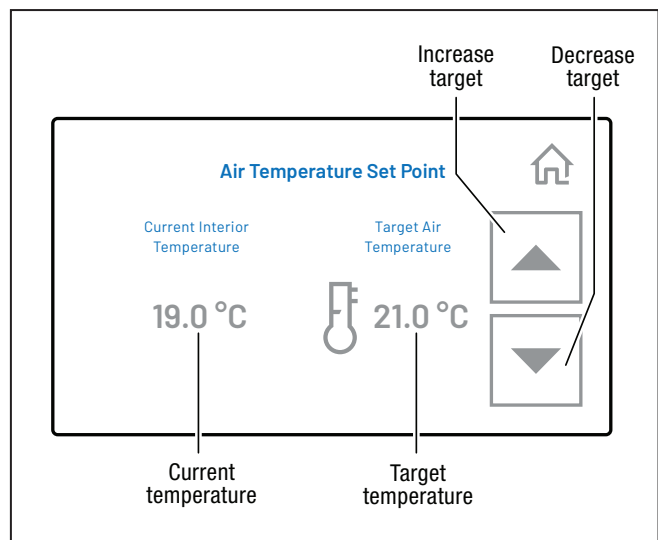
- System must be ON to activate air heating (see section 2.7.1).
- Water heating may be automatically switched OFF if a max runtime has been set (see section 2.7.10).

2.7.4 Air temperature adjustment

The air temperature set point is displayed on the main screen (Item 4, sections 2.6.3). To change the value, press the button, which will take you to the adjustment screen.



On the adjustment screen you will see the current measured internal air temperature and the current setpoint (target) temperature. Temperature is adjusted with the buttons on the right.



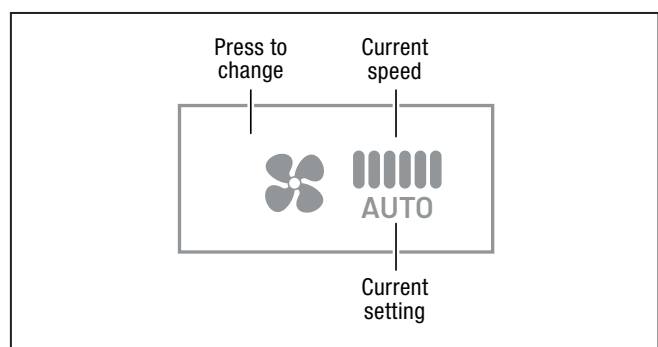
i Note

Temperature setpoint adjustment range:

- 10°C to 30°C in 0.5°C increments.
- 50°F to 86°F in 1°F increments.

2.7.5 Fan speed adjustment

The current fan speed settings are displayed on the main screen (Item 5, sections 2.6.3).



The fan speed graphic changes based on the current air heating fan state.

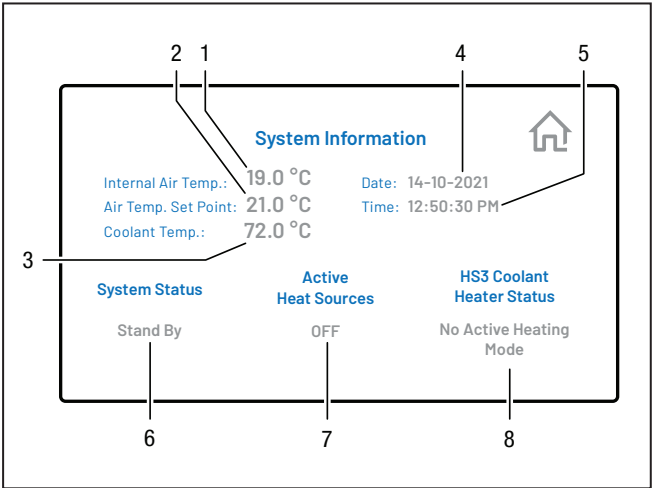
Current fan speed	Description
	OFF
	LOW
	MEDIUM
	HIGH

The current fan setting (LOW, MED, HIGH, AUTO) is shown in text below the current speed (vertical bars).

The AUTO setting will adjust the fan speed based on the difference between the current and target temperatures. The greater the temperature difference the higher the fan speed.

2.7.6 System info at a glance

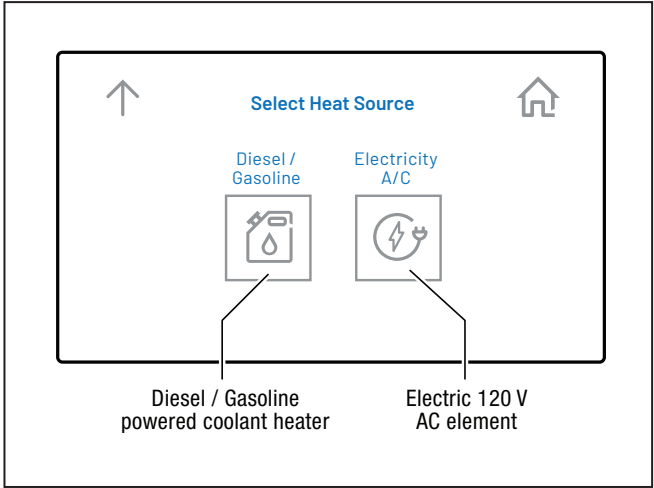
Access to additional information is available by selecting the info button on the main screen (Item 8, sections 2.6.3).



- 1 Interior temperature
- 2 Target interior temperature
- 3 Coolant temperature (heating system)
- 4 Current date
- 5 Current time
- 6 Heating system state
- 7 Active heat sources (currently running)
- 8 Hydronic S3 coolant heater status

2.7.7 Heat source selection

Selecting which heat sources to utilize for can be done from the general settings menu page (Item 10, sections 2.6.3).



The two options available are the fuel operated coolant heater (diesel or gasoline) or a 120V AC electric element.

Selecting the fuel operated heater will allow the system to activate the Hydronic S3 coolant heater when heating is required. The heater will in turn respond with its operating status and other relevant information. The fuel operated heater is the primary heat source and can supply up to 5 kW (17,000 BTU/h) of heat as required.

If the electric source is selected the system will activate an output when heating of the system coolant is required. This output can be utilized to open or close a 120V circuit for the electric heating element, via a switching device.

The electric element (if equipped) can supply 1.5 kW (5,100 BTU/h). It operates at temperatures below the normal operating range of the fuel operated coolant heater.

Note

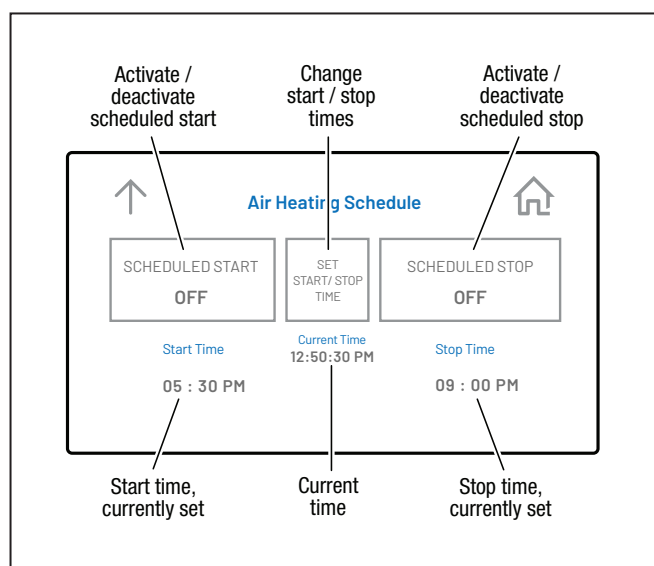
- The electric heating element control will only function when connected to the electric grid and has been wired through a suitable switching device.
- The electric heating element maintains a lower system coolant temperature than does the fuel operated heater.
- If the fuel operated heater is active and maintaining the coolant temperature the electric element will not provide any additional heat.

2.7.8 Scheduled air heating

Warning! Risk of carbon monoxide poisoning

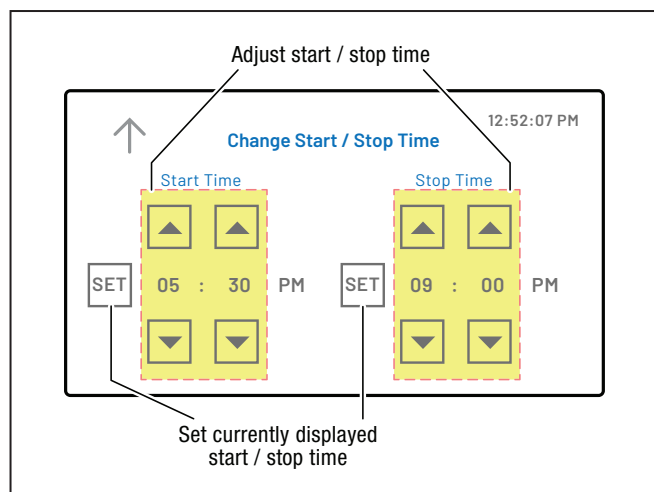
- Scheduled activation of the heating system presents the possibility that the system will activate while in an enclosed space (e.g. parking garage).
 - Exhaust gasses can collect when in an enclosed space and cause poisoning.
- Disable scheduled heating and turn system off when in an enclosed space.

The menu to set a scheduled start and stop time for air heating is available from the general settings menu page (Item 11, sections 2.6.3).



Separate buttons are used to activate/deactivate scheduled start and scheduled stop times. The currently set start and stop times are displayed below their respective activation buttons.

The button in the center of the screen brings up the change start / stop time page.



After adjusting the desired start and stop times one must press the respective "SET" buttons to save the changes.

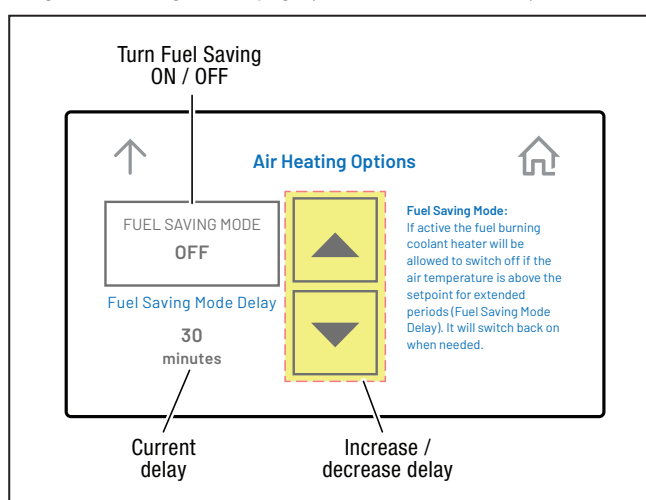
This feature uses the controllers internal clock. To adjust the current time refer to section 2.7.12.

Note

- Text on the SCHEDULED START or SCHEDULED STOP buttons will reflect the current setting of the respective functions.
- The associated indicator on the main screen will be illuminated if either of the two functions are ON.

2.7.9 Air heating options

An additional air heating option (fuel saving mode) is available from the general settings menu page (Item 12, sections 2.6.3).



The current state is displayed (On/Off) as well as the delay setting.

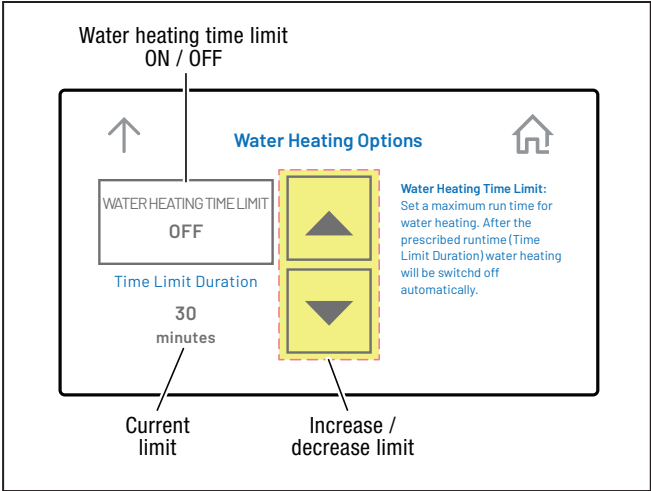
When activated the fuel saving function will monitor for situations when the air heating function has been activated but there is no need for heat, i.e. the internal air temperature is at or above the target. If this condition is present for an extended period (longer than the delay time) the system will permit the Hydronic S3 coolant heater to stop maintaining the coolant at the regular operating temperature to save fuel. If the interior temperature drops the Hydronic S3 will be reactivated and the coolant returned to normal operating temperatures.

Note

- The duration of the delay may need to be adjusted to function appropriately based on the specific characteristics of the vehicle and how it is being used.

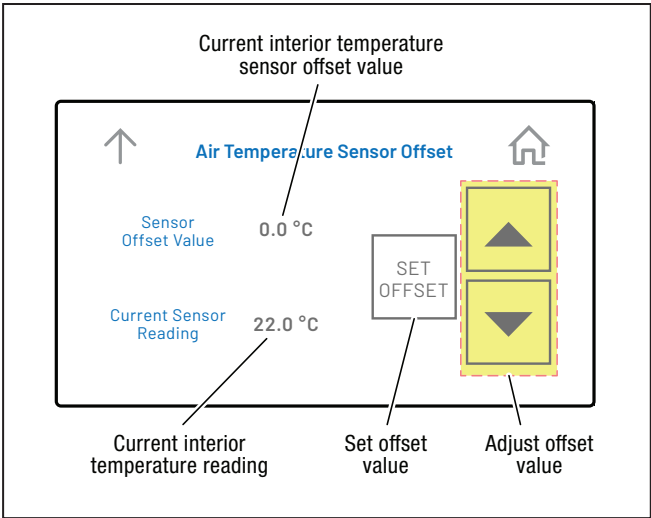
2.7.10 Water heating options

A water heating function to limit the duration of water heating is available in the general settings menu (Item 13, sections 2.6.3). When active a timer will turn off the water heating once it expires.



2.7.11 Air temperature sensor offset

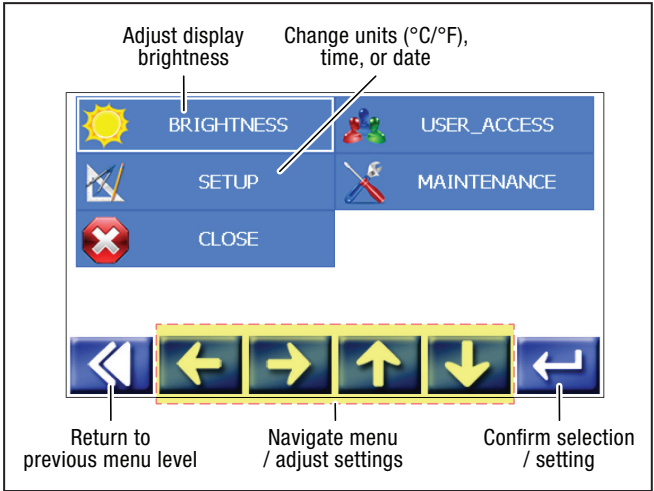
The displayed current air temperature can be adjusted from the general settings menu page (Item 14, sections 2.6.3).



Use the up and down arrows to adjust the offset value. For the changes to take effect the “set offset” button must be pressed. After a short delay the current sensor reading value will change to reflect the offset entered.

2.7.12 Units, time, date, and display settings

The option to change units (°C/°F), set the time and date, or adjust the screen brightness are available from the general settings menu page (Item 15, sections 2.6.3).



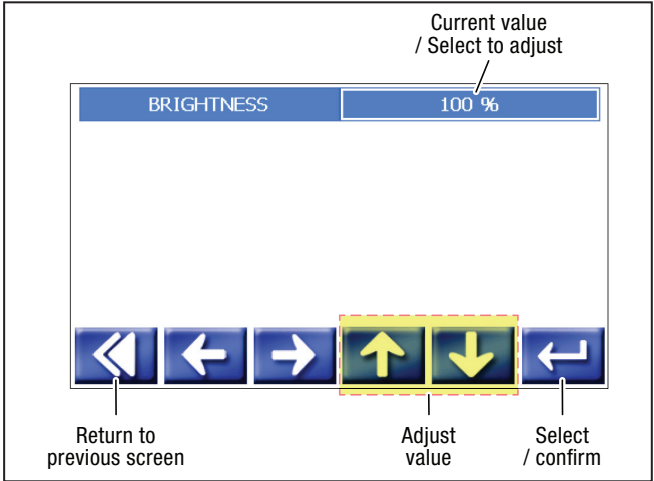
Menu items	Description
 BRIGHTNESS	Adjust the display brightness
 SETUP	Access additional setup menu items
 UNIT	Change display units
 TIME & DATE	Time and date settings

Note

“User access”, “Maintenance”, and “Close” menu items are not utilized during normal operation. They are reserved for service functions and software modifications or updates.

Display brightness

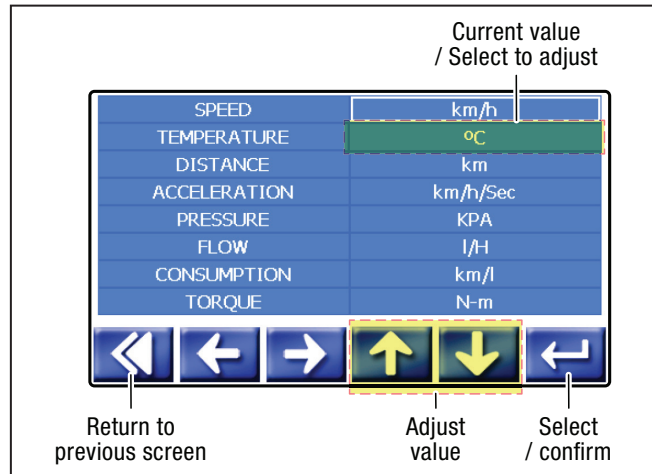
Select the brightness option via the touch screen, or use the menu navigation arrows and then press the confirm button. 5 brightness levels are available (0%, 25%, 50%, 75%, and 100%).



Select the current value so that it is highlighted (dark blue) and use the up and down arrows to adjust the setting. Press the confirm button to enter the value.

Change units (°C / °F)

To change the display between °C and °F select “Setup”, and on the next page select “Units”.



Select the temperature unit so that it is highlighted (dark blue) and use the up and down arrows to adjust the setting. Press the confirm button to enter the value.

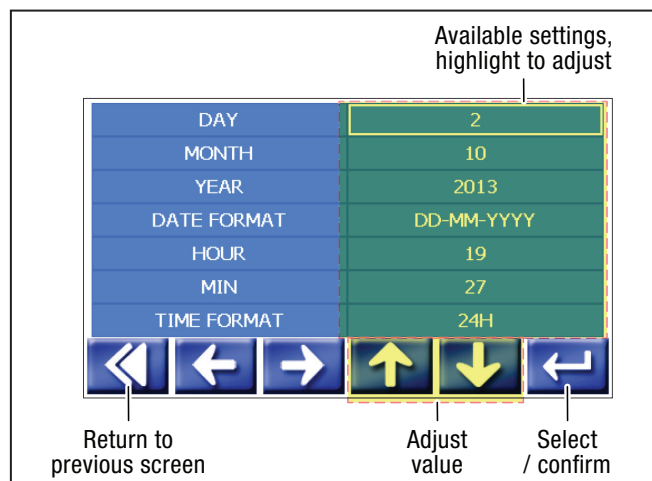
Note

Units other than “Temperature” are not utilized in this version of the of the system and can be ignored.

Set time and date

To change the time or date setting select “Setup”, and on the next page select “Time & date”.

The available settings to adjust include day, month, year, date format, hour, minute, and time format.



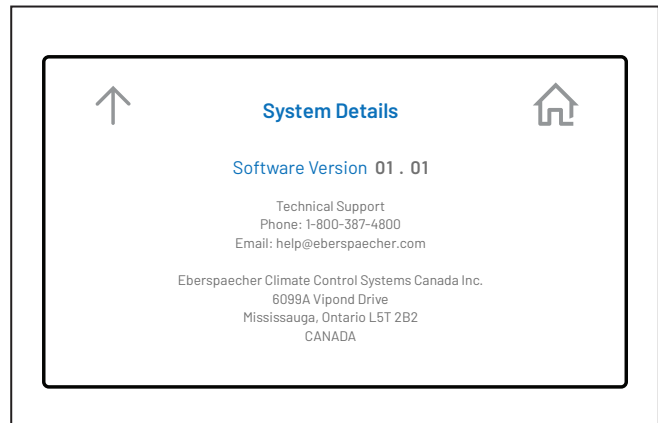
Select the desired value to adjust so that it is highlighted (dark blue) and use the up and down arrows to adjust the setting. Press the confirm button to enter the value.

Note

An internal clock maintains the correct time and date even when power is removed with an onboard battery.

2.7.13 System details

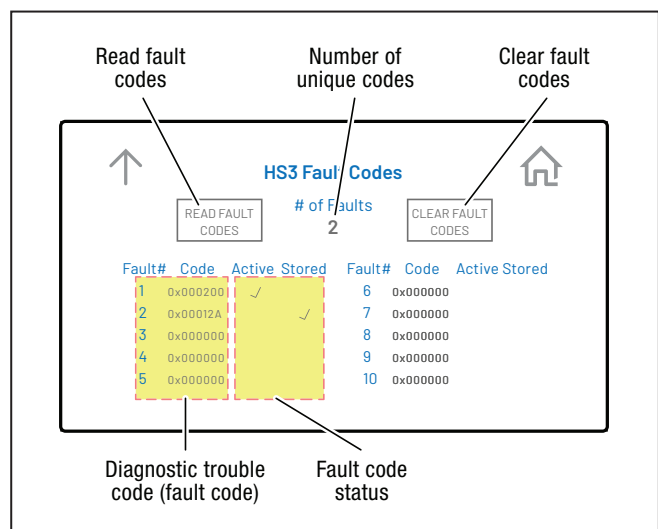
Software version information along with technical support contact info can be accessed from the general settings menu page (Item 16, sections 2.6.3).



2.7.14 Fault codes, Hydronic S3 coolant heater

Diagnostic trouble codes (DTCs) generated and recorded by the Hydronic S3 coolant heater can be read and erased through the system’s user interface.

The fault code menu can be accessed from the Hydronic S3 menu page (Item 17, sections 2.6.3).



Read fault codes

To read fault codes press the “Read Fault Codes” button and wait a few seconds for the communication between the Hydronic S3 and the controller to complete. If the read was successful a pop-up will display an acknowledgment.

The fault codes stored in the Hydronic S3's memory will be displayed along with their status (active or stored).

i Note

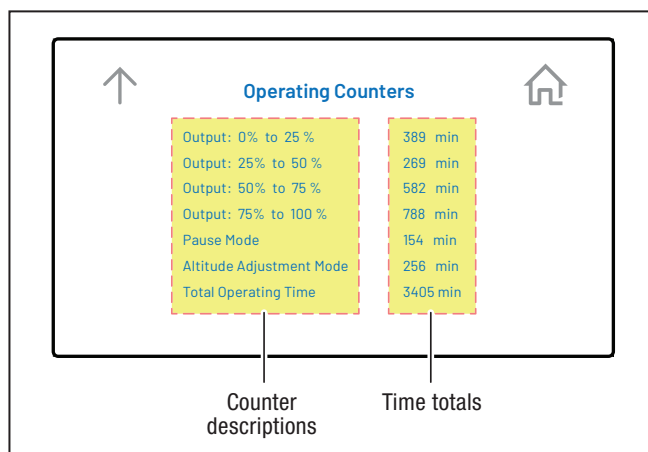
- A maximum of 10 unique fault codes are stored in memory. Multiple occurrences will only be displayed as a single entry.
- An "active" code is one that has been detected in the current activation cycle.
- Switching the Hydronic S3 off and on can result in the code status changing from "Active" to "Stored".

Clear fault codes

To clear fault codes press the "Clear Fault Codes" button and wait a few seconds for the communication between the Hydronic S3 and the controller to complete. If the clear was successful a pop-up will display an acknowledgment.

2.7.15 Operating counters, Hydronic S3 coolant heater

The durations the Hydronic S3 has spent in various operating states is recorded and available from the Hydronic S3 menu page (Item 18, sections 2.6.3).



The operating condition is displayed on the left side of the screen and the duration, in minutes, is displayed on the right.

2.7.16 Priming fuel lines

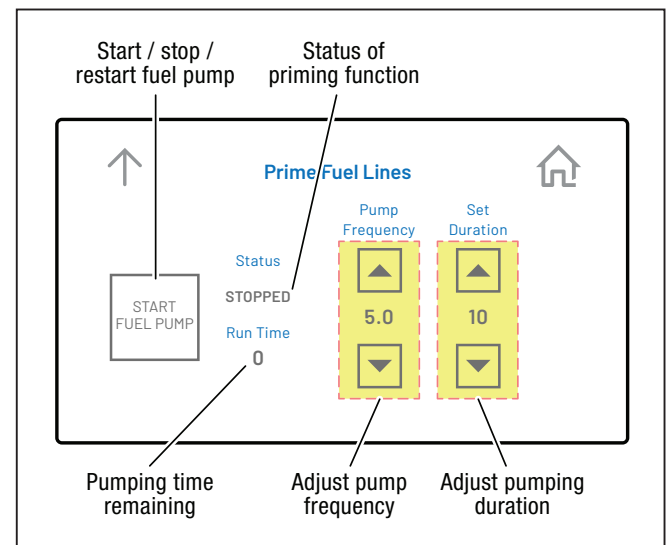
⚠ Warning!

Fuel line priming safety instructions!

Fuel can build up within or leak out of the Hydronic S3 causing an unsafe condition if these instructions are not followed.

- Operating the fuel pump without the heater running can result in fuel buildup within the heater.
 - Fuel buildup within the heater can leak out onto the ground or other equipment and create a fire hazard.
- Only operate the fuel line priming function for the minimum amount of time necessary to fill the fuel lines.
- Monitor the system fuel lines (transparent) and stop the priming function as soon as the fuel has reached the heater.

The fuel pump can be activated and operated independently of the heater in order to prime the fuel lines. The fuel line priming function can be accessed from the HS3 menu page (Item 19, sections 2.6.3).



The fuel pump's frequency and duration of operation can be manually adjusted based on the size of the fuel system and the amount of priming that is required.

Increasing the frequency of the fuel pump will increase the flow rate through the pump.

Pressing the start / stop / restart button will start or stop the priming function. The status of the priming function as well as the remaining priming time are displayed.

2.8 Winterization and storage

⚠ Caution!

Failure to prepare the system when there is a risk of freezing can result in damage to the heating system.

- The exact measures needed to adequately protect the system are vehicle and installation dependent
- Consult with your vehicle instructions or contact your installer for details

If the system is going to remain unused or stored in a freezing environment you must follow the winterization instruction for the fresh water plumbing system of your vehicle.

The only components of the heating system which interact directly with fresh water are the plate heat exchanger and the thermostatic mixing valve. In the absence of any other winterization instruction these components must either be completely drained of fresh water or filled with a medium that will not freeze (be sure to flush them appropriately before the next use).

Disconnect the system from any electric power source for long term storage (e.g. remove fuse, switch off breaker, etc.)

Note

- Do not drain the heating system fluid (coolant) during winterization.
- The air heating function of the system can still be used while the vehicle's plumbing system is "winterized".

2.8.1 Safety test after storage

After a lengthy stoppage (e.g. summer months), check all components are secure (tighten screws where necessary).

Carry out a visual check of the fuel and coolant systems for leaks.

2.9 Disconnecting power

Before disconnecting electrical power from the system ensure that that the system is not in operation. Confirm that the Hydronic S3 coolant heater is not running and the system is off or in standby.

It is not permitted to use the removal of electrical power from the system as a means of switching off operation. Doing so will immediately stop all components and prevent the system from completing its prescribed cooldown cycle which can cause damage to the system.

Warning!

Do not turn off power to the system while it is in operation! Risk of injury!

- Stopping circulation of the coolant through the fuel operate heater (Hydronic S3) while it is in operation can cause the coolant to be overheated.
- Overheated coolant can boil and overflow the coolant system.
- Hot overflowing coolant may harm people, animals, or equipment.
- Never disconnect power from the system or heater while it is in operation.
- Do not deactivate any control device while the system is in operation.
- Ensure that the Hydronic S3 has completed its cooldown cycle and the system is inactive before removing power.

2.10 Operation at higher altitudes

Combustion within the fuel burning coolant heater is affected by the lower air pressure when operating at higher altitudes. To compensate for this the system reads the ambient air pressure and then adjusts the combustion process accordingly.

Altitude compensation is available up to 3,000 m (9,800 ft).

2.11 Control and safety devices

- The heating system coolant circuit is not pressurized. In the event of an overheating condition pressure will be relieved via the overflow port on the coolant tank filler neck.
- Outputs of the controller (e.g. powering the coolant pump and the fan) are protected from short circuits and will switch off in the event of a short. They will then periodically attempt to switch back on until the short is removed.
- Controller will detect an open circuit condition if the output has <200mA across it when activated.
- If the fuel operated coolant heater does not ignite (within 105 seconds for gasoline, 70 seconds for diesel), the start sequence is repeated. If the heater does not ignite within the specified safety time (240 seconds), a safety shut-down occurs. After an unacceptable number of failed starts attempts, the Hydronic S3's ECU locks*.
- If the Hydronic S3's flame goes out by itself during operation, the heater will attempt to restart. If the heater does not ignite or ignites but goes out again within 10 minutes, a safety shutdown occurs. The safety shut-down can be cancelled by briefly switching heating off and on again (heater ON / OFF).
- In the event of overheating (e.g. lack of coolant, poor heat rejection) the overheating sensor triggers. The fuel supply is interrupted and a safety shut-down occurs. Once the cause of the overheating has been eliminated (coolant temperature < 70°C/ 158°F) , the heater can be restarted. After 10 shutdowns due to overheating the Hydronic S3 ECU locks*.
- If the lower or upper voltage limit is reached, the Hydronic S3 shuts down automatically. The system however may remain ON.
- The Hydronic S3 does not start up if the glow plug is defective or if the electric cable to the metering pump is interrupted.
- The speed of the combustion fan motor is monitored continuously. If the fan motor does not start up, if it is blocked or if the speed falls below 40 % of the set speed, a safety shutdown occurs after 60 sec.

- * Cancellation of the lock or reading out of the fault memory is possible:
- from Hydronic S3 Fault Code menu
 - with EasyScan Diagnostic tool.

Note

Do not switch unit on/off more than twice if a fault continues to occur.

2.12 Emergency stop – EMERGENCY OFF

If an emergency stop – EMERGENCY OFF – is necessary during operation, please complete the following steps:

- Switch the heater off at the control unit or
- remove the fuse or
- disconnect the heater from the battery.

3 Troubleshooting / Maintenance / Service

3.1 Troubleshooting

3.1.1 Hydronic S3 coolant heater

If a fault on the fuel operated coolant heater occurs first check the following:

- If the heater does not start after being switched on:
 - Switch the heater off and on again.
- If the heater still does not start, check whether:
 - Fuel in the tank?
 - The fuses are ok?
 - The electrical cables, connections, terminals, are ok?
 - Is the combustion air system or exhaust system blocked?



Note

Always ensure that there is sufficient fuel in the tank and the pickup point is below the level of the fuel. The heater will generate a fault and eventually lock if operated without fuel.

Fault codes registered by the Hydronic S3 can be read following the instruction in section 2.7.14. Consult the Hydronic S3 repair instruction document for a detailed description of the fault code.

3.1.2 Touchscreen

If screen is not turning on check the system fuses, electrical cables, and connectors.

If the screen is on a diagnostic LED is present on the top right corner of the screen bezel.

Blink codes:

- System OK – 1 Hz (1x/sec).
- Start-up / Shutdown – constantly on.
- System crash – not blinking (System will restart after 60 seconds in this condition).

3.1.3 Controller

If an output is not functioning correctly consult the blinking diagnostic codes on the main I/O controller module.

Blink codes:

LED #1 (red)

- 1Hz (1x/sec) – System is OK.
- 2Hz (2x/sec) – No communication with touch screen.
- 5Hz (5x/sec) – Software error.
- Steady ON – Output shorted or overloaded.
- Steady Off – Open circuit logged.

LED #2 (green)

Output number in the event of a short or open circuit. If there are multiple output with issues only the first is shown. Number of blinks indicates output number; long blinks indicate multiples of ten.

3.1.4 Additional troubleshooting support

If after checking the items described above, issues persist, please contact

- For factory installations: your contract workshop / garage.
- For subsequent installations: the workshop / garage that installed the heater.

Repairs are to be conducted by Eberspaecher trained personnel.



Note

Please note that guarantee claims can expire if the heater is modified by a third party or if non-original parts are installed.

3.2 Maintenance



Warning!

Risk of injury, scalding and burns

- The high temperatures of the coolant liquid and the coolant liquid circuit components can cause injuries, scalds and burns.
- Before working on the coolant liquid circuit, wait until all components have cooled, wear safety gloves if necessary. Do not deactivate any control device while the system is in operation.

Check coolant level and concentration regularly and adjust as required. Replace coolant according to manufacturer recommendations.

After extended periods without operation, before heat is needed, perform a trial run with the heater. If thick, persistent smoke develops, unusual burning noises, a clear fuel smell occurs, or if electric / electronic components overheat the heater must be switched off and put out of service by removing the fuse. In this case, the heater should not be started up again until it has been tested by qualified staff who have been trained on Eberspaecher products.



Note

Check the openings of the combustion air supply and exhaust system as well as the blower intakes and outlets after longer standstills, clean if necessary!

3.3 Service

Technical support

If you have any technical questions or problems with the heater, the control unit or the operating software, you can contact the following service address: help@eberspaecher.com.

Notes:

Eberspaecher Climate Control Systems

(800) 387-4800

(905) 670-0960

(905) 670-0728 Fax

info@eberspaecher-na.com

www.eberspaecher-na.com

