



OPERATION MANUAL

Gas-fired steam humidifier
Condair **GS**
Series II

Thank you for choosing Condair

Installation date (MM/DD/YYYY):

Commissioning date (MM/DD/YYYY):

Site:

Model:

Serial number:

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1 Introduction

1.1 To the very Beginning

We thank you for having purchased the **Condair GS steam humidifier**.

The Condair GS steam humidifier incorporates the latest technical advances and meets all recognized safety standards. Nevertheless, improper use of the Condair GS steam humidifier may result in danger to the user or third parties and/or damage to property.

To ensure a safe, proper, and economical operation of the Condair GS steam humidifier, please observe and comply with all information and safety instructions contained in the present documentation as well as in the separate documentations of the components installed in the humidification system. Comply with all national and local regulations dealing with gas, combustion air, flue gas, water, steam and electrical installations.

If you have questions after reading this documentation, please contact your Condair representative. They will be glad to assist you.

1.2 Notes on the Operation Manual

Limitation

The subject of this operation manual is the Condair GS steam humidifier in its different versions. The various options and accessories are only described insofar as is necessary for proper operation of the equipment. Further information on options and accessories can be obtained that are supplied with them. This operation manual is restricted to the **commissioning, operation, maintenance and troubleshooting** of the Condair GS steam humidifier and is meant for **well trained personnel being sufficiently qualified for their respective work**.

Other Related Publications

This operation manual is supplemented by various separate items of documentation (installation manual, spare parts list, etc.), which are included in the delivery as well. Where necessary, appropriate cross-references are made to these publications in the operation manual.

Symbols used in this manual



CAUTION!

The catchword "CAUTION" used in conjunction with the caution symbol in the circle designates notes in this operation manual that, if neglected, may cause **damage and/or malfunction of the unit or damage to property**.



WARNING!

The catchword "WARNING" used in conjunction with the general caution symbol designates safety and danger notes in this operation manual that, if neglected, may cause **injury to persons**. Other specific warning symbols may also be used in place of the general symbol.



DANGER!

The catchword "DANGER" used in conjunction with the general caution symbol designates safety and danger notes in this operation manual that, if neglected, may lead to **severe injury or even death of persons**. Other specific warning symbols may also be used in place of the general symbol.

Storage of the manual

Please safeguard this operation manual in a safe place, where it can be immediately accessed. If the equipment is moved to another location, make sure that the manual is passed on to the new user.

If the manual is lost or misplaced, contact your Condair representative for a replacement copy.

Language versions

This operation manual is available in other languages. Please contact your Condair representative for information.

2 For your safety

General

Every person, who is in charge of any work on the Condair GS must have read and understood the installation manual and the operation manual (this document) of the Condair GS before carrying out any work. Knowing and understanding the contents of the installation manual and the operation manual is a basic requirement for protecting personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

All labels, signs and markings applied to the Condair GS must be observed and kept in readable state.

Qualification of personnel

All procedures described in this operation manual **may only be carried out by specialists who are well trained and adequately qualified and are authorised by the customer.**

For safety and warranty reasons any action beyond the scope of this manual must be carried out only by qualified personnel authorized by Condair.

All personnel working with the Condair GS humidifier must be familiar with, and comply with the appropriate regulations on work safety and the prevention of accidents.

Intended use

The Condair GS steam humidifier is intended **exclusively for air humidification via a steam distributor approved by Condair within specified operating conditions** (see Condair GS operation manual). Any other type of application, without the written consent of Condair, is considered as not conforming with the intended purpose and may lead to the Condair GS becoming dangerous and will void any warranty.

In order to operate the equipment in the intended manner **all the information contained in this manual, in particular the safety instructions, must be observed closely.**

Safety Precautions that must be observed



DANGER!
Risk of electric shock!

The Condair GS is mains powered. Live parts may be exposed when the unit is open. Touching live parts may cause severe injury or even death.

Prevention: Before carrying out any work set the Condair GS out of operation as described in [Section 5.3.8](#) (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.



WARNING!
Wiring errors can cause improper and dangerous operation of the humidifier!

Prevention: Tag all wires before disconnecting them. Reconnect all wires correctly after servicing, and check the unit functions properly.



CAUTION!
Electrostatic discharge (ESD)!

The electronic components inside the control cabinet in the humidifier are sensitive to electrostatic discharge (ESD).

Prevention: Take appropriate measures to protect the electronic components inside the unit against damage caused by electrostatic discharge (ESD).



DANGER!
Risk of fire or explosion!

The Condair GS is a gas-fired humidifier. Improper operation and maintenance as well as incorrect settings and unauthorized alteration can cause carbon monoxide poisoning, explosion, fire or other hazards that can cause serious injury, death or property damage.

If over-heating occurs or if the gas fails to shut off: Shut off the gas supply at the manual gas shutoff valve before shutting off the electrical power supply

DO NOT use this appliance if any part has been under water. Call a qualified service technician immediately to inspect and replace any part of the control system or gas control that has been under water.

Any work on the gas system must only be performed by a qualified installer, service agency or your local gas supplier. Use only factory-authorized and listed kits or accessories when installing or modifying this appliance.

Use only factory-authorized and listed kits or accessories when replacing part or modifying this appliance.

DO NOT store or use gasoline or other flammable vapours and liquids in the vicinity of the humidifier.

What to do if you smell gas:

- **DO NOT** try to light any appliance.
- **DO NOT** touch any electrical switch.
- **DO NOT** use any phone in the building.
- Leave the building immediately.
- Call your gas supplier immediately from a location far away from the building with the gas leak. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.



WARNING!

Risk of severe burns from contact with hot surfaces, steam or hot water!

The steam tank may contain steam or hot water at up to 100 °C. Contact with the hot surfaces, steam vapors or hot water can result in severe burns.

Prevention: Always drain the tank, and allow the unit to cool down to a safe temperature before cleaning the tank. Never open the tank until it has been fully drained. Never use the manual drain valve until the unit has cooled down. Use the manual drain valve to verify that the tank is empty before removing the tank cover.



WARNING!

Risk of severe burns from contact with hot steam vapors!

The Condair GS humidifier produces hot steam vapors for humidification. Bare skin in contact with hot steam vapors can result in severe burns.

Prevention: Never perform any work on the steam system (including the steam lines, steam distributors, etc.) while the humidifier is operating. Shut down the Condair GS humidifier, as described in [Section 5.3.8](#) before carrying out any work on the steam system.



WARNING!
Risk of severe burns from contact with hot surfaces!

The water tank, steam line and exhaust system in the Condair GS humidifier get very hot during operation. Bare skin in contact with hot surfaces can result in severe burns.

Prevention: Shut down the Condair GS humidifier as described in [Section 5.3.8](#) and wait for the components to cool down before performing any work on the unit. Never use the manual drain valve until the unit has cooled down. Use the manual drain valve to verify that the tank is empty before removing the tank cover. Drain the tank as described in [Section 5.3.8](#).



WARNING!
Risk of personal injury!

Wear a safety mask and clean the burner assembly in a well ventilated area.



CAUTION!
Risk of damage to the humidifier components!

Do not use solvents, aromatized or halogenized hydrocarbons, or other harsh chemicals for cleaning. Disinfectants may only be used if they do not leave behind toxic residue. Rinse all parts thoroughly with clean tap water after cleaning.



WARNING!
Risk of fire!

DO NOT clean the sacrificial anode with any chemicals. The anode can react with acids to create flammable hydrogen gas.



WARNING!
Risk of damage to the humidifier components or injury!

DO NOT over-torque the bolts. Ensure the proper order of torquing is followed. Failure to do so may cause damage to the humidifier components or injury.



DANGER!
Risk of harm to personnel or damage to property.

Operating a damaged or improperly secured humidifier presents a risk of danger to personnel or damage to property.

Prevention: Do not start a damaged or improperly secured humidifier.

Preventing Unsafe Operation

All persons working with the Condair GS must report any alterations to the unit that may affect safety to the owner without delay. If it is suspected that **safe operation is no longer possible**, the Condair GS should immediately **be shut down and secured against accidental power-up according to [Section 5.3.8](#)**. This can be the case under the following circumstances:

- if the Condair GS is damaged
- if the electrical installations are damaged
- if the Condair GS is no longer operating correctly
- if connections and/or piping (gas, water, exhaust gas) are not sealed

Prohibited modifications to the unit

No modifications must be undertaken on the Condair GS without the express written consent of Condair.

For the replacement of defective components use exclusively **original accessories and spare parts** available from your Condair representative.

Safety labels on the unit

Various safety and identification labels are attached to the Condair GS. Please note and comply with the relevant information on these labels.

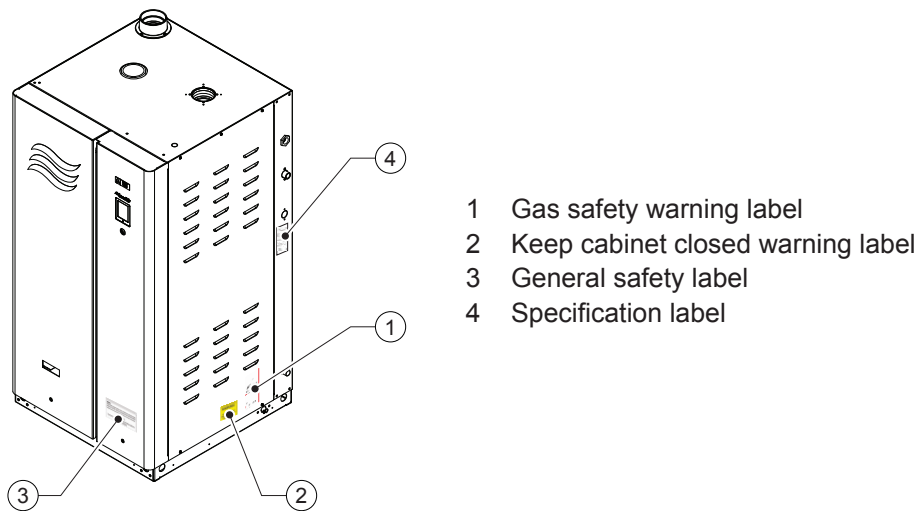


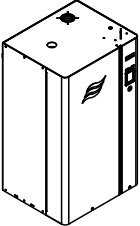
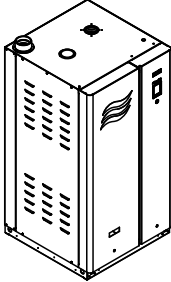
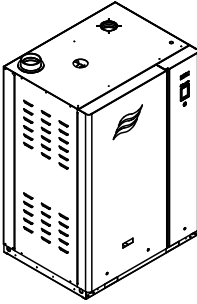
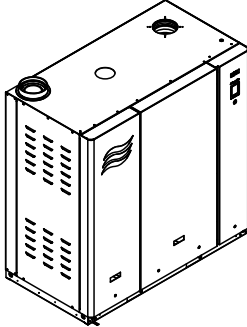
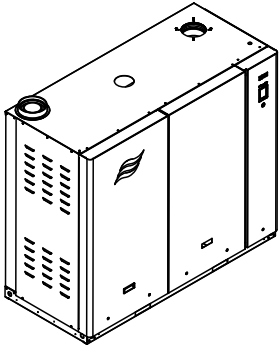
Fig. 1: Position of the safety and identification labels

3 Product Overview

3.1 Model overview

Condair GS are available in **two different housing designs** ("Compact" for wall mounting and "Full-size" for floor mounting), **two efficiency classes** (high efficiency: with condensing heat exchanger (option CS), standard efficiency: without condensing heat exchanger) and **maximum steam outputs ranging from 23 kg/h up to 260 kg/h**.

The humidifier has an integrated controller that controls the humidifier, and also allows the humidifier to be connected to a building automation system (via BACnet, Lonworks, Modbus), or the internet so the humidifier can be controlled and monitored remotely. In addition, up to four humidifiers can be set up in a "Main-Extension" configuration using Condair's Linkup system to satisfy large humidification needs.

Compact	Standard			
GS 23 GS 45	GS 65	GS 90 GS 130	GS 195	GS 260
				
max. steam capacity				
23 kg/h or 45 kg/h	65 kg/h	90 kg/h or. 130 kg/h	195 kg/h	260 kg/h

Detailed information on the unit specifications can be found in [Section 9](#).

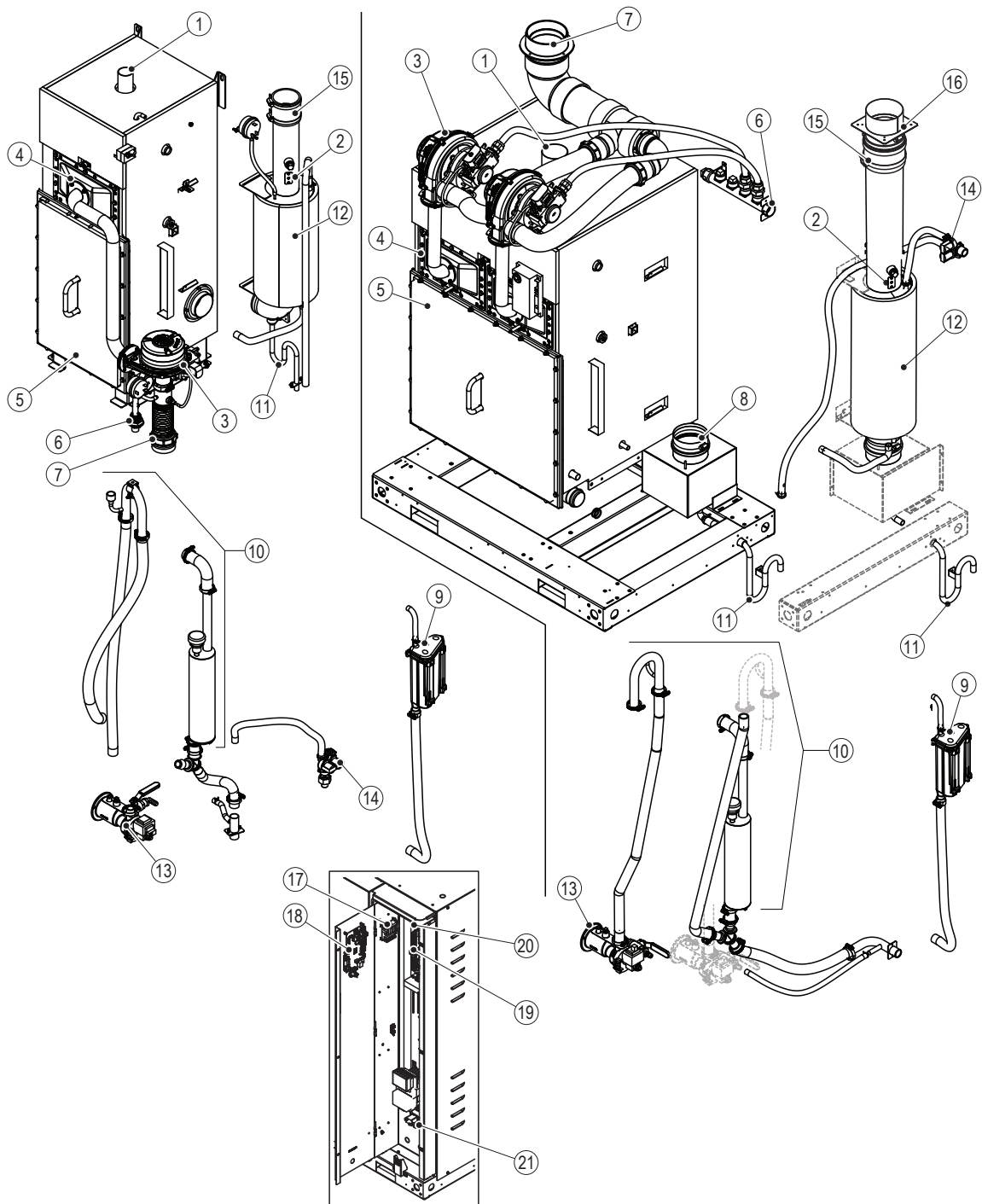


Fig. 2: Humidifier Components (left: compact unit GS 23/45, right: Full-size unit GS 65), front, side and top panels removed in the figure for clarity.

- | | | | |
|----|---|----|---|
| 1 | Steam outlet | 12 | Secondary heat-exchanger (CS models only) |
| 2 | Exhaust gas high limit temperature sensor | 13 | Drain valve |
| 3 | Blower | 14 | Dual fill valve |
| 4 | Burner | 15 | Silicone tube, exhaust outlet |
| 5 | Tank door | 16 | Exhaust adapter |
| 6 | Gas inlet | 17 | Remote fault board |
| 7 | Combustion air inlet | 18 | Control board |
| 8 | Exhaust Manifold (GS 90-260 only) | 19 | Driver board |
| 9 | Level control unit | 20 | Control terminals (low voltage) |
| 10 | Overflow | 21 | Terminal block mains voltage supply |
| 11 | Exhaust condensate trap (CS models only) | | |

Table 1: Components installed by models

Component	Quantity				
	GS 23/45	GS 65	GS 90/130	GS 195	GS 260
Primary heat-exchanger	1	1	2	3	4
Secondary heat-exchanger	1 *	1 *	1 *	2 *	2 *
Water tank	1	1	1	1	1
Burner	1	1	2	3	4
Blower	1	1	2	3	4
Gas valve	1	1	2	3	4
Ignition control module	1	1	2	3	4
Spark-igniter and flame sensor	1	1	2	3	4
Dual fill valve	1	1	1	2	2

* Secondary heat-exchanger on CS models only.

3.2 Functional Description

Combustion

The combustion system consists of a fully modulating forced-draft combustion air blower(s), a negative pressure regulated gas valve(s), and a premix burner(s). On a call for humidity, the blower is energized to purge the system. During this time the control software performs diagnostic checks of the safety systems – the air proving switch (not shown), the high limit temperature switch in the exhaust vent, as well as the blowers. If the air proving switch is open, the warning message "AP Open Warn" appears, and escalates to the fault message "AP Open Fault" if three consecutive warnings occur. At the same time, if the over-temperature switch is open, the fault message "Over-Temperature Fault" appears. In addition, if any of the blowers fail to operate during this time, the fault message "Blower Not Operating" appears. When the functions of the safety systems have been verified successfully, the gas valve(s) open(s) and the gas-air mixture is pushed through the burner ports into the combustion chamber(s). The spark-igniter(s) is/are simultaneously activated to ignite the gas-air mixture.

If a flame is not sensed by the flame sensor(s), the above sequence is repeated after 15 seconds. The sequence is repeated up to a maximum of three times, after which the ignition control module(s) locks out and the fault message "Ignition Fail" appears. If a flame is sensed by the flame sensor(s), the gas valve(s) remain(s) open and combustion continues. The gas valve(s) continue(s) to maintain a constant air-to-gas ratio independent of the blower speed or external conditions.

On the CS models, the hot flue gases pass through the primary heat-exchanger then the secondary heat-exchanger, where it is cooled further before it exits through the exhaust vent. The heat recovered by the secondary heat-exchanger is used to warm up the feed water. On the standard-efficiency model, the hot flue gases pass through the primary heat-exchanger and exit through the exhaust vent.

Water Management

The humidifier is equipped with a level control unit that monitors the water level in the tank. The tank is supplied with water from the water supply, and from the secondary heat exchanger in CS models. A vacuum break valve is used to prevent siphoning in the drain connection.

In the CS model, a secondary heat-exchanger promotes higher efficiencies. This is achieved by using the heat from the exhaust gas to pre-heat the cold fill water entering the tank.

The level control unit is connected to the top and bottom of the tank to monitor water level inside the tank. The level control unit is equipped with a control board and consists of two magnetic floats (one is the level float and one is the safety float) that measure the water level. The water levels in the tank are indicated with 3 LEDs on the control board and are monitored by the control software.

Water Levels:

- L5 (yellow LED lights) – high water level
- L4 (green and yellow LED light) – intermediate water level
- L3 (green LED lights) – middle water level
- L2 (green and red LED light) – intermediate water level
- L1 (red LED lights) – low water level

On initial start-up, the dual fill valve fills the tank and the level control unit. A start-up test monitors the water level as the tank and level control unit fills, and ensures proper functioning of the unit.

Note: A fault message "Float Level" may appear at any time. This indicates an invalid combination of readings from the control software (for example, if L5 and L1 LEDs activate at the same time).

1. Water enters the level control unit via the hose connected to the tank. The water level reaches first the safety float, then the level float.
2. As water fills the level control unit and reaches the L1 level, the control software performs a test to verify proper functioning of the dual fill valve and the drain pump.
 - a) The fill valves fill the tank until the water level L5 is reached (detected by the level control unit).
 - b) Then, the drain pump energizes to lower the water level to just below L3.

Note: The water levels should appear in ascending then descending order; L1, L2, L3, L4, L5, L4, L3. A fault message "Fill Check Fault" appears if the water level does not rise to level L5. A fault message "Drain Check" appears if the water level does not drop below the level L3.

3. When the test is complete, the dual fill valve activates and the water level should rise to level L3.
4. If a demand signal is present, the humidifier begins the combustion sequence.
5. The drain pump and dual fill valves maintain the water level between levels L2 and L5.

If "Float Check" is enabled during steam production, the control software will activate the drain sequence every 24 hours (adjustable to any time of day) to verify proper functioning of the level control unit, dual fill valve, and the drain pump.

3.3 System overviews

3.3.1 System overview compact units GS 23/45

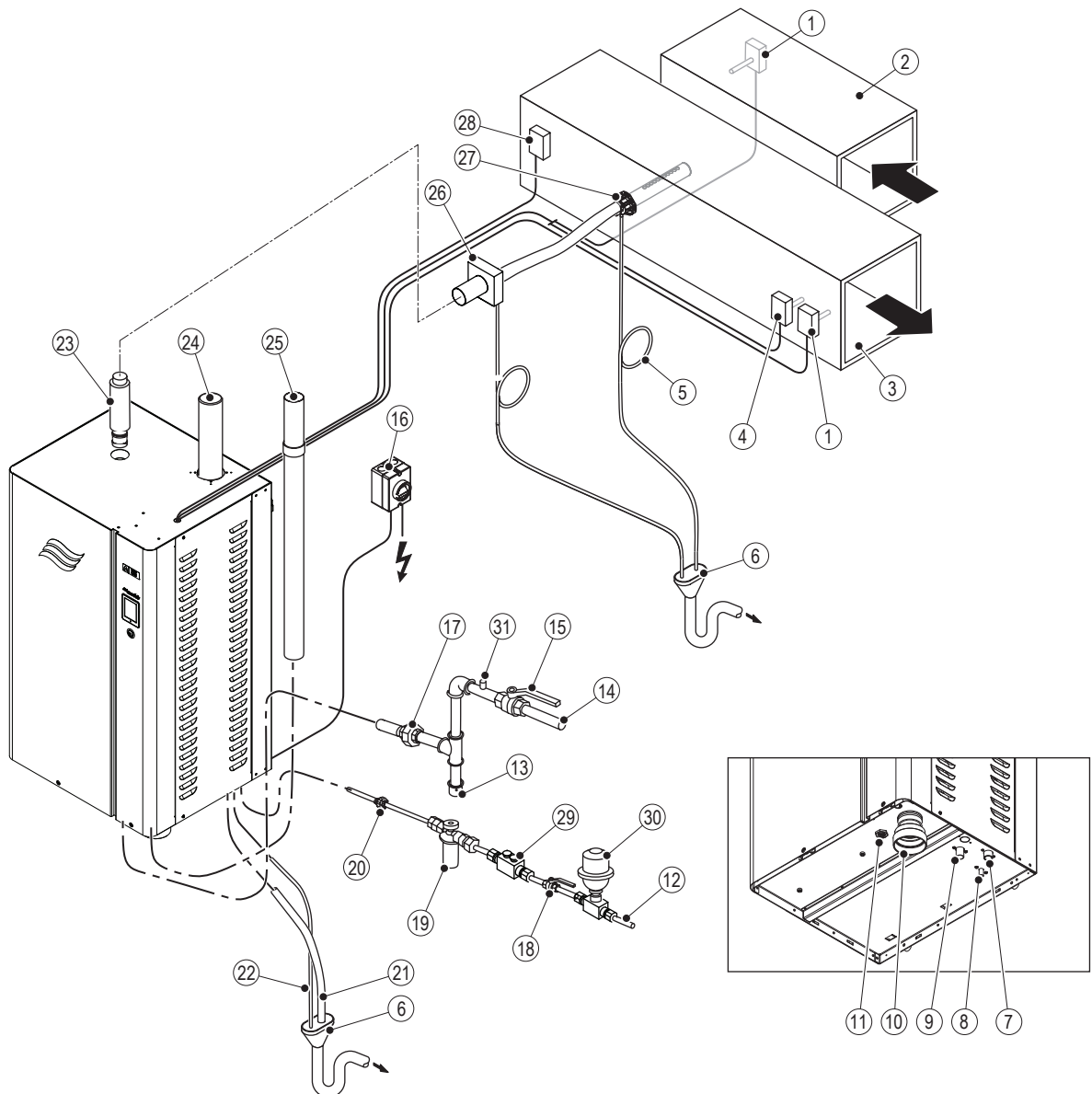


Fig. 3: System overview compact units GS 23/45

- | | | | |
|----|--|----|--|
| 1 | Humidity sensor or external humidity controller (installed in the extract air duct for extract air humidity control or in the supply air duct for supply air humidity control) | 17 | Connection fitting gas supply line |
| 2 | Extract air duct | 18 | Shutoff valve water supply line |
| 3 | Supply air duct | 19 | Water filter |
| 4 | Safety humidistat (external safety loop) | 20 | Connection fitting water supply line |
| 5 | Condensate drain line with trap | 21 | Water drain line |
| 6 | Open funnel with trap | 22 | Flue gas condensate drain (CS only) |
| 7 | Water supply connector | 23 | Steam line |
| 8 | Connector flue gas condensate drain | 24 | Flue gas pipe (connected to exterior) |
| 9 | Water drain connector | 25 | Combustion air supply pipe (connected to exterior – optional) |
| 10 | Combustion air supply connector | 26 | Steam hose adapter |
| 11 | Gas supply connector | 27 | Steam distribution pipe DV81-.. |
| 12 | Water supply line | 28 | Air flow monitor (external safety loop) |
| 13 | Sediment trap | 29 | Pipe disconnector as backflow preventer (optional, supplied by others) |
| 14 | Gas supply line | 30 | Water shock arrester (supplied by others) |
| 15 | Shutoff valve gas supply line | 31 | Gas test port (supplied by others) |
| 16 | Electrical isolator voltage supply (mandatory) | | |

3.3.2 System overview full-size units

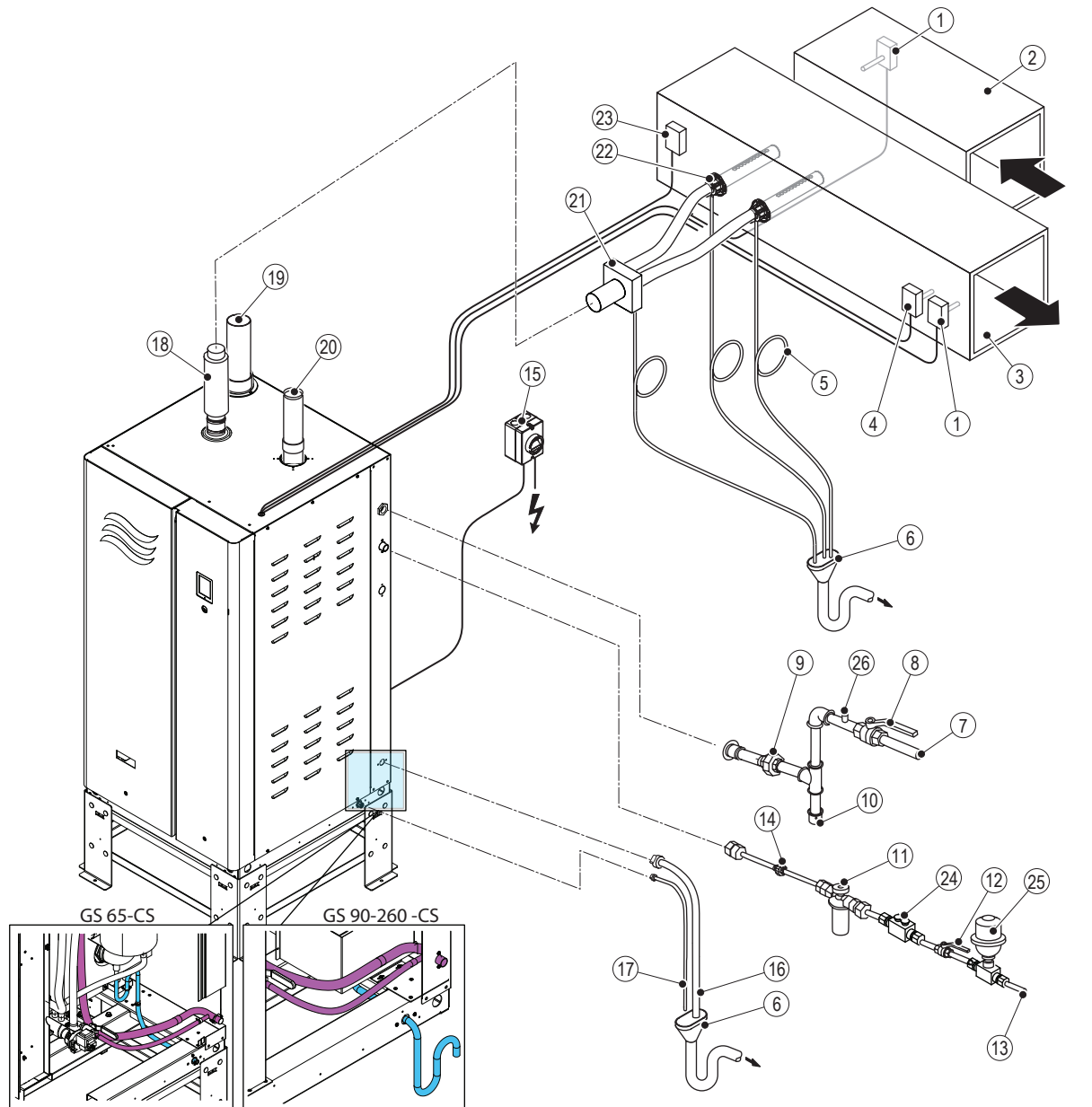


Fig. 4: System overview full-size units GS 65-260 (GS 65 unit is shown)

- | | | | |
|----|--|----|--|
| 1 | Humidity sensor or external humidity controller (installed in the extract air duct for extract air humidity control or in the supply air duct for supply air humidity control) | 14 | Connection fitting water supply line |
| 2 | Extract air duct | 15 | Electrical isolator voltage supply (mandatory) |
| 3 | Supply air duct | 16 | Water drain line |
| 4 | Safety humidistat (external safety loop) | 17 | Flue gas condensate drain line (CS only) |
| 5 | Condensate drain line with trap | 18 | Steam line |
| 6 | Open funnel with trap | 19 | Combustion air supply pipe (connected to exterior – optional) |
| 7 | Gas supply line | 20 | Flue gas pipe (connected to exterior) |
| 8 | Shutoff valve gas supply line | 21 | Steam hose adapter |
| 9 | Connection fitting gas supply line | 22 | Steam distribution pipe DV81-.. |
| 10 | Sediment trap | 23 | Air flow monitor (external safety loop) |
| 11 | Water filter | 24 | Pipe disconnecter as backflow preventer (optional, supplied by others) |
| 12 | Shutoff valve water supply line | 25 | Water shock arrester (supplied by others) |
| 13 | Water supply line | 26 | Gas test port (supplied by others) |

4 Operator Interface

4.1 Display and operating elements

The Condair GS consists of the following display and operating elements (see [Fig. 5](#) and [Table 2](#)).

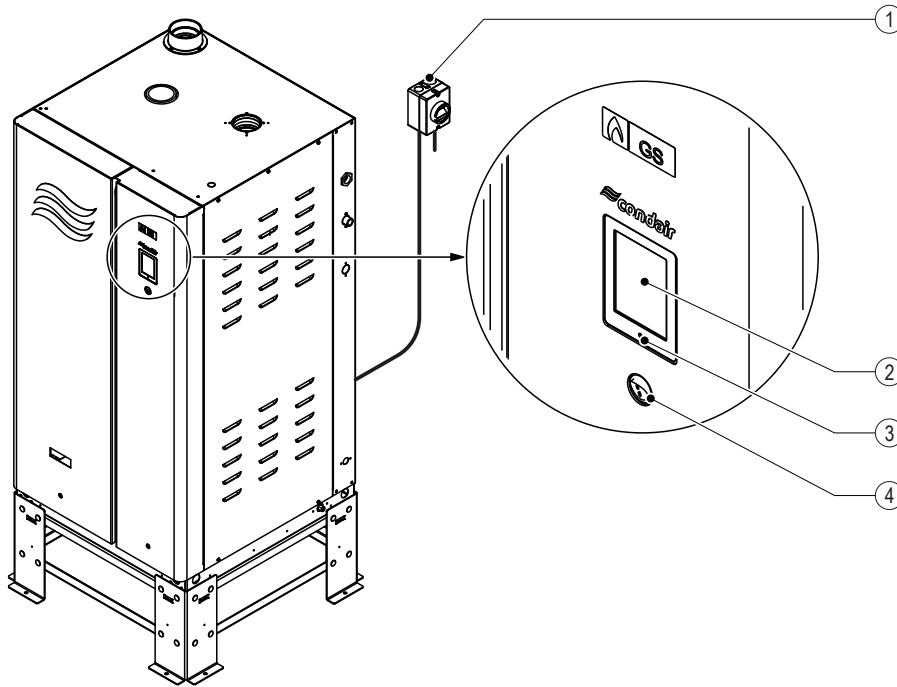


Fig. 5: Display and operating elements

Table 2: Functions of the display and operating elements

Pos.	Element	Function
1	Electrical isolator	External fused electrical isolator installed in the mains voltage supply
2	Touchscreen display	Allows the user to monitor and control the Condair GS humidifier – Refer to Section 4.2 .
3	LED status indicator	The status LED is a multi-function LED, which lights up in different colors depending on the operating status of the humidifier. <ul style="list-style-type: none"> – LED lights Green: indicates that the Condair GS humidifier is operating normally and humidifying. – LED flashing green: indicates that the Condair GS humidifier is in standby mode. – LED lights yellow: indicates that a warning condition is present, or the humidifier is due for maintenance. – LED lights red: indicates that a fault condition is present, and humidification is stopped.
4	On/Off switch	Allows the user to turn the Condair GS humidifier on or off

4.2 Control Software

4.2.1 Home Screen

When the Condair GS humidifier is turned on, it starts initializing and performs system checks. When initialization and system checks are completed successfully, it goes into the normal operating mode. The Home screen then appears on the touchscreen display. The major elements of the Home screen are shown in [Fig. 6](#).

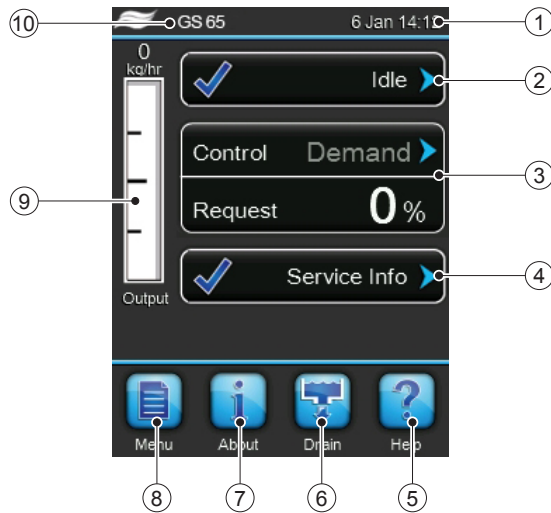


Fig. 6: Home Screen Elements

- | | | | |
|---|--|----|--|
| 1 | Current date and time | 6 | <Drain> button – manually initiate the drain function. Refer to Section 5.3.6 for details. |
| 2 | Operating status message – refer to Section 4.2.2 . | 7 | <About> button – access the system information. Refer to Section 4.2.5 for details. |
| 3 | Humidity control information – shows the type of control signal and the steam output requested. | 8 | <Menu> button – access the Main menu. Refer to Section 4.2.6 for details. |
| 4 | Service/Warning/Fault status message – refer to Section 4.2.3 . | 9 | Visual indication of current steam output level |
| 5 | <Help> button – access technical support help information. Refer to Section 4.2.4 for details. | 10 | Humidifier model designation |

4.2.2 Operating Status

The operating status area of the Home screen shows the current operating status message and an associated status icon. The messages are described in [Table 3](#), and the status icons are described in [Table 5](#).

Table 3: Operating Status Descriptions

Message	Description
Humidifying	The humidifier is generating steam.
Stopped	The humidifier is stopped because a condition with a "Fault" status is active.
Disabled	The Condair GS humidifier is disabled by the BMS (building management system).
Safety Loop	One or more contacts in the external security loop is open, so the humidifier has stopped producing steam.
Idle	The humidifier is in standby mode (no humidity demand). The humidifier will remain in this state until it receives a valid humidity demand signal.
Idle Drain	The humidifier is in standby mode (no humidity demand) and will remain in this state until a demand signal is received, or until the "Idle Drain Time" has elapsed (and the "Idle Drain" function is active). The humidifier will drain when "Idle Drain Time" has elapsed.
Idle-Empty	Indicates that the tank is empty during idle.
Keep Warm)	The humidifier is in standby mode, and the "Keep Warm" function is activated
Filling	Indicates that the tank is being filled
Fill check	The humidifier is performing a fill check.
Drain Check	The humidifier is performing a drain check.
Draining	The humidifier is draining.




4.2.3 Maintenance and Fault Status

The Service/Warning/Fault status area of the Home screen (refer to [Table 4](#)) shows maintenance reminders, warning and fault status messages along with associated status icons (refer to [Table 5](#)). This field also allows access to the "Service" menu. When a maintenance reminder, warning or fault status message is active, the list of current faults/warnings can be accessed directly from this field to view additional details.

Table 4: Maintenance/Fault Status Descriptions

Message	Description
Service info	No faults conditions present.
Main. Warning	This maintenance reminder appears when the Service Interval time set in the control software has elapsed. The unit can continue to operate for another 200 hours, after which a corresponding fault message appears and the unit stops operating. Perform the required scheduled maintenance, then reset the service reminder in the Service menu. Refer to Section 6.5 .
Warning	Warning A condition with a "Warning" status is active. Depending on the warning condition, the humidifier will continue to produce steam when there is a demand (unless the warning relates to a control signal). In addition, the status LED turns yellow in color.
Fault	Fault A condition with a "Fault" status is active. The humidifier will not produce steam until the fault condition is cleared. In addition, the status LED turns red in color.

Table 5: Status Icon Descriptions

Symbol	Description
	This icon appears to the left of the operating status message or the maintenance/fault message when the system is working normally.
 Warning	This icon appears to the left of the maintenance/fault status message when a maintenance reminder or a condition with a "Warning" status is active. The humidifier will continue to produce steam when there is a demand (unless the warning relates to a control signal fault). Typically, these conditions are of a temporary nature, or conditions that cannot cause damage to the system. Depending on the condition, the Condair GS humidifier may be stopped (e.g. if the warning relates to a control signal fault) or remains operable. If the cause of the condition clears on its own accord, the warning message is automatically reset. If the condition becomes worse, a fault message may be triggered. When a warning message is active, the status LED lights yellow.
 Fault	This icon appears to the left of the maintenance/fault status message when a condition with a "Fault" status is active. The humidifier stops producing steam. Typically, these are conditions which prevent further operation of the humidifier, or conditions that can cause damage to the system. When a fault condition occurs, the Condair GS humidifier stops steam production immediately. When a fault message is active, the status LED lights red.

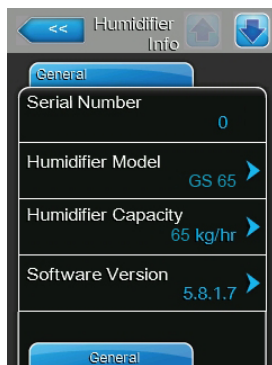
4.2.4 Accessing support informations

Press the **<Help>** button in the home screen (refer to [Fig. 6 on page 18](#)). The screen with the support information appears.

4.2.5 Accessing system informations

Select the **<About>** button on the home screen (refer to [Fig. 6 on page 18](#)) to view the system information for your Condair GS humidifier. The tab structure for this selection is shown below.

General Tab



- **Serial Number:** shows the serial number, which is also shown on the specification label.
- **Humidifier Model:** shows the model number, which is also shown on the specification label on the right side of the humidifier.
- **Humidifier Capacity:** shows the total steam output capacity of the humidifier.
- **Software Version:** shows the current version of the control software. Select the field to update the control software – refer to "[Software Settings Tab](#)" on page 40 for details.



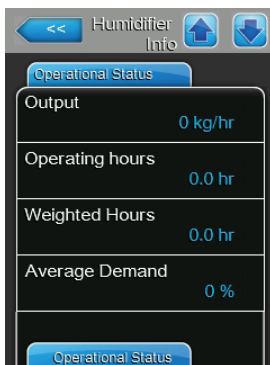
- **Driver Board A/B Version:** shows the current version of the driver board.
- **Graph:** shows you a graph of the trend data.
- **Export Trend Data:** Select the field to send the trend data to a connected USB drive.

Timer Tab

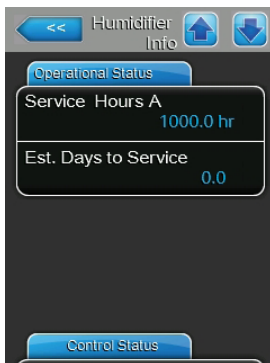


- **On/Off Timers:** shows the current status of the On/Off timer function.
- **Capacity Timers:** shows the current status of the capacity timer function

Operational Status Tab



- **Output:** shows the current actual steam output level of the humidifier.
- **Operating Hours:** shows the current accumulated number of hours the humidifier has been producing steam since startup.
- **Weighted Hours:** shows the number of operating hours of the unit related to 100 % output.
- **Average Demand:** shows the time-averaged demand on the system.

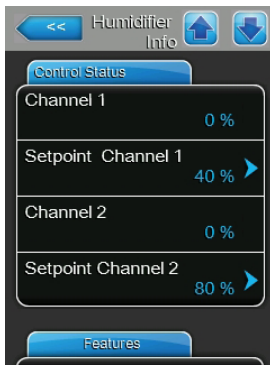


- **Service Hours A:** shows the service interval.
- **Est. Days to Service:** shows the number of days before the unit is due for service (based on average humidifier demand).

Control Status Tab



- **Demand:** shows the calculated demand for the unit as a percentage of its maximum capacity.
- **Linkup:** shows the humidifier's "position" in the linkup chain. Select to set the humidifier
- **Safety Loop:** shows the current status of the On/Off devices in the safety loop. If the loop is open, the unit will not produce steam.
- **Manual Capacity:** shows the capacity limitation value as a percentage of the maximum capacity of the unit. Select the field to set a fixed maximum output capacity.



- **Channel 1:** shows the input signal for Channel 1. If configured for demand control, it represents the demand. If configured for RH(P/PI), it represents sensed humidity.
- **Setpoint Channel 1:** shows the current fixed humidity setpoint value for the unit. Select the field to adjust the setpoint value. Refer to ["PI Control Parameters Tab" on page 30](#) for more details.
Note: This field appears only if "Control Mode CH1" is set to "RH P" or "RH PI".
- **Channel 2:** shows the input signal for Channel 2. If configured for demand control, it represents the demand. If configured for RH(P/PI), it represents sensed humidity.
Note: This field appears only if the "Control Channels" is set to "Dual".
- **Setpoint Channel 2:** shows the limiter setpoint value for the unit. Select the field to adjust the value.
Note: This field appears only if "Control Mode CH2" is set to "RH P" or "RH PI", and "Control Channels" is set to "Dual".

Features Tab

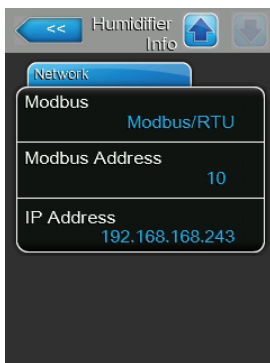


- **Blowdown Rate:** shows the rate at which the tank is partially drained, as a percentage of actual steam production. Select the field to adjust the setting. Refer to the ["Water Management Tab" on page 25](#) for more details.
- **Drain Cool:** shows the configuration setting of the drain cool function. Select the field to choose a different mode – "Off", "On" or "Smart". Refer to the ["Water Management Tab" on page 25](#) for more details.
- **Float Check:** shows the configuration setting of the float check function. Select the field to enable or disable the function. Refer to the ["Operation Tab" on page 27](#) for more details.
- **Float Check Time:** shows the set the time of day when the float check function will occur. Select the field to adjust the setting. Refer to the ["Water Management Tab" on page 25](#) for more details.



- **FTBD** (Full Tank Blowdown): shows the configuration setting of the full tank blowdown function. Select the field to enable or disable the function. Refer to the ["Water Management Tab" on page 25](#) for more details.
- **FTBD Interval**: shows how often a full tank blowdown will occur. Select the field to adjust the setting. Refer to the ["Water Management Tab" on page 25](#) for more details.
- **FTBD Time**: shows the time of day when a full tank blowdown will occur. Select the field to adjust the setting. Refer to the ["Water Management Tab" on page 25](#) for more details.
- **Time Proportioning**: shows the configuration setting of the time proportioning function. Select the field to enable or disable the function. Refer to the ["Operation Tab" on page 27](#) for more details.
- **Idle Mode**: shows the current Idle Mode setting. Select the field to choose a different mode – "Idle Only", "Idle Drain" or "Keep Warm". Refer to the ["Operation Tab" on page 27](#) for more details.
- **Idle Drain Time**: shows the set time duration the humidifier stays in standby mode without a demand, after which the humidifier carries out the function specified in "Idle Mode". Select the field to adjust the setting. Refer to the ["Operation Tab" on page 27](#) for more details.
- **Short Cycle**: shows whether the short cycle function is enabled or disabled. Select the field to enable or disable a timer function that delays steam production until the already delivered humidity can stabilize in the conditioned environment. This feature prevents the humidifier from flooding the environment with excess humidity from false humidity readings. Refer to the ["Operation Tab" on page 27](#) for more details.
- **Short Cycle Time**: shows the set time duration that the unit waits in standby mode before responding to a new demand signal. Select the field to adjust the setting. Refer to the ["Operation Tab" on page 27](#) for more details.

Networking Settings Tab



- **Modbus**: shows set Modbus communication (Options shown: Off, Modbus/RTU, or Modbus/TCP).
- **Modbus Address**: shows the Modbus address assigned to the humidifier.
- **BACnet MSTP MAC**: shows the MAC address assigned to the humidifier.
- **IP Address**: shows the IP address assigned to the humidifier.

4.2.6 Main Menu

Select the **<Menu>** button on the Home screen to view the Main menu. The Main menu and its contents are password-protected. Enter the password "8808" to access the Main menu as shown below.

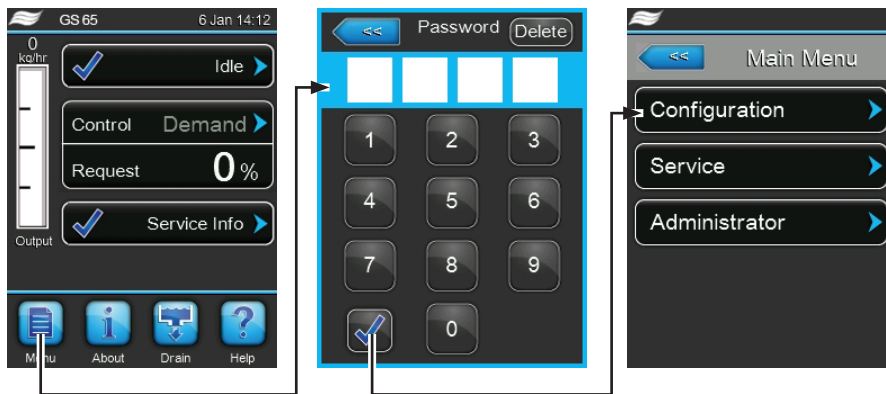


Fig. 7: Main Menu Access

The structure of the Main menu and its sub-menus is shown below.

"Main Menu" on page 24 >	"Configuration Menu" on page 25 >	"Features Menu" on page 25 >	"Water Management Tab" on page 25
			"Operation Tab" on page 27
		"Control Settings Menu" on page 29 >	"Basic Tab" on page 29
			"PI Control Parameters Tab" on page 30
			"RH Alerts Tab" on page 31
			"Multi-Unit Operation Tab" on page 32
		"General Menu" on page 33 >	"Basic Tab" on page 33
			"Time Date Tab" on page 34
		"Communications Menu" on page 34 >	"Remote Enable Tab" on page 34
			"IP Parameters Tab" on page 35
		"BMS Timeout Tab" on page 35	
		"Modbus Parameters Tab" on page 36	
		"BACnet Parameters Tab" on page 36	
	"Remote Fault Board" on page 36		
"Service Menu" on page 37	"Humidifier Service Tab" on page 37		
	"General Service Tab" on page 37		
	"Fault/Service History Tab" on page 38		
	"Diagnostics Tab" on page 38 >	"Input Diagnostics:" on page 38	
		"Relay Diagnostics:" on page 38	
"Setpoint" on page 39			
"Administrator Menu" on page 39 >	"Password Setting Tab" on page 39		
	"Software Settings Tab" on page 40		

Fig. 8: Main Menu Structure

4.2.7 Configuration Menu

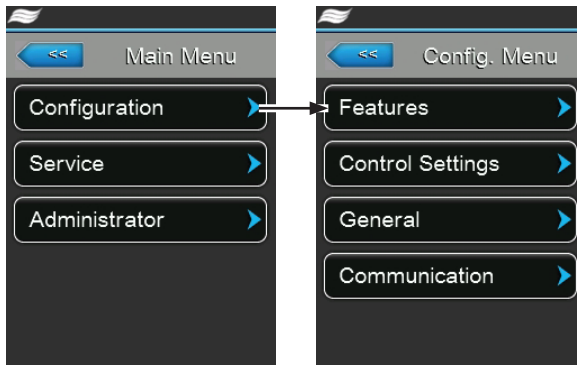


Fig. 9: Configuration Menu

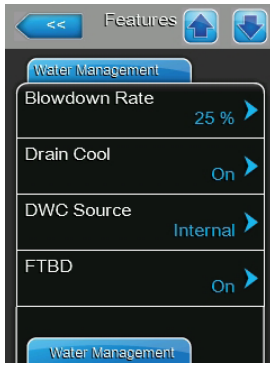
The Configuration menu lets you configure the operation of the Condair GS humidifier. The menu and sub-menu items are discussed below. Refer to [Fig. 8](#) for the menu structure.

4.2.7.1 Features Menu

Water Management Tab



- **Idle Mode:** allows you to set the idle function of the humidifier when it is in standby mode.
Options: **Idle Only** – the humidifier waits indefinitely for a demand signal.
Idle Drain – the tank is drained after "[Idle Drain Time](#)" elapses without demand.
Keep Warm – the water in the tank is kept warm while in standby mode.
Factory setting: **Idle Drain**
- **Idle Drain Time:** allows you to set the time duration the humidifier stays in standby mode without a demand, after which the humidifier carries out the function specified in "[Idle Mode](#)".
Setting range: **1-100 h**
Factory setting: **72 h**
- **Float Check:** allows you to enable or disable the float check function. When enabled, the humidifier performs a float check at startup and every 24 hours (without interrupting steam production if humidifier is operating, or in standby mode), to verify that the float system is working properly.
Options: **On** or **Off**
Factory setting: **On**
- **Float Check Time:** allows you to set the time of day when the float check function will occur.



- **Blowdown Rate:** allows you to set the rate (as a percentage of actual steam production) at which the tank is drained. Refer to [Section 6.4.1](#) for additional details.
 Setting range: **1-50%**
 Factory setting: **25%**

- **Drain Cool:** allows you to enable or disable the drain water cooling function that is used to cool down the drain water before it is discharged.
 Options: **On** – enable the function.
 Off – disable the function.
 Smart – drain water cooling happens only if the tank is hot.
 Factory setting: **On**

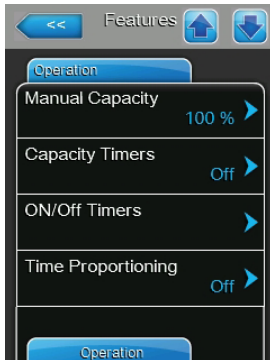
- **DWC Source:** allows you to select the water source used in drain water cooling (DWC).
 Options: **Internal** – use the fill valve in the unit to supply water for drain water cooling
 Separate – use an alternate source to cool the drain water (only for DWC setting)
 Factory setting: **Internal**

- **FTBD:** allows you to enable or disable the full tank blowdown (FTBD) function. Depending on the water quality, this function can be used to extend operational life and service intervals by reducing mineral build-up in the tank. When enabled, the FTBD function performs a full drain of the tank when the weighted runtime hours exceed the FTBD Interval. When blowdown is completed, the tank is refilled and the unit resumes normal operation.
 Options: **On or Off**
 Factory setting: **On**



- **FTBD Time:** allows you to set the time of day when a full tank blowdown will occur.
- **FTBD Interval:** allows you to set the frequency of full tank blowdowns in weighted hours (equivalent to a unit operating at 100% output). Refer to [Section 6.4.1](#) for additional details.
Setting range: **1-200 h**
Factory setting: **100 h**
- **Fill Correction 1:** allows you to set a correction factor for the high volume fill valve(s) to compensate for valve tolerances, as well as site-specific conditions.
CAUTION! Do not adjust this value unless instructed to do so by a Condaire representative.
Setting range: **0.1-2.0**
Factory setting: **1.0**
- **Fill Correction 2:** allows you to set a correction factor for the low volume fill valve(s) to compensate for valve tolerances, as well as site-specific conditions.
CAUTION! Do not adjust this value unless instructed to do so by a Condaire representative.
Setting range: **0.1-2.0**
Factory setting: **1.0**
- **Drain Correction:** allows you to set a correction factor for the drain pump to compensate for drain pump flow rates and site-specific conditions.
CAUTION! Do not adjust this value unless instructed to do so by a Condaire representative.
Setting range: **0.5-1.5**
Factory setting: **1.0**

Operation Tab



- **Manual Capacity:** allows you to set the capacity limitation value as a percentage of the maximum steam capacity of the unit.
Setting range: **20-100 %**
Factory setting: **100 %**
- **Capacity Timers:** allows you to activate/deactivate and configure the timer controlled capacity limitation.
- **On/Off Timers:** allows you to activate/deactivate and configure the On/Off timer function.
Note: A warning message is displayed whenever the humidifier is turned off via the On/Off timer.
- **Time Proportioning:** allows you to enable or disable the time proportioning function, which allows the controller to operate the burners on a time-proportional sequence when the system demand is below the minimum output of a single burner.
Options: **On or Off**
Factory setting: **Off**



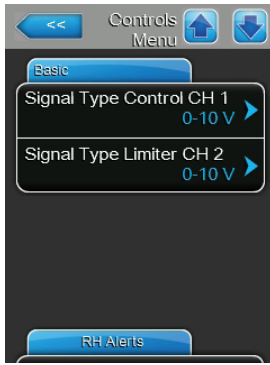
- **Short Cycle:** allows you to enable or disable a timer function that delays steam production until the already delivered humidity can stabilize in the conditioned environment. This feature prevents the humidifier from flooding the environment with excess humidity from false humidity readings.
Options: **On** – the humidifier remains in standby mode until the timer elapses even if there is a new demand signal.
 Off – disables the timer function.
Factory setting: **Off**
- **Short Cycle Time:** allows you to set the time duration that the unit waits in standby mode before responding to a new demand signal.
Setting range: **0-300 s**
Factory setting: **60 s**
- **Exhaust in Duct:** When set to ON, terminal 9 on the Low Voltage terminal strip is monitored at all times for a 24V input. This input behaves similarly to the security loop but is used for the On/Off controls required for the Exhaust in Duct feature. At any time, if the On/Off controls open and the 24V is lost on the terminal 9 input, a E153 Exhaust in Duct Fault is generated and humidification will stop immediately. A power cycle reset is required to clear the fault. In addition to setting this feature in the software, jumper "JP1" must to be moved to position 2-3.
Options: **On** (function enabled) *or* **Off** (function disabled, jumper "JP1" must be in position 1-2)
Factory setting: **Off**

4.2.7.2 Control Settings Menu

Basic Tab



- **Source:** allows you to select the source of incoming control/humidity signal to the humidifier.
Options: **Analog** – signals from analog sensors or humidistats connected to the humidifier's low voltage terminal block.
Modbus – signals from BMS via the Modbus communication protocol.
BACnet – signals from the BMS via the BACnet/IP or BACnet/MSTP communication protocol.
Factory setting: **Analog**
- **Control Channels:** select one or two control signals to control the humidifier.
Options: **Single** – single control signal.
Dual – two control signals (typically a control, plus a limiter signal).
Factory setting: **Single**
- **Control Mode CH 1:** select the general control mode for the incoming control signal.
Options: **Demand** – signal from an external controller.
RH P – uses the internal (proportional) controller to interpret the sensed humidity into a demand.
RH PI – uses the internal (proportional-integral) controller to interpret the sensed humidity into a demand.
On/Off – control signal is from an external On/Off humidistat.
Factory setting: **Demand**
- **Limiter Mode CH2:** only appears when "Control Channels" is set to "Dual". Allows you to set the limiter signal type.
Options: **Demand** – signal from an external controller.
RH P – uses the internal (proportional) controller to interpret the sensed humidity into a demand.
RH PI – uses the internal (proportional-integral) controller to interpret the sensed humidity into a demand.
On/Off – control signal is from an external On/Off humidistat.
Factory setting: **Demand**



- **Signal Type Channel 1:** select the signal type of the incoming control signal.
 Note: This setting is ignored if signal Source is not set to "Analog".
 Options: **0-5V, 1-5V, 0-10V, 2-10V, 0-20V, 0-16V, 3.2-16V, 0-20mA, 4-20mA**
 Factory setting: **0-10V**
- **Signal Type Channel 2:** select the signal type for the high limit signal.
 Note: This setting is ignored if signal Source is not set to "Analog". Channel 2 applies only when Control Channels is set to "Dual".
 Options: **0-5V, 1-5V, 0-10V, 2-10V, 0-20V, 0-16V, 3.2-16V, 0-20mA, 4-20mA**
 Factory setting: **0-10V**

PI Control Parameters Tab

Note: This tab appears only if "[Control Mode CH 1](#)" and/or "[Limiter Mode CH2](#)" is set to "RH P" or "RH PI".



- **Setpoint Channel 1:** allows you to set the humidifier to operate at a fixed humidity setpoint value.
 Setting range: **0-95% RH**
 Factory setting: **40%**
- **Band Channel 1:** allows you to set the proportional range for the internal P/PI humidity controller as a percentage of relative humidity (% RH) within which the humidifier will modulate between 0 and 100% output.
CAUTION! Do not adjust this value unless instructed to do so by a Condair representative.
 Setting range: **6-65%**
 Factory setting: **15%**
- **ITime Channel 1:** allows you to set the integral time for error corrections by the internal PI controller.
CAUTION! Do not adjust this value unless instructed to do so by a Condair representative.
 Setting range: **1-60 minutes**
 Factory setting: **5 minutes**
- **Setpoint Channel 2:** allows you to set the high limiter setpoint value.
 Note: This setting appears only if "[Control Channels](#)" is set to "Dual".
 Setting range: **0-95% RH**
 Factory setting: **80%**



- **Band Channel 2:** allows you to set the proportional range for the internal P/PI limiter controller as a percentage of relative humidity (% RH) within which the humidifier will modulate between 0 and 100% output.
Note: Band channel 2 setting appears only if "[Control Channels](#)" is set to "Dual".

CAUTION! Do not adjust this value unless instructed to do so by a Condair representative.

Setting range: **6-65%**

Factory setting: **15%**

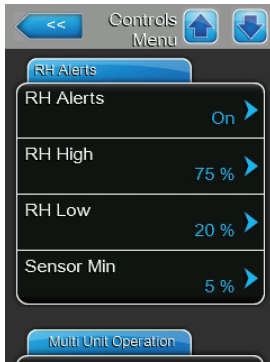
- **Damp Channel 2:** allows you to set the time duration after which the limiter setpoint value takes control of the demand signal.

Note: This setting appears only if "[Control Channels](#)" is set to "Dual".

Setting range: **1-60 s**

Factory setting: **5 s**

RH Alerts Tab



- **RH Alerts:** allows you to enable or disable the alert function that warns if sensed humidity is too high or too low.

Options: **On** – enables the function.

Off – disables the function.

Factory setting: **On**

Note: The following settings are only available if the RH Alerts function is enabled.

- **RH High:** allows you to set the upper limit value of the humidity sensor signal. The RH High warning message is triggered when the signal value exceeds this limit.

Setting range: **20-95%**

Factory setting: **75%**

- **RH Low:** allows you to set the lower limit value of the humidity sensor signal. The RH Low warning message is triggered when the signal value drops below this limit.

Setting range: **20-95%**

Factory setting: **20%**

- **Sensor Min:** allows you to set the minimum signal value of the humidity sensor. If the signal value drops below this setting, the sensor is assumed to be damaged or disconnected. The RH Signal warning message is triggered when the signal value drops below this limit, and humidification stops.

Setting range: **1-10%**

Factory setting: **5%**

Multi-Unit Operation Tab

Refer to [Section 4.3.2](#) for setup procedure



- **Linkup:** allows you to enable or disable the Linkup function, which allows up to six humidifier to connect and operate together from a single set of control signals. It also allows you to designate the humidifier to operate as a "Main" or "Extension" unit.

Options:

Main – designated as the main (master) unit.

Ext 1 – designated as the first extension unit.

Ext 2 – designated as the second extension unit.

Ext 3 – designated as the third extension unit.

Ext 4 – designated as the fourth extension unit.

Ext 5 – designated as the fifth extension unit.

Off – disables Linkup. The humidifier performs as a single unit.

Factory setting: **Off**

Note: The remaining settings in this tab are only available on the main unit when the Linkup function is enabled.

- **Linkup Units:** allows you to set the number of humidifiers in the Linkup chain.

Setting range: **1-6**

Factory setting: **1**

- **Linkup Type:** allows you to select the mode of operation of the humidifier in the Linkup chain.

Options:

Parallel – the humidity demand (from a single zone) is distributed evenly on all humidifiers in the Linkup chain.

Series – the main unit operates to its maximum capacity, and as demand increases the extension units generate steam in sequential order. Each unit scales steam production in small increments. Series setting maximizes turndown.

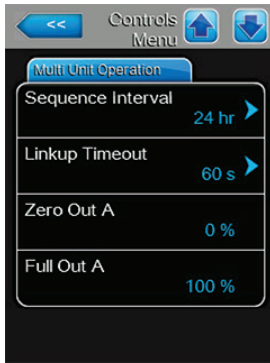
Factory setting: **Series**

- **Sequence Rotation:** allows you to enable or disable the function that manages the starting order to balance operating hours of all linked humidifiers.

Note: This setting is available only if "[Linkup Type](#)" is set to "Series".

Options: **On** or **Off**

Factory setting: **On**



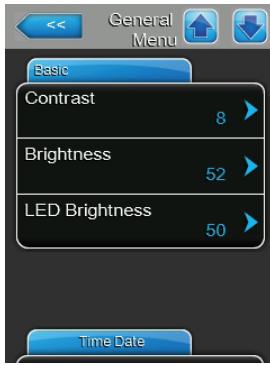
- **Sequence Interval:** allows you to set the time interval used by the control software to establish a new operating sequence to balance operating hours of linked humidifiers.
Note: This setting is available only if Sequence Rotation is enabled.
Setting range: **24-1000 h**
Factory setting: **24 h**
- **Linkup Timeout:** allows you to set the maximum time limit that the units in the Linkup chain can operate without communication to each other before a timeout warning message is generated.
Setting range: **60-120 s**
Factory setting: **60 s**
- **Zero Out:** shows the percentage value of the system demand signal at which the unit is switched on.
Setting range: **0-100%**
Factory setting: **0%**
Note: This setting can only be modified if more than one unit is physically connected to the Linkup chain.
- **Full Out:** shows the percentage value of the system demand signal at which the unit achieves 100% demand.
Setting range: **0-100%**
Factory setting: **100%**
Note: This setting can only be modified if more than one unit is physically connected to the Linkup chain.

4.2.7.3 General Menu

Basic Tab



- **Date:** allows you to set the current date in "MM/DD/YYYY" or "DD/MM/YYYY" format depending on the ["Date Format"](#) setting.
Factory setting: **00/00/0000**
- **Time:** allows you to set the current time in "12-hour" or "24-hour" format depending on the ["Clock Format"](#) setting.
Factory setting: **0.00**
- **Language:** allows you to select the language displayed on the touchscreen display.
Options: **English, German, French, Italian, Spanish, Dutch, Danish, Finnish, Swedish, Polish, Czech, Hungarian, Russian, Japanese or Chinese**
Factory setting: **depending on the country**
- **Units:** allows you to select the units of measurement.
Options: **Imperial or Metric**
Factory setting: **Metric**



- **Contrast:** allows you to set the contrast level of the touchscreen display.
Setting range: **1** (low) - **31** (high)
Factory setting: **8**
- **Brightness:** allows you to set the brightness level of the touchscreen display.
Setting range: **1** (black) - **100** (white)
Factory setting: **52**
- **LED Brightness:** allows you to adjust the brightness of the LEDs.
Setting range: **1-100**
Factory setting: **50**

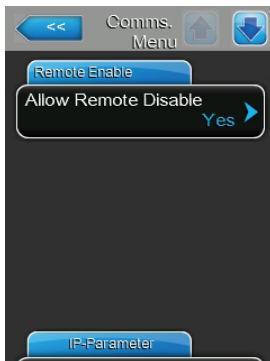
Time Date Tab



- **Date Format:** allows you to select the date format.
Options: **MM/DD/YY** or **DD/MM/YY**
Factory setting: **MM/DD/YY**
- **Clock Format:** allows you to select the time format.
Options: **12 hour** or **24 hour**
Factory setting: **24 hour**

4.2.7.4 Communications Menu

Remote Enable Tab



- **Allow Remote Disable:** allows you select whether steam production by the humidifier can be remotely disabled via the BMS.
Options: **Yes** – remote disable permitted.
No – remote disable not permitted.
Factory setting: **Yes**

IP Parameters Tab

The following settings are used only for communications via the integrated BACnet IP protocol and web pages.



- **IP Type:** allows you to select how the IP Address, Subnet Mask, Standard Gateway as well as Primary and Secondary DNS are assigned.

Options:

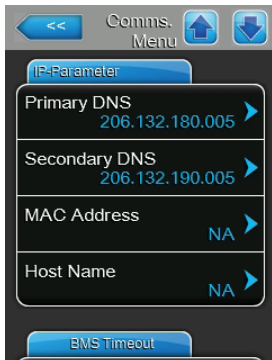
DHCP – IP Address, Subnet Mask, Standard Gateway as well as Primary and Secondary DNS address are dynamically assigned via a DHCP server.

Note: after 5 unsuccessful attempts at obtaining an address with DHCP the system will revert to fixed assignment.

Fixed – manually configure the network address and settings.

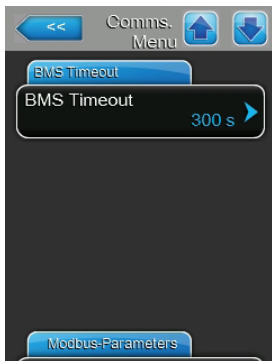
Factory setting: **DHCP**

- **IP Address:** allows you to manually set the IP address of the Condair GS. Note: the IP address must be set only if "**IP Type**" is set to "Fixed".
- **Subnet Mask:** allows you to manually set the IP subnet mask for the IP network. Note: the subnet mask must be set only if "**IP Type**" is set to "Fixed".
- **Default Gateway:** allows you to manually set the default gateway for the IP network. Note: the default gateway must be set only if "**IP Type**" is set to "Fixed".



- **Primary DNS:** allows you to manually set the primary DNS (domain name server) for the IP address. Note: the primary DNS must be set only if "**IP Type**" is set to "Fixed".
- **Secondary DNS:** allows you to manually set the secondary DNS (domain name server) for the IP address. Note: the secondary DNS must be set only if "**IP Type**" is set to "Fixed".
- **MAC Address:** displays the factory set MAC (media access control) address for the Condair GS humidifier. **Not modifiable.**
- **Host Name:** displays the host name of the Condair GS humidifier generated by the control. Format: "IC_"+"Serial number of Condair DL". **Not modifiable.**

BMS Timeout Tab

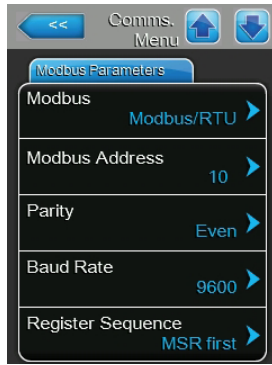


- **BMS Timeout:** allows you to set the maximum time the humidifier will wait without any communications from the BMS network before a timeout warning is generated.

Setting range: **1-300 s**

Factory setting: **300 s**

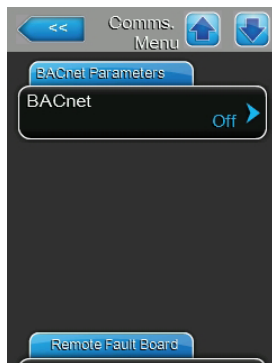
Modbus Parameters Tab



- **Modbus:** allows you to enable "**Modbus/RTU**" or "**Modbus/TCP**" communication via a Modbus network or disable ("**Off**") Modbus communication.
Options: **Off, Modbus/RTU** or **Modbus/TCP**
Factory setting: **Modbus/RTU**

Important: regarding the setting of the individual Modbus parameters as well as the wiring of the Condair GS for the Modbus communication, please observe the instructions in the separate Modbus addendum manual. This manual can be requested from your Condair representative.

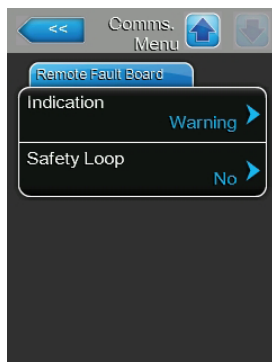
BACnet Parameters Tab



- **BACnet:** allows you to enable "**BACnet MSTP**" or "**BACnet/IP**" communication via the integrated BACnet interfaces of the Condair GS or disable ("**Off**") BACnet communication.
Factory setting: **Off**
Options: **Off** (BACnet interface disabled)
MSTP (BACnet MSTP via RS 485 interface enabled)
BACnet/IP (BACnet/IP via RJ45 interface enabled)

Important: regarding the setting of the individual BACnet parameters as well as the wiring of the Condair GS for the BACnet IP or BACnet MS/TP communication, please observe the instructions in the separate BACnet addendum manual. This manual can be requested from your Condair representative.

Remote Fault Board



- **Indication:** allows you to determine how system warnings are issued via the "Service" relay on the remote fault board. If "Warning" is selected the remote fault board will activate the service relay on any system warning, including system notifications prior to completing automated corrective actions (e.g. fill timeout). If "Service" is selected, the remote fault board will activate the service relay only for service warnings.
Options: **Warning** or **Service**
Factory setting: **Warning**
- **Safety Loop:** allows you to select whether the remote fault board will activate the service relay upon the security loop opens ("Yes") or not ("No").
Options: **Yes** or **No**
Factory setting: **No**

4.2.7.5 Service Menu

The Service menu lets you enter the startup code, reset the service reminder after performing scheduled maintenance, access the fault and maintenance history lists and perform diagnostics.

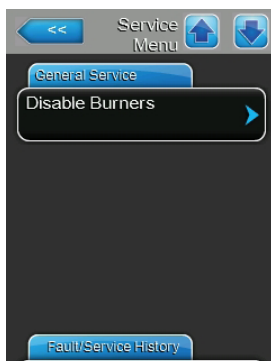
Note: the Service menu can also be accessed from the maintenance and fault status area on the Home screen – refer to [Fig. 6 on page 18](#).

Humidifier Service Tab



- **Drain Tank:** allows you to drain the tank. After pressing this button a warning message is displayed asking you to confirm if you want to proceed with draining the tank. Refer to [Section 5.3.6](#) for detailed instructions.
- **Clean Tank:** allows you to flush the tank in preparation for maintenance. After pressing this button a warning message is displayed asking you to confirm if you want to proceed.
- **Service Interval:** allows you to set the time interval between scheduled maintenance on the unit.
Setting range: **0-3999 h**
Factory setting: **500 h**
- **Reset Service Reminder:** allows you to reset the service reminder message after performing scheduled maintenance on the unit. A warning message is displayed asking you to confirm the reset.
CAUTION! DO NOT reset the service reminder unless the scheduled maintenance has been performed.

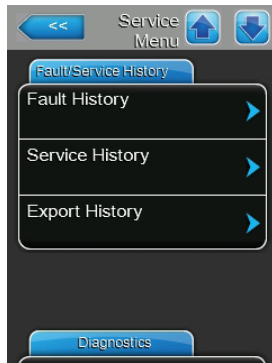
General Service Tab



- **Disable Burners:** allows you to access the "Burners" tab (not shown) where you can enable or disable the individual burners.
 - **Burner "n":** allows you to enable or disable an individual burner; where "n" represents the burner number (1 to 4, depending on the number of blowers in the unit).
Options: **On** or **Off**
Factory setting: **On**

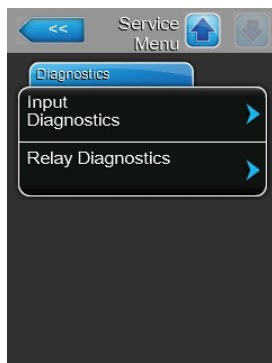
Fault/Service History Tab

Note: Make sure that Date and Time are set correctly so that fault and maintenance history events can be correctly analyzed.



- **Fault History:** allows you to view the fault history list.
- **Service History:** allows you to view the service history list.
- **Export History:** allows you to export the fault and service history to a USB device.

Diagnostics Tab



Input Diagnostics:

Allows you to access the "Input Diagnostics" menu and view the following tabs which show the current status of all inputs to the integrated controller, as well as calculated parameters.

Controls Tab

- Channel 1/2 (current RH or Demand value of control channel 1 or 2)
- FTBD (current status of the full tank blow down function)
- Safety Loop (current status of the safety loop)
- Exhaust in Duct (current status of the exhaust overtemperature switch)

System Tab

- Over Temp (current status of the tank overtemperature switch)
- Tank Temp (current water temperature in the tank)
- Float Low (current status of the level control unit low level switch)
- Float Mid (current status of the level control unit mid level switch)
- Float High (current status of the level control unit high level switch)
- A/P 1-4
- G/V 1-4

Blowers Tab

- Blower 1-4 rpm (current rpm of the corresponding blower)

Counters Tab

- Primary Valve 1 and 2 Count
- Secondary Valve 1 and 2 Count
- Pulse Time On 1 and 2

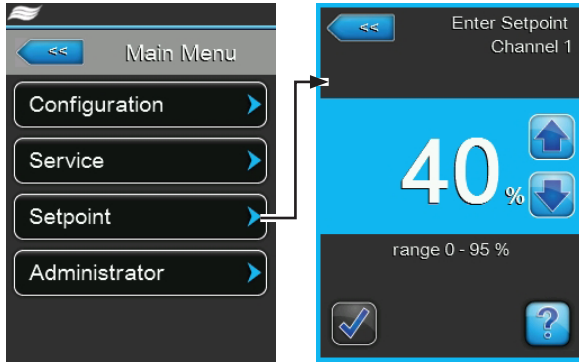
Relay Diagnostics:

Allows you to access the "Relay Diagnostics" menu and view the current status of the relays on the fault remote board.

Remote Fault Board tab

- Running (current status of the relay "Running")
- Service (current status of the relay "Service")
- Fault (current status of the relay "Fault")

4.2.7.6 Setpoint

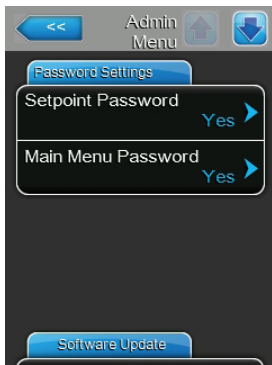


If the ["Control Mode CH 1"](#) is set to "RH P" or "RH PI" the menu item "Setpoint" is shown in the Main Menu additionally. After pressing this button the setpoint entry window appears where you can set the desired humidity setpoint (CH1) that the humidifier must try to maintain.

4.2.7.7 Administrator Menu

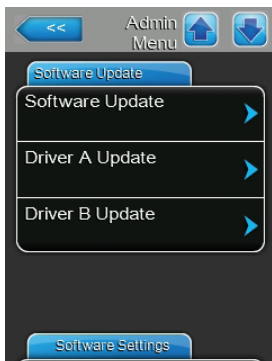
The Administrator menu lets you enable and disable password control, or install updates for the control software.

Password Setting Tab



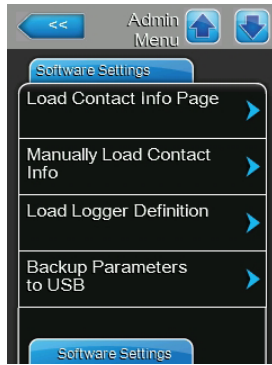
- **Setpoint Password:** allows you to enable or disable password control to modify setpoint values when the humidifier is configured to operate on internal RH(P) or RH(PI) control.
Options: **Yes** – requires password to modify setpoint values.
No – requires no password to modify setpoint values.
Factory setting: **Yes**
- **Main Menu Password:** allows you to enable or disable password control to access the Main menu.
Options: **Yes** – requires password to access the Main menu.
No – requires no password to access the Main menu.
Factory setting: **Yes**

Software Updates Tab



- **Software Update:** allows you to update the control software. A warning message is displayed asking you to confirm the software updating. Refer to [Section 6.5.9](#) for detailed instructions.
- **Driver A/B Update:** allows you to update the driver board firmware for driver board steam cylinder A/B

Software Settings Tab



- **Load Contact Info Page:** allows you to load contact information (for technical support) in the unit, from a USB memory stick. The contact information includes Company Name, Address, Telephone Number, E-mail, and Website and is shown when selecting **<Help>** on the Home Screen. Please contact your Condair representative for assistance with this.
- **Manually Load Contact Info:** allows you to manually enter the Company Name, Address, Telephone Number, E-mail, and Website, that will appear when selecting **<Help>** on the Home Screen.
- **Load Logger Definition:** allows you to load a logger definition file from a USB drive to save data (CSV file) on the USB while the unit is functioning. A factory supplied access file is required to enable operation. The interval between recordings can be changed from the Engineering menu. Please contact your Condair representative for assistance with this.
- **Backup Parameters to USB:** allows you to save the current value of all persistent parameters from a certain Condair GS integrated controller to USB (XML file).
- **Restore Parameters from USB:** loads the persistent parameters (XML file) from USB to a Condair GS integrated controller.
- **Restore Factory Defaults:** Resets the GS software settings to factory defaults.



4.3 Software Configuration

The Condair GS humidifier is shipped fully configured from the factory to suit your site-specific requirements, but this can be modified as needed. This section provides the necessary instructions to reconfigure the control software.

4.3.1 Configuring the Control Software

Perform the basic setup of the Condair GS control software as follows, if necessary:

1. Make sure that all control wiring and jumpers are installed as described in "External Connections" in the Installation Manual.
2. Set up the following parameters:

- ["Source"](#) – select the type of control signals to the humidifier ("Analog", "Modbus", "BACnet/IP", etc.).

Select "Analog" if a sensor/transducer signal or a demand signal from an external P/PI (proportional)/(proportional-integral) controller is wired directly to the humidifier. Otherwise, select an applicable digital communication protocol from the list. If your humidifier has the optional Lonworks or BACnet (BTL) module installed, select "Modbus".

- ["Control Channels"](#) – select the number of control channels.

Select "Dual" if the humidifier is controlled with a control signal and a limiter signal; otherwise set to "Single".

- Control Mode – select the general control mode for the incoming humidity control signal (["Control Mode CH 1"](#)) and limiter signal (["Limiter Mode CH2"](#)).

Select "Demand" if the control signal is a demand signal from an external controller. Select "RH P" or "RH PI", as appropriate, if the control signal is from a sensor/transducer. Or select "On/Off" if the control signal is from an external On/Off humidistat.

- Signal Type – select the signal type of the incoming humidity control signal (["Signal Type Channel 1"](#)) and limiter signal (["Signal Type Channel 2"](#)) if ["Control Mode CH 1"](#) and ["Limiter Mode CH2"](#) is set to "Demand", "RH P" or "RH PI", and ["Source"](#) is set to "Analog".

Select from "0-5V", "1-5V", "0-10V", "2-10V", "0-20V", "0-16V", "3.2-16V", "0-20mA", or "4-20mA", as appropriate for the external control device connected to Channel 1 and Channel 2.

This concludes the basic setup of the control software.

4.3.2 Configuring for Multi-Unit Operation

Set up the control software for multi-unit operation as described below. A maximum of six humidifiers can be set up in a "Main-Extension" configuration using Condair's Linkup system to satisfy large humidification needs.

IMPORTANT! This procedure should only be used to control multiple humidifiers that are using the same control signal inputs from the same conditioned environment.

1. Make sure that all wiring and jumpers are installed, as described in "Connecting Multiple Units Using Linkup" in the Installation Manual.
2. Configure the main humidifier as described in [Multi-Unit Operation Tab on page 32](#).
3. Set "[Linkup](#)" to "Main" on the humidifier that will be designated as Main in the Linkup chain, and set up the following parameters on it:
 - "[Linkup Units](#)" – select the total number of humidifiers in the Linkup chain. For example, if there is one main unit and two extension units, then the total number of humidifier in the chain is 3.
 - "[Linkup Type](#)" – select the mode of operation of the humidifiers in the Linkup chain ("Series" or "Parallel").
 - "[Sequence Rotation](#)" – enable or disable the function that manages the starting order to balance the operating hours on each steam cylinder.
Note: This setting is available only if "[Linkup Type](#)" is set to "Series".
 - "[Sequence Interval](#)" – set the time interval used by the control software to establish a new operating sequence to balance the operating hours on the steam cylinders in the Linkup chain.
 - "[Linkup Timeout](#)" – if required, change the maximum time limit that the units in the Linkup chain can operate without a connection to each other before they generate a Linkup Timeout warning message.
 - "[Zero Out](#)" – if required, set the percentage value of the system demand signal at which the unit is switched on.
 - "[Full Out](#)" – if required, set the percentage value of the system demand signal at which the unit achieves 100% demand.
4. Set "[Linkup](#)" in each extension humidifier as Ext1, Ext2, ...
Note: Each extension unit must be a unique extension number.

The humidifiers in the Linkup chain are now set up to generate steam upon humidity demand.

5 Operation

5.1 General

The Condair GS humidifier must only be operated by personnel who is adequately qualified, well trained and are authorized by the customer.

Observe all safety precautions described in [Section 2](#).

5.2 Initial Commissioning

The humidifier must always be commissioned for the first time by a service technician from your local Condair representative, by a Condair employee, or by personnel who are well trained and authorized by the customer. It is the customer's responsibility to verify the qualifications of personnel.

During the initial commissioning, the following steps are carried out in the order shown. This is to check whether the humidification system was installed according to the information in the installation manual:

1. Verify the site requirements have been satisfied.
2. Inspect the humidifier mounting.
3. Inspect the gas supply installation.
4. Inspect the electrical installations, and check for correct voltage.
5. Inspect the water and drain installations.
6. Inspect the steam and condensate line installations.
7. Inspect the combustion air installation.
8. Inspect the exhaust vent installation.
9. Flush the water supply and drain lines.
10. Configure the controls and the GS humidifier.
11. Conduct performance tests, including control and monitoring devices.
12. Fill out the commissioning protocol documents.

5.3 Operating Procedures

5.3.1 Filling the water tank of the humidifier

Fill the Condair GS humidifier as follows:

Note: When the tank is filling the control software performs the level control unit test to ensure that the fill system, the level control unit and the drain pump(s) are functioning properly.

1. Close the manual gas shutoff valve in the gas supply line.
2. Open the shutoff valve in the water supply line.
3. Set the On/Off button on the humidifier to the "On" position.

The control software then energizes the dual fill valve(s) and starts to fill the tank. When the water in the level control unit reaches the L1 level (red LED), the control software runs a series of tests on the fill and drain system as described in section [Water Management on page 14](#). On successful completion of the tests, the water tank is filled to the L3 level (green LED), and the humidifier goes into standby mode. This process can take approximately 10-30 minutes depending on the size of the unit.

4. Set the On/Off button on the humidifier to the "Off" position, and perform the safety shutoff test described below.

5.3.2 Ignition Safety Shutoff Test

Perform the ignition safety shutoff test as described below:

1. Check that the manual gas shutoff valve in the supply line is still closed.
2. Make sure that the contacts of all devices connected to the external security loop are closed.
3. Set the On/Off button to the "On" position. The control software runs a series of tests on the fill and drain system. On successful completion of the tests the humidifier goes into standby mode.
4. Set the demand signal to the humidifier from the building management system (BMS) or humidistat to 100%.

The control software energizes the blower(s) to initiate the combustion sequence. The blower(s) run(s) at full capacity to purge the system. The control software then verifies the proper functioning of the safety systems and the blowers as described in section [Combustion on page 13](#).

After the safety systems check is completed successfully, the ignition control module(s) is/are energized. The spark-igniter(s) attempt(s) to fire up three times to ignite the gas-air mixture. Since the gas supply is shut off, no flame is detected by the flame sensor(s) and the gas valve(s) is/are de-energized. The red LED in the ignition control module(s) flash(es) to indicate a safety lockout. The warning message "Ignition Fail" also appears on the touchscreen display after a short delay.

Note: On units with multiple burners, each burner attempts to ignite in sequence. Hence, it is important to wait for all burners to complete its cycle.

The ignition safety shutoff test is successful if no ignition has taken place when the manual gas shutoff valve is closed.

After all burners have failed to ignite, the fault message "No Burners Available" will appear on the display. The blowers will perform a post-purge and then shut off.

5. Power cycle the humidifier to reset the fault condition.
6. Open the manual gas shutoff valve.

5.3.3 Starting the Humidifier

Start the humidifier as follows:

Note: This procedure applies also for starting the humidifier after maintenance or at the start of the season.

1. Examine the humidifier and other system components for damage. Do not use the appliance if any part of the humidifier has been under water. Call a qualified service technician to inspect and replace any part of the control system or gas control that has been under water.
2. Check for loose or damaged electrical connections, and repair if necessary.
3. If applicable, make sure that the humidifier and its components have not shifted from their mountings, and are fastened securely.
4. Make sure that all condensate traps in the exhaust and steam lines are filled with water. On the CS models, make sure that the condensate trap inside the unit is filled with water.
5. Clean any build-up of dirt around the control cabinet, the area around the burner(s). Clean the area around the air intake inlet to prevent contaminants from being drawn into the combustion chamber.
6. Clean the air intake terminal, if the humidifier is connected to the exterior.
7. Check that the contacts of all safety monitoring devices connected to the external security loop are closed.
8. Make sure that all access panels on the humidifier are installed and fastened securely.
9. Remove the lock and tag from the external electrical isolator, and restore power to the humidifier.
10. Open the water and gas supply to the unit.
11. Make sure that the tank in the humidifier is filled with water – refer to [Section 5.3.1](#).
12. Make sure that the ignition safety shutdown test is completed – refer to [Section 5.3.2](#).
13. Set the On/Off button on the humidifier to the "On" position.

The control software then energizes the dual fill valve(s) to fill the tank. It then performs a series of tests to verify the function of the level control unit, the dual fill valve(s) and the drain pump – refer to [Water Management on page 14](#). Upon successful completion of the tests, the combustion sequence starts – refer to [Combustion on page 13](#)

Depending on the system demand, the blower(s) run(s) faster or slower to control the input of the burner(s). The generated heat turns the water in the tank to steam, which is then delivered to the distribution system.

As the water level in the tank is reduced due to evaporation, the dual fill valve pulses to maintain water at the correct operating level. In the CS model only, cold fill water passes through the secondary heat-exchanger. Here, heat from the exhaust warms up the cold fill water entering the tank.

When the humidity demand has been satisfied (demand drops below the minimum %), the gas valve(s) is/are de-energized. The blower(s) then perform(s) a post-purge of the combustion chamber(s), and then shut(s) off. Then, the humidifier goes into standby mode to await the next humidity demand signal.

5.3.4 Remote Monitoring

The Condair GS humidifier can be monitored remotely through the remote fault board wired to a remote monitoring system. [Table 6](#) describes the function of each relay.

Table 6: Remote Relay Function

Remote Relay	Description
Error	This relay energizes if the humidifier is stopped due to a fault condition, or may be operable only for a limited period of time.
Service/Warning	Depending on the software configuration, this relay energizes if a service warning or a system warning/notification is active.
Running	This relay energizes if the Condair GS generates steam.
Unit On	This relay energizes if the humidifier has power, and the On/Off switch is in the "On" position.

The Condair GS humidifier can also be monitored remotely from a laptop or desktop computer using the Ethernet port on the integrated control board. Contact your Condair representative for assistance.

5.3.5 Inspections During Operation

Perform regular inspection of the Condair GS humidifier and the humidification system when it is in operation. Inspect the following:

- Check the gas supply line for any leaks.
- Check the water, drain and steam lines for any leakages.
- If applicable, check the humidifier and other system components have not shifted from their mountings, and are fastened securely.
- Check the exhaust vent for any leaks. Check that there are no obstructions anywhere in the exhaust vent, including the exhaust terminal.
- Keep the area around the combustion air intake in the unit clear of all obstructions. If an combustion air intake vent is used, check that there are no obstructions anywhere in the combustion air vent, including the intake terminal.
- Check the area around the unit is clear of all insulating and combustible materials.
- Visually check the electrical wiring for any damage.
- Check the Home screen on the humidifier for any service or system warning messages.

If any irregularities (leakages, fault messages or damaged components) are found, shut down the Condair GS humidifier before carrying out any work – refer to [Section 5.3.8](#). Contact your Condair representative if assistance is required.

5.3.6 Manually Initiate Tank Draining

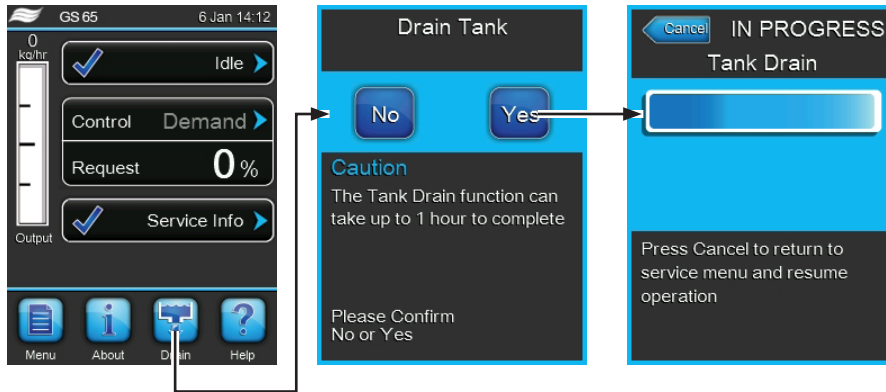



Fig. 10: Manual Draining

During periods of inactivity (e.g. off-season), drain the water from the tank. To drain the tank in the Con-dair GS humidifier, manually initiate draining as follows. Refer to [Fig. 10](#).

1. Press **<Drain>** button on the Home screen.
2. On Linkup units select the appropriate tank to be drained, then press the check mark.
3. Press **<Yes>** button on the confirmation screen. If humidification is in progress, it is interrupted and the drain pump(s) empty/empties the tank. A progress bar shows the status of the drain cycle.

Press **<Cancel>** button at any time to interrupt the drain cycle. If the drain cycle is interrupted before it is completed, open the manual drain valve and verify that there is still water in the tank. Close the manual drain valve, then press the **<No>** button on the next screen to confirm that the tank has not been emptied fully.

 **WARNING!**
Risk of severe burns from contact with hot surfaces, steam or hot water!

The tank may contain steam or hot water. Contact with the hot surfaces, steam vapors or hot water can result in severe burns.

Prevention: Never open the tank until it has been fully drained, and the unit has cooled down to a safe temperature. If the control software/drain valve(s) does not function properly, wait for the unit to cool down, before you open the manual drain valve to empty the tank. Never use the manual drain valve until the unit has cooled down. Failure to do so may damage drain lines that are not rated to handle hot water at up to 100 °C. Close the drain valve after emptying the tank.

Use the manual drain valve to verify that the tank is empty before removing the tank cover. Close the drain valve after emptying the tank.

Note: If necessary, set the On/Off switch to the "Off" position at the end of the drain cycle to prevent the humidifier from filling the tank again.

5.3.7 Full Tank Blowdown

The control software in the Condair GS humidifier performs a full tank blowdown in regular intervals to reduce the amount of dissolved minerals accumulated inside the tank. The "Drain Cool" function in the control software permits drain water cooling whenever the drain pump runs. Make sure that the function is enabled if drain cooling is required. The frequency of the blowdown can be set in the control software.

In addition to the software-controlled full tank blowdown, a separate 24 VAC signal connected to pins "1" and "8" on the low voltage terminal strip can also initiate a full tank blowdown. When a full tank blowdown is initiated, the tank is drained fully then refilled. Make sure the "Drain Cool" function is enabled if drain cooling is required.

5.3.8 Shutting Down



DANGER!
Risk of electric shock!

The control cabinet in the Condair GS humidifier has live voltage. Turning off the unit at the On/Off switch does not shut off power to the control cabinet, which is still live. Touching live parts may cause severe injury or even death.

Prevention: Before performing any work inside the humidifier or with the humidification system, shut down the humidifier properly as described below.

Shut down the Condair GS humidifier as follows (e.g. for maintenance, or at the end of the season):

1. Set the demand signal to the humidifier from the BMS or the humidistat at 0%. Then allow the burner(s) to shut off and the blower(s) to perform a post-purge of the combustion chamber(s).
2. Manually initiate draining of the tank. Refer to [Section 5.3.6](#).

Note: If the control software/drain valve(s) do not function properly, wait for the unit to cool down before using the manual drain valve to empty the tank. Failure to do so may damage drain lines that are not rated to handle water at up to 100 °C. Close the drain valve after emptying the tank.

3. Make a note of any fault code displayed on the Home screen.

Note: At the end of the season, report the fault and service history to a Condair-certified technician. Select: "*Service > Fault/Service History tab*" to access the fault and service history.

4. Set the On/Off button to the "Off" position.
5. Close the manual gas shutoff valve in the gas supply line.
6. Close the shutoff valve in the water supply line.
7. Disconnect the power supply to the humidifier at the external electrical isolator. To prevent accidental power-up, lockout and tag out according to the established safety practices at your facility.
8. Wait for the unit to cool down to a safe temperature before performing any work inside the plumbing cabinet.

6 Maintenance

6.1 General

To ensure proper performance and long operating life of the Condair GS humidifier, Condair recommends inspection of the appliance and installation at least once a year by a qualified service person. The amount and type of maintenance required is generally dependent on how much the humidifier operates. The Condair GS humidifier monitors the amount of steam produced over time and will indicate when service is required. All units come with a default service interval of 1000 hours, which can be adjusted in the control software.

The combustion air blower motors are permanently lubricated and do not require lubrication.

The gas valves in the Condair GS humidifier are negative-pressure-regulated valves. The valves are factory-set for the correct gas type. The valve setting listed on the product rating plate is shown relative to atmosphere – this setting will always remain constant. Contact the factory if adjustment is needed.

IMPORTANT! Tampering with the gas valve, without the express written consent of Condair, will void the warranty.

In general, the burners do not require adjustment or servicing. The combustion chamber and heat-exchanger tubes are all fabricated from stainless steel, and do not require internal cleaning.

The exhaust vent connected to the Condair GS humidifier does not require cleaning, but needs to be inspected regularly for leaks, blockages, sagging and proper condensate removal.

For proper and safe operation of the unit, the area around the combustion air intake of the unit must be kept clear of all obstructions. If an combustion air intake vent is used, it must be inspected for leaks and obstructions (including the intake terminal).

Refer to [Section 6.2](#) for other maintenance requirements. Also perform regular inspections when the unit is operating according to [Section 5.3.5](#).



CAUTION!

Damage caused by use of non-approved parts by Condair is not covered by warranty. Use only original Condair replacement parts

Personnel Qualifications

Maintenance on the Condair GS humidifier must only be performed by well qualified and properly trained personnel authorized by the customer. It is the customer's responsibility to verify qualifications of the personnel.

Safety

Make sure that the Condair GS humidifier is shut down properly as described in [Section 5.3.8](#), and observe all safety precautions described in [Section 2](#) before performing any maintenance on the humidifier.

6.2 Mandatory Maintenance Schedule

[Table 7](#) lists the mandatory maintenance schedule for the Condair GS humidifier.

Table 7: Mandatory Maintenance Schedule

Task	30 Days after Initial Start-up	Mid-season	End of Season (2000 h)	Maintenance
Inspect drainage.	X	X	X	Perform a visual check of the drainage system, including the air gap funnel and drainage into the building drain. Initiate a manual drain (refer to Section 5.3.6), and visually check that water flows freely through the drain.
Perform water analysis.	–	X	X	Perform a water analysis on a semi-annual basis to ensure optimal performance. Refer to Section 6.4 .
Inspect tank, primary heat-exchanger coils and drain fitting for scale build-up.	X	X	X	Adjust Blowdown Rate on page 22 and FTBD Interval on page 23 , as necessary, to reduce scale build-up.
				Inspect the inside of the tank, and make sure that scale build-up does not exceed 50 mm. De-scale as required. Refer to Section 6.5.4 .
Inspect secondary heat-exchanger (CS model only) for blockage.	–	X	X	Inspect water flow through the secondary heat-exchanger and make sure there is no blockage. Clean, if necessary – refer to Section 6.5.3 .
				Inspect the condensate trap connected to the secondary heat-exchanger for blockage. Flush and fill the condensate trap with water, if necessary – refer to Section 6.5.3 .
Inspect sacrificial anode in the tank.	–	–	X	Inspect the anode for severe corrosion or scale build-up. Scrape off excess scale – refer to Section 6.5.4 .
Clean the level control unit.	X	X	X	Make sure that the floats inside the level control unit move freely. Clean the float chamber – refer to Section 6.5.4 .
Inspect the hoses, fill valve and drain pump for blockage.	–	X	X	Check the fill and drain hoses for blockage. Clean the inside of the hoses – refer to Section 6.5.5 .
				Clean the strainer in the dual fill valves – refer to Section 6.5.5 .
				Clean the drain pump – refer to Section 6.5.5 .
Remove dust build-up on the blower housing.	–	X	X	Use an air gun to remove dust accumulation on the blower housing.
Inspect the spark-igniter for oxidation.	–	–	X	Clean the spark-igniter – refer to Section 6.5.6 for details.
Inspect the exhaust vent and terminal.	X	X	X	Check that there are no leaks in the exhaust vent, and it is not damaged or corroded excessively. Check the vent is secured properly and has the proper slope.
				Make sure there is no blockage in the exhaust vent including the exhaust terminal.
				When operating in a stable state, make sure that flue temperature is 135-149 °C for the standard-efficiency model. Flue temperature should be 49-60 °C for the CS models.
Inspect air intake vent and terminal, if used.	–	X	X	Check the combustion air intake vent for leaks.
				Make sure there is no blockage in the combustion air intake terminal, if used. Clean the screen on the elbow at the combustion air inlet.
Inspect high limit switch and sensor.	X	X	X	Visually check that the thermocouple is attached to the exhaust vent, and the thermocouple wires are connected properly to the switch.

Task	30 Days after Initial Start-up	Mid-season	End of Season (2000 h)	Maintenance
Inspect condensate collection system.	X	X	X	Check for leaks or blockages in the condensate lines throughout the steam line and exhaust vent (if applicable).
				Make sure that the condensate traps are filled with water.
				If a condensate neutralizer is installed, follow recommendations of the device manufacturer.
Inspect the mounting of the unit.	–	–	X	Check the mounting surface on which the unit is installed is stable, and the unit is secured properly to the mounting surface.
Inspect overall condition of the unit.	–	–	X	Check the unit for obvious signs of deterioration.
Inspect high temperature elbows and hose cuffs on the exhaust connection(s)	–	–	X	Check the components for obvious signs of deterioration. Check for leaks and cracks.

6.3 List of Consumables

[Table 8](#) shows the list of consumable items for the Condair GS humidifier that must be replaced in regular intervals.

Table 8: Consumables

Consumable Item	Replace	Part Number
High temperature exhaust hoses and elbows	After 4 seasons (8000 hours)	Refer to the Spare Parts List for kit part numbers.
Spark igniter	After 3 seasons (6000 hours)	
Tank door gasket	After each cleaning	
Sacrificial anode	When needed	
All other gaskets	When removed	

6.4 Management of Scale and Chloride Levels

As the humidifier produces steam, minerals dissolved in the water begin to concentrate in the tank over time. The amount of dissolved minerals and the chloride levels need to be carefully controlled so they do not affect the efficiency and service life of components. Hardness of water may cause foaming and contribute to scale build-up in the humidifier tank and level control unit, and chlorides increase the risk of stress corrosion cracking in stainless steel components of the humidifier. All of these contribute to reduced efficiency, and increased amount of service and related maintenance costs.

IMPORTANT! Component failures due to water quality outside the recommended ranges (refer to [Table 9](#)) are not covered by warranty.

The Condair GS humidifier periodically drains water from the tank to reduce the concentration of dissolved minerals that accumulate during long-term operation. This is achieved in two ways – through a partial blowdown and a full tank blowdown (FTBD).

In a partial blowdown, a certain amount of water (determined by the Blowdown Rate setting) is drained from the tank and replaced with fresh water, thus lowering the concentration levels. In a FTBD, the entire tank is drained when a certain number of weighted hours (determined by the FTBD Interval setting) have elapsed, then refilled with fresh water. Weighted hours is defined as the hours equivalent to a unit operating at 100% output.

The humidifier is shipped with a default blowdown rate of 25% for the partial blowdown, and Interval of 100 hours for full tank blowdown (FTBD). These settings ensure that concentration of dissolved minerals is minimized for all water conditions. However, they can be adjusted in the control software once water conditions are known for your site – refer to [Section 6.4.1](#).

In addition to the software-controlled full tank blowdown, a separate 24 VAC signal connected to pins "1" and "8" to the low voltage terminal strip can also be used to initiate a full tank blowdown at any time.

Water Quality

The water quality requirements for the Condair GS humidifier are shown in [Table 9](#). Do-it-yourself kits are available to test hardness in the feed water. You can also contact your local water supplier for a water quality report, or order a Condair water test kit.

Table 9: Water Quality Requirements

Water Type	Hardness °dh (PPM)	Alkalinity (pH)	Chloride (PPM)	Conductivity (µS/cm)	Silica (PPM)
Potable Water	0-11.5 (0-205)	6.5-7.5	0-40	0-1500	0-14
Treated Water	0-1.0 (0-17)	7-7.5	0-40	0-100	0-1

6.4.1 Adjusting Blowdown Settings

Due to the wide range of water quality in different locations, it is important to adjust blowdown to suit the local water conditions. Use the following procedure to adjust the blowdown rate and full tank blowdown interval for the water conditions at your site.

1. Test the quality of the supply water to determine the hardness and the chloride levels.
2. Then set the blowdown rate as follows:
 - a. Refer to [Table 10](#), and make a note of the recommended minimum blowdown rate for the hardness level of the supply water.
 - b. Then refer to [Table 11](#), and make a note of the recommended minimum blowdown rate for the chloride level in the supply water.
 - c. Set the "Blowdown Rate" in the control software of the Condair GS humidifier to the higher of the two noted values.
3. Set the FTBD interval as follows:
 - a. Refer to [Table 10](#), and make a note of the recommended maximum FTBD interval value for the hardness level of the feed water.
 - b. Refer to [Table 11](#), and make a note of the recommended maximum FTBD interval value for the chloride level in the feed water.
 - c. Set the "FTBD Interval" in the control software of the Condair GS humidifier to the lesser of the two noted values.
4. Once the base settings are set, monitor the water quality and maintenance history periodically, and adjust the settings accordingly.

Note: Factory tests have shown that increasing the blowdown rate reduces scale build-up, while reducing the FTBD interval reduces the chloride concentration levels in the tank. The adjusted settings should reflect a balance between reducing concentration levels and minimizing water usage.

Table 10: Blowdown and FTBD Settings Related to Hardness of Water

Supply Water Hardness °dh (PPM)	Recommended Minimum Blowdown Rate (%)	Recommended Maximum FTBD Interval (h)* Weighted hours
0-3,4 (0-60)	12	72
>3,4-6,7 (>60-120)	25	72
>6,7-10,1 (>120-180)	40	72
>10,1-19,6 (>180-350)	50	48
>19,6 (>350)	Not recommended for the humidifier without treatment of the water. Contact your local Condair representative.	

Table 11: Blowdown and FTBD Settings Related to Chloride Levels

Supply Water Chloride Levels °dh (PPM)	Recommended Minimum Blowdown Rate (%)	Recommended Maximum FTBD Interval (h)* Weighted hours
0,28 (5)	12	72
>0,28-0,85(>5-15)	25	72
>0,85-1,40 (>15-25)	45	48
>1,4-2,24 (>25-40)	50	24
>2,24 (>40)	Not recommended for the humidifier without treatment of the water. Contact your local Condair representative.	

6.5 Maintenance Procedures

6.5.1 Removal and Installation of Access Panels

Removal

1. Turn the captive screw at the bottom of the door panel (control cabinet/plumbing cabinet) counter-clockwise with a screwdriver.
2. Lift up the door panel slightly so that the top tabs clear the notches in the cabinet, then carefully swing the bottom of the panel up, and remove the panel.
3. To remove the left/right side panel, remove the screws and slide the panel towards the front of the unit, so the tabs in the side of the panel clear the notches in the fixed rear panel.

Note: The GS 23/45 humidifier does not have a removable left side panel. To remove the right side panel, slide the panel towards the front of the humidifier until the tabs at the top rear and bottom rear of the panel clear the notches in the cabinet, then remove the panel.

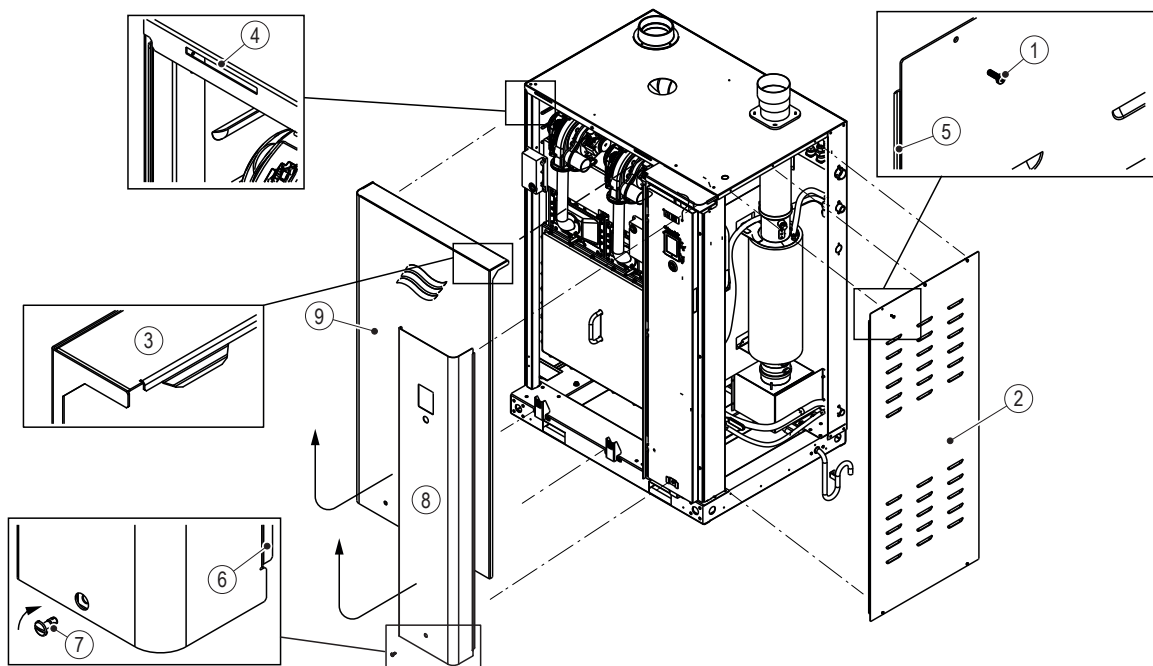


Fig. 11: Access Panels Removal and Installation (GS 64 shown)

- | | | | | | |
|---|---------------------|---|-----------------|---|------------------------------|
| 1 | Screw | 4 | Notch, cabinet | 7 | Captive screw |
| 2 | Panel, right side | 5 | Tab, side panel | 8 | Door panel, control cabinet |
| 3 | Top tab, door panel | 6 | Tab, door panel | 9 | Door panel, plumbing cabinet |

Installation

1. Align and slide the side panel (left/right) towards the rear of the unit, so the tabs in the side of the panel engage with the notches in the fixed rear panel. Install the screws and fasten the panel securely.

Note: To install the right side panel in the GS 23/45 humidifier, align the tabs at the top rear and bottom rear of the panel with the notches in the cabinet, then slide the panel towards the rear of the unit until it is seated properly.

2. Position the door panel (control cabinet/plumbing cabinet) so that the two tabs in the top rear of the panel align with the notches in the cabinet. Lower the door panel to seat the tabs in the notches, while ensuring that the tabs in the (left/right) side panel engage with the notches in the cabinet. Refer to the detail in the [Fig. 11](#).
3. Make sure that the door panel fits flush on the front and the side. Turn the captive screw in the door panel clockwise to secure the door panel. Check that it is fastened securely.

6.5.2 Cleaning the Tank

Clean the inside of the tank, the outside of the primary heat-exchanger coils and the drain fitting as follows. Refer to [Fig. 12 on page 57](#).

Note: It is not necessary to remove the tank from the unit in order to clean it.

1. Use the Clean Tank function in the control software to flush and drain the tank, then shut down the humidifier as described in [Section 5.3.8](#).
2. Remove door panels – refer to [Section 6.5.1](#).
3. Inspect all fill hoses for scale build-up or blockages. Clean or replace where necessary.
4. Remove and discard the tank gasket (Condair does **NOT** recommend reusing the tank gasket).
5. Use a soft-bristled or plastic brush or scraper (not wire brush, not metal) to remove any scale build-up on the inside surfaces of the tank, all tank ports, the outside of the primary heat-exchanger coils, and inside of the drain fitting. Carefully remove any scale build-up on the surface of the temperature sensor. Vacuum out the tank. Flush water through the drain fitting to remove any remaining sediment.
6. Rinse the inside of the tank thoroughly with clean tap water.
7. Inspect the sacrificial anode on the inside of the tank cover and use a soft-bristled brush (not wire brush) to remove scale build-up. Replace the anode, if necessary.



WARNING!
Risk of fire!

DO NOT clean the sacrificial anode with any chemicals. The anode can react with acids to create flammable hydrogen gas.

8. Install a new tank gasket and secure the tank cover to the tank.
Note: The order of torquing the bolts for the tank cover are shown in the hexagonal symbols in [Fig. 12 on page 57](#). Tighten bolts with your fingers and torque at the end of assembly.

Table 12: Torque values

	M6 (top of door)	M6x22
Torque Values	7.91 Nm	7.91 Nm

9. Relocate and secure door panels – refer to [Section 6.5.1](#).
10. Start the humidifier – refer to [Section 5.3.3](#).
11. Check humidifier for leaks.

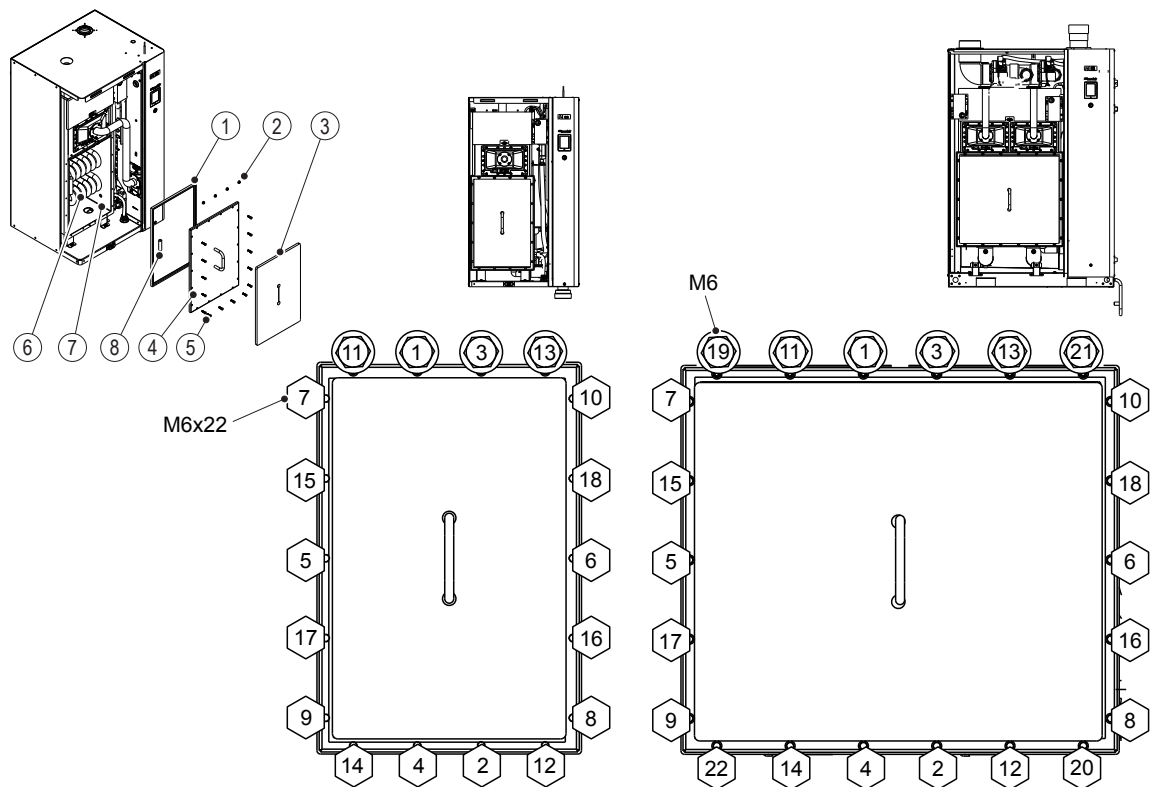


Fig. 12: Tank Door Torque Sequence

- | | | | | | |
|---|------------------|---|--------------------------------|---|-------------------|
| 1 | Gasket | 4 | Tank door | 7 | Tank |
| 2 | M6 nut - 7.91 Nm | 5 | M6x22 hex head screw - 7.91 Nm | 8 | Sacrificial anode |
| 3 | Insulation | 6 | Heat exchanger coils | | |

6.5.3 Cleaning the Secondary Heat-exchanger

Clean the secondary heat-exchanger and condensate trap (CS model only) as follows. Refer to [Fig. 13 on page 58](#).

1. Drain the tank, and shut down the humidifier as described in [Section 5.3.8](#).
2. Remove the right door panel and the right side panel – refer to [Section 6.5.1](#).
3. Disconnect the two water hoses from the secondary heat-exchanger.
4. Flush the inside of the secondary heat-exchanger with clean tap water.
5. Reconnect the water hoses. You may also refer to [Fig. 15 on page 61](#).
6. Disconnect the condensate trap from the secondary heat-exchanger and flush out any scale build-up.
7. Reconnect the condensate trap, and fill the trap with water.
8. Relocate the right side panel, then relocate and secure the right door panel – refer to [Section 6.5.1](#).
9. Start the humidifier – refer to [Section 5.3.3](#).
10. Check humidifier for leaks.

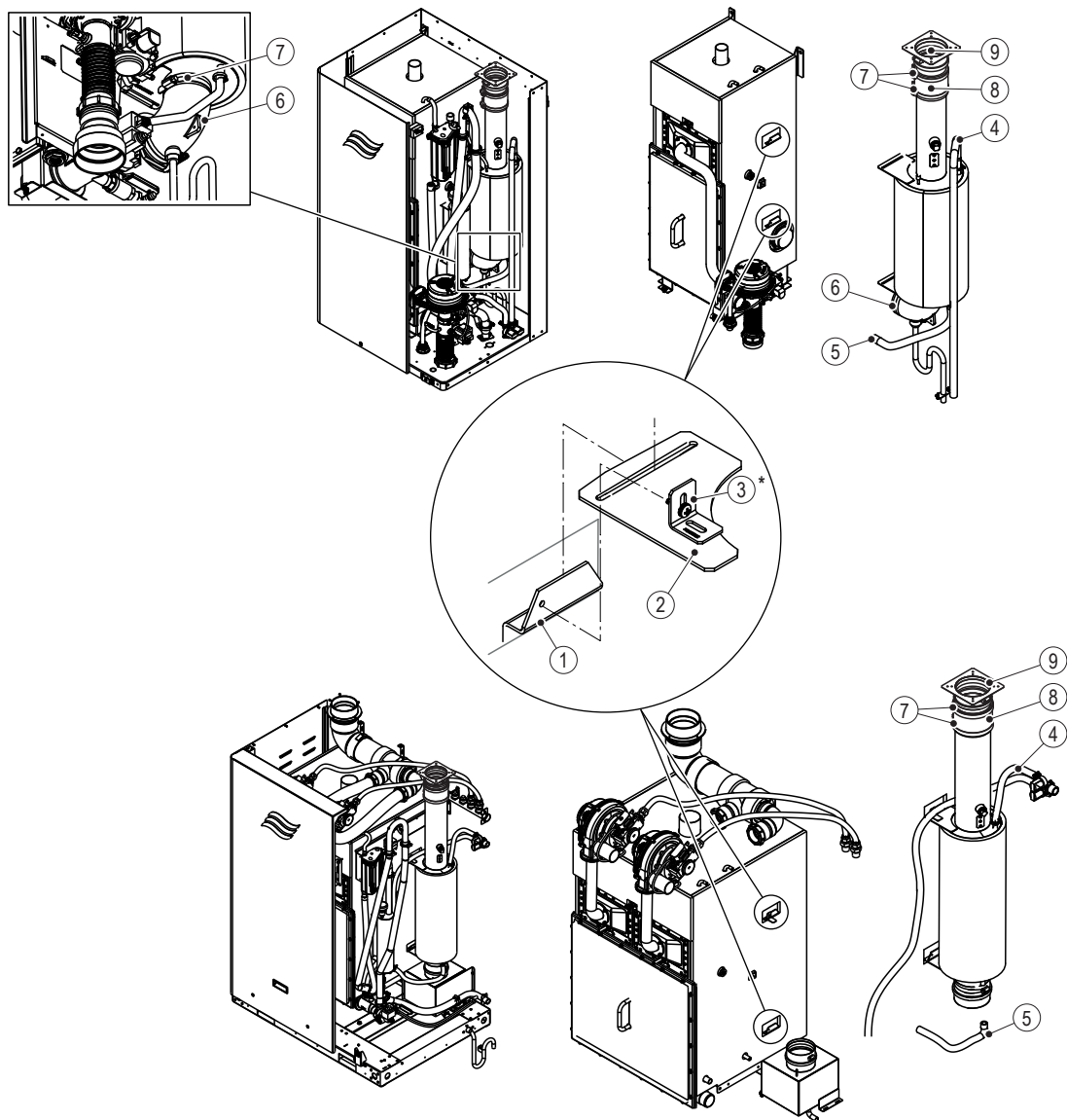


Fig. 13: Cleaning Secondary Heat-exchanger -CS Model Only (compact and double unit shown)

- | | | | | | |
|---|--|---|---|---|--------------------------|
| 1 | Tank bracket | 4 | Hose, fill valve to top of heat-exchanger | 7 | Hose clamps |
| 2 | Hanger bracket | 5 | Hose, heat-exchanger to tank | 8 | Silicone exhaust tube |
| 3 | L-bracket * (for the top of the heat-exchanger only) | 6 | Silicone fitting elbow | 9 | Exhaust outlet connector |

6.5.4 Cleaning the Level Control Unit

Clean the level control unit as follows. Refer to [Fig. 14](#).

1. Shut down the humidifier as described in [Section 5.3.8](#)
2. Remove the right door panel and the right side panel – refer to [Section 6.5.1](#).
3. Remove hoses from the level control unit, and remove the level control unit by pulling on the rear tab and lifting the level control unit upwards.
4. Open the level control unit and carefully remove the two floats. Make a note of the orientation of the floats.
5. Use a soft-bristled brush (not wire brush) to remove any scale build-up on the floats, the inside of the float sleeve and the float chamber. Rinse components with clean tap water.
6. Visually check each float for cracks or other damage. Place the two floats in a container filled with clean water, and check that they both have equal buoyancy. If necessary, replace the floats.
7. Reassemble the level control unit, ensuring the orientation of the floats have been maintained. Reinstall it to the bracket on the humidifier and reconnect hoses. Refer to [Fig. 15 on page 61](#).
8. Relocate the right side panel, then relocate and secure the right door panel – refer to [Section 6.5.1](#).
9. Start the humidifier – refer to [Section 5.3.3](#) and ensure that the "Float Check" is enabled in the features menu of the control software – refer to [Section 4.2.7.1](#).
10. Check humidifier for leaks.

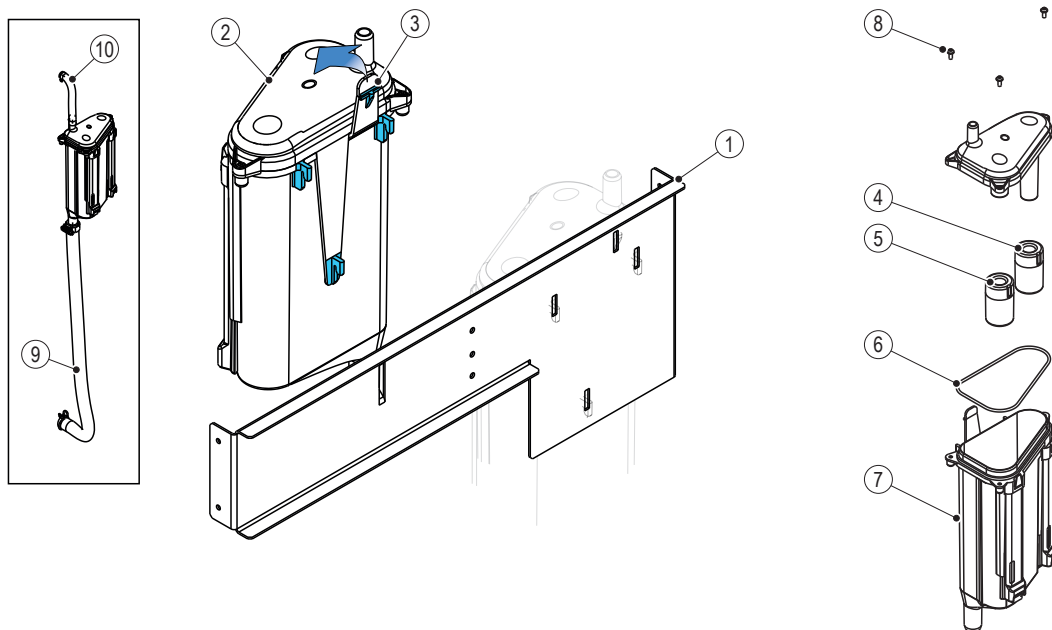


Fig. 14: Cleaning Float Chamber of the level control unit

- | | | | | | |
|---|--|---|---------------------|----|-----------------------|
| 1 | Bracket, level control unit and P-trap | 5 | Safety float | 9 | Hose – bottom of tank |
| 2 | Level control unit | 6 | Seal, float chamber | 10 | Hose to top of tank |
| 3 | Tab level control unit | 7 | Float chamber | | |
| 4 | Level float | 8 | Screw (x3) | | |

6.5.5 Cleaning Hoses, Dual Fill Valves and Drain Pump

Clean the fill and drain hoses, the dual fill valves, and the drain pump as follows. Refer to [Fig. 15 on page 61](#).

1. Shut down the humidifier as described in [Section 5.3.8](#).
2. Remove the right door panel and the right side panel – refer to [Section 6.5.1](#).
3. Loosen the clamps and remove the fill and drain hoses from the humidifier.
4. Dual fill valves: carefully remove the strainer in the dual fill valves. Use a soft-bristled brush (not wire brush) and carefully remove any scale build-up on the strainer. Assemble the dual fill valves after cleaning, taking care not to damage the strainer.
5. Drain pump: disconnect the fill hose from the drain adapter (9). Lift off the retaining tab/bracket (6) and carefully pull the pump out of the adapter (do not damage the O-rings). Use a soft-bristled brush (not wire brush) to remove any scale build-up on the inside of the pump cover, impeller, large O-ring and pump housing. Assemble all drain pump components in reverse order after cleaning.
6. Hoses: Loosen any limescale in the hoses by carefully twisting and flexing the hoses. Rinse the hoses thoroughly with hot tap water before installing the hoses. Secure the hoses with clamps.
7. Relocate the right side panel, then relocate and secure the right door panel – refer to [Section 6.5.1](#).
8. Start the humidifier – refer to [Section 5.3.3](#).
9. Check humidifier for leaks.

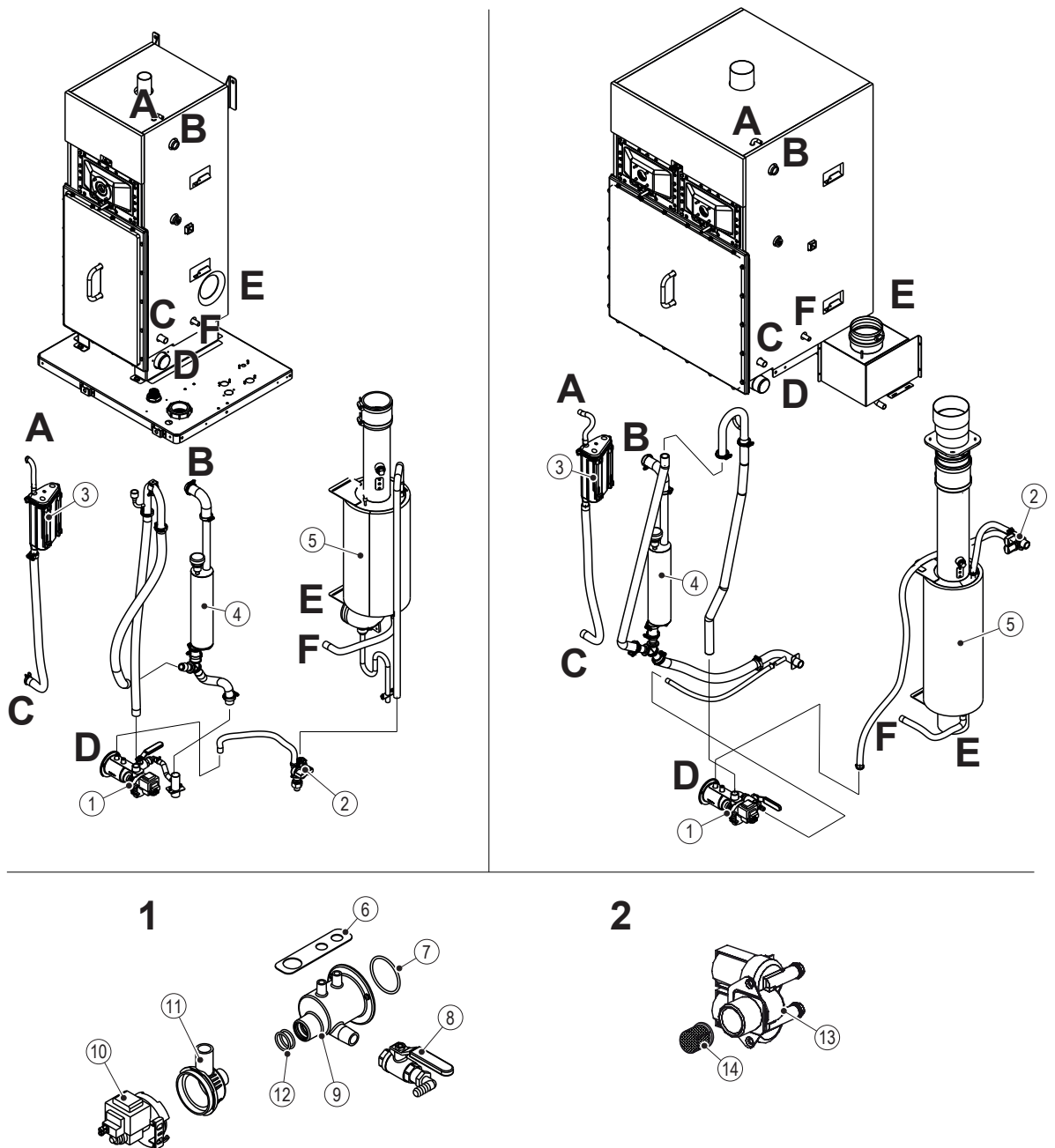


Fig. 15: Cleaning Hoses, Dual Fill Valves and Drain Pump (A-G are connection points to humidifier)

- | | | | | | |
|---|--|----|---------------------|----|------------------|
| 1 | Drain pump | 6 | Bracket, drain pump | 11 | Drain pump cover |
| 2 | Fill valve | 7 | O-ring | 12 | O-ring (x2) |
| 3 | Level control unit | 8 | Drain valve | 13 | Dual fill valve |
| 4 | P-trap | 9 | Drain pump adapter | 14 | Strainer |
| 5 | Secondary heat-exchanger
(CS models only) | 10 | Drain pump, 24 V | | |

6.5.6 Cleaning the Burner Assembly

The burner(s) in the Condair GS humidifier does/do not require maintenance. However, if the burner(s) is/are not operating properly, clean the burner(s) and spark-igniter(s) as described below. Refer to [Fig. 16 on page 62](#).

1. Shut down the humidifier as described in [Section 5.3.8](#).
2. Remove the plumbing cabinet door panel (refer to [Section 6.5.1](#)) and make sure that the tank has been emptied.
3. Remove the four M5 nuts that secure the blower tube to the burner assembly.
4. Disengage the blower tube from the burner assembly.
5. Disconnect the ignition wire from the spark-igniter.
6. Remove the M6×12 hex-head bolts and the burner assembly. Discard the burner gasket.

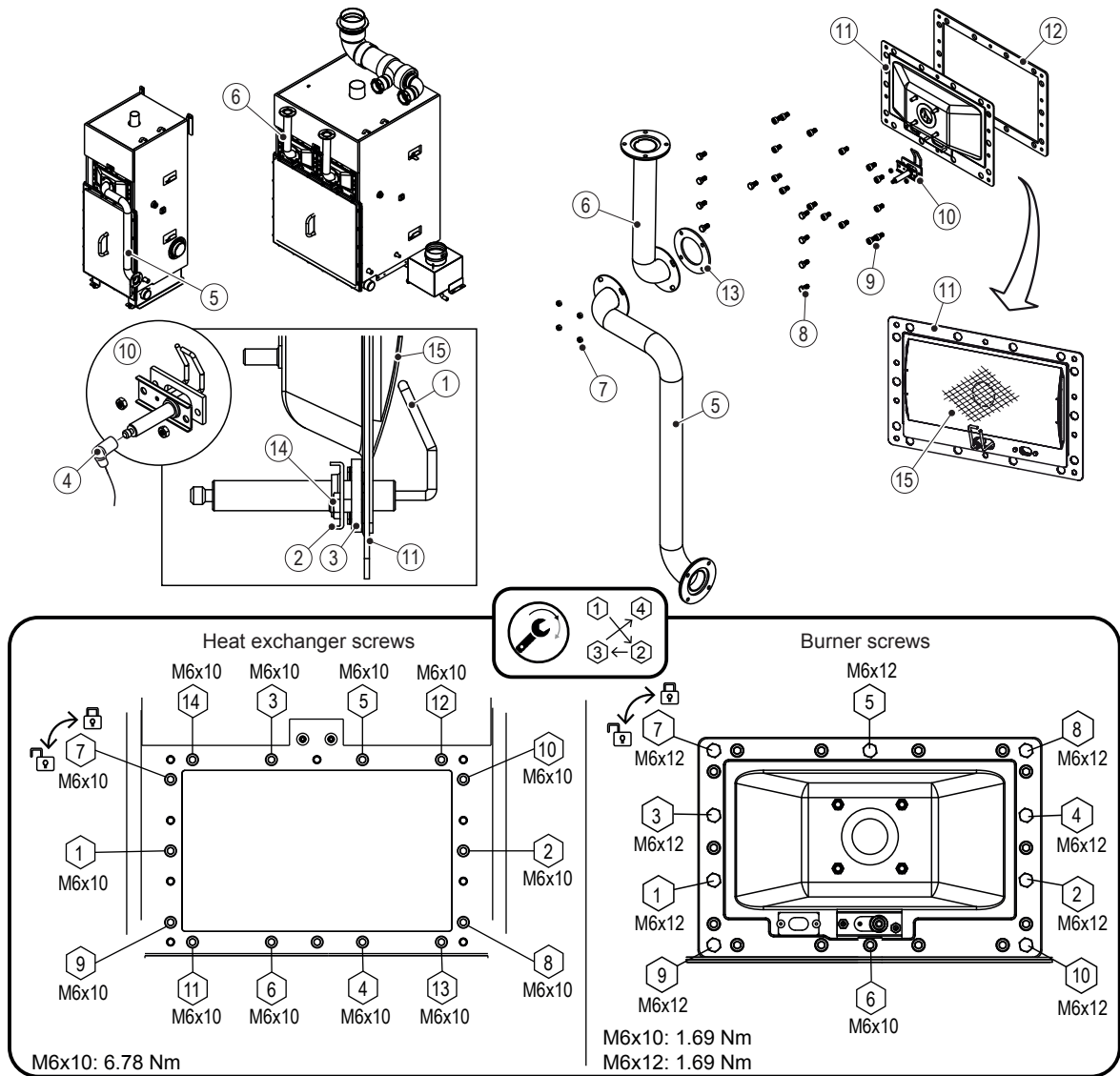


Fig. 16: Cleaning the Burner Assembly

- | | | |
|-----------------------------------|-------------------------------------|----------------------------|
| 1 Spark-igniter electrode | 6 Blower tube (full size unit only) | 11 Burner |
| 2 Spark-igniter bracket | 7 Lock nut M5 (x4) -1.2 Nm | 12 Burner gasket |
| 3 Spark-igniter gasket | 8 M6x12 hex head (x9) | 13 Burner-blower gasket |
| 4 Control wire | 9 M6x10 socket cap (x15) | 14 M4 Nut (x2) |
| 5 Blower tube (compact unit only) | 10 Spark-igniter | 15 Burner assembly matting |

7. Visually inspect the matting on the inside surface of the burner assembly for hot spots, tears, or any clogging. If the matting has hot spots or tears, replace the burner assembly.
If the matting is clogged, DO NOT use a scraper to remove the blockage. Use low pressure air at maximum 35 Pa to clear all blockages without damaging the matting. Blow air in the direction of the arrow.
8. Visually inspect the spark-igniter for any oxidation. Carefully remove any build-up with emery cloth. Check the electrode gap is 3 ± 1.5 mm. DO NOT adjust the gap – replace the spark-igniter, if necessary. Use a new igniter gasket.
9. Assemble the burner assembly in reverse order. Always use a new burner gasket.
10. Apply nickel anti-seize lubricant (Loctite® LB 771™ or equivalent) to the M6×12 hex-head bolts before assembly. Install with M6 lock washers. Wipe off excess lubricant. Torque the **M6x12 bolts and M6x10 bolt to 1.69 Nm**. Refer to [Fig. 16 on page 62](#)
11. On the blower tube, torque the four **M5 nuts to 1.2 Nm**.
12. Relocate and secure the plumbing cabinet door panel - refer to [Section 6.5.1](#).
13. Start the humidifier – refer to [Section 5.3.3](#) and check that the burner(s) operate(s) properly.

6.5.7 Replacing Backup Battery and the internal fuse

Only a qualified service technician authorized by the customer should replace the backup battery and/or the internal fuse on the control board of the Condair GS.

Replace the backup battery and/or the internal fuse on the control board as follows. Refer to [Fig. 17 on page 64](#).

1. Shut down the humidifier as described in [Section 5.3.8](#).
2. Remove the door panel on the control cabinet. Swing the inner panel open (refer to [Section 6.5.1](#)).
3. Replace the backup battery (CR 2032) and/or the internal fuse (10 A, slow-acting) on the control by a new battery/fuse.
4. Close the inner panel, and install the door panel, making sure that it is fastened securely.
5. Restart the unit – refer to [Section 5.3.3](#).

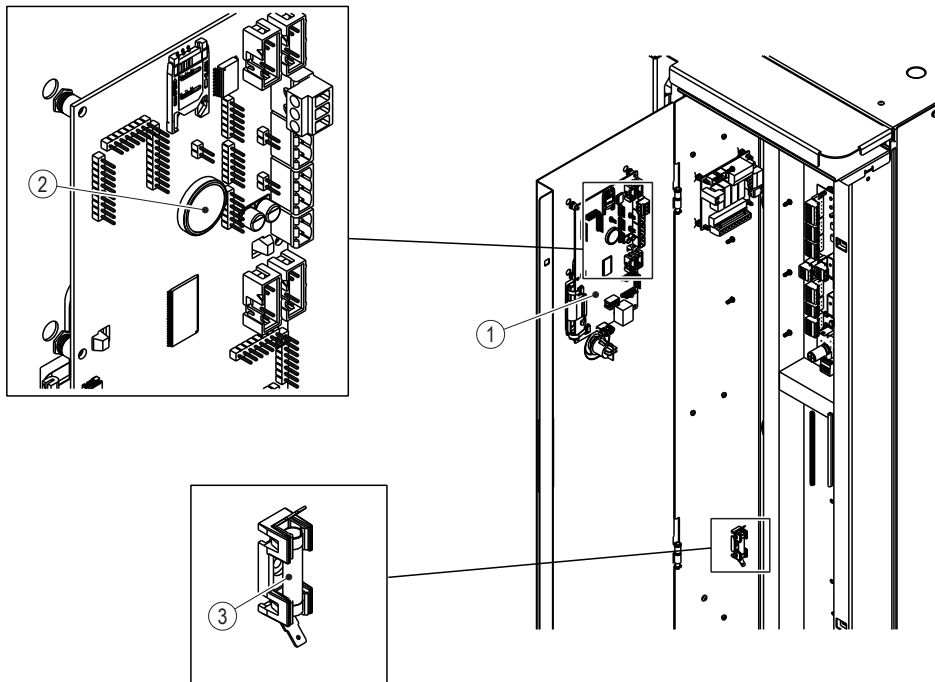


Fig. 17: Backup Battery and Fuse Replacement

1 Control board

2 Backup battery (CR 2032)

3 10 A, slow acting fuse

6.5.8 Resetting Service Reminder

Reset the service reminder messages and maintenance warnings in the control software after performing the required scheduled maintenance:

1. Select "*Menu > Service > Humidifier Service tab > Reset Service Reminder*" in the control software. A reset dialogue appears and prompts you to confirm the reset.
2. Select the **<Yes>** button on the confirmation screen to confirm the reset. Select the **<No>** button to abort the reset.

6.5.9 Installing Software Updates

All software updates can be downloaded from www.condair.com. Download the software update file and extract it to a USB memory stick that has been formatted to 32-bit FAT system. The software update file (ending with .bin) should be located at the root level on the USB stick.

Install the updates for the control software as follows:

1. Shut down the humidifier as described in [Section 5.3.8](#).
2. Remove the door panel on the control cabinet – refer to [Section 6.5.1](#) and swing the inner panel open.
3. Carefully insert the USB memory stick into the USB port on the control board. The maximum **length of the memory stick should not exceed 75 mm**.
4. Close the inner panel, and install the door panel.
5. Remove the lock and tag from the external electrical isolator, and restore power to the humidifier.
6. Set the On/Off button on the unit to the "On" position.
7. When the Home screen appears, press the <Menu> button, then enter the password to login.
8. Select "*Administrator > Software Update*". Confirm the software update in the confirmation window with <Yes> in order to start the update of the control software. A progress bar shows the status of the updating process.



CAUTION!
Risk of file corruption!

DO NOT interrupt software updating once it starts. Wait until updating is completed. Corrupted control software can render the humidifier unusable.

Note: If software updating is accidentally interrupted, the humidifier will not operate. However, updating can be resumed by leaving the USB key inserted in the board and power cycling the unit. The integrated control board will detect that the software was not installed properly, and restart the updating.

When updating is completed, the Home screen is displayed.

9. Repeat Step 1 and 2, and carefully remove the USB memory stick.
10. Close the inner panel. Install the door panel, making sure that it is fastened securely.
11. Start the unit – refer to [Section 5.3.3](#).

7 Fault Isolation

7.1 General

Personnel Qualifications

Troubleshooting of the Condair GS humidifier must only be performed by well qualified and properly trained personnel authorized by the customer. It is the customer's responsibility to verify qualifications of the personnel.

Electrical repairs must only be performed by a licensed electrician authorized by the customer or by Condair service technicians.

Safety

Troubleshooting the Condair GS humidifier may require personnel to access the inside of the control cabinet in the humidifier which may expose personnel and equipment to the hazards. Make sure that the Condair GS humidifier is shut down properly as described in [Section 5.3.8](#), and observe all safety precautions described in [Section 2](#) before performing any work on the humidifier.

7.2 Fault Indication

When a condition that is not normally expected occurs, it is detected by the control software and a warning or fault message is displayed in the Service/Warning/Fault status area of the Home screen (refer to [Fig. 6 on page 18](#)). The warning and fault message types are described in [Table 4 on page 19](#).

When a warning/fault condition occurs, select the warning or fault message to view the [Fault/Service History Tab on page 38](#) and additional details. Refer to [Fig. 18](#).

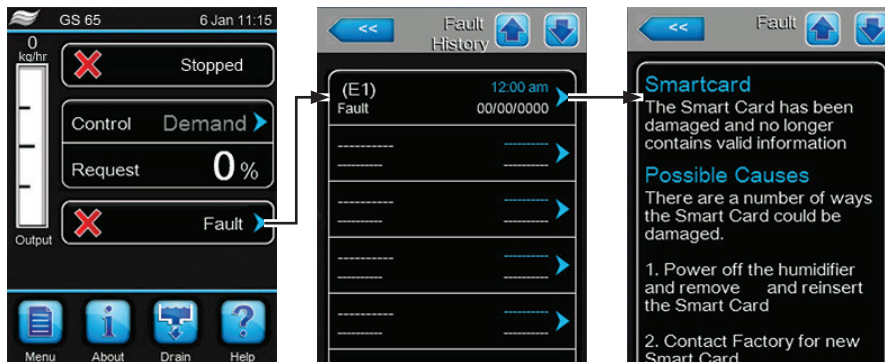


Fig. 18: Fault History Screens

In addition, the "Service" relay on the remote fault board can also be set up to indicate that a service warning or a system warning/notification is active.

7.3 General Troubleshooting

Most operational warning/fault conditions are caused by improper installation, or by not adhering to the suggested best practices for installation of the humidifier and system components. Hence, a full fault diagnosis always requires a thorough examination of the entire system (hose connections, control systems, etc.).

[Table 13](#) provides general guidelines for troubleshooting the humidifier. For detailed troubleshooting information of the auxiliary system components, refer to their product manuals.

The list of warning and fault messages, and corrective actions are shown in [Table 14 on page 68](#).

Table 13: General Troubleshooting – Humidifier

Problem	Probable Cause/Remedy
Nothing happens when the On/Off switch is turned On.	Incorrect voltage, or no voltage. <ul style="list-style-type: none"> – Check the disconnect switch in the supply line is switched on. – Check the fuse on the transformer and the On/Off switch.
	Step-down transformer not outputting 24 VAC. <ul style="list-style-type: none"> – Check the fuse. – Measure and confirm 24 VAC on the transformer primary connections. Replace the transformer, if necessary.
Humidifier will not produce steam, or does not reach RH setpoint value.	Safety loop is open. <ul style="list-style-type: none"> – Check if the message "Safety Loop" is displayed in the operating status area of the Home screen. – Check if there is 24 VAC supply at low voltage terminal strip pin "2". – Check that all On/Off devices connected to low voltage terminal strip pins "1" and "2" are wired properly, and their contacts are closed when they should be.
	Output is limited by the high limit humidistat signal. <ul style="list-style-type: none"> – Check if the high limit humidistat is installed too close to the steam distributor. The recommendation is five times the absorption distance or minimum 3 m. Check the setpoint value for the high limit – typically set at 80% RH.
	No signal on Channel 1. <ul style="list-style-type: none"> – Check voltage between low voltage terminal strip pins "3" and "4". For a demand signal configuration, the signal must be 27% of full scale signal for the humidifier to start. For a transducer signal configuration, the signal must be lower than the setpoint value for the humidifier to start.
	No signal on Channel 2 (on units with "Control Channels" set to "Dual"). <ul style="list-style-type: none"> – Check voltage between low voltage terminal strip pins "3" and "5". For a demand signal configuration, the signal must be 27% of full scale signal for the humidifier to start. For a transducer signal configuration, the signal must be lower than the setpoint value for the humidifier to start.
	Capacity has been manually limited. <ul style="list-style-type: none"> – Check/adjust "Manual Capacity", if necessary.
Humidifier displays warning or fault message.	The control software has detected an abnormal condition. <ul style="list-style-type: none"> – Refer to Section 7.4.

7.4 Warning and Fault List

[Table 14](#) shows the list of warning and fault messages triggered by the control software in the humidifier, and the corrective actions. The warning code escalates to a fault code if the alarm condition is not resolved within a certain period of time. After fixing a fault condition, reset the fault status as described in [Section 7.5](#).

Table 14: Warning and Fault List

Code		Message	Probable Cause/Remedy
Warning	Fault		
W01	E01	Error Smartcard	No communication with the SIM card.
			The SIM card may not be seated properly on the integrated control board. <ul style="list-style-type: none"> Check that the SIM card is seated properly.
			Defective SIM card. <ul style="list-style-type: none"> Contact your Condair representative.
W06	-	Main Missing (or) Ext Missing (No Signal Warning)	No communication between the Extension unit and the Main unit in the Linkup chain. Operation is interrupted until a signal is received.
			The Linkup configuration between the Main and Extension unit is not set correctly. <ul style="list-style-type: none"> Check the Linkup configuration.
			The Main unit or Extension unit may be switched off. <ul style="list-style-type: none"> Switch on the Main and/or Extension unit.
			Loose connection. <ul style="list-style-type: none"> Check the connection between the Main and Extension units.
W07	-	Ext Fault	An Extension unit has a fault condition which was communicated to the Main unit.
			Alarm condition in the Extension unit(s). <ul style="list-style-type: none"> Check the Extension unit(s).
-	E10	CTRLR Fault (or) Memory (or) CTRLR Reset	Flash memory read/write fault. <ul style="list-style-type: none"> Contact your Condair representative.
W22	E22	Fill Warning (W22) Fill Timeout (E22)	The fill valve(s) have been active for an extended length of time and the water level is still zero. The dual fill valve remains activated. The "Fill Warning" will eventually become a "Fill Timeout" if the issue has not been addressed.
			Water supply problems. <ul style="list-style-type: none"> Make sure that the water supply line is open, and there is adequate flow and pressure.
			Loose wiring, or clogged strainer in dual fill valves. <ul style="list-style-type: none"> Check the wiring to the float board and the dual fill valves. Check the strainer in the dual fill valves is not clogged – refer to Section 6.5.5.
			Drain pump running, or manual drain valve open. <ul style="list-style-type: none"> Check that the manual drain valve is closed, and the drain pump is not running.
			Floats may be stuck. <ul style="list-style-type: none"> Visually check that the different LEDs on the float board light up as the water level in the level control unit changes. If necessary, clean the float chamber – refer to Section 6.5.4.
			Fill valve relay on the driver board not seated properly, or defective. <p>CAUTION! Electro-static discharge damage to board.</p> <ul style="list-style-type: none"> Check that LED3 (corresponding to REL4 for the high volume fill valve) and LED4 (corresponding to REL5 for the low volume fill valve) on the driver board light up when the fill valves are supposed to be energized. If not, check the relay(s) is/are seated properly on the driver board. Swap the relay(s) with another relay on the board to verify that it is working. If necessary, replace the relay.
			Defective dual fill valves. <ul style="list-style-type: none"> Check for 24 VAC on the pins of the dual fill valves. If necessary, replace the dual fill valves. Reconnect the wires correctly.
			Scale build-up in the drain fitting. <ul style="list-style-type: none"> Clean the drain fitting, as described in Section 6.5.2.

Code		Message	Probable Cause/Remedy
Warning	Fault		
W28	E28	Service Due Warning	The set service interval time has elapsed. The unit will continue to run for 200 hours before a fault message is generated and the operation of the humidifier is stopped.
		Service Due Fault (on fault)	Unit needs to be serviced. <ul style="list-style-type: none"> Perform scheduled maintenance according to Section 6. Reset the service reminder after performing all required maintenance work – refer to Section 7.5.
W32	-	RH Signal	The RH input is less than 3%. Operation is interrupted until an input higher than 3% is received.
			Loose wiring, faulty sensor. <ul style="list-style-type: none"> Check the connection between the sensor and the driver board of the humidifier. Swap the sensor with another sensor and verify that it is working. If necessary, replace the sensor.
			Layout of the humidifier control system may be causing signal interference. <ul style="list-style-type: none"> Check that the controls layout permits accurate readings.
W34	-	Rem Disable	The unit has been disabled remotely by the building management system (BMS) through Modbus communication. Operation is interrupted until the unit is enabled again through Modbus or the control software.
			Unit disabled by the BMS. <ul style="list-style-type: none"> Enable the unit through the BMS. If unit cannot be enabled remotely, try enabling the unit through the Modbus setting in the control software.
W35	-	BMS Timeout	The maximum wait time without any communications from the BMS has been exceeded. If the signal " Source " is set to "Analog", the humidifier will continue operating; otherwise it stops producing steam until communications with the BMS is re-established.
W42	-	RH High	Sensed humidity is above the " RH High " value configured in the control software. The unit will remain idle until the sensed RH value drops below the setpoint value.
			Incorrect layout of the humidifier control system (sensor location too close to steam distributor or other sources that affect measurement), or defective components. <ul style="list-style-type: none"> Check the humidifier control system.
			Humidifier capacity too large for the space being humidified. Limit the output capacity of the humidifier – refer to " Manual Capacity ". <ul style="list-style-type: none"> Adjust the Proportional / Integral value of the controller.
			The " RH High " value for the sensor signal may be set too low. <ul style="list-style-type: none"> Adjust the RH High value for the sensor.
W43	-	RH Low	Sensed humidity is below the minimum value configured in the control software. The unit should continue operating unless it is in standby mode.
			Incorrect layout of the humidifier control system (sensor location too close to steam distributor or other sources that affect measurement), or defective components. <ul style="list-style-type: none"> Check the humidifier control system.
			The " RH Low " value for the sensor signal may be set too high. <ul style="list-style-type: none"> Adjust the RH Low value for the sensor signal.
			Unit may be in standby mode. <ul style="list-style-type: none"> Check the safety loop is closed, and that all burners are operational.
-	E46	Drain Check	The drain pump has been active for an extended period of time without the water level changing in the tank. The unit needs to drain for optimal performance. <ul style="list-style-type: none"> Fix the problem before restarting the unit.
			Back pressure in the drain line may be causing slow drain. <ul style="list-style-type: none"> Remove any blockages in the drainage system.
			Loose connection. <ul style="list-style-type: none"> Check the connections between the float board and the driver board, as well as the drain pump.
			Floats may be stuck. <ul style="list-style-type: none"> Visually check that the different LEDs on the level control unit board light up as the water level in the tank (float chamber) changes. If necessary, clean the level control unit – refer to Section 6.5.4.
			Drain pump may be clogged. <ul style="list-style-type: none"> Clean the drain pump – refer to Section 6.5.5.

Code		Message	Probable Cause/Remedy
Warning	Fault		
W52	–	Float Inconsistent	On unit startup the float levels do not rise logically from low water level L1 (red LED) to high water level L5 (yellow LED).
			Excess back pressure in the steam line. <ul style="list-style-type: none"> • Check the steam line.
W57	–	Startup Code	Float level sensor may be malfunctioning. <ul style="list-style-type: none"> • Inspect all hoses and connections to level control unit. • Clean the level control unit – refer to Section 6.5.4.
			Activation code required to use the humidifier. <ul style="list-style-type: none"> • Contact your Condaire representative.
–	E84	Driver Board	Activation code missing. <ul style="list-style-type: none"> • Contact your Condaire representative.
			No communication between the integrated control board and the driver board. <ul style="list-style-type: none"> • Verify dip switch settings.
			Dip switch settings are not correct. <ul style="list-style-type: none"> • Make sure the RS485 cable is connected to J15 (RS4851) on the driver board, and J12 on the integrated control board. • With the unit powered up, check that LED1 and LED10 on the driver board are flashing. Otherwise, contact your Condaire representative.
			Communication cable between the driver board and the integrated control board not connected properly. <ul style="list-style-type: none"> • Check that the heartbeat LED10 on the driver board is blinking. Otherwise, contact your Condaire representative.
–	E138	Over Temperature	Unspecified driver board fault.
			The exhaust or tank safety sensor has exceeded the safety limit. The unit will not operate when this fault condition is active. Fix the problem first, then reset the over-temperature switch as described in Section 7.5 .
			Unit may be operating with incorrect water level. <ul style="list-style-type: none"> • Check that the level control unit is operating properly.
			Exhaust vent may be blocked. <ul style="list-style-type: none"> • Make sure that the exhaust vent is free of obstructions.
			Dual fill valves may not be working properly. <ul style="list-style-type: none"> • Refer to the troubleshooting procedure for fault code "Fill Check Fault".
			Thermocouple wire may be damaged. <ul style="list-style-type: none"> • Visually inspect the thermocouple wire for kinks or other damage.
			Excess scale build-up on the coils of the primary heat-exchanger. <ul style="list-style-type: none"> • Remove scale build-up on the coils of the primary heat-exchanger – refer to Section 6.5.2.
			Temperature of the water supply may be too high. <ul style="list-style-type: none"> • Check that the temperature of the water supply. For optimal performance, temperature must not exceed 21 °C.
W139	–	No Burners Available	Exhaust condensate removal (on CS model) may be blocked. <ul style="list-style-type: none"> • Check for blockages in the exhaust drain line in the unit.
			All burners have been disabled through the control software. No burners are available for operation of the unit. The unit will not respond to a demand until one or more burners is enabled. <ul style="list-style-type: none"> • Enable the "Disable Burners" in the control software.

Code		Message	Probable Cause/Remedy
Warning	Fault		
-	E140	Keep Warm	The <i>"Keep Warm"</i> function is activated, but the tank temperature has not increased in the allotted time.
			Loose connection. <ul style="list-style-type: none"> Check the tank temperature sensor connection.
			Burners may be disabled. <ul style="list-style-type: none"> Check that no more than one burner is disabled in the control software.
			Scale build-up on the temperature sensor. CAUTION! The tank may be hot to the touch. <ul style="list-style-type: none"> Carefully remove scale build-up on the sensor as described in Section 6.5.4.
			Temperature sensor defective. CAUTION! The tank may be hot to the touch. <ul style="list-style-type: none"> Check the tank to see if it is hot. Then check the electrical signal to the sensor. Replace the sensor, if defective.
W141		Ignition Fail	The ignition module identified has failed to ignite within the allotted time (4 minutes). The unit will index to next available burner in the sequence.
			Loose wiring, or defective spark-igniter. <ul style="list-style-type: none"> Visually check the sight port of problematic burner. Check if sparking can be seen or heard during the ignition sequence. Check if the burner ignites, but stops after 3 seconds. Remove and clean oxidation on the igniter. Check the distance between the 'spark gap'. Check the spark-igniter connection. If necessary, replace the spark-igniter.
			Gas supply problem. <ul style="list-style-type: none"> Check the gas supply is open. Check for 24 VAC at the gas valve. Check the status LED on the ignition control module – three flashes of the red LED indicate problem with the supply, or gas valve, or a loose connection. Contact your Condair representative if further assistance is required.
			Faulty ignition control module. Check the status LED on the ignition control module – a solid red LED indicates an ignition control module failure. Replace the ignition control module, if necessary.
			Incorrect gas valve adjustments. <ul style="list-style-type: none"> Check if the throttle adjustment on the gas valve has been tampered.
-	E142	No Burners Available	All burners have experienced an ignition control module failure, and no burners are available to produce steam. The unit is unsafe to operate with this fault condition. Fix the problem before restarting the unit.
			Gas supply problem. <ul style="list-style-type: none"> Check the gas supply is open. Check for 24 VAC at the gas valve. Check the status LED on the ignition control module – three flashes of the red LED indicate problem with the supply, or gas valve, or a loose connection. Contact your Condair representative if further assistance is required.
			Loose wiring, or defective spark-igniter. <ul style="list-style-type: none"> Visually check the sight port of problematic burner – check for a glowing red spark-igniter followed by a flame. Check the spark-igniter connection. If necessary, replace the spark-igniter.
			Faulty ignition control module. <ul style="list-style-type: none"> Check the status LED on the ignition control module – a solid red LED indicates an ignition control module failure. Replace the ignition control module, if necessary.

Code		Message	Probable Cause/Remedy
Warning	Fault		
-	E143	Gas Valve Fail	The identified gas valve was energized out of sequence, or when it was not expected to be energized. The unit is unsafe to operate with this fault condition. Fix the problem before restarting the unit.
			Loose connections. <ul style="list-style-type: none"> • Make sure that all onboard electronics are connected according to the wiring diagram. • Check the status LED on the ignition control module – three flashes of the red LED indicate problem with the supply, or gas valve, or a loose connection. • Check connections to all ignition control modules and gas valves. Check for 24 VAC at location labelled "TH" on the ignition control module.
			Faulty gas valve. <ul style="list-style-type: none"> • Check for voltage at locations labelled "TH" and "V2" on the ignition control module after the blower has completed pre-purging the system. If 24 VAC voltage is detected at "V2" but not at "TH", replace the gas valve. Contact Condaire to order a replacement gas valve.
-	E144	Float Level	On three consecutive occasions, more than one float level was registering at the same time. The unit cannot operate without accurate float level reading. Fix the problem before restarting the unit.
			Floats may not be working properly. <ul style="list-style-type: none"> • Check the float chamber for scale build-up, and clean if necessary – refer to Section 6.5.4. • Check that both floats have equal buoyancy, as described in Section 6.5.4. Replace the floats, if necessary.
			Faulty float board <ul style="list-style-type: none"> • Examine the float board for signs of corrosion, splashed water on it, or other damage. Replace the float board, if necessary.
			Obstructions in hoses to level control unit, or hoses incorrectly installed. <ul style="list-style-type: none"> • Check for obstructions in the hoses. • Check that all hoses are installed correctly.
-	E145	Fill Check	The dual fill valve(s) has/have been active for an extended period of time without the water level rising in the tank (level control unit). The unit will not operate without an accurate water level reading. <ul style="list-style-type: none"> • Fix the problem before restarting the unit.
			Water supply problems. <ul style="list-style-type: none"> • Make sure that the water supply line is open, and there is adequate flow and pressure.
			Loose wiring, or clogged strainer in dual fill valves. <ul style="list-style-type: none"> • Check the wiring to the float board and the dual fill valves. • Check the strainer in the dual fill valves is not clogged – refer to Section 6.5.5.
			Drain pump running, or manual drain valve open. Visually check that the manual drain valve is closed, and the drain pump is not running.
			Floats may be stuck. <ul style="list-style-type: none"> • Visually check that the different LEDs on the float board light up as the water level in the float chamber changes. If necessary, clean the level control unit – refer to Section 6.5.4.
			Fill valve relay on the driver board not seated properly, or defective. CAUTION! Electro-static discharge damage to board. <ul style="list-style-type: none"> • Check that LED3 (corresponding to REL4 for the high volume fill valve) and LED4 (corresponding to REL5 for the low volume fill valve) on the driver board light up when the fill valves are supposed to be energized. If not, check the relay(s) is seated properly on the driver board. • Swap the relay(s) with another relay on the board to verify that it is working. Replace if necessary.
			Defective dual fill valves. <ul style="list-style-type: none"> • Check for 24 VAC on the pins of the dual fill valves. If necessary, replace the dual fill valves. Reconnect the wires correctly.
			Scale build-up in the drain fitting. <ul style="list-style-type: none"> • Clean the drain fitting, as described in Section 6.5.2.

Code		Message	Probable Cause/Remedy
Warning	Fault		
-	E146	Blower Not Operating	The identified blower is not operating, or registered a value below 500 rpm while being energized. The unit is unsafe to operate with this fault condition. Fix the problem before restarting the unit.
			Loose connections. <ul style="list-style-type: none"> Check the PWM (pulse width modulation) and power connection to the blower.
			Blower relay on driver board may be defective. <p>CAUTION! Electro-static discharge damage to board.</p> <ul style="list-style-type: none"> Visually check that LED7 (corresponding to relay REL8 for the blower) on the driver board lights up when the blower is supposed to be energized. If LED7 does not light up, the relay is faulty. Replace the driver board. Refer to the GS Spare Parts List.
			Blower feedback signal may be missing. <ul style="list-style-type: none"> Restart the unit, and check the blower rpm in "Input Diagnostics" in the control software. If the rpm is low, contact your Condair representative.
			Restrictions at blower, or damaged blower. <ul style="list-style-type: none"> Visually inspect the blower and blower inlet for restrictions. Visually inspect the blower impeller for damage. Order a replacement blower, if necessary.
			Main power to blower relay damaged. <ul style="list-style-type: none"> Visually inspect the connections between the main power. Visually inspect the blower relay for damage and replace if necessary.
			Worn out blower. <ul style="list-style-type: none"> The blower speed may decrease due to wear. The blower is safe to operate, but the output may be reduced. Order a replacement blower.
W147	-	Blower RPM Low	The blower identified is running at a lower rpm than expected by more than the allowable tolerance. The unit will continue monitoring the blower rpm.
			Loose connections. <ul style="list-style-type: none"> Check the PWM and power connection to the blower.
			Low voltage. <ul style="list-style-type: none"> Visually check that LED7 (corresponding to relay REL8 for the blower) on the driver board lights up when the blower is supposed to be energized. Check for 120 VAC on the output side of the blower relay.
			Restrictions at blower, or damaged blower. <ul style="list-style-type: none"> Visually inspect the blower and blower inlet for restrictions.
			Worn out blower. <ul style="list-style-type: none"> The blower speed may decrease due to wear. The blower is safe to operate, but the output may be reduced. Order a replacement blower.
W148	-	Blower RPM High	The blower identified is running at a higher rpm than expected by more than the allowable tolerance. The unit will continue monitoring the blower rpm and display this warning if the rpm remains high.
			Loose connection. <ul style="list-style-type: none"> Check the PWM connection to the blower.

Code		Message	Probable Cause/Remedy
Warning	Fault		
W149	E149	Air Proving Switch Open	The air proving switch identified has opened while the unit was operating or during blower start-up. The unit will interrupt operation and retry three times. After a third attempt a fault message is generated. The unit is unsafe to operate with this fault condition. Fix the problem before restarting the unit.
			Blockage in the air intake vent or air intake terminal. <ul style="list-style-type: none"> Visually inspect the air intake vent and air intake terminal for blockages.
			Defective air proving switch. <ul style="list-style-type: none"> Check that the air proving switch remains closed during operation of the blower. Check for suction in the pressure tubes. If the air proving switch does not close, it may be defective and must be replaced.
			Pressure tubes not connected, or loose wiring. <ul style="list-style-type: none"> Check the pressure tube connections are attached securely. Check the wiring between the air proving switch(es) and connector J2 on the driver board. With demand off and the blower not operating, check for 24 VAC at pins 1 and 2 on connector J2.
			Exhaust condensate removal (on CS model) may be blocked. <ul style="list-style-type: none"> Check for blockages in the exhaust drain line in the unit.
-	E153	AP Exhaust	One or more of the external safety switches installed for the Exhaust in Duct feature have opened. <ul style="list-style-type: none"> Safety switches have been wired incorrectly. Verify for the proper installation of all safety switches, and verify that the switches have been wired correctly to the controls low-voltage terminal. Verify that the air handling system is operational.

7.5 Resetting Fault Status

General Reset

With the exception of the over-temperature fault (see below) all "Fault" status conditions including the ignition control module safety lockout must be reset as follows:

1. Correct the cause of the problem.
2. Set the On/Off button to the Off position. Wait approximately for 5 seconds, then set the On/Off button to the "On" position. If the alarm condition has been eliminated, the fault message is automatically reset; otherwise the fault message reappears after a short while.

Resetting Over-Temperature Fault

Reset the over-temperature "Fault" status as follows:

1. Correct the cause of the problem and wait for the unit to cool down.
2. Press the reset button on the overtemperature switch.
3. Set the On/Off button to the Off position. Wait approximately for 5 seconds, then set the On/Off button to the "On" position. If the alarm condition has been eliminated, the fault message is automatically reset; otherwise the fault message reappears after a short while.

8 Decommissioning of the Condair GS

8.1 General

If the Condair GS humidifier needs to be removed from service (for disposal or long-term storage), strictly follow all instructions in the following chapters.

Personnel Qualifications

Decommissioning of the Condair GS humidifier must only be performed by a qualified service technician authorized by the customer. It is the customer's responsibility to verify qualifications of the personnel.

Safety

Decommissioning of the Condair GS humidifier may require personnel to access the inside of the control cabinet in the humidifier which may expose personnel and equipment to the hazards. Make sure that the Condair GS humidifier is shut down properly as described in [Section 5.3.8](#), and observe all safety precautions described in [Section 2](#) before performing any work on the humidifier.

8.2 Removal from Service for Disposal or Long-term Storage

Remove the Condair GS humidifier from service (for disposal or long-term storage) as follows:

1. Drain the tank, and shut down the humidifier as described in [Section 5.3.8](#). Follow all safety precautions.
2. Disconnect the gas connection to the humidifier.
3. Disconnect and remove the power supply to the Condair GS humidifier. Refer to "Wiring Diagrams" in the Installation Manual.
4. Disconnect and remove the control signal inputs to the humidifier.
5. Disconnect the steam and condensate lines, and empty out all fluids.
6. Disconnect the water and drain connections to the humidifier.
7. Disconnect and remove the intake and exhaust vents.
8. Remove the humidifier from its mounting surface.
9. If the Condair GS humidifier is to be put into long-term storage, store the humidifier in its original packaging inside a protected area that meets the following requirements:
 - Room temperature 5 to 40 °C
 - Room humidity: 10 to 75% RH
10. If the Condair GS humidifier is to be disposed off, refer to [Section 8.3](#).

8.3 Disposal/Recycling

The Condair GS humidifier should not be disposed off in domestic waste, and should only be disposed off in accordance with local regulations at authorized collection facilities.

If you have any questions, contact the appropriate local authorities or your local Condair representative.

9 Product specifications

9.1 Performance Data

Model	Power consumption at minimum demand [kW]		Power consumption at maximum demand [kW]		Manifold Pressure in Pa	Min./Max. Steam Capacity in kg/h
	Natural gas (G20)	Propane (G31)	Natural gas (G20)	Propane (G31)		
GS 23-CS	3.6	3.6	18.2	18.2	-2,5	4.6-23
GS 23	4.1	4.1	20.5	20.5	-2,5	4.6-23
GS 45-CS	7.3	7.3	36.4	36.4	-2,5	9-45
GS 45	8.2	8.2	41.0	41.0	-2,5	9-45
GS 65-CS	10.9	10.9	54.5	54.5	-2,5	13-65
GS 65	12.3	12.3	61.5	61.5	-2,5	13-65
GS 90-CS	7.3	7.3	72.7	72.7	-2,5	9-90
GS 90	8.2	8.2	82.0	82.0	-2,5	9-90
GS 130-CS	10.9	10.9	109.0	109.0	-2,5	13-130
GS 130	12.3	12.3	123.0	123.0	-2,5	13-130
GS 195-CS	10.9	10.9	163.5	163.5	-2,5	13-195
GS 195	12.3	12.3	184.5	184.5	-2,5	13-195
GS 260-CS	10.9	10.9	218.0	218.0	-2,5	13-260
GS 260	12.3	12.3	246.0	246.0	-2,5	13-260

9.2 Gas consumption at maximum power

Model	Power consumption at maximum demand [kW]	Gas consumption at maximum demand [m³/h]		
		Natural gas (G20)	Natural gas (G25)	Propane (G31)
GS 23-CS	18.2	1.7	2.0	0.7
GS 23	20.5	1.9	2.3	0.8
GS 45-CS	36.4	3.5	4.0	1.4
GS 45	41.0	3.9	4.5	1.5
GS 65-CS	54.5	5.2	6.0	2.1
GS 65	61.5	5.9	6.8	2.3
GS 90-CS	72.7	6.9	8.1	2.7
GS 90	82.0	7.8	9.1	3.1
GS 130-CS	109.0	10.4	12.1	4.1
GS 130	123.0	11.7	13.6	4.6
GS 195-CS	163.5	15.6	18.1	6.2
GS 195	184.5	17.6	20.4	6.9
GS 260-CS	218.0	20.8	26.2	8.2
GS 260	246.0	23.4	29.5	9.3

9.3 Operating Data

Control signal input types	
Active	0-5 VDC, 1-5 VDC, 0-10 VDC, 2-10 VDC, 0-20 VDC, 0-16 VDC, 3,2-16 VDC, 0-20 mADC, 4-20 mADC
Passive	135-10 kΩ ohmic humidity sensor
On/Off control	<2,5 VDC (Off) 2,5-20 VDC (On)
Digital (via Modbus, BACnet IP/MSTP)	BACnet IP, BACnet MSTP, Modbus, LonWorks (Option), BACnet MSTP BTL-Certified (Option), BACnet IP BTL-Certified (Option)

Ambient Conditions	
Ambient temperature	5-40 °C
Relative humidity	5-80 % (non-condensing)

Combustion Air	
Combustion air maximum temperature	30 °C

Backpressure steam line	
Maximum permissible backpressure (duct static pressure and line backpressure)	1.49 kPa for compact unit 2.49 kPa for full-size unit

Gas operating pressure			
Natural gas:	H, E, E(S)	G20	1.69-2.49 kPa
	L, ELL	G25	1.99-2.99 kPa
	HS	G25.1	1.99-2.99 kPa
	Lw	G27	1.74-2.29 kPa
	Ls	G2.350	1.05-1.59 kPa
Propane:		G31	2.49-5.73 kPa

CO ₂ levels in flue products		
Gas type	CO ₂ at maximum rate	CO ₂ at minimum rate
G20	9,5 ± 0,2 %	8,5 ± 0,2 %
G25		
G25.1		
G27		
G2.350		
G31	10,4 ± 0,2 %	9,5 ± 0,2 %

Water Supply	
Water pressure (regulated)	3,0-8,0 bar (300-800 kPa)
Flow rate	10 l/min for GS 23-130, 20 l/min for GS 195-260
Water temperature	1-25 °C, recommended maximum: 15 °C
Water quality	Cold potable water filtered to 125 µm, hardness of 0-205 ppm, pH level between 5-8 and chloride 0-40 ppm

Drain water	
Drain water temperature	60 °C maximum (with drain water cooling), 100 °C (without drain water cooling)
Drainage capacity	20 l/min

Power				
Model	230 V/1~50 Hz			
	Pn max. in kW	In max. in A	Cable cross section in mm²	Fuse "F1" in A slow acting (aM)
GS 23-CS	0.23	1.0	1.5	10
GS 45-CS	0.23	1.0	1.5	10
GS 65-CS	0.35	1.5	1.5	10
GS 90-CS	0.32	1.4	1.5	10
GS130-CS	0.53	2.3	1.5	10
GS 195-CS	0.72	3.1	1.5	10
GS 260-CS	0.92	4.0	1.5	10

IP Rating	IP20 for all units
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CONSULTING, SALES AND SERVICE:



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