F&P 950

F&P 950™ Respiratory Humidifier

PRODUCT TECHNICAL MANUAL

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Contents

1 About this manual

This manual is intended for use by service and maintenance personnel who are qualified to perform maintenance and servicing on medical devices like the F&P 950™ Respiratory Humidifier and its accessories listed in Section 1.1. It details the product specifications, maintenance procedure, troubleshooting guide, and servicing instructions.

WARNING

- The technical manual must be followed for all servicing and maintenance of the humidifier. Failure to comply may impair the performance of the humidifier or compromise safety.
- The operation of high-frequency surgical apparatus, shortwave, or microwave equipment in the vicinity of the humidifier may adversely affect its function. If this occurs, the humidifier should be removed from the vicinity of such devices.
- Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm to any part of F&P 950™ Respiratory Humidifier, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

This manual is intended to be used in conjunction with the F&P 950™ Respiratory Humidifier User Instructions.

NOTES

- Fisher & Paykel Healthcare has a policy of continued product improvement and reserves the right to change specifications.

1.1 Scope

Table 1.1 List of products and accessories.

PRODUCT	REFERENCE
Heaterbase	REF 950A*XX*[1], REF 950G*XX*[1], REF 950J*XX*[1]
Sensor Cartridge	REF 950S01
Other accessory	REF 950X00

[1] *XX* represents the country codes.

1.2 Safety statements

WARNING

A warning describes a potentially hazardous situation which, if not avoided, may result in serious or catastrophic harm to the user or patient or damage to the equipment or other property.

CAUTION

A caution describes a potentially hazardous situation which, if not avoided, may result in minor or moderate harm to the user or patient or damage to the equipment or other property.

NOTE

A note emphasizes an important detail about the product that may otherwise be misinterpreted or overlooked that could cause harm or injury to the product, patient, or user.

1.3 Glossary

Breathing circuit/ circuit	Tubing that directs respiratory gases through the humidifier, and to and from the patient; for example, the inspiratory limb and the expiratory limb.
Breathing circuit kit/circuit kit	Breathing circuit and associated parts that are available as a package; for example REF 950A81.
Caution LED	Light in the shape of the caution symbol on the front panel of the heaterbase.
Chamber	Water reservoir that allows gas to be heated and humidified by passing it over heated water.
Dry line	Tubing that directs the respiratory gas to the heaterbase.
Expiratory heater wire adapter	Electrical connector between the expiratory limb and the heaterbase; for example REF 950X00.
Expiratory limb	Tubing that directs the respiratory gas from the patient.
Humidifier	The F&P 950™ Respiratory Humidifier; for example REF 950ANZ with appropriate humidifier accessories.
Humidifier accessories	Parts required for basic operation of the humidifier; for example, Sensor Cartridge, expiratory heater wire adapter, and parts belonging to circuit kits.
Inspiratory limb	Tubing that directs the respiratory gas to the patient.
Main screen	The default screen of the graphical user interface on the heaterbase, displaying the operating mode, estimated dew point, and other symbols representing warning and alarm conditions.
PCB	Printed circuit board assembly inside the heaterbase.
Power cord	The electrical cable connecting the heaterbase to the mains supply.
Sensor Cartridge	An accessory for use with the heaterbase to measure gas temperature and gas flow rate.

2 Product information

The F&P 950™ Respiratory Humidifier provides heat and humidity to medical gases by passing the gas through a heated water chamber and heated breathing tubes. The amount of heating is controlled based on the gas temperature measured at different parts of the humidifier.

The F&P 950™ Respiratory Humidifier is to be used with Fisher & Paykel Healthcare breathing circuit kits and associated accessories. Refer to the Respiratory Humidification Product Catalogue or your local Fisher & Paykel Healthcare representative for a list of approved accessories.

When an adult breathing circuit is connected, the F&P 950™ Respiratory Humidifier can provide humidity in Invasive, Mask, and Optiflow™ modes.

In Mask and Optiflow™ modes it is possible to change the target temperature to provide conditions which may encourage patient comfort.

When a neonatal breathing circuit is connected, the F&P 950™ Respiratory Humidifier can provide humidity for Neonatal respiratory support.

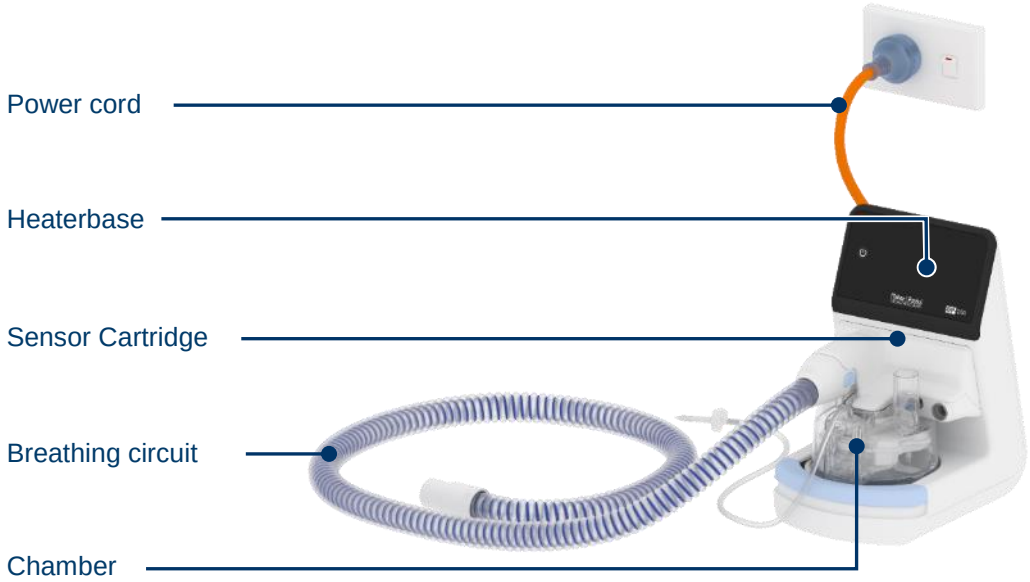


Figure 2.1 F&P 950™ Respiratory Humidifier.

2.1 Humidifier user interface

The F&P 950™ utilizes an LCD touch screen to enhance the user experience. Details of the different screens can be found below:

SCREEN	REFERENCE	
Main	F&P 950™ Respiratory Humidifier User Instructions	
Alarm	F&P 950™ Respiratory Humidifier User Instructions	
	Section 5.1 Alarms	
Options	Appendix A	Options screen

2.2 Symbols

Table 2.1: Device and packaging symbols associated with the F&P 950™ Respiratory Humidifier.

DEVICE AND PACKAGING MARKINGS			
	Recyclable		Fragile, handle with care
	Catalogue reference number		Keep dry
	Batch code		Manufacturer
	Serial number		European representative*
	Date of manufacture		Temperature limitations
	Date of expiration		Humidity limitations
	Regulatory compliance mark*		CE Marking 93/42/EEC*
	Follow instructions for use – safety		Type BF Applied Part
IP21	IP classification		WEEE (Waste Electrical and Electronic Equipment)*
	USB 2.0		Alternating current
	Class II equipment		Warning: hot surface
Rx only	For USA: prescription only*		Consult instructions for use
	Raise finger guard	 **E354976**	MEDICAL – GENERAL MEDICAL EQUIPMENT AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH CSA CAN/CSA-C22.2 NO. 60601-1:14, EN 60601-1-8:2006/AMD.1:2012 *

** symbol displayed on select models*

HUMIDIFIER CONTROLS AND USER INTERFACE SYMBOLS			
	Standby (On/Off)		Caution
	Alarm audible pause		Alarm
	Alarm audible paused		Sensor Cartridge service life warning
	Invasive mode		Sensor Cartridge authentication failure
	Mask mode		Neonatal mode
	Optiflow™ mode		Information screen
	Accept		Cancel
	Back Arrow		

2.3 Applicable standards

The following standards apply to the F&P 950™ Respiratory Humidifier:

- IEC 60601-1:2005 + Amd1:2012
- IEC 60601-1-2:2014
- ISO 8185:2007 / ISO 80601-2-74:2017

The following standards apply to the F&P 950™ Breathing Circuit Kit:

- ISO 5367:2014
- ISO 5356-1:2015
- ISO 10993-1:2018
- ISO 18562-1:2017

3 Specifications

3.1 Mechanical

SPECIFICATION		VALUE
Dimensions (heaterbase only)		240 mm (D) x 154 mm (W) x 253 mm (H)
Weight	Heaterbase and power cord	3.45 kg
	Sensor Cartridge	0.2 kg
	Expiratory heater wire adapter	< 0.1 kg
IP classification		IP21

3.2 Electrical

SPECIFICATION		VALUE
Supply voltage	REF 950AXX	230 V ~
	REF 950JXX	115 V ~
	REF 950GXX	100 V ~
Supply current	REF 950AXX	1.5 A Max.
	REF 950JXX	3.0 A Max.
	REF 950GXX	3.5 A Max.
Supply frequency		50/60 Hz, sinusoidal wave
Power input		350 VA
Heater plate capacity		200 W at nominal mains voltage
Heater plate thermal cutout		155 °C
Heater wire supply		22 ± 5 V ~, 3.7 A Max., 50/60 Hz
IEC 60601-1 classification		Class II
Earth conductor	REF 950AXX	Functional earth only
	REF 950JXX	
	REF 950GXX	
Applied parts classification		BF
Sound pressure level		Alarms exceed 45 dBA @ 1 m
Fuse Type		5 x 20 mm 4A 250 VAC Fast-Acting, High-Breaking-Capacity Ceramic fuse
Interface connection	USB Type-A	USB 2.0 host
	USB Micro-AB	Non-clinical use, disabled

NOTE Any equipment to be connected to these USB ports must be approved by Fisher & Paykel Healthcare. Damage may occur with use of non-approved devices.

3.3 Technical specifications

SPECIFICATION		VALUE
Temperature	Accuracy	± 2 °C
Estimated dew point	Display range	10 – 50 °C
	Display for < 10 °C	LOW
	Display for invalid reading	– – –
Humidifier Classification (ISO 80601-2-74)		Category 1

3.4 Service life

MODEL NUMBER	COMPONENT	TYPICAL SERVICE LIFE
REF 950AXX REF 950JXX REF 950GXX	F&P 950™ Heaterbase	7 years[1]
REF 950X00	F&P 950™ Expiratory Heater Wire Adapter	7 years[1]
REF 950S01	F&P 950™ Sensor Cartridge	15,000 hours of use[3] or 7 years[1, 2, 3] whichever is earlier

[1] Typical service assumes average usage pattern. Actual service life may vary.

[2] Time from the date of manufacturing.

[3] The humidifier will generate a warning prior to expiry and an alarm after the expiry period. The details of these notifications are provided in Section 5.1.1.

4 Maintenance procedures

4.1 Maintenance schedule

In order to ensure your F&P 950™ Respiratory Humidifier continues to operate correctly and safely, a maintenance check at least once a year is recommended. Follow the maintenance task flow diagram in Figure 4.1 below, which shows the sequence of checks with reference to related subsections.

Appendix D may be used to record the results from the checks.

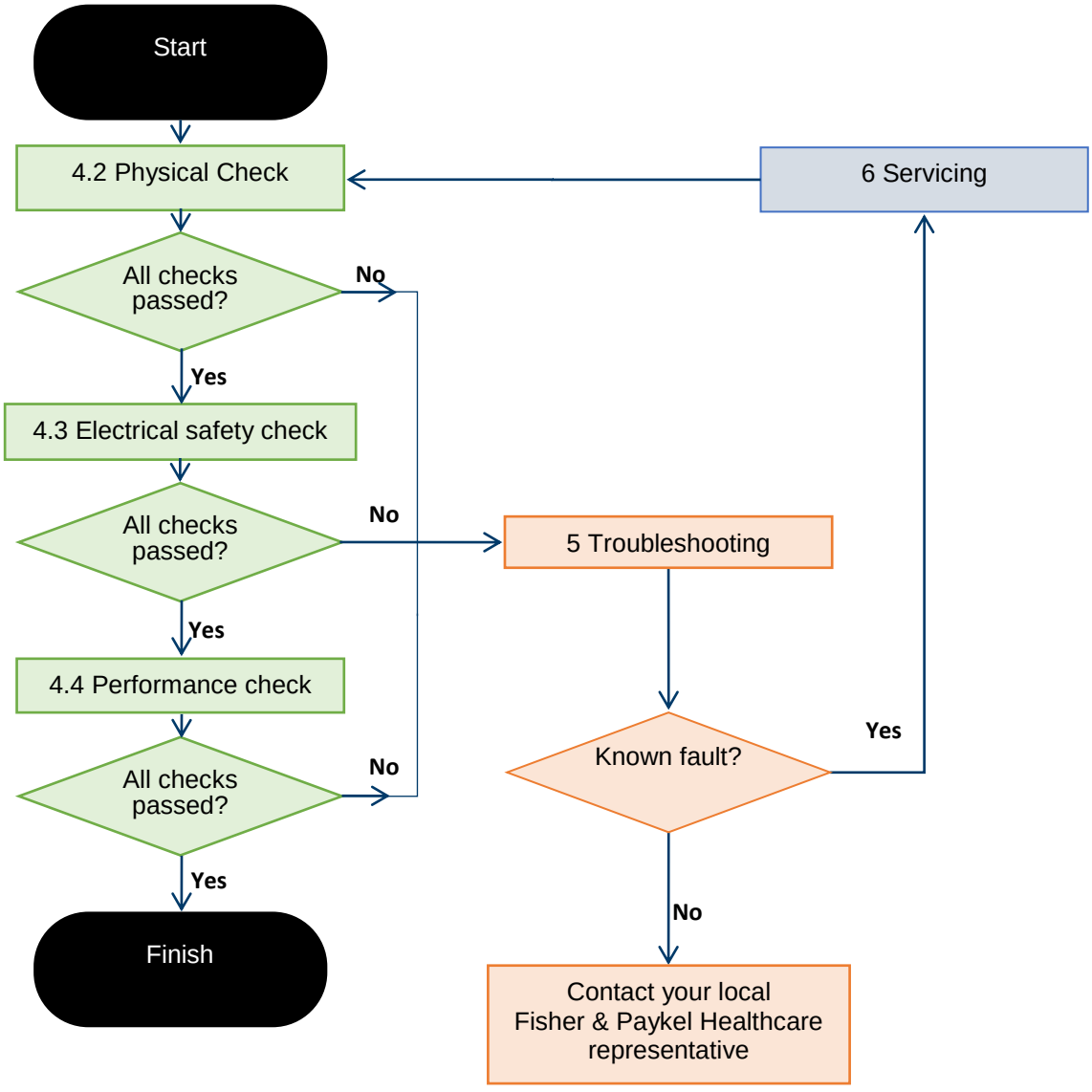


Figure 4.1 Annual maintenance tasks flow chart.

WARNINGS

- Do not perform maintenance and servicing activities while the humidifier is in use on a patient. Failure to comply may result in serious harm.
- This product is only designed and verified for use with accessories and spare parts approved by Fisher & Paykel Healthcare. Unauthorized accessories or spare parts which are used with the humidifier may impair performance of the humidifier, or compromise safety (including potentially causing serious patient harm), or result in increased electromagnetic emissions, or decreased electromagnetic immunity, resulting in improper operation.
- This product is designed for the delivery of air and/or oxygen. It is not suitable for the delivery of flammable anesthetic gas mixes or heliox gas. Failure to comply may impair performance of the humidifier or compromise safety (including potentially cause patient harm).
- Remove any sources of ignition such as: cigarettes, an open flame, or materials which ignite easily at high oxygen concentrations.
- Follow the instructions of the oxygen device provider; keep oxygen regulators, cylinder valves, tubing, connections, and all other oxygen equipment away from oil, grease, or greasy substances. Spontaneous and violent ignition may occur if these substances come into contact with oxygen under pressure.

CAUTION

Do not touch the hot surface of the heater plate, chamber base, or probes. Failure to comply may result in a skin burn.

4.2 Physical check

Carry out a physical check on the F&P 950™ Respiratory Humidifier by following the instructions specified in the table below. If any components are damaged, follow the instructions specified in the “corrective action” column to repair or replace the component.

> **WARNING**
>
> Disconnect power from the humidifier before carrying out a physical check. Failure to comply may result in serious harm.

Table 4.1 Physical check procedure.

Accessories and parts

Figure 4.2 Power cord and expiratory heater wire adapter

STEP	INSPECTION INSTRUCTIONS	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
1.1	Check the power cord for damage.	Replace the power cord.	F&P 950™ Respiratory Humidifier User Instructions.
1.2	Check the power cord retainer for damage.	Replace the power cord retainer.	Section 6
1.3	Check the expiratory heater wire adapter cable and its connectors for damage.	Replace the expiratory heater wire adapter.	F&P 950™ Respiratory Humidifier User Instructions.

Heaterbase

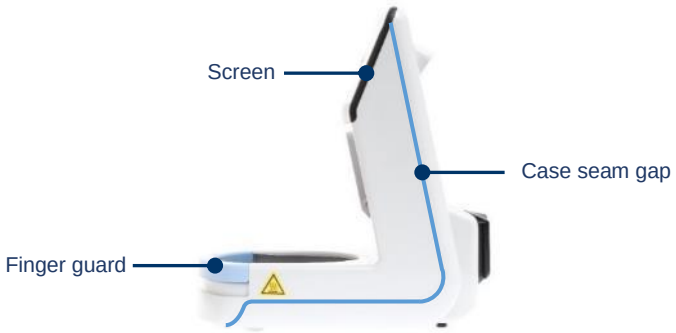


Figure 4.3 Heaterbase

STEP	INSPECTION INSTRUCTIONS	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
2.1	Check the heaterbase case for damage.	Contact your local Fisher & Paykel Healthcare representative.	–
2.2	Check the mounting bracket for damage.	Replace mounting bracket.	Section 6
2.3	Check the screen and its surrounding black panel for damage. Ensure the screen is secure, not cracked or delaminating.	Replace screen.	Section 6
2.4	Check that all case fixing screws and the mounting bracket fixing screw (refer to Figure 4.4) are present and torqued to the values specified in Table 6.1 using a torque driver.	Contact your local Fisher & Paykel Healthcare representative.	–

Figure 4.4 Case fixing and mounting bracket screw locations.

2.5	Check the “Hot Surface” sticker is present on each side of the heaterbase.	Replace “Hot Surface” stickers.	Section 6

STEP	INSPECTION INSTRUCTIONS	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
2.6	Check the heater plate for damage exceeding normal e.g. deep scratches or heavy corrosion.	Contact your local Fisher & Paykel Healthcare representative.	–
2.7	Check the finger guard to ensure it does not get stuck when pushed down, is flush with the top lip of the case surrounding the heater plate, is not loose, and pushes down evenly.	Replace the finger guard if damaged.	Section 6
2.8	Check the case is fully closed and the case seam gap (Figure 4.3) is uniform.	Contact your local Fisher & Paykel Healthcare representative.	–
2.9	Check the “IFU” sticker is present on the rear of the heaterbase.	Replace “IFU” sticker.	Section 6

Sensor Cartridge

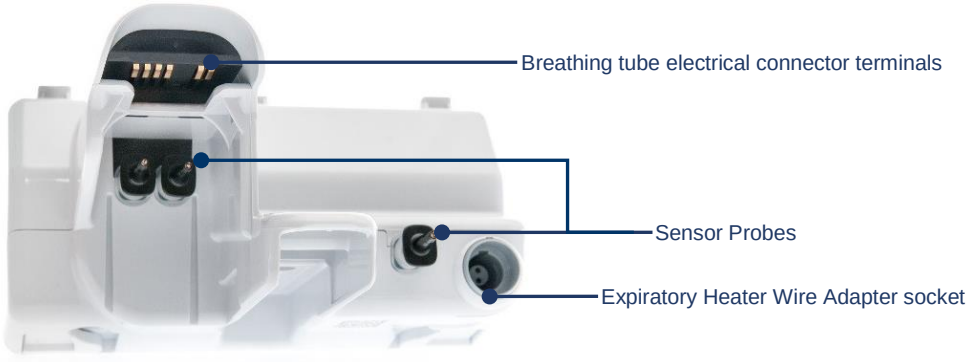


Figure 4.5 Sensor Cartridge.

STEP	INSPECTION INSTRUCTIONS	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
3.1	Check if the Sensor Cartridge case is damaged.	Replace the Sensor Cartridge if damaged.	Appendix A.8
3.2	Check each sensor probe’s glass thermistor for damage.	Replace the Sensor Cartridge if damaged.	Appendix A.8
3.3	Check each sensor probe’s glass thermistor for deposits or foreign material.	Clean probes as required.	F&P 950™ Respiratory Humidifier User Instructions.
3.4	Check each sensor probe housing for damage.	Replace the Sensor Cartridge if damaged.	Appendix A.8
3.5	Inspect the expiratory heater wire adapter socket for damage.	Replace the Sensor Cartridge if damaged.	Appendix A.8
3.6	Wipe the breathing tube electrical connector terminals with a cloth dampened with isopropyl alcohol.	–	–
3.7	Inspect the breathing tube electrical connector terminals for damage.	Replace the Sensor Cartridge if damaged.	Appendix A.8

4.3 Electrical safety check

When performing an electrical safety test, please be aware that:

- Electrical safety testing should only be carried out by a person with the relevant local electrical work qualifications.
- The humidifier and associated accessories should be tested to the current local medical electrical standards for in-house testing (for example, refer to AS/NZS 3551 for Australia and New Zealand).
- The humidifier is an IEC 60601-1 Class II Medical Device. The power cord earth is functional only and not protective, thus a protective earth test is **not required**.
- Accessible metal contacts of the heaterbase (including the heater plate, mounting bracket bolt, and case screws shown in Figure 4.6) should be tested for touch current.
- The maximum allowable touch current is 100 µA.

Figure 4.6 Touch current check locations.

WARNING

Failure to complete an electrical safety check may result in electrocution.

NOTES

- The heater plate cannot be used as an earth reference; this may result in corrosion.
- Permanent damage to the humidifier may result if the USB port is used as an earth point during electrical safety testing.
- Do not scratch the heater plate surface; this may result in corrosion.

4.4 Performance check

Follow the instructions provided in this section to check for the functionalities and performance of the F&P 950™ Respiratory Humidifier.

4.4.1 Functional check

The functional checks ensure the general performance of the humidifier and its user interface. Please set up the test equipment as specified in Figure 4.7.

Follow the functional check instructions in Table 4.2. If any components are found to be faulty, follow the instructions specified in the 'corrective action' column to repair or replace the component.

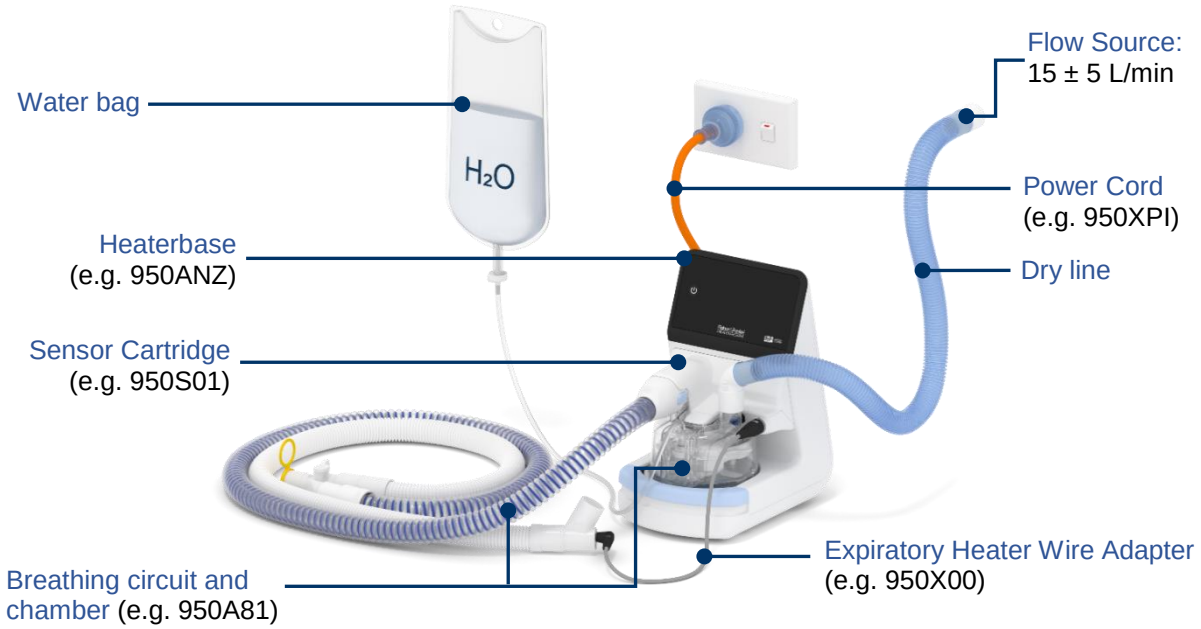
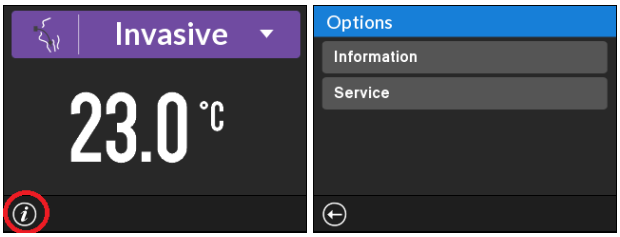


Figure 4.7 Equipment setup for functional check.

Table 4.2 Functional check procedure.

STEP	PROCEDURE	FAILURE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
SETUP AND LED CHECK				
1.	Connect the humidifier with mains power supply using the power cord.	–	–	–
2.	Check that the Caution LED illuminates briefly when the humidifier is turned on at the mains power supply.	Caution LED does not illuminate briefly.	Contact your local Fisher & Paykel Healthcare representative.	–
3.	After the Caution LED has turned off, press the On/Off button to turn the humidifier on.	Cannot be turned on.	Refer to Section 5.2 "Cannot turn on humidifier".	Section 5.2
		Humidifier alarms.	Refer to Section 5.1.	Section 5.1

STEP	PROCEDURE	FAILURE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
DISPLAY CHECK				
4.	Press the ⓘ (information) button in the bottom left corner of the screen. Check the options screen for displayed color and artifacts, comparing with screenshot below. **NOTE** The displayed number and mode may not match the image below. 	Screen appearance does not match.	Check the breathing circuit is connected. Contact your local Fisher & Paykel Healthcare representative.	–
		Cannot change screen.	Contact your local Fisher & Paykel Healthcare representative.	–
5.	Disconnect the inspiratory tube. Check that both a visual and an audible disconnection alarm are generated. The displayed image should be animated.  **WARNING** Failure to verify the audio function of the humidifier may compromise the alarm system which may lead to serious harm.	No animation played.	Contact your local Fisher & Paykel Healthcare representative.	–
		No alarm screen.	Replace the Sensor Cartridge and repeat the test. If result is consistent, contact your local Fisher & Paykel Healthcare representative.	Appendix A.8
		Audible tones distorted.	Contact your local Fisher & Paykel Healthcare representative.	–
		No audible tones.	Contact your local Fisher & Paykel Healthcare representative.	–
6.	Press the alarm pause button on the screen. Check button color turns gray and audible alarm is paused.	Audible tones not paused (muted).	Contact your local Fisher & Paykel Healthcare representative.	–

STEP	PROCEDURE	FAILURE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
		Button does not turn gray.	Contact your local Fisher & Paykel Healthcare representative.	–
7.	Retrieve a log file from the device. Refer to Appendix A.4 Retrieving device log.	Unable to retrieve log.	Contact your local Fisher & Paykel Healthcare representative.	–
8.	Press and hold the On/Off button until the humidifier turns off.	Humidifier does not turn off.	Contact your local Fisher & Paykel Healthcare representative.	–

4.4.2 Warm-up check

Follow the instructions given in this section to check the performance of the humidifier control system. This warm-up check is only required if the heaterbase has recently been serviced or is suspected to be faulty.

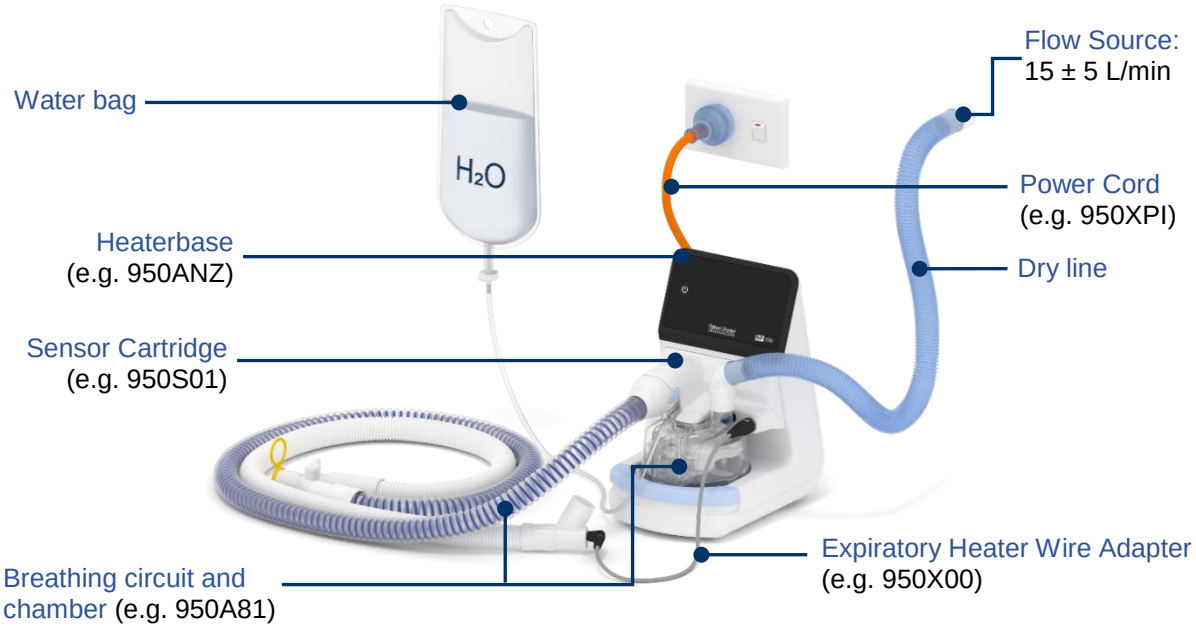


Figure 4.8 Equipment setup for warm-up check.

Table 4.3 Warm-up check procedure.

STEP	PROCEDURE AND PASS CRITERIA	FAILURE	CORRECTIVE ACTION	REFERENCE
1.	Ensure the humidifier has passed all the functional tests (refer to Section 4.4.1).			
2.	Throughout the duration of the test, ensure that the ambient temperature is between 18 °C and 26 °C if an adult breathing circuit is used, or that the ambient temperature is between 20 °C and 26 °C if a neonatal breathing circuit will be used for the warm-up check.			
3.	Connect the humidifier to a mains power supply using the power cord. Ensure the power supply meets the electrical requirements in Section 3.2.			
4.	Set up the heaterbase and its accessories as specified in **Figure 4.8**.			
5.	Connect the flow source to the humidifier chamber inlet port and turn the humidifier on.			
6.	Select “Invasive” mode on the humidifier if an adult breathing circuit is used or keep the humidifier in “Neonatal” mode if a neonatal breathing circuit will be used for the warm-up check.			
7.	Clear any alarms prior to starting the checks below (refer to Section 5.1).			
8.	Wait approximately 30 minutes for the humidifier to stabilize.			
9.	Check displayed number after the humidifier has stabilized.	Displayed number is not within 37 ± 2 °C.	If setup is correct, refer to Section 5.2 “Humidifier failed warm-up check”’.	Section 5.2
		Alarmed.	If setup is correct, refer to Section 5.2 “Humidifier failed warm-up check”.	Section 5.2

5 Troubleshooting

5.1 Alarms

The alarms on the F&P 950™ Respiratory Humidifier fall into two main categories:

1. Operational alarms which provide information for the user to assess and resolve the alarm condition themselves.
2. Alarms which require the attention of a service technician.

All alarms have a “medium” priority classification.

Each alarm has a visual and audible component. The audible alarm signal consists of three tones repeated every 5 seconds.

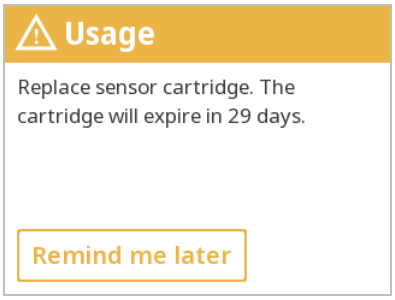
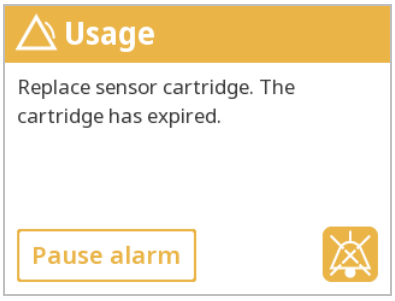
This section specifies only alarms which would require the attention of a service technician. For all other operational alarms, please refer to the F&P 950™ Respiratory Humidifier User Instructions.

5.1.1 Sensor Cartridge warnings

The humidifier will generate a warning prior to expiry and an alarm after the expiry period of the Sensor Cartridge. The details of these notifications are provided in the table below.

For instructions on how to replace the Sensor Cartridge, please refer to Appendix A.8.

Table 5.1 List of Sensor Cartridge service life warnings/alarms.

NOTIFICATION	NOTIFICATION CONTENT	WHEN DISPLAYED	POSSIBLE INTERACTIONS
Service life warning	 Audible tone: single-burst audible tone.	30 days prior to expiry and will reappear every 24 hours, or every 8 hours if less than 7 days remaining.	Press the “Remind me later” button to dismiss the warning screen. Contact a technician to replace the Sensor Cartridge as soon as appropriate.
Service life alarm	 Audible tone: continuous alarm tone.	7 years from the date of manufacture or after 15,000 hours of use. If alarm is paused, will reappear 4 hours later.	Press the “Pause Alarm” button to dismiss the warning screen. Contact a technician to replace the Sensor Cartridge as soon as appropriate.

NOTIFICATION	NOTIFICATION CONTENT	WHEN DISPLAYED	POSSIBLE INTERACTIONS
Service life symbol		When the “Remind me later” or “Pause Alarm” buttons are pressed.	Press the symbol to go to the warning/alarm screen associated with the service life.

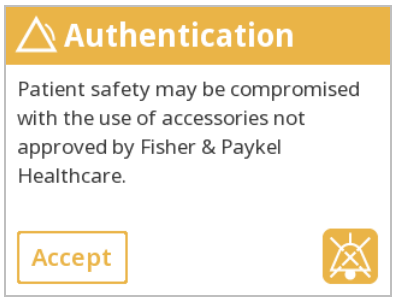
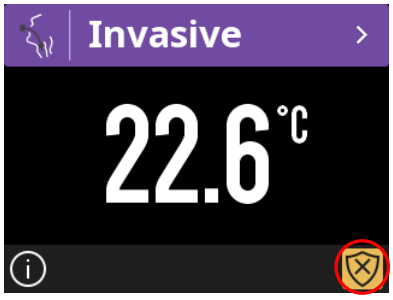
WARNING

This product is only designed and verified for use with accessories and spare parts approved by Fisher & Paykel Healthcare. Unauthorized accessories or spare parts which are used with the humidifier may impair performance of the humidifier, or compromise safety (including potentially causing serious patient harm), or result in increased electromagnetic emissions, or decreased electromagnetic immunity, resulting in improper operation.

The Cartridge Authentication alarm activates when the humidifier does not recognize the Sensor Cartridge.

If this occurs, the user may choose to press “Accept” to acknowledge that the Sensor Cartridge is not Fisher & Paykel Healthcare approved. A Sensor Cartridge authentication failure icon will appear at the bottom right of the display.

Table 5.2 List of Sensor Cartridge authentication warnings/alarms.

NOTIFICATION	NOTIFICATION CONTENT	WHEN DISPLAYED	POSSIBLE INTERACTIONS
Sensor Cartridge authentication failure	 Audible tone: continuous alarm tone.	When Sensor Cartridge authentication test fails	Contact a technician to replace the Sensor Cartridge as soon as appropriate and/or press the “Accept” button to acknowledge and dismiss the warning screen.
Sensor Cartridge authenticity failure symbol		When the Sensor Cartridge authentication test fails	To remove the Sensor Cartridge authentication failure icon, contact a technician to replace the Sensor Cartridge as soon as appropriate.

5.1.2 Service required alarms

This section describes how to respond to 'Service required' alarms according to the code specified.

All service required alarms displayed on the F&P 950™ heaterbase screen will provide the same user instructions to turn off the humidifier and contact a technician. However, the alarm screen will also show a unique alarm code at the left corner of the screenshot as per Figure 5.1. This code is required to determine the corrective action required for the alarm condition.

NOTE Please retrieve the device logs (refer to A.4) and contact your local Fisher & Paykel Healthcare representative if the humidifier continues to alarm after the corrective action is applied.

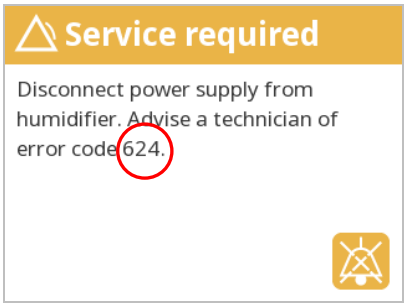


Figure 5.1 'Service Required' alarm example.

Table 5.3 List of service required alarms.

ALARM CODE	ALARM CONDITION	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
580, 601, 602, 610–615, 624–627, 632–635, 651	Fault found in the Sensor Cartridge.	Replace the Sensor Cartridge.	Appendix A.8
652, 653	Software does not support the attached Sensor Cartridge.	Contact your local Fisher & Paykel Healthcare representative.	–
719	Heater plate thermal cutout has triggered.	Reset the heater plate thermal cutout switch.	Section 0
721	Fault in the breathing circuit of any type.	Replace the breathing circuit.	e.g. REF 950A81 User Instructions
725	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
726, 727	Fault in the breathing circuit of any type.	Replace the breathing circuit.	e.g. REF 950A81 User Instructions
728–733	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
734, 766, 767	Fault in the adult breathing circuit.	Replace the adult breathing circuit.	e.g. REF 950A81 User Instructions
736, 737, 748–750, 753	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–

ALARM CODE	ALARM CONDITION	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
780	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
890–894	Fault in the breathing circuit of any type.	Replace the breathing circuit.	e.g. REF 950A81 User Instructions
900, 901	Fault found in the heater plate assembly.	Contact your local Fisher & Paykel Healthcare representative.	–
940–944, 968, 973, 974	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
979	Display assembly is not compatible with the current version of the software.	Contact your local Fisher & Paykel Healthcare representative.	–
999	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
1000–1003	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
1010–1012, 1016, 1020, 1021, 1111, 1112, 1116	Fault found in the Sensor Cartridge.	Replace the Sensor Cartridge.	Appendix A.8
1502, 1505, 1530–1533	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
1534	Fault found in the Sensor Cartridge.	Replace the Sensor Cartridge.	Appendix A.8
1540–1542, 1591, 1595–1598	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
1600–1602	Fault found in the Sensor Cartridge.	Replace the Sensor Cartridge.	Appendix A.8
1902, 1903, 1906–1911, 1914–1919	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
1920–1921, 2021–2025	Fault in the neonatal breathing circuit.	Replace the neonatal breathing circuit.	e.g. REF 950N80 User Instructions
2100–2104, 2200–2209	Fault found in the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–

ALARM CODE	ALARM CONDITION	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
Other codes	–	Contact your local Fisher & Paykel Healthcare representative.	–

5.2 Technical problems

Error states that do not result in an alarm are discussed in this section. Please follow the instructions specified in the “Corrective action” column in Table 5.4 to repair or replace any components.

Table 5.4 List of technical problems.

#	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
1.	**MAINTENANCE**			
1.1	Humidifier failed the electrical-safety check.	Fault on the heaterbase PCB.	Contact your local Fisher & Paykel Healthcare representative.	–
		Fault on other electrical parts.	Contact your local Fisher & Paykel Healthcare representative.	–
1.2	Humidifier failed the warm-up check.	Gas flow outside specification.	Adjust the gas flow according to the specification. Check dry line connection.	Section 4.4.2
		Chamber not inserted properly.	Insert the chamber fully and ensure the finger guard is up.	e.g. REF 950A81 User Instructions
		Faulty heater plate.	Contact your local Fisher & Paykel Healthcare representative.	–
		Damaged or bent sensor probe.	Replace the Sensor Cartridge.	Appendix A.8
		No water in chamber.	Ensure the chamber is connected to a water supply.	F&P 950™ Respiratory Humidifier User Instructions
		Ambient conditions outside humidifier operating range.	Check the ambient conditions are within the humidifier operating range.	F&P 950™ Respiratory Humidifier User Instructions

#	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
2.	**HUMIDIFIER**			
2.1	Cannot turn the humidifier on.	Incompatible power supply used.	Ensure the power supply meets the electrical requirements.	Section 3.2
		Power cord not connected securely.	Ensure the power cord is connected securely to the humidifier and the power cord retainer is used.	F&P 950™ Respiratory Humidifier User Instructions
		Broken power cord.	Replace the power cord.	F&P 950™ Respiratory Humidifier User Instructions
		Device fuse blown.	Contact your local Fisher & Paykel Healthcare representative.	–
		Faulty display assembly.	Replace display assembly.	Section 6.
		Faulty transformer.	Contact your local Fisher & Paykel Healthcare representative.	–
		Display assembly or other PCB disconnected.	Contact your local Fisher & Paykel Healthcare representative.	–
2.2	On/Off button stuck down.	Broken on/off button.	Contact your local Fisher & Paykel Healthcare representative.	–
2.3	Repetition of Caution LED being lit followed by a humidifier reset.	Fault on the heaterbase PCB or software.	Contact your local Fisher & Paykel Healthcare representative.	–
		Previous software upgrade disrupted during update.	Plug in the USB key with an appropriate upgrade file.	Appendix A.6
2.4	Caution LED lit and the humidifier resets once.	Reset triggered by the humidifier.	No corrective action is required.	–
2.5	Screen is blank or distorted and the Caution LED is flashing. An audible alarm can also be heard.	Display assembly is not compatible with the installed software.	Contact your local Fisher & Paykel Healthcare representative.	–

#	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION	CORRECTIVE ACTION REFERENCE
2.6	Caution LED is flashing; no audible tone.	Incorrectly entered software upgrade mode.	Restart the humidifier by turning off and on the mains power at the wall.	–
		Software upgrade through USB in progress.	No corrective action is required.	–
		Searching for an upgrade file.	Plug in the USB key with an appropriate upgrade file.	Appendix A.6
		Unsupported USB key.	Plug in the USB key with an appropriate upgrade file.	Appendix A.6
2.7	Screen displays distorted or unexpected color.	Display assembly or other PCB disconnected.	Contact your local Fisher & Paykel Healthcare representative.	–
		Fault in the display assembly.	Replace display assembly.	Section 6.
2.8	Touch screen has no response.	Fault in the software.	Restart the humidifier by turning off and on the mains power at the wall.	–
		Display assembly or other PCB disconnected.	Contact your local Fisher & Paykel Healthcare representative.	–
		Fault in the display assembly.	Replace display assembly.	Section 6.
2.9	Activation point on the touch screen is different from the touch point.	Display assembly or other PCB disconnected.	Contact your local Fisher & Paykel Healthcare representative.	–
		Fault in the display assembly.	Replace display assembly.	Section 6.
2.10	No or distorted audible sound.	Fault in the audio module.	Contact your local Fisher & Paykel Healthcare representative.	–
2.11	USB port not functioning.	PCB harness connection loose.	Contact your local Fisher & Paykel Healthcare representative.	–

6 Servicing

The following section details various servicing activities and spare parts available for the F&P 950™ Respiratory Humidifier. As shown by the diagram below (Figure 6.1), all servicing activities must be followed by a maintenance procedure as detailed in Section 4.

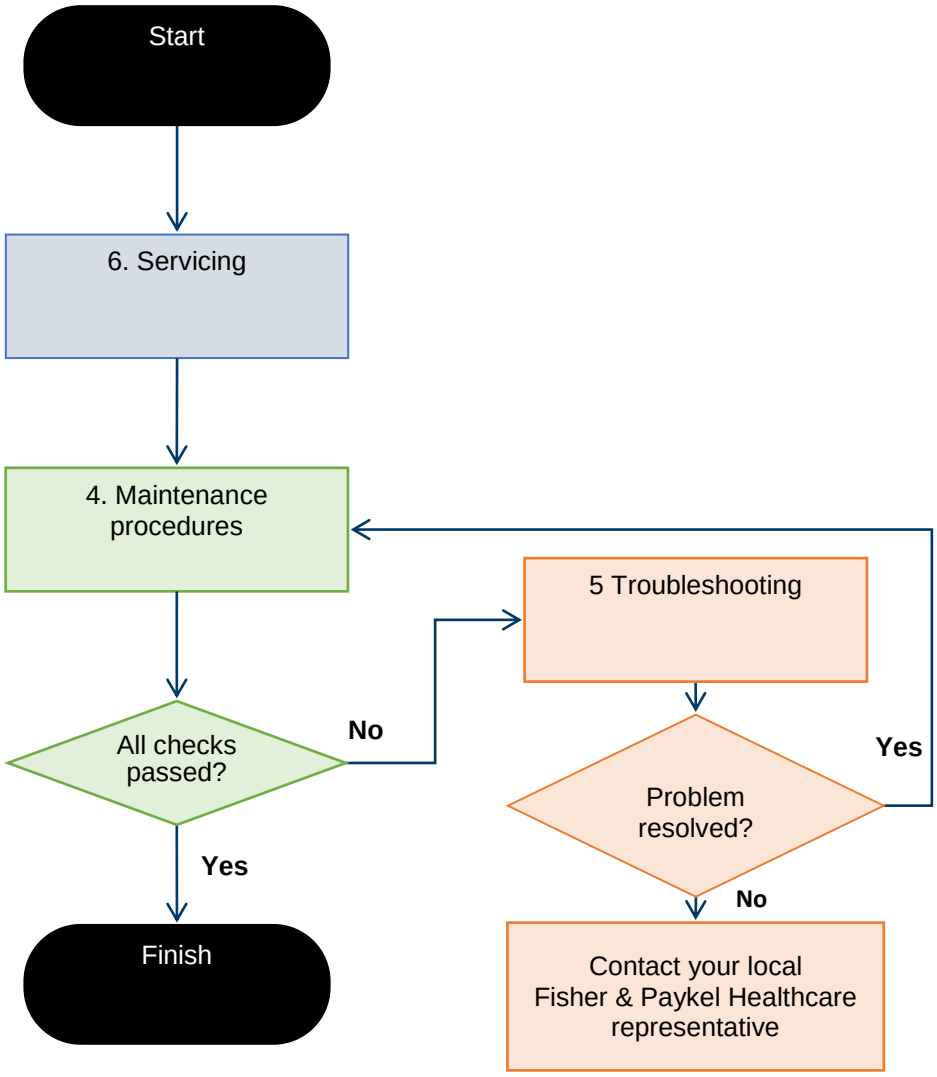


Figure 6.1 Servicing tasks flow chart.

WARNINGS

- All servicing procedures must be followed by the annual maintenance check to ensure proper operation.
- This humidifier must not be connected to a power supply during servicing. Failure to comply may result in serious harm.
- Disconnect power from the humidifier before opening the heaterbase. Failure to comply may result in serious harm.
- Disconnect power from the humidifier before resetting the heater plate thermal cutout. Failure to comply may result in serious harm.
- Do not perform maintenance and servicing activities while the humidifier is in use on a patient. Failure to comply may result in serious harm.
- Ensure the cables are not damaged during routing and are not accessible when the heaterbase is fully assembled. If the wires are damaged or exposed, the patient or the user may receive an electric shock.
- Observe electrostatic discharge precautions when servicing the heaterbase (e.g. use an anti-static mat and wrist strap). Failure to do so may result in irreparable damage to the heaterbase.
- Remove any sources of ignition such as: cigarettes, an open flame, or materials which ignite easily at high oxygen concentrations.
- This product is only designed and verified for use with accessories and spare parts approved by Fisher & Paykel Healthcare. Unauthorized accessories or spare parts which are used with the humidifier may impair performance of the humidifier, or compromise safety (including potentially causing serious patient harm), or result in increased electromagnetic emissions, or decreased electromagnetic immunity, resulting in improper operation.
- To prevent damage to components, do not use excessive force when refastening screws and bolts removed from the product.
- You must not modify the equipment in any way. Failure to comply may result in serious harm.

CAUTION

Do not touch the hot surface of the heater plate, chamber base, or probes. Failure to comply may result in a skin burn.

6.1 Screws and torque settings

Table 6.1 lists the types of screws used in the assembly of the heaterbase and the associated screw torques. Please fasten the screws to the specified torques during the assembly of all heaterbase components.

Table 6.1 Screws, torque settings, and maximum fastening cycles for servicing the heaterbase.

SCREW APPLICATION	SCREW TYPE	TORQUE (Nm)
Case-fixing screw	SS PH2 Plastite	0.8
USB-port-cover screw	SS PH2 Plastite	0.8
Display screw	SS PH2 Plastite	0.8
Chassis screw	SS PH2 Plastite	0.8
Power-cord-retainer screw	SS PH2 Plastite	0.8
Mounting-bracket-fixing screw	SS T25 Torx	5.0

6.2 Resetting the heater plate thermal cutout

Locate the thermal cutout reset button on the bottom of the heaterbase as in **Figure 6.2** below. Use a small plastic pin to depress the button. If the thermal cutout has been tripped, an audible *click* will confirm that it has been reset.

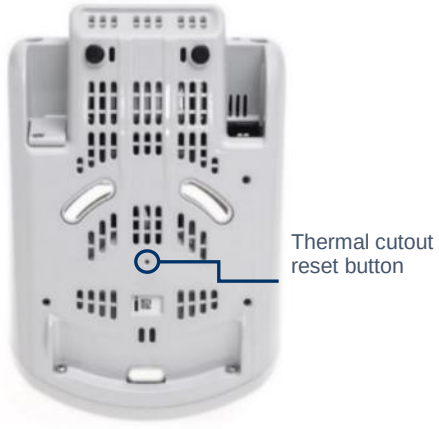


Figure 6.2 Location of thermal cutout reset button.

6.3 Exploded schematic

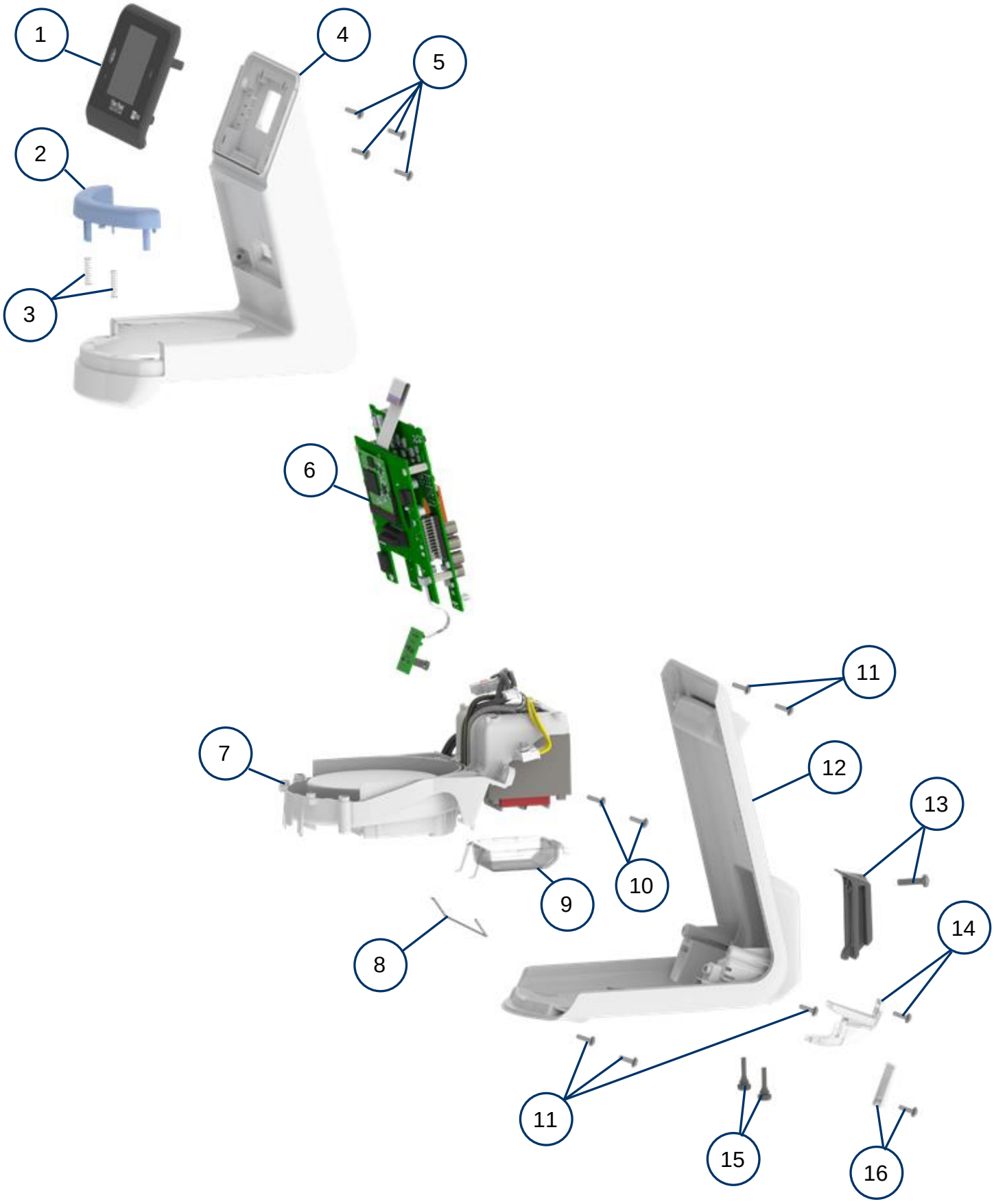


Table 6: Exploded Schematic Component Descriptions.

ITEM	COMPONENT	ITEM	COMPONENT
1	Display	9	Transformer Cover
2	Finger Guard	10	Chassis Screws
3	Finger-Guard Springs	11	Case Screws
4	Front Case	12	Rear Case
5	Display Screws	13	Mounting Bracket & Screw
6	PCB Assembly	14	Power-Cord Retainer & Screw
7	Chassis Assembly	15	Rubber Feet
8	Torsion Bar	16	USB Cover & Screw

6.4 Heaterbase teardown

1. Ensure you are wearing a properly earthed anti-static wrist strap before servicing this heaterbase.
2. Unfasten the power cord retainer fixing screw (1x PH2 Taptite Screw, **Figure 6.3**).
3. Remove the power cord retainer and disconnect the power cord.
4. Unfasten the mounting bracket fixing screw (1x T25 Torx).
5. Remove the mounting bracket (**Figure 6.4**).

Figure 6.3 Location of power cord retainer and fixing screw.

Figure 6.4 Location of mounting bracket fixing screw.

6. Unfasten the case-fixing screws from the rear case (6x PH2 Taptite Screw, **Figure 6.5**).
7. Remove the rear case by levering the rear case from the front case at the seam (**Figure 6.6**). The rear case should disengage from the chassis drainage slots.

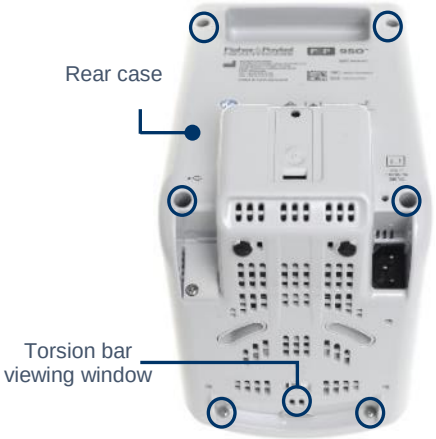


Figure 6.5 Location of case fixing screws.

Figure 6.6 Side view showing removal of rear case.

8. Remove the torsion bar (**Figure 6.7**).
9. The finger guard is attached to the case at three points: the outer clips and the arrowhead (**Figure 6.8**). Detach the outer clips by pressing the outer face of the finger guard inwards (**Figure 6.9**) while simultaneously pulling gently on the corresponding end of the finger guard.
10. Disconnect the 6x PCB harness connector cables (**Figure 6.10**).

Figure 6.7 Torsion bar removal.

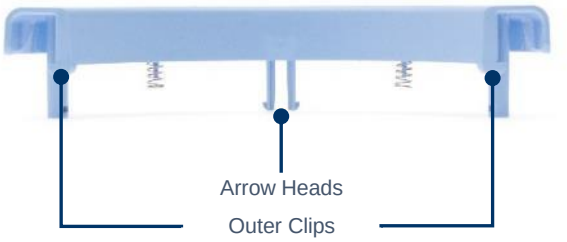


Figure 6.8 Finger guard.

Figure 6.9 Finger guard removal.

Figure 6.10 Location of 6x connectors.

NOTES

- Take care not to interfere with the PCB when unfastening the display-fixing screws.
- The lower display screws are captured by the PCB.

11. Unfasten the display fixing screws (4x PH2 Taptite Screw, **Figure 6.11**).
12. Disconnect the display connector at the display by lifting the latch on the connector and gently pulling the ribbon cable (**Figure 6.12**).
13. Remove the display.

Figure 6.11 Display screw locations.

Figure 6.12 Display connection.

14. Remove the USB PCB by pulling down on the clip and gently pushing the PCB up (**Error! Reference source not found.**). Hang it out of the way, leaving it connected to the PCB.
15. Unfasten the chassis-fixing screws (2x PH2 Taptite Screw), and unclip the front-chassis clips and slide the chassis assembly out (**Error! Reference source not found.**).
16. Remove the PCB by applying downwards pressure to the two clips at the bottom (**Error! Reference source not found.**).

NOTE The two screws that were captured by the PCB will fall out.

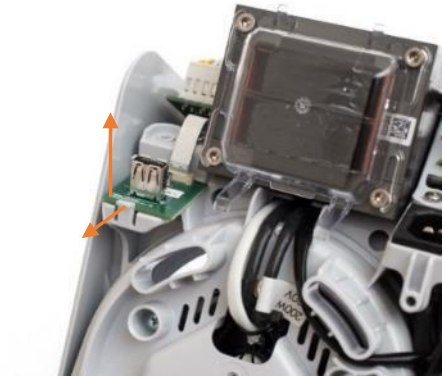


Figure 6.13 USB PCB removal.

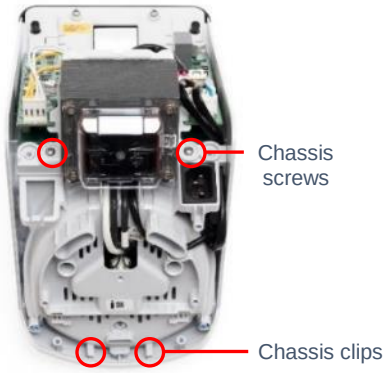


Figure 6.14 Chassis clips and screws locations.

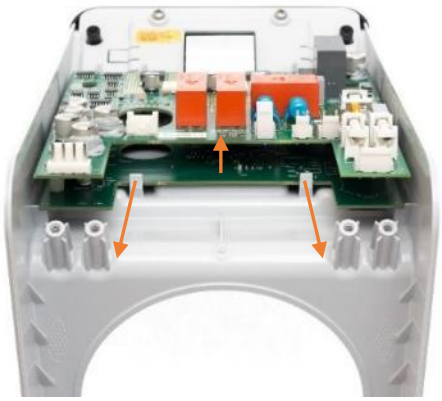


Figure 6.15 PCB removal.

Replacement is the reverse of removal:

17. Install the lower display screws before reattaching the PCB.
18. Insert the top of the PCB then press down on the bottom to secure with the clips.

NOTE Take care when replacing the display connector – ensure the blue strip is evenly visible.

19. Reinstall the display.
20. Slide the chassis onto the PCB, aligning the front clips, screw bosses and PCB slots (**Error! Reference source not found.**).
21. Press the front of the chassis until it clicks into place.
22. Fasten the chassis-fixing screws – ensure replacement into the correct screw bosses (**Error! Reference source not found.**). Fasten the screws to the specified torque settings as listed in Table 6.1 above.
23. After replacing the chassis and securing the chassis fixing screws to the specified torque as listed in Table 6.1 above, check the gap between the chassis and the PCB clip to confirm that it is no more than 0.8 mm (**Figure 6.16**).

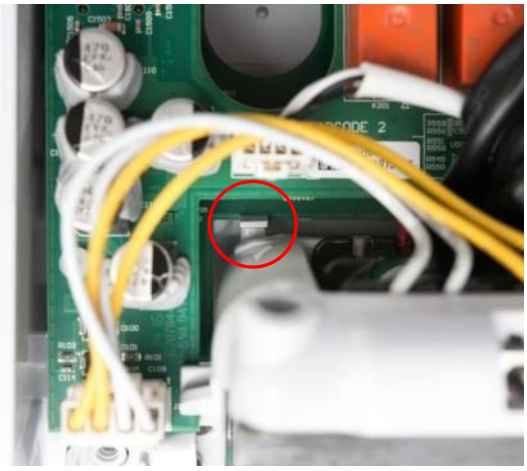


Figure 6.16 Chassis PCB clip gap location.

24. Reinstall the USB PCB – align the notch with the clip, pull on the clip, and gently press down the PCB.
25. Reconnect the 6x connector cables (**Figure 6.10**).
26. Place the finger-guard springs into the bosses on the case.

27. Cover the vertical posts of the finger guard with synthetic grease.

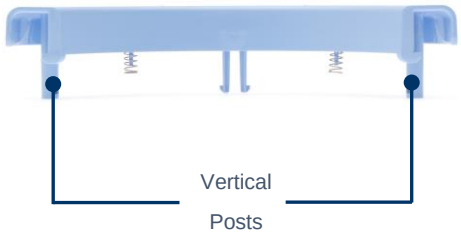


Figure 17: Finger Guard Vertical Posts.

NOTE Ensure both vertical posts of the finger guard are completely covered in synthetic grease before assembling the finger guard.

28. Align the finger guard posts, springs, and arrowhead, then press the finger guard downwards until it clicks into place.
29. Install the torsion bar while depressing the finger guard.

NOTES

- Ensure the torsion bar is in the correct orientation and is visible through the torsion bar viewing windows when the rear case is installed (**Figure 6.5**).
- Ensure the transformer cover is attached to the chassis assembly.

30. Check that the wires are routed so that they won't become jammed when the rear case is reinstalled.
31. Reinstall the rear case, power cord and retainer, and mounting bracket, then fasten the screws to the specified torque settings as listed in Table 6.1 above.

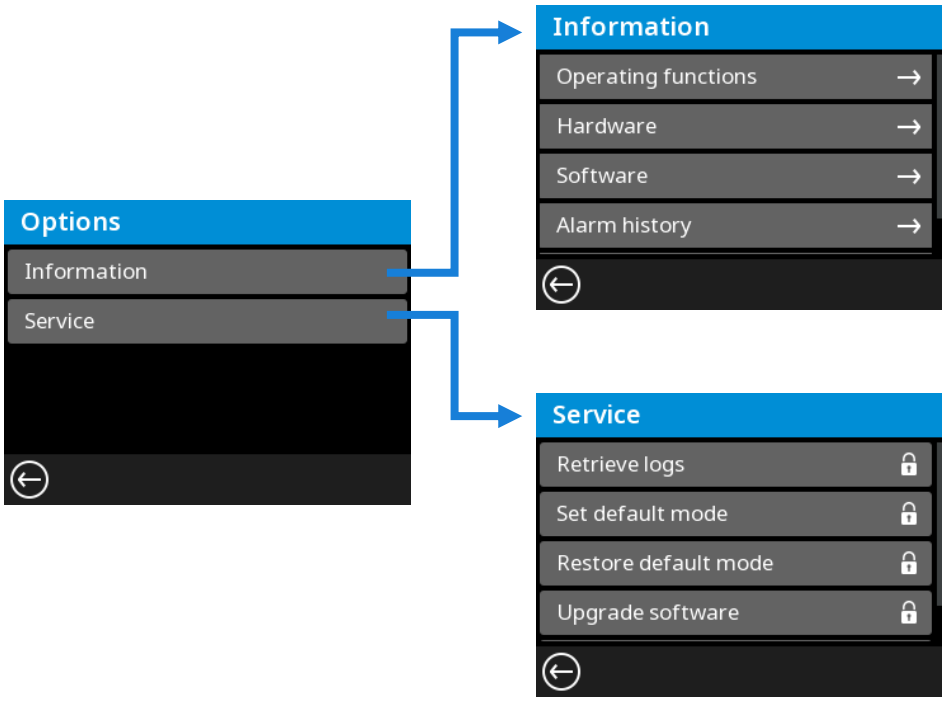
6.5 Spare Parts

The following spare parts kits are available in select markets only, contact your local Fisher & Paykel Healthcare representative for more information or to purchase spare parts kits:

KIT #	KIT DESCRIPTION	CONTENTS		Quantity
950Z01	950 Spare Small Parts Kit		Finger guard	1
			Mounting bracket	1
			Power-cord retainer	1
			Rubber foot	2
			Finger-guard springs	2
			Torsion bar	1
			“Follow IFU” label	1
			“Hot surface” labels	2
			Mounting-bracket screw	1
			PH2 screws	13
			Synthetic grease	1
950Z02	950 Spare Display Kit		Mounting-bracket screw	1
			PH2 screws	13
			Display	
950Z07ANZ	950 Spare Power Cord Kit (ANZ)		Power cord	1
950Z07AGB	950 Spare Power Cord Kit (AGB)			

Appendix A Options screen

The “Options” screen of the F&P 950™ heaterbase provides access to the following features and functions:

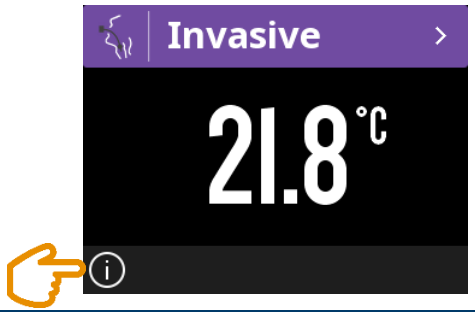
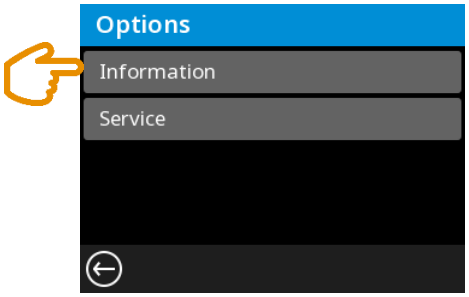
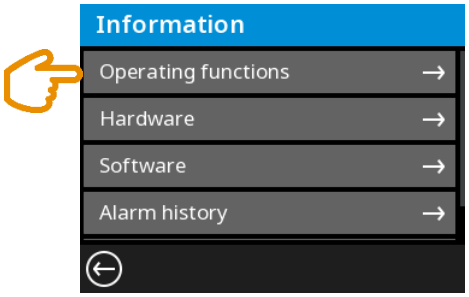
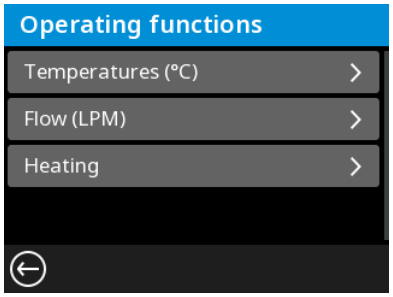


FEATURE/FUNCTION	FEATURE INTENT	REFERENCE
Operating functions	Feature that exposes a subset of real-time readings from the humidifier.	Appendix A.1
Hardware/software	Feature that details the software and hardware versions of the F&P 950™ heaterbase.	Appendix A.2
Alarm History	Feature that displays the last 10 user alarms and details.	Appendix A.3
About	Trademark, patent, and legal information.	-
Retrieve logs	Feature that allows the user to retrieve the device logs.	Appendix A.4
Set default mode	Feature that allows the user to set the default operating mode and set point temperature.	Appendix A.5
Restore default mode	Restores the humidifier to the default factory operating mode and set-point temperature.	-
Upgrade software	Feature that allows the user to upgrade the humidifier software.	Appendix A.6
Set language	Feature that allows the user to change the display language.	Appendix A.7

A.1 Troubleshooting

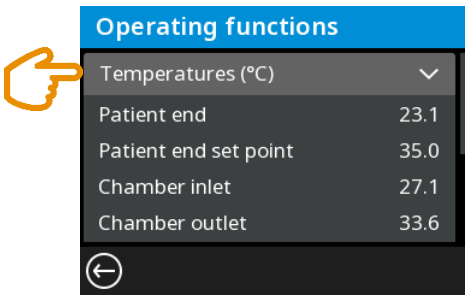
The “Operating Functions” screen may be useful for troubleshooting. To access the “Operating Functions”, follow the instructions below:

NOTE Information in the “Operating Functions” screen is for troubleshooting purposes only. It shall not be used for patient diagnostics.

STEP	INSTRUCTION	SCREENSHOT
1.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
2.	From the “Options” screen that is displayed, select “Information”.	
3.	From the “Information” screen that is displayed, select “Operating Functions”.	
4.	The following categories of readings will be presented.	

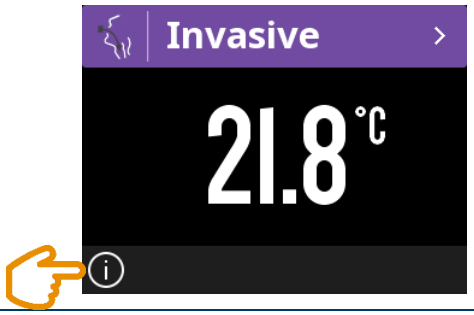
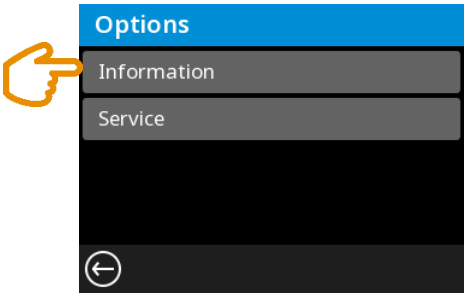
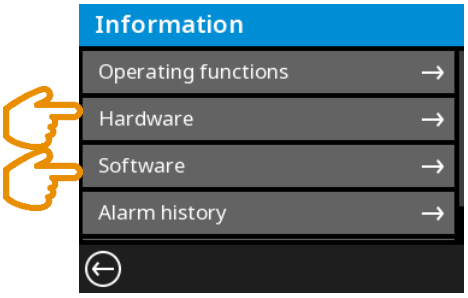
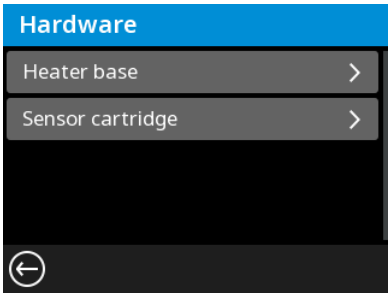
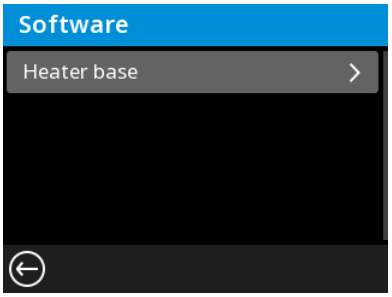
5. To view the readings under each category, touch the category name. Similarly, to hide the readings touch the category name again.

   Swipe up and down to scroll.



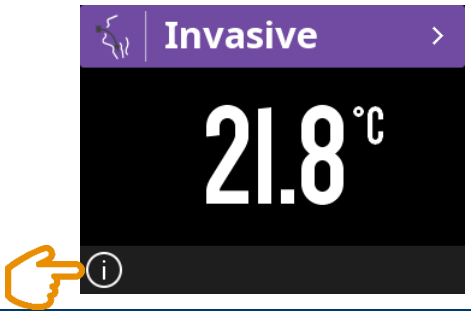
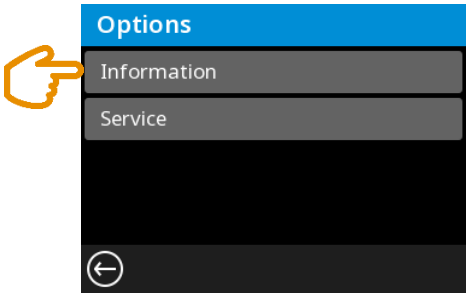
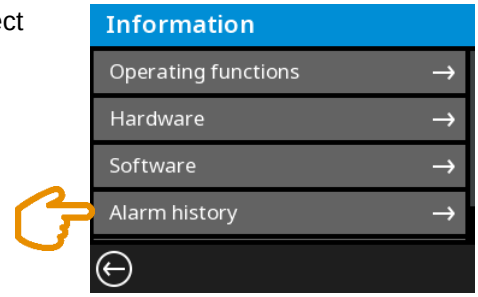
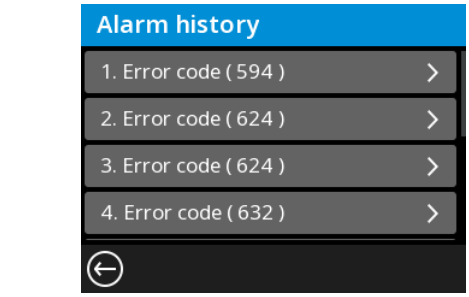
A.2 Accessing version information

To access the humidifier version information, follow the instructions below:

STEP	INSTRUCTION	SCREENSHOT
1.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
2.	From the “Options” screen that is displayed, select “Information”.	
3.	From the “Information” screen that is displayed, select “Hardware” or “Software”.	
4.	The “Hardware” screen contains the hardware information associated with the heaterbase and Sensor Cartridge. To view the readings under each category, touch the category name. Touch the category name again to hide the details.	
5.	The “Software” screen contains the software information associated with the heater base. To view the readings under each category, touch the category name. Touch the category name again to hide the details.	

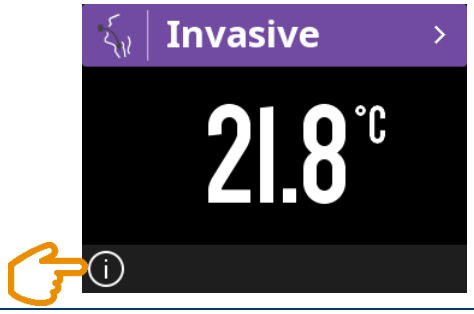
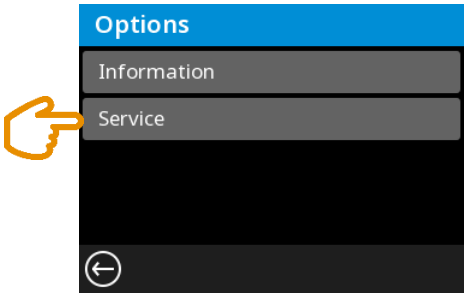
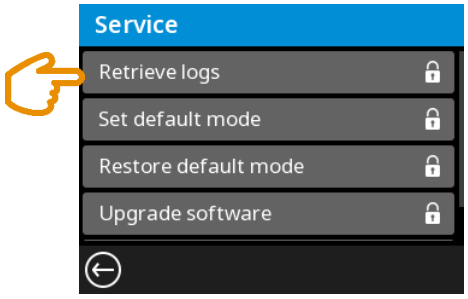
A.3 Viewing previous user alarm code

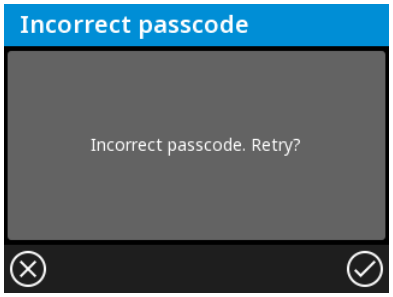
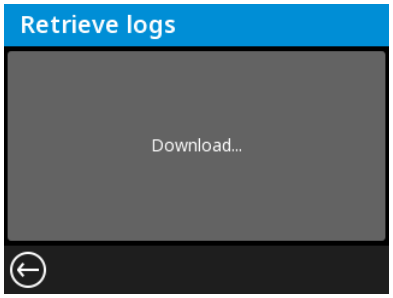
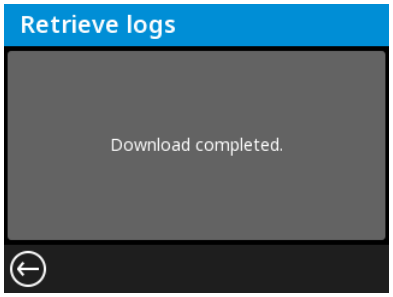
To access the previous alarm code information, follow the instructions below:

STEP	INSTRUCTION	SCREENSHOT
1.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
2.	From the “Options” screen that is displayed, select “Information”.	
3.	From the “Information” screen that is displayed, select “Alarm history”.	
4.	The “Alarm history” screen contains the user alarm information associated with the heaterbase and Sensor Cartridge. Maximum 10 user alarms can be displayed with the newest alarm placed on the top of the list. Touch the user alarm code to view more details. Touch the user alarm code again to hide the details.	

A.4 Retrieving device log

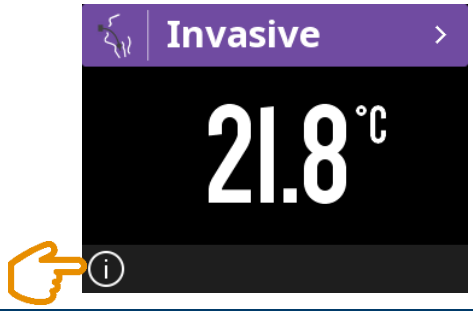
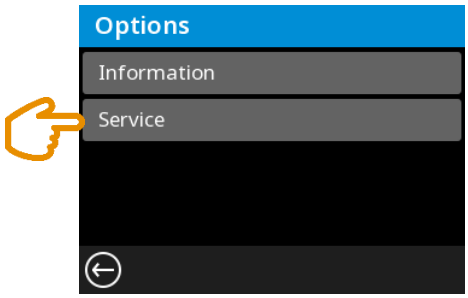
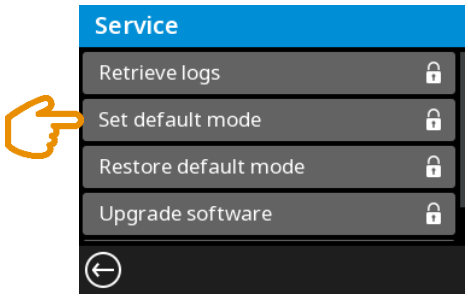
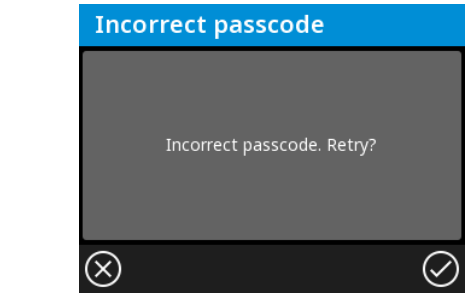
To retrieve the device logs, follow the instructions below:

STEP	INSTRUCTION	SCREENSHOT
1.	Unscrew the USB port cover.	–
2.	Plug the humidifier into mains power and turn it on.	–
3.	Insert a FAT32 USB key into the USB Type-A port.	
4.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
5.	From the “Options” screen that is displayed, select “Service”.	
6.	From the “Service” screen that is displayed, select “Retrieve Logs”.	

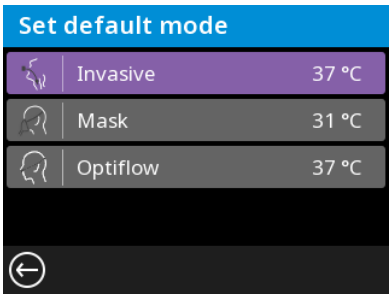
7.	The Fisher & Paykel Healthcare logo will appear as a passcode panel. Press the following letters in sequence: “F”, “P”, and “H”.	
8.	If an incorrect passcode is entered, a message box will be displayed. Press the check icon to retry.	
9.	Text will appear below the “Retrieve logs” item to state that the download is in progress.	
10.	When the download is complete, a message will appear on the “Retrieve logs” screen.	
11.	Remove the USB key and re-secure the USB cover.	–

A.5 Setting default operating mode

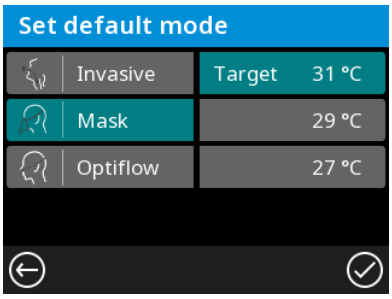
Follow the instructions below to select default modes and set points for an F&P 950™ Respiratory Humidifier operating with an adult breathing circuit attached:

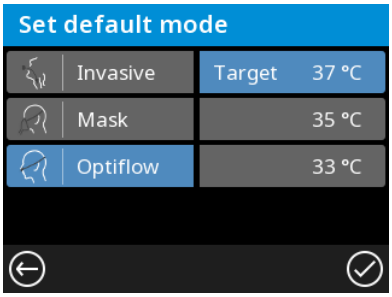
STEP	INSTRUCTION	SCREENSHOT
1.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
2.	From the “Options” screen that is displayed, select “Service”.	
3.	From the “Service” screen that is displayed, select “Set default mode”.	
4.	The Fisher & Paykel Healthcare logo will appear as a passcode panel. Press the following letters in sequence: “F”, “P”, and “H”.	
5.	If incorrect passcode is entered, a message box will be displayed. Press the check icon to retry.	

6. The following screen will appear, to allow the user to select the default operating mode.

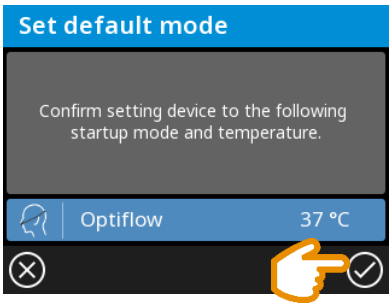


7. If “Mask” or “Optiflow” modes are selected, the user is prompted to select a set point temperature. The options for set-point temperature for Mask and Optiflow™ modes are shown opposite:





8. Once the default mode and set point temperature has been selected, confirm the selection.



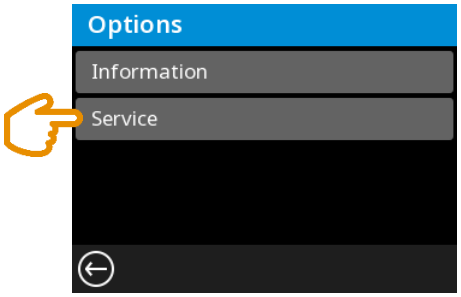
NOTE If the Sensor Cartridge is replaced, please check that the desired device settings are in place.

A.6 Upgrading F&P 950™ heaterbase software

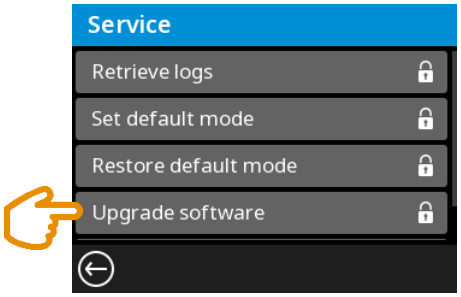
Follow the instructions below to install new software onto an F&P 950™ heaterbase:

STEP	INSTRUCTION	SCREENSHOT
1.	Unscrew the USB port cover.	
2.	Insert a USB key with the software upgrade file into the USB port.	
3.	Connect the chamber and inspiratory breathing tube.	
4.	Plug the humidifier into mains power and turn it on.	–
5.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	

6. Select “Service”.

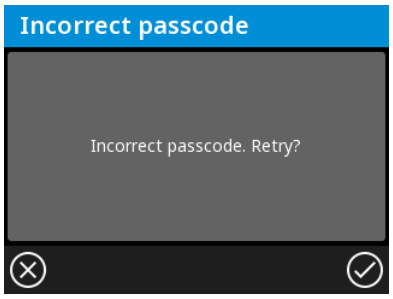


7. Select “Upgrade software”.



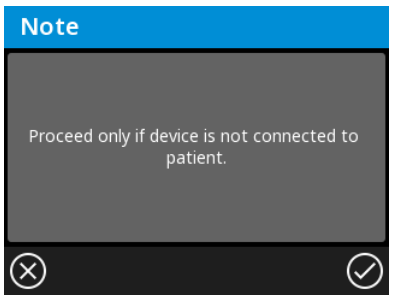
8. The Fisher & Paykel Healthcare logo will appear as a passcode panel. Press the following letters in sequence: “F”, “P”, and “H”.

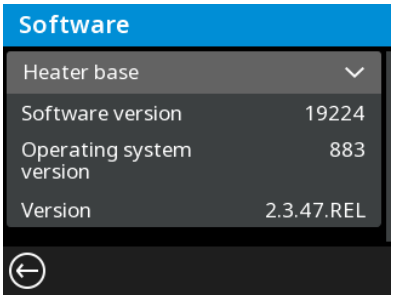
9. If incorrect passcode is entered, a message box will be displayed. Press the check icon to retry.



10. When the correct password is selected, a screen will be displayed to ask for confirmation that a patient is not connected.

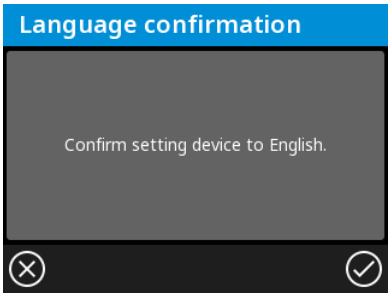
Read the warning and if you agree, select the check icon.



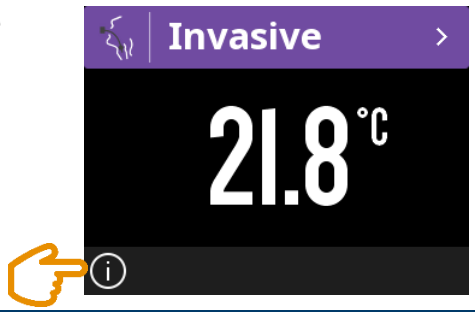
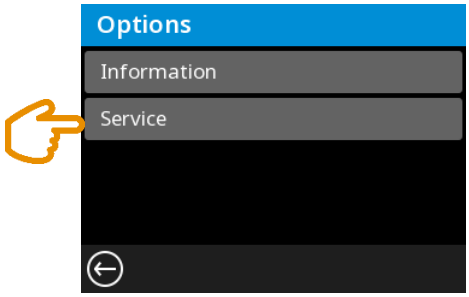
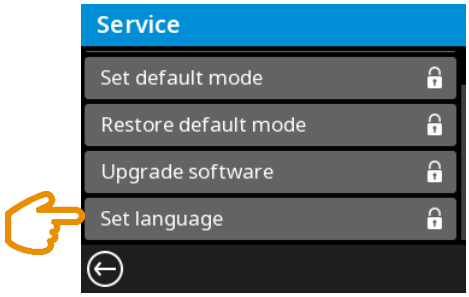
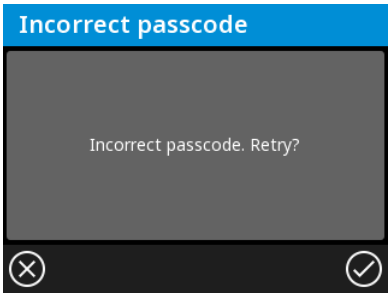
11.	The Caution LED will flash during the update. Wait for the humidifier to restart. **NOTE** If a send to service error code 1122 or 653 occurs, a Sensor Cartridge upgrade is required.	
12.	Remove the USB key and re-secure the USB port cover.	–
13.	To ensure the software has been upgraded, compare the installed software version (refer to A.2) matches the version of the upgrade file on the USB key.	

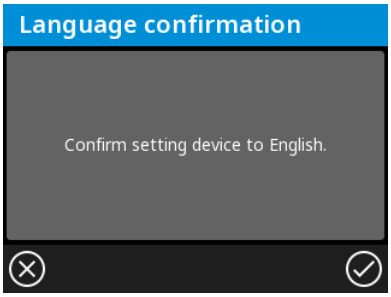
A.7 Setting display language

If the device has not been turned on and the language has not been set up previously, follow the instructions below to set the display language.

STEP	INSTRUCTION	SCREENSHOT
1.	Depending on the model, the “Language” screen is displayed when the device is turned on, to allow the user to select different languages. If no action is taken by the user after two minutes, the language will automatically be set to English. Some models (e.g. 950ANZ) have a default of English.	
2.	If a language is selected, a confirmation message will be displayed. Press the check icon to confirm selection.	

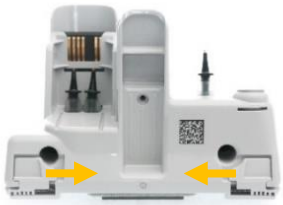
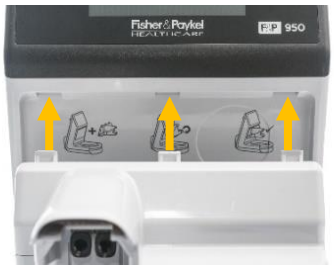
If the language has been set up previously, follow the instructions below to change the language.

STEP	INSTRUCTION	SCREENSHOT
1.	When the “Main” screen is displayed, navigate to the “Options” screen by touching the information icon on the bottom left of the “Main” screen.	
2.	From the “Options” screen that is displayed, select “Service”.	
3.	From the “Service” screen that is displayed, scroll down to the bottom and select “Set language”.	
4.	The Fisher & Paykel Healthcare logo will appear as a passcode panel. Press the following letters in sequence: “F”, “P”, and “H”. If incorrect passcode is entered, a message box will be displayed. Press the check icon to retry.	 

5.	The following screen will be displayed to allow the user to select the language. A check icon indicates the currently selected language.	
6.	If a language is selected, a confirmation message will be displayed. Press the check icon to confirm the selection.	

A.8 Replacing F&P 950™ Sensor Cartridge

Follow the instructions below to install a new Sensor Cartridge onto an F&P 950™ heaterbase:

STEP	INSTRUCTION	
1.	Slide the clips on the underside of the Sensor Cartridge inwards and pull the bottom of the Sensor Cartridge outwards.	 
2.	Remove the Sensor Cartridge from the heaterbase.	
3.	Insert the tabs on the top of the Sensor Cartridge into the slots on the heaterbase.	
4.	Press firmly on the bottom of the Sensor Cartridge until the clips click into place.	

Appendix B IEC 60601-1-2:2014 EMC Tables

Guidance and manufacturer's declaration – electromagnetic emissions		
The F&P 950™ Respiratory Humidifier is intended for use in a professional healthcare facility environment. The customer, or the user, of the F&P 950™ Respiratory Humidifier should ensure that it is used in such an environment.		
Emissions test	**Compliance class/group**	**Electromagnetic environment – guidance**
Radiated RF emissions CISPR 11	Group 1, Class A	The F&P 950™ Respiratory Humidifier uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Conducted RF emissions CISPR 11	Group 1, Class A	The F&P 950™ Respiratory Humidifier is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes
Harmonic distortion IEC 61000-3-2	Class A	
Voltage fluctuations and flicker IEC 61000-3-3	None	

Guidance and manufacturer's declaration – electromagnetic immunity		
The F&P 950™ Respiratory Humidifier is intended for use in the professional healthcare facility environment. The customer or the user of the F&P 950™ Respiratory Humidifier should ensure that it is used in such an environment.		
Immunity test	**Compliance level**	**Electromagnetic environment – guidance**
Electrostatic discharge IEC 61000-4-2	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines, 100 kHz repetition frequency	
Surges IEC 61000-4-5	± 0.5 kV, ± 1 kV line-to-line ± 0.5 kV, ± 1 kV, ± 2 kV line-to-ground	
Voltage dips IEC 61000-4-11	0% U_T for 0.5 cycle at 0º, 45º, 90º, 135º, 180º, 225º, 270º and 315º 0% U_T for 1 cycle and 70% U_T for 25/30 cycles, single phase at 0º	If the user of the F&P 950™ Respiratory Humidifier requires continued operation during power mains interruptions, it is recommended that the F&P 950™ Respiratory Humidifier be powered from an uninterruptible power supply or a battery.
Voltage interruptions IEC 61000-4-11	0% U_T for 250/300 cycle	
Power frequency magnetic field IEC 61000-4-8	30 A/m, 50/60 Hz	

Proximity fields from RF wireless communications equipment IEC 61000-4-3	9–28 V/m, 15 Radio Service Bands at 385 MHz to 5785 GHz	
Radiated RF EM fields IEC 61000-4-3	3 V/m, 80 MHz to 2.7 GHz, 80% AM at 1 kHz	
Conducted disturbances induced by RF fields IEC 61000-4-6	3 Vrms, 0.15–80 MHz, 6 Vrms in ISM bands between 0.15 MHz and 80 MHz, 80% AM at 1 kHz	
NOTE 1 U_T is the AC mains voltage prior to application of the test level.		

Appendix C Product version history

HARDWARE	SOFTWARE	INTRODUCTION
Initial release of hardware	2.0.35.797.13750.REL	Jul 2016
Sensor Cartridge PCB (Z42004 B2)	2.2.9.843.16257.REL	Nov 2017
Heaterbase PCB (Z42042 D2)	2.2.17.871.17813.REL	Sep 2018
Heaterbase PCB (Z42042 D2)	2.3.44.877.18771.REL	Mar 2019
Heaterbase PCB (Z42042 D2)	2.3.45.877.18871.REL	May 2019
Heaterbase PCB (Z42042 D2)	2.3.47.883.19224.REL	Aug 2019
Heaterbase PCB (Z42042 D2)	2.3.52.890.19630.REL	Mar 2020
Heaterbase PCB (Z42042 E)	2.3.52.890.19630.REL	Apr 2020
Heaterbase PCB (Z42042 E)	4.0.3.923.20678.REL	Nov 2020

Appendix D Maintenance check report template

This section can be printed out for recording the maintenance test results.

Product Technical Manual Version	Asset ID
Heaterbase Model Number	**Software Version**
Heaterbase Serial Number	**Sensor Cartridge Serial Number**

Checks	Result (Y/N)	Comments
Physical Check (refer to Section 4.2) Check following parts for physical damage:		
Accessories		
Power cord and retainer inspection passed?		
Expiratory heater wire adapter inspection passed?		
Heater base		
Case inspection passed?		
Display inspection passed?		
All case screws and mounting bracket screw present?		
Heater plate inspection passed?		
Finger guard functioning properly?		
Case seam gap inspection passed?		
USB Port Cover Secured?		
Sensor Cartridge		
Sensor Cartridge case inspection passed?		
Probe thermistors inspection passed?		
Probe housings inspection passed?		
Expiratory heater wire adapter socket inspection passed?		
Wiped breathing tube connector terminals?		

Breathing tube connector terminals inspection passed?		
Electrical safety check (refer to Section 4.3) Perform the following electrical safety checks:		
Country-specific medical electrical standards for in-house testing completed and passed (e.g. AS/NZS 3551)?		
Leakage current test of metal contacts < 100 µA?		
Functional check (refer to Section 4.4.1) Check following functions perform as expected:		
Caution LED illuminated?		
On/Off button turns humidifier on?		
Options screen appearance as expected?		
Able to change to Optiflow™ mode?		
Optiflow™ screen appearance as expected?		
Alarm screen appearance as expected?		
Alarm animations played?		
Audible alarm can be heard?		
Able to pause alarm?		
On/Off button can turn humidifier on and off?		
Warm-up check (Refer to Section 4.4.2) Warm-up check required if the humidifier is faulty or serviced. Record “N/A” if not required.		
Displayed number reached within expected range and time (37 ± 2 °C after 30 mins)?		
Notes *Take photos of any observed faults, capture the alarm code, retrieve the logs from the humidifier and fill in the maintenance check report (refer to A.4) before contacting a Fisher & Paykel Healthcare representative.*		

Performed by				
Date	**Name**	**Title**	**Organization**	**Signature**

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F&P 950

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