F&P myAIRVO™ 2

Technical Manual

Fisher & Paykel HEALTHCARE

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BEFORE YOU START

This Technical Manual is intended for clinical engineering / technical personnel. It defines the technical specifications, setup, servicing and troubleshooting information, for the myAIRVO 2 humidifier. It applies to all lot numbers from **140910** and above.

OTHER REFERENCES

- Refer to the myAIRVO 2 User Manual for detailed instructions for use.
- Watch the myAIRVO 2 DVD to learn how to set up and use the myAIRVO 2. Also available on YouTube.
- Download the AIRVO 2/myAIRVO 2 Simulator App to learn how to use the myAIRVO 2. You can change settings, simulate faults and test your skills. Available from the Apple, Google Play and Windows App stores.

- Visit the Fisher & Paykel education & resources website (https://www.fphcare.co.nz/education/) to find self-paced online courses and local training events.
- If the unit is ever used by multiple patients, the unit must be cleaned and disinfected between patients according to instructions in the Disinfection Kit Manual (900PT600).
- For further assistance, please contact your Fisher & Paykel Healthcare representative.

TABLE OF CONTENTS

1. GENERAL INFORMATION

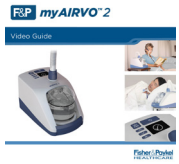
The myAIRVO 2 is a humidifier with integrated flow generator that delivers warmed and humidified respiratory gases to spontaneously breathing patients through a variety of patient interfaces.

PACKAGE CONTENTS

myAIRVO 2 humidifier (PT100xx)

myAIRVO 2 User Manual

myAIRVO 2 Swingtag



myAIRVO 2 DVD

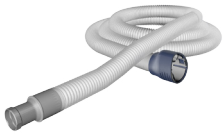
Oxygen inlet extension kit (900PT422)

Reusable water chamber (HC360)

Air filter (x2) (900PT913)

Power cord (900PT410xx)

Funnel



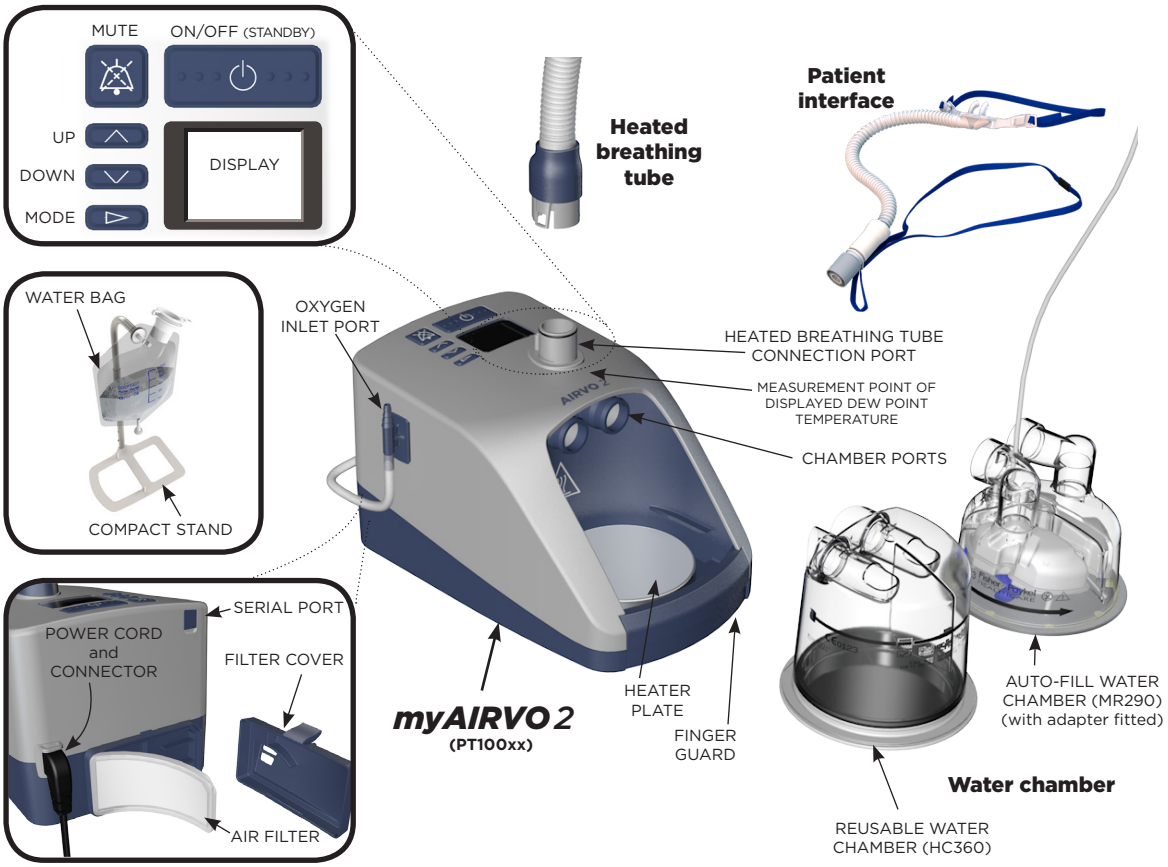
Heated breathing tube (900PT500)

WARNING

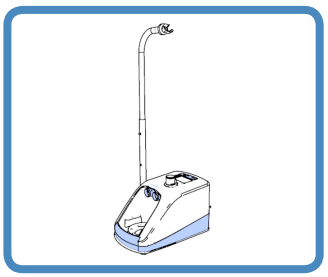
UNDER NO CIRCUMSTANCES SHOULD THE myAIRVO 2 BE OPENED OR ANY OF THE SIX FASTENING SCREWS ON THE UNDERNEATH SIDE OF THE DEVICE BE LOOSENED.

OPENING THE UNIT WILL AFFECT THE OXYGEN SEALS INSTALLED INSIDE, WHICH WILL COMPROMISE THE SAFETY OF THE DEVICE.

myAIRVO 2 AND ACCESSORIES



2. SETTING UP myAIRVO 2 FOR FIRST USE

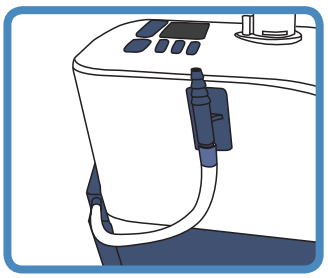


1. REMOVE THE MYAIRVO 2 FROM ITS PACKAGING

Place the myAIRVO 2 on the 900PT400 compact stand.

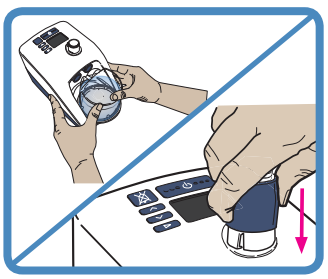
2. CONNECT THE POWER CORD

Plug the power cord connector into the socket on the back of the myAIRVO 2.



3. ATTACH THE OXYGEN INLET EXTENSION KIT

Refer to the instruction sheet included with the kit itself.



4. ATTACH WATER CHAMBER AND HEATED BREATHING TUBE

The water chamber and heated breathing tube must be connected to carry out the following setup and testing procedures.

5. SWITCH ON UNIT

Switch on the unit by pressing the On/Off button.

6. WARM-UP

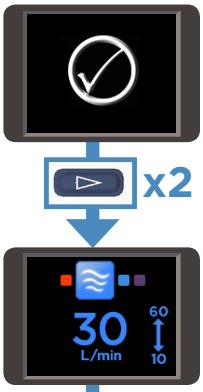
The unit will begin to warm up. You will see a warm-up symbol on the screen.

“Warm-up” symbol

7. READY FOR USE

The “Ready for use” symbol means that the system is ready for the patient to use.

“Ready for use” symbol

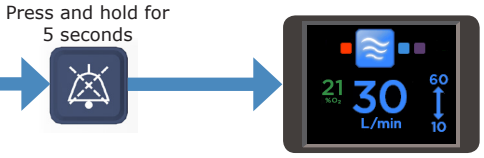


TEMPORARY OXYGEN DISPLAY

From the ‘Ready for use‘ screen, press the Mode button twice to access the flow settings.

Press and hold the Mute button for 5 seconds to display the oxygen fraction delivered to the patient.

The oxygen fraction will be displayed for 30 seconds, before disappearing.



8. DRYING MODE / OFF

To turn the unit off, press and hold the On/Off button for 3 seconds until a melody sounds. The unit will automatically enter Drying Mode.

To switch the unit off without completing Drying Mode, hold down the On/Off button for 3 seconds. If you unplug the unit’s power cord from the mains power supply while the unit is still running, the “Power Out” alarm will sound. Press the Mute button to permanently silence this alarm.

ADVANCED SETTINGS

When you see the “Warm-up” or “Ready for use” symbols, hold a combination of three buttons (Up, Down and Mute) for 5 seconds, to view and change advanced settings.

This button combination is for use by clinical engineering / technical personnel only.

AIRVO 2 / myAIRVO 2 MODE

You can change the unit from “myAIRVO 2” (home / long-term care) mode to “AIRVO 2” (hospital) mode.

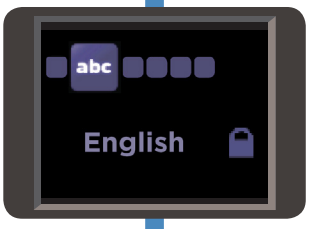
Contact Fisher & Paykel Healthcare for an “AIRVO 2 User Manual”.

To change the mode:

Hold the Up and Down buttons for 3 seconds to “unlock” the setting.

Use the Down button to select AIRVO 2.

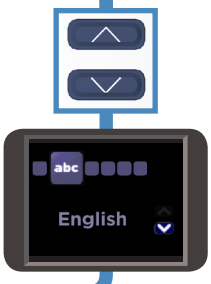
Press the Mode button to confirm the change and/or move on to the next screen. Note that the unit will reset itself if it is switched between AIRVO 2 and myAIRVO 2 modes.



LANGUAGE

You can set the AIRVO 2 / myAIRVO 2 to one of 22 language settings:

English (en)	Nederlands (nl)	Svenska (sv)	Polski (pl)	العربية (ar)
Deutsch (de)	Português (pt)	简体中文 (zh) [simp.]	Русский (ru)	Türkçe (tr)
Español (es)	Dansk (da)	繁体中文 (zh) [trad.]	תירבע (he)	
Français (fr)	Suomi (fi)	한국어 (ko)	Ελληνικά (el)	
Italiano (it)	Norsk (no)	日本語 (ja)	Română (ro)	

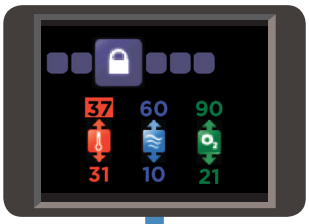


To change the language:

Hold the Up and Down buttons for 3 seconds to “unlock” the setting.

Use the Up and Down buttons to select the desired language.

Press the Mode button to confirm the change and/or move on to the next screen.

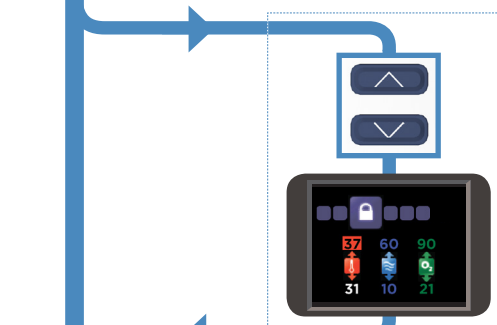


ENVIRONMENT SETTINGS (FOR DEFAULT MODE)

A clinician may change the "Environment Settings", to customise individual myAIRVOs for different patients depending on their needs. The "Environment Settings" chosen will put limits on the "Patient Settings" that the operator can choose when in normal use.

This screen defines the "Environment Settings" for the myAIRVO 2 when in Default Mode (ie. non-"Junior Mode").

Minimum dew-point temperature (°C) 	**The lowest target dew-point temperature that the operator will be able to select.** *Possible Settings: 31, 34, 37 °C* If this is set to 31, the operator can select a target dew-point temperature between 31 and 37. ie. 31, 34 or 37 (°C). If the patient is tracheostomised, a clinician may wish to set this value to 37, so that the operator can only select a target dew-point temperature between 37 and 37, ie. only 37 (°C). Note: The maximum dew-point temperature setting is always 37 °C in Default Mode.
Minimum flow (L/min) 	**The lowest flow that the operator will be able to select.** *Possible Settings: 10 to 60 in increments of 5 L/min, always less than or equal to Maximum Flow setting.* Example: If this is set to 10, the operator will be able to select flows down to 10 L/min. If this is set to 25, the operator will be able to select flows down to 25 L/min.
Maximum flow (L/min) 	**The highest flow that the operator will be able to select.** *Possible Settings: 10 to 60 in increments of 5 L/min, always greater than or equal to Minimum Flow setting.* Example: If this is set to 60, the operator can select flows up to 60 L/min. If this is set to 35, the operator can select flows up to 35 L/min.
Maximum oxygen fraction (%) 	**The highest oxygen fraction that the operator may set the unit to.** *Possible settings: 30 - 90% in increments of 5% O2.* The unit will alarm if the measured oxygen fraction exceeds this value.
Minimum oxygen fraction (%) 	**The lowest oxygen fraction that the operator may set the unit to.** *Possible settings: 21 or 25% O2.* When set to 25% the unit will alarm if the measured oxygen fraction is below this value allowing detection of oxygen disconnection.
Note that, for Oxygen display, this is a measurement only, not a control setting. The operator changes the measured oxygen fraction by altering the myAIRVO 2 target flow setting and the flow of oxygen connected to the unit (e.g. from a flowmeter) - there is no closed-loop control.	

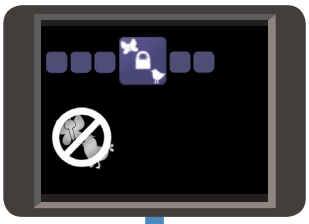


To change the environment settings:

Hold the Up and Down buttons for 3 seconds to "unlock" the first setting.

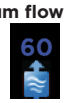
Use the Up and Down buttons to change the setting, then press the Mode button to progress to the next setting.

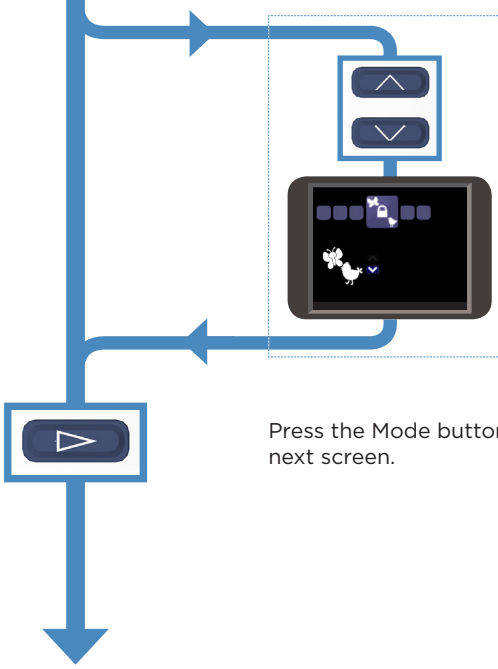
Press the Mode button to confirm the change and/or move on to the next screen.



ENVIRONMENT SETTINGS (FOR JUNIOR MODE)

This screen defines the “Environment Settings” for the myAIRVO 2 when in Junior Mode.

Junior Mode Enable/Disable  Enabled  Disabled	When this option is enabled, the operator can enter Junior Mode from the Home Screen, by holding the Mode button for 5 seconds. When this option is disabled, entering Junior mode is not possible. **This option is disabled by default**. You must enable it in order for the unit to be used in Junior mode.
Dew-point temperature (°C)	The only dew-point setting in Junior Mode is 34 °C.
Minimum flow (L/min) 	**The lowest flow that the operator will be able to select.** *Possible Settings: 2 to 25 in increments of 1 L/min, always less than or equal to Maximum Flow setting.* If this is set to 10, the operator will be able to select flows down to 10 L/min.
Maximum flow (L/min) 	**The highest flow that the operator will be able to select.** *Possible Settings: 2 to 25 in increments of 1 L/min, always greater than or equal to Minimum Flow setting.* If this is set to 15, the operator can select flows up to 15 L/min.
Maximum oxygen fraction (%) 	**The highest oxygen fraction that the operator may set the unit to.** *Possible settings: 30 - 90% in increments of 5% O2.* The unit will alarm if the measured oxygen fraction exceeds this value.
Minimum oxygen fraction (%) 	**The lowest oxygen fraction that the operator may set the unit to.** *Possible settings: 21 or 25% O2.* When set to 25% the unit will alarm if the measured oxygen fraction is below this value allowing detection of oxygen disconnection.
Note that, for Oxygen display, this is a measurement only, not a control setting. The operator changes the measured oxygen fraction by altering the myAIRVO 2 target flow setting and the flow of oxygen connected to the unit (e.g. from a flowmeter) - there is no closed-loop control.	



To change the environment settings:

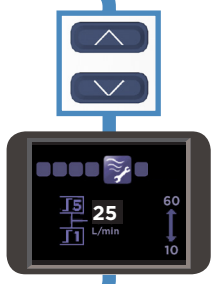
Hold the Up and Down buttons for 3 seconds to “unlock” the first setting.

Use the Up and Down buttons to change the setting, then press the Mode button to progress to the next setting.

Press the Mode button to confirm the change and/or move on to the next screen.

FLOW INCREMENT SETTINGS

This screen defines the “Flow Increment Settings” for the myAIRVO 2 when in either Default Mode or Junior Mode.
You can define the flow rate above which the increments are 5 L/min and below which the increments are 1 L/min.

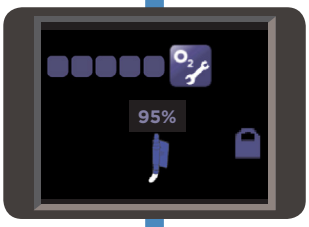


To change the environment settings:

Hold the Up and Down buttons for 3 seconds to “unlock” the setting.

Use the Up and Down buttons to change the setting.
Flows > 25 L/min will increment in steps of 5 L/min
Flows < 25 L/min will increment in steps of 1 L/min

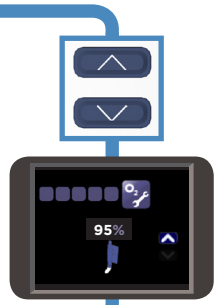
Press the Mode button to confirm the change and/or move on to the next screen.



OXYGEN INPUT SETTINGS

This screen defines the “Oxygen Input Settings” for the myAIRVO 2 when in either Default Mode or Junior Mode.
The 95% setting is for use with oxygen concentrators and is the default setting for myAIRVO 2.

The 100% setting is for hospital oxygen supplies, liquid oxygen or standard bottled oxygen.



To change the environment settings:

Hold the Up and Down buttons for 3 seconds to “unlock” the setting.

Use the Up and Down buttons to change the setting.

Press the Mode button to return to the “Warm-up”/”Ready for use” screen. You can now conduct the Performance/Acceptance checks.

3. ACCEPTANCE/PERFORMANCE CHECKS

This section contains performance checks which can be carried out on the myAIRVO 2, however there is no manufacturer requirement to carry out these checks on a routine basis. These checks test the basic functions of the unit, the operation of the flow sensor and the audible alarm signal.

SENSOR CHECKS

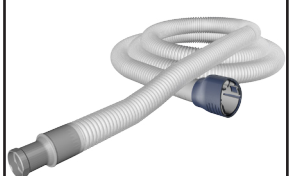
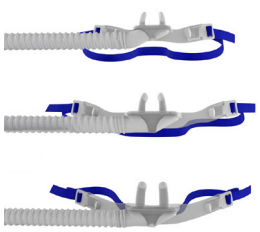
To ensure quality and patient safety, Fisher & Paykel Healthcare undertakes stringent testing to each and every unit manufactured. The myAIRVO 2's sensors, measuring temperature, flow and oxygen, have been carefully designed to exacting criteria, and are calibrated and tested in our controlled work environment to strict limits. Furthermore, the myAIRVO 2 itself carries out regular self-checks during normal use, comparing sensor readings against expected values.

Do not perform additional tests of internal sensor accuracy, as these often produce erroneous results due to limitations of the external test environment and equipment used, particularly given the temperature, humidity content and/or flow of the gases being delivered by the myAIRVO 2.

ACCEPTANCE/PERFORMANCE CHECKS

The acceptance/performance checks should be conducted under the following ambient conditions: Temperature: 22 ± 2°C, Humidity: 50 ± 5% RH.

The following equipment is required:

			
myAIRVO 2 humidifier	HC360 water chamber	Heated breathing tube (from 900PT500 or 900PT501 kit)	Nasal interface (OPT842, OPT844 or OPT846)

A. HEATERPLATE TEST

1. Add 150mL of room temperature (not hot) water to the humidification chamber and fit the chamber onto the heater plate of the device. Fit the chamber tightly on to the chamber ports.
2. Connect the heated breathing tube to the Heated Breathing Tube Connection port. Connect the nasal cannula interface to the heated breathing tube.
3. Turn on the device, by pressing the power button for 2 seconds. Warm-up bars will be displayed as the unit warms up. Ensure the flow is set to 30 L/min.
4. Check that the "Ready for use" symbol (a "tick" or "check") is displayed within 30 minutes.

B. "CHECK FOR LEAKS" TEST

After the "Ready for use" symbol is displayed, the "Check for leaks" sensor test can be tested as follows:

1. Remove the chamber completely from the unit.
2. Check that the display shows the "Check for leaks" error (in the appropriate language) and that the auditory alarm sounds, within 2 minutes.
3. Reconnect the chamber and check that this flashing display disappears, the audible alarm stops and the display reverts back to the Warm-up/Ready-for-use screen.

C. “CHECK FOR BLOCKAGES” TEST

After completing the “Check for leaks” test, the “Check for blockages” test can be tested as follows:

1. Disconnect the cannula from the Heated Breathing Tube.
2. Completely block the end of the Heated Breathing Tube with your hand.
3. Check that the display shows the “Check for blockages” error (in the appropriate language) and that the auditory alarm sounds, within 30 seconds.
4. Unblock the end of tube and check that this flashing display disappears, the audible alarm stops and the display reverts back to the previous display.
5. Reconnect the cannula to the Heated Breathing Tube.

D. “CHECK TUBE” TEST

After completing the above flow tests, the Tube Missing alarm can be tested as follows:

1. Remove the Heated Breathing Tube (pull the blue sleeve up first).
2. Check that within 10 seconds the display shows the “Check tube” error and the auditory alarm sounds.
3. Refit the Heated Breathing Tube, check the alarm stops and that the display reverts back to the previous display.

Note: If any of the tests above fail, please contact your Fisher & Paykel Healthcare representative.

4. SERVICING

AIRVO 2 and myAIRVO 2 humidifiers do **NOT** require routine servicing or calibration.

The only checks that can be carried out are the Acceptance/Performance Checks in the previous section, and the Electrical Safety Test detailed below.

WARNING

UNDER NO CIRCUMSTANCES SHOULD THE myAIRVO 2 BE OPENED OR ANY OF THE SIX FASTENING SCREWS ON THE UNDERNEATH SIDE OF THE DEVICE BE LOOSENED. OPENING THE UNIT WILL AFFECT THE OXYGEN SEALS INSTALLED INSIDE, WHICH WILL COMPROMISE THE SAFETY OF THE DEVICE.

ELECTRICAL SAFETY TESTS

To test for electrical safety perform the following electrical safety tests and any others required by local regulations.

Inspection	Check the power cord for damage - cuts, stretching, wear, adequate cable restraint, bent pins. Replace with F&P approved cord if necessary.
Insulation Resistance	Use a 500 VDC insulation tester to measure the resistance between the mains plug phase pin and the heaterplate* - it should be > 10 Mohm. Repeat test from the mains plug neutral pin to the heaterplate*. * Note: The exposed surface of the heaterplate is anodised (high resistance). Contact MUST be made to the bottom lip of the heaterplate at the front of the device to make proper connection - depress the finger guard and slip the tester probe beneath the heaterplate to ensure contact to unanodised aluminium.

STORAGE AND DISPOSAL

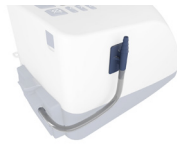
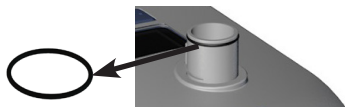
Refer to myAIRVO 2 User Manual.

5. SPARE PARTS

5.1 POWER CORDS

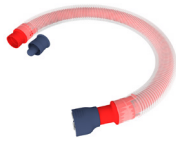
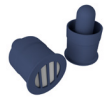
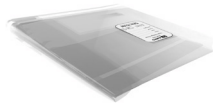
900PT410AZ (Aus/NZ)	
900PT410EW (European)	
900PT410UK (UK)	
900PT410US (US/Canada)	
900PT410KR (Korea)	
900PT410JP (Japan)	

5.2 FOR MYAIRVO

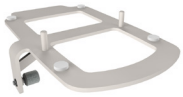
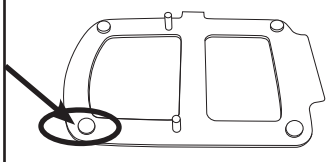
900PT911 Non-Return Valve (2-pack)	
900PT912 AIRVO 2 Filter Holder	
900PT913 Air Filter (2-pack)	
900PT422 Oxygen Inlet Kit	
900PT407 Serial Port Cover (10-pack)	
900PT408 AIRVO Outlet O-Ring (10-pack)	

5.3 FOR DISINFECTION (IF REQUIRED)

Note: If the unit is ever used by multiple patients, the unit must be cleaned and disinfected between patients according to instructions in the Disinfection Kit Manual (900PT600).

900PT600 Disinfection Kit	
900PT601 Disinfection Filter (2-pack)	
900PT602 Cleaning Sponge Stick (20-pack)	
900PT603 Disinfection Storage Cover (20-pack)	

5.4 HARDWARE

900PT400 Compact Stand	
900PT401 Water Bag (2-pack)	
900PT405 Pole Mounting Tray	
900PT421 Mobile Pole Stand	
900PT423 Hook for 900PT421	
900PT426 Plastic Basket	
900PT427 Oxygen Bottle Holder	
900PT409 3M Dual Lock Pad (4 pairs)	

APPENDIX A: IEC60601-1-2 EMC TABLES

Guidance and manufacturer's declaration - electromagnetic emissions		
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should ensure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The device 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.
RF emissions CISPR 11	Class B	Applicable for countries with 100-115V and 220-240V mains voltage.
Harmonic emissions IEC 61000-3-2	Class A	The device 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
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of device should ensure that it is used in such an environment.			
Immunity test	**IEC60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC61000-4-2	±2kV ,±4kV, ±6kV contact ±2 kV ,±4kV, ±8 kV air	±2 kV,±4kV, ±6 kV contact ±2 kV ,±4kV, ±8 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 IEC61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV See note 2 below	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV ±2 kV	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power interruptions, it is recommended the device be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE 1: U_T is the a.c. mains voltage prior to application of the test level.			
NOTE 2: This testing is not necessary for the safe operation of the device.			

Guidance and manufacturer's declaration - electromagnetic immunity

The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should ensure that it is used in such an environment.

Immunity test	IEC60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	**$d = 1.2 \sqrt{P}$**
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	**$d = 1.2 \sqrt{P}$** 80 MHz to 800 MHz **$d = 2.3 \sqrt{P}$** 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range [b]. Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the device.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the device

The device is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device as recommended below, according to the maximum output power of the communications equipment.

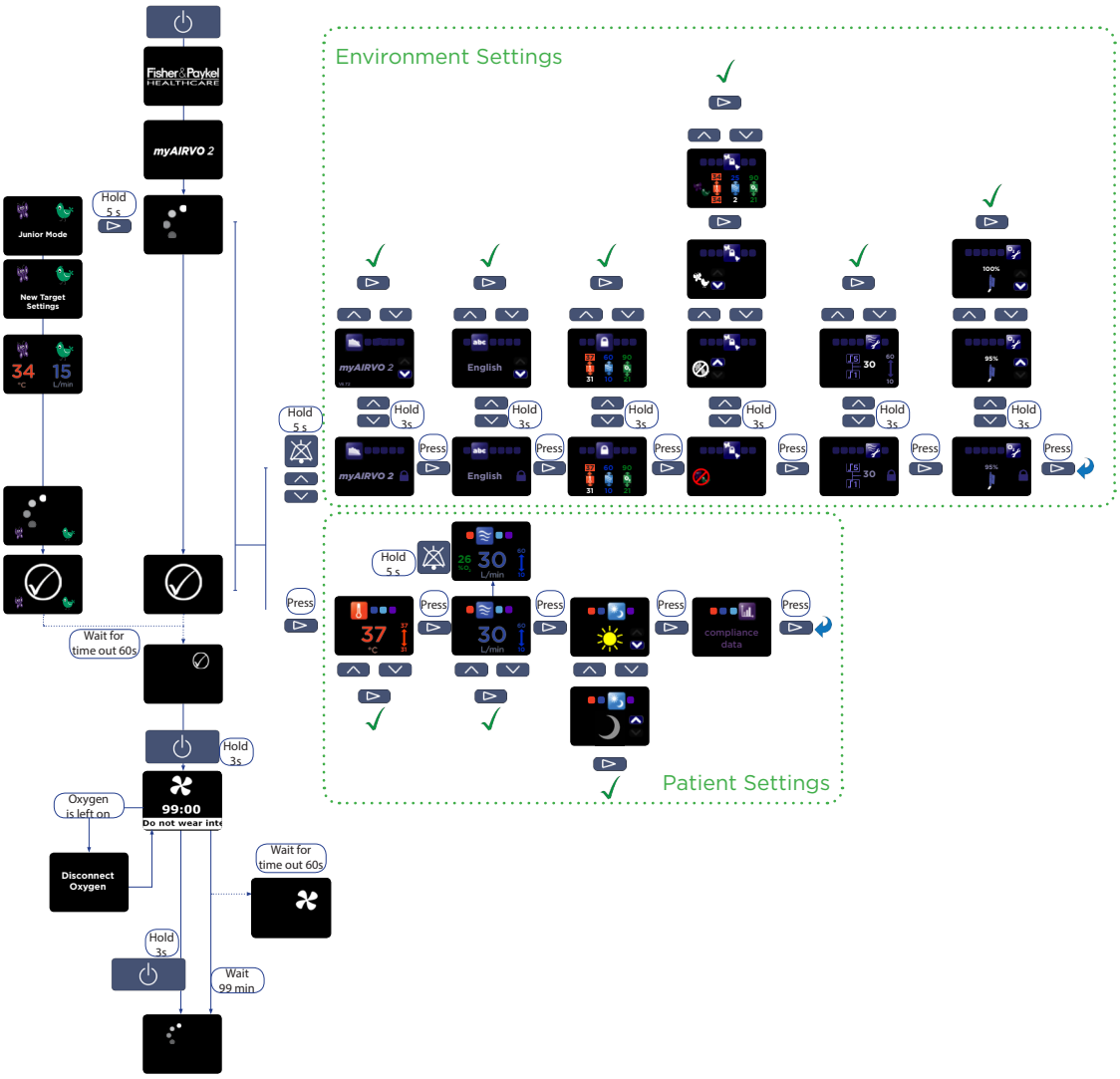
Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter m**		
	150 kHz to 80 MHz	**80 MHz to 800 MHz**	**800 MHz to 2.5 GHz**
	$d = 1.2 \sqrt{P}$	**$d = 1.2 \sqrt{P}$**	**$d = 2.3 \sqrt{P}$**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

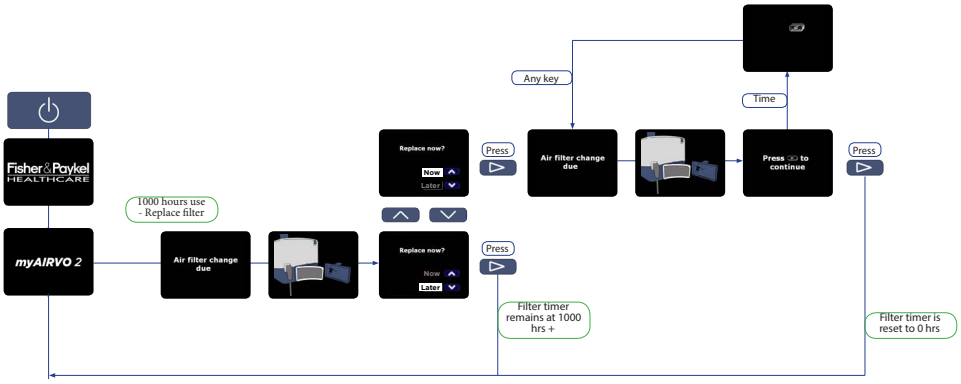
NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

APPENDIX B: INTERFACE FLOW CHART

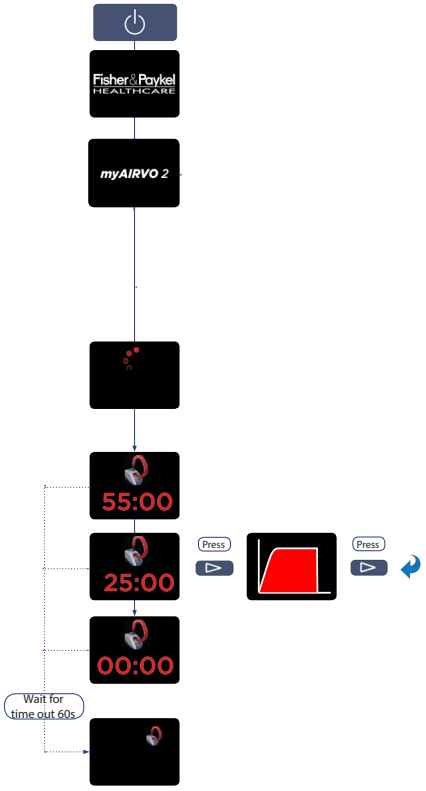
myAIRVO 2



FILTER CHANGE DUE



DISINFECTION



APPENDIX C: DEFAULT VALUES

The following values are default non-alarm settings set by the factory:

Parameter	Model	Mode	Value	Unit
Default set dewpoint temperature	AIRVO 2 or myAIRVO 2	Default	37	°C
	AIRVO 2 or myAIRVO 2	Junior	34	°C
Max set dewpoint temperature	AIRVO 2 or myAIRVO 2	Default	37	°C
	AIRVO 2 or myAIRVO 2	Junior	34	°C
Min set dewpoint temperature	AIRVO 2 or myAIRVO 2	Default	31	°C
	AIRVO 2 or myAIRVO 2	Junior	34	°C
Default set flow	AIRVO 2	Default	30	L/min
	myAIRVO 2	Default	25	L/min
	AIRVO 2 or myAIRVO 2	Junior	15	L/min
Max set flow	AIRVO 2 or myAIRVO 2	Default	60	L/min
	AIRVO 2 or myAIRVO 2	Junior	25	L/min
Min set flow	AIRVO 2 or myAIRVO 2	Default	10	L/min
	AIRVO 2 or myAIRVO 2	Junior	2	L/min
Default upper oxygen limit	AIRVO 2	Default or Junior	95	%
	myAIRVO 2	Default or Junior	90	%
Max upper oxygen limit	AIRVO 2	Default or Junior	100	%
	myAIRVO 2	Default or Junior	90	%
Min upper oxygen limit	AIRVO 2 or myAIRVO 2	Default or Junior	30	%
Default lower oxygen limit	AIRVO 2 or myAIRVO 2	Default or Junior	21	%
Max lower oxygen limit	AIRVO 2 or myAIRVO 2	Default or Junior	25	%
Min lower oxygen limit	AIRVO 2 or myAIRVO 2	Default or Junior	21	%
Language	AIRVO 2 or myAIRVO 2	Default or Junior	English	
Flow Increment Crossover	AIRVO 2 or myAIRVO 2	Default or Junior	25	L/min
Oxygen Input	AIRVO 2	Default or Junior	100	%
	myAIRVO 2	Default or Junior	95	%
Disinfection Stop-Gate	AIRVO 2	Default or Junior	Confirmation not required	
Transport Mode	AIRVO 2	Default or Junior	Disabled	
Day/Night mode	myAIRVO 2	Default or Junior	Day	

APPENDIX D: TROUBLESHOOTING GUIDE

This Troubleshooting Guide is intended for technical users, including clinical / biomedical engineers and technical personnel, of the myAIRVO™ 2 humidifier. It applies to all myAIRVO 2 humidifiers from lot numbers **140910** and above.
If this troubleshooting guide does not resolve your issue, please contact your local Fisher & Paykel Healthcare representative.

D.1 myAIRVO does not turn on

A. Press and hold the ON/OFF button for at least 2 seconds.

B. Is the myAIRVO 2 plugged into mains power?

C. Is the power cord securely inserted into the back of the myAIRVO 2?

D. Is the power cord damaged?
- If yes, replace the damaged cord. See **Section 5.1** for a **900PT410xx** replacement power cord.
- If no, try using another power cord.

E. Connect the myAIRVO 2 into another power outlet.

F. Connect a different electrical device into the same power outlet. Turn on the device to confirm that the power outlet is working.

G. The myAIRVO 2 may be 'on' with a broken display.
Turn the myAIRVO 2 on without the heated breathing tube and check that the audible alarm activates.

D.2 Power out (black screen)

The auditory alarm will sound for at least 120 seconds.

The most likely cause is a dislodged or disconnected power cord.

A. Please follow the instructions in **Section D.1**.
Note: Press "audio pause" button to permanently silence the alarm ( ).
The device will not automatically restart.

D.3 "Check water" Fig. 1

A. Is the water bag empty?
If yes, refill or replace the water bag and press the "mode" button ( ) to reset the alarm.

B. Is the water chamber empty?
- For HC360: Ensure the water level is below the indicated black line.
- For MR290: If yes, replace the water chamber as it may be damaged.

Contact your local Fisher &Paykel Healthcare representative about the faulty chamber.
⚠ Warning: The heater-plate and base of the water chamber may be hot.

C. For MR290:
- Open the vent cap near the water bag spike. This allows the pressure to equalize, letting the water flow into the water chamber.
- Ensure that there are no kinks in the fluid line, preventing water from

Figure 1

D.4 “Check for leaks”[Fig. 2] or “E122”

The most likely cause is a missing water chamber or the existing chamber has not been pushed into place correctly.

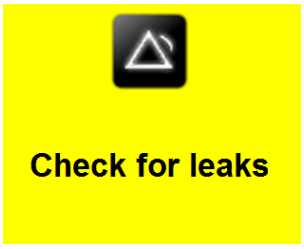


Figure 2

D.4.1 WATER CHAMBER

A. Is the water chamber fitted correctly? Even if it appears to be:
- Remove the water chamber.
- Push the chamber on firmly, until the finger guard “clicks” into place[Fig. 3].

⚠ Warning: The heater-plate and base of the water chamber may be hot.

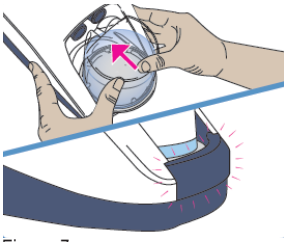


Figure 3

D.4.2 HEATED BREATHING TUBE

A. Is the heated breathing tube attached to the device correctly?
Even if it appears to be:
- Disconnect the heated breathing tube.
- Check that the black O-ring is in place[Fig.4].
  If the O-ring is damaged or missing, replace with part **900PT408**.
- Reconnect the heated breathing tube.

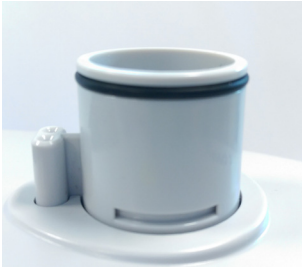


Figure 4

B. Confirm that the heated breathing tube is not visibly damaged.

D.4.3 PATIENT INTERFACE

A. Is the patient interface correctly fitted to the heated breathing tube?
- Even if it appears to be, disconnect and reconnect the patient interface. It should make a “click” sound when it is connected properly.

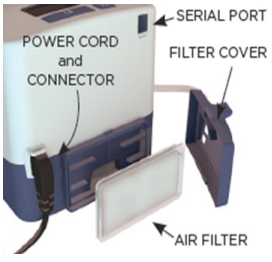
B. The unit may be in Junior mode, used an adult interface.
- Press and hold the “mode“ button (▷) for 5 seconds to change between Junior mode and Default mode.

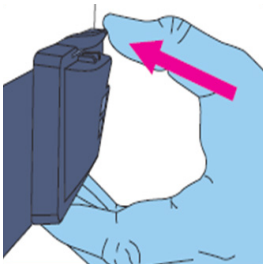
Junior mode can be disabled in the advanced menu, see page 10.

Note: If the myAIRVO is in Junior mode and the 900PT501 Default tube is used with the OPT842/44/46/70 or RT013 interfaces, it may generate a “Check for leaks” alarm.

D.4.4 AIR FILTER & FILTER COVER

A. Is the air filter and filter cover (at the back of the device) correctly fitted, as per the User Manual?





D.5 “Check for blockages” Fig. 5 or “E121”

D.5.1 WATER CHAMBER AND NON-RETURN VALVE

A. Have the silicone flaps of the non-return valve, found inside the left-hand chamber port, been displaced[Fig. 6]?
- If yes, return them to the correct position using a non-sharp tool, such as a pair of non-sharp tweezers[Fig. 7].

Note: If the Non-return valve is damaged or missing, replace with part **900PT911**. Upon replacement, ensure the spine is sitting vertically[Fig. 7]. If placed horizontally, this may cause the bottom flap to open due to gravity[Fig. 6b]. This may cause both “Check for leaks” and “Check for blockages” warnings.

B. Is the water chamber overfilled above the black line?
- For HC360: Ensure the water level is below the indicated black line.
- For MR290: If yes, replace the water chamber as it may be damaged.

Contact your local Fisher &Paykel Healthcare representative about the faulty chamber.

D.5.2 HEATED BREATHING TUBE

A. Is the heated breathing tube visibly blocked or kinked[Fig. 8]?

D.5.3 PATIENT INTERFACE AND AIRVO MODE

A. Is the patient interface visibly blocked or kinked[Fig. 9]?

B. The unit may be in Default mode with a junior cannula.
- Press and hold the “mode” button (▷) for 5 seconds to change between Default mode and Junior mode.

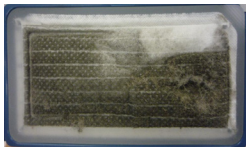
Note: If the myAIRVO is in Default mode and the 900PT531 Junior tube is used with the OPT316 and OPT318 cannula interfaces it may generate a “Check for blockages” alarm.

C. Are you using an unsuitable cannula?
- The OPT312 and OPT314 cannot be used with the myAIRVO 2.

See the User Manual for information regarding patient interfaces.

D.5.4 AIR FILTER

A. Is the air filter significantly discolored/dirty?
- Replace with part **900PT913**.



Note: A prompt[Fig. 10] for filter change will occur once the myAIRVO 2 has counted 1,000 hours of use. Choose “Now” or “Later”[Fig. 11] by using the “up” or “down” buttons and press the “mode” button (▷) to confirm. Selecting “Now” will zero the counter. Selecting “Later” will activate the prompt at the start of next use.

B. Is there a foreign object blocking the air filter or filter holder?

D.5.5 CONDENSATION

Please see **Section D.10**.

D.5.6 ALTITUDE

A. The myAIRVO 2 is designed to operate at an altitude below 2,000 meters.

Figure 5

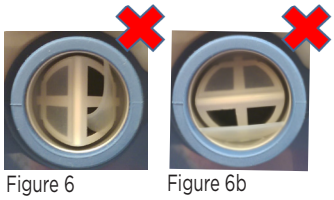


Figure 6 Figure 6b

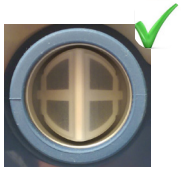


Figure 7

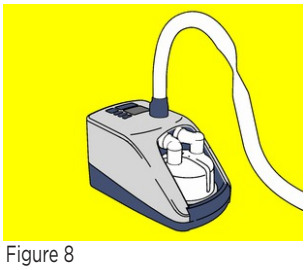


Figure 8

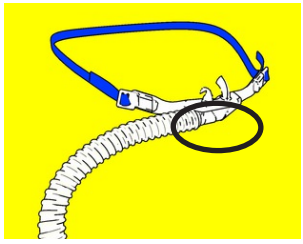


Figure 9

Figure 10

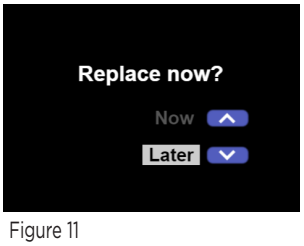


Figure 11

D.6 "Cannot reach target flow"[Fig. 12]

A. Press the "mode" button (▷) to continue normal operation at a lower (maximum achievable) flow rate.

B. Is the target flow setting too high for the patient interface?
- Check the swing tag/User Manual for the appropriate flow range for each patient interface.

Note: If the myAIRVO 2 cannot reach the target flow setting, it will automatically select a maximum achievable flow rate and prompt the user to press the "mode" button (▷) to confirm.

C. Follow steps in **Section D.5** — "check for blockages".

D. Is the altitude above 2,000 m?
The myAIRVO 2 is designed to operate at an altitude below 2,000 meters.

Figure 12

D.7 "Cannot reach target temperature"[Fig. 13]

The most likely cause is operating the myAIRVO 2 at a high flow rate in a cold room. Consider decreasing the target flow setting.

A. Press "mode" button (▷) to continue.
Note: The humidity level may be compromised.

B. Is the ambient room temperature below 18 °C (64 °F)?
- If yes, proactive management of condensation may be required. See **Section D.10** on prevention and management of condensation.

Figure 13

D.8 "Check operating conditions"[Fig. 14]

This alarm may be caused by a sudden change in ambient room temperature, e.g. storing the unit in a cold place, then using it in a warm place.

A. Is the ambient room temperature less than 10 °C (50 °F) or greater than 30 °C (86 °F)?

B. Leave the unit running for 30 minutes.
Switch the unit off, then restart.

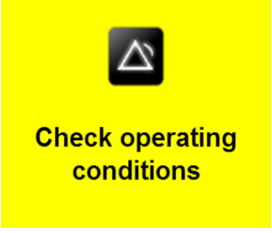


Figure 14

D.9 "Check tube"[Fig. 15] or "E38"

A. Is the heated breathing tube attached correctly?
- Even if it appears to be, unplug and reconnect the heated breathing tube.

B. Is the heated breathing tube visibly damaged?
- Check the electrical pins and the tube itself.

C. Try using a new heated breathing tube.

Figure 15

D.10 Condensation

D.10.1 PREVENTION OF EXCESSIVE CONDENSATION

A. Is the myAIRVO 2 being used in ambient conditions between 18 – 28 °C (64 - 82 °F)?
   - If the room is less than 18 °C (64 °F), condensation is more likely to occur.

B. Is there a local source of cooling acting on the heated breathing tube?
   - A fan to cool the patient,
   - An air-conditioning unit, vent or an open window?
   - Are you able to remove or minimize these sources of cooling, e.g. redirect the fan, cooling the patient, away from the heated breathing tube?

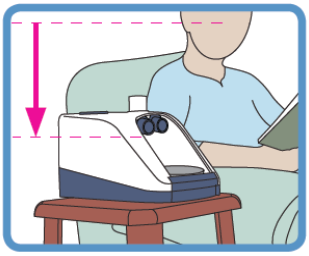


Figure 16

D.10.2 CONDENSATION MANAGEMENT

A. Implement a system to check the heated breathing tube for condensate regularly.

B. Is the myAIRVO 2 placed below head height[Fig. 16]?
   - This will allow condensate to drain towards the water chamber, away from the patient.

C. If condensation is present, drain it back into the water chamber[Fig. 17]:
   - Disconnect the patient interface from the heated breathing tube.
   - Drain the tube by lifting the patient end of the tube, allowing the condensate to run into the water chamber.
   - At higher target flow rates, it may be necessary to first reduce the target flow rate to 30 L/min or below, to ensure the condensate drains into the water chamber.

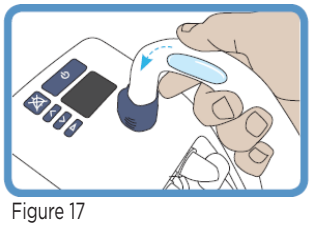


Figure 17

D. If condensate persists, consider turning the target temperature down.
   - A lower target temperature will decrease the humidity output of the myAIRVO 2, decreasing the level of condensation.

   Note: The temperature and humidity level delivered to the patient will also be reduced.

D.11 "O_2 too low"[Fig. 18]

The measured oxygen level has fallen below the allowed limit.
Ensure the oxygen source matches that of the oxygen setting - see "Oxygen Input Settings" on page 11.

A. Adjust the level of oxygen from the oxygen source as necessary, i.e. increase the oxygen flow rate through the oxygen flow meter.

B. Is the oxygen source (wall / cylinder flow meter or concentrator) turned on?

C. Is the oxygen source empty or faulty?

D. Is the "AIRVO 2 oxygen inlet kit"[Fig. 19] installed correctly, as per the instructions included with part **900PT422** and confirmed that there are no kinks in the "AIRVO 2 oxygen inlet kit" oxygen tubing?

E. Is the oxygen source tubing correctly and securely fitted to the myAIRVO 2?

F. Is the minimum oxygen limit set to 25%?
- A prompt will appear with an option to change this lower limit to 21 %.

Select "Yes" or "No" by using the "Up" and "Down" buttons. Press the "mode" button ( ) to confirm selection[Fig. 20].
See **Section 2 - Advanced Settings** to change this lower oxygen limit.

G. Ensure the oxygen source matches the oxygen input setting.
- For oxygen concentrators: The "Oxygen Input Setting" should be 95 %.
- For 100 % oxygen sources: The "Oxygen Input Setting" should be 100 %.

See page 11 for details on "Oxygen Input Settings"

H. Allow the device to sufficiently warm up; rapid changes in temperature can affect the sensor.

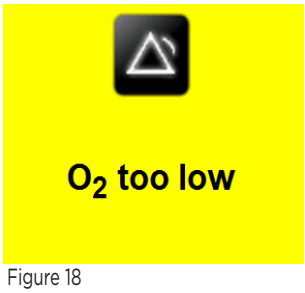


Figure 18


Figure 19

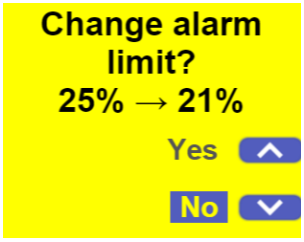


Figure 20

D.12 "O_2 too high"[Fig. 21]

The measured oxygen level has risen above the allowed limit.
Ensure the oxygen source matches that of the oxygen setting - see "Oxygen Input Settings" on page 11.

A. Adjust the level of oxygen from the oxygen source as necessary, i.e. decrease the oxygen flow rate through the oxygen flow meter.
See **Section 2 - Advanced Settings** to change this lower oxygen limit.

B. Ensure the oxygen source matches the oxygen input setting.
- For oxygen concentrators: The "Oxygen Input Setting" should be 95 %.
- For 100 % oxygen sources: The "Oxygen Input Setting" should be 100 %.

See page 11 for details on "Oxygen Input Settings"

Figure 21

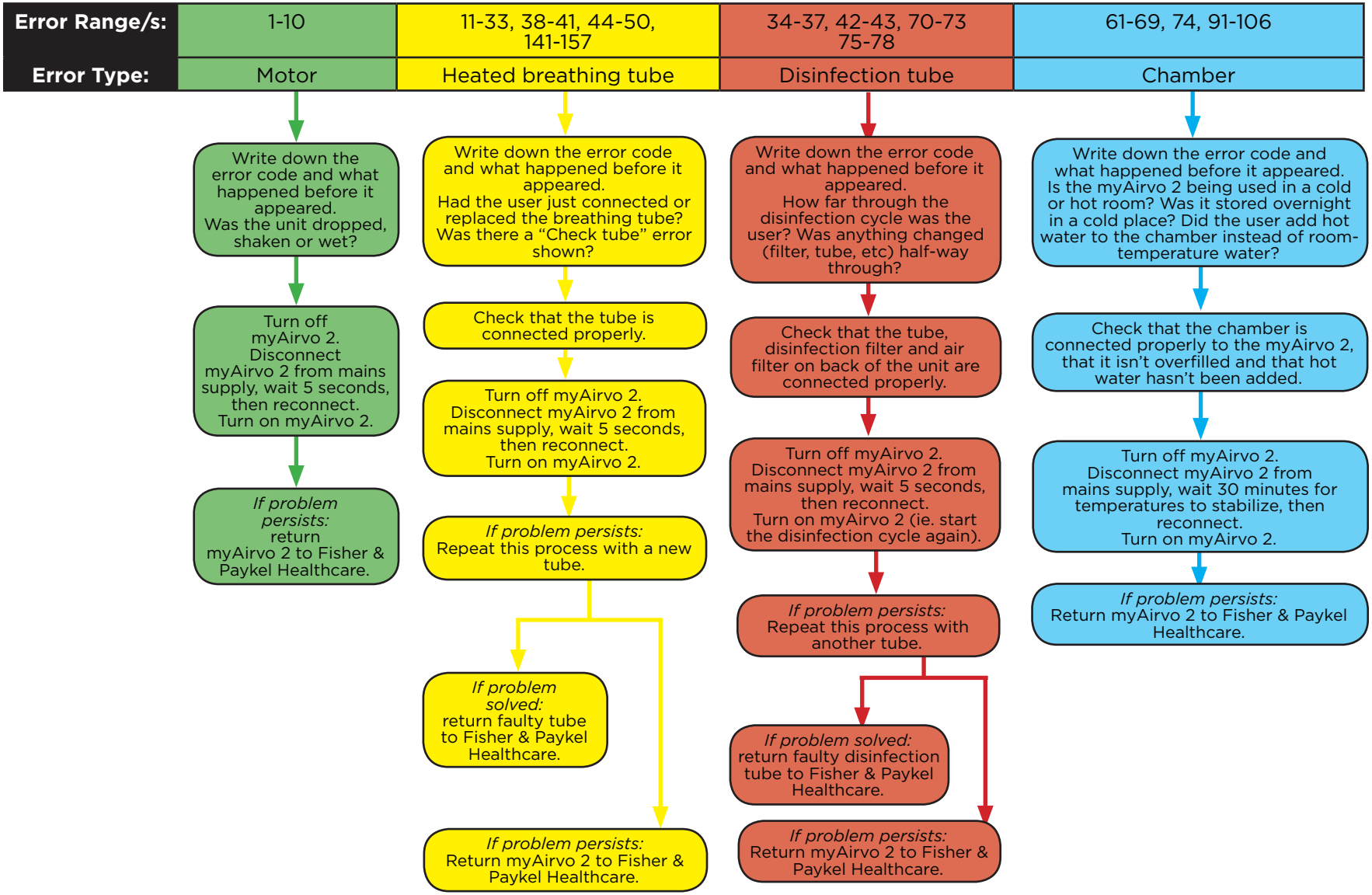
D.13 Exxx[Fig. 22]

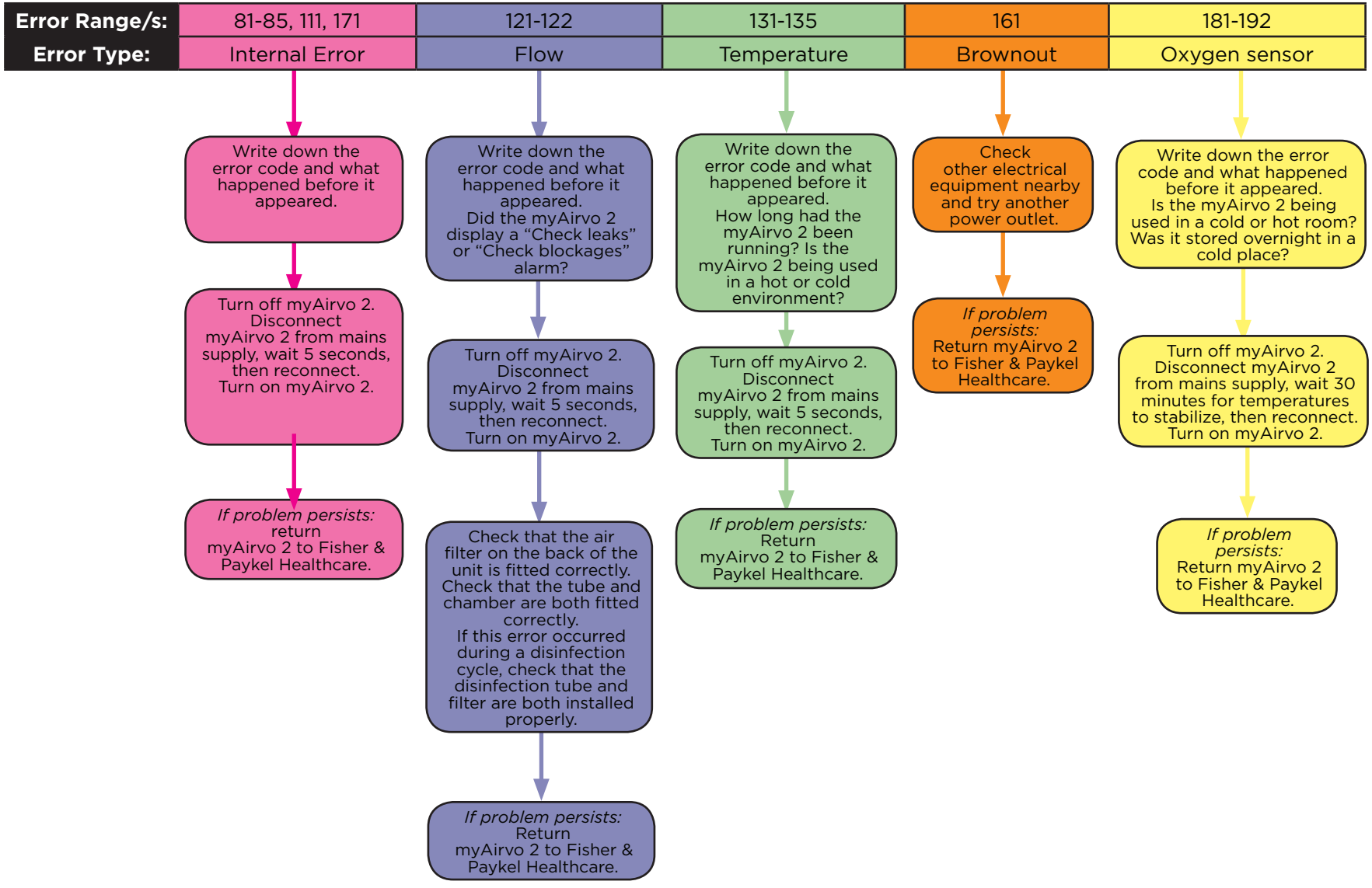
A. Follow the instructions in **Appendix E** if a fault with an error code is displayed on the myAIRVO screen.

Figure 22

APPENDIX E: TROUBLESHOOTING

The following pages provide troubleshooting advice for fault / error / "E" codes that may appear during use of the myAIRVO 2.


Error Range/s:
1-10
11-33, 38-41, 44-50, 141-157
34-37, 42-43, 70-73 75-78
61-69, 74, 91-106
Error Type:
Motor
Heated breathing tube
Disinfection tube
Chamber
Write down the error code and what happened before it appeared. Was the unit dropped, shaken or wet?
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2.
If problem persists: return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. Had the user just connected or replaced the breathing tube? Was there a "Check tube" error shown?
Check that the tube is connected properly.
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2.
If problem persists: Repeat this process with a new tube.
If problem solved: return faulty tube to Fisher & Paykel Healthcare.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. How far through the disinfection cycle was the user? Was anything changed (filter, tube, etc) half-way through?
Check that the tube, disinfection filter and air filter on back of the unit are connected properly.
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2 (ie. start the disinfection cycle again).
If problem persists: Repeat this process with another tube.
If problem solved: return faulty disinfection tube to Fisher & Paykel Healthcare.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. Is the myAirvo 2 being used in a cold or hot room? Was it stored overnight in a cold place? Did the user add hot water to the chamber instead of room-temperature water?
Check that the chamber is connected properly to the myAirvo 2, that it isn't overfilled and that hot water hasn't been added.
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 30 minutes for temperatures to stabilize, then reconnect. Turn on myAirvo 2.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.


Error Range/s:
Error Type:
81-85, 111, 171
Internal Error
121-122
Flow
131-135
Temperature
161
Brownout
181-192
Oxygen sensor
Write down the error code and what happened before it appeared.
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2.
If problem persists: return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. Did the myAirvo 2 display a "Check leaks" or "Check blockages" alarm?
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2.
Check that the air filter on the back of the unit is fitted correctly. Check that the tube and chamber are both fitted correctly. If this error occurred during a disinfection cycle, check that the disinfection tube and filter are both installed properly.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. How long had the myAirvo 2 been running? Is the myAirvo 2 being used in a hot or cold environment?
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 5 seconds, then reconnect. Turn on myAirvo 2.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.
Check other electrical equipment nearby and try another power outlet.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.
Write down the error code and what happened before it appeared. Is the myAirvo 2 being used in a cold or hot room? Was it stored overnight in a cold place?
Turn off myAirvo 2. Disconnect myAirvo 2 from mains supply, wait 30 minutes for temperatures to stabilize, then reconnect. Turn on myAirvo 2.
If problem persists: Return myAirvo 2 to Fisher & Paykel Healthcare.

For more information please contact your local Fisher & Paykel Healthcare representative

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