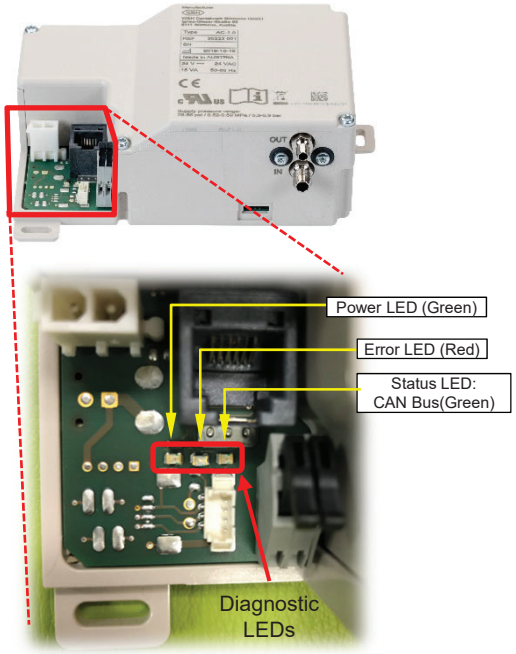
Advanced Air Blink Codes

The list below summarizes blink codes for the control module LEDs.

- *The key note is the error LED, if it is flashing, it is likely that there is also an error displayed on the deluxe plus touchpad that says something about failure of the control module.*
- *Unfortunately, flashing 1 time indicates a problem with the handpiece, coupler, or tubing, NOT the control module.*



Display	Description of error	Solution
Power LED (green)		
OFF	no voltage applied	apply correct power supply
ON	power applied	N/A- no error indicated
Status LED (green)		
OFF	not ready for operation	restart
flashes	ready for operation, no data connection	check data communication (e.g. CAN bus)
ON	ready for operation, data connection OK	N/A- no error indicated
Error LED (red)		
OFF	no error	N/A- no error indicated
ON	boot loader active	N/A- no error indicated
flashing 1 x	failure applied part	check applied part (tubing, coupler, handpiece)
flashing 2 x	communication error	check data communication (e.g. CAN bus)
flashing 3 x	supply voltage too high / low	check power supply
flashing 4 x	electronic module failure	replace electronic module
flashing 5 x	input signal out of range	replace electronic module
flashing 6 x	input signal at start not valid	replace electronic module
flashing 7 x	overheating or overloading of electronics	cool down system
1 x long, 1 x short	no speed signal	check applied part (tubing, coupler, handpiece)

Advanced Air Help Messages

Taken from section 3.4 of PPS-0164.

- Specifically new error messages #51, #52 and #53 address Advanced Air

a dec NEWBERG OREGON	PRODUCT PERFORMANCE SPECIFICATION	PPS-0164 PAGE 11 OF 12
Revised By / Date J. McMullan, 06.28.18	TITLE: Software, Deluxe Touchpad Help Messages	REV: E
Approved by R. Ayers, 08.20.18		ECO: 10096.037

	Name	Screen message 12345678901234567890	Conditions to generate message	300 System	500 System
51	Advanced Air internal controller error	Advanced Air Controller is not functioning.	This error is caused by the AC-1.0 controller flagging any one of multiple errors: • internal controller error • supply voltage under range • supply voltage over range • controller over temperature • operation timeout (15 min)		X (DCAP only)
52	Advanced Air (sensor) handpiece is not detected or is not functioning.	Advanced Air handpiece not detected. Only basic air operation is available. Press any button.	This screen is displayed when an Advanced Air (sensor) handpiece cannot be detected by the controller. This could be because there is no handpiece attached, there is a non-Advanced Air (sensor) handpiece attached or there is an Advanced Air handpiece attached that is not functioning properly.		X (DCAP only)
53	Advanced Air controller is offline	No data communication with Advanced Air Controller	User has picked up Advanced Air handpiece and controller is disconnected from DCS, has failed, or does not have power.		X (DCAP only)

Advanced Air Help Message Troubleshooting Matrix

ID	NAME	SCREEN MESSAGE 12345678901234567890	CONDITIONS TO GENERATE MESSAGE	300 SYSTEM	500 SYSTEM	TROUBLESHOOTING OPTIONS TO TRY
51	Advanced Air internal controller error	Advanced Air Controller Not Functioning	This error is caused by the AC-1.0 controller flagging any one of multiple errors: 1. Internal controller error 2. Supply voltage under range 3. Supply voltage over range 4. Controller over temperature 5. Operation timeout (15 min)	Not Applicable	X (DCAP only)	Please note, the error numbers are not displayed on the screen and may not correspond to the blink code of the error LED 1 This is the most complicated error. Something potentially has gone wrong with either the controller, coupler, tubing or handpiece itself. Most commonly the handpiece has a bad light circuit and it has temporarily shorted out the IOLS drive in the control module. In this case, first try to repair or replace the handpiece. (by installing any known good handpiece that is proven functional and well serviced can be tried to confirm.) Initially this error will be most common with non-Primea handpieces. Older handpieces that have been repeatedly sterilized and of unknown quality are the most suspect. If the issue is not with the handpiece then continue onward with replacing the coupler and then continue to work backwards into replacmenet of tubing and the control module. 2 or Check the voltage on the 0V and 24V connection of the Advanced Air control module. Check the same 0V and 24V connection to the Wagos in the delivery system control head. We must ensure connections to the 24V source are solid and secure. (No loose wires or low quality connections to Wagos or the Control module.) 3 In more rare instances the customer may be located at a site that is utilizing a Buck or Boost transformer to eliminate power issues. If they are too close to substation, they may have a transformer that lowers their overall input power and it may be too low. If the practice is located at the far end of the grid then they may have installed a transformer that has raised circuit voltage to unexpected levels. 4 This indicates that the operating environment inside delivery system control module too hot. Suspend operation until the system cools off and then try again. 5 This is a rare error condition that only occurs if you have been operating the Advanced Air handpeice in a continuous fashion for 15 minutes. This error is the result of a deliberate design feature to ensure a handpeice did not get accidentally left running in an unattended fashion. Remove your foot from the foot pedal and then reapply your foot to continue operation.
52	Advanced Air (sensor) handpiece is not detected or is not functioning.	Advanced Air handpiece not detected. Only basic air operation is available. Press Any Button	This screen is displayed when an Advanced Air (sensor) handpiece cannot be detected by the controller. This could be because there is no handpiece attached, there is a non-Advanced Air (sensor) handpiece attached or there is an Advanced Air handpiece attached that is not functioning properly.	Not Applicable	X (DCAP only)	Several scenarios may be true and should be checked: (options A to D below) A The customer is not using a Primea Adanced Air handpiece. If the handpiece is not Primea, then it does not have proper internal Hall Effect sensor designed to measure the rotational speed of the turbine. If not using a Primea handpiece then only basic air functinality is possible. B There may be a broken wire in the coupler or tubing C The electronics in Primea handpiece may have failed, try another primea handpiece. D While a more remote possibility, the control module may have failed. It is far more likely that the problem relates to the handpiece.
53	Advanced Air controller is offline	No data Communication with Advanced Air Controller	User has picked up Advanced Air handpiece and controller is disconnected from DCS, has failed, or does not have power.	Not Applicable	X (DCAP only)	This indicates that CAN bus is down and not operational. (options A to D below) A Follow the normal approach to troubleshoot any CAN bus communication problem. Ensure all CAN cable connectors are properly plugged in both at Advanced Air control module and on other end plugged into Control Head PCA. If this does not work, check the CAN connectors to look for any damage to pins. Inspect the cable jacketing to ensure no nicked cables or damage to wire. B If necessary, start disconnecting other elements on the CAN network such as lights or electric motor controllers to where the only CAN item remaining plugged in is the Advanced Air module. If you disconnect CAN running from delivery system to the chair board you can still operate Advanced Air normally. Chair functions will be available via the foot switch or assistant's touchpad. If this solves the problem then you know the issue relates to some unfavorable interaction with another connected CAN device. C Look for any signs of interference in the operatory or nearby environment that may be impacting the CAN bus. This includes nearby cell phone towers, radio station towers, power substations or overhead power lines, etc. D There is a potential that the Advanced Air control module may have a problem. Check that the control module is properly powered at 24V from the Wago connectors and wires are properly secured into the terminal block of the module. The internal functionality of the controller related to CAN may be broken.

What to do if you feel Advanced Air is Underpowered

1) Use the correct bur for the material and effect you are demonstrating.
    a. Carbides dull VERY fast on hard materials at high speed (Use a diamond for Ceramics!)
2) Ensure the handpieces are regularly lubricated.
    a. Many dealers don't currently have a functional Assistina available.
    b. Primea handpieces should be lubricated after every demonstration.
3) Ensure the floor gauges are set correctly
    a. Delivery system gauge should read 70 or 75
    b. Advanced air gauge should read over 80 (prefer 85)
4) Ensure the oil collector is not full
    a. If the handpieces are regularly lubricated, the oil collector will eventually get saturated
    b. Saturated oil collector gauze will decrease the performance of advanced air

Field Test to Determine if Advanced Air Functioning Properly

The best way for a field tech (or TM) to show that advanced air is functioning as designed.

Tools Required:

- 0.02104000 4-way handpiece gauge

- A large diameter bur (#4 Round Bur)

- A solid cutting sample (tile)
- A Primea handpiece

- Safety Glasses

The basic steps are as follows:

1. Setup the Advanced Air system (Important!)
   A. Speed 320,000 RPM
   B. Torque Mode
2. Put the bur into the handpiece
   A. Check the bur and handpiece for issues (smooth bur insertion, smooth bearing feel)
   B. Press +/- on the display
   C. Fully activate the foot control
   D. Verify Display Pressure reading: (must be over 65 psi, just like an electric)
      Note: All other readings must come from the 4-way handpiece gauge set (0.02104000).
3. Release the foot control
   A. Attach gauge set (0.02104000) between rotoquick and handpiece
4. Fully activate the foot control
   A. Check the handpiece for vibration or other typical handpiece issues
5. Cut into a block, slowly increasing pressure until bur stalls out (4-5 seconds)
   A. Record maximum observed Drive Air (DA)
   B. Record maximum observed Exhaust (EX)
6. Repeat steps 3-4 several times (5 or so should be good)

Expected Results

If:

The Exhaust Air maximum is below 0.6 bar (8.7psi)

And:

The Drive Air maximum is more than 3.6 bar (43.5 psi) above Exhaust Air reading

Then:

The system is performing in acceptable fashion.

Using this method, the only calculation necessary is a bit of subtraction:

Drive Air – Exhaust ≥ 43.5 psi

In general, the larger the distance between the Drive Air and the Exhaust readings, the more power you are getting.

Ideally we want less than 9psi max exhaust & more than 53psi max drive air.

Light Brightness

- These lights can be very bright…
  - *Do not look directly the LEDs*
  - *The LED's must be on for Advanced Air to function.*
    They cannot be turned adjusted or turned off
- There is some variability between LEDs and brightness depends upon a number of factors
- We can expect that some doctors will complain about too much light
- Factors that affect LED perception
  - ✓ Use of eye loupes while the LED is pointed at the doctor
  - ✓ Use of lighted loupes
  - ✓ Use of ambient light sources
    Large picture windows, room lights, etc.
  - ✓ Use of dental lights

Generally the brighter the overall room the less "bright" the handpiece LEDs will appear

Light Brightness

Comparison to TK-97L and TK-97L

- The ring LED and single LED are the same as the TK-97L and TG-97L handpieces.

  There is still no way to change the brightness based on specific doctor preferences.

- Light intensity or brightness is controlled by same power input that drives hand piece and impacts functionality.

- A-dec software parameter for brightness is set to 50%
  - This translates to 75% brightness in the hand piece
    - ✓ If we set ours to 0% that would result in 50% at the hand piece
    - ✓ W&H protects the lower 50% to drive proper functionality
    - ✓ Operating below 50% will cause more critical problems with mechanical performance.

Speed Control

- Advanced Air speed control is generally the same as an electric motor…*yet with much higher speeds*

Up to 320K RPM 

Up to 200K RPM 

- Clinician sets maximum speed and the foot control allows smooth control from 60K to this set speed.
- When operating at < 60K due to load placed on turbine, it is possible to load the system beyond the speed detection range of the system.
  - *In this case the system can't tell if the burr is stuck*
  - *So the speed remains below detection speed for ~5 seconds the system will stop*
  - *Several puffs of air will be applied to restart the burr, yet if it does not restart then the user will have to release the pedal and then restart with the foot control.*

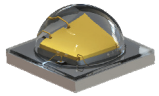
Advanced Air Light Failure Troubleshooting

QUESTION:

If the AA system has to have a good light circuit to function what happens if the light goes out on the RG handpiece? What happened is just one or two lights go out on the RK handpieces?

ANSWER:

This depends on how the light fails (true for RG and RK)



- If only the LED itself goes bad, the handpiece will continue to function in advanced air modes.
- If the handpiece PCB goes bad, most likely the handpiece will function only in 'Basic Mode', it may throw errors related to malfunction of the control module.
- If the handpiece PCB goes bad in ANY CONNECTED HANDPIECE (TG, TA, TK, etc.), the system may throw errors related to malfunction of the control module.

RK-97 L
with 5x ring LED+

RG-97 L
with LED+

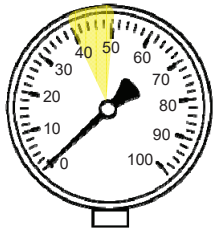
Advanced Air Drive Pressure

QUESTION:

If you don't have an Advanced Air handpiece on the tubing, what drive air pressure does the control module produce?

ANSWER:

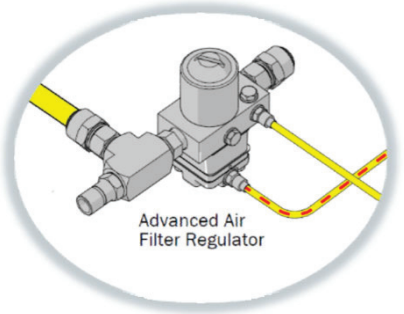
The control module will produce around 40-50psi.



- This value is approximate as it is dependent on many factors that affect performance of the system.
- In Basic Mode, the module allows for the valve to open only to 50%, this results in about 50% of the pressure read from the Advanced Air pressure gauge in the floorbox.
- The pressure floorbox is set at 83psi by the factory, but in an office that supplies less than 90PSI to the floorbox could have even less available pressure in Basic Mode.

Older Handpieces

- It is fine to use older handpieces in the system.
  - ✓ *They will be operated from roughly 0-50 psi. (This is approximate)*
  - ✓ *Varies by setting of the floor regulator & plumbing of the compressor system in the office.*



- Some handpieces will cause the system to error out
  - ✓ The cause of this is still under investigation, yet primary cause thus far is old handpieces with poorly functioning light circuits

FAQs (Continued)

Can air handpieces from other manufacturers be operated in an Advanced Air System?
Yes. In order to operate standard turbines (from W&H and other manufacturers), the Advanced Air system will operate in Basic mode. Turbines which can be connected to the standard 6-hole connection are then operated with a constant operating pressure.
The Advanced Air System primarily supports Primea Advanced Air handpieces. If you attach a standard handpiece or any other air-powered device (from W&H or other manufacturers), the system will prompt you to switch to Basic Mode and run the handpiece at a drive air supply level that might or might not be suitable for the handpiece or the application.

Do the turbines wear out faster than a typical air high-speed handpiece?
No. The turbines wear in the same way as a typical air high-speed handpiece.

Does this system wear out burs faster?
No. Depending on use, burs may actually last longer due to the constant rate of speed and the ability to set an optimal speed vs the high rate of variability with a typical air high-speed handpiece.

FAQs

Can the Advanced Air (Primea) handpieces be used with the RA-24 (halogen) coupler?
No. The RA-24 coupler has no connection to the handpiece identification resistance, that means the controller tries to check which handpiece is connected and finds just the halogen lamp, which has a unknown resistivity. Consequently a RA-24 will not work to test a Advanced Air system.

Can the RQ54 be used? Sometimes doctors like it better because the RQ24 is not as bright.
No. It doesn't work because you need the IOLS connectivity through the tubing, coupler, and HP.

Is Advanced Air integration exclusive to A-dec?
Yes in the US. No International - Ultradent and DKL offer it.

What is the warranty on a Primea Advanced Air handpiece?
2-year warranty for Primea Advanced Air handpieces purchased from an authorized A-dec dealer. See Regulatory Information, Specifications, and Warranty for full warranty information.

Do the Primea Advanced Air built-in electronics need to be serviced?
The built-in electronic components do not need to be serviced separately. However, regular servicing should be completed. This will ensure the proper functioning and safety of the components.

Anticipated Service Call Topics

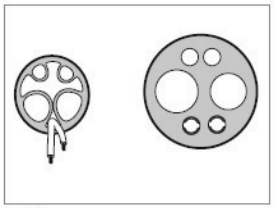
- Leaking drive air due to debris in the control valve
  - ✓ *MUST install regulator correctly*
- Leaking water due to reversed AC/WC lines in the block
  - ✓ *At base of handpiece*
  - ✓ *At base of coupler*
  - ✓ *Water streaming from the oil collector*
- Press a button for basic mode:
  - ✓ *Due to IOLS issues in general with any handpiece*
- If the handpiece light is non-functional, dim, or intermittent, you could observe errors that indicate the advanced air system is non functional
  - ✓ *Nearly all of these are due to the handpiece and have nothing to do with the delivery system or advanced air controller.*
  - ✓ *In most cases, the error is cleared by returning the handpiece from the delivery system and pulling it back out.*

    In rare instances, power cycling the delivery system may be required.

Service Parts

FULL SYSTEM CONSISTS OF:

Control module & Regulator



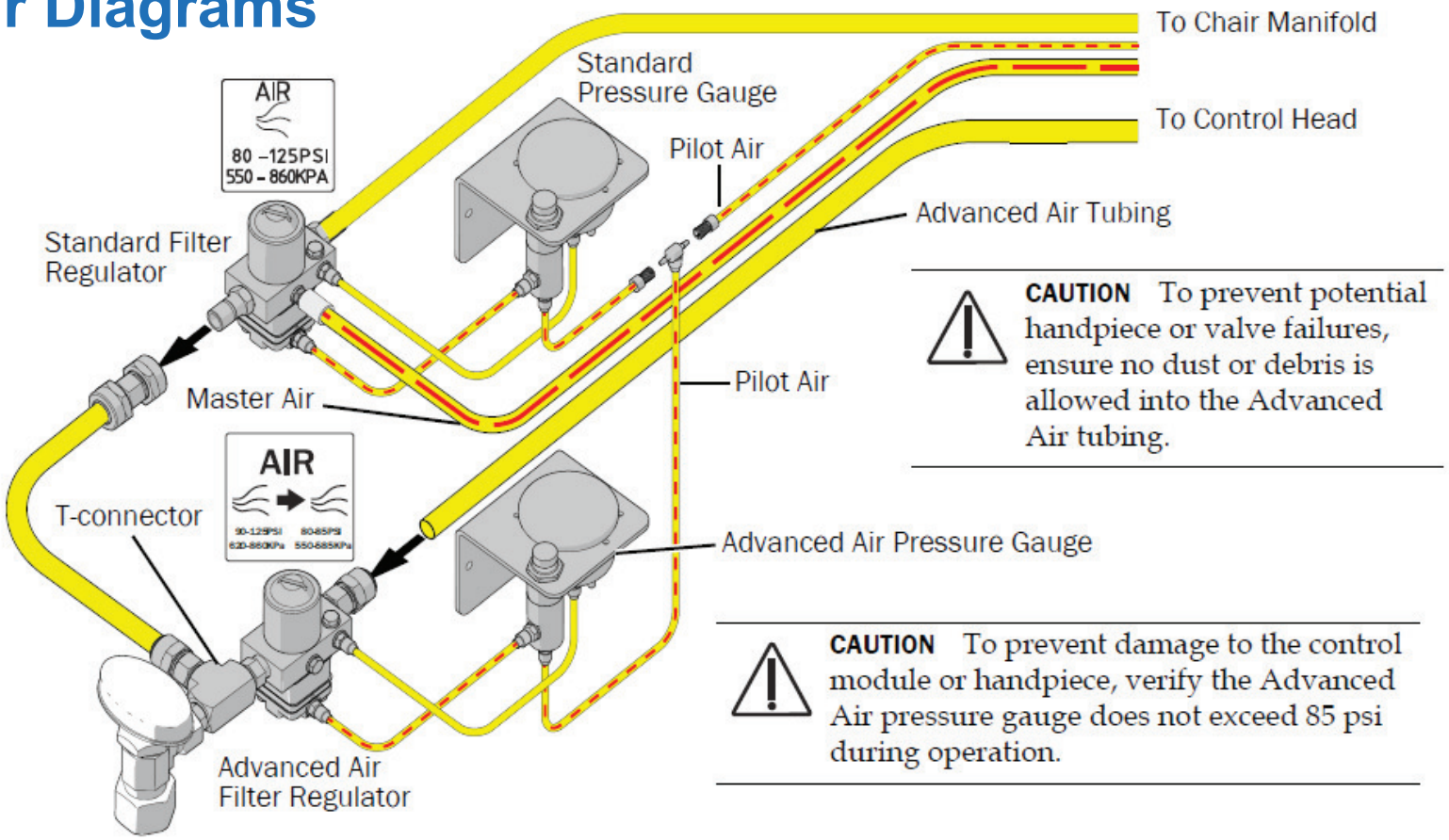
Tubing

Coupler

Handpiece

Item	Description	OTC P/N
AC-1.0	Advanced Air Control Module	54.0664.01
AC-1.0 & Regulator	Advanced Air Control Module w/ Regulator	54.0664.02
Regulator Kit	Advanced Air Regulator Kit	54.0719.00
Hardware Kit	Advanced Air Hardware Kit	54.0720.00
Doc Kit	Advanced Air Documentation Kit	54.0721.00
RK-97L	Primea 5x Ring LED handpiece	0.30221000
RG-97L	Primea Single LED handpiece	0.30222000
RQ-24	Coupler w/ 360 Rotation	0.10402430
Tubing	6-pin tubing 64" 6-pin tubing 85"	98.1164.00 98.1167.00

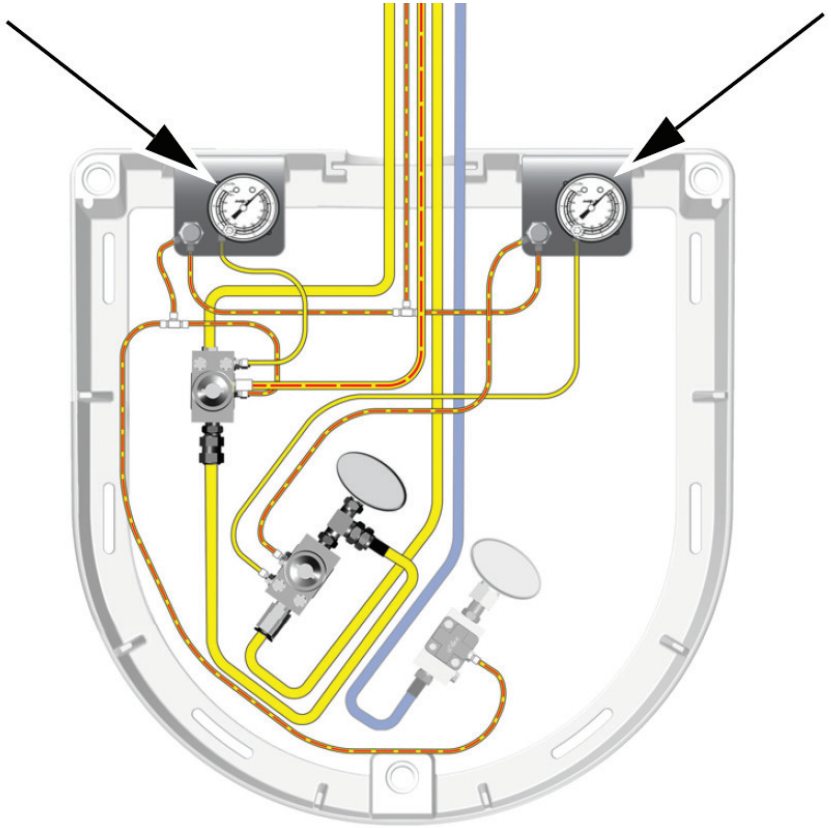
Air Diagrams



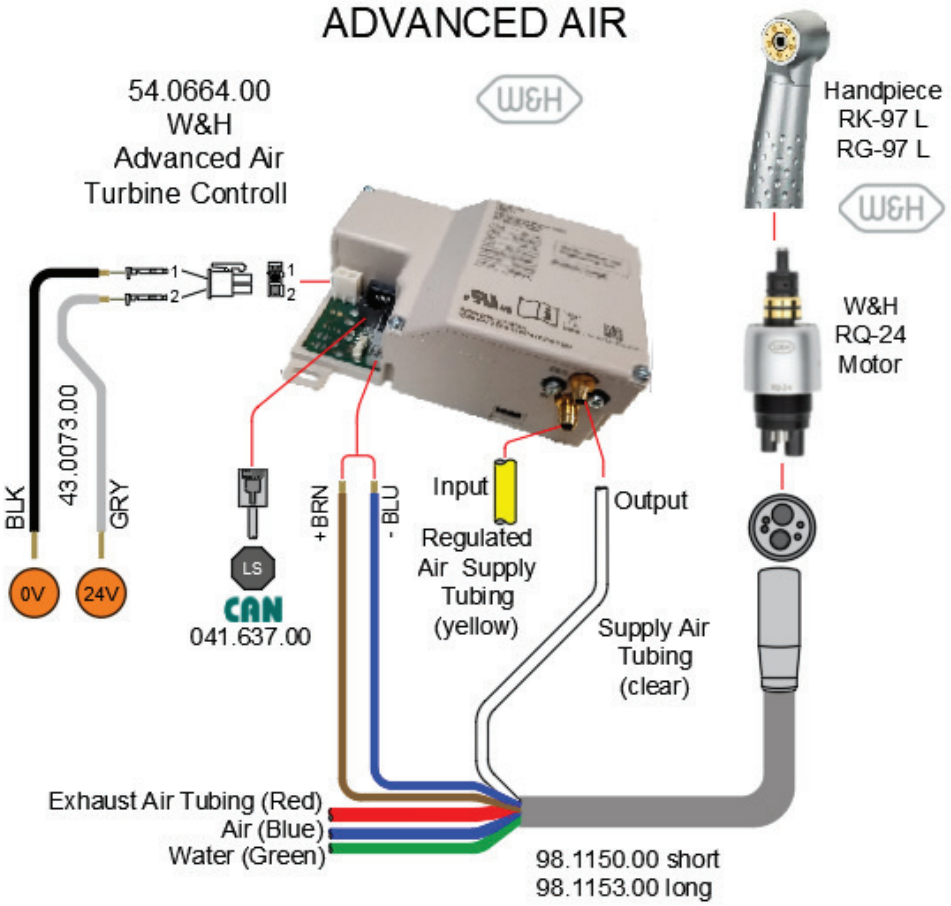
CAUTION To prevent potential handpiece or valve failures, ensure no dust or debris is allowed into the Advanced Air tubing.

CAUTION To prevent damage to the control module or handpiece, verify the Advanced Air pressure gauge does not exceed 85 psi during operation.

Air Diagrams

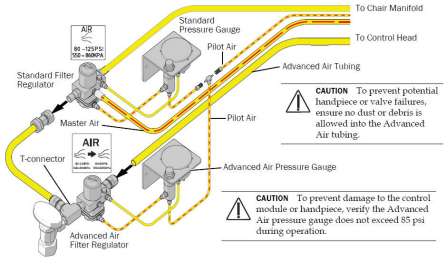


Connection Diagram



Useful References

86.0803.00
W&H Advanced Air Floorbox Connections



86.0754.00
W&H Primea Advanced Air on A-dec 532/533/541 Delivery Systems Installation Guide


a-dec

W&H Primea Advanced Air on A-dec 532/533/541 Delivery Systems

INSTALLATION GUIDE

Contents

NOTE Information that is critical to a successful and safe installation is shaded like this note throughout the guide.

86.0759.00
A-dec 5432/533 Delivery Systems Instructions for Use

86.0760.00
A-dec 541/545 Delivery Systems Instructions for Use