Pico-Peizo™

J60P
Users manual

CustomerInfo@PicoPiezo.com

www.PicoPiezo.com

Version 2.1_ano

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1. Disclaimer

Each package is double checked before shipping to insure the correct item/s and all necessary assembly hardware is included before the box is closed. Each electronic component is hand tested for output range, and overall workmanship before it is packaged to insure that every unit shipped is working perfectly.

Since PicoPiezo are not installing their products directly. PicoPiezo its affiliates or its employees or its owners cannot accept any liability / responsibility caused from use or misuse of any product offered by PicoPiezo beyond the invoiced purchase price paid for the item. PicoPiezo shall not be held liable for any direct, or indirect, business losses or damages e.g. lost time, profits or savings as a result of use, misuse or otherwise of their products or/and services.

All items / parts or components supplied by PicoPiezo, such as electronic interface units, jet assemblies, power systems, or any other items are to be installed and/or used at the customers own risk.

By using a product(s) supplied by, or manufactured by, PicoPiezo you are stating that you have read the disclaimer, warranty and safety information and agree to hold PicoPiezo, it's owner/s and any of its employees free from all and any liabilities, and agrees he, or she, is using and operating the product at his or her own risk, and that no warrantees or guarantees are made, expressed, or implied on performance, power output, operational parameters, etc.

The manufacturer of this product is in no way liable or responsible for the manner in which this product is used. Installation or/and use of this produce is at the sole risk/responsibility of the end user.

Adhere to safety instructions of the machine supplier, in particular, take care when handling hot waxes, chemicals, moving components and so forth.

Parts, components, installation procedures and operating instructions may vary from time to time, without notice. PicoPiezo accepts no liability for such changes or the consequences thereof.

2. Limited liability warranty

PicoPiezo products are covered by a limited liability warranty from defects in material and workmanship. This warranty does not apply if, in the judgment of PicoPiezo, the product fails due to damage from shipment, handling, storage, accident, abuse or misuse, or if it has been used or maintained in a manner not conforming to product's instructions, has been modified in any way, or has a defaced or removed serial number. Repair by anyone other than PicoPiezo or an approved agent voids this warranty. The maximum liability of PicoPiezo is the product purchase price. You can find out if your product is covered by a PicoPiezo warranty by comparing the duration of the warranty against the product purchase date.

3. Warranty replacement procedure

Do not ship your defective product to PicoPiezo before contacting customer support.

4. Safety information

Important Safety Information: Read The Following Warnings Before Installation or Operation

WARNING - Electric Shock
To avoid electric shock when you use this system:

- Do not use PicoPiezo products during a lightning storm. There may be a risk of electric shock from lightning.
- Do not use the PicoPiezo product if any electrical interfaces or wires are damaged, split or broken.
- Make sure that the AC plug is fully inserted into the wall outlet or extension cord.
- Always carefully disconnect all plugs by pulling on the plug and not on the cord.
- Adhere to the safety instructions of Machine supplier. In particular, take care when handling hot waxes or chemicals and around moving components.
- Do not remove safety features on the original machine or PicoPiezo products.
- When installing, or removing any electrical components, the machine should be completely switched off. Switch off the machine and electronic before changing a head.
- Jet inserts run hot in the machine! Use appropriate protective clothing, gloves and eye protection.
- When using chemicals of any description, refer to their health and safety datasheets. Ensure adequate ventilation. Use appropriate respiratory equipment and protective clothing.
- Do not allow the system to become wet.

Web: www.PicoPiezo.com
Email: CustomerInfo@PicoPiezo.com

5. Introduction

The PicoPiezo J60P is supplied as a tuning, refurbishment or repair accessory.

Please read all Warranty, Disclaimer and Safety information before proceeding to use this system.

Figure 1

What are the J60P Jet inserts ?
The J60P Jet inserts are an industrial grade "hard" jet. The J60P jet is based on Piezoelectric technology, has a borosilicite orifice and is designed to operate at high temperatures (up to 150°C). The J60P is serviceable, however this should only be performed by trained PicoPiezo personnel.

Figure 2

Why is the J60P Jet larger than the original ?
The J60P jet insert is physically longer than the original jet insert. This is because it uses different technology to the original jet which it replaces. It is necessity for a mechanical interface to raise the jet body such that the jet nozzle is at the appropriate height for correct operation. Pedestals have been provided to raise the jet body and maintain the nozzle at the correct height.

Figure 3

What is the J60P Interface electronic ?
Because the J60P is made from more robust materials, and its physically larger than the original jet and requires a different pulse stream to drive it. This is supplied by the interface electronic. The interface electronic also has a number of useful diagnostic LED's.

Note !
Read this manual in its entirety before attempting to install or use the modified print heads, or the interface electronic. Failure to do so may result in material damage to the Solidscape machine, the PicoPiezo jets, create a potential safety issue or cause injury.

6. Packing check list:

The full replacement J60P jet kit is supplied with the following components:

Figure 4

a) Two (2) refurbished Solidscape print heads, containing PicoPiezo inserts and fitted with three new screws, see Figure 4.

b) Two (2) adapter plates for attaching the modified print heads to the print head carriage, see Figure 5.

c) Six (6) machine screws for securing the adapter plate to the print head carriage, see Figure 5.

Figure 5

d) One (1) Allan key to secure the supplied machine screws, see Figure 5.

e) Two (2) ten pole electrical connector extenders. These fit between the modified jets and the electrical connector block on the print head carriage, see Figure 5.

Figure 6

f) One (1) J60P Electronic interface unit, see Figure 6.

g) One (1) strip of insulation foam, approximately 2.5 inches in length.

h) One (1) J60P user guide, see Figure 7.

Figure 7

7. Installing the J60P jets

Figure 8

Note!
Read this manual in it's entirety before attempting to install, or use, the modified print heads, or the interface electronic. Both the Machine and the Interface electronic should be disconnected from the mains before installing.

The overall procedure for installing the new jets and interface electronic is as follows and should be followed in this sequence:

1. Install the adapter plate
2. Install the modified jets
3. Connect the ribbon cable between the interface electronic and the Solidscape machine
4. Plug the interface electronic into the rear PCB on the Solidscape machine
5. Secure/tidy all cables
6. Switch on the machine
7. Switch on the interface electronic
8. Purge and wipe
9. Perform offset calibration
10. Perform volume calibration
11. Ready for use

These steps are outlined in detail in the following sections.

7.1. Install the adapter plate

The following outlines the steps in installing the adapter plate and connector extender for the J60P Jets.

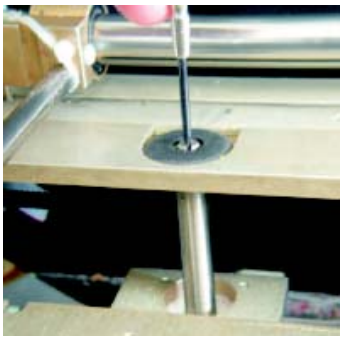


Figure 9

1. Lower the build table by 5 or more inches in order to create room to use the Allen key when fixing the adapter plates to the print head carriage, see Figure 9.

Figure 10

2. Sit the socket screw on the long end of the Allen key, see Figure 10.

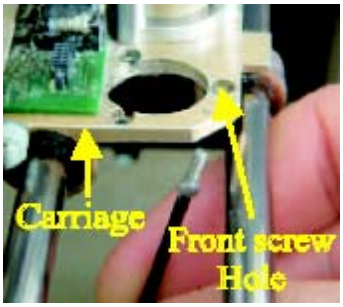


Figure 11

3. Guide the socket screw through the front hole of the print head carriage. See Figure 11 and Figure 12.

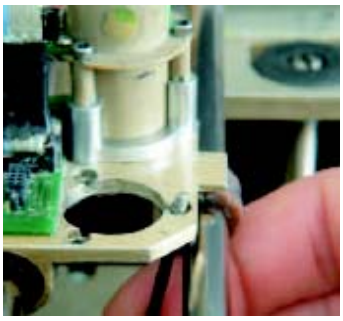


Figure 12

Figure 13

4. Loosely screw the socket screw through the front hole of the print head carriage and into the adapter plate, see Figure 13.

Figure 14

5. Loosely fit the remaining two screws using a similar procedure as described above. Once all three screws are loosely fitted, then tighten the screws starting with the front screw. See Figure 14.

Figure 15

6. Insert the ten pole connector extenders into the receiving female socket which is attached to the Printed Circuit Board (PCB) attached to the print head carriage. Ensure that the pins are carefully aligned before inserting. See Figure 15.

7.2. Install the modified jets

The modified jets fit to the adapter plate in a similar fashion to the way they fitted to the original print head carriage. Refer to the machine's users manual as necessary.

The connector extender should be fully aligned with, both the print head PCB and the print head carriage PCB. This is easily done by fitting the connector extender to the print head first, and aligning it to the print head carriage PCB connector as you lower the print head.

Figure 16

1. First screw the three cap screws, which are on the modified print head, back until they are flush with the plastic casing. See Figure 16.

Figure 17

2. Carefully sit the modified print head on the adapter, while ensuring that the 10 pin electrical connector is correctly aligned with the connector on the print head. See Figure 17.

Figure 18

3. First loosely screw in the three socket screws to the adapter plate. Once all three screws are loosely screwed into the adapter plate then proceed to tighten the three socket screws. See Figure 18.

7.3. Installing the interface electronic

Please ensue that both the Solidscape machine and the interface electronics are tuned off and unplugged.

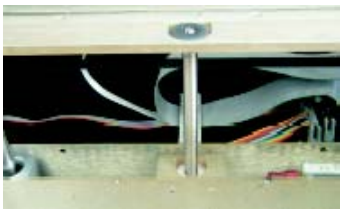


Figure 19

Figure 19 shows the original cabling configuration. This view is as seen from the fount of the machine when the build table is lowered significantly. The view is explained in more detail in Figure 20.

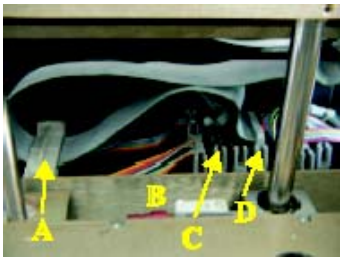


Figure 20

Figure 20 illustrates the position of various components.

A. Ribbon cable clamp
B. Cutter cable connector
C. Jet ribbon cable connector
D. Carriage ribbon cable connector

Figure 21

Release the ribbon cable clamp (A in Figure 20), this will loosen the cables, see Figure 21.

Figure 22

Figure 22 illustrates the position of the jet ribbon cable connector. This connector is to be released.

Figure 23

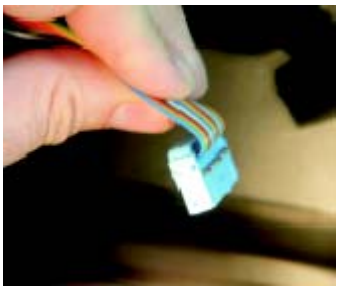
As shown in Figure 23 unplug the jet ribbon cable connector.

Position the interface electronics on the left hand side of the Solidscape machine, sitting on the power supply enclosure, as shown in Figure 24.

Figure 24

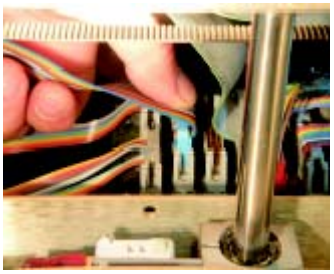
Ensure that the jet ribbon cable and the carriage PCB ribbon cable are safely out of the way while installing the interface electronics cable. See Figure 25.

Figure 25



Plug the ribbon cable from the interface electronics into the male socket previously occupied by the jet ribbon cable. The jet ribbon cable should now have been removed as previously described. See Figure 26 and Figure 27.

Figure 26



As illustrated in Figure 26and Figure 27 take note of the connector orientation. Insert the cable from the interface electronic into the male connector previously occupied by the female jet ribbon cable connector.

Figure 27

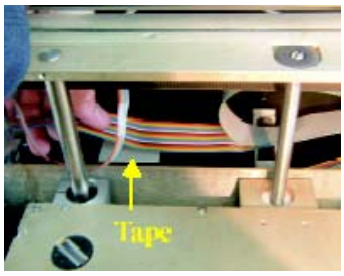


Figure 28

Route the interface electronics ribbon cable (rainbow colored in Figure 28) behind the build table as illustrated in Figure 28 and Figure 29. The ribbon cable should run through the ribbon cable clamp. It may help to use double sided tape to fix the interface electronics ribbon cable to the machine floor as shown in Figure 28.

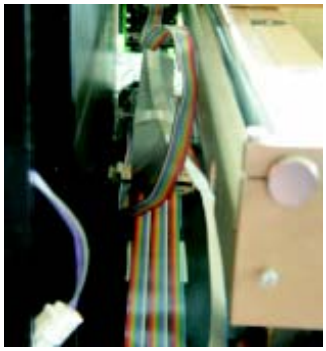


Figure 29

Figure 29 shows the ribbon cable between the interface electronics and the jet ribbon cable connector, running along the machine floor.

Figure 30

As illustrated in Figure 30 first place the interface electronics ribbon cable in the ribbon cable clamp.

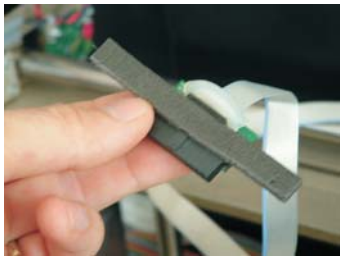


Figure 31

The next step is to insulate the jet cable connector with the gray insulation strip, which has been provided.

As illustrated in Figure 31, having removed the paper protecting the adhesive surface of the gray insulation strip, place the insulation strip centre way on one side of the jet cable connector.

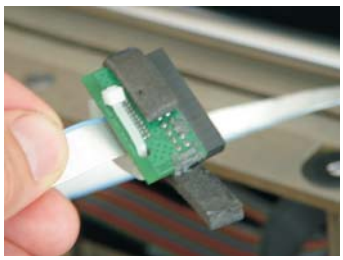


Figure 32

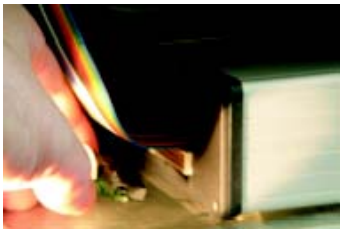
Having placed the gray insulation strip centre way on one side of the jet cable connector wrap one side of the gray insulation strip around the connector and then wrap the other side as illustrated in Figure 32 and Figure 33

The jet cable connector should now be fully insulated such that the electrical pins are not exposed and insulated by the gray insulation strip. See Figure 33 and Figure 34

Figure 33

Figure 34 provides an end view of the fully insulated jet cable connector.

Figure 34



Insert the female end of the ribbon cable provided into the exposed male connector on the interface electronics. See Figure 35 and Figure 36.

Figure 35

Figure 36

Run this cable such that the male connector lies on top of the first ribbon cable from the interface electronics, which has already been installed.

Ensure that the male end of this ribbon cable is facing up as illustrated in Figure 37.

Figure 37

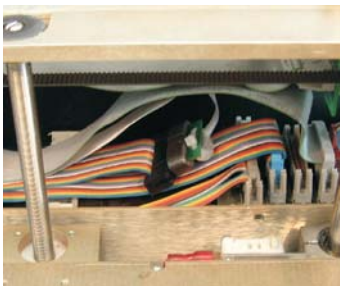


Figure 38

Insert the jet ribbon cable connector, which has been previously insulated using the gray insulation strip provided, into the male end of the ribbon cable from the interface electronic, see Figure 38.

The jet head ribbon cable takes essentially the same route as it previously did, the only difference now is that it is plugged into the male connector on the end of the ribbon cable from the interface electronic rather than into the male connector on the Solidscape machine.

Figure 39

Place the carriage ribbon cable on top of jet ribbon cable. See Figure 38.

Ensure that both ribbon cables form the interface electronic, the jet ribbon cable and the carriage ribbon cable are running through the cable clamp. Clamp all cables securely in place as illustrated in Figure 39 and Figure 40.

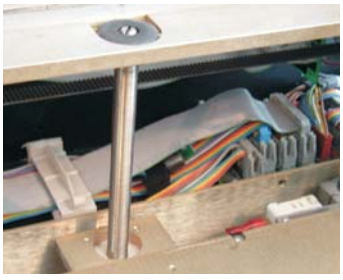


Figure 40

The interface electronic is now installed. Tidy the cables, close the machine panels, etc. and return the print table to its normal position.

Note!
Tidying the cables is a very important step. Poorly fitted cables can fail prematurely due to wear and strain, causing damage to the machine or safety issues. Bending and rubbing of cables needs to be kept to a minimum.

7.4. Switching on the machine and the interface electronic

The power on sequence is here described.

1. Power up the machine as described in the machine user's manual.
2. Plug in or switch on the PicoPiezo interface electronic.
3. The blue LED on the interface electronic should light up immediately, indicating that mains power is being supplied.

8. Testing

This section describes how to test and calibrate the PicoPiezo jets.

1. Purge, wipe (using the machine's wipe station) and test both heads as described in the machine user's manual.
2. The machine should now be jetting correctly.
3. Perform offset calibration as per the machine user's manual.

8.1. Volume calibration

The volume should remain constant for a long time. However volume calibration will need to be done the first time new inserts/jets are installed, and occasionally thereafter.

Calibrating the build volume requires modifying two variables in the **MM2.ini** file.

The Value of **Build.Normal.JetHoldVoltage** controls the build volume.

The Value of **Support.Normal.JetHoldVoltage** controls the build volume.

The normal value for both jet heads is about **60V.**

8.2. Tips and advice

The Jet interface electronic includes two heating LED's.
When the Machine is switched on from cold, the Build and Support jet heating LED's should light constantly for approximately 60 seconds, and then start flickering on and off. This indicating that the jets have warmed up to the programmed operating temperature. If the LEDs do not behave as expected, refer to the section on troubleshooting.

9. Maintenance and troubleshooting

The following section provides information on maintenance and troubleshooting. Please also refer to the troubleshooting table which appears in the next section.

9.1. General wax issues

Wax tends to degrade over time at elevated temperatures. The higher the temperature the quicker the rate of degradation. Just a few degrees increase in temperature will dramatically increases the rate at which the wax "cogs". Therefore, the wax degrades quickest in the jet itself as these are generally at the highest temperature.

In order to avoid degradation of the wax, and eventually blocking the jet, it is recommended to keep a flow through the jets by using them frequently.

1. Build models regularly, or frequently purge (purge plus purge and fire) a little wax to keep the wax in each jet fresh.

2. Alternatively switch off the machine when it is not in use for prolonged periods.

Wax blockages are generally the biggest source of potential problems with PicoPiezo jets.

9.2. Orifice

The orifice is hard (several hundred times harder than plastic, even at elevated temperatures. Under normal conditions (wiping etc.) the orifice will not get damaged.

Note! Do not bring any hard materials in contact with the jet orifice, as this may damage the jet beyond repair, and do so **at the user's own expense**.

10. Trouble shooting table

Category	Symptom	Possible cause	Solution
Power LED	Blue LED lights when electronic is plugged in	Normal	
	Blue power light does not light	No power to electronic	The electronic needs mains power 110V or 220V as specified on label. An incorrect voltage will damage the electronic.
Build jet heating LED	Build jet heating LED light is on constantly, while the Jet gets up to temperature, and then flickers	Norma, it flickers to regulate the temperature	
	Build jet heating LED fails to light	Build jet missing	Insert Build jet
		Cabling problem	Check extender connectors between head and print head carriage PCB
		Cabling problem	Check cabling between electronic and breakout
		Cabling problem	Check cabling between electronic and print head carriage PCB
		Software state	Check temperature setting in software… if all the cabling is correct, sometimes the software will need a reset.
		Other Tips	Try replacing the jet with a working jet, or a jet that is coming up to temperature correctly. However never mix build and support waxes
	Build jet Lights, and will not go out	Machine recording incorrect temperature	Check all cabling as in above problem
			Check temperature setting in software… if all the cabling is correct, sometimes the software will need a reset.
			Try replacing the jet with a working jet, or a jet that is coming up to temperature correctly. However never mix build and support waxes

Table 1 Troubleshooting - table 1 of 3

Category	Symptom	Possible cause	Solution
Support jet heating LED	Any of the problems that relate to the build jet heating LED also apply to the Support Jet Heating LED. See above.	As above	As Above
Build Jet Fire LED	Build Jet fire light/ flickers during: 1. A jet check: 2 A purge and fire	Normal.. This indicates that the electronic is receiving the pulses correctly from the Patternmaster, and it is generating new pulses correctly	none
	Build Jet fire fails to light during: 1. A jet check: 2 A purge and fire	Cabling problem	Check cable between electronic and Patternmaster breakout board
		Power	Check that blue power LED is on
		Software state	Reset Patternmaster
Build Jet Fire LED	Any of the problems that relate to the build jet fire LED also apply to the Support Jet fire LED. See above.	As above	As Above
Purge and fire	Purge and fire streams wax with a straight steady stream in one direction only streams	Normal	
	Purge and fire no wax		
	Purge and fire drips wax, but will not 'stream' wax	Wet orifice	Wipe jet and try again
		Unwanted particle in jet orifice	See "Clearing a Jet" at the end of this section
	Purge and fire streams wax but not straight.		
	Purge and fire streams wax but the direction changes as it streams		

Table 2 Troubleshooting - table 2 of 3

Category	Symptom	Possible cause	Solution
Jet test	Jet test produces clean narrow, straight stripe of wax on drum, with no spray.	Normal	
	No stripe of wax	Electronic problem	Check that appropriate Jet fire LED is lighting
		air in wax	Purge as per machine manufacturer's instructions
		Wet orifice	Wipe
		Unwanted particle in jet orifice	See "Clearing a Jet" at the end of this section
	Uneven stripe, or stripe with spray droplets either side	Point of jet covered with wax	wipe
		Air in wax supply	Purge as per machine manufacturer's instructions
		Unwanted particle in jet orifice	See "Clearing a Jet" at the end of this section
		Wax flow or pressure not correct	Use one inch of Teflon purge tube during a standard purge, before you remove the purge tube, the wax should start to slowly retract up the tube. If this doesn't happen, suspect wax flow or pressure issues.
		Wax temperature not correct	Check settings in Software. Double check with temperature probe.
		Wax degraded	

Table 3 Troubleshooting - table 3 of 3

Refer to the user forum at www.PicoPiezo.com/userforum for further suggestions on getting the best performance from your PicoPiezo products.

Operational and Storage Environment

Operating Temperature:	32 - 104 degrees F (0 - 40 degrees C)
Operating Humidity:	20 - 80%
Operating Altitude:	0 - 9180 feet (0 - 2800m)
Storage Temperature:	14 - 122 degrees F (-10 - 50 degrees C)
Storage Humidity:	10 - 90%
Storage Altitude:	0 to 9840 feet (0 - 3000m)

Power Requirements

Please refer to the label on the interface electronic
Option 1: 110V / 60Hz
Option 2: 220V / 50Hz

Contact details

Web: www.PicoPiezo.com
Email: CustomerInfo@PicoPiezo.com