

# TRAK<sup>®</sup> 3ntr 3D Printers

## SPFU Installation Quick Start Guide

---

Document: P/N 32230 Version: 010820
--

### Covers Current Models:

- 3ntr A2
- 3ntr A4

**TRAK** MACHINE  
TOOLS



**SOUTHWESTERN INDUSTRIES, INC.**

2615 Homestead Place

Rancho Dominguez, CA 90220-5610 USA

T | 310.608.4422 | F | 310.764.2668

Service Department: 800.367.3165

e-mail: [sales@trakmt.com](mailto:sales@trakmt.com) | [service@trakmt.com](mailto:service@trakmt.com) | web: [www.trakmt.com](http://www.trakmt.com)

Copyright © 2019, Southwestern Industries, Inc. All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, photocopying, recording or otherwise, without the prior written permission of Southwestern Industries, Inc.

While every effort has been made to include all the information required for the purposes of this guide, Southwestern Industries, Inc. assumes no responsibility for inaccuracies or omission and accepts no liability for damages resulting from the use of the information contained in this guide.

All brand names and products are trademarks or registered trademarks of their respective holders.

Southwestern Industries, Inc.  
2615 Homestead Place  
Rancho Dominguez, CA 90220  
Phone 310-608-4422 Fax 310-764-2668  
Service Department  
Phone 800-367-3165 Fax 310-886-8029

## **Table of Contents**

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
<b>2</b>	<b>Clean Nozzle Procedure .....</b>	<b>1</b>
2.1	<b>Clean Nozzle Procedure Overview:.....</b>	<b>1</b>
2.2	<b>Unload Filament Using Change Filament Function.....</b>	<b>1</b>
2.3	<b>Load Cleaning Filament .....</b>	<b>5</b>
2.4	<b>Nozzle Cleaning (Automated Function).....</b>	<b>7</b>
<b>3</b>	<b>Install SPFU to Nozzle #1 .....</b>	<b>11</b>
<b>4</b>	<b>TRAK Warranty Policy.....</b>	<b>20</b>

# 1 Introduction

This guide outlines the process to install the Soft Polymer Feeder Unit (SPFU) to Nozzle #1 of your TRAK 3ntr A2 or A4 printer. Before you can install the SPFU, you must complete the Clean Nozzle procedure (also outlined within this guide).

## 2 Clean Nozzle Procedure

This section details all the steps to clean extruder nozzles. The nozzle cleaning procedure must ALWAYS be performed BEFORE changing to a new polymer type filament. A nozzle cleaning procedure should always be performed any time there are unacceptable nozzle flow conditions that cannot be cleared with several purge cycles.

### 2.1 Clean Nozzle Procedure Overview:

There are three steps to cleaning nozzles:

- 1) Remove existing filament(s) using the change filament function
- 2) Feed cleaning filament (nylon) to the extruder(s)
- 3) Clean nozzle(s) using the front panel control Clean Nozzle function

**CAUTION** - Only load factory recommended (nylon or equivalent) filament for cleaning procedures.

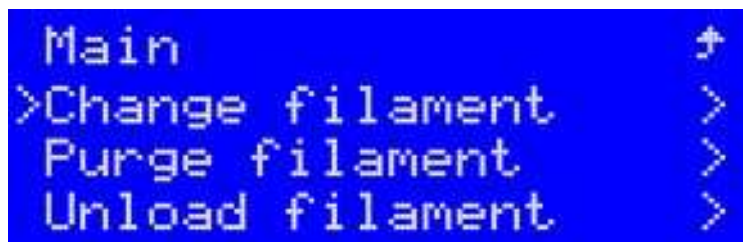
**NOTE** - Before using the Clean Nozzle function from the front panel, you must use the Change/Load Cleaning Filament procedure to remove build/support filament and feed the nylon cleaning filament to the extruders to be cleaned.

### 2.2 Unload Filament Using Change Filament Function

In this section, you will change filament removing existing spools before installing the cleaning filament (instead of a new build/support material filament spool). It should always be performed before a nozzle cleaning procedure.

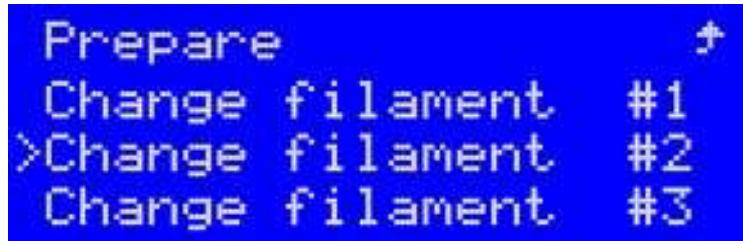
**NOTE** - If you are using an MMS unit or PolyBox (humidity-controlled container) the process is different. If feeding material directly from a PolyBox or equivalent container, follow the instructions as applicable

- 1) Check that there is enough clearance (20-30mm) between nozzle and plate before starting. If not, move printer plate following instructions for "Move Z axis function"
- 2) Navigate to the Prepare menu. From the Prepare menu select "Change filament"



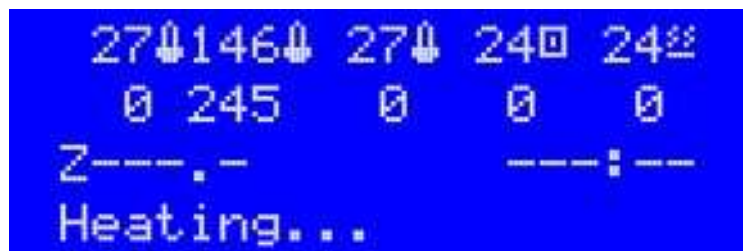
**Figure 2.2.1 Selecting Change Filament from Prepare Menu**

- 3) Assuming filament has been previously loaded, Select Change Filament "Extruder #1"



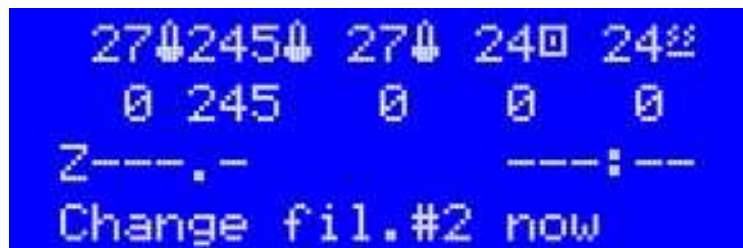
**Figure 2.2.2 Selecting Extruder for Change Filament**

- 4) The selected extruder will begin heating up and the LCD will display Heating... Observe the temperature readout for the selected extruder and see it increasing.



**Figure 2.2.3 Info Display During Change Filament**

- 5) Once the set temperature is reached, the machine will purge some filament. Once this automatic purging is completed, the display will indicate "Unload Filament Now". At this time, you can now reach to the back of the cabinet to unload the filament.

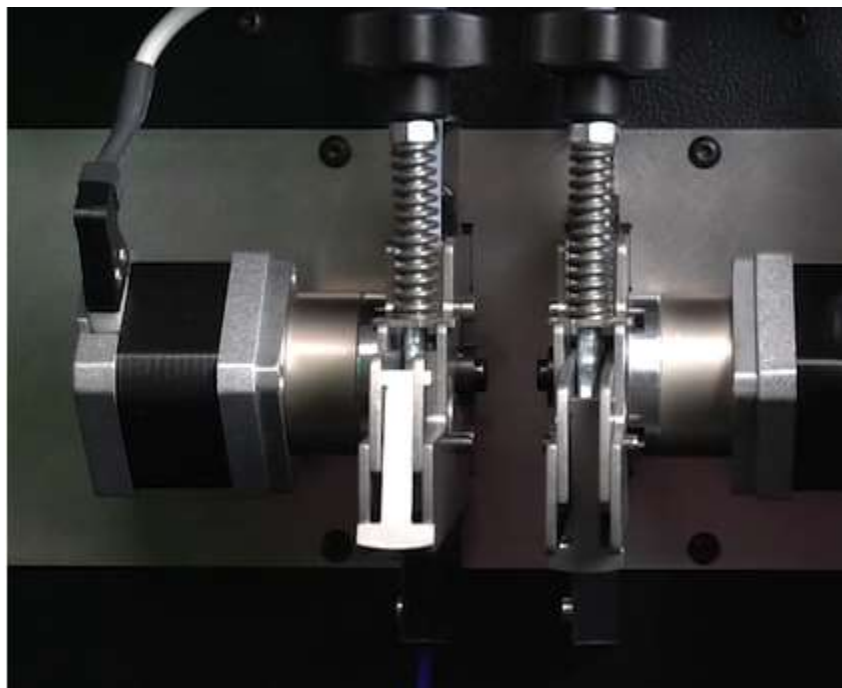


**Figure 2.2.4 Printer Readiness Signal to Change Filament Spool**

- 6) Locate the feeder handle on the selected extruder. Grab the feeder handle of the selected extruder, push it down and secure it into position with the provided lock "lip" This way the feeder mechanism will be disengaged. Looking at the feeders from the rear of the printer, the rightmost is the #1 feeder, and leftmost is #3.



**Figure 2.2.5 Disengage filament feeder**



**Figure 2.2.6 Latched & Unlatched Filament Feeders**

- 7) Pull the filament from the feeder, rewinding the filament onto the spool.



**Figure 2.2.7 Pulling old filament out of feeder unit**

- 8) Thread the end through the opening on the spool to keep it from de-coiling.



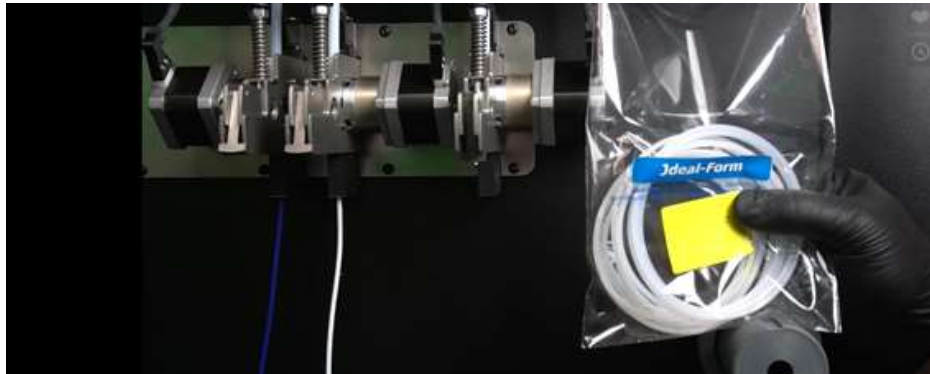
**Figure 2.2.8 Secure filament end to spool**

- 9) Unlock and remove collar from filament spool spindle of selected extruder on back of printer. Remove filament spool and place in a dry and clean container (with desiccant package) away from heat and sunlight.



## 2.3 Load Cleaning Filament

- 1) Obtain the cleaning filament (Hollow nylon filament specially for nozzle cleaning).



**Figure 2.3.1 Nozzle Cleaning Filament (Nylon)**

- 2) Trim off several mm to remove bends, dirt, tape, or damage. Straighten as needed.



**Figure 2.3.2 Trim off the end of new filament**

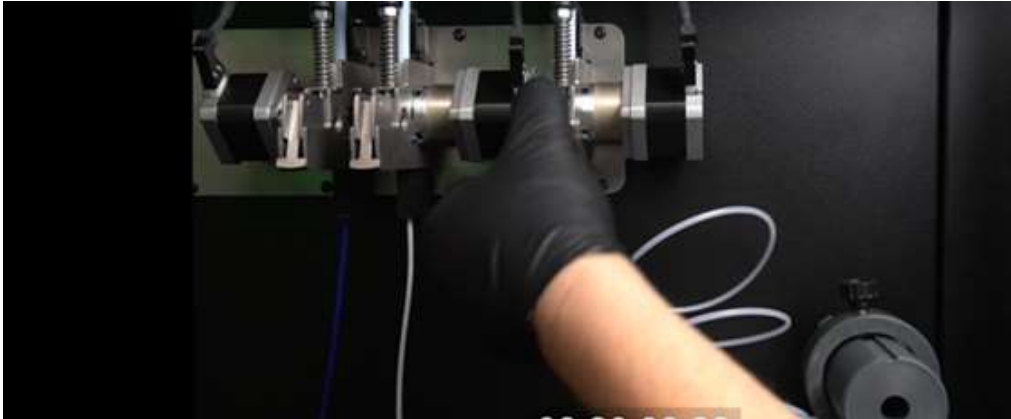
- 3) Use scissors, knife, or a pencil sharpener to point the filament end for easy feeding to the extruder.



**Figure 2.3.3 Illustration of correct and incorrect filament tip sharpening**

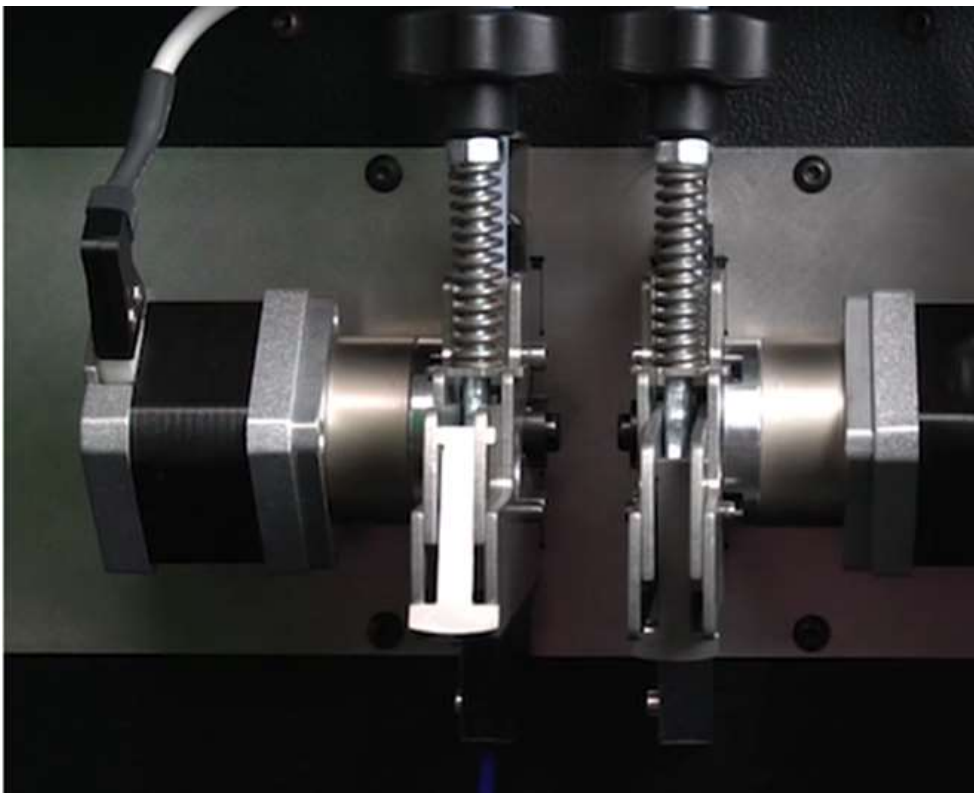


- 4) Feed the filament into the feeder unit and keep feeding until the end stops at the extruder. Release the feeder handle. Verify the locking "lip" is disengaged.



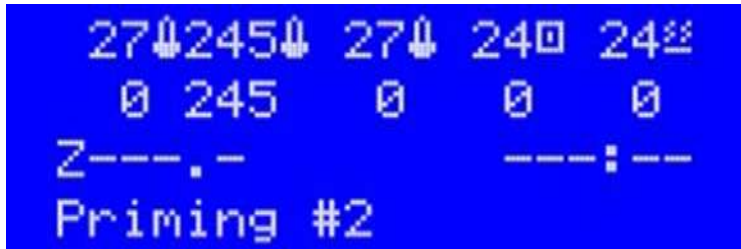
**Figure 2.3.4 Engage the filament feeder**

- 5) The locking lip is now engaged. The machine will automatically control the filament feed.



**Figure 2.3.5 Latched and Unlatched Filament Feeders**

- 6) Press the button on the jog wheel. The LCD will display "Priming #X" as it purges some filament. Upon completion, the LCD will display "Change #x Complete" to indicate completion.



**Figure 2.3.6 LCD Display while new filament is priming**

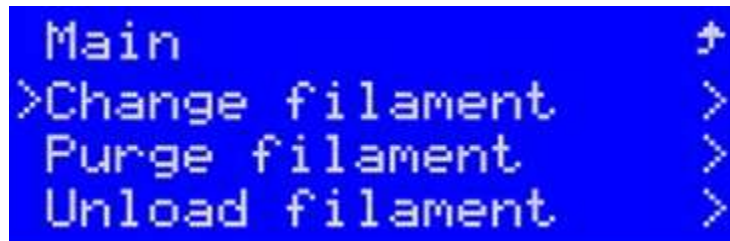
- 7) Repeat filament change/load cleaning filament procedure for extruder #2 (as necessary)
- 8) Repeat filament change/load cleaning filament procedure for extruder #3 (as necessary)
- 9) Procedure complete!

## 2.4 Nozzle Cleaning (Automated Function)

This section details the nozzle cleaning procedure. The nozzle cleaning procedure must ALWAYS be performed BEFORE changing to a new polymer type filament. A nozzle cleaning procedure should always be performed any time there are unacceptable nozzle flow conditions that cannot be cleared with several purge cycles.

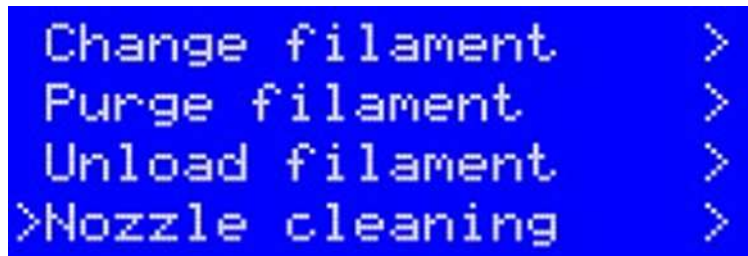
**NOTE** - Before using the Clean Nozzle function from the front panel, you must use the Change Filament procedure to remove build/support filament and feed the nylon cleaning filament to the extruders to be cleaned.

- 1) Use CHANGE FILAMENT/Load Cleaning Filament procedure (see appropriate guide section for instructions) to remove filament in use and to load cleaner filament to the machine.



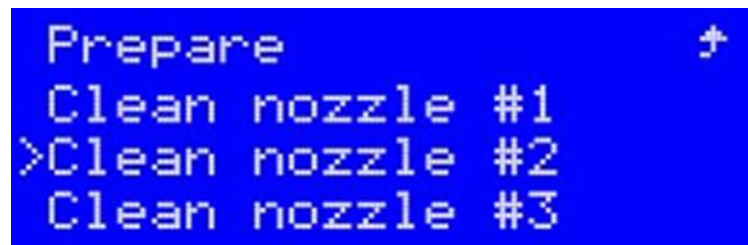
**Figure 2.4.1 Change Filament Function**

- 2) Select the nozzle cleaning function from the printer control panel Prepare Menu



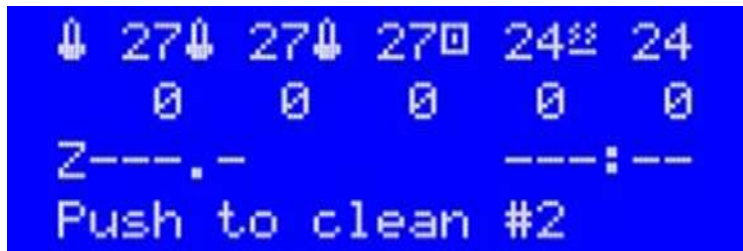
**Figure 2.4.2 Prepare Menu: Nozzle Cleaning Selected**

- 3) Choose the nozzle to be cleaned (Nozzle #2 in this example)



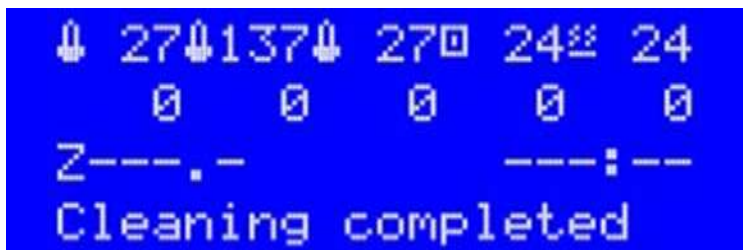
**Figure 2.4.3 Select Extruder for Cleaning**

- 4) After verifying the nylon cleaning filament is properly loaded into the extruder, press the black jog wheel button to start the automatic cleaning procedure.



**Figure 2.4.4 Printer indication – Ready to Clean**

- 5) The printer will now heat the chosen extruder, clean the nozzle, then cool it down to a preset value and pulls out the filament (from the heated nozzle) for you to check it.



**Figure 2.4.5 LCD Indicating Cleaning Complete**

- 6) Inspect the cleaning filament tip after the cleaning cycle.
- 7) If the filament tip appears with the proper shape and no traces of color, then the cleaning process can be concluded, if not, additional steps are required (below)



**Figure 2.4.6 Ideal Cleaning Filament Tip (after cleaning)**

- 8) If the filament tip after cleaning has any traces of color on it (as below), repeat the cleaning process for additional cycles, until no traces of color remain.



**Figure 2.4.7 Cleaning Filament Tip Color after multiple Cleaning Cycles**

- 9) If the shape of the extruded cleaning filament tip after the cleaning cycle is not ideal (as pictured above), repeat the cleaning cycle a couple times.
- 10) If an ideal cleaning filament tip is not obtained after a couple cycles (bad tips shown below), perform the following extruder troubleshooting steps:
  - a. Check/Fill coolant liquid level
  - b. Verify coolant fluid flow to extruder
  - c. Check extruder thermal gain setting (correct if necessary)
  - d. Perform a Feeder roller cleaning procedure
  - e. Nozzle change (may be required)



**Figure 2.4.8 Bad Tips after Filament Cleaning: Requires Troubleshooting**

- 11) Repeat entire cleaning process for other extruders (as required/needed)
- 12) Nozzle cleaning function complete!

### 3 Install SPFU to Nozzle #1

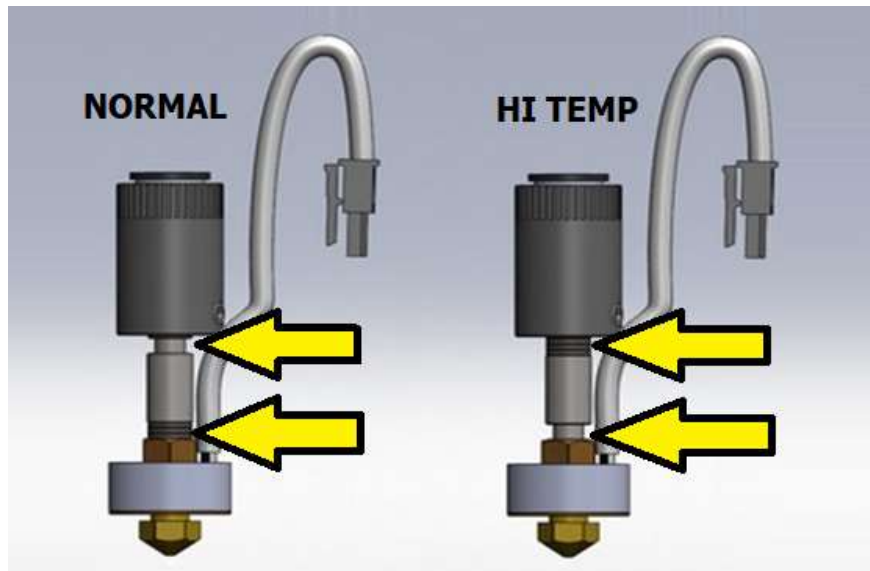
This section outlines the process to install the SPFU on Nozzle #1. You must complete the Nozzle Cleaning procedure before proceeding with SPFU installation.

- 1) Move print bed away from extruders (for access) using Move Axis function.
- 2) Use a 2.5mm hex key to remove the screws holding the printer upper front panel cover (#1 in drawing below). There are 8 screws on an A2, 4 screws on an A4.
- 3) Remove printer front access cover to provide access for installation.



**Figure 3.1 Removing Printer Front Access Cover**

- 4) Inspect the extruder #1 configuration visually within the printer. Verify extruder #1 is mounted in the Normal position (see illustration below)



**Figure 3.2 Extruder Configuration ID Guide: Normal and HI TEMP**



- 5) Verify extruder #1 is set for NORMAL (not HI TEMP) control setting. Use the printer control panel to go to Hardware>Extruder Configuration. Normal setting is indicated with HITEMP = 0 (Required for SPFU).

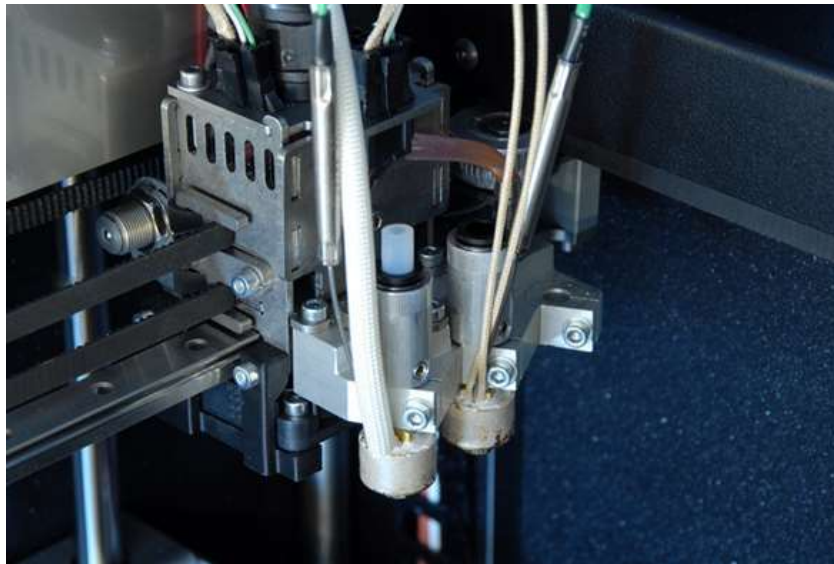


**Figure 3.3 Extruder #1 in Normal Control Setting**

- 6) Follow the Clean Nozzle procedure (See the appropriate guide section for instructions) to remove current filament, feed cleaning material to extruder(s), and perform the automatic cleaning function.

**CAUTION** – You must complete the Clean Nozzle procedure before continuing with the SPFU fitment procedure. A Nozzle Cleaning procedure must be completed for each nozzle before SPFU can be fitted.

- 7) Turn OFF Printer
- 8) Remove PTFE piping from #1 & #2.
- 9) Fit the 25mm PTFE pipe on #1 tube adapter



**Figure 3.4 PTFE Piping for SPFU on Extruder**

- 10) Remove the feeder for Extruder #1



11) Feed the flexible shaft of the SPFU motor assembly through the passage of #1 piping



**Figure 3.5 Shaft for SPFU**

12) Put the motor assembly in place. Magnet will hold the part securely against the machine.



**Figure 3.6 SPFU Motor Placement**

13) Verify the printer power is OFF

**NOTE** -Never plug in stepper motor cables with power ON.

14) Connect stepper motor

15) Connect filament sensor



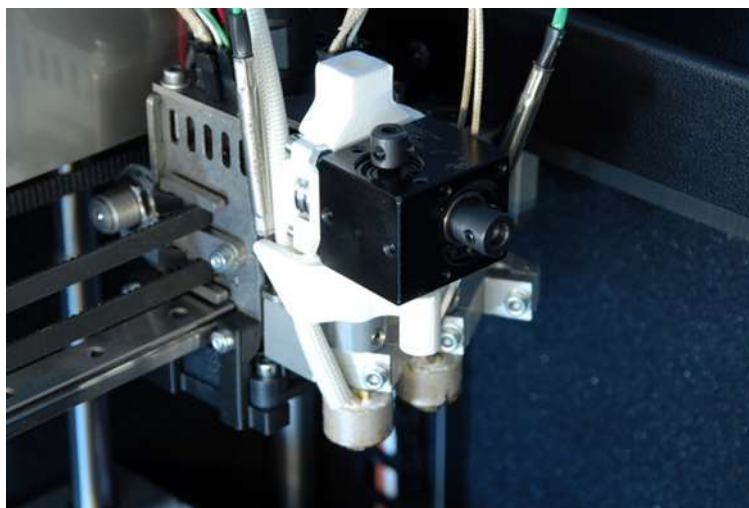
**Figure 3.7 Connect Stepper Motor and Filament Sensor**

16) Fit the PTFE piping into motor assembly as shown



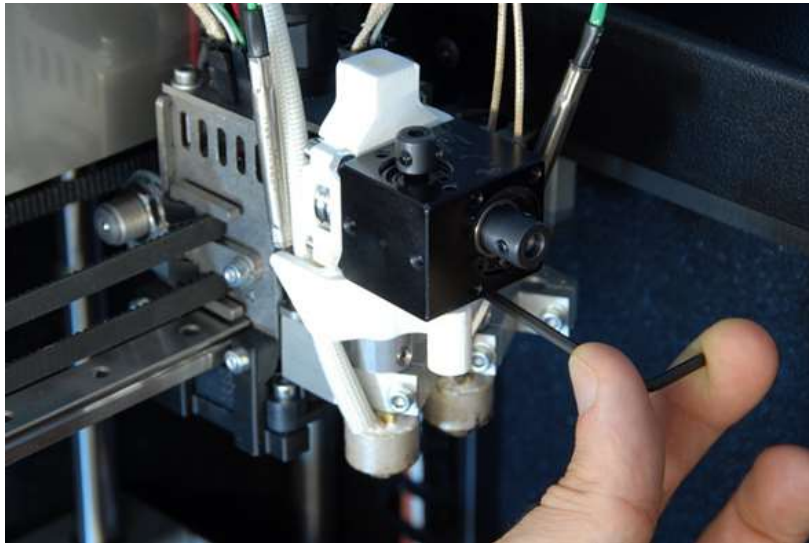
**Figure 3.8 Fitting PTFE piping into motor assembly as shown**

17) Place SPFU on Extruder #1



**Figure 3.9 SPFU Mounted on Extruder #1**

- 18) Tighten the locking screw on the SPFU assembly with an Allen wrench. Do not overtighten, snug is acceptable. User should encounter resistance when lifting up on the SPFU

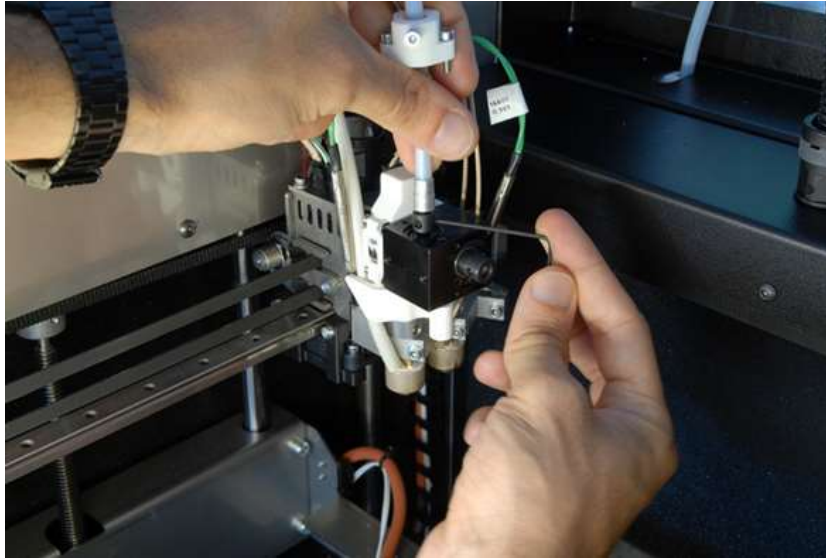


**Figure 3.10 Tighten Locking Screw on SPFU Assembly**



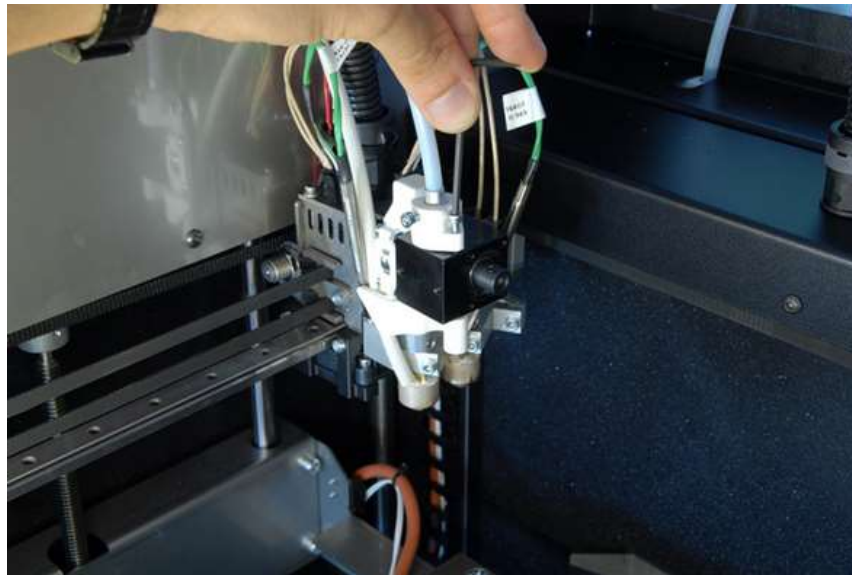
**Figure 3.11 View of SPFU Locking Screw from below**

- 19) Place Flexible shaft as shown. Tighten the three set screws. Do not overtighten, snug is acceptable.



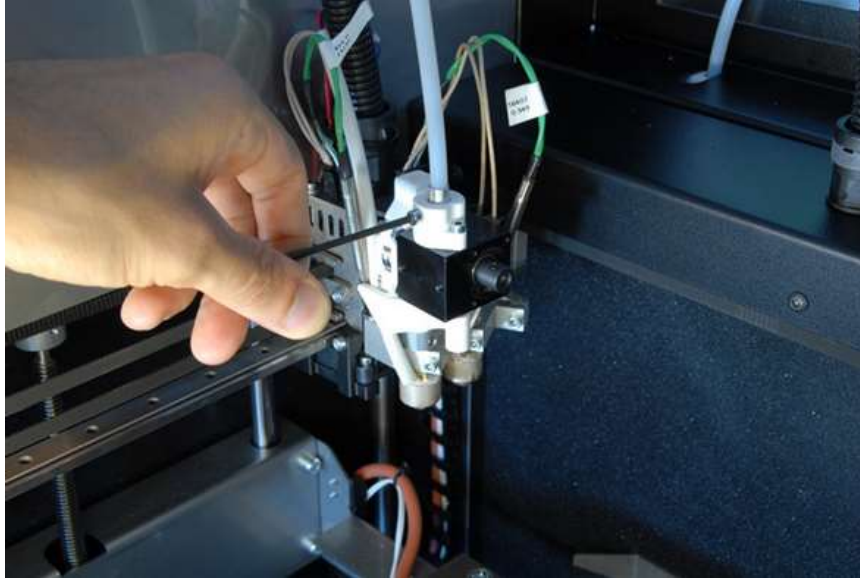
**Figure 3.12 SPFU Flexible Shaft Placement & Tightening**

- 20) Tighten the shaft holder screws. Do not overtighten, snug is acceptable.



**Figure 3.13 SPFU Shaft Holder Screw Tightening**

- 21) Lock the flexible shaft. Tighten until driveshaft tube is snug.  
**NOTE** – Be sure the shaft is fully seated, and screw is acting against end of the shaft piping. There may not be an aluminum component on the end of the shaft (as in illustration).



**Figure 3.14 Locking SPFU Flexible Shaft**

22) Power ON the Printer.

**NOTE** – Printer can be powered ON once the feeder disconnect and SPFU feeder connect are done. This will provide chamber lighting.

23) Determine the desired SPFU enablement mode for your installation based on the table below. The mode selected depends on the location of the SPFU installation (Front/Extruder #1 or Rear/Extruder #3) and if Chamber Heating is to be enabled or disabled.

**NOTE** – Chamber Heating is often disabled with an SPFU installation to avoid accidentally melting the polymer within the feeder tube/SPFU unit. If you choose one of the SPFU modes with enabled chamber heating, be sure to set chamber heating temperatures to an acceptable (lower) temperature.

SPFU Mode Setting	SPFU Installation Location	Chamber Heater Enablement
1	Front – Extruder #1	Disabled
2	Rear – Extruder #3	Disabled
3	Front – Extruder #1	Enabled
4	Rear – Extruder #3	Enabled

**NOTE** – For a front/Extruder #1 SPFU install, SPFU Mode Setting 3 is most typical.

24) Navigate from the Printer LCD display. Go to Hardware >SPFU. Enable the SPFU from the front control panel using the desired SPFU mode selection (from chart Above). Save.



**Figure 3.15 Enabling SPFU from Hardware Menu**



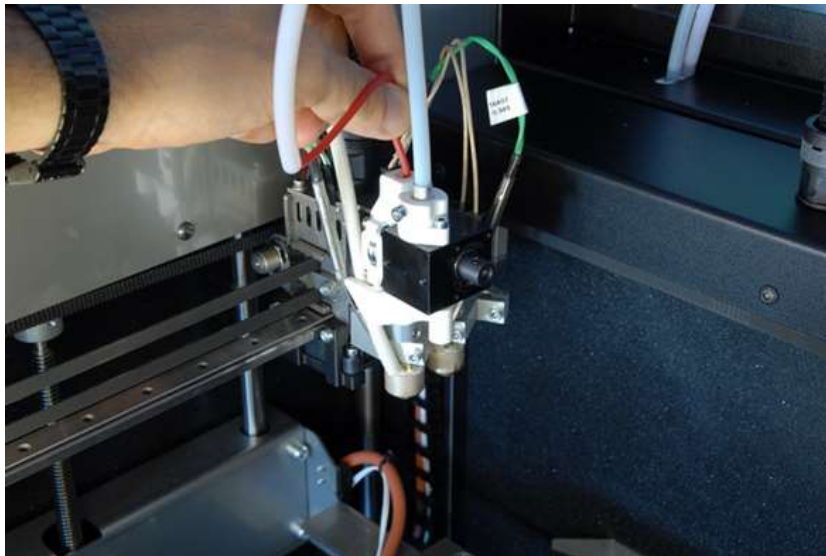
25) Verify SPFU is enabled by info screen display indicating "SPF"



**Figure 3.16 Info Screen Indicating SPFU Enabled**

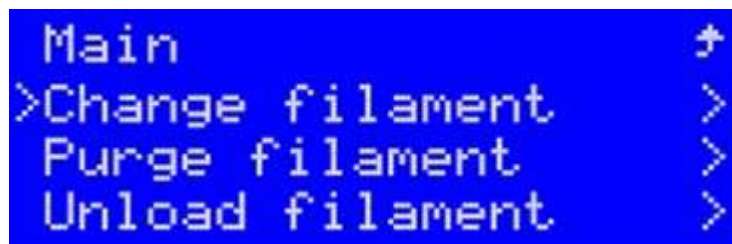
26) Feed filament into filament feeder until it appears at the SPFU filament feed tube end.  
**NOTE** – When feeding soft filament, it can be useful to ensure there is extra filament available for feeding it into the SPFU/extruder.

27) Feed filament directly through the PTFE piping and into the SPFU unit until the pinch roller grabs it. Carefully pull excess slack from the back of printer to set filament feeder tube properly.



**Figure 3.17 Feeding Filament through PTFE piping**

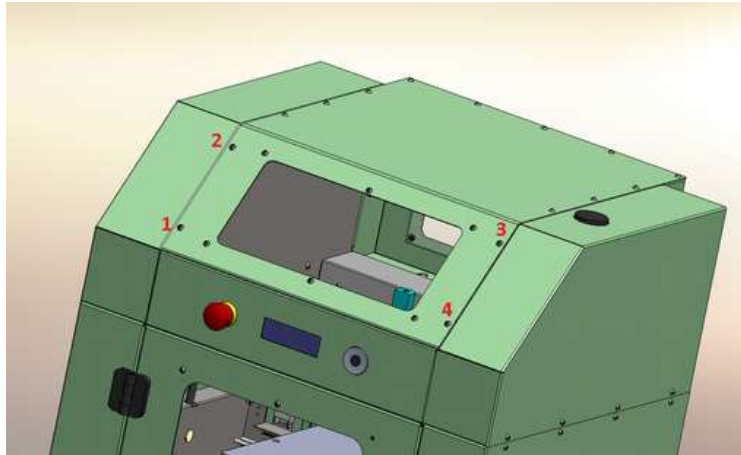
28) Perform the Filament Change function from the printer front panel and follow the on-screen instructions to complete the process.



**Figure 3.18 Change Filament Function**

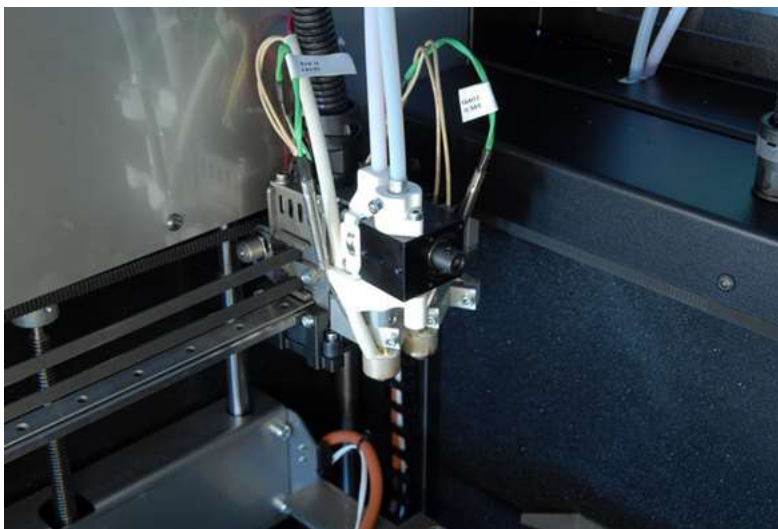
29) Connect the other end of the PTFE piping. Make sure it is firmly seated into SPFU

- 30) Replace Printer front upper access cover. Re-install and tighten screws with 2.5mm hex key.  
There are 8 screws on an A2, 4 screws on an A4.  
**CAUTION** – Never use printer without front access panel (or any access cover) removed.



**Figure 3.19 Printer Front Access Cover and Screws**

- 31) SPFU Installation process complete!



**Figure 3.20 Completed SPFU Installation on Extruder #1**



TRAK Machine Tools  
Southwestern Industries, Inc

# TRAK Warranty Policy

## Warranty

TRAK products are warranted to the original purchaser to be free from defects in workmanship and materials for the following periods:

Product	Warranty Period	
	Materials	Factory Labor
New TRAK/ProtoTRAK	1 Year	1 Year
Any EXCHANGE Unit	90 Days	90 Days

The warranty period starts on the date of the invoice to the original purchaser from Southwestern Industries, Inc. (SWI) or their authorized distributor.

If a product, subsystem or component proves to be defective in workmanship and fails within the warranty period, it will be repaired or exchanged at our option for a properly functioning unit in similar or better condition. Such repairs or exchanges will be made FOB Factory/Los Angeles or the location of our nearest factory representative or authorized distributor.

## Disclaimers of Warranties

- This warranty is expressly in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of SWI (or any producing entity, if different).
- Warranty repairs/exchanges do not cover incidental costs such as installation, labor, freight, etc.
- SWI is not responsible for consequential damages from use or misuse of any of its products.
- TRAK products are precision mechanical/electromechanical/electronic systems and must be given the reasonable care that these types of products require. Evidence that the product does not receive adequate Preventative Maintenance may invalidate the warranty. Excessive chips built up around ballscrews and way surfaces is an example of this evidence.
- Accidental damage, beyond the control of SWI, is not covered by the warranty. Thus, the warranty does not apply if a product has been abused, dropped, hit or disassembled.
- Improper installation by or at the direction of the customer in such a way that the product consequently fails, is considered to be beyond the control of the manufacturer and outside the scope of the warranty.
- Warranty does not cover wear items that are consumed under normal use of the product. These items include, but are not limited to: windows, bellows, wipers, filters, drawbars and belts.