TRAK® 3ntr 3D Printers

Clean Nozzle Procedure

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Covers Current Models:

- **3ntr A2**
- **3ntr A4**

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1 Introduction

This guide details all the steps to clean extruder nozzles. Nozzle cleaning is commonly performed when changing filaments, if undesirable flow conditions are present, or during routine printer maintenance, set-up, and/or installation activities. When required, each nozzle must be individually cleaned.

NOTE - 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. Nozzle cleaning may also be required during common maintenance and print job set-up procedures such as a nozzle change, installing and SPFU, reconfiguring extruders, and more.

2 Clean Nozzle Procedure

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.

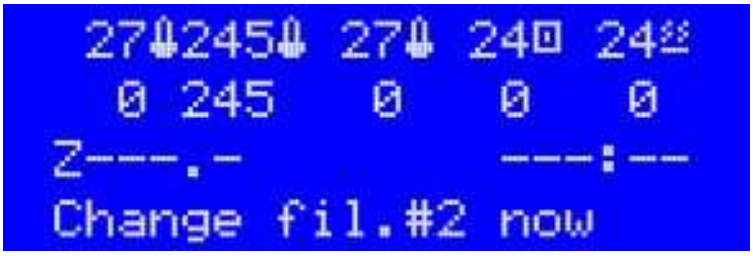

Figure 2.2.4 Printer Readiness Signal to Change Filament Spool

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.

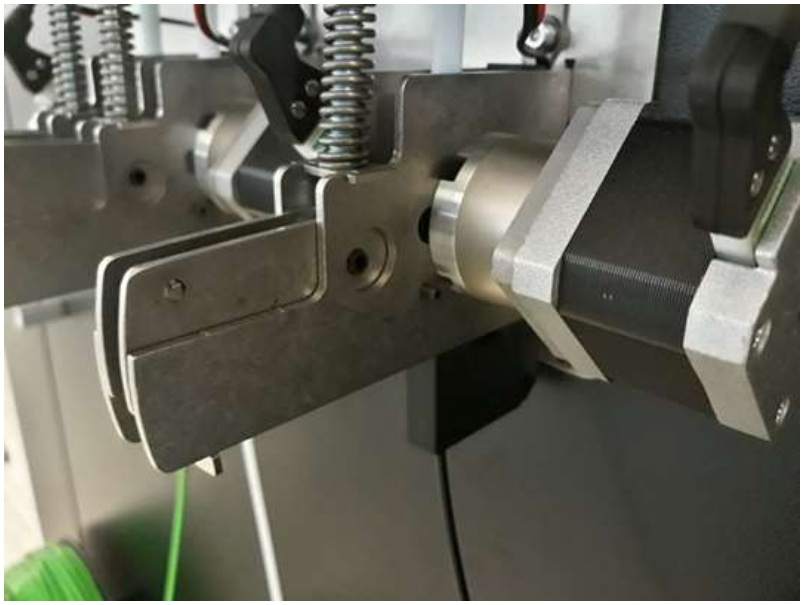

Figure 2.2.5 Disengage filament feeder

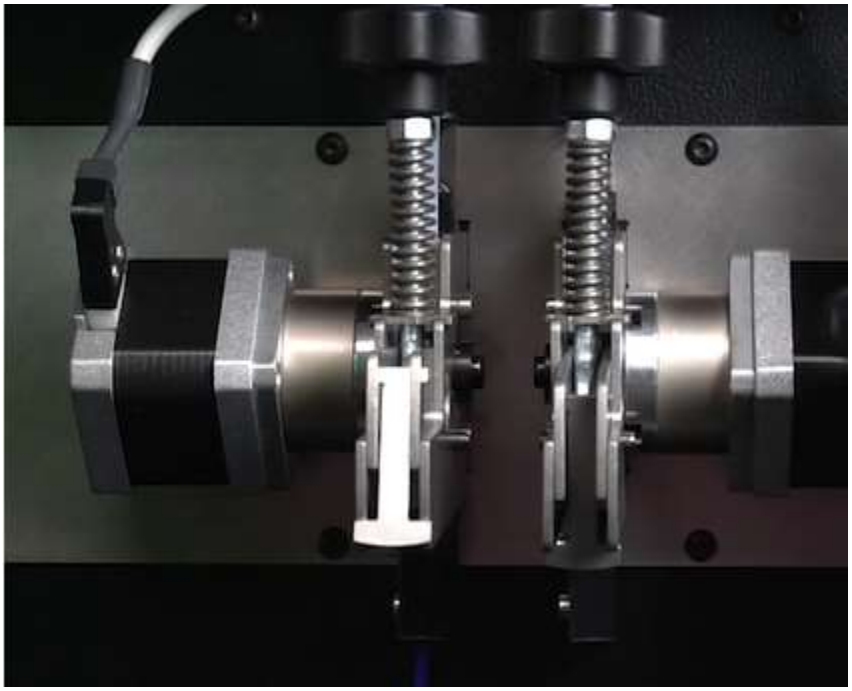

Figure 2.2.6 Latched & Unlatched Filament Feeders

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).

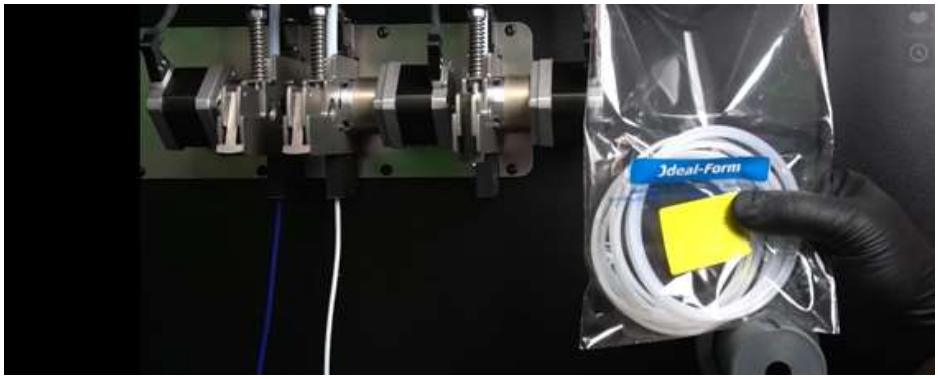

Figure 2.3.1 Nozzle Cleaning Filament (Nylon)

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

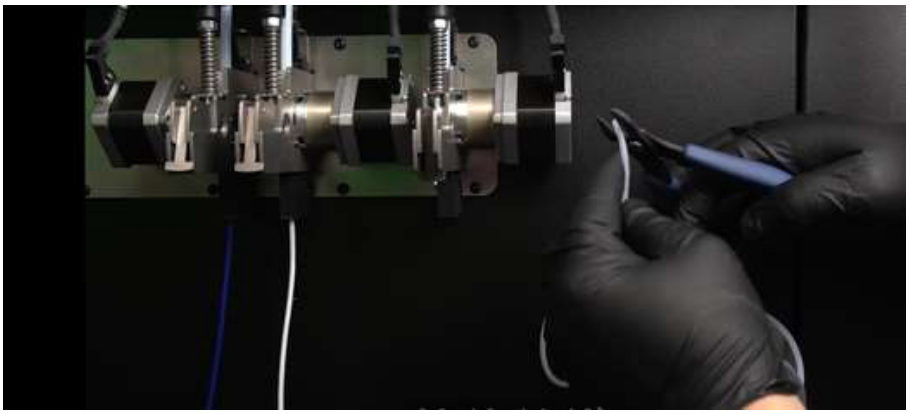

Figure 2.3.2 Trim off the end of new filament

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

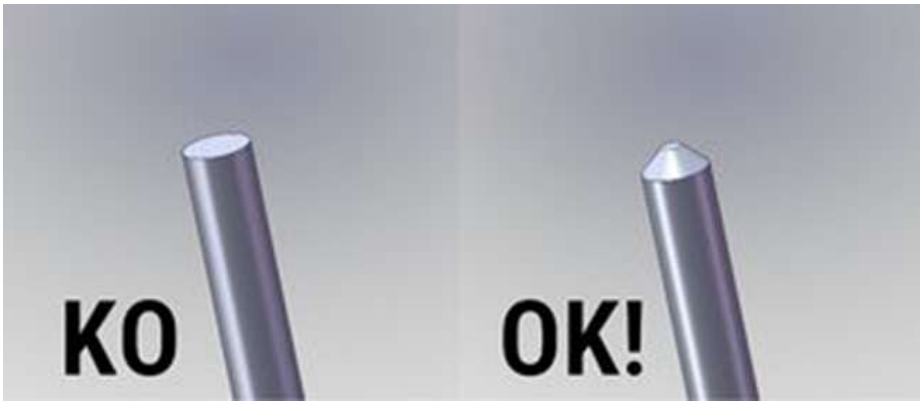

Figure 2.3.3 Illustration of correct and incorrect filament tip sharpening

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.

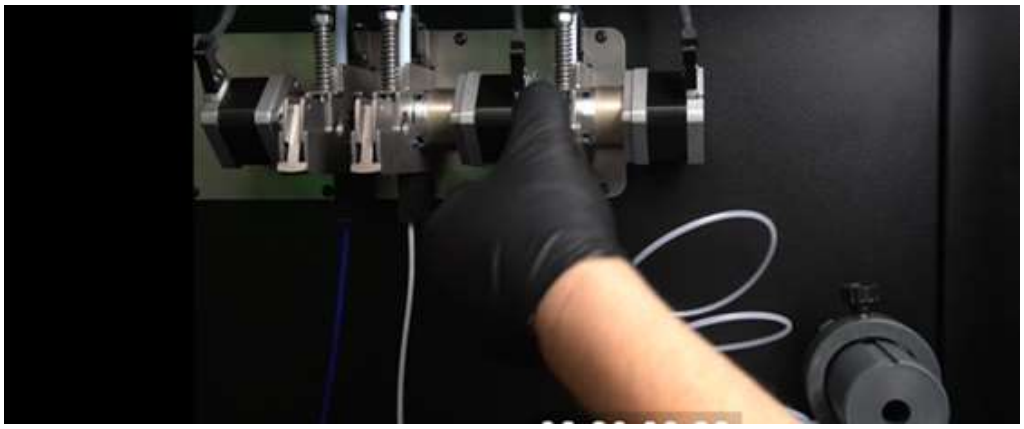

Figure 2.3.4 Engage the filament feeder

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

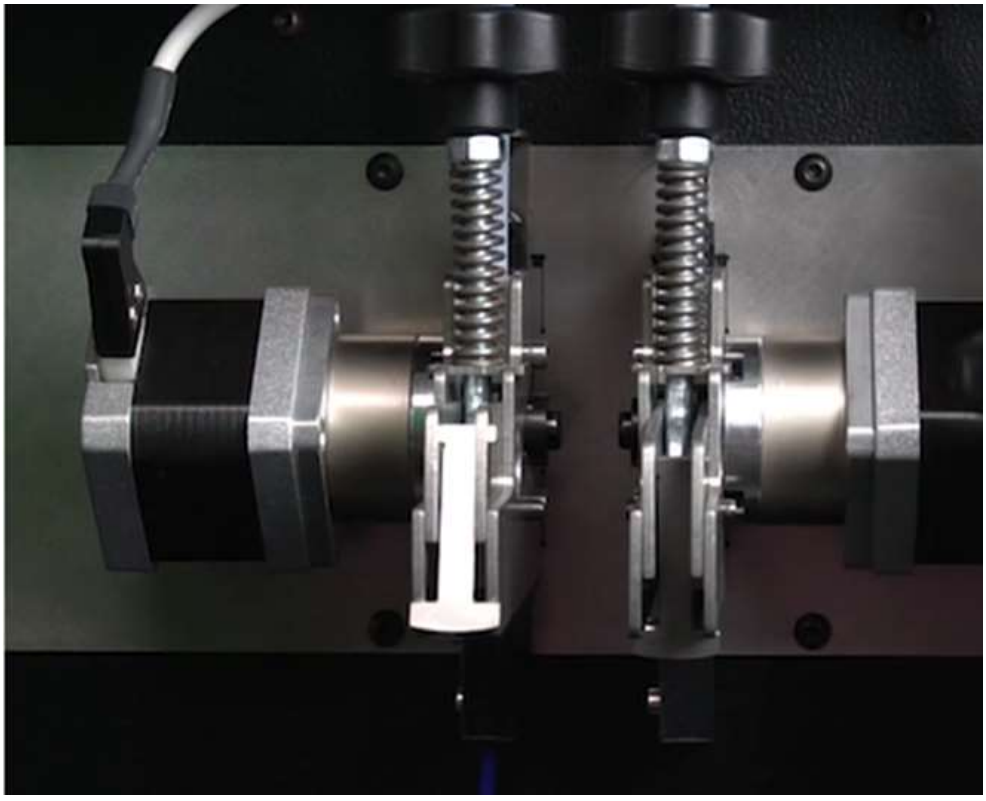

Figure 2.3.5 Latched and Unlatched Filament Feeders

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.

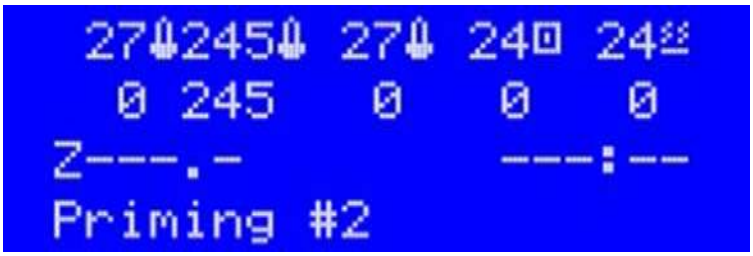

Figure 2.3.6 LCD Display while new filament is priming

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.

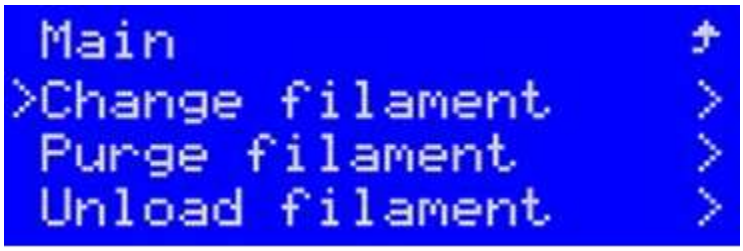

Figure 2.4.1 Change Filament Function

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

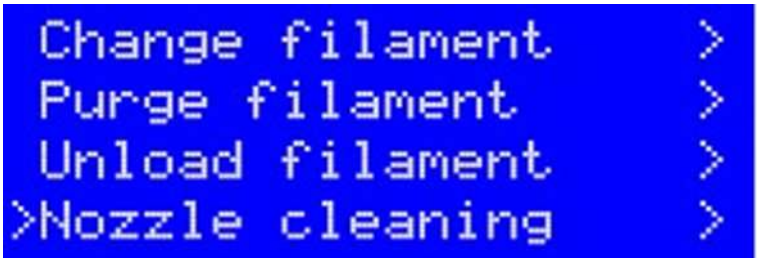

Figure 2.4.2 Prepare Menu: Nozzle Cleaning Selected

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

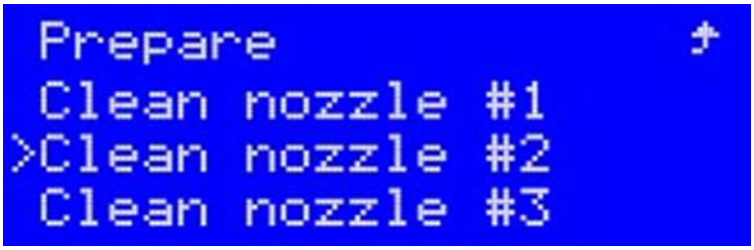

Figure 2.4.3 Select Extruder for Cleaning

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.

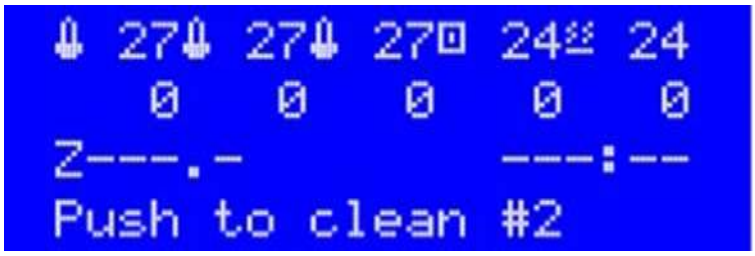

Figure 2.4.4 Printer indication – Ready to Clean

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.

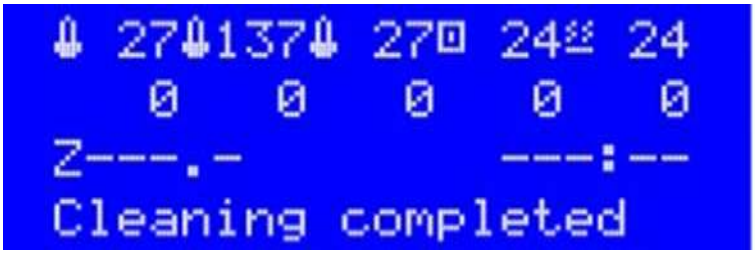

Figure 2.4.5 LCD Indicating Cleaning Complete

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.

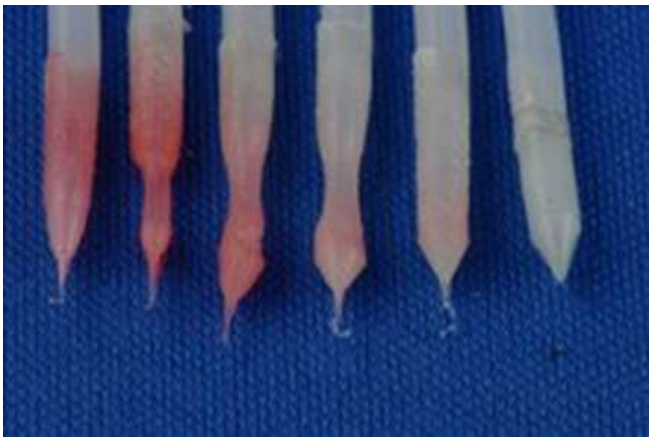

Figure 2.4.7 Cleaning Filament Tip Color after multiple Cleaning Cycles

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!

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.