

What's New in Version 3.00

Update Type

V3-00T1U3-00T1-X.stf contains the following upgrade details.

1. Controller Firmware V3.00
2. HMI Touchscreen 3.00 (User Interface)
3. Pro-forma file to suit version 3.00

This update includes all the patches (if any) applied to previous versions.

Purpose

Late in 2022 we started on a project; the aim was the next level. Taking all the information we had gained from many users and some new concept ideas, to develop the next level of control and user interface. After well over 100 beta versions and many experimental trials we paused the project to bring firmware version 2 users many of the improvements made in this process, starting with version 2.30. The plan was to slowly introduce more and more of firmware version 3 features into the older version systems. In doing this, we broke a few things for some and discovered much information from user feedback.

This version started out small and was set to be a modest change called V2.42 (with a new killer control engine partly based on V3 trials and partly based on V2.20's system that many people seemed to prefer). It then evolved into V2.50 due to the significant number of changes in the control interface.

With V2.50 we had reached our goal however, it involved significant structural changes to the profile, that were now no longer compatible with previous versions. The firmware now contained a considerable amount of early V3 system improvements and code. The net result is that we have reached our goal of a new level of stability and control in this very tricky environment.

Technical Notes

This version represents a significant improvement in control and self-learning from previous versions.

You will need to relearn your profiles to accommodate the new profile features and behavior in this version.

This version uses a new powder file called Powder.dbl, to enable new and future enhancements.

YOU MUST DOWNLOAD AND COPY THE Powder.dbl FILE ONTO THE ROOT/TOP LEVEL FOLDER OF THE SD CARD to use this new version of software. You can leave the old powder.txt file in place, or delete it.

The file is available on the download section of the website: <https://supertrickler.com.au> in the ancillary files section.

Important: Roll Back Strategy

With each version upgrade, as in any complex software system, the results of the upgrade may not yield desirable or beneficial results. You may wish to 'roll back' or return to the previous version where you were having more desirable results. **In general, rolling back the software is not an issue; however, version 3 has a significantly different powder and preset profile structure that is not compatible with previous versions. Before upgrading, please follow the directions to save the current version of your profiles in case you decide to roll back.**

TO SAVE YOUR CURRENT VERSIONS PROFILES BEFORE UPGRADING:

When you take you Micro SD card out to load the upgrade file on it (as described in the Install section below), make a copy of the BIN folder, either on your computer or on the SD card, you can name it anything OTHER than BIN (e.g. BIN220 or BIN241, AND DO NOT REMOVE THE ORIGINAL BIN FOLDER).

Do your upgrade and if you find you would like to roll back, simply rename the existing BIN folder to BIN300 or delete it, then rename your BIN220/BIN241 back to BIN, do the roll back update and you are as you were before the update.

Install

DO NOT FORMAT or DELETE any file from your SD card other than that describe in the roll back.

1. With the SuperTrickler **powered on** and from the main sub menu, remove the Micro SD card (tweezers are a great help).
2. Copy the V3-00T1U3-00T1-X.stf file on the root (top level) directory of the Micro SD card.
3. Reinsert the card back into the SuperTrickler.
4. The system should automatically take you to the Upgrade screen. (System – Setup - System Core – Firmware Update)
5. Press & Hold the Start button for several seconds until the process starts.

Future Plans

With the new powder and preset profile structure we have more flexibility and storage room for additional data. We will continue to introduce more of our early successful experiments over time such as failed learning recognition, rapid early learning and much more into the version 3 series over time.

[Changes are from the previous Version 2.41 firmware](#)

New Technology

- The Vibrator Speed Setting system has changed significantly and a new system is deployed to make the task of setting this significantly easier and less prone to mistakes.
- Inflight Tracking: In versions prior to V2.40 the inflight tracking used an exponential filter to slowly adjust to the inflight amount in response to conditions on the day and the amount of powder in the hopper. This type of filtering is slow to respond to changes, and suffered a problem that a bad inflight value could negatively impact the inflight tracking value. In V2.40 we introduced median spread average filtering for this purpose as its faster to react and automatically filters out specious inflight values. In this version we have combined the two methods utilizing the advantage of the median filter to reject abnormal values and feeding that into the exponential filter for slow conservative control. At the same time, we have added the option to still use a refined version of median filter to take advantages of its faster response to changes.

For simplicity we have given the option a simple naming choice of either Sedate (default) for the exponential filter and Agile for the median filter.

Note 1: The Agile filter may be subject to a small increase in overthrows and some setpoint offset maybe required with Bulk and Fine.

Note 2. On the Bulk, Fine & Slow profile screens, the inflight tracking button has been changed to a switch to accommodate the new option and the warning when turning it off has been removed.

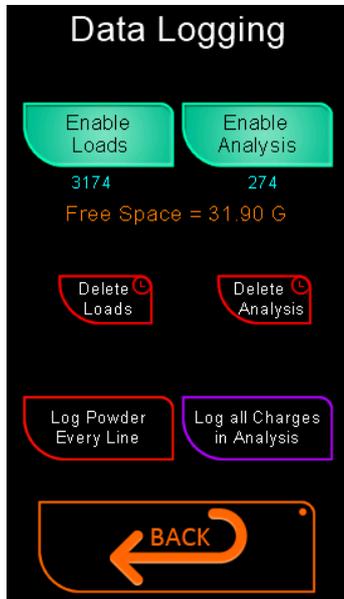
We have added the ability to switch between the original vibrator stop mode and the later idle mode of operation within the profile to give the users more ability to fine tune the system to the powder in use.

- The new powder.dbl (database language) is a highly advanced file. Not only it does it give you the list of powders but it is now capable of talking to your profile with information and the ability to make changes to the default settings to better suit a particular powder. With user information feedback we hope to populate the language with more powder specific information over time. We will update this file in the downloads section of the website as we add more information to the database.

- The pulsing system has had a significant overhaul, the many systems involved in the process are extremely complex and out of scope of this document. Overtime we hope to continue improvements, now that we have characteristics information with many of the powders.

Data Logging

The data logging system has been significantly improved to provide more data for analysis and the user interface and user feedback has been improved. Default is Enable Analysis with log all charges.



On the charge screen, the logging functionality is shown in the logging picture. A tick in the top left = Loads are enabled
A cross in the top left = Analysis is enabled
A white LOG text = all loads will be logged in the Analysis file.



A blue icon depicts; only the Loads logging is enabled (loads.csv).



A brown icon depicts; only the Analysis (Failed) is enabled (analysis.csv).



A brown icon with a tick and cross and white LOG depicts; only the Analysis file is enabled with all load data (successful and failed) being recorded.

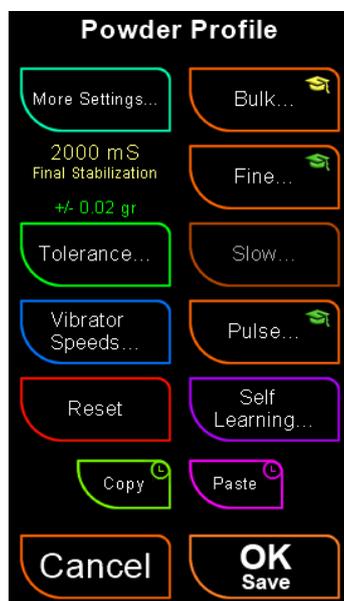


A green icon depicts; both Load & Analysis (Failed) are enabled



A green icon with a white LOG text depicts; both Load & Analysis (Failed) are enabled with all load data (successful and failed) being recorded.

Profile Main Page



☞ The tolerance adjustment has been reinstated on the main profile screen.

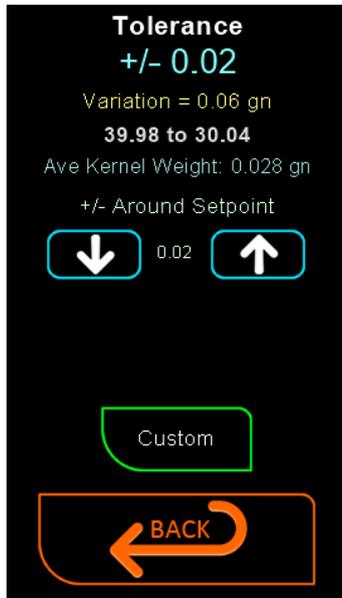
☞ To accommodate this there has been a slight rearrangement of the screen layout.

☞ When the tolerance has been changed from anything other than the standard +/- 0.02, a small green dot will flash in the top left corner of the Tolerance... button.

☞ **Reset** will now take you to reset menu screen, where all reset and restore options are on a single screen.

Profile Tolerance

The tolerance adjustment has a simplified user interface, and now display more information. In previous versions the tolerance adjustment was carried out via the numeric touch screen and by holding the Tolerance Offset button. In this version tolerance offset has been dropped, replaced with a more flexible custom tolerance option. The tolerance value is adjusted by pressing the up and down buttons. The tolerance will increment, and decrement is steps of 0.02 grains (due to scale resolution there is no point if having odd values). The tolerance display is now in two different formats. For the standard +/- (around the setpoint) the format is displayed as +/- 0.02 (or what the value is). Whereas for a custom value the format is show as the value below and the value above the setpoint, eg -0.02 +0.04



When in the standard tolerance mode, the larger tolerance display will be in blue and when a custom tolerance is set the display will be in green.

The second yellow line shows the tolerance range or variation. You can see the +/- 0.02 gn yields a variation of 0.04 grains, 0.02 below and 0.02 above.

The third white line in bold shows the charge range with the current setpoint.

The value in-between the down up buttons is the current tolerance value.

Note: When available (from within the powder.dbl file), the average kernel weight will be displayed within 3 decimal places.

Custom tolerances allow you to specify the tolerance value below and above the setpoint. This can be handy in cases where the powder kernel weight is 0.03 gn where ± 0.02 gives almost no grace to the value and ± 0.04 gives a range of 0.08 grains. However, you can tighten the tolerance easily while allowing some grace by using the custom settings and setting the below value to say -0.2 and above by 0.04 giving a range of 0.06.

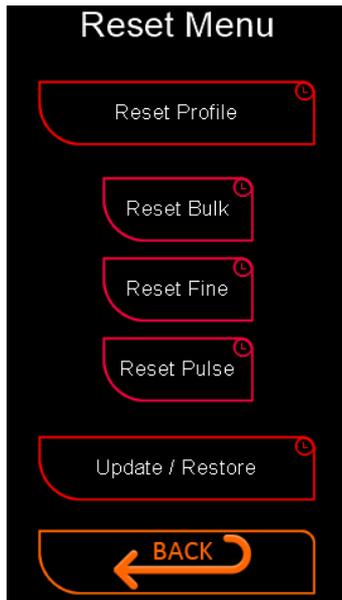


Pressing the Custom button, opens up the above and below options and operate the same as above.

Note: if you press custom again, the tolerance will revert back to the +/- based on the above value.

Profile Reset

The profile resetting has been consolidated into one menu.



Reset Profile: Resets all the profile with the following exclusions...

- Final stabilization time
- Setpoint
- Tolerances
- Vibrator base setting
- Vibrator high speed limit
- Bulk motor current
- Cartridge Volume (Presets)
- Powder Alert Value

Reset Bulk: Resets just the Bulk Instruments part of the profile with the exception of the Bulk motor current

Reset Fine: Resets just the Fine Instruments part of the profile.

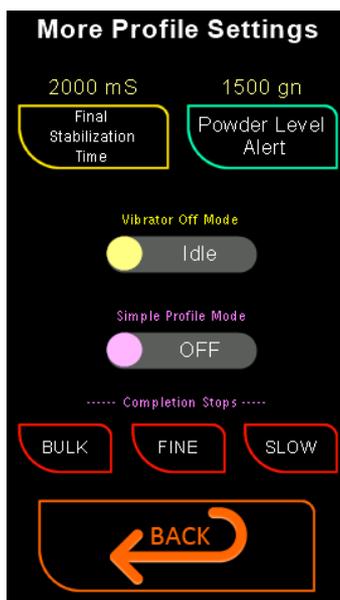
Reset Pulse: Resets just the Pulse Instruments part of the profile.

Update / Restore: re-reads the 'powder properties data', then restores all settings back to the factory defaults with the exception of the following.

- Setpoint
- Cartridge Volume (Presets)
- Powder Alert Value

Profile More

This screen has been rearranged due to the tolerance being moved to the main profile screen but further to this we have added a new control, to define how the vibrator motor is used and the Simple Profile Mode has been changed from a button style to a selector switch style operation.



The new Vibrator Off Mode works as follows.

If set to 'Idle' the vibrator, when not in use during a charge, will go in to a low power idle state rather than stopping all together. The advantage of this system is that vibrator motor does not require a start operation than can sometime cause a burb of powder.

If this is set to 'Stop' (default) the vibrator motor will come to a complete stop when not required. This is the system used by all version until V2.40.

Profile Bulk Fine & Slow

The inflight tracking button has been replaced with a switch and a Sedate or Agile filter option added.



For more information see the New Technology section above.

Defaults....

Bulk = Agile

Slow = Sedate

Fine = Sedate

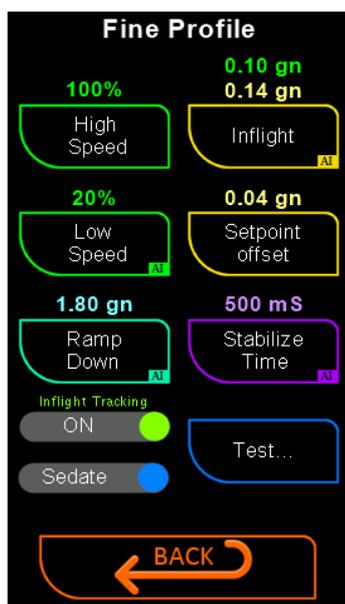
IMPORTANT NOTE: When the instrument stabilization time is too short, the inflight tracking has a hard time finding the correct values. In these cases, the Inflight tracking will be automatically turned off and disabled when the instrument stabilization time is below the following values.

For Bulk if the stabilization is below 500 milliseconds.

For Fine and Slow if the fine stabilization is below 700 milliseconds.

Profile Fine

We have added a fine Setpoint Offset similar to the bulk Setpoint Offset. The concept of the offset is to



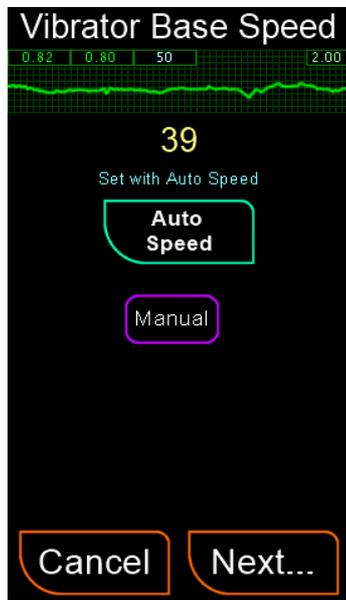
have the instrument stop short, and let the following instrument complete the charge. The scale data may appear fast to you or me, but is in fact very slow in computing terms, and very inaccurate as kernels are falling into the cup, this can play havoc with the control system. There are several mechanisms in place to mitigate the unavoidable short fall of the scale data but it is not fool proof. Having the offset allows a little more forgiveness to the scale data, especial with some heavier powders.

Note 1. the layout has been rearranged to accommodate the setpoint offset and new inflight tracking options, to make it consistent with the bulk layout.

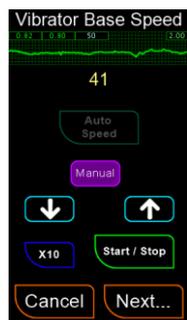
Note 2. The inflight tracking button has been replaced with a switch and a Sedate or Agile filter option added.

Vibrator Speed

The vibrator speed setting has been changed, and simplified, to reduce user errors and overcome previous limitations. The process is now a two-step process, first setting the vibrator base speed, via the automatic system (PREFERRED) or by manual adjustment. The next step involves setting the high speed Limit. The high speed Limit is the maximum speed that any instrument can obtain.

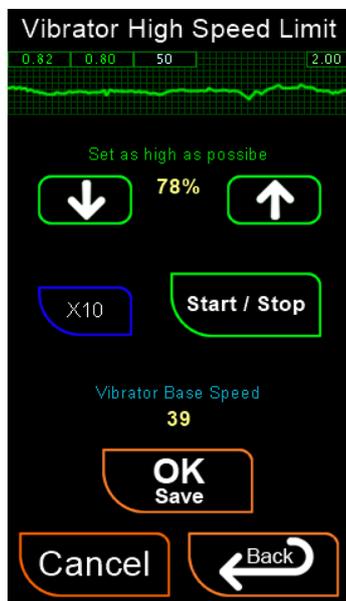


First Step is to set the base speed: press the Auto Speed button and wait for the system to find the base value or Vibrator low speed. Once that is complete, the system will automatically take you to the Vibrator High Speed Limit setting.



You can also use manual to adjust the speed until you get a kernel coming out around once a second. Once this has been achieved, stop the motor and reduce the speed by 5 units to obtain the best range for the control system.

Second Step is to set the High Speed Limit: Press the Start Stop button to start the vibrator and adjust the speed up or down to obtain the best possible speed without powder bouncing out of the cup. Many of our tester have found that setting the high speed limit to a smooth flow of around 0.10 has been very beneficial to speed, due to the consistent flow rate.

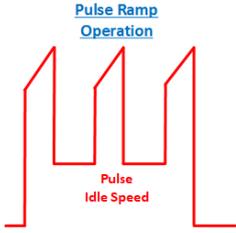


Upon completion, press the OK/Save button to lock in the values.

Note: The high speed limit is not the original vibrator maximum speed (that is now internally fixed). This limit is simply the speed that all vibrating instruments will never go above.

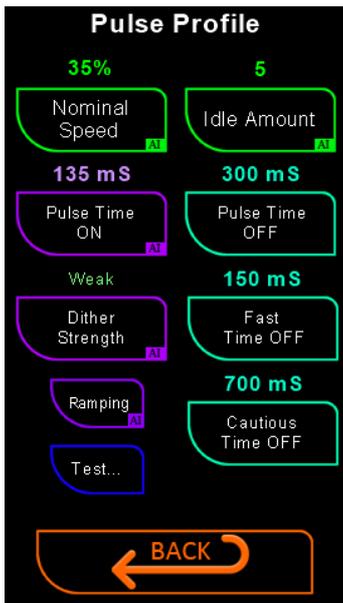
Profile Pulse Ramp

We have changed the pulse ramp operation to speed up the behavior. Previously the pulse ramp would either start from the vibrator idle speed or pulse idle speed if switched on and would ramp up over the pulse period to full power, however the low-speed starting was ineffective and really only wasted time until it got to near the nominal speed. In this version the ramp starts at 2/3 of the nominal speed and ramps up to full nominal speed over the ramp period. At times the system will use the ramp even if it's not selected when a cautious pulse is required. The charge speed display will be preceded with a '/' to indicated that it is ramping. Example Pulse /32%



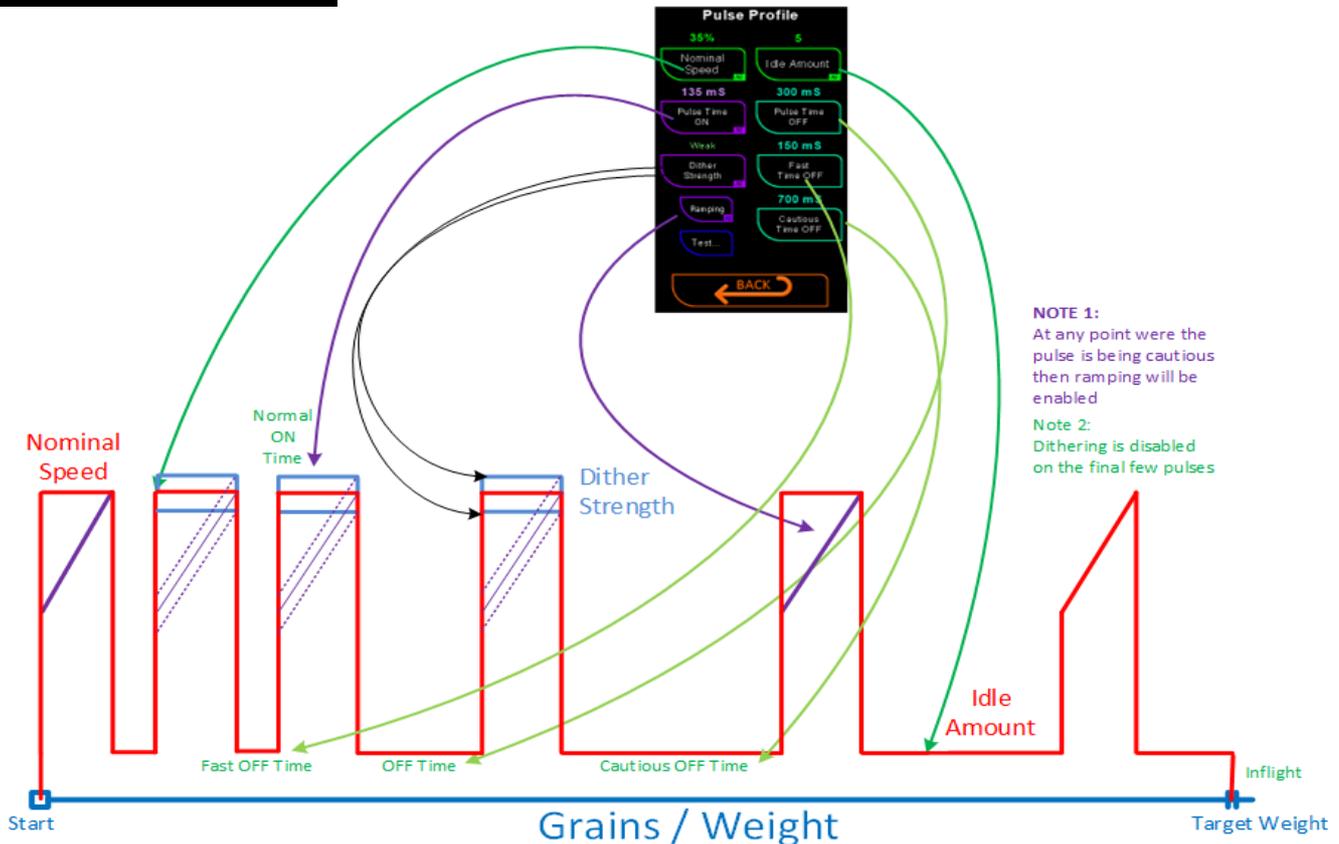
Profile Idle Speed

The pulse idle speed has been upgraded: The original system had a range between off (0) and 1% to 100% of the range of the vibrator speed. This limited the practical range to a very small value and was difficult to fine tune. In this version the Pulse Idle % has been dropped and the value no longer represents the normal speed range. The button has been renamed to 'Idle Amount' and the units are a value between Off (0) and 1 (or a minimum value) to 100 that allows for much finer control, the default value is automatically set when the vibrator base speed is set. A value of 50 is equivalent to the 1% speed. This control is very reactive and generally a low value < 50 will be required.



We have added another control called the Fast Time Off. This fast off time is used when the remaining powder required is such that normal pulse would take a considerable of time. In this case the fast pulse is used to hurry the process up.

PULSE SETTINGS



Powder Selection

With the additional data in the powder.dbl file, we have added the ability to change the button text color depending on what attributes may have changed.



White Text: No changes to the profile (it may contain average kernel weight).

Green Text: Only the tolerance values have been altered.

Yellow Text: Other profile fields have been altered as well as possibly the tolerances.

Other Changes

☞ Preset Field Size. The field size for the preset heading and name has been increased from 15 characters to 30 characters. There was a user request to allow for a clearer description of the presets.

As a result of this change the preset heading and name, are now displayed on separate lines in all screens where this was displayed as a single line.

☞ More buttons have the 'return' function, to have the alternative exit directly back to the charge screen feature added to them.

☞ There have been several button color changes to aid in the intuitive operation of the screens.

☞ The charge screen manual **pulse button** operation has been improved.

As before pressing and holding the button will drive the pulse system as per profile setting until the button is released.

New: Tapping the button will initiate an automatic sequence and will turn off when the scale value increases. This can be cancelled by tapping the button again.

☞ Profile buttons that the AI Self-Learning can adjust are now displayed with an AI icon in the bottom right of the button. Eg



☞ There are many other small refinement changes to the version that is beyond the scope of this document to describe.

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