

Tillett and Hague Technology V10.18 Software update - Spring 2026

This document outlines changes to Inter-row and In-row software made since the spring of 2025 when V6.13 was the current version.

We have continued our policy of continuous evolution with a view to offering improving performance whilst keeping the user interface recognisable to current users. We are also maintaining our policy of making this software update freely available to existing customers so that older machines can benefit from recent innovations. The V10.18 update can be applied to all Tillett and Hague GigE based systems. In general, all features will be available on older systems, though there are a small number that may require hardware or implement module firmware updates.

This update is the first that we have introduced using our new software version control system. We have also taken this opportunity to integrate all our vision-based products into one software suite. This means that generic improvements can benefit all our applications automatically. To delineate that change version numbers have jumped to V 10 for all products.

This is also the first major revision to have been subject to pre-release testing with our enhanced testing facilities. That includes new bench tests rigs for hardware function, simulated image sequences for testing a variety of challenging crop situations, a rolling road rig for complete system testing, as well as traditional in-field testing. Testing has shown that V10.18 offers significant performance improvements in many situations. We have found no situations where performance has degraded. We would appreciate customer feedback as we will strive to make further improvements in years to come.

Software improvements have been made in two categories. The first is to the user interface look and feel. The second relates to new features that either improve performance or enable new functions. In some cases, these are linked to hardware changes. We will start by looking at changes related to the user interface.

User interface

General appearance

The clarity of graphics and text has been improved with more flexibility in branding options. There are now a wider range of button shapes and colours available. If you wish to discuss your branding style, please get in touch.

We have attempted to make the user interface simpler to operate by making more adjustments available from the working screen, reducing the need to scroll through multiple screen layers. Where possible we have introduced buttons with drop down selection menus to make selection of alternative options easier and clearer. We have also made more use of graphical icons making internationalisation easier.

Working screen

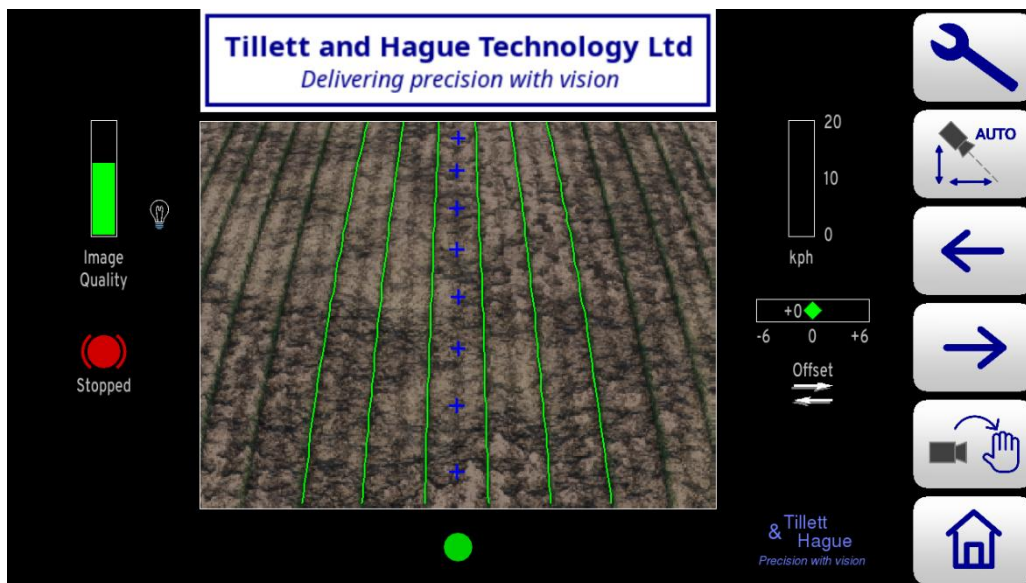
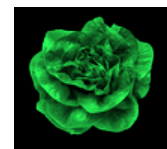
The working screen layout is largely unchanged, though a new “auto learn” button has been introduced which is explained below under “New features”. That new button replaces the button that paged through main camera display selection for multi-camera systems. It is now only possible to change camera section by touching on the appropriate thumbnail.

Other changes are:

Briefly touching the manual button scrolls between vision, manual, and if fitted, feeler guidance mode, as it did previously. However, in the new version pressing and holding that button will, if the machine is stationary, pop up a screen that enables you to change all the manual mode preferences that previously had been available in the advanced settings and diagnostics page. This makes changes quicker and easier whilst reducing the number of lines in the advanced settings page.



Similarly, if crop colour choice is enabled, from the working screen touching and holding on the crop colour icon pops up a menu and graphic enabling you to make any changes that have been enabled. These choices have been removed from the setup screen.



Working screen (Inter-row single camera system)

Setup screen

On the setup screen selection of configuration and crop size is done by touching on the appropriate button and selecting from a drop-down list of options. This replaces navigation via arrow buttons which have been removed.



Set-up screen (Inter-row two camera system)

Advanced settings and diagnostics

Some options have been removed from this page as they are accessible from the working screen. Most options can now be changed by touching on the appropriate button and selecting from a drop-down selection. Where only a simple on/off is required, touch slider switches have been added. There are some new options mainly relating to ISOBUS that may cause the advanced settings page options to roll over to a second page. Next and previous page buttons are provided if this occurs.



New features

Auto-learning

One of the most important new functions is an extension of our machine learning techniques to include camera height and orientation. When enabled this function estimates corrections to configuration values for camera height and look ahead based on the position of crop rows in the image. The purpose of this innovation is to increase tolerance to camera setup error and to improve performance through better template alignment.

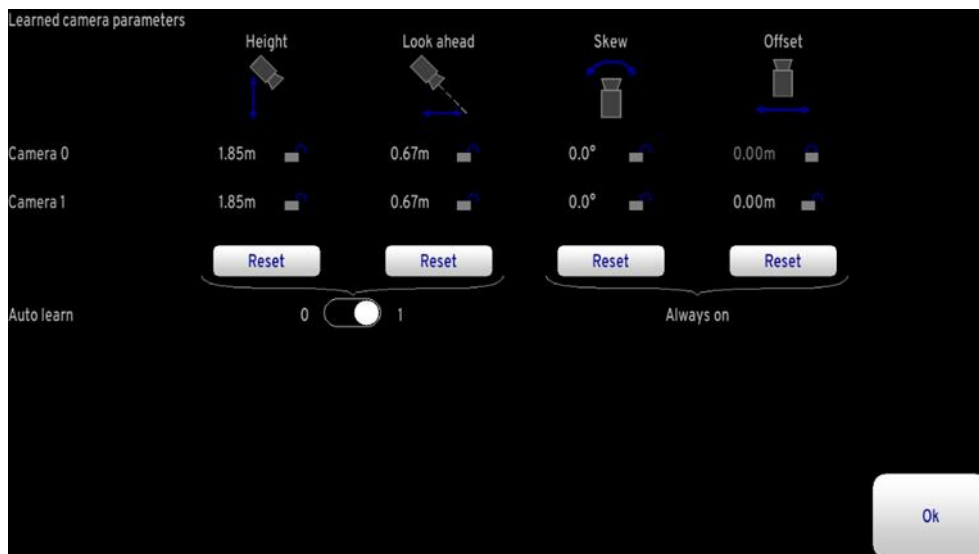
A new button has been added to the working screen positioned just below the Spanner button on the right-hand side. If auto learn is switched on, briefly touching that button introduces a small amount of flexibility to camera height and angle/look ahead parameters for the camera currently displaying the main image. The system automatically adjusts those parameters to give a better template fit for that camera only. This machine learning can be performed whenever the machine is in work, either stationary or when moving. It will lock onto rows almost immediately and should stabilise after approximately 100m of running.



For best results, only trigger auto camera pose estimation on flat ground when crop rows are straight and clearly defined.

Touching and holding the auto-learn button when moving has no effect, but when stationary it opens a popup box displaying all four machine learned parameters. Those parameters are:

- Camera height, the height of the camera (measured from the camera lens) to ground level.
- Camera lookahead, a measure relating to camera angle to the vertical
- Camera skew, a measure of camera angular misalignment in the horizontal plane.
- Camera offset, the lateral error between two or more cameras fitted to the same section.



New learned parameters popup box for a two camera system

Camera skew and offset have been features of our vision guidance software for more than 20 years. The only difference is that they can now be viewed and reset from this screen and not from the advanced settings and diagnostics page as had previously been the case.

Both camera height and look ahead displayed are current values derived by adding an automatically learned correction to configuration values. Resetting them takes them back to configuration values. If there are multiple cameras, reset operates on all of them. This is unlike the minor reset triggered by a brief touch of the Auto learn button, which only effects height and look ahead for the currently selected camera.

Auto machine learning of camera skew and offset is always on, though after approximately 100m or so of running they automatically converge to stable values that are effectively fixed. Auto-learning for camera height and lookahead estimation can be turned off using the touch toggle switch on the bottom line. Turning auto-learn off freezes parameters at their current learned values unless they are reset to configuration values. Turning auto-learn back on also resets to configuration values.

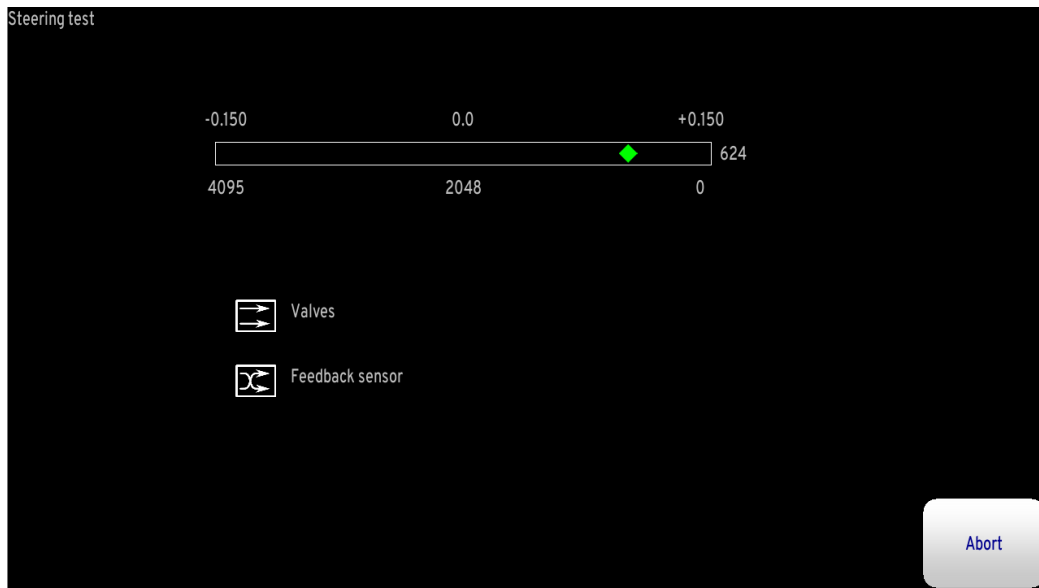
The set-up screen displays current camera height and look ahead values used for each camera along with their constituent configuration and corrections values in brackets. If you wish configuration values to be the same as the learned values, you can edit those values in the editor.

For inter-row machines we anticipate that it will rarely be necessary to turn auto estimation off. For In-row and spot spray applications timing of per plant devices can be affected by changes to camera height and look ahead. Sensitivity will vary with machine geometry. We would recommend caution when using auto learning on these machines as touching the auto-learn button, deliberately or accidentally, may result in a change to nozzle or in-row cultivator timing. This might require fine offset correction in the direction of travel. If this is a problem, it would be possible to first run the machine (using either inter-row or in-row software) with per plant treatment devices disengaged so that camera height and look ahead figures can be learned. Once these have stabilised auto learn can be switched off and commissioning of per plant treatment devices conducted in the usual way. This gives the benefit of auto learning at the set up phase, but would not allow regular in-work corrections. Auto-learn could be switched back on at any time, but the user would have to be aware that timing may need correction if parameters change.

New features available from Advanced settings and diagnostics screen

Steering test – purge/synchronise button

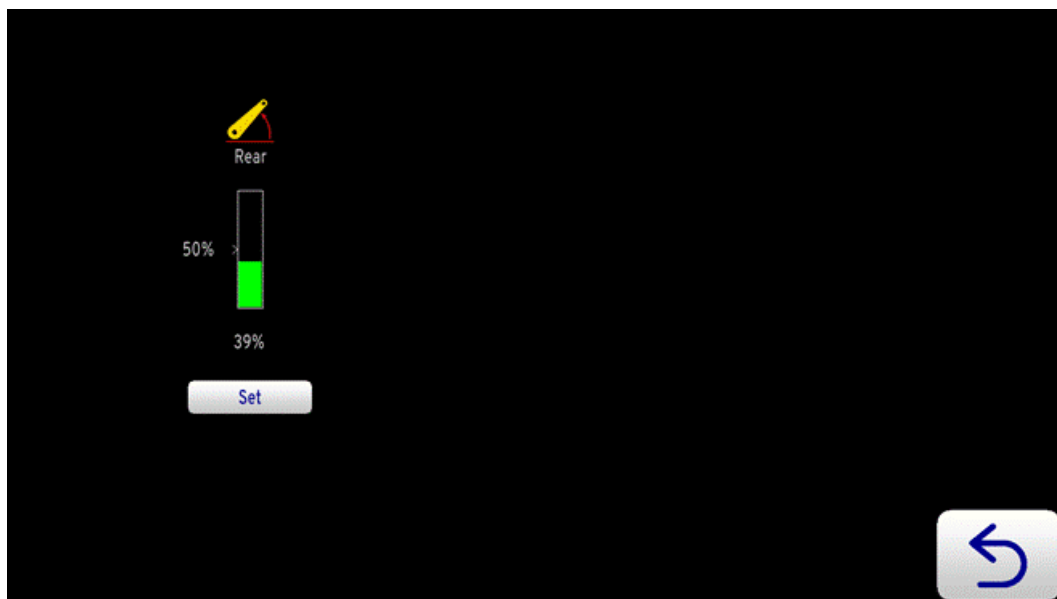
Test steering now includes live graphical and numeric displays of test parameters such as position sensor output values. An optional additional steering purge/synchronising button has been added that drives steering hydraulic flow continuously left and right for 10 seconds each way. This can be helpful for purging air from a hydraulic system or for driving actuators to a fixed stop for the purposes of synchronisation. If this might be helpful in your application, please contact us.



Steering test graphical progress screen (purge screen is similar)

ISObus hitch setpoint.

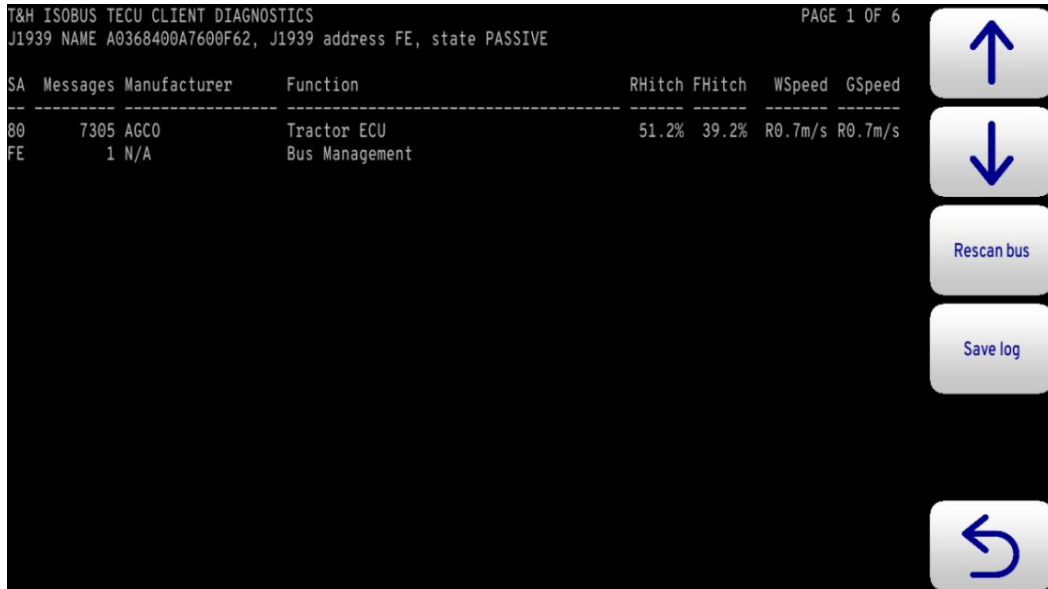
ISObus options are only displayed if the implement module has an ISObus connection. When selected, a screen with live graphics displays current hitch position as a green bar. To set the trigger position move the tractor hitch to the desired lift trigger position and press the set button. The trigger point has now been set and its value as a percentage of full stroke is displayed beneath the green bar. By default, hitch lift trigger position for both front and rear hitches will be 50% unless reset by the operator. Hitch setpoints are retained between sessions.



ISObus hitch trigger point setting screen

Isobus diagnostics

This utility displays live ISOBUS data to check that a successful connection between tractor and implement has been achieved and that relevant tractor data is available. Live tractor data can be revealed and read using the arrow buttons to select the relevant page.



ISObus hitch trigger point setting screen

It is also possible to save a 20Mb log, typically 10 to 40minutes of ISOBUS traffic, to a USB device. This file can be sent to [Tillett and Hague](http://www.tillettandhague.com) to aid in diagnosing ISOBUS connection issues between implement and tractor.

Configuration option for “Fixed” camera

The configuration editor is unchanged from V6.13. However, under “Section” with advanced settings you can now opt to mount cameras on a fixed frame. All previous versions have required mounting on a steered element that tracks crop rows. The primary application for this facility relates to tool frame tractors (e.g. Fendt GT) with narrow mid-mounted cultivators that would otherwise have restricted field of view. You can now mount cameras on the front axle looking ahead of the wheels with the side shift moving cultivators behind.



Configuration editor "Section" page with new fixed frame camera mounting option

Demo mode

A new demo mode has been introduced to replace the previous version. The new version runs standard application software and can connect to system hardware as normal. However, it now takes image sequences from a file rather than a camera. That file contains meta data giving settings relating to that stored image sequence which are normally made using photo realistic synthetic images.

The new demo mode could be used for exhibitions in which the implement can move in reaction to plants/crop rows as they appear on the console screen. This facilitates a moving exhibit without the need for a rolling road rig or similar.

It is also possible to run in demo mode without having an implement connected. This is equivalent to the previous demo mode.

The new demo mode is enabled and removed via a software update. Please contact us for further information.

New colour camera with near infra-red sensitivity

This version of software auto recognises our new camera that has sensitivity in the near infra-red. Using this camera is transparent to the user as it is auto recognised on start up. The benefit is that plant material is identified using brightness in the near infra-red rather than green. Not all live plant leaves are green, but they are all reflective in the near infra-red. This therefore provides a solution to locating plants such as some varieties of cabbage that can be a very dark purple colour.

The new camera will also work on green crops, so it is possible to work on a wide variety of crop colours using a single camera without the need to adjust colour settings. However, some performance sacrifices have been made to achieve this and so if a customer has only green crops, we recommend they use our normal RGB cameras. A firmware update has also marginally improved the performance of our RGB cameras.