SMARTCOM ISOBUS UT

Original

Operator's manual

67000604-100, version 1.00
GB - 02.2026

www.hardi.com.au

We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depend upon your care. The first step is to carefully read and pay attention to this instruction book. It contains essential information for the efficient use and long life of this quality product.

This instruction book is valid for the following SmartCom software version:

- A.2.2.89

Earlier and later software versions may differ.

The original instruction book is approved and published in English. All other languages are translations of the original. In the event of any conflicts, inaccuracies or deviations between the English original and other languages the English version shall prevail.

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing. As it is HARDI Australia policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

HARDI Australia is without any obligation in relation to implements purchased before or after such changes.

HARDI Australia cannot undertake any responsibility for possible omissions or inaccuracies in this publication, although everything possible has been done to make it complete and correct.

As this instruction book covers more models and features or equipment, which are available in certain countries only, please pay attention to paragraphs dealing precisely with your model.

Published and printed by HARDI Australia.

Table of Contents

Table of Contents

Table of Contents

General Info

About the Book

This instruction book covers AEON, NAVIGATOR and MEGA models with features or equipment, which are available for certain sprayer models or in certain countries only. Therefore, please pay attention to paragraphs dealing with precisely your model.

Abbreviations in This Book

Abbreviation	What It Is
ASC	AutoSectionControl
CAN	Controller Area Network
ECU	Electronic Control Unit
ISOBUS	ISO 11783 standard is a communication protocol for the agriculture industry, called ISOBUS
LED	Light Emitting Diode
PCB	Printed Circuit Board
PDU	Power Distribution Unit
PF	PrimeFlow
PPU	Pulses Per Unit
PTO	Power Take-off
RPM	Revolutions Per Minute
SMCU	Stepper Motor Control Unit
UT	Universal Terminal
VRA	Variable Rate Application
VT	Virtual Terminal

1 - About

Operator Safety

Explanation of Symbols

Safety symbols used in the following chapters throughout this Instruction Book to designate, where the reader has to pay extra attention.

The signal word (DANGER, WARNING, ATTENTION or NOTE) describes the severity of the risk.

The symbols have the following meaning:

This symbol means DANGER. Be very alert as your safety is involved! The DANGER symbol indicates a high risk for an immediate death or serious physical injury, if not following the instruction.

This symbol means WARNING. Be alert as your safety can be involved! The WARNING symbol indicates a medium risk for immediate death or serious injury, if not following the instruction.

This symbol means ATTENTION. This indicates an obligation to special behaviour or an activity required for proper sprayer handling. This instruction will help you to avoid faults on the sprayer or disturbance to the environment.

This symbol means NOTE. This indicates handling tips and particularly useful information. This instruction will help you to use all the functions of your sprayer in the best way possible for a better, easier and safer operation.

Precaution

Note the following recommended precautions and safe operating practices before using the sprayer.

General Info

Read and understand this instruction book before using the equipment. It is equally important that other operators of this equipment read and understand this book.

If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.

Keep children away from the equipment.

Local law may demand that the operator certified to use spray equipment. Adhere to the law.

Tractors driver seat is the intended working place during operation.

Service

Never service or repair the equipment while it is operating. Always replace all safety devices or shields immediately after servicing.

Turn electrical power off before connecting and disconnecting the display and transducers, servicing or using a battery charger.

If using an arc welder on the equipment or anything connected to the equipment, disconnect power leads before welding. Remove all inflammable or explosive material from the area.

Do not use a high pressure cleaner to clean the electronic components.

Introduction

About the SmartCom ISOBUS UT System

The SmartCom ISOBUS UT is for use in agricultural and horticultural production. The components developed to last many years under agricultural conditions.

The system has a non-volatile memory without battery, which simplifies storage. When disconnecting the power, all menu parameters saved in the memory and therefore not lost.

Main Components	Location
SmartCom Terminal (e.g. HC 9700)	Tractor
Grip (optional)	Tractor
SetBox (optional)	Tractor
FluidBox	Sprayer
SmartCom	Sprayer

The transducers utilized chosen for long service life and good signal quality. The speed and flow transducers have a built-in diode that will flash thereby indicating it functions, to aid servicing.

Status designations in the display will show in different colours depending on the function used.

Display Readouts

Among many possible display readouts, are:

- Volume rate.
- Speed.
- Liquid rate per minute.
- Total covered area.
- Total volume sprayed.
- A trip register.

The system is also compatible with Variable Rate Application (VRA) and is prepared for communication with Precision Farming tools (e.g. AutoSectionControl).

Functions Include

- Correct area with closure of up to 13 manually controlled spray boom sections.
- Many alarm functions and possibility for audio/visual alarm, etc.
- Many warnings depending on operation. Alarms and warnings is shown:
    - UT/VT screen: in the bottom left 1/4 corner of the display.

*EU - European models

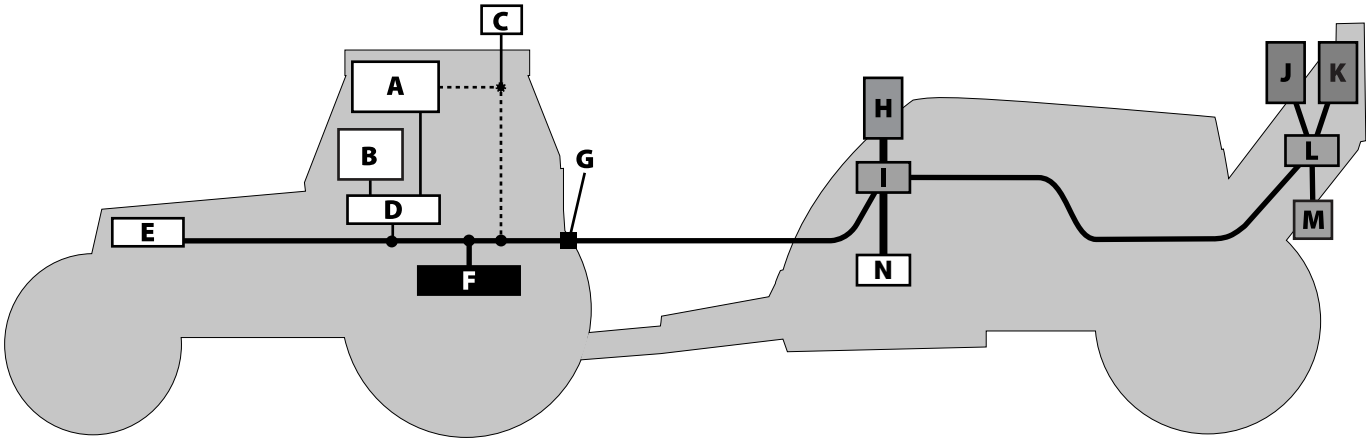
3 - Description

System Description

Overall Description

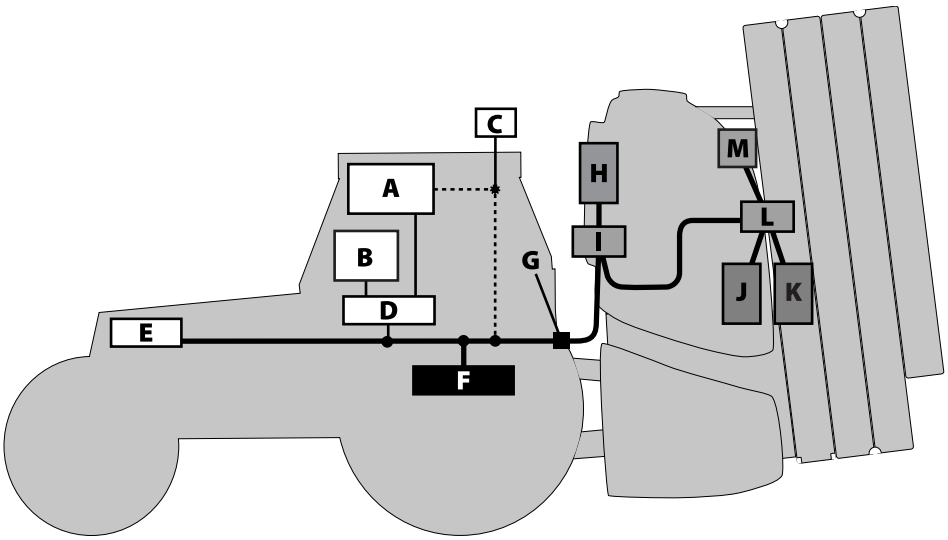
The precise wiring setup can vary, depending on the Terminal and sprayer equipment fitted.

Trailed sprayer with SmartCom ISOBUS System



A. VT Terminal.
B. SetBox and Grip (optional).
C. GPS Antenna (optional).
D. Cabin Connector.
E. ISOBUS.
F. Tractor Bus.
G. IBBC Connector.
H. SmartCom (sprayer ECU 1).
I. PDU 2.
J. SmartCom (sprayer ECU 2).
K. SmartCom (sprayer ECU 3).
L. PDU 3.
M. AutoTerrain/ActiveSlant UC7.
N. FluidBox 8000, FluidBox 7000 or FluidBox (optional).

Lift-mounted sprayer with SmartCom ISOBUS System



A. HC 8700, HC 9700 or VT Terminal.
B. SetBox and Grip.
C. GPS Antenna (optional).
D. Cabin Connector.
E. ISOBUS.
F. Tractor Bus.
G. IBBC Connector.
H. SmartCom (sprayer ECU 1).
I. PDU 2.
J. SmartCom (sprayer ECU 2).
K. SmartCom (sprayer ECU 3).
L. PDU 3.
M. ActiveSlant/AutoSlantUC7.

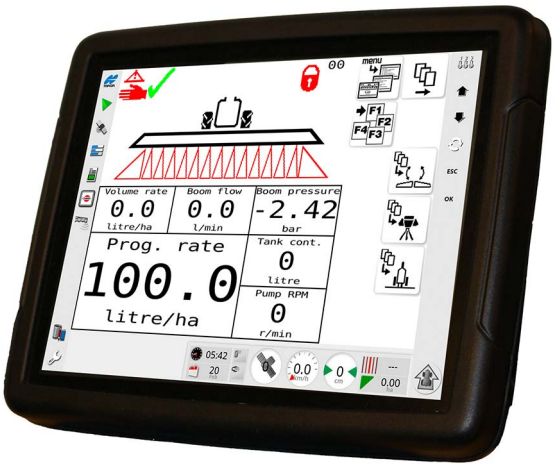
Terminal

Types of Terminals

The SmartCom UT software can run with two main types of display Universal Terminals (UT):

ISOBUS Terminals without Buttons

TOPCON X35 and X25 or similar ISO terminals with touchscreen interface and soft keys.



- Touch screen and no buttons (except ON/OFF).
- Function soft keys are graphical and operated by pressing the touch screen.
- The SmartCom software runs as a Virtual Terminal (VT) into the Terminal software.

ISOBUS Terminals with Buttons

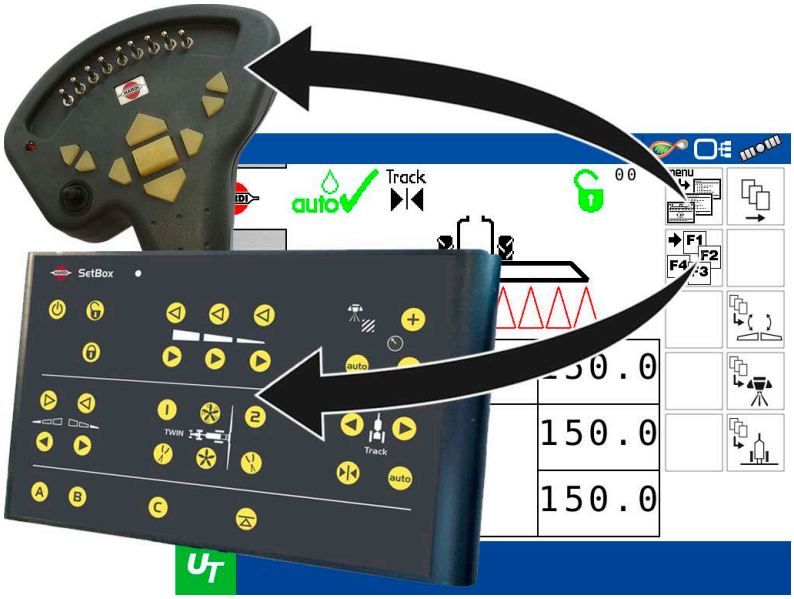
ISO Terminals with physical function buttons, e.g. the Massey Ferguson terminal shown.

- Conventional or touch screen and physical buttons.
- Graphical function buttons but operated by physical buttons on the terminal.

The software runs as a Virtual Terminal (VT) into the terminal software.

Additional Controls

By default, all functions can be controlled by the UT screen soft keys. But the sprayer can also be configured with a Grip and a SetBox, where classic controls can replace the soft key functions (see "Optional Controls" on page 23) depending on set-up:



- The sprayer has no SetBox and Grip.

  The boom, track and spray functions are solely controlled by soft keys on the HARDI UT.

- The sprayer has a Grip but no SetBox.

  The boom, track and spray functions controlled by the soft keys on the HARDI UT, but certain boom and spray functions can be controlled by the Grip.

  The soft key mask for boom correction and individual spray sections can be hidden (see "Soft Key Menus" on page 18).

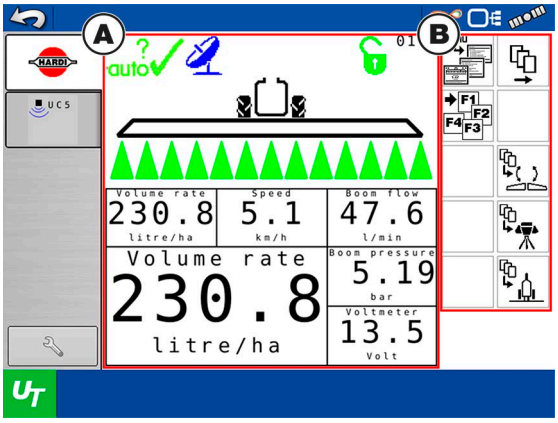
- The sprayer has both the SetBox and Grip.

  Most functions are moved to the SetBox and Grip.

  The soft key mask for boom correction and individual spray sections can be hidden (see "Soft Key Menus" on page 18).

Universal Terminal Layout

The Main HARDI Universal Terminal (UT) is built up by:



A. Data mask

   The data mask shows a status line and readouts of the relevant values.

   For further information, please see "Data Mask" on page 15

B. Soft key mask

   The soft key mask on the right side is used to operate the machine.

   For further information, please see "Soft Key Mask" on page 17.

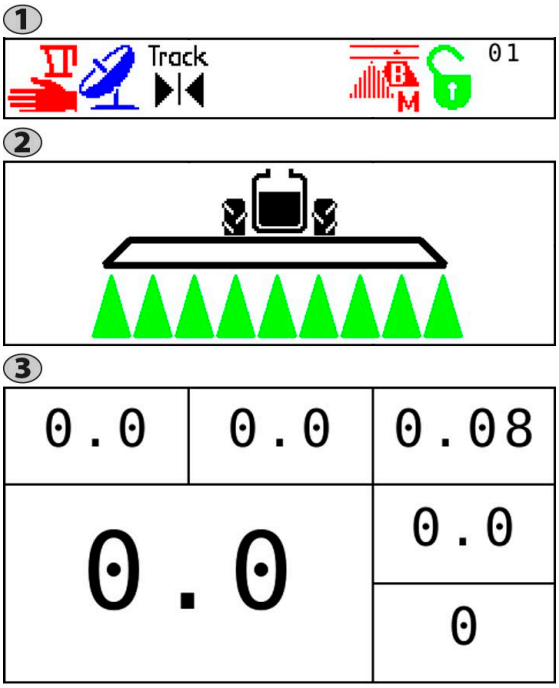
Data Mask

General Info

The data mask of the Main HARDI UT includes three lines:

1. The 1st line is for status symbols, register number and alarm number. Find description of all status symbols on the next page.

ATTENTION! If an error occurs, then it will show an alarm/warning error number instead of register number (A).



2. The 2nd line are icons for boom status, foam marker, end nozzles and a visual tank level indication.

Nozzles spraying.	End nozzles spraying. End nozzles function only. Right side icon shown (Left side icon is mirror of right side icon).
Nozzles spraying and awaits to close. (Only when section control is used)	Edge nozzles spraying. Edge nozzles function only. Right side icon shown (Left side icon is mirror of right side icon).
Nozzles not spraying.	Edge nozzles OFF. Edge nozzles function only. Right side icon shown (Left side icon is mirror of right side icon).
Nozzles not spraying and awaits to open. (Only when section control is used)	Foam marker ON.
Section partially ON. AutoNozzleControl function only.	Foam marker OFF.

3. The bottom half has 6 boxes with information, whereof 5 boxes are selectable. The upper left box always shows the actual volume rate.

See "Menu 2.1 Display readout" on page 52 for setup of the display readouts in the bottom half of the Terminal display.

3 - Description

1st Line Status Icons

 All "OK"	 Information	 Warning	 Stop (critical)	 Variable rate (GPS) active
 Pendulum Locked	 Pendulum Unlocked			
 Track Crab left	 Track Crab right	 Track Locked	 AEON only: Track Aligned when reversing	
 Track Automatic	 Track Manual	 Track Auto mode not available		
 AutoSelect automatic mode Line A is ON	 AutoSelect automatic mode Line B is ON	 AutoSelect automatic mode Both lines are ON		
 AutoSelect manual mode Line A is ON	 AutoSelect manual mode Line B is ON	 AutoSelect manual mode Both lines are ON	 AutoSelect Both lines are OFF	
 TWIN Pre-set 1	 TWIN Pre-set 2	 TWIN Manual		
 Auto mode Nozzle size calculated	 Auto mode No flow to sections	 Auto mode Nozzle size not calculated		
 Manual mode Nozzle size calculated	 Manual mode No flow to sections	 Manual mode Nozzle size not calculated	 Regulation valve fault	
 Increment steps mode Nozzle size calculated	 Increment steps mode No flow to sections	 Increment steps mode Nozzle size not calculated	 Rate percentage calibration	 Rate percentage no flow

Soft Key Mask

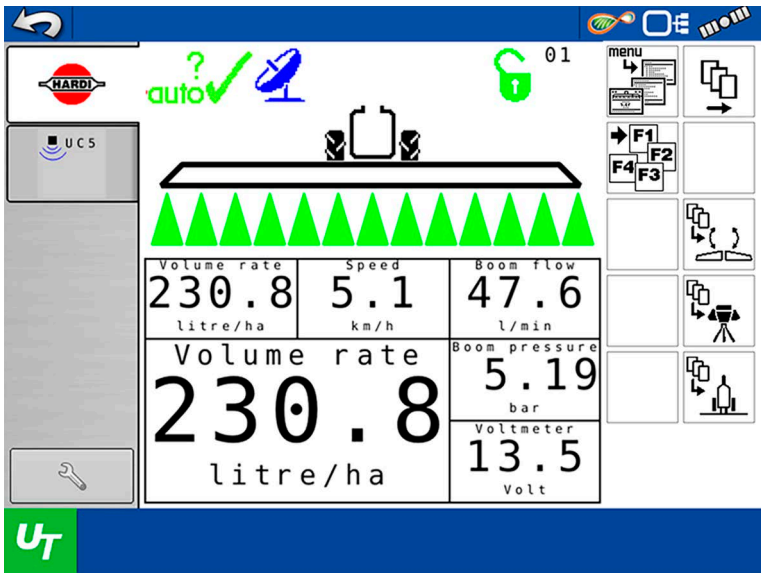
General Info

The SmartCom software offers an on-screen control of all functions via the soft keys on the HARDI UT screen. The soft key mask on the right side is used to operate the machine.

Using the soft key functions, it is possible to:

- Control the boom, track and spray functions.
- Navigate between the different soft key screens.
- Make shortcuts direct to certain functions.

NOTE! The location and layout of buttons may differ depending on the general layout of the terminal used.



Soft keys on Main HARDI UT:

Main Menu
(See "General Info" on page 50)

Function keys
(See "Function Keys" on page 27)


Go to next soft key menu.


Go to Folding menu.


Go to Spray pressure menu.


Go to Track and End/Edge Nozzles

In addition, SmartCom offers the option to assign 20 of the soft keys as AUX-N functions to external devices. See how in "Assigning AUX-N Function Softkeys" on page 91.

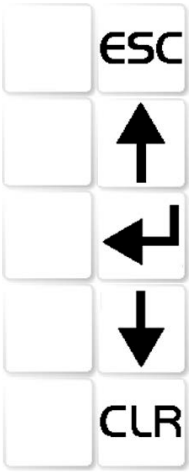
This function requires to be unlocked. Please contact your HARDI Dealer to do so.

Soft Key Menus

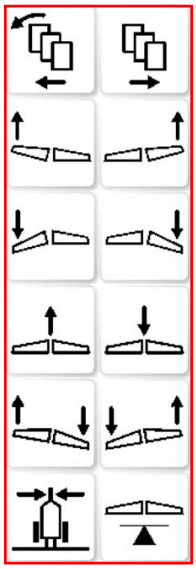
The softkey user interface has a maximum of 7 softkey masks in a 12 softkey button setup.

Depending on controls connected to the display, the softkey masks marked with red can be disabled. See “On-screen Softkey Functions” on page 86.

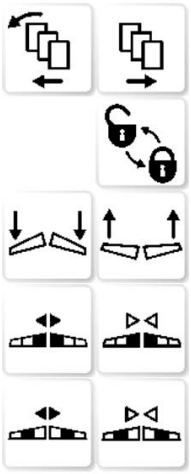
Navigation Controls



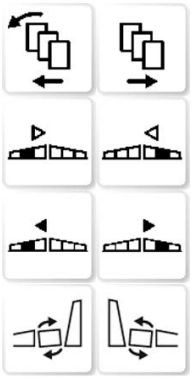
Boom Correction Controls
Driving and Spraying



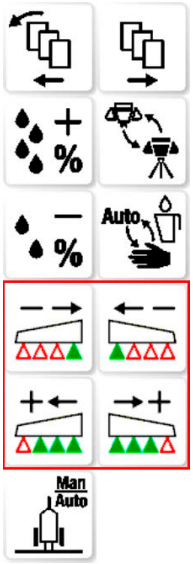
Boom Folding Controls
Standstill Sprayer



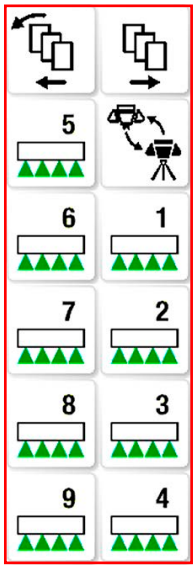
Boom Outer Wing Controls
Individual Folding



Spray Controls

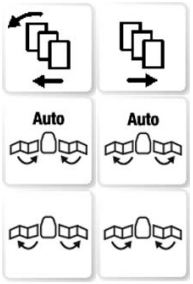


Spray Section Controls



Track Controls
End/Edge Nozzles Controls

Automatic Folding Controls



Overview of Soft Key Functions

NOTE! Some buttons may be hidden as they are not applicable for your sprayer.

Navigation Controls

ESC Escape to previous screen	Scroll up selection.	Enter a submenu or confirm a value.	Scroll down selection.	CLR Clear a value or a register.
Go to next soft key menu.	Go to previous soft key menu.			

Boom Controls - Folding/Unfolding both Left/Right Wings

Fold inner wings.	Fold 1st outer wings.	Fold 2nd outer wings.	Boom tilt down.	Lock-Unlock pendulum.
Unfold inner wings.	Unfold 1st outer wings.	Unfold 2nd outer wings.	Boom tilt up.	Align slant.

Boom Controls - Individual Folding/Unfolding

Fold left 1st outer wing.	Fold right 1st outer wing.	Fold left 2nd outer wing.	Fold right 2nd outer wing.	Centre Frame rotate right.
Unfold left 1st outer wing.	Unfold right 1st outer wing.	Unfold left 2nd outer wing.	Unfold right 2nd outer wing.	Centre Frame rotate left.

Boom Controls - While Spraying

Boom lift down.	Slant up left.	Left tilt up.	Right tilt up.	
Boom lift up.	Slant up right.	Left tilt down.	Right tilt down.	

Spray Controls

Main spray ON/OFF.	In Auto Mode, spray percentage increase. In Manual Mode, pressure increase.	Open sections one by one from right to left.	Open sections one by one from left to right.	Open single section. Section number shown. 1 up to 13 sections.
Auto Toggle AUTO / MANUAL spraying.	in Auto Mode, spray percentage decrease. In Manual Mode, pressure decrease.	Close sections one by one from left to right.	Close sections one by one from right to left.	

Track Controls

AUTO MAN Toggle AUTO / MANUAL steering.	Align steering.	Steer left.	Steer right.	

Automatic Folding Controls

Auto AutoFold In.	Auto AutoFold Out.	Sequential fold In.	Sequential fold Out.	

Message Controls

Accept of message				

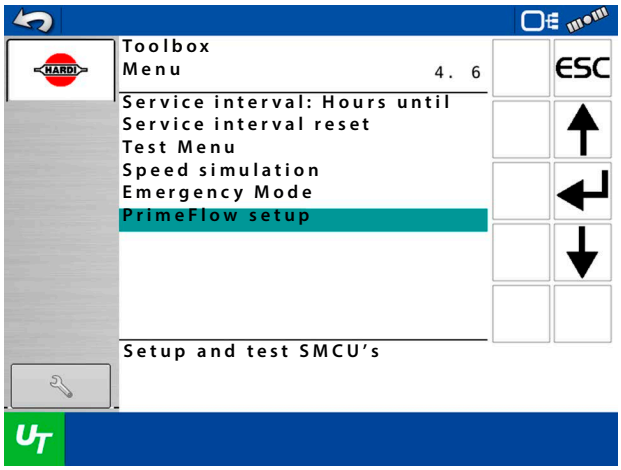
General Keystrokes

The first steps to choose a menu shown below. See also "Full Menu Structure" on page 41.

Menu Selection

1. Press ↵ to proceed into the menu.
2. In the menu, the last selected value used, is marked with a green bar.

   Move the menu marking up and down by using the ↑ and ↓ keys.
3. Confirm selection by pressing ↵.

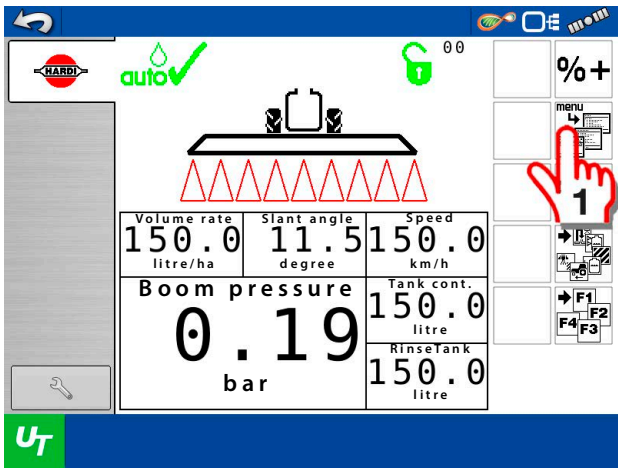


NOTE! Press ESC to go one step back or to leave a menu without changing values.

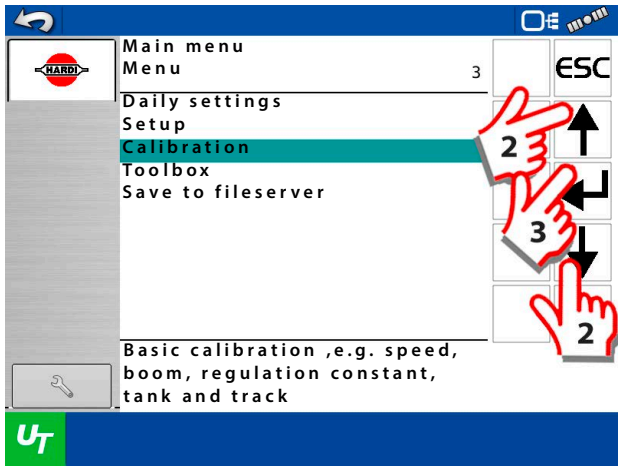
NOTE! There is help text for each menu in the bottom of the display. The actual help text shown is for the menu at the blue/green bar.

Menu Editing Example

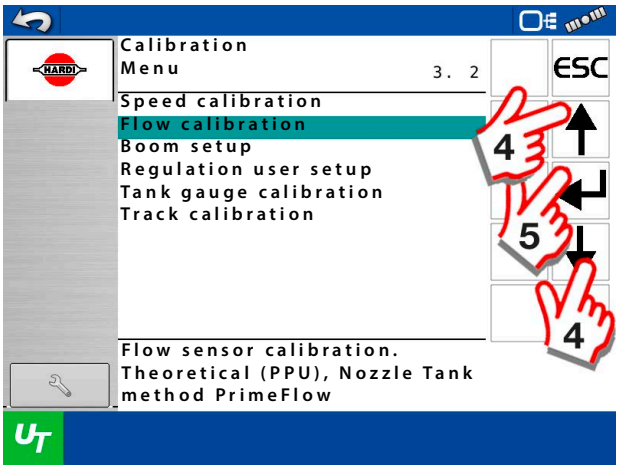
1. At the main screen, select the Menu button to enter the menus.



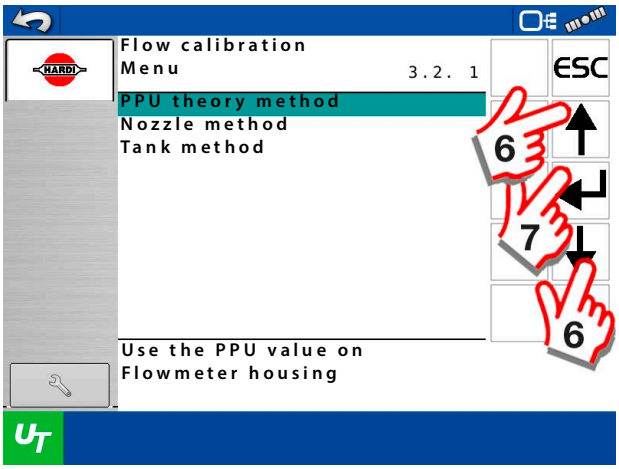
2. Scroll to "Calibration" with ↑ or ↓.
3. Select ↵ to confirm.



4. Scroll to "Flow calibration" with ↑ or ↓.
5. Select ↵ to confirm.

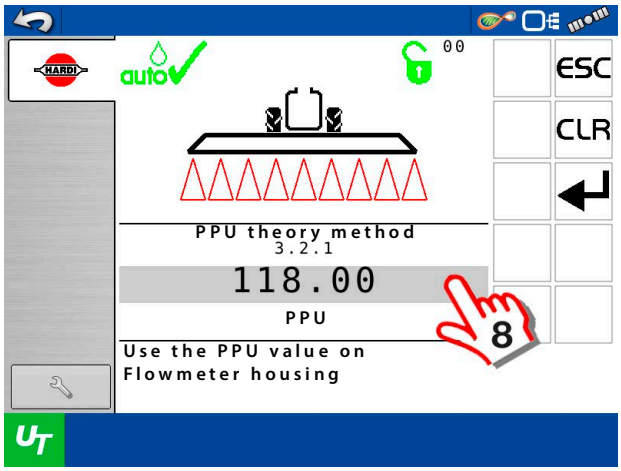


6. Scroll to "PPU theory method" with ↑ or ↓.
7. Select ↵ to confirm.



ATTENTION! The procedure for the following two steps can vary between ISOBUS Terminals.'

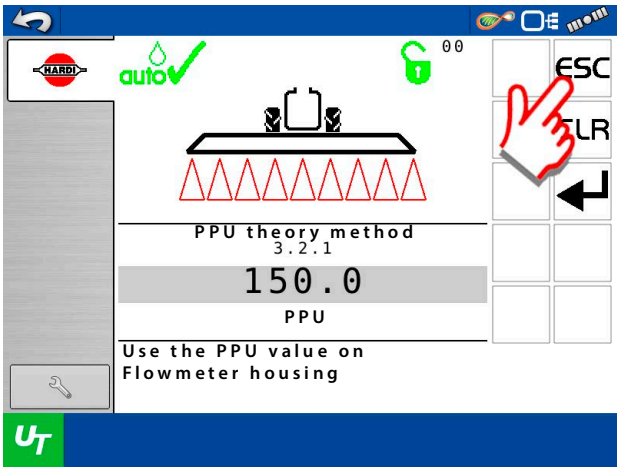
8. Select the value field to enter a value.



9. Enter the new PPU value on the numeric keypad and select ✓ to confirm.

NOTE! If pressing ✗ to cancel and exit, the value not saved.

The value is changed. Press ESC to go back to the previous menu.



Optional Controls

General Info

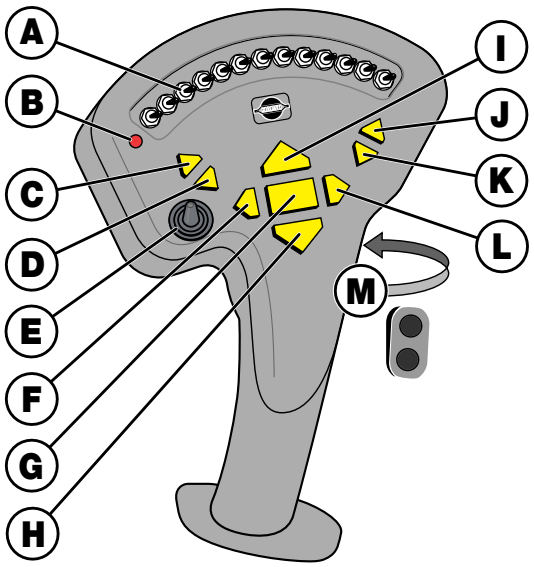
In addition to the UT, the sprayer can be configured with optional controls that can expand boom, spray and track functions. Depending on the sprayer, following controls can be installed:

- Grip
- SetBox

Grip (optional)

When fitted, the ergonomic Grip locates inside the tractor cabin. Using the Grip, it is possible to operate all common functions required during normal spraying. This includes Track and TWIN functions, that is only available to certain sprayers.

ATTENTION! It is not possible to switch the Grip ON/OFF separately. When turning the SmartCom controller power ON/OFF, the Grip automatically switches ON/OFF.



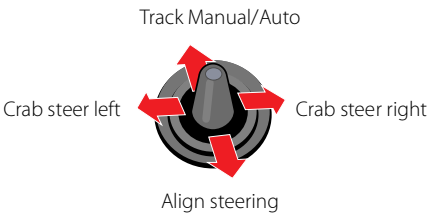
A. Switches for distribution section valves on the spray boom. Turns (up to 13) separate spray sections on or off.
   - The switch is in up position: OFF.
   - The switch is in down position: ON.

B. Status LED. During use, the light must be ON and blinking.

C. Tilt left up.

D. Tilt left down.

E. Thumbstick (EU):



F. Boom slant left up.

G. Main spray ON/OFF.

H. Boom height down.

I. Boom height up.

J. Tilt right up.

K. Tilt right down.

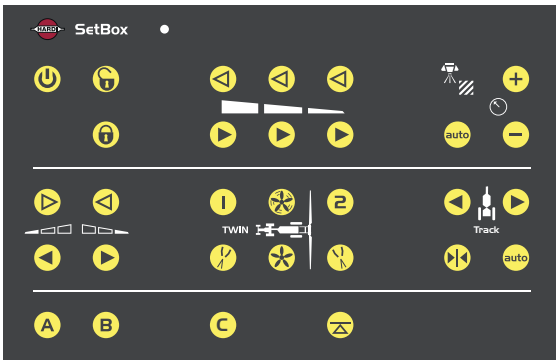
L. Boom slant right up.

M. TWIN pre-set 1 and 2 (TWIN sprayers only).

3 - Description

SetBox (optional)

The optional SetBox controls secondary functions. Find the buttons grouped into control areas to simplify operator understanding.



NOTE! The buttons A and B not used.

Power Button

Group		Button and LED Description
		Power ON/OFF. This button has no function. The SmartCom system turns on when the display turned on.
		Status LED. ON = Ready and communicating. OFF = No power to SetBox. Flashing = No communication with SmartCom.

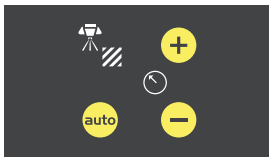
Pendulum Lock Buttons

Group	Button	Button Description
		Pendulum unlock after unfolding the boom.
		Pendulum lock before folding the boom. TWIN booms only: When locking the boom, the TWIN air angle sets to fold-safe position.

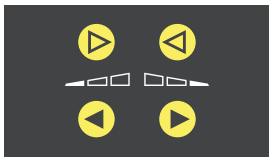
Boom Fold Buttons

Group	Button	Button Description
		Fold boom wing. Refer to the sprayer instruction book for folding procedure.
		Unfold boom wing. Refer to the sprayer instruction book for folding procedure.

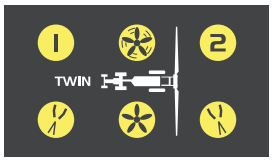
Main Spray Buttons

Group	Button	Button Description
		Automatic volume rate. Always use automatic mode when spraying, for the DynamicFluid4 regulation valve to work properly.
		Manual increase the spray pressure. Do not use this manual button during normal operation, as the DynamicFluid4 regulation valve automatically adjusts the spray pressure.
		Manual decrease the spray pressure. Do not use this manual button during normal operation, as the DynamicFluid4 regulation valve automatically adjusts the spray pressure.

Single-side Boom Fold Buttons

Group	Button	Button Description
		Fold left boom wing. Refer to the sprayer instruction book for folding procedure.
		Unfold left boom wing. Refer to the sprayer instruction book for folding procedure.
		Fold right boom wing. Refer to the sprayer instruction book for folding procedure.
		Unfold right boom wing. Refer to the sprayer instruction book for folding procedure.

TWIN System Buttons

Group	Button	Button Description
		TWIN sprayers only: TWIN pre-set 1. Activates appropriate stored parameters for fan speed and air angle.
		TWIN sprayers only: TWIN pre-set 2. Activates appropriate stored parameters for fan speed and air angle.
		TWIN sprayers only: Air slot angle. Rearwards control for TWIN.
		TWIN sprayers only: Air slot angle. Forwards control for TWIN.
		TWIN sprayers only: Increase air volume for TWIN.
		TWIN sprayers only: Decrease air volume for TWIN.

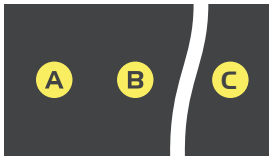
Track System Buttons

Using the ComfortTrack or IntelliTrack function, when making turns in the field, ensures:

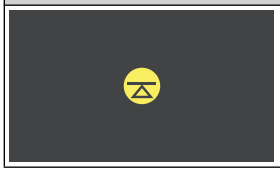
- A small turning radius.
- A better stability when turning.
- That the spray boom is perpendicular to the crop rows.

Group	Button	Button Description
		Track manual/Slope correction control: Will manually crab steer the sprayer to the left and are used for slope correction by manually steering the sprayer left or right.
		Track align: Aligns the sprayer. Used before folding the boom (NAVIGATOR and AEON only) or if steering is not necessary.
	auto	Track automatic mode: Switches the Track into auto mode ON/OFF (Press one time into Manual, then once again to go into Auto mode). The sprayer will follow the wheel track from the tractor.

Optional Functions Buttons

Group	Button	Button Description
	A	Not used.
	B	Not used.
	C	Not used.

Boom Slant Level Button

Group	Button	Button Description
		Level of boom slant. Pressing the button will bring the slant angle into level position, i.e. slant in neutral position.

Functions

Function Keys

By pressing 

on the Main HARDI UT, you access the optional functions keys from where you can enter the submenu of the feature. Depending on the sprayer configuration, the optional auto functions are:

- AutoFill (EU)
- AutoWash (EU)
- AutoSelect (EU)
- DilutionKit (EU)
- End Nozzles
- Edge Nozzles (EU)
- Night Spraying Lights (Keys always visible)

NOTE! The number of levels in the optional functions menu system depends on the number of functions available at the sprayer.

LEVEL 1	LEVEL 2	
AutoFill (EU)	Edit filled	
	Abort	
AutoSelect (EU)	Line A ON Line B OFF	Line A and B ON
	Line B ON Line A OFF	Auto mode
AutoWash (EU)	BoomFlush	MultiRinse
	FastFlush	
DilutionKit (EU)	BoomDilution	Stop Dilution
	TankDilution	
Edge Nozzles (EU)	Left ON/OFF	
	Right ON/OFF	
End Nozzles	Left ON/OFF	
	Right ON/OFF	
Night Spraying lights	Night Spraying lights ON	
	Night Spraying lights OFF	

AutoFill (EU)

This system eases the tank filling process for the operator. The SmartValves and the full tank safety sensor are the main components used. In addition, AutoFill automatically reduces AutoAgitation during the filling process for maximum filling effect.

Depending on your FluidBox, the buttons used for operating AutoFill described in:

- FluidBox 8000: "AutoFill Menu".
- FluidBox 7000: "AutoFill and Manual Filling Menu".

How it Works

1. Read the actual tank contents on the display.
2. In the display, enter the volume to AutoFill.
3. In the work area, the operator connects the hose and starts the filling job via the FluidBox.
4. The SmartValve closes when the fill volume reached.

NOTE! Depending on your FluidBox, detailed filling instructions given in the FluidBox 7000 or FluidBox 8000 instruction books.

AutoSelect (EU)

ATTENTION! This system requires a pneumatic air system available to drive the AutoSelect. Take compressed air from the tractor compressor, the sprayer pneumatic brake system or a separate electric compressor with tank fitted in the ChemLocker.

If the sprayer is equipped with two sets of boom lines, then use this function to maintain volume rate and droplet size during large changes in forward speed. Controlled by the DynamicFluid4 system, this can help in following situations:

- Operator can select or change nozzle from the driver seat.
- For example, using a specific drift reduced nozzle on headland or in buffer zones.
- Increased working speed without compromises.
- Operator can react on wind condition and direction. With rear wind, a higher driving speed is possible when switching nozzles.
- Operator can change volume rates and dose rates easier in the field and still have a good spray quality.

Choose the right menu for your spraying job. When AutoSelect is active, an icon will appear in the display, showing the actual status.

AutoSelect in the Controller

- The system is set up in menu 2.2.3 if it is active. See the System Setup chapter.
- The boom lines are pronounced:
    - A stand for front boom lines.
    - B stand for rear boom lines.
- The AutoSelect is set up to react on pressure.

AutoSelect possible to use for four main application methods:

1. To manually switch between nozzle types with the same output.
   As spraying conditions change during the day it may be an advantage to change from an F-series nozzles to LOWDRIFT series nozzles to overcome off target wind drift (or LOWDRIFT to INJET as the case may be).

Status icons are:

 icon is shown when line A is active and in manual mode.

 icon is shown when line B is active and in manual mode.

2. To manually switch to a larger or smaller nozzle size.
   If there is a requirement to change the application rate during spraying, or between spraying tasks.

   Status icons are:

 icon is shown when line A is active and in manual mode.

 icon is shown when line B is active and in manual mode.

3. To manually switch both lines on together.

   In the case of some grass weed selective herbicides there may be a requirement to use two sets of small nozzles where higher application rates can be achieved while maintaining small droplet production.

   Status icons are:

 icon is shown when both lines are active and in manual mode.

 icon is shown when line A is active and in manual mode.

 icon is shown when line B is active and in manual mode.

4. To automatically switch the second boom line on.
   If the minimum and maximum forward speed is outside the effective operating pressure range of the nozzle, then a second boom line can be switched on and off automatically based on pressure. As the forward speed increases the nozzles pressure rises.
   At a predetermined operating pressure, the AutoSelect controller switches in the second boom line. The pressure falls providing for the forward speed to be increased.

   Status icons are:

 icon is shown when both lines are active and in auto mode.

 icon is shown when line A is active and in auto mode.

 icon is shown when line B is active and in auto mode.

AutoWash (EU)

AutoWash is a series of three different automated rinsing/flushing programmes managed by the controller.

General Info

AutoWash will optimise the consumption of rinsing water and allow up to 6 cycles to obtain a residual concentration of less than 2% by running a full MultiRinse.

Each programme will automatically turn the required valves to correct position and in the optimal sequence to ensure rinsing of all the intended spray lines.

One of three different programs depending on the situation can be selected, BoomFlush, FastFlush and MultiRinse. These are fast and easy to use for the operator:

- The cleaning process done in the field so the residues do not end up in the farmyard. The operator remains in the cabin thus avoiding contamination from the equipment and the sprayed crop, to himself and the tractor cabin.
- The operation is simple, as the operator does not need an in-depth understanding of the sprayer. The operator only needs to select a suitable programme for the wash job.
- It greatly saves time, as e.g. there is no need for wearing protective clothing every time operating the valves.
- When AutoWash operates, it takes control of both suction SmartValve and pressure SmartValve.

The intention of the AutoWash functions are to act as an aid for the user to get a complete cleaning of the sprayer. However, the intention is not to do the following three things:

Do Not

- Use AutoWash at stand still. Stationary washing can cause spot contamination. This does not apply if a drained filling/washing location is available at the farm.
- Put cleaning agent in the RinseTank.
- Pause a wash program and add cleaning agent into the MainTank.

Additional Info

The design of the AutoWash programs BoomFlush, FastFlush and MultiRinse are for use in the field, and operates while driving in order to distribute wash water, which contain spray chemical broadly on the field to avoid spot contamination.

If the farm has a wash area with means to collect and safely dispose wash water (e.g. a manure tank), then AutoWash can operate when stationary.

Other procedures may be required or cannot complete in the field. For example:

- Soak wash: A label defined wash that requires more than 500 litres of clean water and neutralising agents. Wash of sprayer between jobs with incompatible chemicals must be according to prescriptions from chemical producer. Use e.g. AllClearExtra, as this is a commonly used cleaning agent. If your chemical prescribes another cleaning agent and/or another cleaning procedure, you must follow that.
- TankFlush: After transferring spray-liquid to a storage tank.
- TurboFiller: Always clean immediately after use, preferably whilst using the FastFiller.

ATTENTION! AutoWash do not contain TurboFiller wash. The TurboFiller need separate cleaning.

WARNING! The meaning of the AutoWash functions is an aid for the user to get a complete cleaning of the sprayer. HARDI cannot undertake any responsibility that possible operational faults from the operator result in a poor cleaned sprayer.

ATTENTION! For the use of AutoWash functions, please refer to "" on page 130.

BoomFlush

BoomFlush rinses the spray lines. Used when there is an interruption in the spray job, e.g. rain, when the MainTank still contains spray chemical.

BoomFlush reduces sedimentation in boom tubes and reduces harm from dripping water when dismantling the non-drip valve or when opening the PrimeFlow valves at the nozzles.

- Uses approximately 100 litres from the RinseTank.
- Spray out rinse water at nominal driving speed to avoid overdosing.

NOTE! When doing a BoomFlush the MainTank contents increases with approximately 40 litres. This is solely spray-liquid that are primed back to the MainTank before clean rinse water is directed to the nozzles. Therefore, the spray chemical not thinned with water from the RinseTank.

FastFlush

This is a quick, basic wash. Used for planned stop where the same pesticide is sprayed next day in the same crop. The MainTank must be empty before attempting to do a FastFlush.

FastFlush both flushes MainTank, the fluid system and the boom. FastFlush reduces sedimentation inside the entire sprayer; however, the residual concentration is still relatively high.

- Uses approximately 75 litres from the RinseTank.
- Spray out rinse water at nominal driving speed to avoid overdosing.

MultiRinse

This is an extended wash. Used if there is a slight change in pesticide or crop or the next spraying task is with incompatible pesticide/crop combination.

MultiRinse performs the same sequence of steps as FastFlush, but performs it several times. Hence, greatly reduce the spray chemical concentration.

The MainTank must be empty before attempting to do a MultiRinse.

MultiRinse:

- Does the same steps as a FastFlush, but repeats between 3 and 7 times depending on the sprayers RinseTank size.
- Uses approximately 450 litres from the RinseTank.
- Makes driving and washing more comfortable. Recommended speed is the half of normal spraying speed, whereby dose rate (litres/ha) is increased.

NOTE! Spraying time is unchanged as flow rate and spray pressure is the same as for normal spraying.

MultiRinse, however is only based on cleaning with water, which may not be sufficient. Always refer to chemical manufacturer's instruction for information of possible necessary use of a cleaning detergent like e.g. AllClearExtra.

Cleaning Needs

The schematics outlines specific situations of cleaning and their need of an AutoWash program.

	Spray Situation			
	Interrupted Spray Job	**Planned Stop**	**Slight Chemical Change**	**Conflicting Chemicals**
Situation	Stop spraying due to wind, rain, heat etc.	Same pesticide and crop next day.	In pesticide or crop. Compatible pesticide-crop.	Dangerous pesticide crop combination.
Pesticide Usage	Same pesticide morning and evening.	Same pesticide morning and evening.	Different pesticide.	Incompatible pesticides.
Crop Sprayed	Same crop.	Same crop.	Similar crops.	Different crops.
Examples of Spraying	E.g. pesticide brand X morning and evening.	E.g. pesticide brand X morning and evening.	E.g. fungicide in wheat followed by insecticide in barley.	E.g., herbicide in wheat then spray in sugar beet.

	Results to Crop			
	Interrupted Spray Job	**Planned Stop**	**Slight Chemical Change**	**Conflicting Chemicals**
No Cleaning	No crop damage. Boom might drip. Sedimentation.	No crop damage. Boom might drip. Sedimentation.	 Little crop damage.	 Severe crop damage.
BoomFlush	 Safe	Depends on chemicals.	 Little crop damage.	 Severe crop damage.
FastFlush	Not possible. MainTank not empty.	 Safe	Depends on chemicals.	 Crop damage.
MultiRinse	Not possible. MainTank not empty.	Safe but overkill.	 Safe	Probably OK except when chemical binding occurs.
Soak Wash (FastFlush & MultiRinse)	Not possible. MainTank not empty.	Safe but overkill.	Safe but overkill.	 Safe

Summary Cleaning Results

The schematic outlines the results of completed AutoWash programs and soak wash procedure.

	BoomFlush	**FastFlush**	**MultiRinse**	**Soak Wash**	**TurboFiller Wash**
Liquid system rinsed	Partially	Completely	Completely	Completely	No
Boom lines rinsed	Yes	Yes	Yes	Yes	No
MainTank rinsed	No	Yes	Yes	Yes	No
TurboFiller rinsed	No	No	No	No	Yes
AutoWash rinse action steps	1	1 or 2	6		
Residual concentration	Less than 20%	Less than 55%	Less than 2%		
Total amount - Rinse water used	100 litres	75 litres	450 litres	480 to 990 litres	Unspecified, from FastFiller or RinseTank
Approximate time consumed*	3 Min.	5 Min.	25 Min.	2 x 25+ Min.	Manual operation
Approximate distance	500 metres (9 km/h)	800 metres (9 km/h)	800 (9 km/h) + 1700 metres (4.5 km/h)		
Driver action	From cabin	From cabin	From cabin	From cabin + Add neutral agent at fill station	TurboFiller valves

*depending on nozzle size.

AutoAgitation

AutoAgitation is fully automatic and consists of an electrically operated flow valve and the TankGauge sensor. Thereby SmartCom control the flow for the agitation. This is a standard feature together with AutoFill and/or AutoWash.

With a full tank, AutoAgitation will ensure maximum agitation. As the tank empties, the computer regulates the flow to prevent foam, and minimises liquid residues when the tank is empty.

It is possible to select different programmes for optimal agitation. Refer to "Menu 2.2 Auto functions (EU)" on page 54.

A manual override is possible from the FluidBox, by pressing the buttons for zero, half or full agitation. Depending on your FluidBox, refer to:

- FluidBox 8000: "Agitation Menu"
- FluidBox 7000:"Agitation Menu"

NOTE! When using the main ON/OFF on the Grip, AutoAgitation will override the FluidBox agitation setting.

DilutionKit

Some sprayers are equipped with DilutionKit as an option. The DilutionKit offers two ways to dilute the sprayer contents.

NOTE! The dilution kit is NOT a rinsing device. For rinsing the sprayer, please refer to "Cleaning" in the sprayer instruction book for proper cleaning procedure.

Tank Dilution

Used when the MainTank is empty, to dilute the residual spray-liquid before returning to the farm for refilling.

Boom Dilution

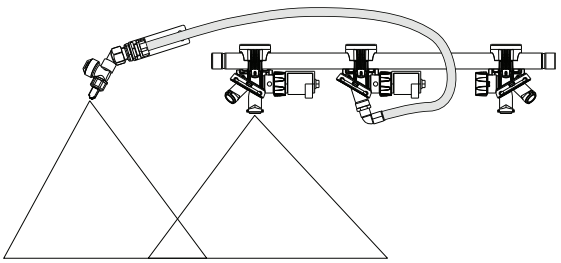
Used when a spray job is interrupted.

Before returning to the farm, diluting the boom is necessary to prevent deposits of spray-liquid settling in the boom, which could then block the nozzles.

ATTENTION! Refer to the sprayer instruction book for further explanation of the DilutionKit system.

Edge Nozzles

A conventional boom is spraying 50 cm outside the boom structure. It is possible to upgrade with the edge nozzle kit. The edge nozzle kit provides an extra nozzle fitted to the end of the boom structure, pointing 45° outwards, and activated by a solenoid valve.



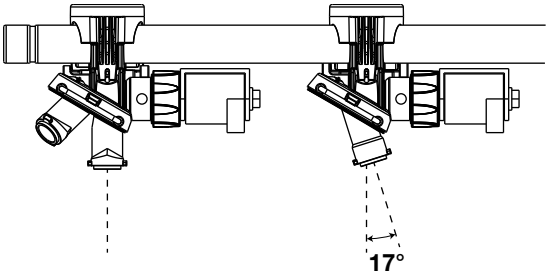
Using the angled nozzle holder with a standard flat fan nozzle, as a range extending nozzle, the boom will act as it is wider than it is.

- No setup required in the controller.
- Use same nozzle for edge nozzles as the other nozzles used for the spray job.
- Turn edge nozzles ON/OFF in the menu (submenu in F1 F2 F4 F3). See "Night Spraying Light (optional)" on page 125.
- When the edge nozzles are active, it shows in the display with separate icons in the ends of the boom line.

NOTE! It is important that the volume applied from the end nozzle match the volume applied under the boom. This is a comparison of volume per minute per length. (Litre/Min/metre).

3 - Description

End Nozzles



A conventional boom, which is spraying 50 cm outside the boom structure. It is possible to upgrade with the border end nozzle kit. The end nozzle kit provides an extra nozzle on the nozzle tube which is angled 17.5 degrees inwards.

Using the angled nozzle holder with a standard flat fan nozzle, this will act as a border nozzle keeping the spray fan within the end of the boom structure.

- No setup required in the controller.
- Use same nozzle for end nozzles as the other nozzles used for the spray job.
- Turn end nozzles ON/OFF in the menu (submenu in). See "End Nozzles" on page 125.
- When activating the end nozzle, the outermost nozzle switches off.
- When the end nozzles are active, it shows in the display with separate icons in the ends of the boom line.

NOTE! It is important that the volume applied from the end nozzle match the volume applied under the boom. This is a comparison of volume per minute per length. (Litre/Min/metre).

Night Spraying Light

NOTE! Refer to "Night Spraying Light (optional)" on page 125 for information about work light function.

Other Functions

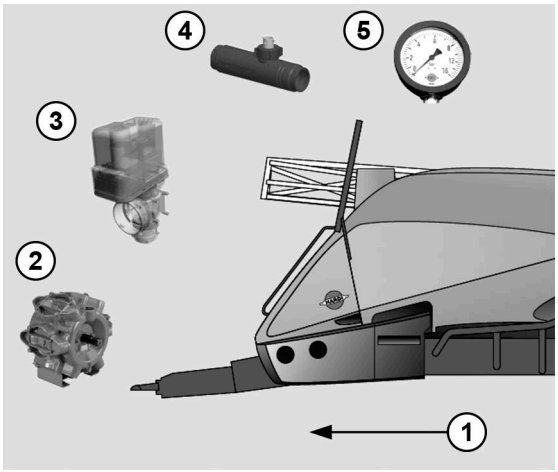
DynamicFluid4 Pressure Regulation

Traditional fluid regulation starts, when opening the nozzles. With DynamicFluid4 the regulation is a continuous process, even if the nozzles are closed.

The DynamicFluid4 system is based on 5 sensors that the sprayer computer uses to calculate an optimal regulation. The sensors are also back-up for each other, ensuring that the system can continue regulation - even if one or more sensor signals fails.

The applied 5 sensors measure:

1. Driving speed.
2. Pump RPM.
3. Regulation valve opening angle.
4. Fluid flow.
5. Fluid pressure.



DynamicFluid4 uses the following parameters/variables to regulate:

- Driving Speed.
- Pump RPM.
- Active Sections.

Then DynamicFluid4 starts to move the regulation valve towards the calculated final position, immediately after the operator makes any changes.

During the spray job, there are two scenarios:

Nozzles ON

The sensor input to the regulation system is live.

Nozzles OFF

The regulation based on a simulation of the previous spray situation. This called FeedForward and it foresees the correct opening of the regulation valve. Thereby it is extremely fast to obtain the correct application rate when opening the nozzles.

Even when closing all but one nozzle on a very wide boom, it is quick to achieve the correct and stable application rate. The benefit is more precise application rates immediately when spraying begins.

Features for DF4

- A synthetic or ceramic disc and a stainless steel disc regulate the pressure, ensure quick reaction and zero leakages.
- Very fast and accurate regulation when all sensors are active, setup in controller menus are correct, and pump, filters and valves are in good condition. The system measures and calculates 20 times per second.
- Quick reacting valve, when turning sections On/Off, and at speed changes.
- Optimized AutoSectionControl feature that predict boom sections to open/close and optimized nozzle pressure.
- Optimized for different PTO systems.
- Nozzle surveillance. No setup or tuning is required for nozzle change.
- Controller display can show the current nozzle output, which compared with the rated output. A significant difference in output is caused by failures occurring in the liquid system, such as:
    - Severe clogging of filters.
    - Large leakages on hoses and fittings.
- All functions work, though with degraded performance (limp-home modes), if:
    - Failures occur in the fluid system, e.g. pump defects, clogged filters or leaking valves.
    - Failures occur on the pressure sensor, flow sensor or pump sensor.
- There is a wrong setup of sprayer data in the menus.

Screen Icons

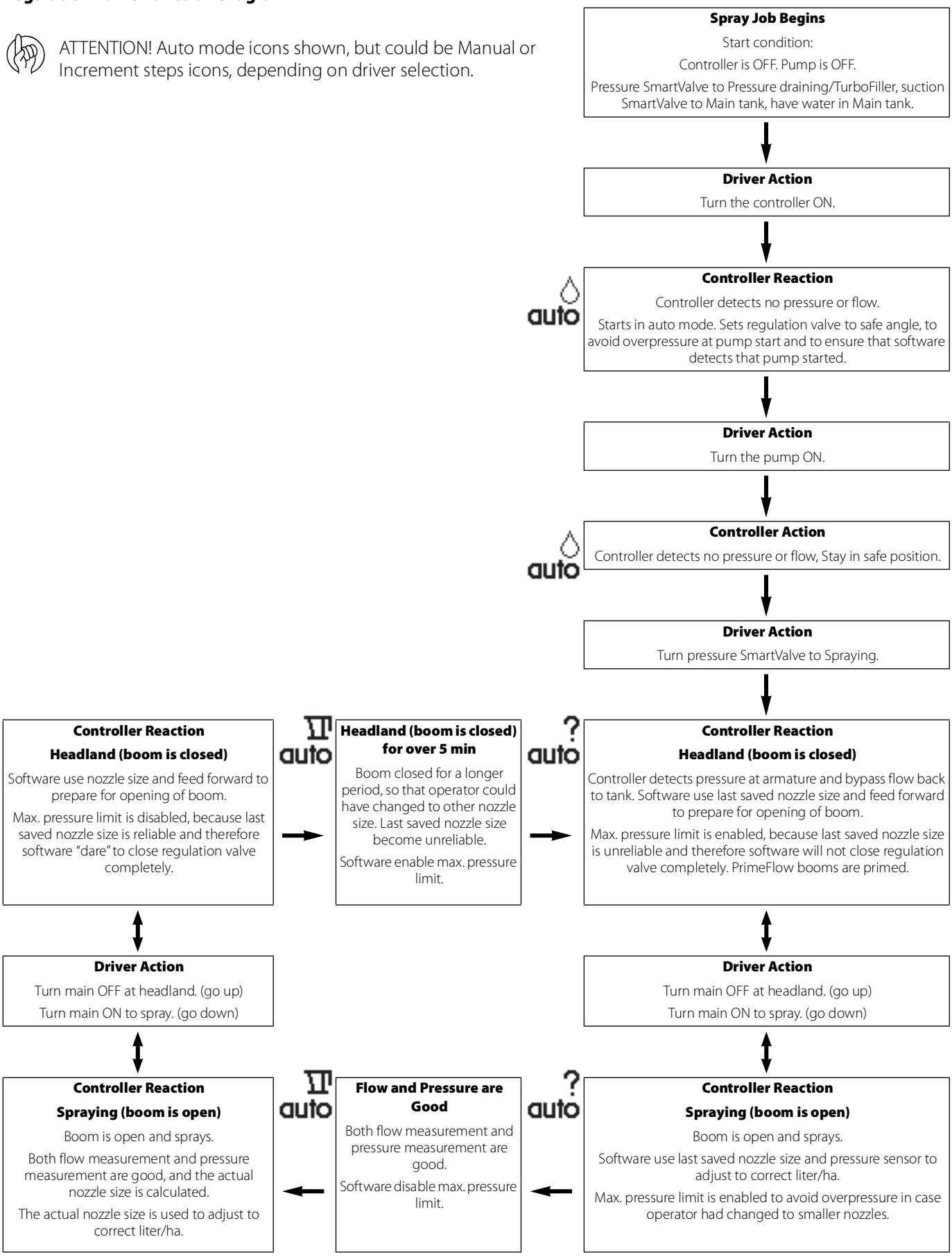
The sprayer driver selects one of three modes Auto, Manual or Increment steps. The sprayer computer detects one of three regulation modes Drop, Question Mark or Calibration Jug. This makes 9 modes in total.

Auto	Manual	Increment Steps
When pressing the Automatic Volume Rate button on the SetBox.	When pressing one of the Manual pressure control buttons on the SetBox.	When changing the Volume Rate in steps with %-up or %-down buttons on the Terminal.

			**Calibration Jug Sign** There is flow to section valves. Nozzle size (L/min at 3 bar) was calculated.
			**Drop Sign** There is no flow to section valves. The pump not started or the pressure SmartValve is set to other function than spraying.
			**Question Mark Sign** There is flow to section valves but pressure and flow has not yet been stable, therefore the nozzle size (L/min at 3 bar) was not calculated. The system uses the previously stored nozzle size. Also caused by a sensor failure or unstable sensor.

Regulation Valve Function Diagram

ATTENTION! Auto mode icons shown, but could be Manual or Increment steps icons, depending on driver selection.



PrimeFlow

PrimeFlow is a pressure-based system for circulation of liquid to the nozzles before the actual spraying starts. It prevents sedimentation and ensures a homogeneous pesticide before spraying onto the ground.

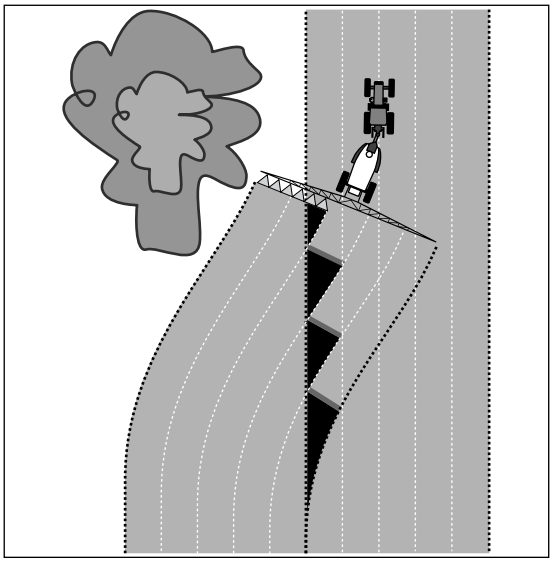
The PrimeFlow menus are only relevant for sprayers equipped with PrimeFlow valves. The PrimeFlow liquid system must be set up at installation. The HARDI Service Centre does this.

ATTENTION! When setup, the PrimeFlow system is automatic and therefore does not need user action to work while spraying.

AutoSectionControl

AutoSectionControl is:

- A fully automatic system that opens and closes boom sections as necessary.
- A system integrated into the SmartCom terminal and connected to a GPS receiver.



NOTE! In case, a non-HARDI terminal do not have auto section functions, the use of AutoSectionControl not possible.

AutoSectionControl do:

- Manage the sections when driving over sprayed area like into a headland or wedge or around obstacles like trees, etc.
- Automatically record the area sprayed, when spraying.

In a typical situation where the headland already sprayed, AutoSectionControl will now automatically close the sections if the operator passes over a sprayed area.

NOTE! When driving towards the end of a sharp angled wedge. The following scenario can occur when using AutoSectionControl in combination with an EFC fluid system:

AutoSectionControl first closes the outer sections and shortly after closes the remaining sections, which cause a pressure build-up in the return line. This may force the outer section to briefly open, and spray for a very short instance less than 1 second.

ATTENTION! Variable Rate Application needs to be enabled for AutoSectionControl to work - refer to "Menu 2.3 Variable Rate Application (VRA) / Remote / AutoSectionControl" on page 56.

AutoNozzleControl

AutoNozzleControl is a PrimeFlow based system. The system works with AutoSectionControl and controls every single nozzle automatically to reduce the environmental impact as much as possible, by minimising double-sprayed area.

When a section is partially ON, this icon shown in the display.

There is no setup required for AutoNozzleControl to work. However, the controller used, need to be capable of a multi-section setup corresponding to the number of nozzles on the boom.

ATTENTION! Variable Rate Application needs to be enabled for AutoNozzleControl to work - refer to "Menu 2.3 Variable Rate Application (VRA) / Remote / AutoSectionControl" on page 56.

AutoNozzleControl Modes

Switching between automatic and manual modes changes the AutoNozzleControl function:

- Auto mode: Single nozzle switching (50 cm sections).
- Manual mode: Nozzles grouped into sections. Up to 13 sections, depending on the sprayer setup.

ComfortTrack / IntelliTrack (Trailed Sprayers only)

ComfortTrack (AEON) or IntelliTrack (NAVIGATOR) are steering mechanisms for the HARDI sprayers. When using a track system, sprayer stability is a common concern. Many factors influence the sprayer; deal with the conditions where the sprayer might tip over.

NOTE! When the spray boom is folded, for safety reasons the system only is active in following situations:

- For ComfortTrack when driving:

Driving Speed	Steering Amount
Up until 5 km/h.	Full steering.
Between 6-14 km/h	Steering angle decreases when speed increases.
Above 15 km/h	No steering.

- For IntelliTrack when driving up until 5 km/h in manual mode.

Driver Influence

Some of the factors that the driver can influence with are:

- Driving behaviour
- Field conditions
- Track width
- Tank contents
- Tyre pressure

Read the sprayer instruction book for further information.

DANGER! The system calibration is for driving on flat fields. Pay special attention when driving in hilly conditions.

DANGER! When driving on fields with deep tracks, it is necessary to decrease the speed.

Unsafe Driving

If unsafe driving occurs an alarm will trigger, and the sprayer will align.

There are two ways to turn off the alarm:

- Press ↵.
- Press ▶|◀, if a SetBox is installed.

WARNING! Be aware that it is not possible to turn off the alarm as long as unsafe driving still occurs!

ATTENTION! If necessary, adjust the level of security in menu 3.6.6 - please contact your HARDI Service Centre, if in doubt about the correct setting.

3 - Description

Menus

Full Menu Structure

The below menu structure is correct for SW A.2.2.89 - later versions can differ from this.

Options differ based on machine configurations.

NOTE! Blank fields are menus without name or description.

Menu Number	Menu Name	Help Text in Display
1	Daily settings	Most used settings e.g. desired rate, tank contents and register number
1. 1	Volume rate	Use arrow keys or numeric keys to set the desired volume rate
1. 2	Reserved	Reserved Reserved Reserved
1. 3	Select register	Use register 1 to 99 for job. Scroll to register, then press Enter to show data
1. 3. 1	Show register spray data 1	Use register 1 to 99 for job. Scroll to register, then press Enter to show data
1. 3. 1. 1	Show register spray data 1	Press C for 5 sec to reset register, Enter to see screen 2, ESC to leave
1. 3. 1. 1. 1	Start date	
1. 3. 1. 1. 2	Start time	
1. 3. 1. 1. 3	End date	
1. 3. 1. 1. 4	End time	
1. 3. 2	Select register	Use register 1 to 99 for job. Scroll to register, then press Enter to show data
1. 3. 3	Total register	Shows register number 0 which is a total of all registers
1. 3. 99. 1	Show register spray data 1	Press C for 5 sec to reset register, Enter to see screen 2, ESC to leave
1. 3. 99. 1. 1	Start date	
1. 3. 99. 1. 2	Start time	
1. 3. 99. 1. 3	End date	
1. 3. 99. 1. 4	End time	
1. 4	Volume rate: Present high	Rate selected with1 press on the arrow up-key
1. 5	Volume rate: Present low	Rate selected with1 press on the arrow down-key
2	Setup	Customization of display, automatic functions, clock, alarms, registers, etc
2. 1	Display readout	Customizes the 4 small display readouts
2. 1. 1	Show upper middle	
2. 1. 1. 01	Prog volume rate litre/ha	Shows Programmed volume rate Application rate litre per hectare
2. 1. 1. 02	Boom flow	Boom flow per minute sprayed out through the boom
2. 1. 1. 03	Time	Actual time
2. 1. 1. 04	Work rate ha/hour	Rate shown in hectare per hour or acre per hour
2. 1. 1. 05	Actual volume rate litre/ha	Actual rate in litre per hectare or gallon per acre
2. 1. 1. 06	Tank contents	Main tank contents
2. 1. 1. 07	Speed	Driving speed
2. 1. 1. 08	Volume sprayed	Readouts for Volume sprayed in currently active register
2. 1. 1. 09	Area sprayed	Readouts for Area sprayed in currently active register
2. 1. 1. 10	Spray width	Spray width including end nozzle
2. 1. 1. 11	Pressure	Displays spray pressure if sensor is fitted
2. 1. 1. 12	Fan speed	Displays Twin fan speed if sensor is fitted
2. 1. 1. 13	Regulation valve angle	
2. 1. 1. 14	Pendulum lock status	Displays reading of pendulum lock sensor if fitted
2. 1. 1. 15	Pendulum unlock status	Displays reading of pendulum unlock sensor if fitted
2. 1. 1. 16	Dynamic centre position	Displays Dynamic centre position sensor if fitted
2. 1. 1. 17	Spray pump rev	Displays revolutions if sensor is fitted
2. 1. 1. 18	FlexCapacity Pump Rev	Displays revolutions of Flex Capacity pump Rev is fitted
2. 1. 1. 19	Extra sensor 2F	Readout from extra sensor 2 frequency
2. 1. 1. 20	Extra sensor 3A	Readout from extra sensor 3 analogue

Menu Number	Menu Name	Help Text in Display
2. 1. 1. 21	Extra sensor 4A	Readout from extra sensor 4 analogue
2. 1. 1. 22	Voltmeter	Displays system voltage. Useful when fault finding
2. 1. 1. 23	Agitation	Agitation valve opening
2. 1. 1. 24	RinseTank content	RinseTank calculated content
2. 1. 1. 25	Slant angle	Headland assist angle sensor
2. 1. 1. 26	Boom height	Headland assist height sensor
2. 1. 1. 27	Air pressure	Displays compressor air pressure if sensor is fitted
2. 1. 1. 28	Air slot angle	Displays air slot angle if TWIN functionality is configured.
2. 1. 1. 29	Pendulum angle	Pendulum angle sensor value
2. 1. 1. 30	Nozzle PWM Duty cycle	Average nozzle PWM Duty cycle If the PWM nozzle control system is installed
2. 1. 1. 31	Reserved	R R
2. 1. 1. 32	Crab Steer Offset	
2. 1. 1. 33	Nozzle size flow at 3 bar	Calculated nozzle flow at 3 bar
2. 1. 1. 34	Reserved	R R
2. 1. 1. 35	Hitch Angle	
2. 1. 1. 36	Linkage Angle	
2. 1. 1. 37	PF bus +	Voltage on PrimeFlow databus +
2. 1. 1. 38	PF bus -	Voltage on PrimeFlow databus -
2. 1. 2	Show upper right	
2. 1. 2. 01	Prog volume rate litre/ha	Shows Programmed volume rate Application rate litre per hectare
2. 1. 2. 02	Boom flow	Boom flow per minute sprayed out through the boom
2. 1. 2. 03	Time	Actual time
2. 1. 2. 04	Work rate ha/hour	Rate shown in hectare per hour or acre per hour
2. 1. 2. 05	Actual volume rate litre/ha	Actual rate in litre per hectare or gallon per acre
2. 1. 2. 06	Tank contents	Main tank contents
2. 1. 2. 07	Speed	Driving speed
2. 1. 2. 08	Volume sprayed	Readouts for Volume sprayed in currently active register
2. 1. 2. 09	Area sprayed	Readouts for Area sprayed in currently active register
2. 1. 2. 10	Spray width	Spray width including end nozzle
2. 1. 2. 11	Pressure	Displays spray pressure if sensor is fitted
2. 1. 2. 12	Fan speed	Displays Twin fan speed if sensor is fitted
2. 1. 2. 13	Regulation valve angle	
2. 1. 2. 14	Pendulum lock status	Displays reading of pendulum lock sensor if fitted
2. 1. 2. 15	Pendulum unlock status	Displays reading of pendulum unlock sensor if fitted
2. 1. 2. 16	Dynamic centre position	Displays Dynamic centre position sensor if fitted
2. 1. 2. 17	Spray pump rev	Displays revolutions if sensor is fitted
2. 1. 2. 18	FlexCapacity Pump Rev	Displays revolutions of Flex Capacity pump Rev is fitted
2. 1. 2. 19	Extra sensor 2F	Readout from extra sensor 2 frequency
2. 1. 2. 20	Extra sensor 3A	Readout from extra sensor 3 analogue
2. 1. 2. 21	Extra sensor 4A	Readout from extra sensor 4 analogue
2. 1. 2. 22	Voltmeter	Displays system voltage. Useful when fault finding
2. 1. 2. 23	Agitation	Agitation valve opening
2. 1. 2. 24	RinseTank content	RinseTank calculated content
2. 1. 2. 25	Slant angle	Headland assist angle sensor
2. 1. 2. 26	Boom height	Headland assist height sensor
2. 1. 2. 27	Air pressure	Displays compressor air pressure if sensor is fitted
2. 1. 2. 28	Air slot angle	Displays air slot angle if TWIN functionality is configured.
2. 1. 2. 29	Pendulum angle	Pendulum angle sensor value
2. 1. 2. 30	Nozzle PWM Duty cycle	Average nozzle PWM Duty cycle If the PWM nozzle control system is installed
2. 1. 2. 31	Reserved	R R
2. 1. 2. 32	Crab Steer Offset	
2. 1. 2. 33	Nozzle size flow at 3 bar	Calculated nozzle flow at 3 bar
2. 1. 2. 34	Reserved	R R
2. 1. 2. 35	Hitch Angle	
2. 1. 2. 36	Linkage Angle	
2. 1. 2. 37	PF bus +	Voltage on PrimeFlow databus +

Menu Number	Menu Name	Help Text in Display
2. 1. 2. 38	PF bus -	Voltage on PrimeFlow databus -
2. 1. 3	Show lower middle	
2. 1. 3. 01	Prog volume rate litre/ha	Shows Programmed volume rate Application rate litre per hectare
2. 1. 3. 02	Boom flow	Boom flow per minute sprayed out through the boom
2. 1. 3. 03	Time	Actual time
2. 1. 3. 04	Work rate ha/hour	Rate shown in hectare per hour or acre per hour
2. 1. 3. 05	Actual volume rate litre/ha	Actual rate in litre per hectare or gallon per acre
2. 1. 3. 06	Tank contents	Main tank contents
2. 1. 3. 07	Speed	Driving speed
2. 1. 3. 08	Volume sprayed	Readouts for Volume sprayed in currently active register
2. 1. 3. 09	Area sprayed	Readouts for Area sprayed in currently active register
2. 1. 3. 10	Spray width	Spray width including end nozzle
2. 1. 3. 11	Pressure	Displays spray pressure if sensor is fitted
2. 1. 3. 12	Fan speed	Displays Twin fan speed if sensor is fitted
2. 1. 3. 13	Regulation valve angle	
2. 1. 3. 14	Pendulum lock status	Displays reading of pendulum lock sensor if fitted
2. 1. 3. 15	Pendulum unlock status	Displays reading of pendulum unlock sensor if fitted
2. 1. 3. 16	Dynamic centre position	Displays Dynamic centre position sensor if fitted
2. 1. 3. 17	Spray pump rev	Displays revolutions if sensor is fitted
2. 1. 3. 18	FlexCapacity Pump Rev	Displays revolutions of Flex Capacity pump Rev is fitted
2. 1. 3. 19	Extra sensor 2F	Readout from extra sensor 2 frequency
2. 1. 3. 20	Extra sensor 3A	Readout from extra sensor 3 analogue
2. 1. 3. 21	Extra sensor 4A	Readout from extra sensor 4 analogue
2. 1. 3. 22	Voltmeter	Displays system voltage. Useful when fault finding
2. 1. 3. 23	Agitation	Agitation valve opening
2. 1. 3. 24	RinseTank content	RinseTank calculated content
2. 1. 3. 25	Slant angle	Headland assist angle sensor
2. 1. 3. 26	Boom height	Headland assist height sensor
2. 1. 3. 27	Air pressure	Displays compressor air pressure if sensor is fitted
2. 1. 3. 28	Air slot angle	Displays air slot angle if TWIN functionality is configured.
2. 1. 3. 29	Pendulum angle	Pendulum angle sensor value
2. 1. 3. 30	Nozzle PWM Duty cycle	Average nozzle PWM Duty cycle If the PWM nozzle control system is installed
2. 1. 3. 31	Reserved	R R
2. 1. 3. 32	Crab Steer Offset	
2. 1. 3. 33	Nozzle size flow at 3 bar	Calculated nozzle flow at 3 bar
2. 1. 3. 34	Reserved	R R
2. 1. 3. 35	Hitch Angle	
2. 1. 3. 36	Linkage Angle	
2. 1. 3. 37	PF bus +	Voltage on PrimeFlow databus +
2. 1. 3. 38	PF bus -	Voltage on PrimeFlow databus -
2. 1. 4	Show lower right	
2. 1. 4. 01	Prog volume rate litre/ha	Shows Programmed volume rate Application rate litre per hectare
2. 1. 4. 02	Boom flow	Boom flow per minute sprayed out through the boom
2. 1. 4. 03	Time	Actual time
2. 1. 4. 04	Work rate ha/hour	Rate shown in hectare per hour or acre per hour
2. 1. 4. 05	Actual volume rate litre/ha	Actual rate in litre per hectare or gallon per acre
2. 1. 4. 06	Tank contents	Main tank contents
2. 1. 4. 07	Speed	Driving speed
2. 1. 4. 08	Volume sprayed	Readouts for Volume sprayed in currently active register
2. 1. 4. 09	Area sprayed	Readouts for Area sprayed in currently active register
2. 1. 4. 10	Spray width	Spray width including end nozzle
2. 1. 4. 11	Pressure	Displays spray pressure if sensor is fitted
2. 1. 4. 12	Fan speed	Displays Twin fan speed if sensor is fitted
2. 1. 4. 13	Regulation valve angle	
2. 1. 4. 14	Pendulum lock status	Displays reading of pendulum lock sensor if fitted
2. 1. 4. 15	Pendulum unlock status	Displays reading of pendulum unlock sensor if fitted

Menu Number	Menu Name	Help Text in Display
2. 1. 4. 16	Dynamic centre position	Displays Dynamic centre position sensor if fitted
2. 1. 4. 17	Spray pump rev	Displays revolutions if sensor is fitted
2. 1. 4. 18	FlexCapacity Pump Rev	Displays revolutions of Flex Capacity pump Rev is fitted
2. 1. 4. 19	Extra sensor 2F	Readout from extra sensor 2 frequency
2. 1. 4. 20	Extra sensor 3A	Readout from extra sensor 3 analogue
2. 1. 4. 21	Extra sensor 4A	Readout from extra sensor 4 analogue
2. 1. 4. 22	Voltmeter	Displays system voltage. Useful when fault finding
2. 1. 4. 23	Agitation	Agitation valve opening
2. 1. 4. 24	RinseTank content	RinseTank calculated content
2. 1. 4. 25	Slant angle	Headland assist angle sensor
2. 1. 4. 26	Boom height	Headland assist height sensor
2. 1. 4. 27	Air pressure	Displays compressor air pressure if sensor is fitted
2. 1. 4. 28	Air slot angle	Displays air slot angle if TWIN functionality is configured.
2. 1. 4. 29	Pendulum angle	Pendulum angle sensor value
2. 1. 4. 30	Nozzle PWM Duty cycle	Average nozzle PWM Duty cycle If the PWM nozzle control system is installed
2. 1. 4. 31	Reserved	R R
2. 1. 4. 32	Crab Steer Offset	
2. 1. 4. 33	Nozzle size flow at 3 bar	Calculated nozzle flow at 3 bar
2. 1. 4. 34	Reserved	R R
2. 1. 4. 35	Hitch Angle	
2. 1. 4. 36	Linkage Angle	
2. 1. 4. 37	PF bus +	Voltage on PrimeFlow databus +
2. 1. 4. 38	PF bus -	Voltage on PrimeFlow databus -
2. 1. 5	Show ESC softkey to leave	ISOBUS terminal can have a separate ESC key or use an ESC softkey
2. 1. 5. 1	Show ESC as softkey	Choose this to show ESC key as softkey on ISOBUS terminal
2. 1. 5. 2	Do not show ESC as softkey	Choose this if ISOBUS terminal has a separate ESC key.
2. 1. 6	Show big lower left	
2. 1. 6. 1	Prog volume rate litre/ha	Shows Programmed volume rate Application rate litre per hectare
2. 1. 6. 2	Boom flow	Boom flow per minute sprayed out through the boom
2. 1. 6. 3	Time	Actual time
2. 1. 6. 4	Work rate ha/hour	Rate shown in hectare per hour or acre per hour
2. 1. 6. 5	Actual volume rate litre/ha	Actual rate in litre per hectare or gallon per acre
2. 1. 6. 6	Tank contents	Main tank contents
2. 1. 6. 7	Speed	Driving speed
2. 1. 6. 8	Volume sprayed	Readouts for Volume sprayed in currently active register
2. 1. 6. 9	Area sprayed	Readouts for Area sprayed in currently active register
2. 1. 7	Configure softkeys screen	
2. 1. 7. 1	10 or 12 SoftKeys on terminal	
2. 1. 7. 1. 1	Choose 10 SoftKeys on terminal	
2. 1. 7. 1. 2	Choose 12 SoftKeys on terminal	
2. 1. 7. 2	Boom hydraulics softKeys	
2. 1. 7. 2. 1	Show Slant Tilt Lift	
2. 1. 7. 2. 2	Hide Slant Tilt Lift	
2. 1. 7. 3	Individual Sections softkeys	
2. 1. 7. 3. 1	Show Individual Spray Sections	When no Grip and when used
2. 1. 7. 3. 2	Hide Individual Spray Sections	When no Grip and softkeys are never used
2. 1. 7. 3. 3	Hide Stepw. and Indiv Sections	When Grip is mounted
2. 1. 7. 4	Softkeys or classic view	
2. 1. 7. 4. 1	Show classic view	
2. 1. 7. 4. 2	Show Softkeys view	
2. 2	AUTO functions	AUTO functions
2. 2. 1	Reserved	Reserved Reserved Reserved
2. 2. 2	Dual Line	To set up lower and upper trigger limits for the operation of line A and line B
2. 2. 2. 1	Lower pressure level	Key in pressure level to switch Dual Line to smaller nozzles
2. 2. 2. 2	Upper pressure level	Key in pressure level to switch Dual Line to bigger nozzles

Menu Number	Menu Name	Help Text in Display
2. 2. 3	AutoAgitation select level	Powerful or soft no Agitation
2. 2. 3. 1	Agitation switch	Switch increase or decrease agitation
2. 2. 3. 2	Powerful AutoAgitation	Recommended for powder
2. 2. 3. 3	Soft AutoAgitation	Recommended for liquid chemical
2. 2. 3. 4	Fixed agitation	Valve is positioned
2. 2. 3. 5	No agitation	Never use if sedimentation occurs. Recommended for liquid fertilizer.
2. 2. 4	AutoAgitation fixed level	Key in position of agitation valve for FluidBox key and fixed level
2. 3	VRA / Remote control	Variable Rate Application by RS232 Auto Section Control
2. 3. 1	VRA / Remote control disable	Variable Rate Application / Remote control disabled. Dish icon disappears
2. 3. 2	VRA / AutoSection control	AutoSectionControl for EFC, ActiveAir,AutoSelect. For PF with no ANC or old terminal
2. 3. 3	VRA / AutoNozzle control	AutoNozzleControl for PrimeFlow with ANC option, SingleNozzleControl
2. 4	Select next UT in tractor	When tractor has 2 terminals select the next UT
2. 4. 1	Select next UT in tractor	When tractor has 2 terminals select the next UT
3	Calibration	Basic calibration ,e.g. speed, boom, regulation constant, tank and track
3. 1	Speed calibration	Sprayer, tractor, Alpha or radar speed input. Calibration of selected sensor
3. 1. 1	Sprayer speed	Speed sensor mounted on trailed sprayer Connected to armature junction box
3. 1. 1. 1	Sprayer speed constant	Shows and permits change to the constant, Pulses Per Unit (meter / feet)
3. 1. 1. 2	Sprayer speed practical	Preferred method. Do in field with spray tank half full for most accurate result
3. 1. 1. 2. 1	Sprayer practical	Measure up a distance more than 70 meters or 200 feet. Then drive distance
3. 1. 1. 2. 2	Sprayer practical	Now key in the exact distance, measured by a measuring tape
3. 1. 1. 2. 3	Sprayer practical	This is the new constant (pulses per meter or feet)
3. 1. 2	Speed from SmartCom or IsoBus	Choose sensor connected to SmartCom or via CanBus
3. 1. 2. 1	Speed Sensor or Radar	SmartCom pin input from sprayer wheel speed sensor or from tractor radar connector
3. 1. 2. 2	Speed via ISOBUS Groundbased	Speed via ISOBUS cable from GPS
3. 1. 2. 3	Speed via ISOBUS Wheelbased	Speed via ISOBUS cable from Tractor ECU
3. 2	Flow calibration	Flow sensor calibration. Theoretical (PPU), Nozzle Tank method PrimeFlow
3. 2. 1	PPU theory method	Use the PPU value on Flowmeter housing
3. 2. 2	Nozzle method	Practical flow calibration, by checking the actual nozzle output per minute
3. 2. 2. 1	Nozzle method	measure the flow per minute from a number of nozzles. Press Enter.
3. 2. 2. 2	Nozzle method	Key in the averaged actual flow value and press Enter
3. 2. 2. 3	Flow calibration	This is the PPU constant from the volume previously just measured
3. 2. 2. 4	Nozzle method	Open all sections
3. 2. 2. 5	Nozzle method	Close end nozzles, Bi-jet nozzles
3. 2. 3	Tank method	Practical flow calibration done by emptying over half the tank
3. 2. 3. 1	Tank method	The sprayed amount is counted up when the sections are opened
3. 2. 3. 2	Tank method	Press Enter. The shown volume is adjusted to match the actual volume
3. 3	Boom setup	Boom width, number of sections and number of nozzles for each section
3. 3. 1	Width	The total spray boom width. Include end nozzles if fitted
3. 3. 2	Number of sections	The number of spray boom sections. Keyin, then press Enter
3. 3. 3	Nozzles / sections	To set up no. of nozzles per section. Screens for each section will appear
3. 3. 3. 01	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 1
3. 3. 3. 02	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 2
3. 3. 3. 03	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 3
3. 3. 3. 04	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 4
3. 3. 3. 05	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 5
3. 3. 3. 06	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 6
3. 3. 3. 07	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 7
3. 3. 3. 08	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 8
3. 3. 3. 09	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 9
3. 3. 3. 10	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 10
3. 3. 3. 11	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 11

Menu Number	Menu Name	Help Text in Display
3. 3. 3. 12	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 12
3. 3. 3. 13	Nozzles / sections	Use arrow keys or numeric keys, then press Enter to set up section 13
3. 3. 4	Slant Burst setup	Setup and test Slant Burst
3. 3. 4. 1	Burst Control Threshold	Use numeric keys to set the desired threshold value in degrees
3. 3. 4. 2	Burst Time	Use numeric keys to insert pulse time in milliseconds
3. 3. 4. 3	Burst Delay	Use numeric keys to insert time of delay between pulses in milliseconds
3. 3. 5	Length hitch to axle for ASC	Length from hitch to axle on sprayer for AutoSection Control for ISOBUS
3. 3. 6	Length axle to boom for ASC	Length from axle on sprayer to boom for AutoSection Control for ISOBUS
3. 3. 7	Boom angle sensors calibration	Boom wings Tilt, Inner, Outer1, Outer2 sensors offset and gain calibration
3. 3. 7. 1	Wing Tilt sensor calibration	Wing Tilt sensor offset calibration
3. 3. 7. 1. 1	Boom Wings Tilt angle values	Put the wings in the highest position and press Enter
3. 3. 7. 2	Wing Fold sensor calibration	Wing Fold sensor offset and slope calibration
3. 3. 7. 2. 1	Boom Fold angle values	When Boom is folded press Enter
3. 3. 7. 3	Lift angle sensor calibration	Boom Lift sensor lower position calibration
3. 3. 7. 3. 1	Lift sensor calibration fault	Boom Lift sensor calibration fault. Please check the sensor
3. 4	Regulation user setup	Setup of pressure filter, nozzle, ASC default
3. 4. 1	Flow sensor restriction	Flow to obtain 1 bar pressure drop over pressure filter and flow sensor
3. 4. 2	Simulated speed value	Type in speed for priming at stand still and when both flow and pressure are defect
3. 4. 3	Nozzle size flow at 3 bar	Nozzle output l/min
3. 4. 4	Dual line second nozzle	0075Pink = 0.3; 02Yellow = 0.8 04Red = 1.6; 08White = 3.2 l/min
3. 4. 5	Type of nozzle	Select Regular or QuintaStream nozzle
3. 4. 5. 1	Regular nozzle	Flat fan, Low drift, Minidrift
3. 4. 5. 2	QuintaStream	QuintaStream fertiliser nozzle
3. 4. 6	ASC map headland gap	ASC map headland gap display setup
3. 4. 6. 1	HARDI/AgLeader displays	HC 8500, HC9500, Versa, Integra, HC 8600, HC 9600, InCommand
3. 4. 6. 2	3rd party ISO displays	John Deere, TopCon, ME (including HC7500), Trimble and other
3. 4. 7	Limit for sim speed value	Type in limit for simulated speed value
3. 4. 8	ASC Prepared Boom Width	When using autosection control valve will be prepared for th is width
3. 5	Tank gauge calibration	Setup density of chemical or fertilizer. Calibration for tank size and shape
3. 5. 1	Adjustment of specific gravity	Enter weight of liquid fertilizer divided by weight of water (e.g. 1.10 to 1.30)
3. 5. 2	Calibration of Tank gauge	Calibrate if factory calibration is not adequate. Disable SafeTrack
3. 5. 2. 1	Water level	Fill up the tank to the max level, then press Enter
3. 5. 2. 2	Water level	Level the sprayer, then press Enter
3. 5. 2. 3	Water level	Empty sprayer through main flow meter at boom. Computer will register flow
3. 5. 2. 4	Calibration of Tank gauge	Key in true volume from flowmeter. Computer will calculate table
3. 5. 3	Select factory calibration	Select preloaded factory calibration for Hardi tanks or custom calibration
3. 5. 3. 1	Custom calibration of gauge	Tank gauge table from custom Calibration
3. 5. 3. 2	Factory calibration	Factory tank gauge table
3. 5. 4	Offset at empty MainTank	Actual frequency. Accept if empty. Or keyin recorded empty-frequency
3. 6	Track calibration	Track width, tractor drawbar length, damping, alignment, sensitivity set up
3. 6. 1	Track width	Track width of the sprayer wheels measured center to center
3. 6. 2	Tractor drawbar	Measure the length from tractor rear axle to drawbar connection
3. 6. 3	Dead zone for regulation	Min value 0 cm and max value 20 cm.
3. 6. 4	Track sensitivity	Control the track sensitivity
3. 6. 4. 1	Accurate	
3. 6. 4. 2	Comfort	
3. 6. 5	Hitch sensor calibration	
3. 6. 5. 1	Hitch sensor calibration	Center Sprayer and drive straigth for at least 50m
3. 6. 5. 2	Hitch sensor calibration	Angle has to stay in between +-2, adjust chains if out of range
3. 6. 5. 3	Hitch sensor calibration	Calibration successful
3. 6. 6	Safety Factor	Increasing this value increases the safety. With 100% best safety is achieved.
3. 6. 7	End-stop Calibration	
3. 6. 7. 1	End-stop Calibration	Set wheelsteer end stop position manually

Menu Number	Menu Name	Help Text in Display
3. 6. 7. 2	End-stop Calibration	Angle must have at least 15 degree (+/-)
3. 6. 7. 3	End-stop Calibration	Calibration successful
3. 6. 8	Disable align while reverting	
3. 6. 8. 1	Alignment enabled	
3. 6. 8. 2	Alignment disabled	
3. 6. 9	Crab Steer Sensitivity	
3. 6. 9. 1	Soft	
3. 6. 9. 2	Medium	
3. 6. 9. 3	Hard	

4	Toolbox	Helpful tools e.g. measure distance and area, service intervals, test etc
4. 1	Service interval: Hours until	Work hours remaining for each part until next service is recommended
4. 1. 1	10 hrs Check filters	
4. 1. 2	10 hrs Check nozzles	
4. 1. 3	50hrs Grease points	
4. 1. 4	100hrs Tighten bolts	
4. 1. 5	250hrs Misc. check	
4. 2	Service interval reset	Reset timer counter when service has been carried out
4. 2. 1	Check filters reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 2. 2	Check nozzle reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 2. 3	Grease points reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 2. 4	Tighten bolts reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 2. 5	Misc. check reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 3	Test Menu	Test of components
4. 3. 1	Flow Speed Optional sensors	Activate function to monitor sensor (e.g. drive forwards, start flow)
4. 3. 2	Active keys	Push key to see if a count is registered. If yes, the key or switch function is OK
4. 3. 3	PrimeFlow test	PrimeFlow test for nozzles and PrimeFlow computers on boom
4. 3. 3. 1	PrimeFlow computer status	Press Arrow DOWN to see next SMCU Arrow UP to see previous
4. 3. 4	Input test	See computer readings of sensors Frequency, switch, analogue inputs
4. 3. 4. 1	Boom diag	
4. 3. 4. 1. 1	Dummy text UK & US	
4. 3. 4. 1. 2	Dummy text UK & US	
4. 3. 4. 1. 3	Dummy text UK & US	
4. 3. 4. 1. 4	Dummy text UK & US	
4. 3. 4. 1. 5	Dummy text UK & US	
4. 3. 4. 1. 6	Dummy text UK & US	
4. 3. 4. 2	Tank diag 1	
4. 3. 4. 2. 1	Dummy text UK & US	
4. 3. 4. 2. 2	Dummy text UK & US	
4. 3. 4. 2. 3	Dummy text UK & US	
4. 3. 4. 2. 4	Dummy text UK & US	
4. 3. 4. 3	Tank diag 2	
4. 3. 4. 3. 1	Dummy text UK & US	
4. 3. 4. 3. 2	Dummy text UK & US	
4. 3. 4. 3. 3	Dummy text UK & US	
4. 3. 4. 4	PrimeFlow cable diag	
4. 3. 5	Fluid and valve test	Test of regulation and electric valves
4. 3. 5. 1	Regulation sensors	Details for regulation sensor inputs Boom pressure Flow Pump RPM
4. 3. 5. 1. 1	Boom pressure	
4. 3. 5. 1. 2	Boom flow sensor	
4. 3. 5. 1. 3	Pump RPM	
4. 3. 5. 1. 4	FlexCapacity RPM	
4. 3. 5. 1. 5	Reg. valve sensor	
4. 3. 5. 1. 6	Agt. valve sensor	
4. 3. 5. 1. 7	Reg. duty cycle	
4. 3. 5. 1. 8	Speed	

Menu Number	Menu Name	Help Text in Display
4. 3. 5. 1. 9	Regulator state	
4. 3. 5. 2	Flow calculations	Check flow calculations are realistic with current settings of sprayer
4. 3. 5. 2. 1	Boom pressure	
4. 3. 5. 2. 2	Agitation calc press	
4. 3. 5. 2. 3	Pump calc flow	
4. 3. 5. 2. 4	Agit valve calc flow	
4. 3. 5. 2. 5	Reg valve calc flow	
4. 3. 5. 2. 6	Boom flow sensor	
4. 3. 5. 2. 7	Nozzle SizeQ 3 bar A	
4. 3. 5. 2. 8	Nozzle SizeQ 3 bar B	
4. 3. 5. 2. 9	Nozzle SizeQ 3 bar AB	
4. 3. 5. 3	Extra reg. diagnose	Saritor hydraulic valve
4. 3. 5. 3. 1	Hydr. valve offset	
4. 3. 5. 3. 2	Hydr. valve slope	
4. 3. 5. 3. 3	Hydr. valve hysteres	
4. 3. 6	PrimeFlow SMCU status	See nozzle position, nozzle order, counts of data error power error
4. 3. 6. 1	Reserved	
4. 3. 6. 2	Reserved	
4. 3. 6. 3	Nozzle order	Show - when connected in normal order Short Medium Long from left
4. 3. 6. 4	Reserved	
4. 3. 6. 5	Reserved	
4. 3. 6. 6	Reserved	
4. 3. 7	PrimeFlow motor status	
4. 3. 8	Track service menu	
4. 3. 8. 1	Track sensor test	Actual sensor signals Under 0.5 volts means not connected
4. 3. 8. 1. 1	Hitch angle actual	
4. 3. 8. 1. 2	Linkage angle actual	
4. 3. 8. 1. 3	Reserved	
4. 3. 8. 1. 4	Reserved	
4. 3. 8. 1. 5	Rollover risk	
4. 3. 8. 1. 6	Rollover risk max	
4. 3. 9	Boom test	
4. 3. 9. 1	Boom angle sensors 1	Current values of Tilt, Inners, Outer-1 and Outer-2 angle sensors
4. 3. 9. 1. 1	Tilt left	
4. 3. 9. 1. 2	Tilt right	
4. 3. 9. 1. 3	Left inner	
4. 3. 9. 1. 4	Right inner	
4. 3. 9. 1. 5	Left outer 1	
4. 3. 9. 1. 6	Right outer 1	
4. 3. 9. 1. 7	Left outer 2	
4. 3. 9. 1. 8	Right outer 2	
4. 3. 9. 2	Boom angle sensors 2	Current values of Tilt, Outer-3 and Outer-4 angle sensors
4. 3. 9. 1. 5	Left outer 3	
4. 3. 9. 1. 6	Right outer 3	
4. 3. 9. 1. 7	Left outer 4	
4. 3. 9. 1. 8	Right outer 4	
4. 4	Speed simulation	Key in speed value. To disable simulation keyin 0 or power off
4. 5	Emergency Mode	Emergency operation for boom, track and spray system.
4. 5. 1	Boom in emergency limp home	
4. 5. 1. 1	Normal, protection enabled	
4. 5. 1. 2	Limp home, protection disabled	
4. 5. 2	Tank in emergency limp home	
4. 5. 2. 1	Normal, protection enabled	
4. 5. 2. 2	Limp home, protection disabled	
4. 5. 3	Track in emergency limp home	

Menu Number	Menu Name	Help Text in Display
4. 5. 3. 1	Normal, protection enabled	
4. 5. 3. 2	Limp home, protection disabled	
4. 5. 4	Fold in emergency limp home	
4. 5. 4. 1	Outer4	Press Fold button to fold then Enter to approve joint folded state one by one
4. 5. 4. 2	Outer3	
4. 5. 4. 3	Outer2	
4. 5. 4. 4	Outer1	
4. 5. 4. 5	Inner	
4. 5. 5	Unfold in emergency limp home	
4. 5. 5. 1	Inner	Press Unfold button to unfold then Enter to approve joint unfolded state one by one
4. 5. 5. 2	Outer1	
4. 5. 5. 3	Outer2	
4. 5. 5. 4	Outer3	
4. 5. 5. 5	Outer4	
4. 5. 6	Spray in emergency limp home	
4. 5. 6. 1	Normal, protection enabled	
4. 5. 6. 2	Limp home, protection disabled	
4. 6	PrimeFlow setup	Setup and test SMCU's
4. 6. 1	Test Nozzle positions	Each nozzle is open for 2 sec. Check that sequence does not jump
4. 6. 1. 1	Test Nozzle positions	Each nozzle is open for 2 sec. Check that sequence does not jump
4. 6. 1. 2	Test Nozzle positions	Each nozzle is open for 2 sec. Check that sequence does not jump
4. 6. 2	Assign nozzle position to SMCU	Assign nozzle position
4. 6. 2. 1	Prepare cables for assign	Connect all SMCU's for assigning nozzle position.Then press enter.
4. 6. 2. 2	Nozzle position assigned	At counter stop, check nozzle no. and use magnet to assign SMCU. Press enter at finish.
4. 6. 3	Reset nozzle position in SMCU	
4. 6. 3. 1	Confirm reset of SMCU's	
4. 6. 3. 2	Resetting SCMU	
4. 6. 4	Reserved	
4. 6. 5	Reserved	
4. 6. 6	Change Nozzle Order	
4. 6. 6. 1	Change Nozzle Order	Key in SMCU number for change of nozzle order
4. 6. 6. 2	3 nozzle SMCU standard	
4. 6. 6. 2. 1	Cables Short-Medium-Long	
4. 6. 6. 2. 2	Cables Long-Medium-Short	
4. 6. 6. 2. 3	Cables Medium-Short-Long	
4. 6. 6. 2. 4	Cables Long-Short-Medium	
4. 6. 6. 2	2 nozzle SMCU standard	
4. 6. 6. 2. 1	Cables Short-Medium	
4. 6. 6. 2. 2	Cables Medium-Short	
5	Save to fileserver	Data records of registers or configuration for print or dump
5. 1	Print	Register and configuration can be printed to the 12 volt printer
5. 1. 1	Print all registers	Registers in use will be printed. Print starts upon key press on Enter
5. 1. 1	Print all registers	Bytes printed at 9600 8-N-1 baud Press ESC to cancel

3 - Description

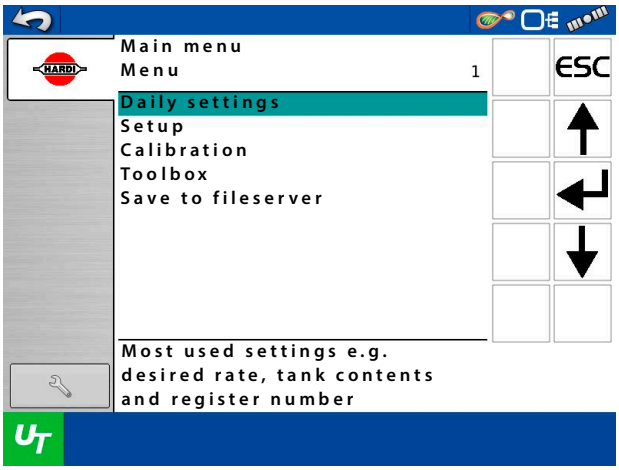
Main Menu

General Info

When selecting 

on the Main HARDI UT, you will enter the Main Menu. From here you can enter following menus:

1. Daily settings (see "Menu 1 Daily Settings" on page 51)
2. Setup (see "Menu 2 Setup" on page 52)
3. Calibration (see "Menu 3 Calibration" on page 58)
4. Toolbox (see "Menu 4 Toolbox" on page 76)
5. Save to fileserver (see "Menu 5 Save to fileserver" on page 84)



Menu 1 Daily Settings

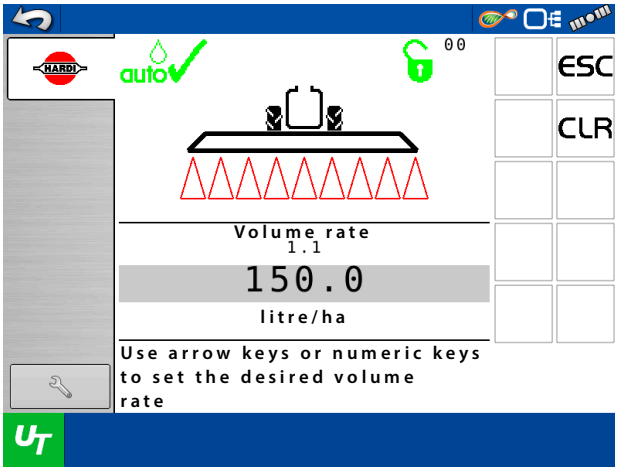
General Info

This menu presents the most used settings, such as desired rate, tank contents and register number.

Menu 1.1 Volume rate

Volume rate, also called application rate, is the volume of fluid, which passes through the nozzles per area unit. The volume rate unit is litres per hectare.

Find description of volume rate in "Volume Rate Read and Change" on page 120.



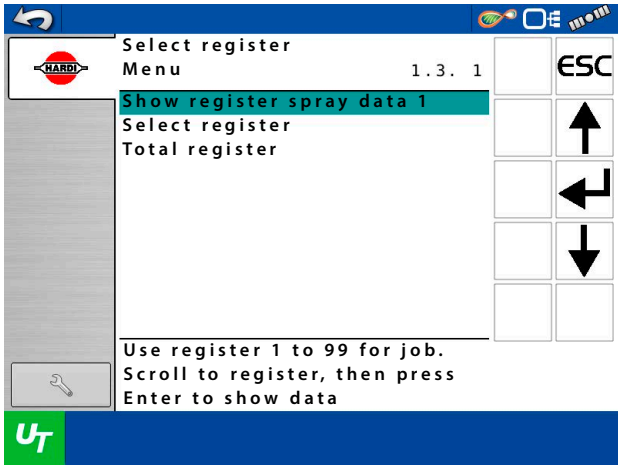
Menu 1.2 Reserved

Menu not used.

Menu 1.3 Select register

- Menu 1.3.1: View current working register data in two submenus. Press ↵ to jump between the submenu.
- Menu 1.3.2: Select working register.
- Menu 1.3.1: View total register data in two submenus. Press ↵ to jump between the submenu.

NOTE! The active register number is always visible in the right upper corner of the UT window.



Menu 1.4 Volume rate: Preset high

Menu not used.

Menu 1.5 Volume rate: Preset low

Menu not used.

Menu 2 Setup

General Info

In this menu, you can customize display, automatic functions, clock, alarms and registers.

NOTE! The following menu explanations assume you have mastered the general keystrokes, and you can "find your way" to the specific menu. If this is not so, please re-read section "General Keystrokes" on page 20.

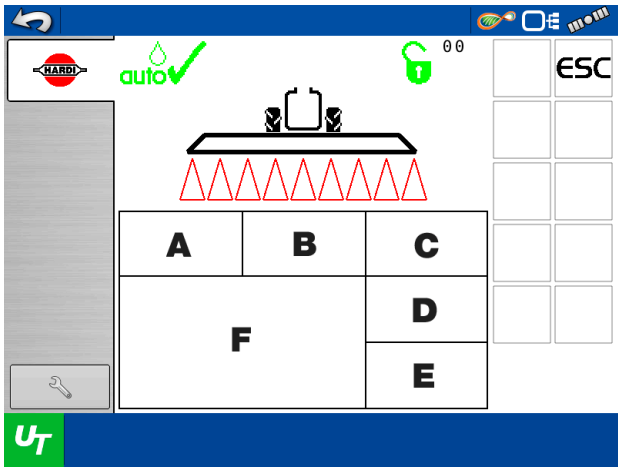
Menu 2.1 Display readout

The work screen window has six different informational readouts. There is free choice on which functions to show in these windows on the display.

For a full list of possible readouts, please refer to the following menus in "Full Menu Structure" on page 41:

Possible Readouts

A	Always show the actual volume rate.
B	Set readout in menu 2.1.1 [Show upper middle]
C	Set readout in menu 2.1.2 [Show upper right]
D	Set readout in menu 2.1.3 [Show lower middle]
E	Set readout in menu 2.1.4 [Show lower right]
F	Set readout in menu 2.1.6 [Show big lower left]



NOTE! The readout in the large window (F) is possible to change to another readout by pressing one of the pre-set keys.

However, this readout will change back to show the readout selected in menu 2.1.6 [Show big lower left], when the controller is rebooted.

NOTE! As some readouts need extra sensors, it is necessary to connect the relevant sensor to get a readout.

Menu 2.1.5 Show ESC softkey to leave

In menu 2.1.5 it can be selected how the ESC key is operated.

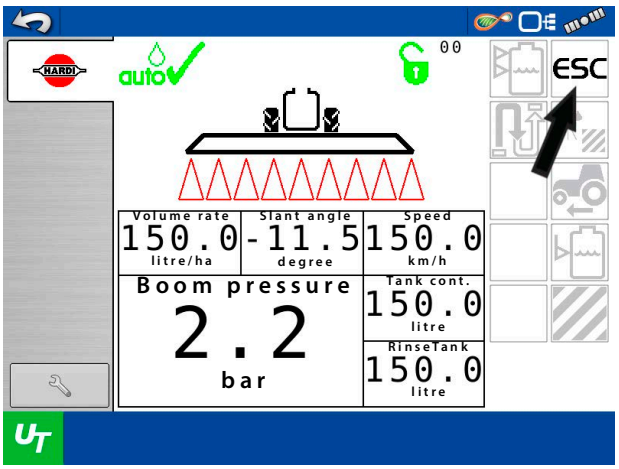
- Menu 2.1.5.1:

  Select this menu if there is no ESC button on the ISOBUS Terminal.

- Menu 2.1.5.2:

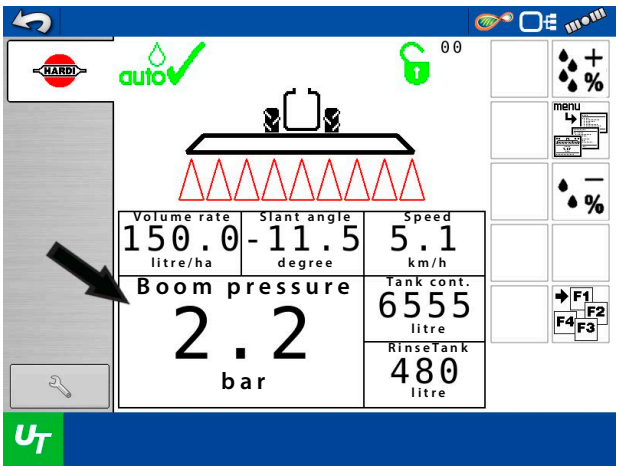
  Select this menu if the ISOBUS Terminal has a physical ESC button.

ATTENTION! Do only select menu 2.1.5.2 if the ISOBUS Terminal has a physical ESC button!



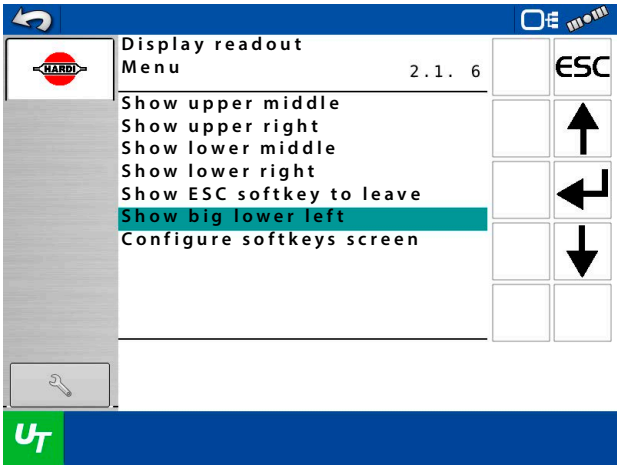
Menu 2.1.6 Show big lower left

The lower left corner of the display has selectable readouts to show.



Go to menu [2.1.6 Show big lower left] and select either of the submenus for desired display readout:

- Menu [2.1.6.1 Prog volume rate litre/ha].
- Menu [2.1.6.2 Boom flow].
- Menu [2.1.6.3 Time].
- Menu [2.1.6.4 Work rate ha/hour].
- Menu [2.1.6.5 Actual volume rate litre/ha].
- Menu [2.1.6.6 Tank contents].
- Menu [2.1.6.7 Speed].
- Menu [2.1.6.8 Volume sprayed].
- Menu [2.1.6.9 Area sprayed].



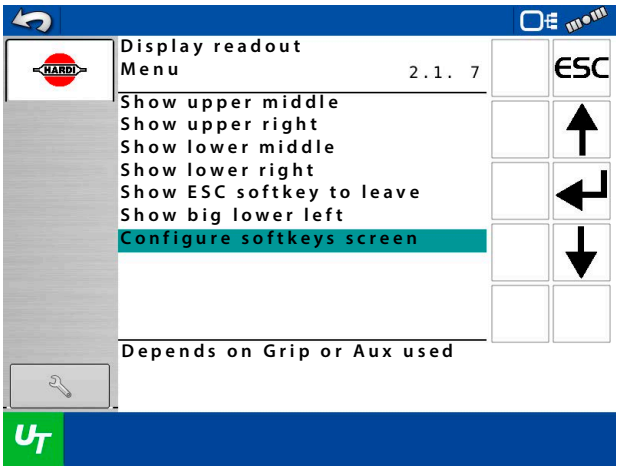
Menu 2.1.7 Configure softkeys screen

This menu is only applicable when softkey functions enabled.

Refer to "On-screen Softkey Functions" on page 86 for setup.

Configure the softkey screens in the submenus:

- Menu [2.1.7.1 10 or 12 SoftKeys on terminal].
- Menu [2.1.7.2 Boom hydraulics softkeys].
- Menu [2.1.7.3 Individual Section softKeys].
- Menu [2.1.7.4 Softkeys or classic view].



Menu 2.2 Auto functions (EU)

In this menu, several automatic functions can be set up for specific use. For explanation of the automatic functions, please refer to "Functions" on page 27.

Menu 2.2.1 Reserved

Menu not used.

The Controller can be set to operate the HARDI Foam marker automatically through the main ON/OFF valve. When the main ON/OFF is ON, it will automatically start the Foam marker.

Furthermore, the Foam marker can be set for up and back spraying or race-track (round and round) spraying.

Possible settings are:

Setting	Activity
Disable	The marker will only follow the setting of the switch on the SetBox.
Same side	The Terminal will automatically activate the same side for race-track spraying.
Change side	The Terminal will automatically change side for up and back spraying.

Menu 2.2.2 Dual Line (optional)

This function, also known as AutoSelect, is a sprayer fitted with 2 sets of boom lines this function can be used to ensure volume rate and droplet size is maintained during large changes to forward speed.

The boom lines are pronounced A (front boom lines) and B (rear boom lines).

System Options

2 step: A to B

3 step: A to B to A&B

Menu 2.2.2.1 Lower pressure level

Select the lower limit here. Key in pressure level to switch AutoSelect to smaller nozzles.

Menu 2.2.2.2 Upper pressure level

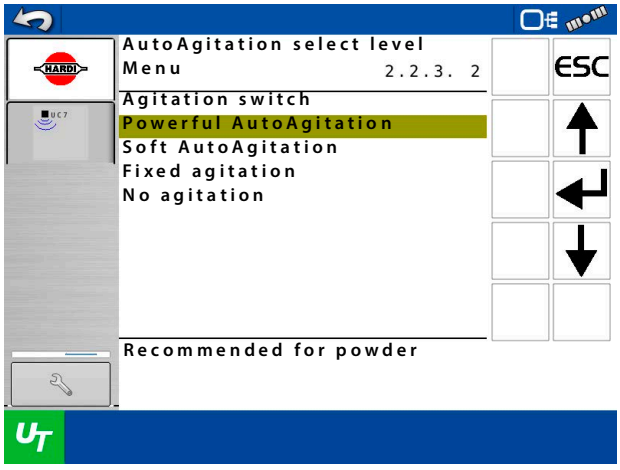
Select the upper limit here. Key in pressure level to switch AutoSelect to bigger nozzles.

ATTENTION! Note this menu only show up if enabled in the software.

Menu 2.2.3 AutoAgitation select level (optional)

This menu set the level of agitation when spraying. Select one of the submenus, for the level of agitation:

Menu	Function
2.2.3.1	Powerful AutoAgitation.
2.2.3.2	Soft AutoAgitation.
2.2.3.3	No agitation.
2.2.3.4	Fixed agitation.
2.2.3.5	Agitation switch.



ATTENTION! When spraying, the setting in this menu overrides a "No agitation" setting on the FluidBox.

NOTE! For fixed agitation, the level is set in Menu [2.2.4 AutoAgitation fixed level].

Menu 2.2.4 AutoAgitation fixed level

Key in the percentage value corresponding to position of agitation valve for fixed agitation level. Percentage range is 0% (closed) to 100% (wide open).

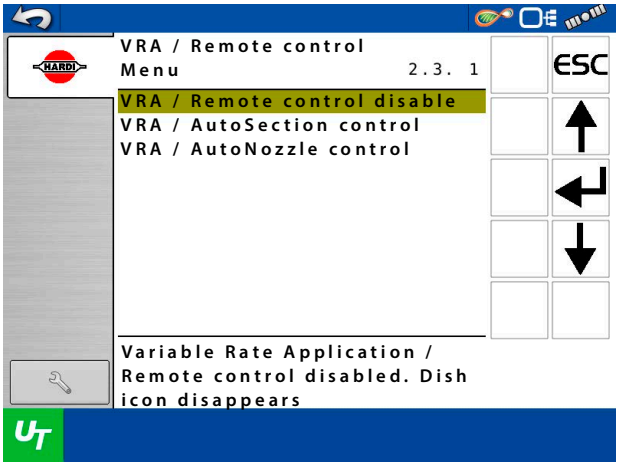
This setting should be done when Menu [2.2.3.4 Fixed agitation] is selected.

Menu 2.3 Variable Rate Application (VRA) / Remote / AutoSectionControl

If the volume rate comes from an external source (e.g. a site-specific application map, remote sensor or a GPS system like AutoSectionControl), then enable VRA.

Select one of the submenus to enable or disable:

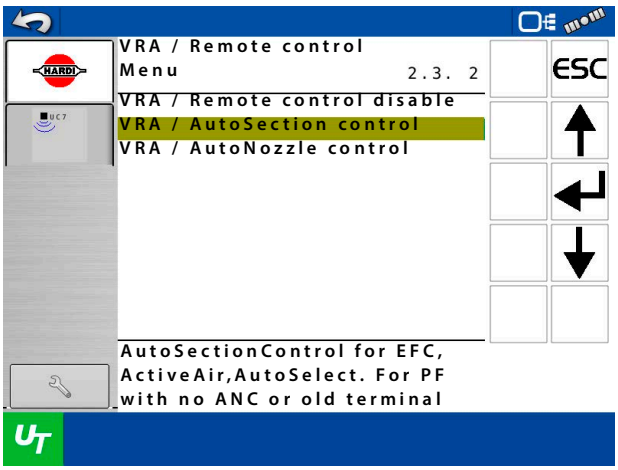
Selecting menu 2.3.1 disables the VRA/Remote control facility.



Selecting menu 2.3.2 enables the VRA/AutoSectionControl facility.

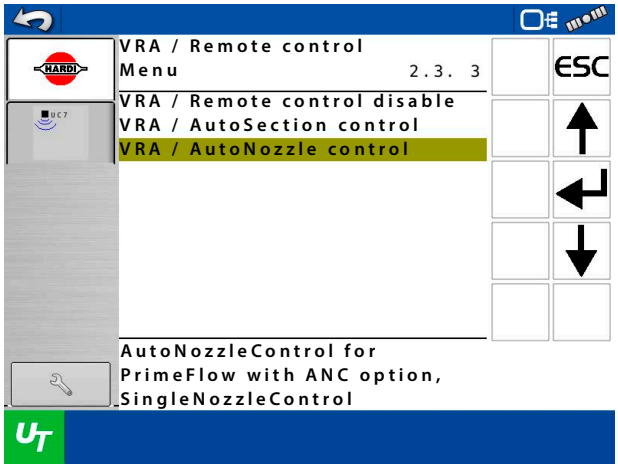
Use this for sprayers equipped with either:

- EFC
- ActiveAir.
- AutoSelect.
- PrimeFlow sprayers without single nozzle control.

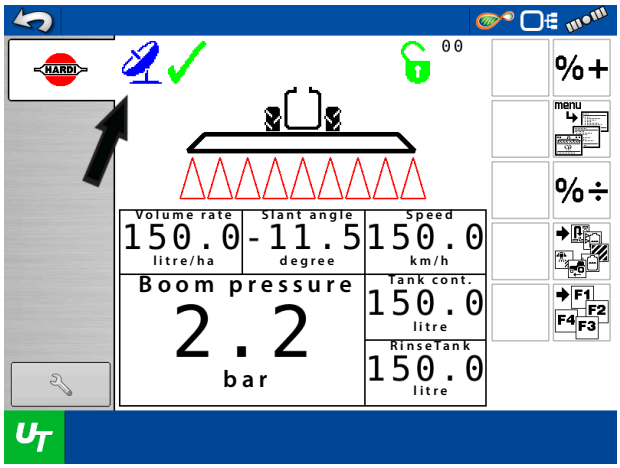


Selecting menu 2.3.3 enables the VRA/AutoNozzleControl facility.

This enables use with sprayers having PrimeFlow and single nozzle control.



When enabled, the symbol is visible on the 1st line in the display. Manual pressure regulation and stepped over/under application is still possible.



Menu 2.4 Select next UT in tractor

If connecting the SmartCom controller to a tractor with multiple terminals, it is possible to move the Hardi UT from one to terminal to another.

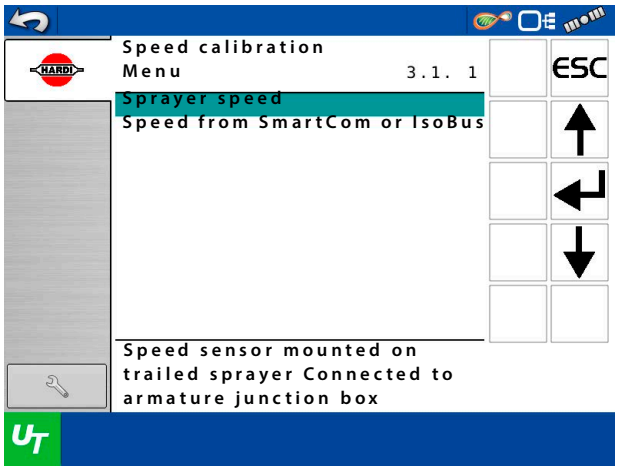
Menu 3 Calibration

General Info

In this menu, you access basic calibration such as speed, boom, regulation, tank and track.

Menu 3.1 Speed calibration

The calibration process is the same for each sensor type. In the following example a "speed sensor on sprayer" (Menu 3.1.1 Sprayer) is used.



Navigating the Menu

1. From menu [3 Calibration] the menu [3.1 Speed calibration] should be selected.
2. Select one of the following menus corresponding to desired speed sensor:

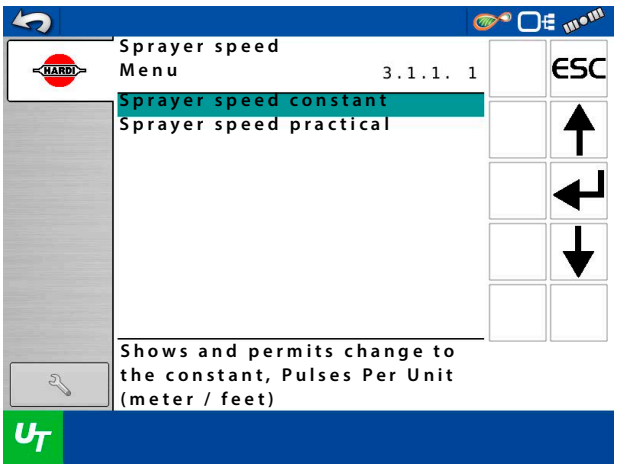
Menu	Function	Sensor Type
3.1.1	Sprayer speed	Speed sensor on sprayer.
3.1.2	Choose speed source	Other kind of speed sensor available.

3. The last confirmed sensor is the active speed sensor.
4. Depending on the selection, the following can be selected in the submenus:
   A. Sprayer speed:
      Menu [3.1.1.1 Sprayer speed constant]
      Menu [3.1.1.2 Sprayer speed practical]
   B. Chose speed source:
      Menu [3.1.2.1 Speed Sensor or Radar]
      Menu [3.1.2.2 Speed via ISOBUS]
3. Depending on the choice of submenu, see description below.

It is possible to calibrate the speed sensor in different ways. By entering a theoretical speed constant or by doing a practical calibration.

Menu 3.1.1 Sprayer speed

Select Calibration Method in the two submenus.



Menu	Function
3.1.1.1	Sprayer speed constant
3.1.1.2	Sprayer speed practical

The procedure of each menu is described in the below parts.

The speed sensor can be calibrated theoretically (See "Menu 3.1.1.1 Sprayer speed constant" on page 59.) or practically (See "Menu 3.1.1.2 Sprayer speed practical" on page 59.).

NOTE! Recommended is to use the practical method.

Menu 3.1.1.1 Sprayer speed constant

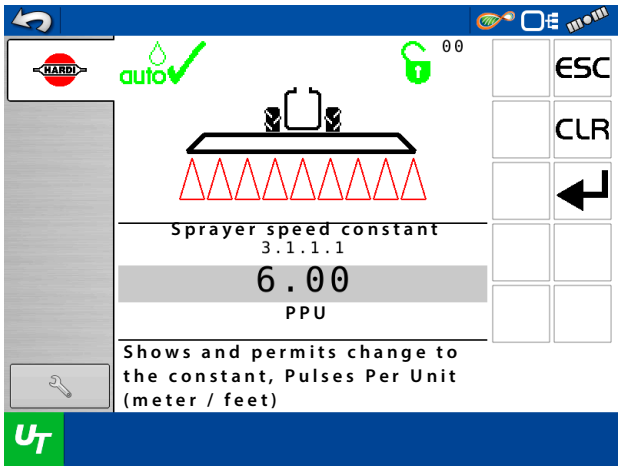
The theoretical speed constant, called PPU (pulses per unit), is the number of times the speed sensor record holes (or protrusions/magnets) in the speed sensor ring, per metre driven.

If necessary, calculate this as follows:

$$PPU = \frac{\text{Number of holes}}{\text{Tyre circumference in metres}}$$

NOTE! Recommended is to use the practical method, described below in menu [3.1.1.2 Sprayer speed practical].

As a guideline, PPU with commonly used tyres and the standard speed ring (36 holes) on HARDI sprayers are:



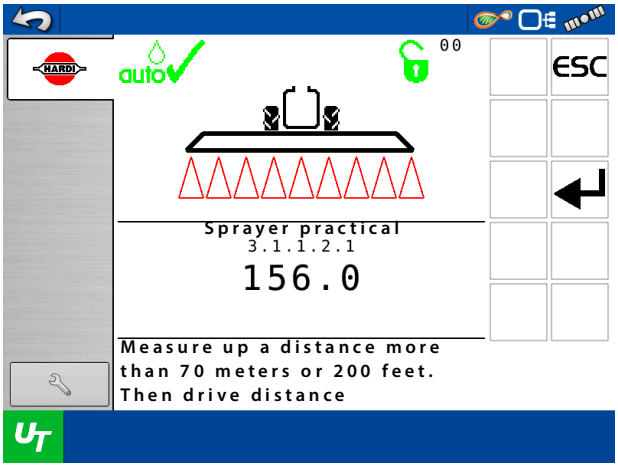
Tyre Size	PPU
230/95R48 (11.2x48)	6.919
300/95R46 (12.4x46)	6.592
300/95R52 (12.4x52)	6.060
340/85R48 (13.6x48)	6.376
467/80R38 (18.4x38)	6.692
528/80R38 (20.8x38)	6.331
650/65R42 (26x42)	5.994

Menu 3.1.1.2 Sprayer speed practical

Do the practical calibration of speed by driving a measured distance, then correcting the display readout so that the actual and the calculated distances are the same.

NOTE! The calibration should take place in the field with a half-full tank. Also, apply normal working tyre pressure in order to obtain the wheel's real "working radius".

ATTENTION! Changing tyres will require a new calibration!



Method

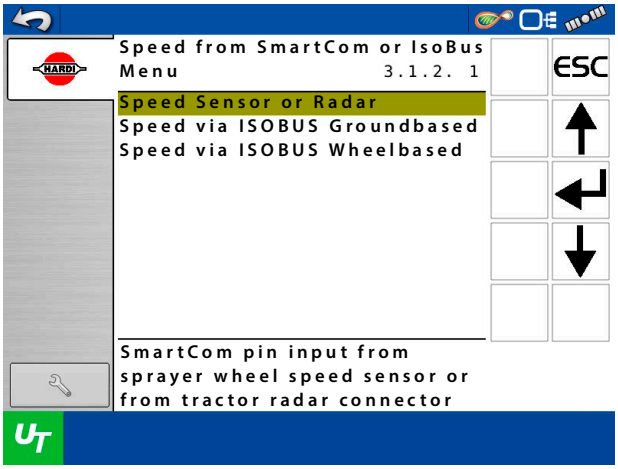
1. Measure a distance not less than 70 metres.
2. Park the tractor at the start of the measured distance.
3. Press ↵. When the display read "zero distance [0 m]".
4. Drive the distance.
5. Press ↵.
6. Correct the distance shown on the display to read the actual distance driven.
7. Press ↵ to see the new calculated value.
8. Press ↵ again to accept the value.

Menu 3.1.2 Choose speed source

The SmartCom controller can receive a speed input from other sources than the sprayer fitted wheel sensor, which for natural reasons is only present on trailed sprayers.

Therefore, the sprayer can receive a speed input from the following sources:

Menu	Menu Name	Receives input from
3.1.2.1	Speed Sensor or Radar	Wheel speed sensor or from the tractor radar connector.
3.1.2.2	Speed via ISOBUS Groundbased	ISOBUS cable coming from a GPS receiver.
3.1.2.3	Speed via ISOBUS Wheelbased	ISOBUS cable coming from the tractor ECU.



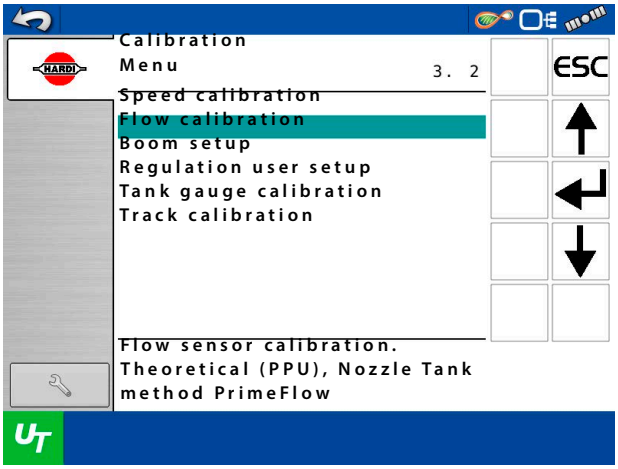
Menu 3.2 Flow calibration

Calibrate the flow transducer theoretically or calibrate with clean water by using one of the two practical methods.

The theory method is preferred. However, use the practical methods in the case that inaccuracies may occur:

Method	Calibration Time	Accuracy
Theory method	Short	Accurate
Tank method	Time consuming	Accurate
Nozzle method	Short	Less accurate

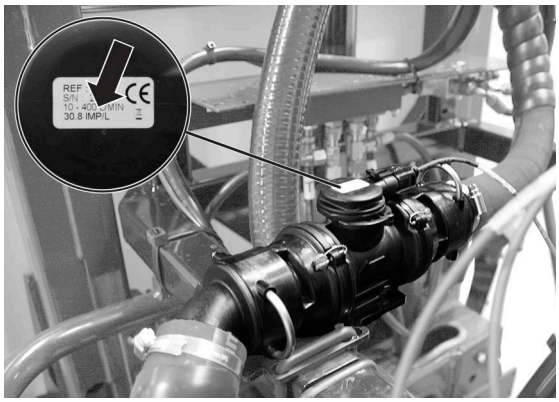
ATTENTION! Recommended is to check the calibration at least once during the spraying season. Use the chart at the back of the book to record the values.



Menu 3.2.1 PPU theory method

1. Preferred method is to read the PPU value on the flow housing.

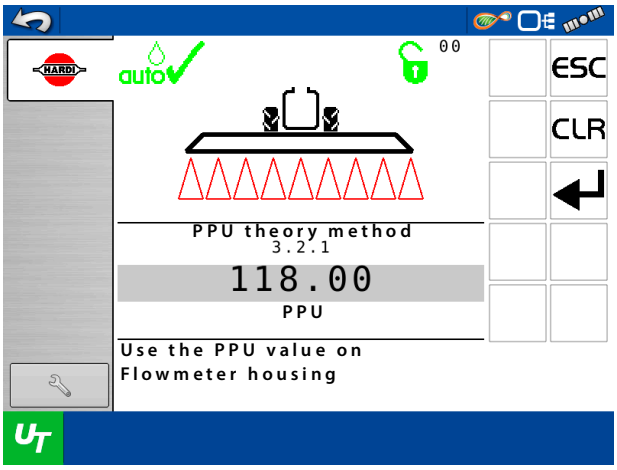
   The picture shows the location where the PPU value stamped into the flow housing.



ATTENTION! Each flow sensor calibrated with a specific PPU value. Therefore, no general PPU values given.

ATTENTION! PPU indicates the number of pulses, which theoretically come from the flow transducer whilst 1 litre of liquid passes through.

2. Enter the PPU value into menu 3.2.1 to change the theoretical flow constant.



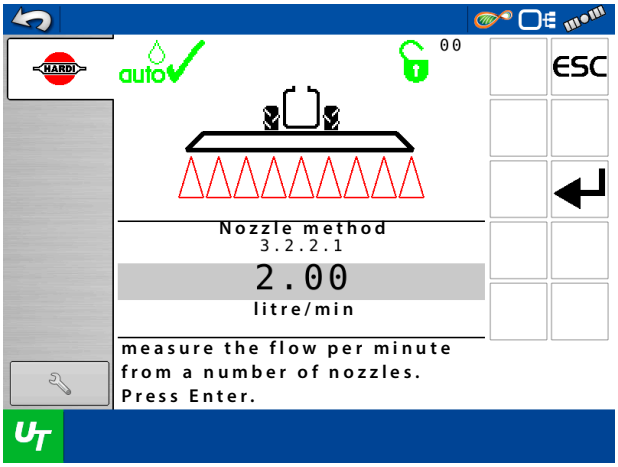
Menu 3.2.2 Nozzle method

Compares the individual nozzle output on the display to the actual individual nozzle output. Correct the output displayed to read the actual output.

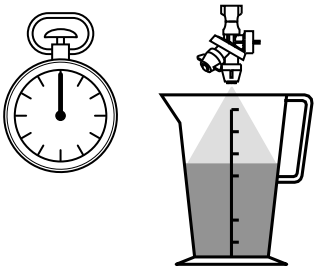
Method

1. Open all boom sections. Switch the main ON/OFF to ON. Close End Nozzles and Edge nozzles (if fitted).
2. Go to menu [3.2.2 Nozzle method].
3. Press ↵. The display will then show the individual nozzle output per minute.

ATTENTION! If a section not opened or an End Nozzle/Edge Nozzle is not closed, a warning will show up in the largest window on the display.



4. Using a HARDI calibration jug, check the actual nozzle output per minute. Recommended is that an average of several nozzles be taken.
5. Press ↵.
6. Correct the output shown on the display to read the average output measured with the calibration jug.
7. Press ↵ to see the new value.
8. Press ↵ again to accept the value.

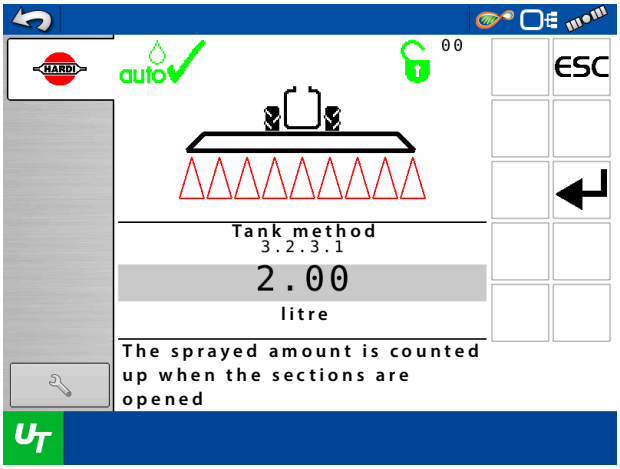


Menu 3.2.3 Tank method

Partly empty the tank through the nozzles while the display calculates the quantity emptied based on the actual calibration value (PPU). Correct the quantity displayed to read the quantity sprayed out.

Correct quantity measured by an external flowmeter fitted or by weight difference before and after.

NOTE! To obtain a high level of accuracy, it is not advisable to use the MainTank scale tube for this purpose.

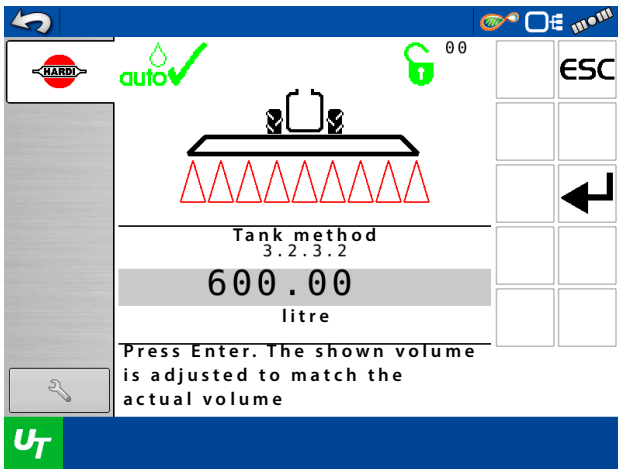


Method

1. Fill the sprayer with a known amount of water, e.g. 1000 litres.

   Recommended is to use an external calibrated flowmeter or to weight the sprayer before and after filling in order to get an exact value.

2. Open all the boom sections.
3. Go to menu [3.2.3.1 Tank method], press ↵ and switch the main ON/OFF to ON.
4. The display unit will then begin to count the volume emptied through the nozzles.
5. When for example, 600 litres emptied out, then switch the main ON/OFF to OFF.
6. Weight the sprayer again to get the exact volume sprayed out.



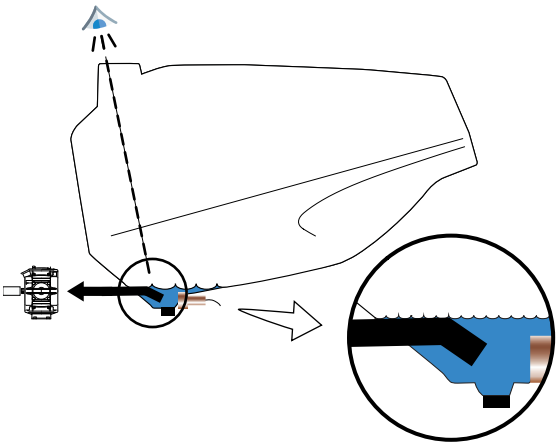
If calibrated, use the TankGauge for the tank contents readout by pressing ■ .

ATTENTION! It is of great importance not to run the tank empty as air will enter the flowmeter, causing inaccuracy.

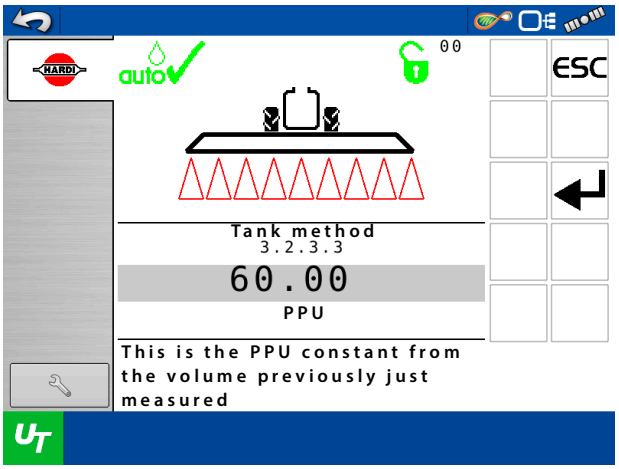
A. Therefore, if the MainTank is almost empty, let a helper stand on the sprayer platform, watching into the MainTank. The helper may keep an eye to the tank suction fitting in the sump.

   The tank suction fitting is located in the sump and recognized by its 45° bend.

B. When the water level passes the upper edge of the tank suction fitting, the helper may tell this to the driver who immediately switch the main ON/OFF to OFF.



3. When weighted or the contents is read out on the tank level, then press ↵.
4. Correct the volume shown in menu 3.2.3.2 to read the actual volume sprayed out.
5. Press ↵ to see the new PPU value.
6. Press ↵ again to accept the new PPU value.

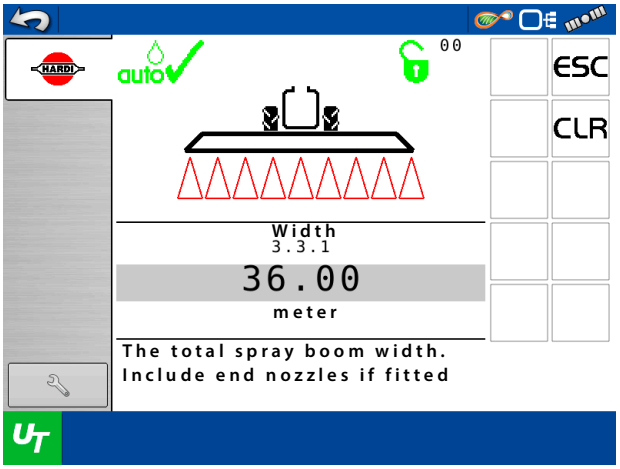


Menu 3.3 Boom

Refer to "Boom Settings" on page 92 for the setup procedure in each of the following submenus.

Menu 3.3.1 Width

In this menu, it is possible to view the total boom width of the sprayer from tip to tip.



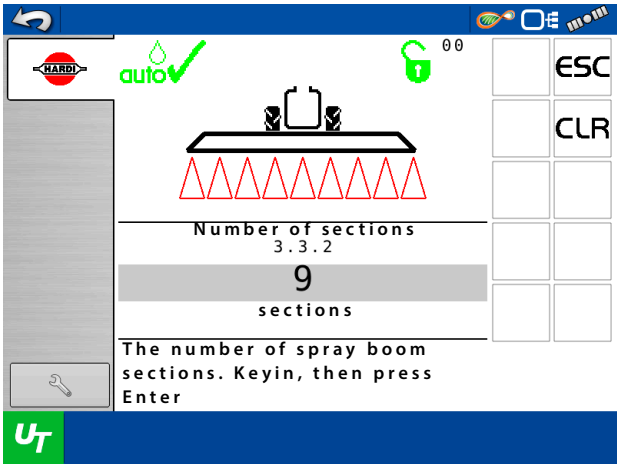
NOTE! This menu pre-set by the HARDI.

NOTE! This menu is read-only. Boom width is factory set for the specific sprayer configuration.

Menu 3.3.2 Number of sections

In this menu, it is possible to view the number of boom sections available.

The number must correspond to the number of valves placed side-by-side on the boom centre section.



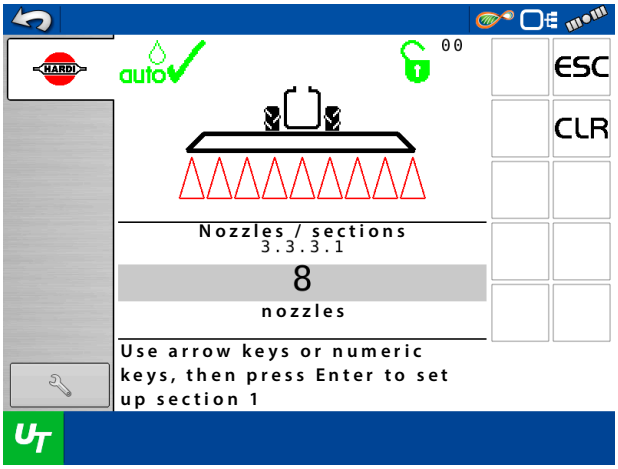
NOTE! This menu pre-set by the HARDI.

NOTE! This menu is read-only. Number of sections is factory set for the specific sprayer configuration.

Menu 3.3.3 Nozzles/sections

The SmartCom needs to know how many nozzles each section do have. Number of nozzles entered for every section individually.

See "Menu 3.3.3 Nozzles/sections" on page 92 for procedure.



NOTE! The HARDI Service Centre may already set this menu.

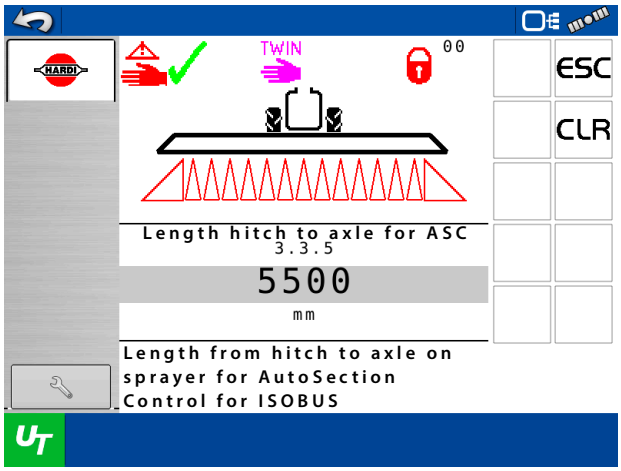
Menu 3.3.4 Slant Burst Setup

Menu currently not used.

Menu 3.3.5 Length hitch to axle for ASC

For correct AutoSectionControl function, enter the set length from the hitch to wheel axle on the sprayer.

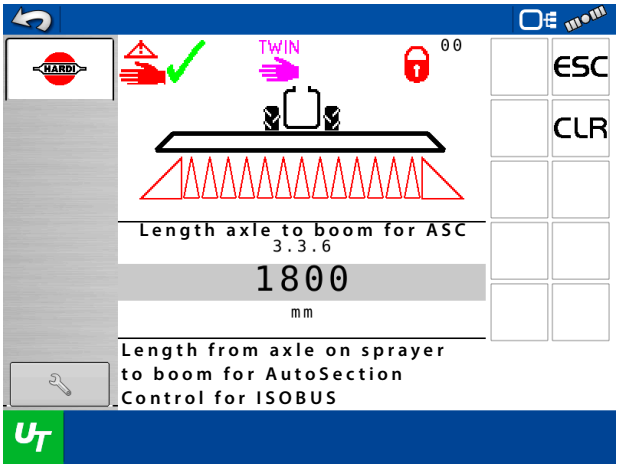
NOTE! The value obtained from the SmartCom software. Therefore, this menu only edited when steering compensation necessary. See “Steering Compensation” on page 102.



Menu 3.3.6 Length axle to boom for ASC

For correct AutoSectionControl function, enter the set length from the wheel axle on sprayer to the nozzles on the boom.

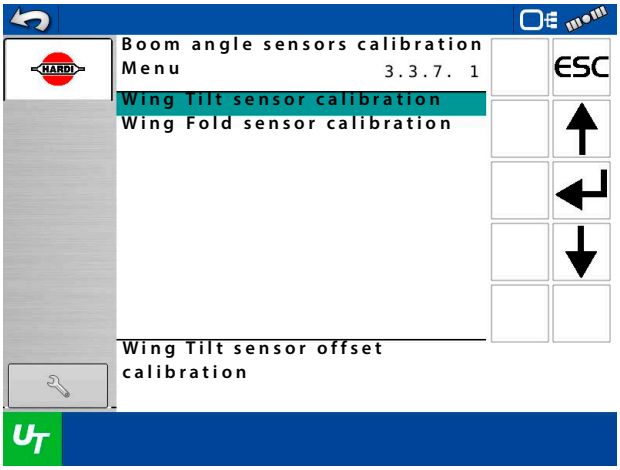
NOTE! The value obtained from the SmartCom software. Therefore, this menu only edited when steering compensation necessary. See “Steering Compensation” on page 102.



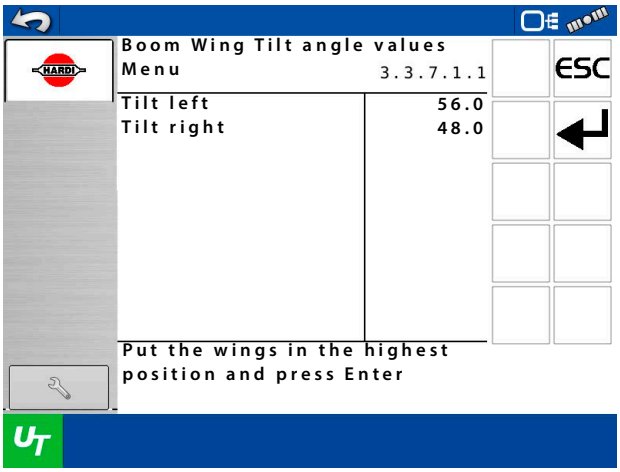
Menu 3.3.7 Boom angle sensors calibration

For correct TWIN fold protect function, the sensors used need correct calibration.

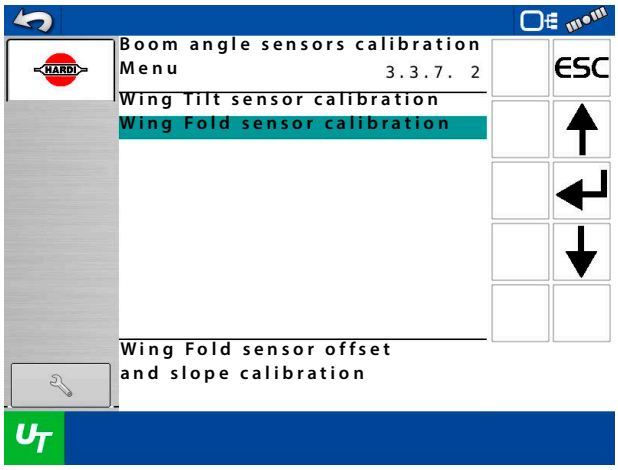
1. Select menu [3.3.7.1 Wing Tilt sensor calibration].



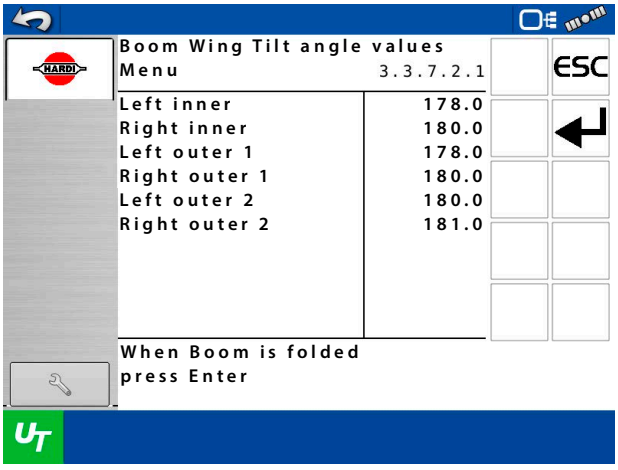
2. Raise both left and right tilt to highest position possible.
3. Press Enter to calibrate the tilt sensors.



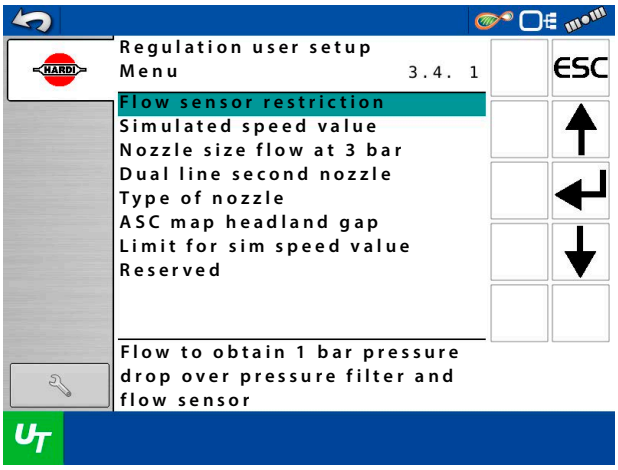
4. Select menu [3.3.7.2 Wing Fold sensor calibration].



5. Fold the boom completely into storage position.
6. Press Enter to calibrate the fold sensors.



Menu 3.4 Regulation user setup



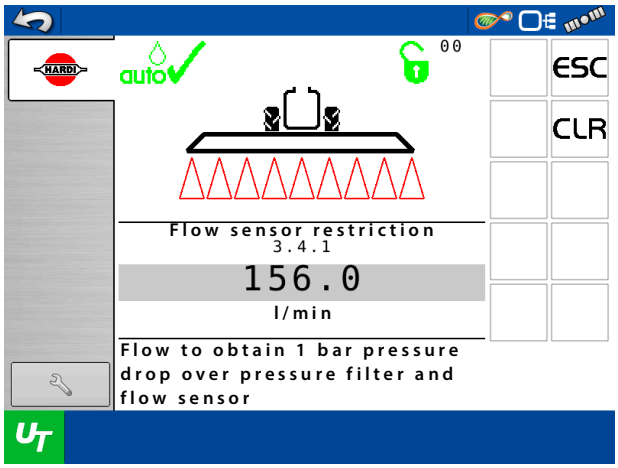
It is possible to adjust the sensitivity of the pressure regulation valve. The values is to be set for obtaining precise regulation, even if a sensor fail.

Up to five main sensors control the valve:

- Sprayer speed sensor:
  This sensor reads the sprayers forward speed, used for calculating the volume rate at all spraying speeds.
- Flow sensor:
  This sensor reads the flow at the operating unit; used for calculating the nozzle size and l/ha. In addition, used for back up for pressure sensor.
- Pressure sensor:
  This sensor reads the pressure at the operating unit, used for calculating the pressure and flow for the pressure regulation valve.
- PTO RPM sensor:
  This sensor read the pump RPM, used to calculate the flow from the pump at all pump speeds.
- Regulation valve opening angle sensor:
  This sensor read the opening angle for the rotary valve inside. When the opening angle is known, the flow can be calculated when the pressure is also known.

  The result is when forward speed, pump RPM, etc. is known, then the regulation valve can predict a setting (Feed Forward) before opening the main ON/OFF. Thereby the volume rate is regulated against the forward speed, even if the forward speed has changed significantly since closing the main ON/OFF (no fluctuation).

Menu 3.4.1 Flow sensor restriction



The menu defines the resistance in the plumbing and circuits of the specific sprayer setup.

As the resistance varies with the choice of flow house, this must be set up prior to spraying.

The value fixed for flow sensor restriction at the flow sensor currently used with the SmartCom system. The value must be set for the specific sprayer:

Sprayer	Value (L/min)
NAVIGATOR without options	156
NAVIGATOR with DilutionKit	127
NAVIGATOR i	112
MEGA 1" hose*	100
MEGA 5/4" hose*	176
MEGA 1" hose* and with DilutionKit	88
MEGA before February 2019	63

*hose diameter before the flow sensor.

Menu 3.4.2 Simulated speed value

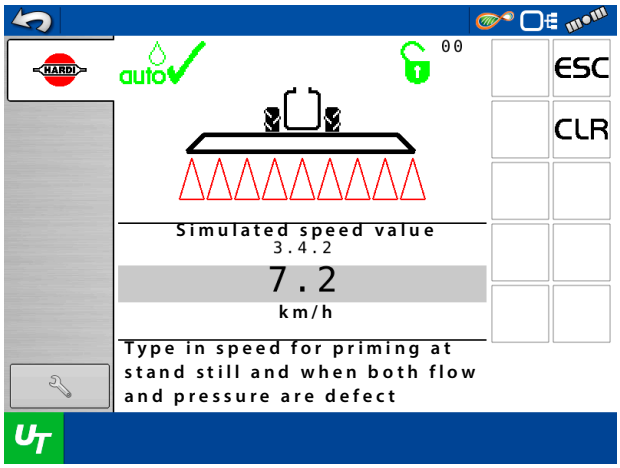
The "Simulated speed value" menu is used in 2 situations:

When stand still or driving very slow while priming the boom.	This feature allows the operator to stand still or drive slow and automatically get normal spray pressure to prime the boom.
If the speed sensor is defect.	In this case, the computer will assume that the sprayer is traveling with the speed typed in this menu. The operator should keep the tractor constantly at this speed to maintain a good regulation with the ability to handle changes in the application rate and changes in open or closed sections. The speed entered should be appropriate also for headlands. If reducing the speed at headlands, resulting that the application rate will be higher than set value. I.e., if the operator selects an application rate of 100 litre/ha and a speed of 8 km/h and then reduces the speed to 6 km/h at headlands, then the actual application rate will increase to 133 litre/ha.

In addition, when the spraying speed drops below the lowest speed where a spray job can begin when starting at the headland, then simulation of the speed starts to maintain normal spray pressure until the normal spraying speed reached again.

When the nozzles are open, then the application rate calculates based on the measured flow, boom width and simulated speed. This desired, because it works as a limp home state when the driving speed sensor is defect.

- Default value: 7.2 km/h



ATTENTION! Use this menu when a spray job has to be finished before fixing the defect sensor.

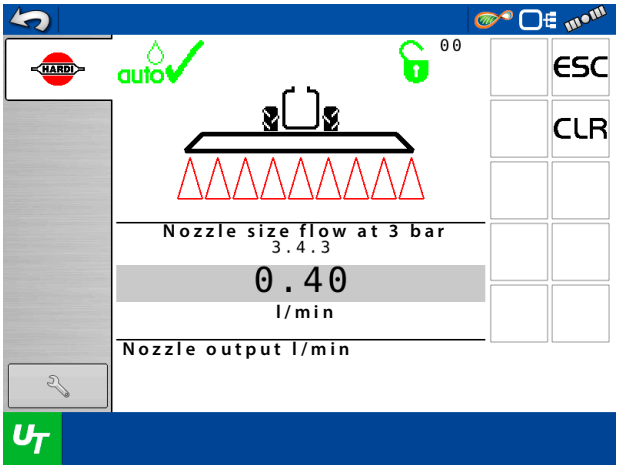
ATTENTION! The recommended setting is 75-90% of the normal spraying speed.

Menu 3.4.3 Nozzle size flow at 3 bar

Use this menu for two different scenarios:

Check of nozzle output for nozzles used.	In fault-free operation, the controller use the flow sensor and the pressure sensor to detect the nozzle size. Therefore, when entering this menu while spraying, the actual nozzle output is calculated and shown in the display. This can be used when nozzles are changed or e.g. to check the nozzle output when a specific gravity has been set in menu 3.5.1 for fertilizers.
In case of flow sensor and/or pressure sensor fault.	Enter the nozzle flow to obtain a more accurate regulation of the regulation valve. There is no nozzle identification, if either the flow sensor or the pressure sensor is faulty. The controller stores the last detected nozzle size, and then uses this value.

- Default value: 0.80 l/Min



ATTENTION! If changing from small nozzles to large nozzles, manually entering the nozzle size may be necessary. This because DynamicFluid4 does not calculate the nozzle size when the pressure goes below 0.8 bar.

ATTENTION! If changing nozzles while a sensor is faulty, then type in the size of the new nozzle.

The nozzle size is defined as the flow at 3 bar, as to be seen in the HARDI nozzle catalogue.

NOTE! The flow at 3 bar in the HARDI nozzle catalogue is measured without the nozzle filter and without the PENTALET nozzle holder. The flow restriction from these two make the nozzle appear smaller, see table below.

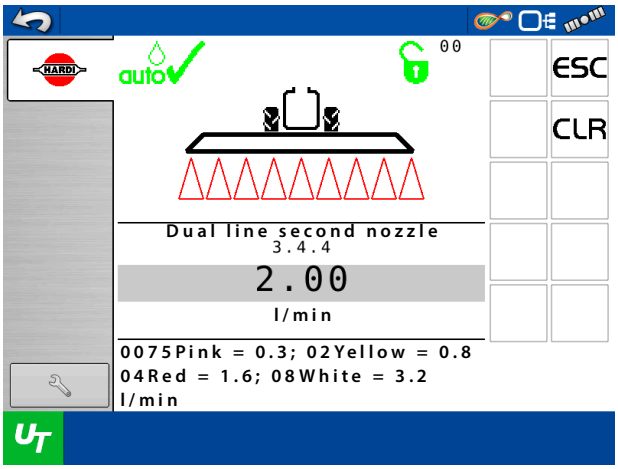
Nozzle	Flow (l/Min)
0075-Pink	0.30
010-Orange	0.40
015-Green	0.60
020-Yellow	0.80
025-Lilac	1.00
03-Blue	1.20
04-Red	1.60
05-Brown	2.00
06-Grey	2.40
08-White	3.20
10-Light blue	4.00
15-Light green	6.00

Menu 3.4.4 Dual line second nozzle

This menu only used for sprayers with AutoSelect.

This menu do the same as menu 3.4.3 but for nozzle fitted to line B.

- Default value: 1.60 l/Min

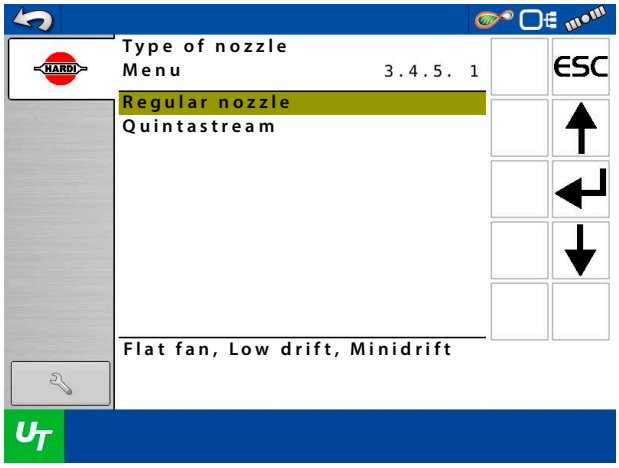


Menu 3.4.5 Type of nozzle

Select the nozzle type to use when spraying.

- Default value: Regular nozzle.

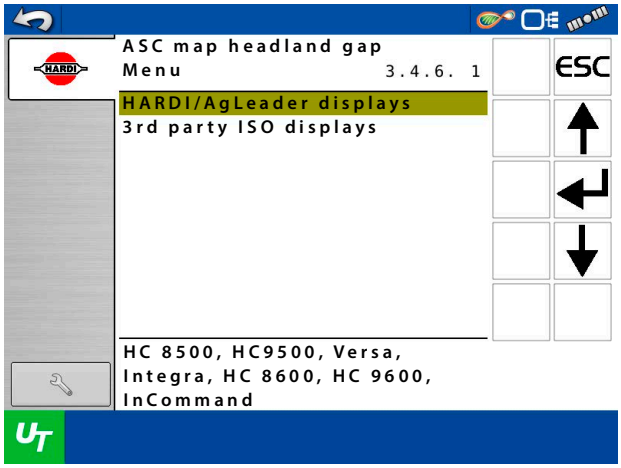
ATTENTION! If changing the nozzle type, then remember to change the gravity of the chemical mix in menu [3.5.1 Adjustment of specific gravity] if necessary, for the TankGauge to measure the tank level correctly.



Menu 3.4.6 ASC map headland gap

Select menu corresponding to the controller used when running AutoSectionControl:

Menu	Menu Name	Controller Used
3.4.6.1	HARDI/AgLeader displays	HC 8600 and HC 9600
3.4.6.2	3rd party ISO displays	HC 7500, HC 8700, HC 9700 and other displays



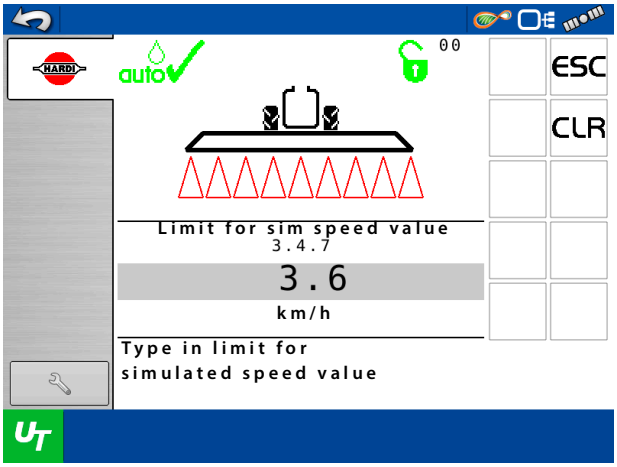
Menu 3.4.7 Limit for sim speed value

The menu defines the trigger value where using the simulated speed value, instead of the actual wheel speed.

When the vehicle speed drops below this value, the system uses the simulated speed value as entered in menu 3.4.2.

This helps the regulation valve to predict its setting when the nozzles opens, which reduces pressure fluctuations.

- Recommended value: half of normal driving speed.
- Default value is 3.6 km/h. Minimum is 1.5 km/h.
- This value must always be set below the speed driven at headland turns.



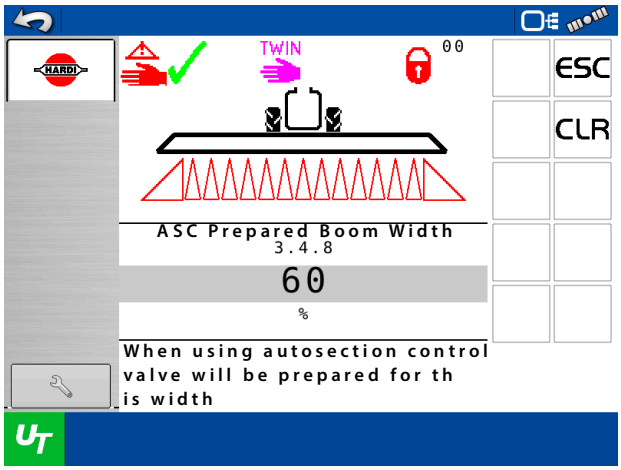
Menu 3.4.8 ASC Prepared Boom Width

When using AutoSectionControl, the regulation valve will be prepared for this width, i.e. the number of nozzles that opens.

Use this menu to set how large part of the boom need to be prepared to open, after turning at headlands.

This setting may depend on the shape of the field sprayed:

Regular field, rectangle shaped field, etc.	Set a high percentage, maybe up to 100% This prepares most or all the spray sections to open immediately after the headland turn.
Irregular field, triangular shaped, etc.	Set a low percentage, below 60% and depending on the irregularity of field. This will ensure the spray sections opens with a delay that fits the shape of the field.



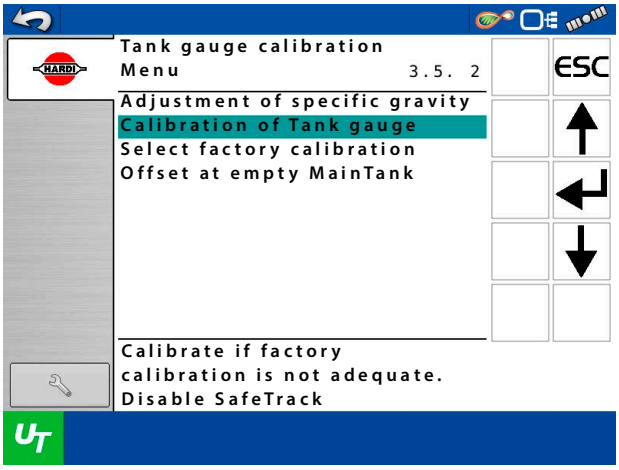
- Default value: 60%

NOTE! This menu is only active when using AutoSectionControl.

Menu 3.5 Tank gauge

This menu for setting specific gravity for spray fluid or fertilizer. In addition, do the setup of the TankGauge here.

ATTENTION! For increased accuracy, recommendation is to do the flow calibration (menu 3.2) before proceeding.



Menu 3.5.1 Adjustment of specific gravity

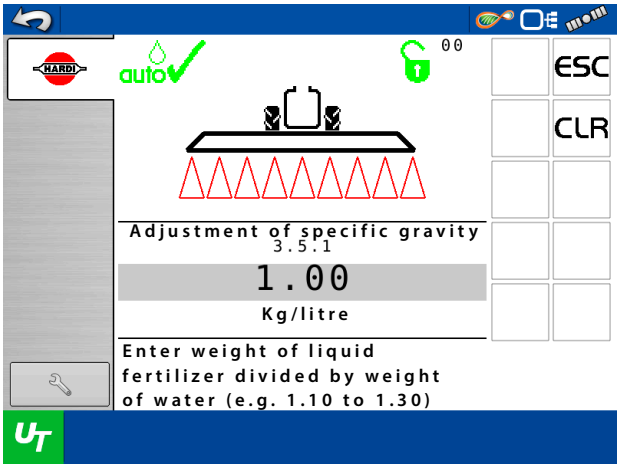
The correction factor for the specific gravity of the liquid sprayed can be set.

Default value is 1.00 kg/litre.

For liquid fertilisers, the specific gravity may range up to 1.3 kg/litre. The value in this case would be 1.30 kg/litre.

NOTE! Remember to set the type of nozzle to use in menu [3.4.5 Type of nozzle].

NOTE! When set, the nozzle output can be checked by monitoring menu [3.4.3 Nozzle size flow at 3 bar] while spraying.



Procedure

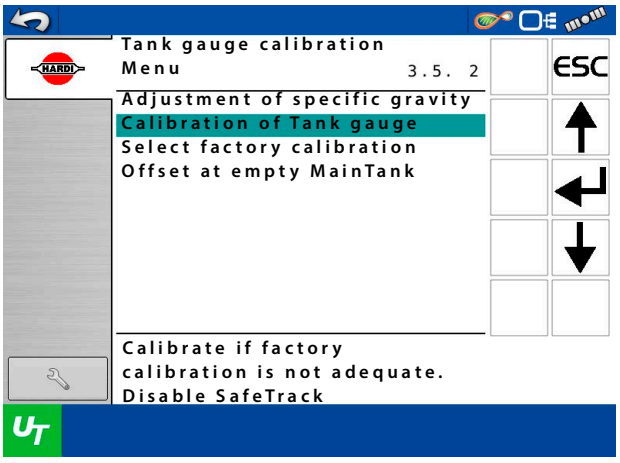
1. Set specific gravity.
2. Press ↵ to confirm.

Menu 3.5.2 Calibration of Tank gauge

Calibration of the HARDI TankGauge is necessary if the factory calibration shows inaccurate. E.g., a different placed hitch point on the tractor or other tyre mounting may result an inaccurate calculation of the tank contents.

Therefore, it is recommended to custom calibrate with the sprayer attached to the tractor that will be used for spraying, noting that later changes of tractor can affect the accuracy of the TankGauge.

Refer to “Custom Calibration of TankGauge” on page 94 for calibration procedure.



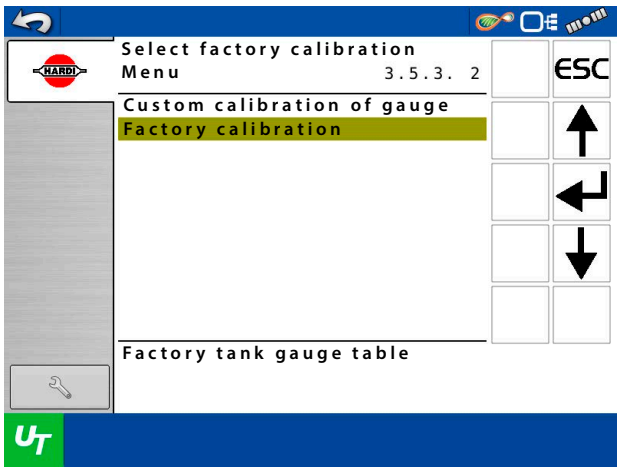
Menu 3.5.3 Select factory calibration

Your HARDI service centre may have set up this menu. See "Menu 3.5.4 Offset at empty main tank" to check if empty.

The prerequisites for accuracy of the TankGauge, when selecting the factory calibration is:

- If factory calibration used, HARDI can only vouch for the precision when the sprayer is level.
- Check if level by placing a level on the sprayer as follows:

Sprayer Model	Place of Level
AEON	The support frame below the right side RinseTank must be in level position.
MEGA	The platform must be in level position.
NAVIGATOR	The underside of the main frame must be in level position.



ATTENTION! If not fulfilling one of the prerequisites, then refer to "Custom Calibration of TankGauge" on page 94 to make a custom calibration of the TankGauge.

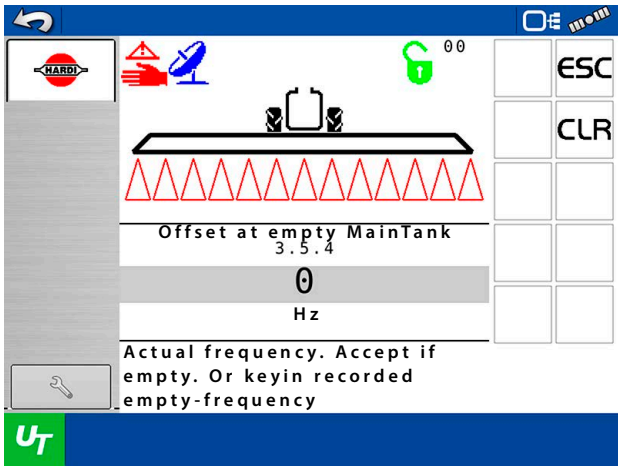
Menu 3.5.4 Offset at empty MainTank

This menu read out the frequency (Hz) at empty tank. If the main tank is empty, then press Enter to accept the frequency.

This menu only used in case the main tank is not empty, to correct the empty-frequency, if known to the user.

NOTE! The definition of an empty tank is when the pump is not able to suck more liquid from the tank, i.e. when defined empty, there will still be a very small amount of liquid in the sump.

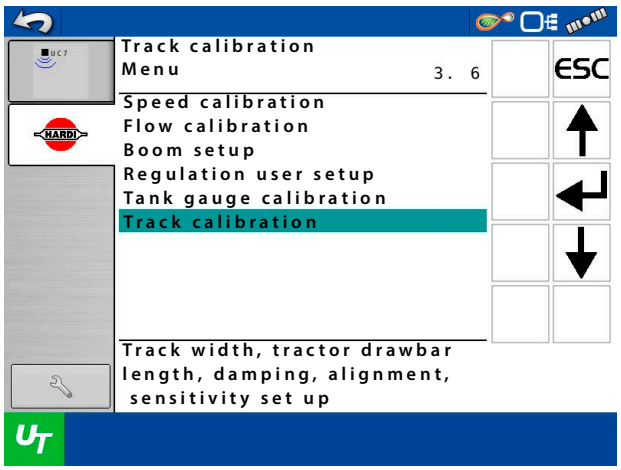
ATTENTION! This can also be useful for re-calibrating empty tank frequency if the sensor has dirt on it.



Menu 3.6 Track calibration (Trailed Sprayers only)

There is no standard setting for the Track setup. It is necessary to adjust the Track to the actual conditions, for different kinds of tractors, setup of the sprayer and spraying practices.

Described below is each adjustment and the effect it will have on the sprayer.



Menu 3.6.1 Track width (EU)

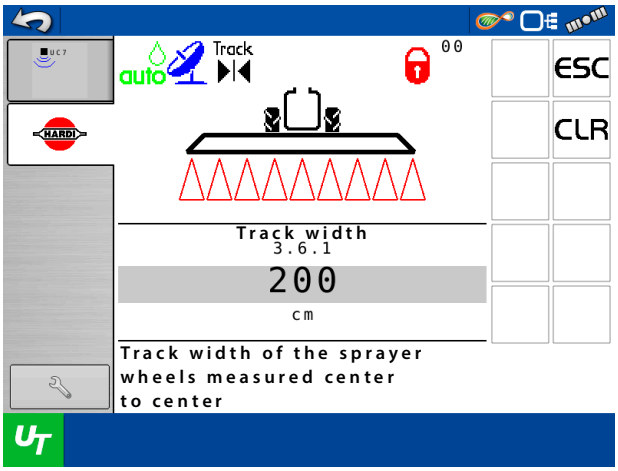
Enter the track width here.

- Measure the track width from right side tyre centre to left side tyre centre of the sprayer wheels.

It is important to enter the correct track width. The controller will calculate the speed at the centre of sprayer and not at the wheel sensor as speed varies in right and left turns.

ATTENTION! If the track width is incorrect, it will influence on track precision and the rollover risk factor (menu 3.6.6).

Factory setting: 180 cm



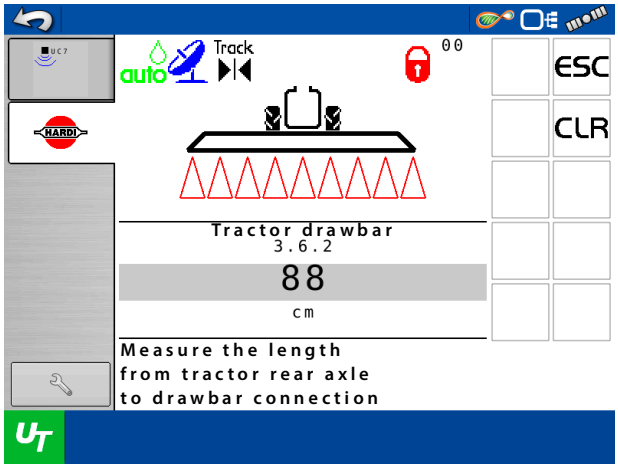
Menu 3.6.2 Tractor drawbar

Enter the length of the tractor drawbar here. It is necessary to adjust this every time when attaching a new tractor to the sprayer.

- The measurement is from the centre of the tractor rear axle to the centre of the drawbar pin.

ATTENTION! When attached, check the rigidity of the tractor drawbar mounts. There may be no sideways movement.

Factory setting: 80 cm



Inaccurate Drawbar Measurement

An inaccurate drawbar measurement will cause the sprayer to steer unintended:

- Too short measurement = Track react faster, i.e. steer too early.
- Too long measurement = Track react slower, i.e. steer too late.

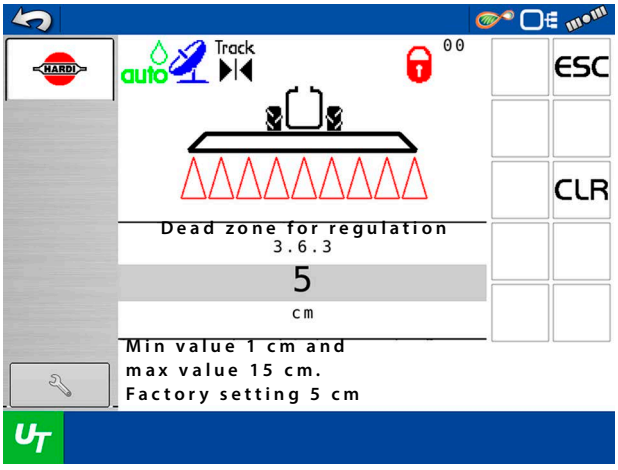
Menu 3.6.3 Dead zone for regulation

This is the non-regulation zone when the sprayer is straight behind the tractor. Increase this value, if the sprayer hydraulics oscillates when driving straight forward.

Spraying Speed	Track Setup
High speed (20 to 25 km/h)	Must react slowly: Increase the dead zone value, if not.
Low speed (7 to10 km/h)	For high precision: It is possible to reduce the dead zone value.

Increasing value: No oscillation but tendency to sway. Low precision, but very steady driving with less corrections.

Decreasing value: Reacting on small deviations. Tendency to oscillation that can damage the boom. High precision, but more unstable driving with small corrections all the time.

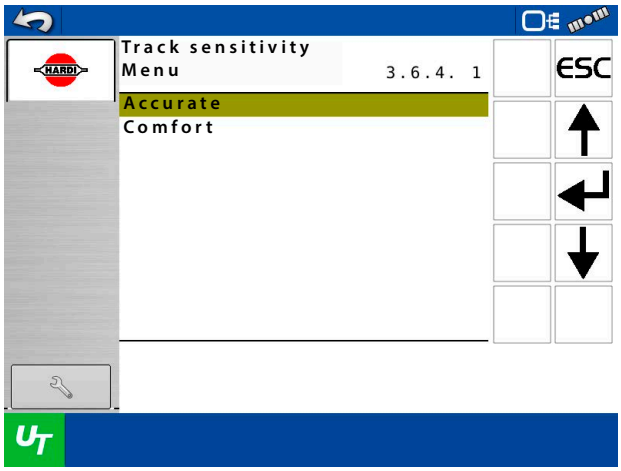


- Factory setting: 5 cm
- Max. is 20 cm

Menu 3.6.4 Track sensitivity (EU)

This menu sets the type of sensitivity for which the ComfortTrack or IntelliTrack will regulate.

Accurate:	The precision is at its best with some fast movements.
Comfort:	Smooth movements with slight reduction in the accuracy.

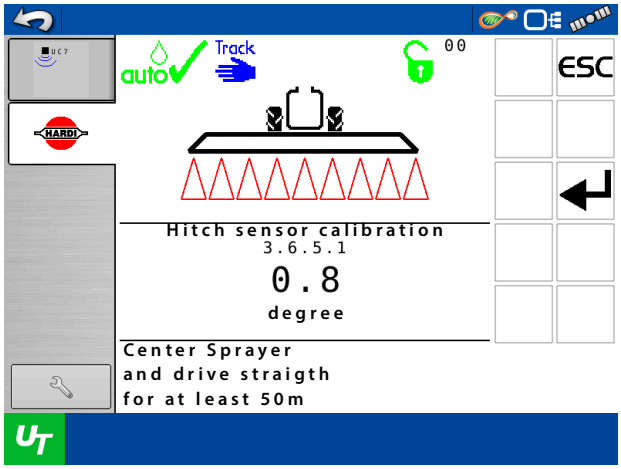


Menu 3.6.5 Hitch sensor calibration (EU)

When attaching a sprayer with ComfortTrack or IntelliTrack to the tractor, then it is necessary to fit the chains for the track sensor.

When attaching the chains to the tractor, the sensor needs calibration for the steering to work properly. This is to compensate if the front potentiometer placed offset to the centre line when attaching the sprayer.

Please refer to "ComfortTrack / IntelliTrack Setup (Trailed Sprayers only)" on page 112 for calibration procedure.



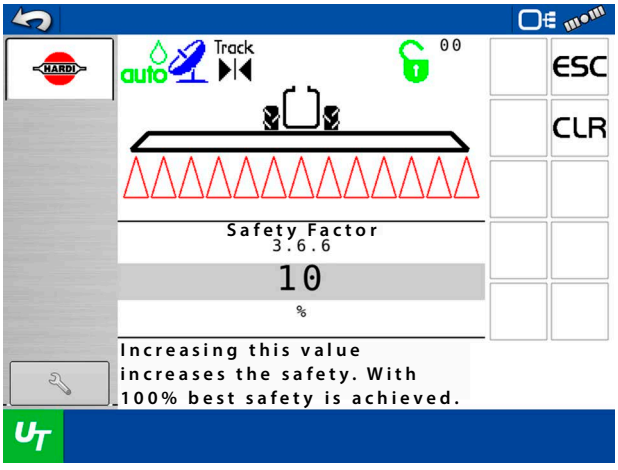
Menu 3.6.6 Safety Factor (NAVIGATOR Only) (EU)

To avoid the sprayer is tipping over, set an acceptable safety factor. This factor determines the possible aggressiveness when driving in turns, until the sprayer will align the steering.

Values that SmartCom considers for risk assessment are:

- Speed
- Turning radius
- Angle of the drawbar

Increasing value:	Increases the safety when driving. Reduces the risk of the sprayer tipping over.
Decreasing value:	Increases the risk of the sprayer tipping over. Be very careful when doing this!



⚠ DANGER! Decreasing this value may cause the sprayer to tip over!

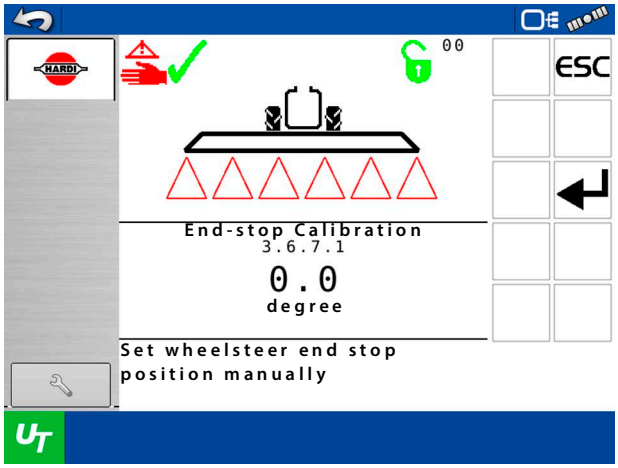
The risk is set as a value in percent.

- 1% gives no safety. Not recommended setting!
- 100% gives maximum safety.

- Default is 10%.

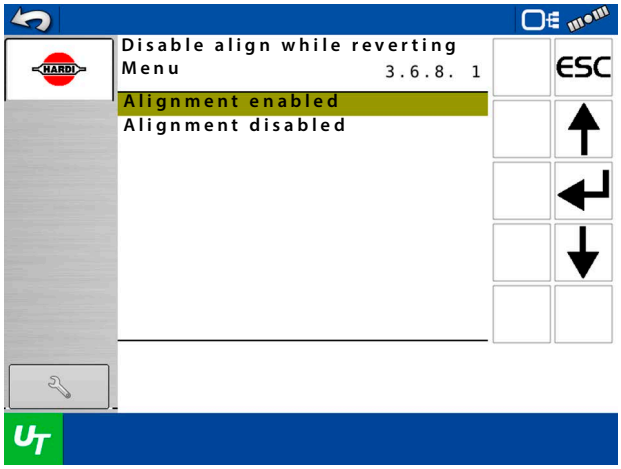
Menu 3.6.7 End-stop Calibration (AEON Only) (EU)

This menu calibrates the steering so the SmartCom computer knows its end-stops of the steering cylinders on AEON sprayers.



Menu 3.6.8 Disable align while reverting (AEON Only) (EU)

In this menu it is possible to select whether the sprayer steering shall align or not, when reversing an AEON sprayer.



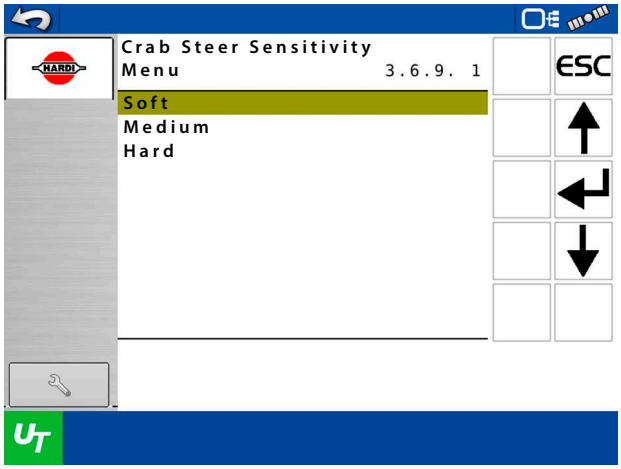
Menu 3.6.9 Crab Steer Sensitivity (EU)

This menu used to set the crab steer sensitivity.

Setting the sensitivity affects how much each key press will steer the sprayer, when the slope correction buttons or are pressed.

Set crab steer sensitivity to:

Menu Name	Movement
Soft	Small movement per each key press.
Medium	Medium movement per each key press.
Hard	Large movement per each key press.



NOTE! The maximum possible crab steer angle depends on the sprayer chassis size and track width.

Menu 4 Toolbox

General Info

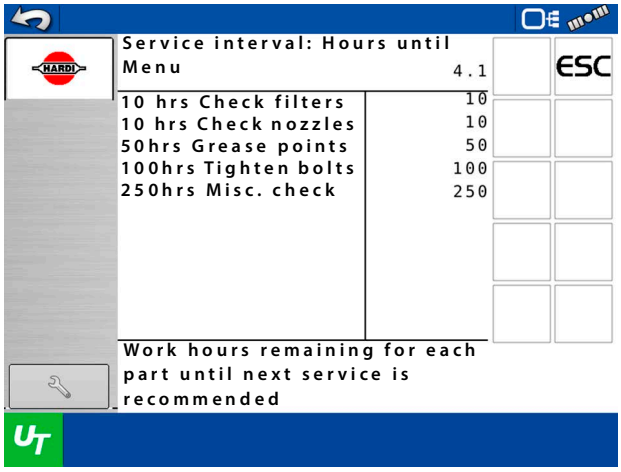
From this menu you can access helpful tools such as service intervals, measurement of distance and area and test.

Menu 4.1 Service intervals: Hours until

The controller contain scheduled service intervals and a nozzle check. This make it easier for the operator to remember the service intervals.

Entering the menu will display the hours remaining until next service.

The factory set up the Controller with three service and a nozzle check reminder.



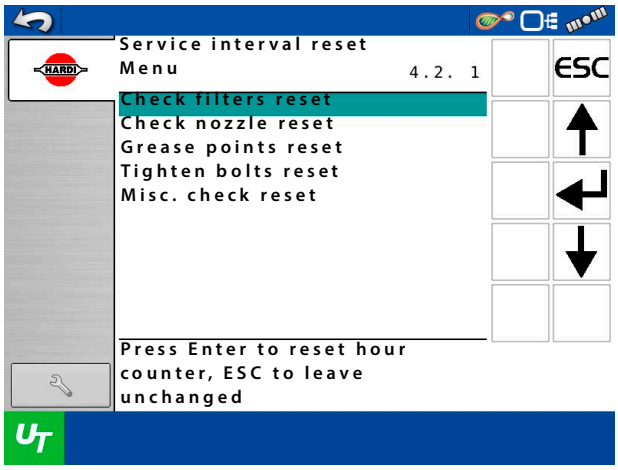
Service Interval	Action
10hrs Check filters reset	See sprayer instruction book, Maintenance.
50hrs Grease boom reset	See sprayer instruction book, Maintenance.
250hrs Grease track and centre	See sprayer instruction book, Maintenance.
Miscellaneous service	Not defined from factory.
10hrs Check nozzles	Check flow rate. Change nozzles if more than 10% of rated flow.

Press ↵ to register service or control, if displayed when switched on. The reminder ✉ will remain present until resetting the service interval.

Menu 4.2 Service interval reset

To reset service interval, go to relevant interval menu and:

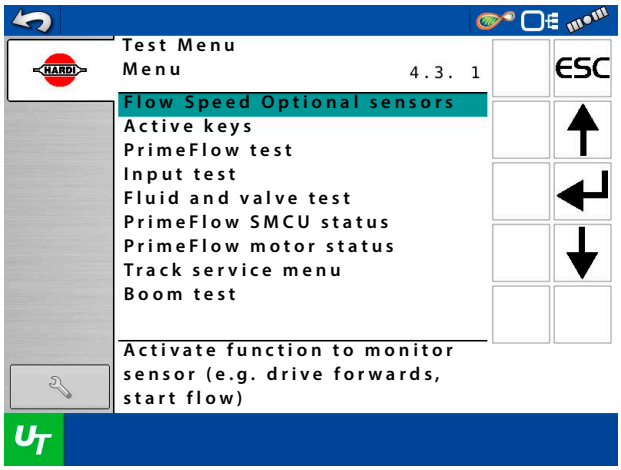
- Press ↵ to reset hour meter.
- Press ESC to leave unchanged.



Menu 4.3 Test Menu

This menu to see calculated sensor values.

1. Go to the "Test menu".
2. Choose the item to test with ↑ or ↓.
3. Press ↵ to open the menu.
4. Monitor the sensor values, and see if it is realistic for the current sprayer setup.



Menu 4.4 Speed simulation

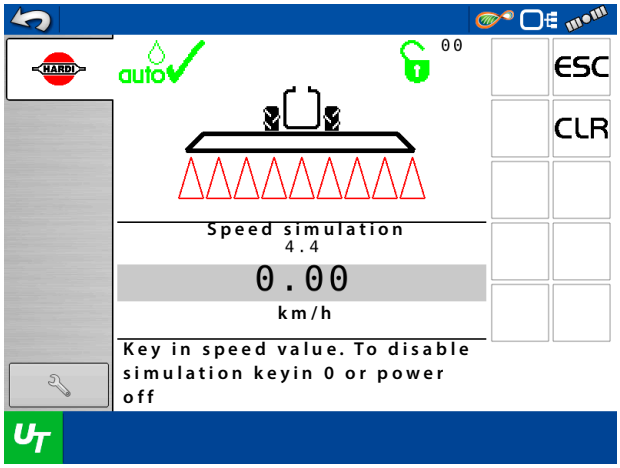
In this menu, for certain purposes it is possible to simulate the speed.

Enter a two-figure value.

NOTE! This menu is for test purposes and not related to menu 3.4.2.

ATTENTION! The state remains valid until restarting the Controller or the value is set to 0.00 km/h.

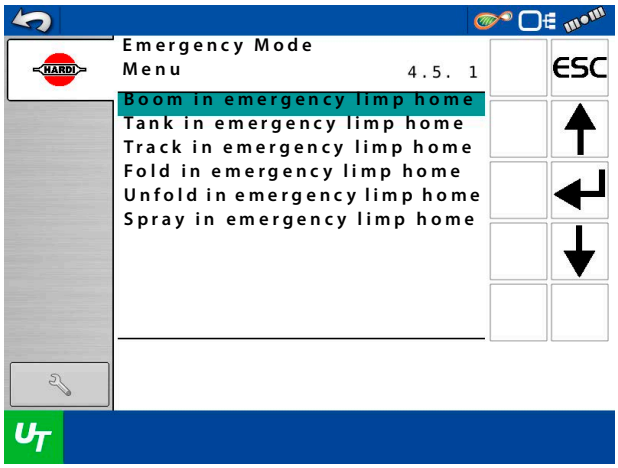
ATTENTION! Value set to 0.00 km/h means OFF.



Menu 4.5 Emergency Mode

This menu bypasses the system so all relevant sensors are ignored. Then it is possible to manually fold the boom, align track or operate valves in order to drive home for service.

- See "In an Emergency Situation" on page 151 for use of this menu.
- Find the submenus described on the next page.

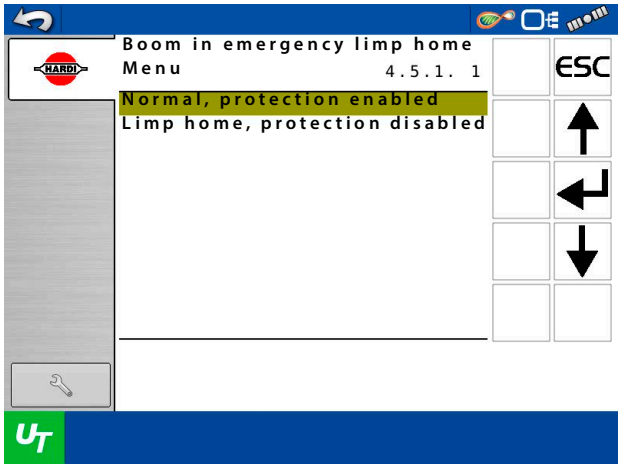


ATTENTION! Do not use the emergency limp home modes unless a problem has occurred. This is not for use during normal operation.

Menu 4.5.1 enables or disables limp home mode for boom functions. Turn it ON/OFF by selecting either of the menus:

- Menu 4.5.1.1 [Normal, protection enabled].
- Menu 4.5.1.2 [Limp home, protection disabled].

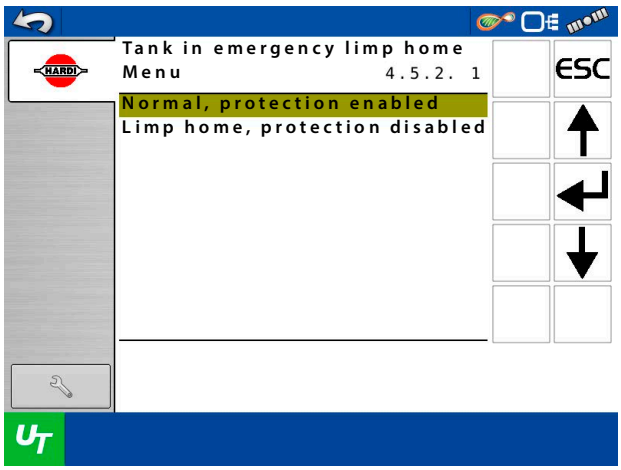
When limp home enabled, then manually folding of the boom is possible.



Menu 4.5.2 enables or disables limp home mode for tank functions. Turn it ON/OFF by selecting either of the menus:

- Menu 4.5.2.1 [Normal, protection enabled].
- Menu 4.5.2.2 [Limp home, protection disabled].

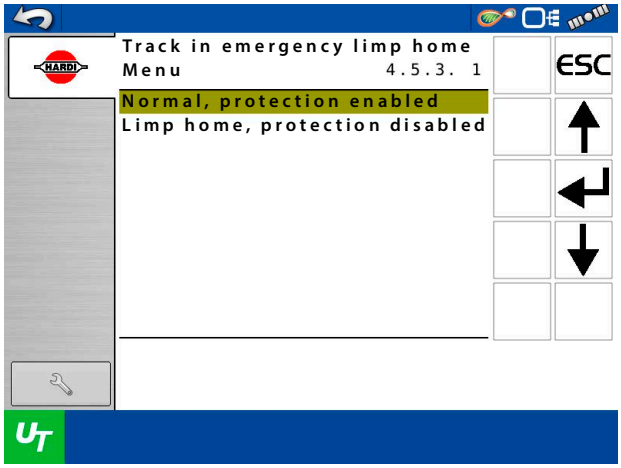
When limp home enabled, this disables the electric valves. Then manually turning of the valves are possible.



Menu 4.5.3 enables or disables limp home mode for track functions. Turn it ON/OFF by selecting either of the menus:

- Menu 4.5.3.1 [Normal, protection enabled].
- Menu 4.5.3.2 [Limp home, protection disabled].

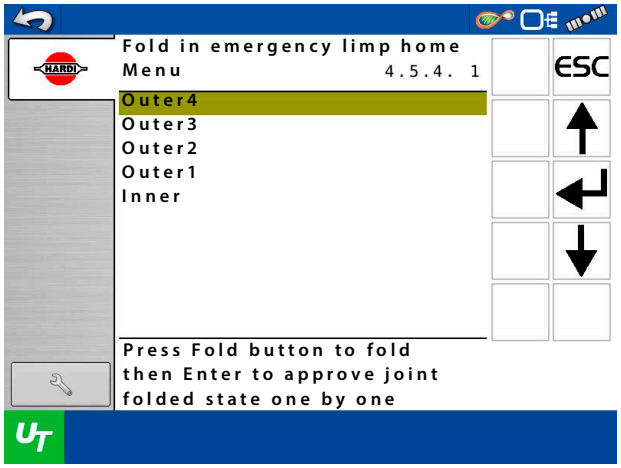
When limp home enabled, this disables the track protection. Then manual alignment of the track is possible.



Per each of the boom folding joints,

- Menu 4.5.4.1 [Outer 4].
- Menu 4.5.4.2 [Outer 3].
- Menu 4.5.4.3 [Outer 2].
- Menu 4.5.4.4 [Outer 1].
- Menu 4.5.4.5 [Inner].

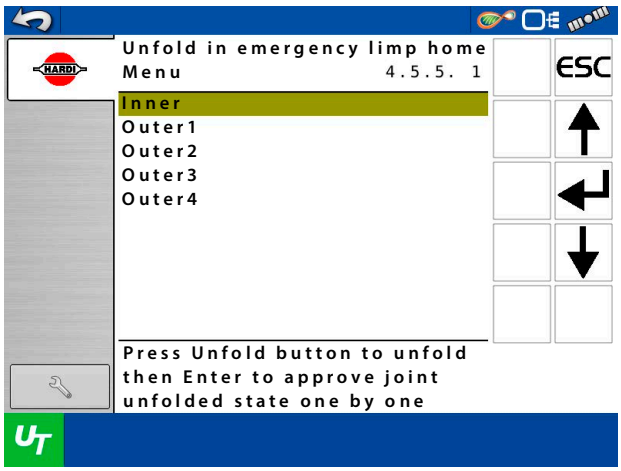
press the fold button to completely fold that boom wing. Then Enter to approve the joint is in folded state.



Per each of the boom folding joints,

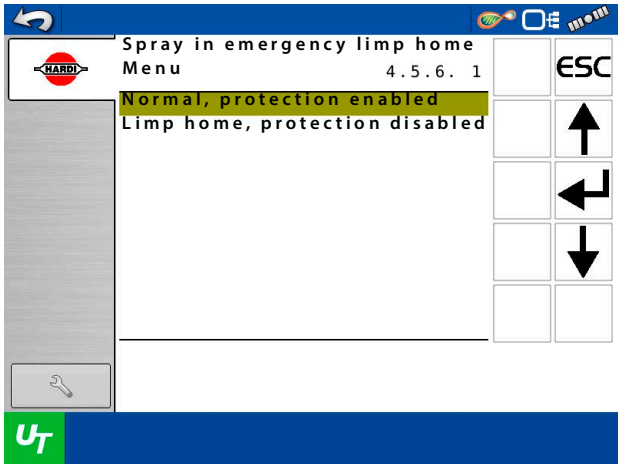
- Menu 4.5.5.1 [Inner].
- Menu 4.5.5.2 [Outer 1].
- Menu 4.5.5.3 [Outer 2].
- Menu 4.5.5.4 [Outer 3].
- Menu 4.5.5.5 [Outer 4].

press the unfold button to completely unfold that boom wing. Then Enter to approve the joint is in unfolded state.



Menu 4.5.6 enables or disables limp home mode for spray valves. Turn it ON/OFF by selecting either of the menus:

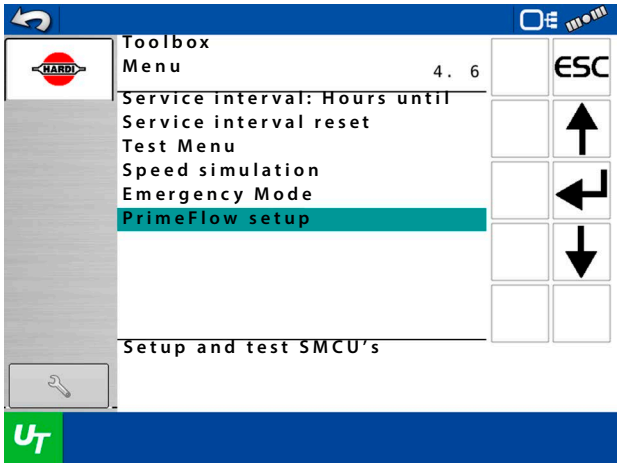
- Menu 4.5.6.1 [Normal, protection enabled].
- Menu 4.5.6.2 [Limp home, protection disabled].



Menu 4.6 PrimeFlow setup (EU)

This menu is to setup and test the PrimeFlow function.

It is advisable to contact the HARDI Dealer prior to attempt changing these settings.



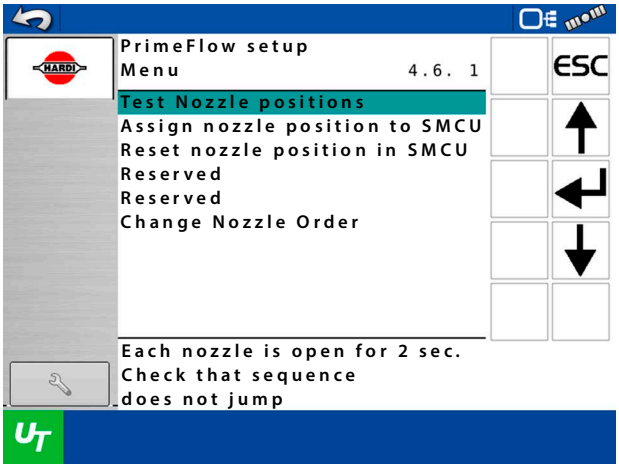
Menu 4.6.1 Test Nozzle positions

The nozzle position test confirm that all the nozzles are able to open and close at the same time. It also tests that the nozzle programming did assign the correct places on the boom.

To test, enter the "Test Nozzle positions" menu. Then all nozzles will automatically first open and then close again. Then the nozzles will automatically open for 2 sec. one by one from the left to the right side of the boom.

At this test, the nozzle farthest to the left should open first and then the nozzle next to it on the right side.

If the sequence jump from one nozzle to another nozzle, not in consecutive order, the system needs reprogramming or changing nozzle order.

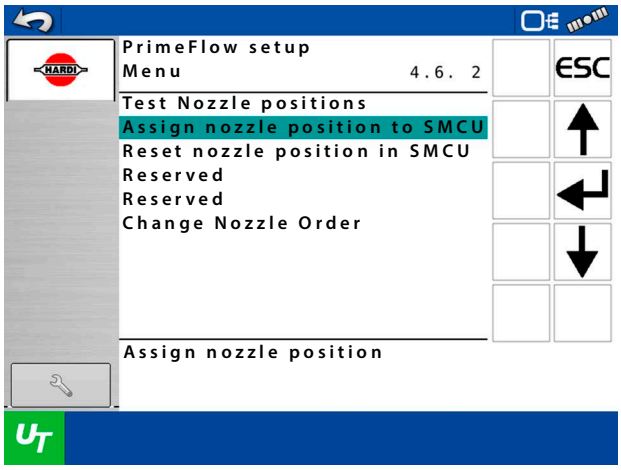


Menu 4.6.2 Assign nozzle position to SMCU

Assign nozzle position to SMCU when replacing a SMCU on the boom.

In this menu, it is possible to program the PrimeFlow system SMCU with a unique ID number, a position on the boom and a nozzle position assignment.

It is necessary to program the system before the system is operational.

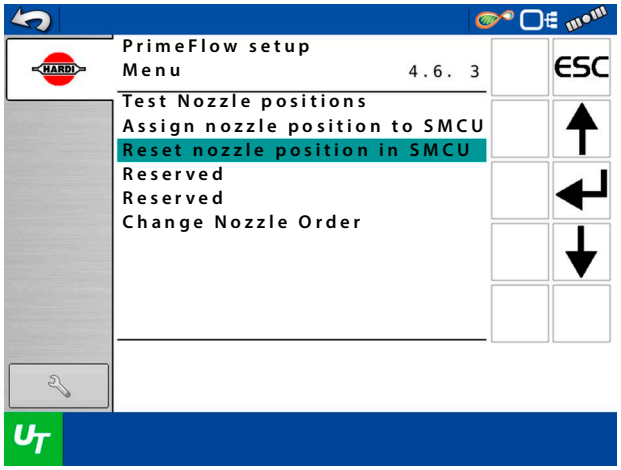


Menu 4.6.3 Reset nozzle position in SMCU

If a SMCU is assigned with an ID number, it is necessary to reset before reusing it in another position on the boom.

The LED on the SMCU is flashing if it has an ID number assigned. Otherwise, if the SMCU not programmed, the LED will light up constant.

ATTENTION! Be aware that this reset all powered SMCU's.



Menu 4.6.4 Reserved

Menu not used.

Menu 4.6.5 Reserved

Menu not used.

Menu 4.6.6 Change Nozzle Order

The nozzle order for each SMCU is defined by the length of the stepper motor cables. If necessary, the nozzle order for each SMCU can be changed.

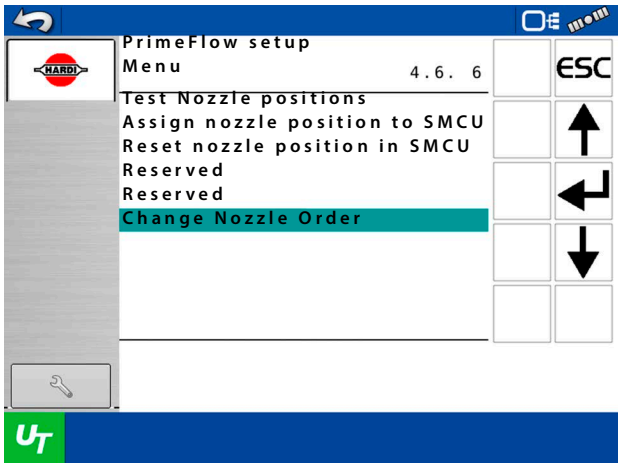
E.g. breakaway sections and brackets on a TWIN sprayer boom can block the fitting of the SMCU at the outermost left nozzle. To fix this problem the SMCU can be moved to the right, using a longer cable that routes back to the left nozzle. Using this setup, it is necessary to change default the nozzle order for the SMCU, to keep the correct nozzle sequence for the whole boom.

Default nozzle order for SMCU cables are:

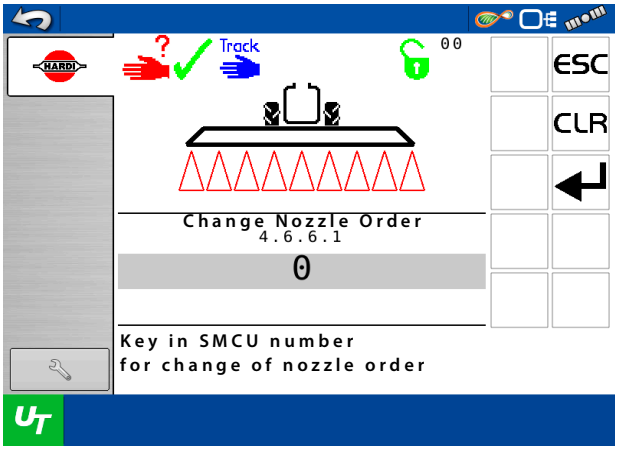
2 motor SMCU	Short cable fitted to the left nozzle.
	Medium cable fitted to the right nozzle.
3 motor SMCU	Short cable fitted to the left nozzle.
	Medium cable fitted to the nozzle in the mid.
	Long cable fitted to the right nozzle.

To change the nozzle order:

1. Select menu 4.6.6 [Change Nozzle order].



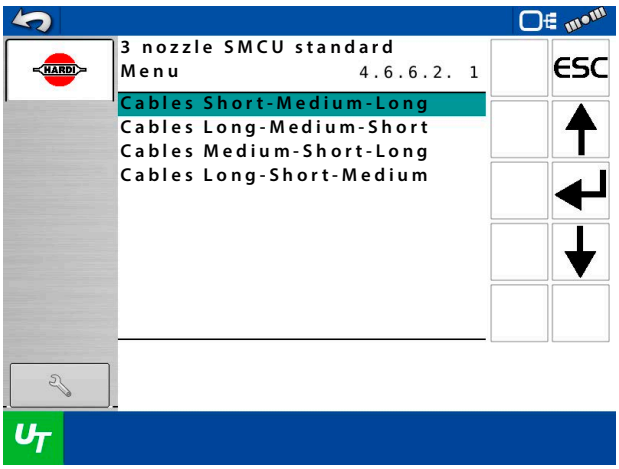
2. To find the SMCU to correct, count the SMCU's from left to right boom side, viewed in the driving direction.
3. Type in the SMCU number to correct.
4. Press ↵ to confirm.



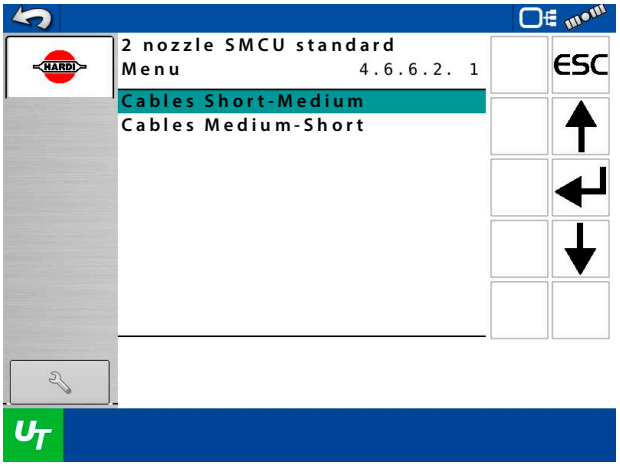
5. Select the cable configuration corresponding the one physically fitted from that SMCU to the nozzles on the sprayer.

NOTE! The cable order always is from left to right side of the boom, viewed in the driving direction.

NOTE! The cable combination "Short-Medium-Long" is default for a 3 nozzle SMCU.



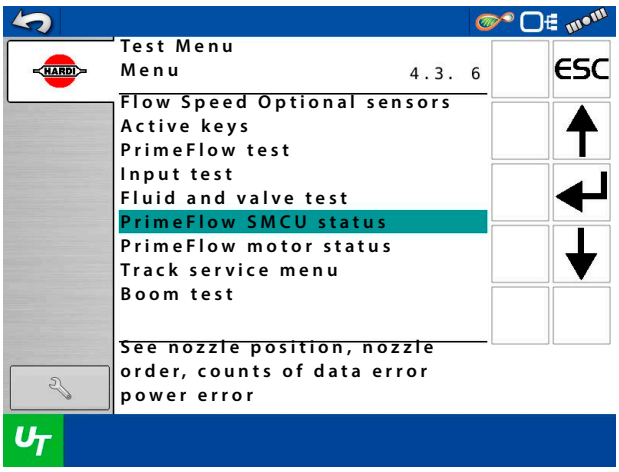
NOTE! The cable combination "Short-Medium" is default for a 2 nozzle SMCU.



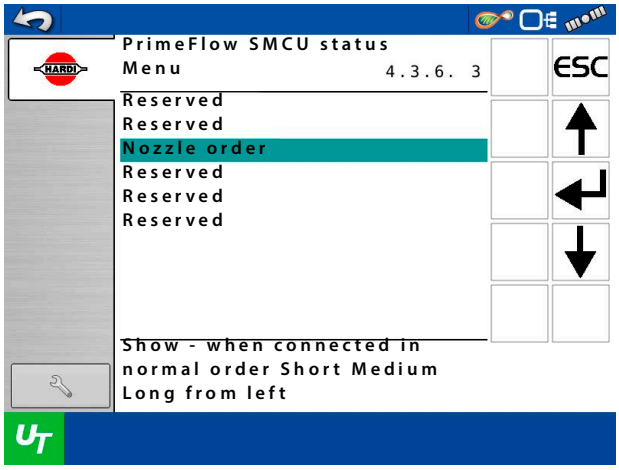
6. Press ↵ to confirm the choice.
7. Press ESC to leave the menu.

Verify the PrimeFlow Order

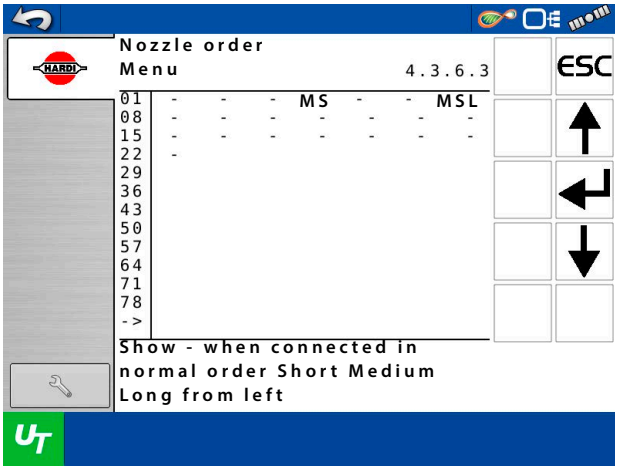
1. Go back to menu 4.3 [Test Menu].
2. Select Menu 4.3.6 [PrimeFlow SMCU status].



3. Now select Menu 4.3.6.3 [Nozzle order].



4. The SMCUs with a different nozzle order will show.



Menu 5 Save to fileserver

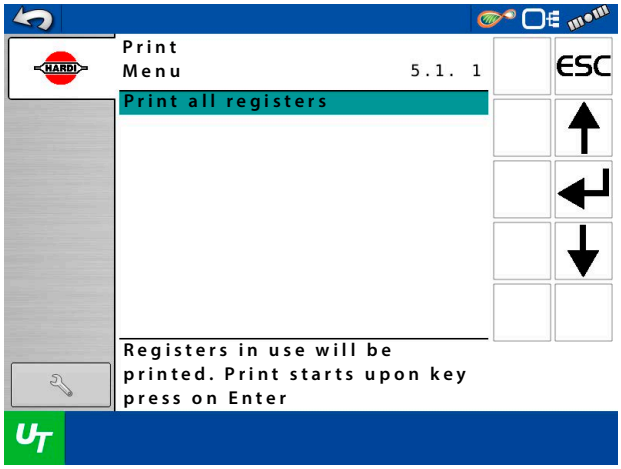
General Info

This menu is **not active**.

Menu 5.1 Print

Menu not used.In this menu, it is possible to print data stored in the register.

1. Plug in an USB stick to the controller.
2. Enter menu 5.1.1
3. Press ↵ to start printing.
4. Use a PC to read the printed data on the USB stick.



Initial Settings

System Start-up

Turn the SmartCom system ON at the rear side of the display.

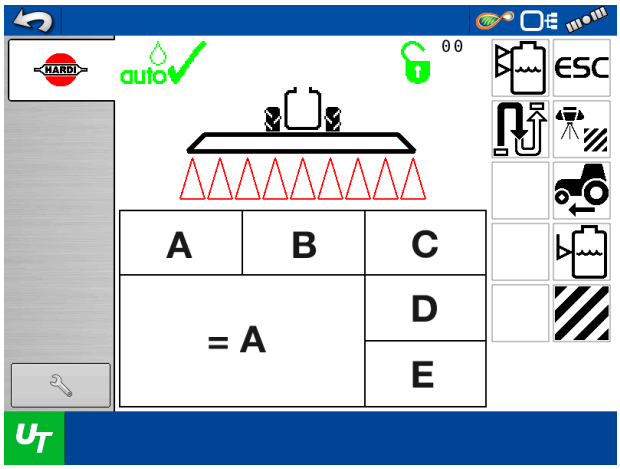
NOTE! This applies to HARDI displays. How to turn the SmartCom system ON, may differ when using other displays.

When turned ON:

- The system initiates itself.
- The HARDI UT screen becomes visible in the controller, when ready to use.

Display Readout

It is possible to freely choose which functions to be shown in the four boxes (B), (C), (D) and (E) of the display.



Box (A) will always show the actual volume rate.

The large box shows the same as box (A), as default. It is possible to change this to another readout by pressing one of the pre-set keys. However, this readout will change back to the actual volume rate when rebooting the controller.

Readout Selection

1. Go to menu 2.1 [Display readout].
2. Use ↑ or ↓ to choose which of following boxes you want the data shown and press ↵ to confirm.

   2.1.1 Show upper middle (B)

   2.1.2 Show upper right (C)

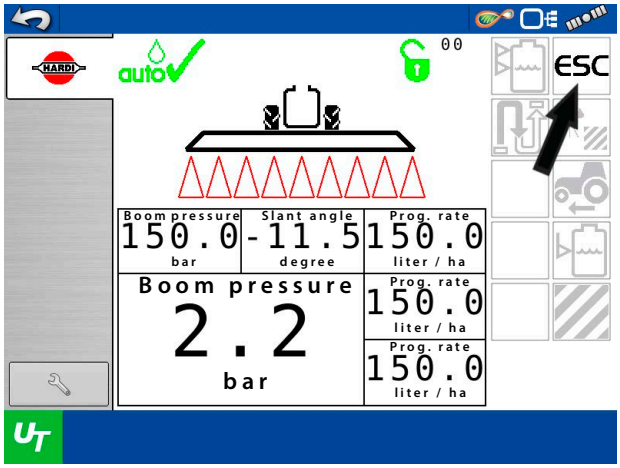
   2.1.3 Show lower middle (D)

   2.1.4 Show lower right (E)
3. Choose a submenu e.g. menu 2.1.1.04 [Work rate]. Press ↵ to confirm.
4. Press ESC to leave menu.

ATTENTION! For a full list of possible readouts, please refer to menu 2.1.1, menu 2.1.2, menu 2.1.3, menu 2.1.4 and menu 2.1.5 in “Full Menu Structure” on page 41.

ESC Key Setup

Select how to operate the ESC key in menu 2.1.5:



- Menu 2.1.5.1:

  Select this menu if there is no ESC button on the ISOBUS Terminal.

- Menu 2.1.5.2:

  Select this menu if the ISOBUS Terminal has a physical ESC button.

ATTENTION! Do only select menu 2.1.5.2 if the ISOBUS Terminal has a physical ESC button!

On-screen Softkey Functions

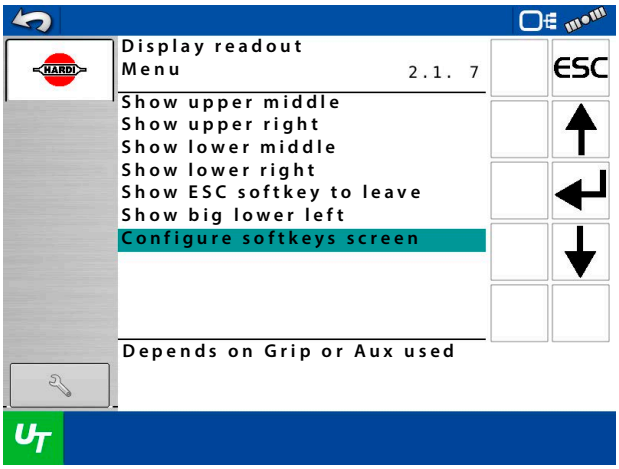
The arrangement of the softkey function buttons depends on the ISOBUS display used as spray controller. In addition, it also depends on the setup of the sprayer, i.e. if using softkey function buttons only or a Grip is added to the system.

Select Softkeys or Classic View

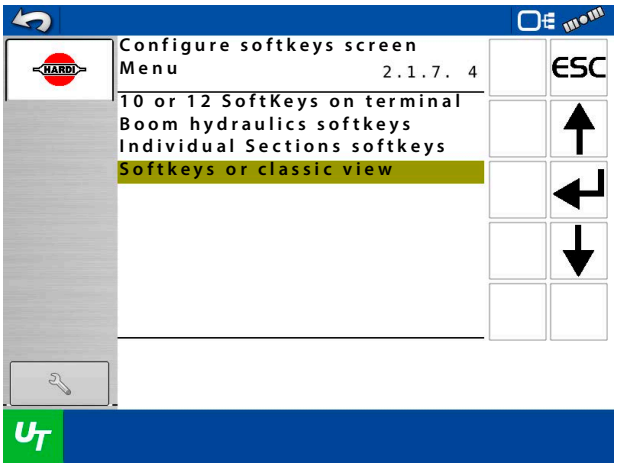
Use this menu to select whether to have a classic SmartCom user interface, or to use the softkey function buttons as replacement of the SetBox, with or without the Grip.

If having a Grip, the boom hydraulics mask not necessary to have on-screen softkey function, as the functions can be controlled from the Grip.

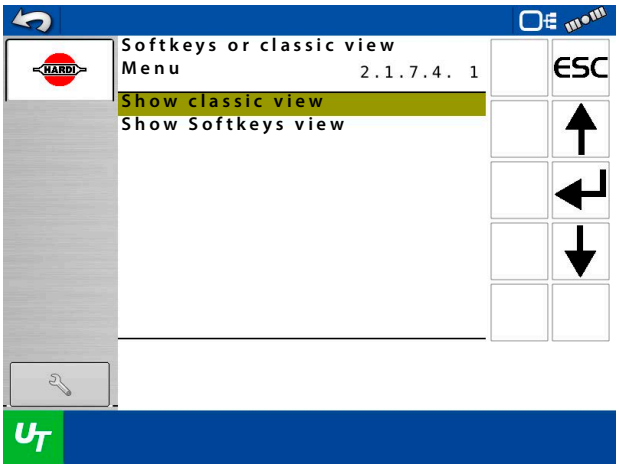
1. Select menu 2.1.7 [Configure softkeys screen].



2. Select menu 2.1.7.4 [Softkeys or classic view].



3. Turn the use of softkey masks ON/OFF by selecting either of the menus:
   - Menu 2.1.7.4.1 [Show classic view].
   - Menu 2.1.7.4.2 [Show Softkeys view].

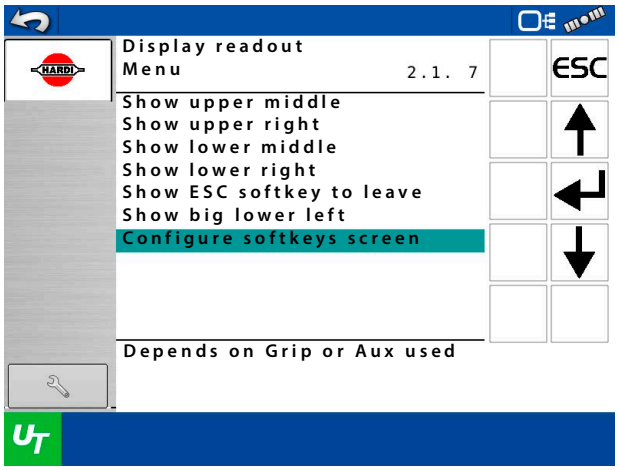


Setup Display with 10 or 12 Softkeys

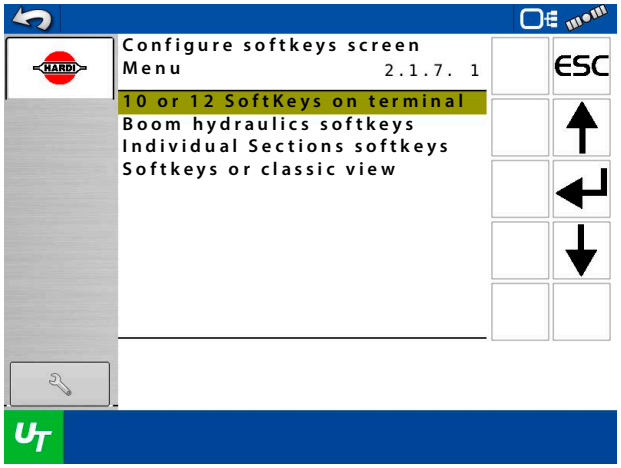
Displays have different grids. The number of slots for softkey function buttons can vary between 10 and 12 buttons. Therefore, check if your ISOBUS display support 10 or 12 button setups.

ATTENTION! If possible, adjust the setup to show 12 buttons for the best user experience.

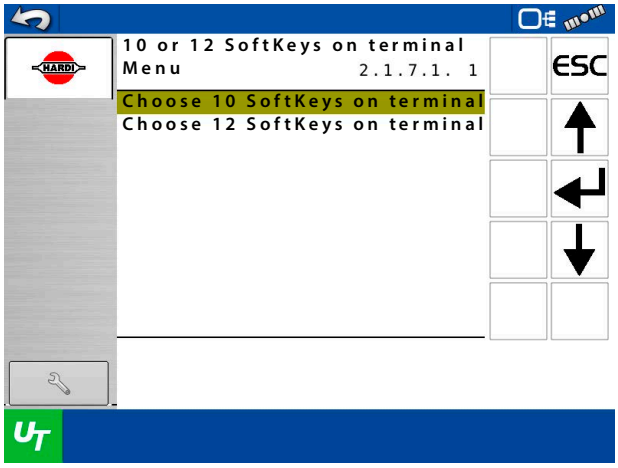
1. Select menu 2.1.7 [Configure softkeys screen].



2. Select menu 2.1.7.1 [10 or 12 SoftKeys on terminal].



3. Adjust to 10 or 12 buttons by selecting either of the menus:
   - Menu 2.1.7.1.1 [Choose 10 SoftKeys on terminal].
   - Menu 2.1.7.1.2 [Choose 12 SoftKeys on terminal].



Setup Softkey Masks

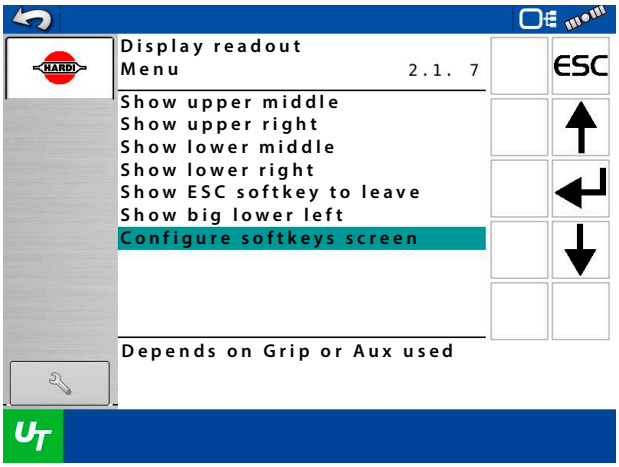
Depending on the controls available for the sprayer, then setup the softkey masks to fit this.

Boom Hydraulics Softkeys

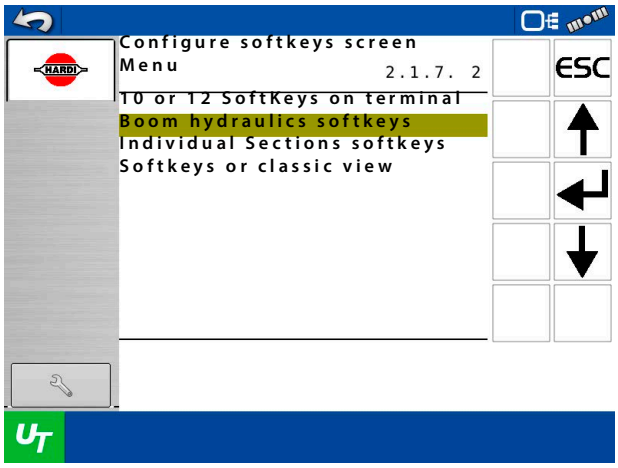
Set up this mask, depending on whether the system have a Grip or not.

If having a Grip, the boom hydraulics mask not necessary to have on-screen, as the functions can be controlled from the Grip.

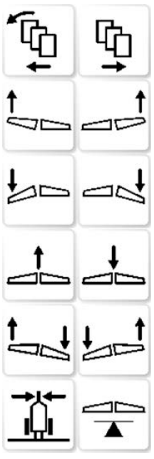
1. Select menu 2.1.7 [Configure softkeys screen].

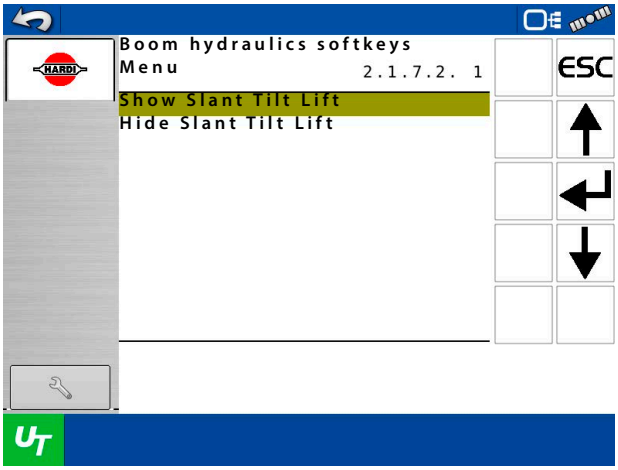


2. Select menu 2.1.7.2 [Boom hydraulics softkeys].



3. Turn boom hydraulics mask ON/OFF by selecting either of the menus:
   - Menu 2.1.7.2.1 [Show Slant Tilt Lift].
   - Menu 2.1.7.2.2 [Hide Slant Tilt Lift].



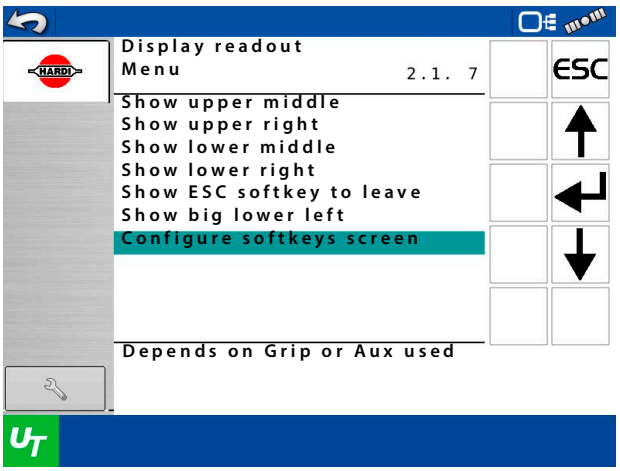


Individual Sections Softkeys

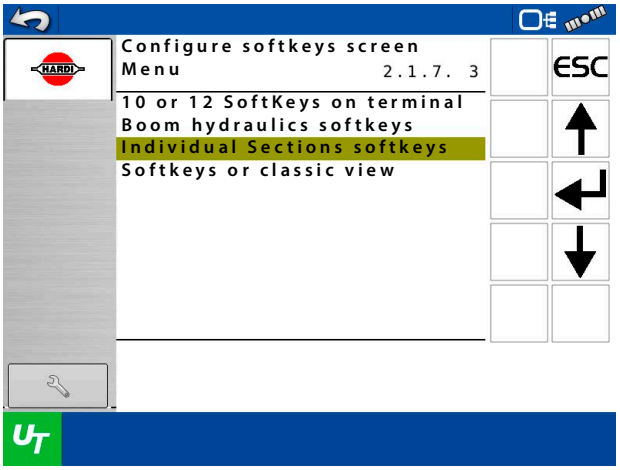
Set up this mask, depending on whether the system have a Grip or not.

If having a Grip, the individual sections mask not necessary to have on-screen, as the functions can be controlled from the Grip.

1. Select menu 2.1.7 [Configure softkeys screen].



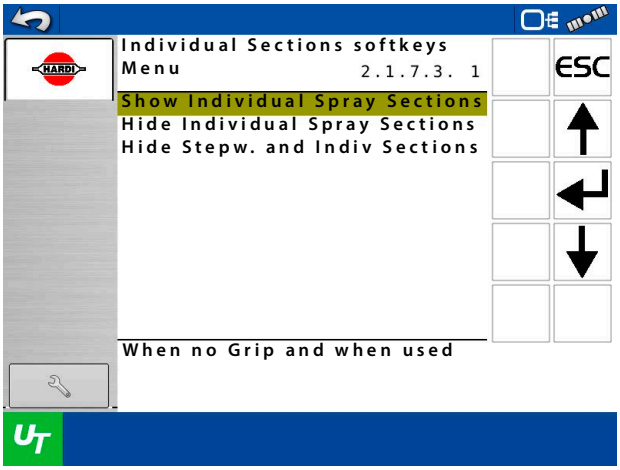
2. Select menu 2.1.7.3 [Individual Sections softkeys].



3. Turn individual sections mask ON/OFF by selecting either of the menus:

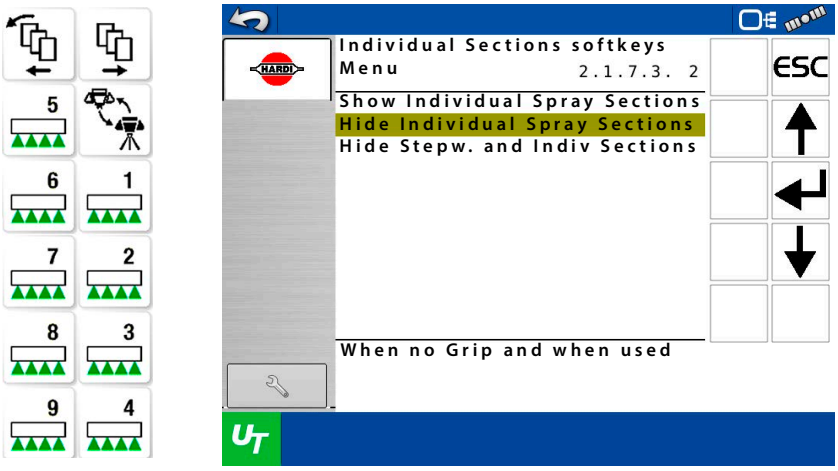
   - Menu 2.1.7.3.1 [Show Individual Spray Sections].

     Use this when using the softkey menus, because the sprayer is not equipped with a Grip.



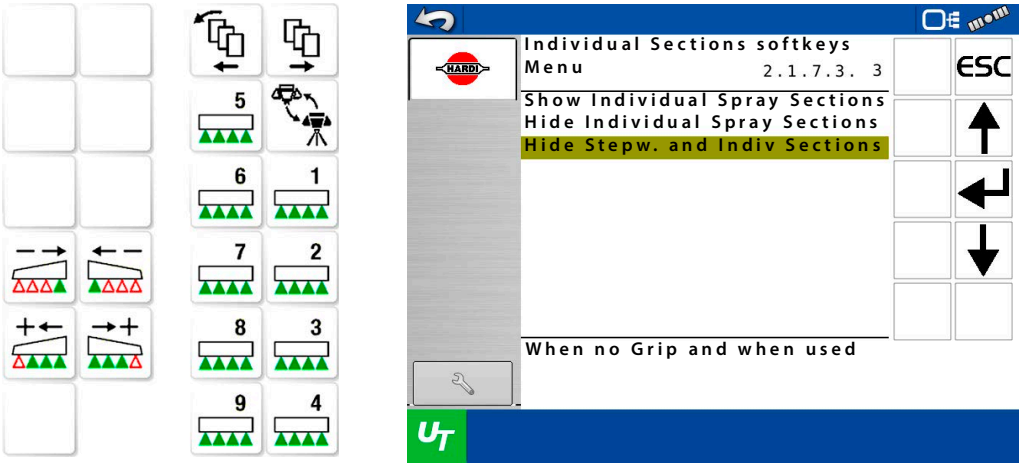
- Menu 2.1.7.3.2 [Hide Individual Spray Sections].

  Use this when the sprayer is equipped with a Grip, making the individual spray section softkeys unnecessary. However, selecting this menu, the softkeys for stepwise opening or closing the spray sections will remain visible.



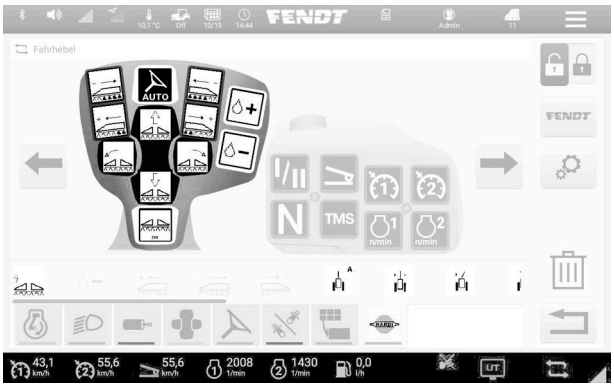
- Menu 2.1.7.3.3 [Hide Stepw. and Indiv Sections].

  Use this when the sprayer is equipped with a Grip, making the individual spray section softkeys unnecessary. Selecting this menu, the softkeys for stepwise opening or closing the spray sections will also be hidden.



Assigning AUX-N Function Softkeys

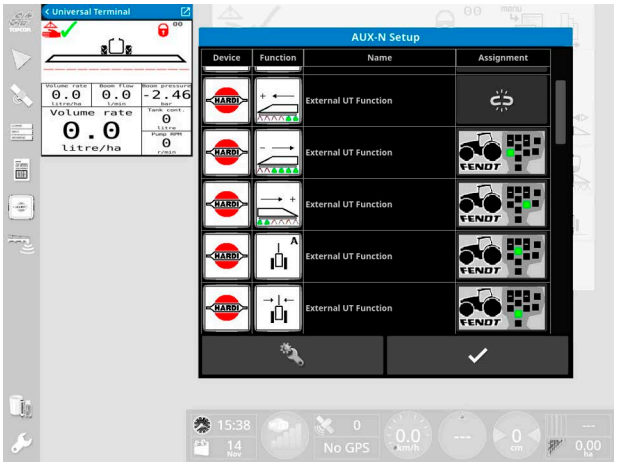
Softkeys on the HARDI UT can be assigned to a AUX-N control from 3rd party vendors as a quickly accessible function, e.g. on a tractor mounted joystick or display.



NOTE! It is possible to assign these 20 softkeys to the AUX-N function keys.

Main spray ON/OFF.	Open sections one by one from right to left.	Open sections one by one from left to right.	
Toggle AUTO / MANUAL spraying.	Close sections one by one from left to right.	Close sections one by one from right to left.	
Boom lift down.	Slant up left.	Left tilt up.	Right tilt up.
Boom lift up.	Slant up right.	Left tilt down.	Right tilt down.

The assigning of softkey buttons varies from product and/or vendor, and therefore not described in this book. Please refer to the instruction book for that product.



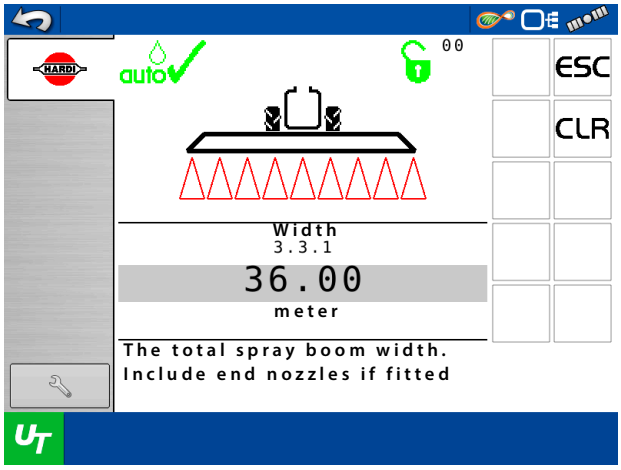
Boom Settings

Prior to the use of the SmartCom sprayer, it needs to be set up with boom data.

Menu 3.3.1 Width

Check that correct boom width is set.

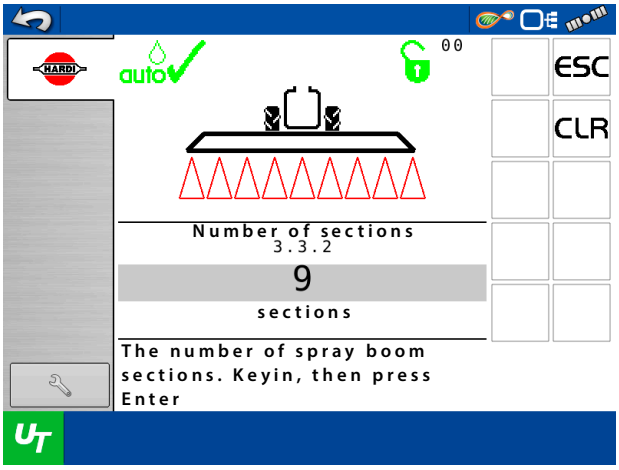
NOTE! This menu is read-only. Boom width is factory set for the specific sprayer configuration.



Menu 3.3.2 Number of sections

Check that correct number of boom sections is set.

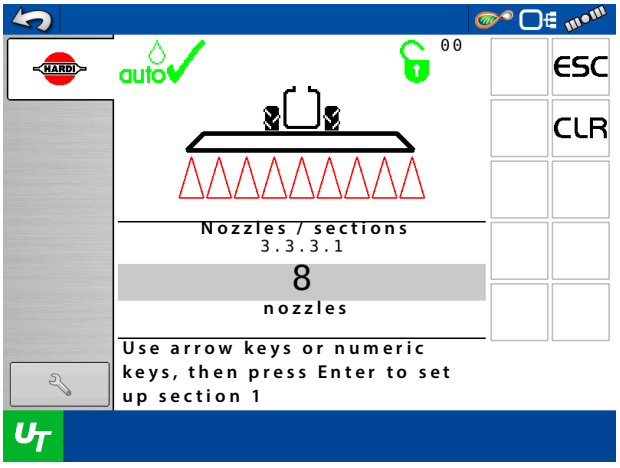
NOTE! This menu is read-only. Number of sections is factory set for the specific sprayer configuration.



Menu 3.3.3 Nozzles/sections

1. Set correct number of nozzles per section.
2. Press ↵ to continue to next boom section.
3. Press ↵ after the last section.

NOTE! The HARDI Service Centre already set this menu.



Trim the TankGauge Readout

In certain circumstances, it is possible to prevent doing a full-tank calibration by adjusting the TankGauge offset value.

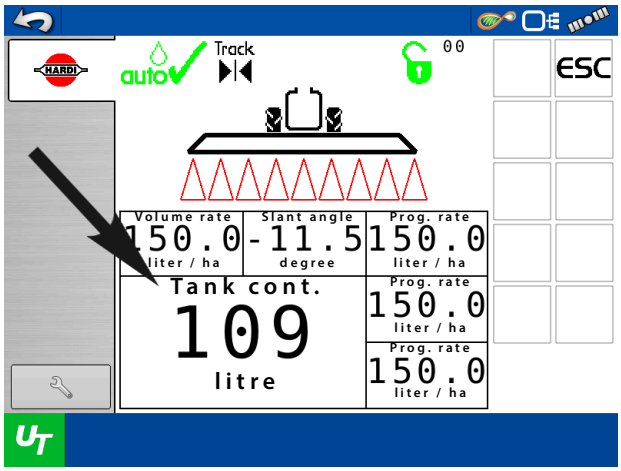
1. Attach the sprayer to the tractor used for the spray job. If adjustable, set at the desired drawbar height.

NOTE! HARDI recommend doing the TankGauge trim at the normally used filling place.

2. Fill 50 to 100 litres of water in the MainTank.
3. Engage the pump.
4. Circulate the water from MainTank to MainTank in order to fill suction filters.
5. Disengage the pump.

NOTE! It is important to stop the pump before the MainTank runs empty. It is necessary to repeat steps 3-9 if the pump sucks air before stopped.

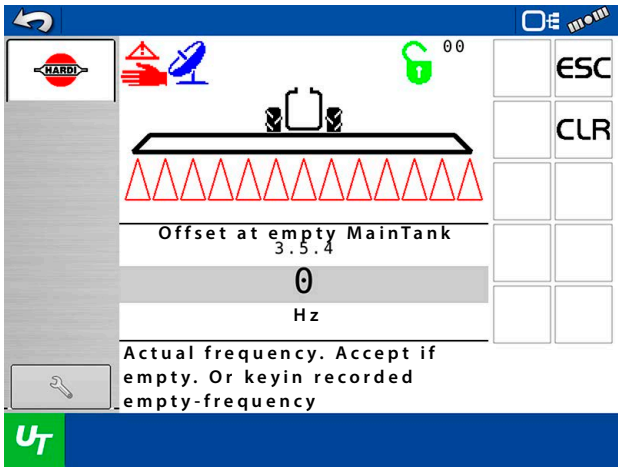
6. Empty MainTank completely. Depending on the sprayer, do this by pulling the drain valve handle or cord.
7. Fill a verified amount of e.g. 100 litres of water into the MainTank. Though not less than 20 litres.
8. Verify the amount registered on the display.



9. If this amount does not match the amount filled, adjust the offset Hz-value:

   In menu 3.5.4, adjust either up or down, until the exact filled amount matches the display readout.

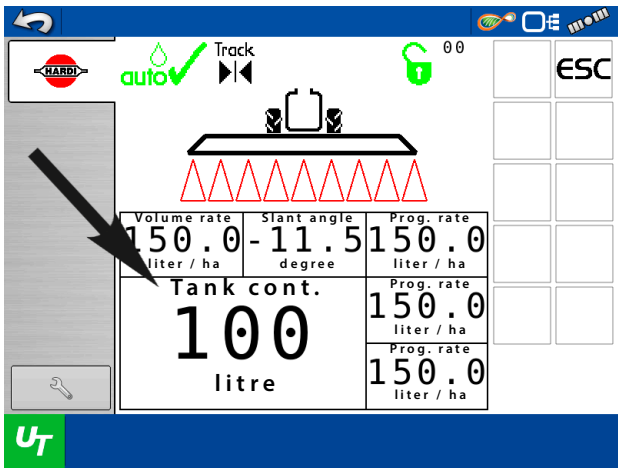
   - Frequency should not be below 100 Hz. Below this indicates a faulty TankGauge sensor.
   - Frequency should not exceed 180 Hz. Above this indicates a polluted or damaged TankGauge sensor.



NOTE! If the displayed amount set, to match the filled quantity requires a frequency outside 100-180 Hz, then check the sensor:

- If polluted, clean the sensor and repeat trim of the TankGauge readout.
- If damaged, replace the sensor and repeat trim of the TankGauge readout.

10. When the TankGauge readout trimmed, the display shows the amount as the verified amount filled.



NOTE! Only if the readout later shows inaccurate when spraying, it may be necessary to carry out a custom calibration of the TankGauge.

If the case, refer to "Custom Calibration of TankGauge" on page 94 for procedure.

Custom Calibration of TankGauge

Calibration of the HARDI TankGauge is necessary if the factory calibration shows inaccurate. E.g., a different placed hitch point on the tractor or other tyre fitting may result an inaccurate calculation of the tank contents.

Therefore, recommendation is to do the custom calibration with the sprayer attached to the tractor used for spraying. Note that later changes of tractor can affect the accuracy of the TankGauge.

Preparations Prior to Calibration

The sprayer needs to be level and the fluid system hoses, valves, etc. need to be primed (filled with water) prior to doing the calibration. If not done, the calibration will be inaccurate. This, because empty hoses will be filled during the calibration process.

1. Park the sprayer at the normally used filling place.

NOTE! Levelling the tractor and sprayer combination is of great importance as the accuracy is directly affected!

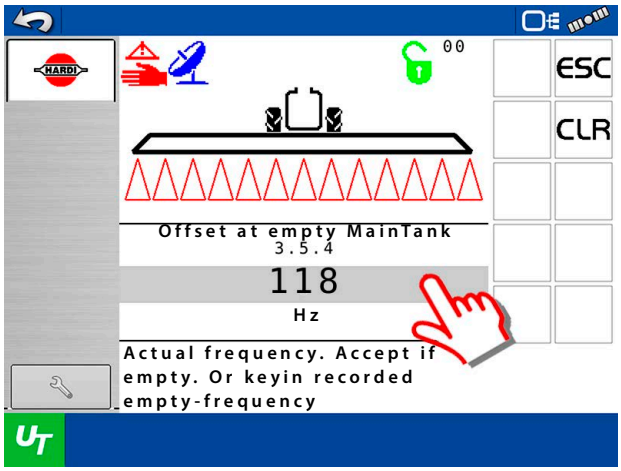
If assuming use of the same tractor after the custom calibration, it is not necessary for the sprayer to be level itself. However, for highest precision, the entire combination of tractor and sprayer must be level, i.e. placed on level ground. HARDI recommend doing the TankGauge calibration at the normally used filling place.

2. Unfold the boom.

   If not possible to unfold the boom: To bypass the nozzles, alternatively attach a hose of maximum 50 mm in diameter after the flowmeter unit. Larger hoses may cause inaccurate pressure measurement during calibration.

Priming Procedure

3. Depending on the sprayer, pull the drain valve handle or cord, to assure the MainTank is completely empty.
4. Select menu 3.5.4 [Offset at empty MainTank].
5. Press the offset readout to open the keypad.



6. Press ✔ to accept the MainTank empty value.

ATTENTION! Do not change the value!

NOTE! Typically, the value is between 100-150 Hz.

If reading a value much above this, the sensor may have dirt on it. If so, clean the sensor prior to proceeding.

7. Fill 50 to 100 litres of water in the MainTank.
8. Engage the pump.
9. Circulate the water in order to fill suction and pressure filters. During this procedure, also check that there are no leakages in the fluid system.
10. Close the agitation valve. If AutoAgitation set:
    A. Go to menu 2.2.3 [AutoAgitation select level].
    B. Select menu 2.2.3.5 [No agitation].

    Keep the agitation valve closed during the calibration procedure.
3. The system must be in Manual mode indicated by in the top of the display before turning on spraying. Press to change between Manual and Auto mode.
4. Set the main spray ON/OFF to spraying. All section valves must be open.
5. Manually set the spray pressure to 5 bar by pressing %+ or %÷.

    When set, keep this pressure during the calibration procedure.
6. Close the main spray ON/OFF to prime the bypass valve.
7. Disengage the pump.

NOTE! It is important to stop the pump before the MainTank runs empty. It is necessary to repeat steps 3-9, if the pump sucks air before stopped.

8. Empty MainTank completely. Depending on the sprayer, do this by pulling the drain valve handle or cord.

Filling the MainTank

9. There are two options for filling the MainTank with clean water for the custom calibration:

WARNING! Do not leave the sprayer whilst filling the tank and keep an eye on the level indicator in order NOT to overfill the tank.

A. Filling using an external calibrated flowmeter:
    1. Attach an external calibrated flowmeter.
    2. Prime the filling hose and attach it to the flowmeter.
    3. Set the flowmeter to zero litres or read the current value, depending on the flowmeter type.
    4. Completely fill the MainTank with water, via the external calibrated flowmeter.

        It is advisable to fill up the tank completely to the tank lid, as the water level must be above the nominal tank contents.
    5. For later purpose, note the amount of water filled.

ATTENTION! As the accuracy of the custom calibration is affected, it is of high importance that the external calibrated flowmeter measures the correct quantity within a 2% deviation.

B. Weight the sprayer before and after filling:

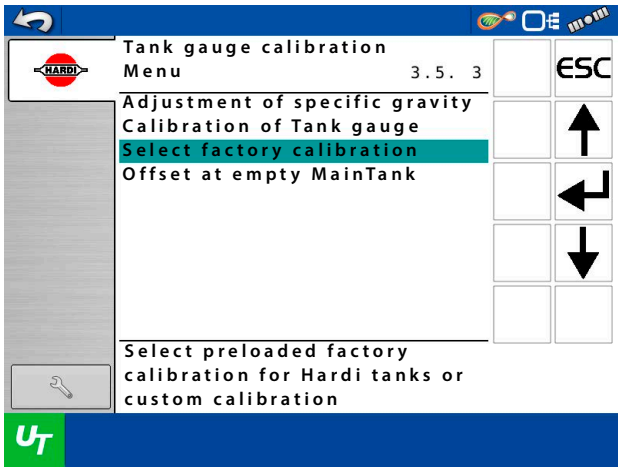
1. Place the sprayer on a weighting bridge.
2. Note the sprayer empty weight.
3. Completely fill the MainTank with water.

   It is advisable to fill up the tank completely to the tank lid, as the water level must be above nominal tank contents.
4. Note the sprayer weight with full MainTank.
5. Calculate the difference between full and empty weights that is the amount of water filled.
6. For later purpose, note the amount of water filled.

ATTENTION! As the accuracy of the custom calibration is affected, it is of high importance that the weighting bridge measures within a 2% deviation.

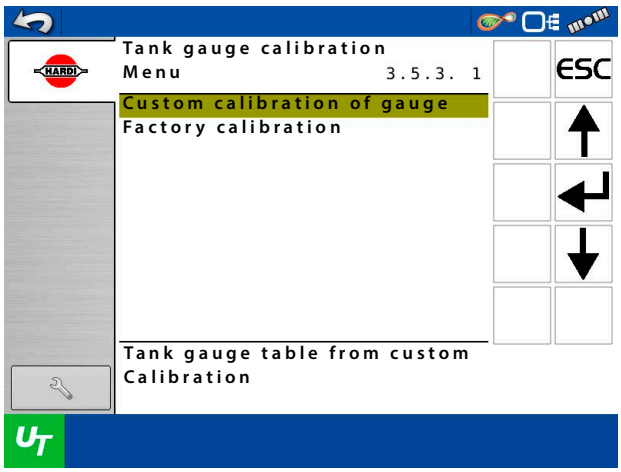
Custom Calibration

13. Select menu 3.5.3 [Select factory calibration].

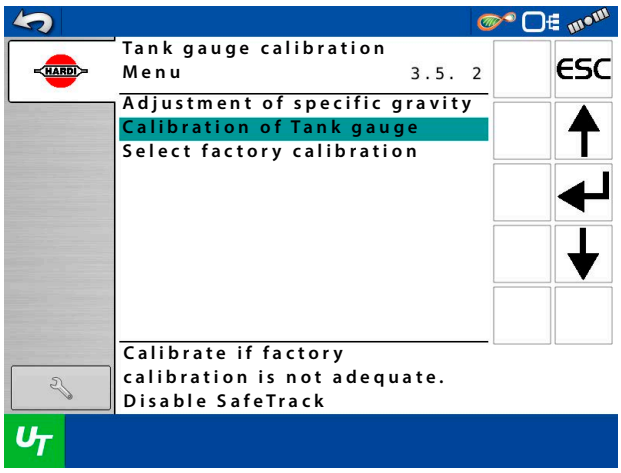


14. Select menu 3.5.3.1 [Custom calibration of gauge].

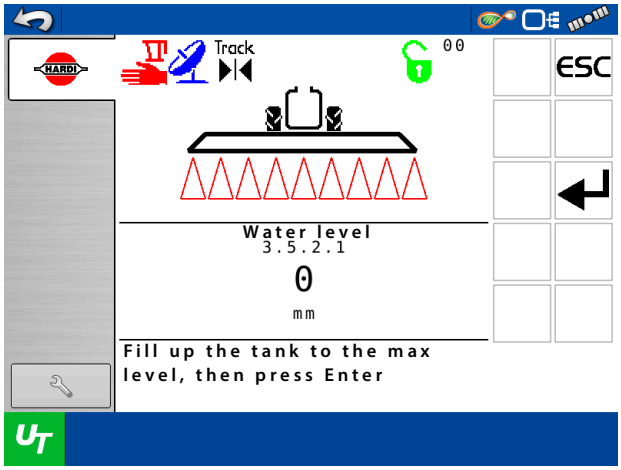
    This step is to ensure use of the custom TankGauge table after the calibration procedure has ended.



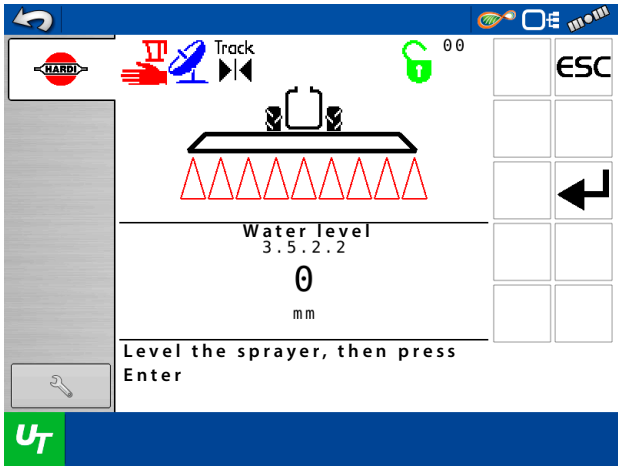
15. Select menu 3.5.2 [Calibration of Tank gauge].



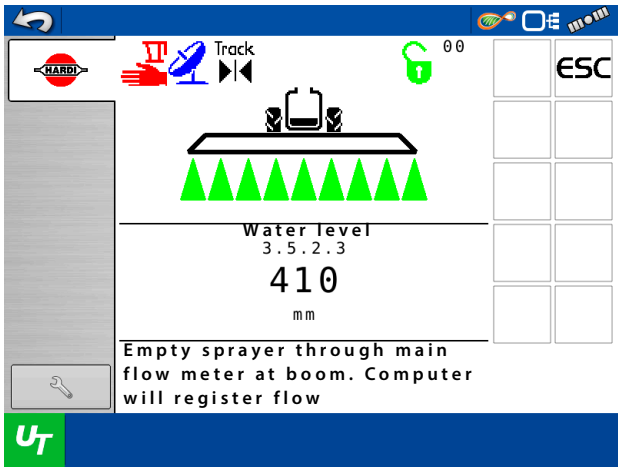
16. Menu 3.5.2.1 [Water level] appears.
17. Press ↵.



18. Engage the pump and set the PTO revolutions at 540 RPM or 1000 RPM (depending on the pump model).
19. Press ↵.



20. The SmartCom computer is ready to start the calibration process.

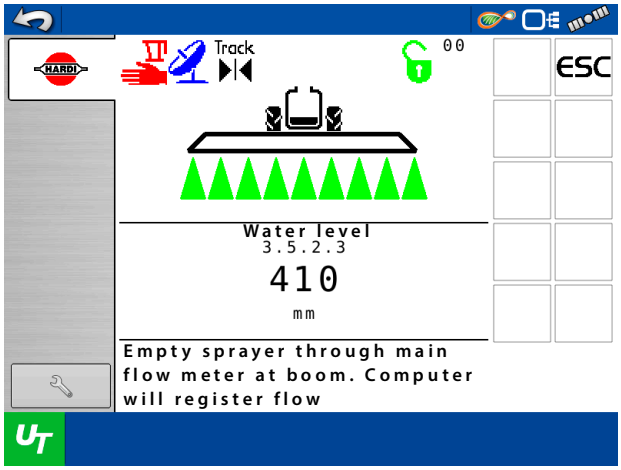


21. Press the main spray ON/OFF to open all boom sections and empty the tank. Now the pulses from the flowmeter continuously logged as data points.

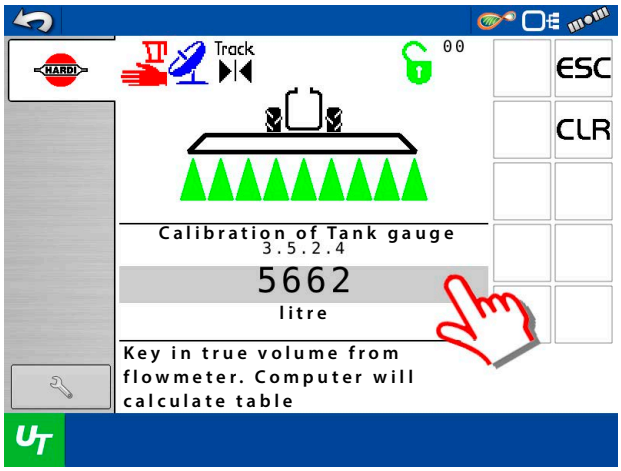
ATTENTION! On sprayers with BoomPrime or PrimeFlow, it is essential for the precision of the calibration, to press the main spray ON/OFF as quickly as possible after pressing ↵ in step 19.

22. During the emptying session, the screen shows the actual water level in millimetres measured from the bottom.

ATTENTION! It is essential not to change the spray pressure during the calibration procedure.



23. When the MainTank is empty, then the SmartCom computer automatically stop the calibration process and menu 3.5.2.4 [Calibration of Tank Gauge] appears in the display.
24. Press the volume readout to correct the displayed volume. Correct the volume to the actual quantity filled in step 12 “Filling the MainTank” on page 95.
25. Press the main spray ON/OFF to close the spray valves.
26. The new custom tank gauge table is calculated and the calibration of the HARDI TankGauge is finished.



Fluid Bypass Restriction

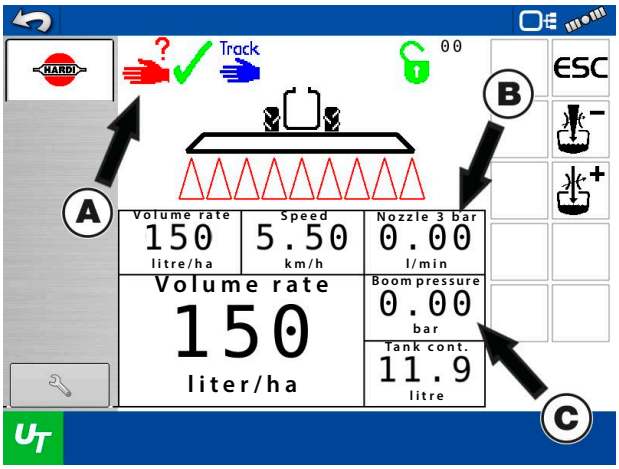
The purpose of this setup is to maintain a higher circulation pressure for a faster respond of the boom fluid system at e.g spot spraying.

Calibrating the Fluid Bypass Restriction valve (FBR valve) is necessary at initial start-up of the sprayer, and when doing a significant change of nozzle size.

Prerequisites

Prerequisites for correct calibration:

- If having PulseSystem, press to set in manual mode. Then press or to set 60% duty cycle in PulseSystem UT to perform a calibration of average DutyCycle.
- Never perform the FBR valve calibration if remain shown in display throughout the procedure (A).

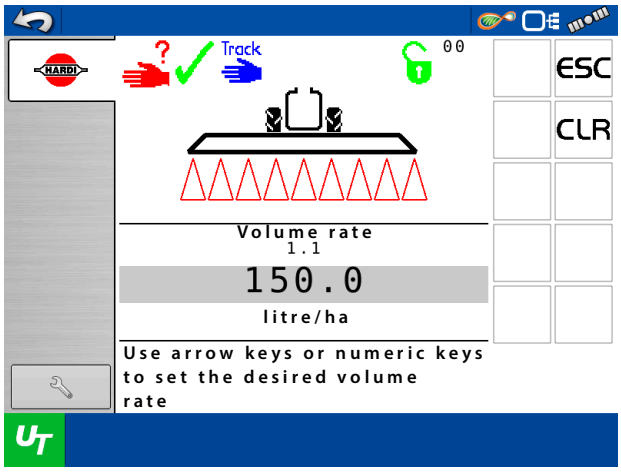


Preparations

1. Start by setting up the necessary work screen readouts in menu [2.1 Display readout]:
    - Set up the nozzle flow readout (B) in menu 2.1.x.33 [Nozzle size flow at 3 bar].
    - Set up the boom pressure readout (C) in menu 2.1.x.11 [Pressure].

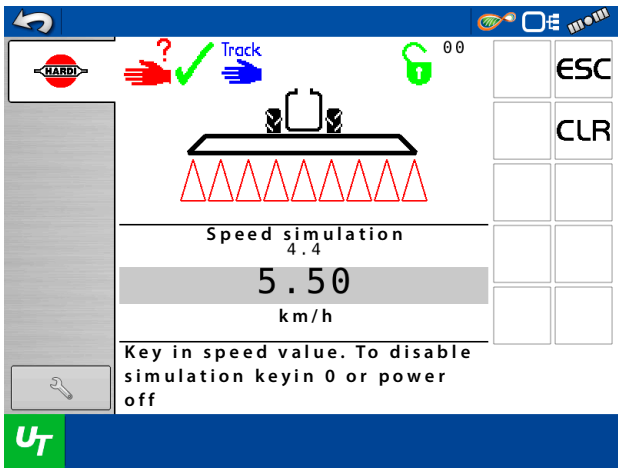
NOTE! Refer to "Menu 2.1 Display readout" on page 52 on how to set up display readouts.

2. For calibration purpose, fill water into the MainTank.
3. Drive to a suitable place where the water can be sprayed out.
4. Unfold the inner wings of the spray boom. The outer wings can remain folded.
5. Adjust the boom height to ½ meter above the ground.
6. Disable AutoSectionControl on the controller.
7. Set to desired application rate in menu 1.1 [Volume rate].



8. As the calibration is performed when stand still, then set a simulated speed value.

   Set the simulated speed to the normal driving speed during spraying, in menu 4.4 [Speed simulation] to gain 3 bar spray pressure.

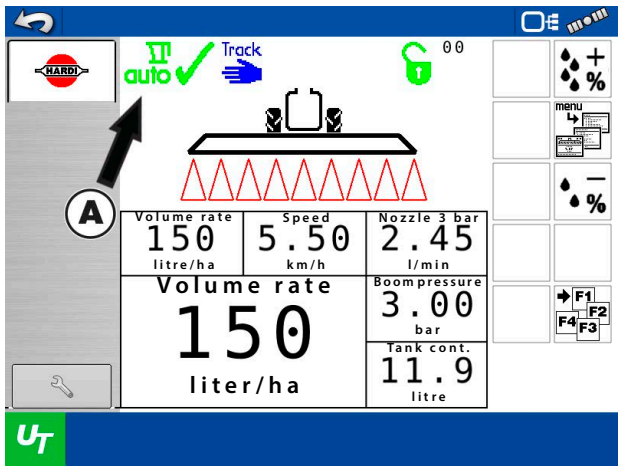


Calibration Procedure

1. Turn on the PTO to start the spray pump.
2. Turn on spraying by pressing the Main spray ON/OFF button.
3. The system must be in Auto-mode (A) indicated in the top of the display before turning on spraying. Press to change between Manual and Auto mode.

NOTE! If by some reason + or − has been pressed on the SetBox, then press auto before turning on spraying.

4. Observe that the pressure is stable.
5. Observe that the nozzle size at 3 bar has been calculated. The symbol (A) must show up.



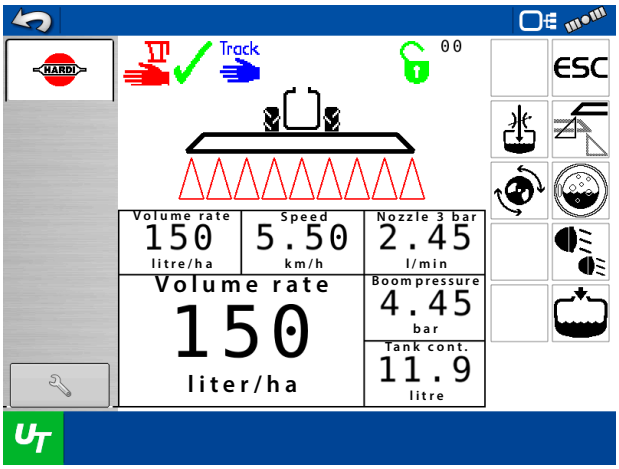
6. Close half of the spray section valves.

   If having an uneven number of sections, turn off one more section. E.g. if having 13 sections, turn off 7 sections.
7. Press to change between Manual and Auto mode. The system must be in Manual mode and set DynamicFluid4 in manual by pressing at %+ or %÷ briefly.

NOTE! If you have a SetBox, you can only set the DF4 in manual mode by pressing + or −.

8. Turn off spraying by pressing the Main spray ON/OFF button.

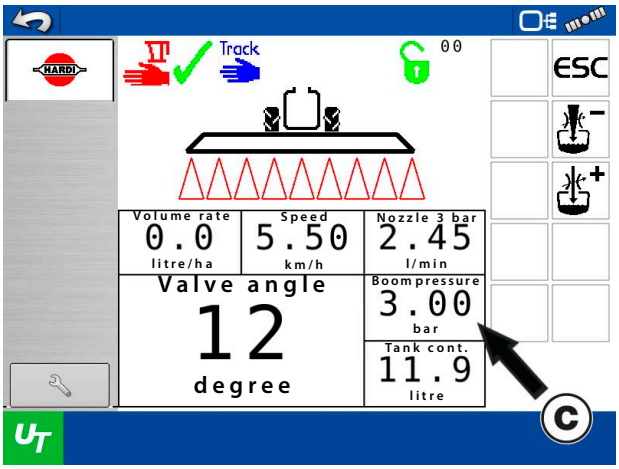
9. At the UT work screen, press F1 F2 F4 F3 to enter the options menu.
10. Press to enter the Fluid Bypass Restriction menu.



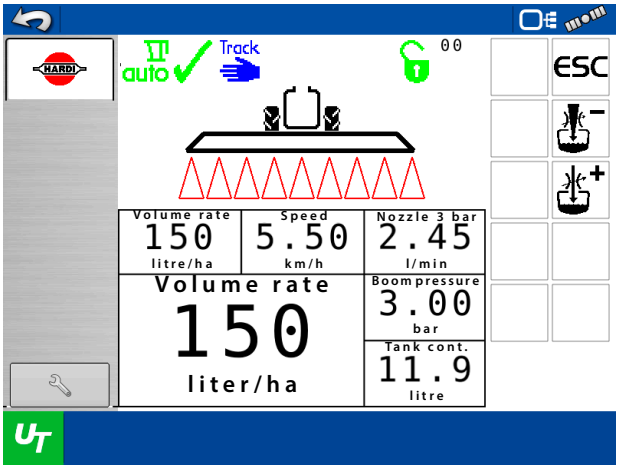
11. Adjust the FBR valve position, by pressing + or − until the desired circulation pressure (C) is reached.

NOTE! The desired circulation pressure defines as the same or approximately the same pressure, as the spray pressure. This, as the intention of the FBR valve is to avoid pressure fluctuation when opening/closing one or more nozzles, when spraying.

NOTE! If the display reads 69 degree after pressing + or −, it means the FBR valve is closed, which is not allowed.
If so, press − until the desired pressure is reached.



12. Set DynamicFluid4 in Auto mode auto by pressing Auto.
13. Turn on spraying by pressing the Main spray ON/OFF button. This still with half of the spray sections closed.
14. Turn off spraying by pressing the Main spray ON/OFF button.
15. Observe Headland pressure on UT and mechanical gauge.



After-calibration Check

1. Observe the spray pressure with the Main spray ON/OFF turned OFF, while having all spray sections ON.
2. Observe the pressure with Main spray ON/OFF turned OFF, while opening 1 spray section.

In both cases the pressure should stay at approximately same level as the spray pressure.

AutoWash after Spraying

ATTENTION! It is of great importance that the FBR valve is fully open when performing an AutoWash.
Therefore, press + or − until the display reads 0 (zero) degree, prior to start of any AutoWash procedure.

Steering Compensation

General Info

For trailed sprayers equipped with IntelliTrack or ComfortTrack, it is important for AutoSectionControl and AutoNozzleControl performance, that the display take active steering into account.

Some displays have built-in functionality to compensate for the difference in boom behaviour when the sprayer uses active steering, compared to sprayers without active steering. The steering compensation should also correspond to the type of steering the sprayer is equipped with, i.e. steering drawbar (IntelliTrack) or steering wheels (ComfortTrack).

Using a different type of active steering compensation than the sprayer is equipped with, may reduce AutoSectionControl or AutoNozzleControl performance, compared to using no compensation at all.

If the display does not support the correct type of steering compensation corresponding to the sprayer, it is still possible to improve AutoSectionControl and AutoNozzleControl performance by using a modified length geometry for the sprayer and the tractor drawbar.

Correct setup will ensure the graphical behaviour of the boom in the display, to resemble the physical behaviour of the boom more closely. This will improve AutoSectionControl and AutoNozzleControl performance, by avoiding potential gaps or overlaps.

Setup Selection

The following sections describes the necessary setup procedure for IntelliTrack and ComfortTrack, using the HC 8700/9700 displays. For other displays, the procedure often is like the procedure for HC 8700/9700 displays.

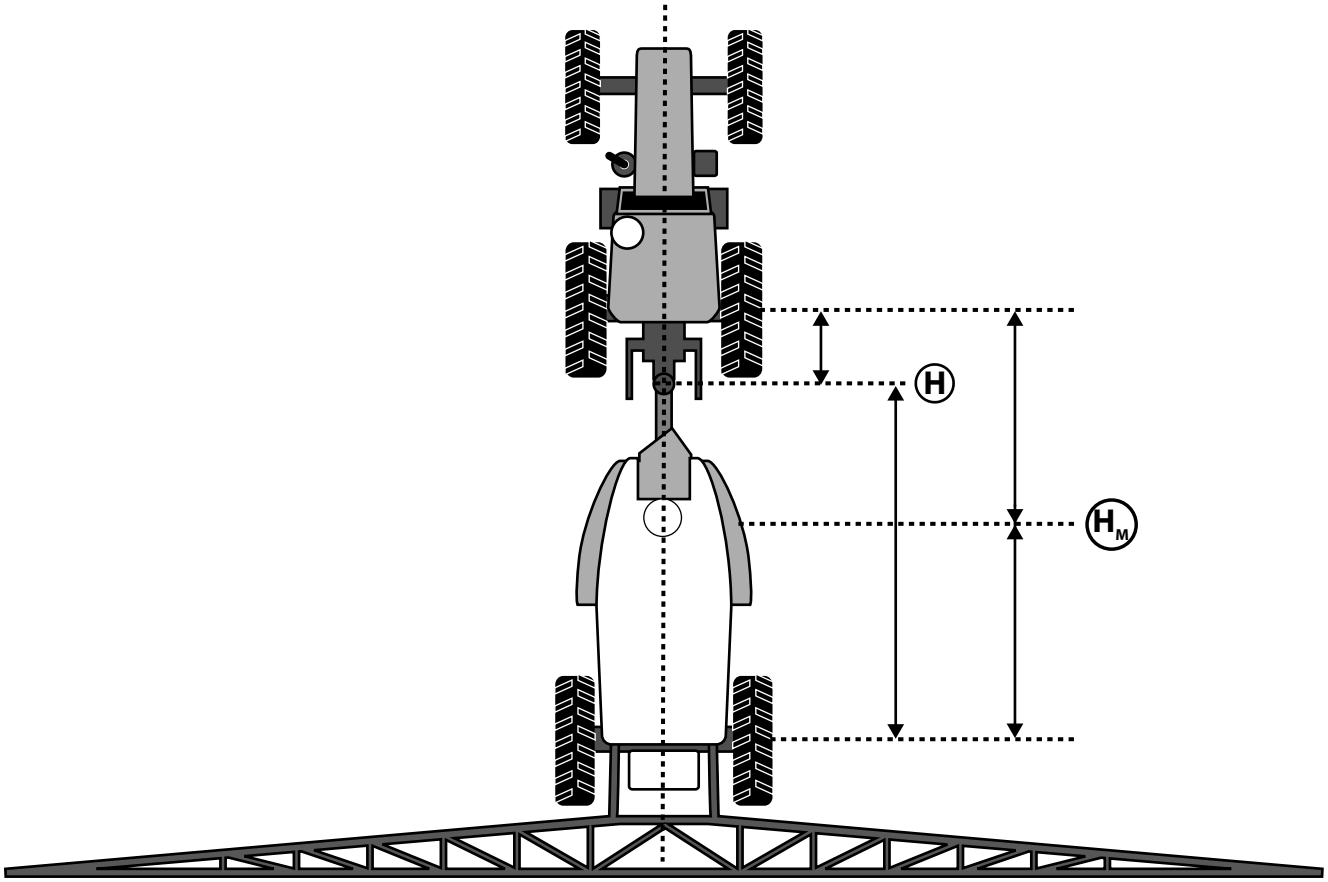
Use the schematic to find the correct setup for your sprayer:

Sprayer	Display		Necessary Setup
NAVIGATOR without IntelliTrack	HC 8700/9700		Use setup for "NAVIGATOR with IntelliTrack using HC 8700/9700 (EU)" on page 103.
NAVIGATOR with IntelliTrack (EU)	HC 8700/9700		Use setup for "NAVIGATOR with IntelliTrack using HC 8700/9700 (EU)" on page 103.
NAVIGATOR without IntelliTrack	Other display		Setup procedure like "NAVIGATOR with IntelliTrack using HC 8700/9700 (EU)" on page 103.
NAVIGATOR with IntelliTrack (EU)	Other display	The display have active steering based on a steerable drawbar.	Select active steering based on a steerable drawbar in the display.
		No active steering functionality or different type of active steering in the display.	Setup procedure like "NAVIGATOR with IntelliTrack using HC 8700/9700 (EU)" on page 103.
AEON	HC 8700/9700	Display software before 5.02.24	Use setup for "ComfortTrack together with early HC 8700/9700 Display Software" on page 109.
		From display software 5.02.24	Use setup for "ComfortTrack together with later HC 8700/9700 Display Software" on page 108.
AEON	Other display	The display have active steering based on steerable wheels.	Select active steering based on steerable wheels in the display.
		No active steering functionality or different type of active steering in the display.	Setup procedure like "ComfortTrack together with early HC 8700/9700 Display Software" on page 109.

NAVIGATOR with IntelliTrack using HC 8700/9700 (EU)

It is possible to model an active steering using a steering drawbar, by artificially modifying the position of the hitch point (H) between the tractor and sprayer, to a location halfway between the tractor rear axle and the sprayer axle (H_M). This requires modification of both the tractor and implement geometry.

NOTE! Only use this procedure if the controller do not support active steering by a steerable drawbar.



NOTE! Only use the tractor with modified geometry for spray jobs using active IntelliTrack steering compensation. For all other tasks, use a tractor configuration with real geometry.

NOTE! If turning IntelliTrack off, use a tractor and implement selection with their real geometry.

Setting up the HC 8700/9700 Display

Follow the procedure below to add active steering compensation using adjusted geometry.

The adjusted geometry virtually moves the location of the hitch point backwards in the display. This will improve the displayed model of boom behaviour.

NOTE! If using the sprayer without active IntelliTrack steering, then deactivate the steering compensation. To deactivate active steering, use the procedure as below, using the real geometry instead.

ATTENTION! Always set the tractor geometry to the real measurements, when using it for all other tasks.

1. The lengths given in step 5 gives a good accuracy. However, if very high accuracy necessary, start accurately measuring the distances (B) and (E) on the tractor and sprayer.
2. Then calculate the modified lengths used in the following steps:

For example the tractor and sprayer measures:

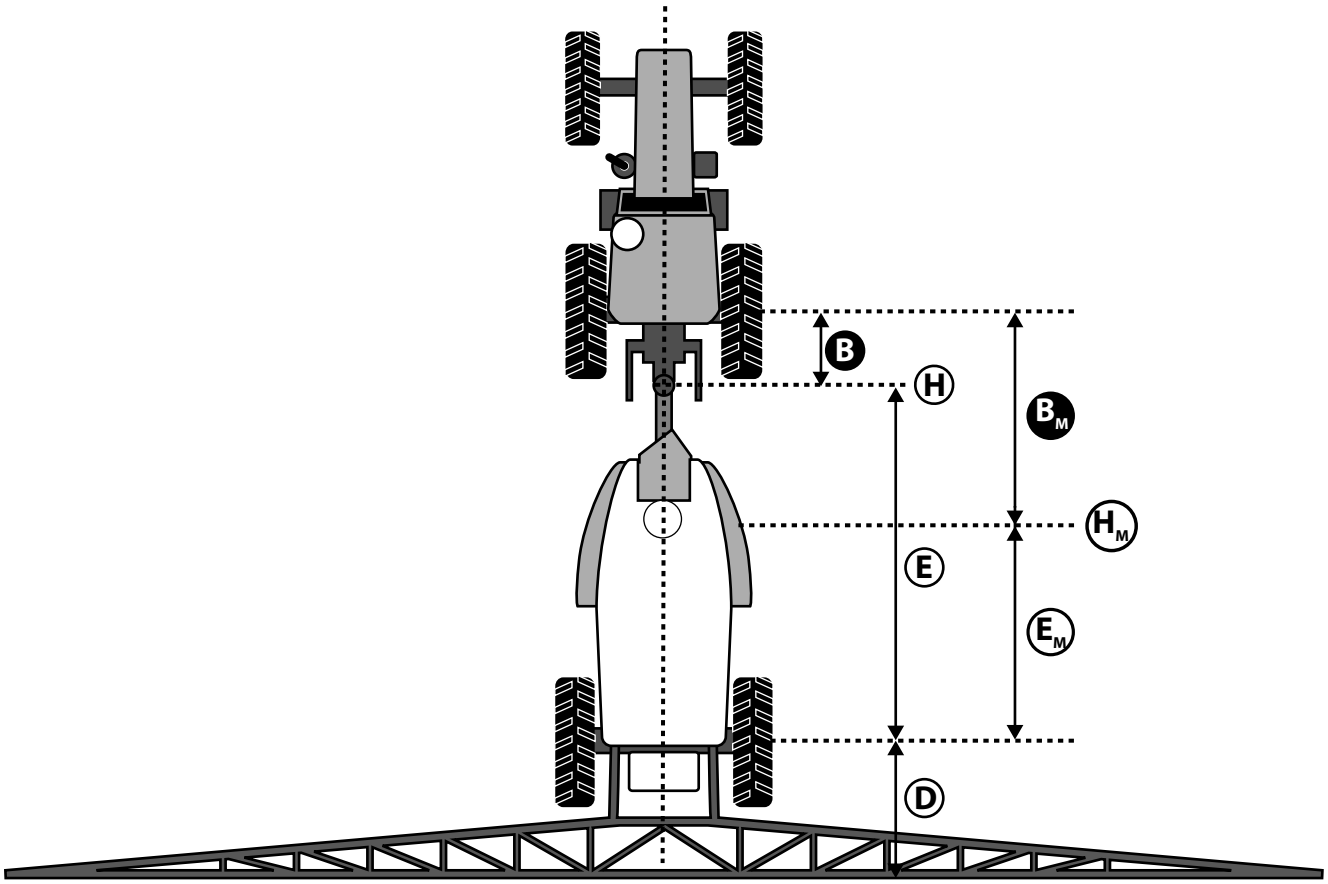
B	=	850 mm
D	=	2100 mm
E	=	5200 mm
Total Length	=	8150 mm

Calculated modified lengths are:

$$B_M = E_M = \frac{(B + E)}{2} = \frac{(850\ mm + 5200\ mm)}{2} = 3025\ mm$$

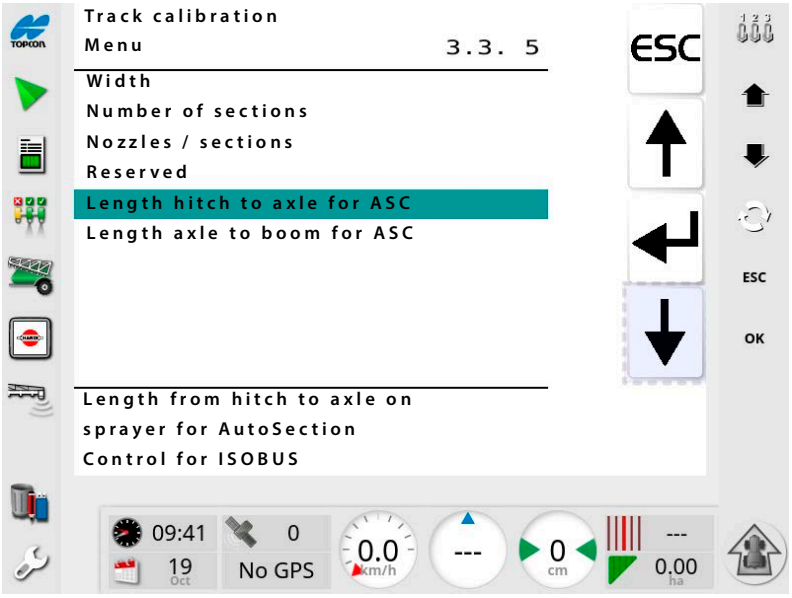
Check the calculation to match the total length:

- $B_M + E_M + D = 3025\ mm + 3025\ mm + 2100\ mm = 8150\ mm$ = Modified lengths OK.



3. Press  to enter the HARDI Universal Terminal menu in the HC 8700/9700 display.

4. Navigate to menu no. 3.3.5.



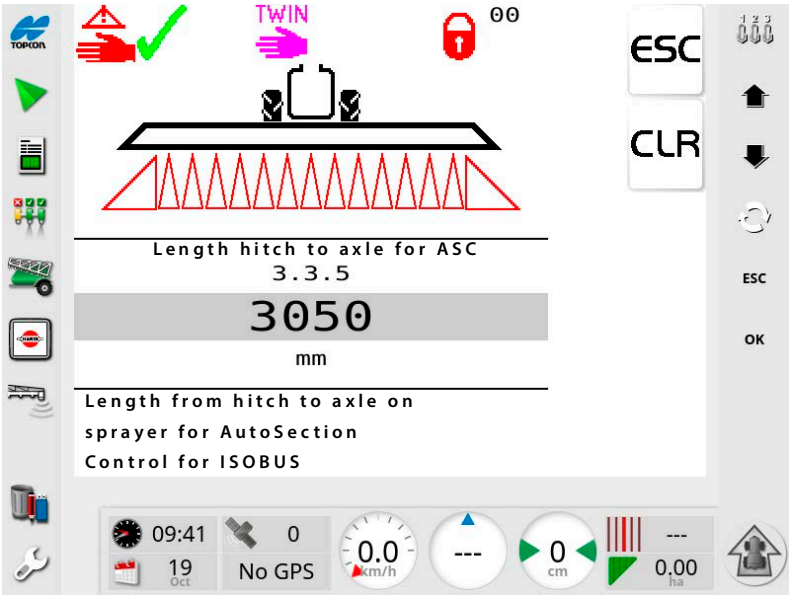
5. Enter the length from hitch to axle, using the lengths calculated in step 2 or the values below:

   With compensation:

Sprayer	Hitch to Axle
NAVIGATOR 3000/4000 litres	2650 mm
NAVIGATOR 5000/6000 litres	3050 mm

   Without compensation (real lengths):

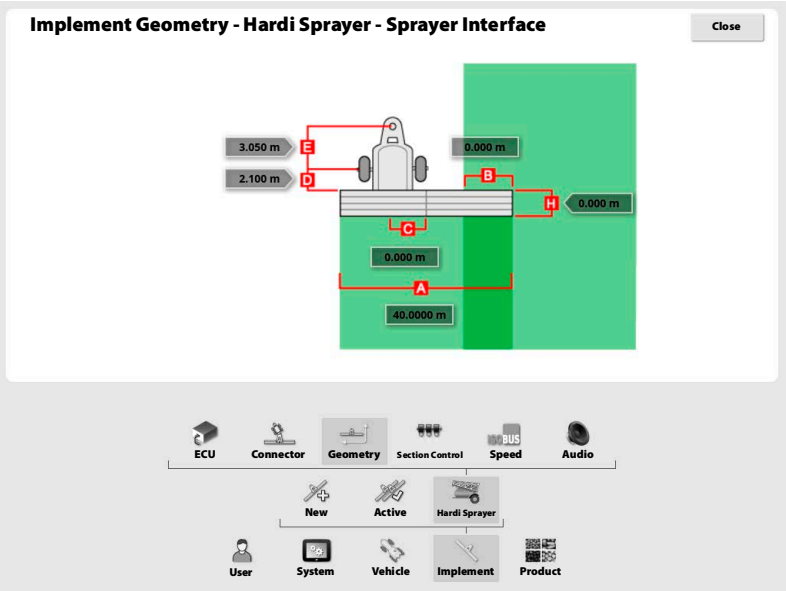
Sprayer	Hitch to Axle
NAVIGATOR 3000/4000 litres	4500 mm
NAVIGATOR 5000/6000 litres	5300 mm



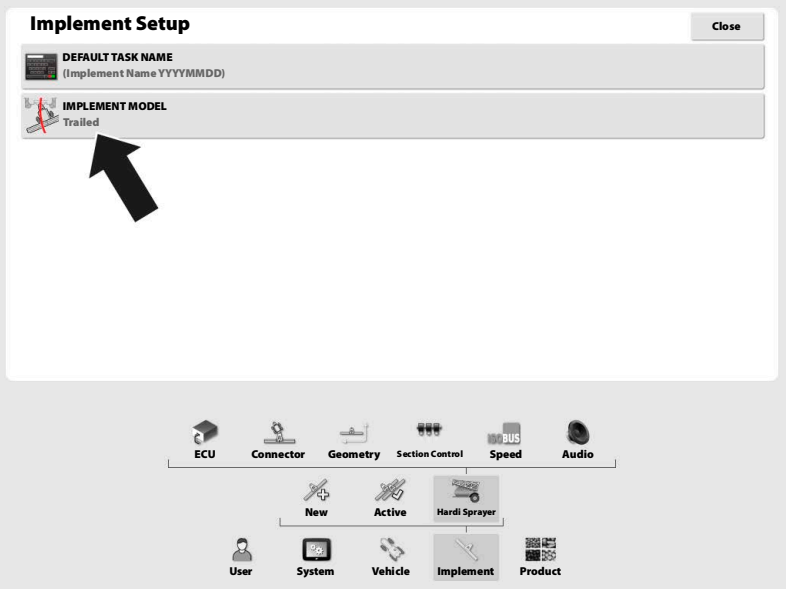
6. Press ESC until the main Universal Terminal screen is visible.
7. Disconnect and reconnect the sprayer by disconnecting and reconnecting the ISOBUS connector.
8. Press on the HC 8700/9700 display.

9. Navigate to Implement Geometry:
    - Select Implement, then
    - Hardi Sprayer, then
    - Geometry.

    When correctly adjusted, the screen display the value E as set in step 5.



10. Navigate to Implement Setup:
    - Select Implement, then
    - Hardi Sprayer.
11. The button "IMPLEMENT MODEL" should read "Trailed".



12. Navigate to Vehicle Geometry:
    - Select Vehicle, then
    - Geometry.
13. In "Vehicle Geometry" menu:
    A. Press B 0.000 m.
    B. Set the distance from the rear axle to the hitch point on the tractor to following:

    Value B_M calculated in step 2, or

    $B_M = B_{real} + X$

    where X is:

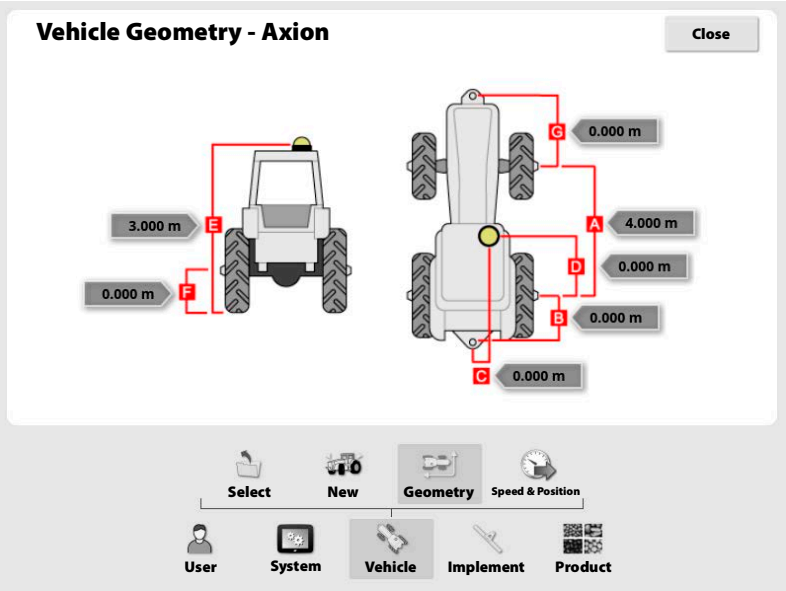
1850 mm	NAVIGATOR 3000/4000
2250 mm	NAVIGATOR 5000/6000

    Example for NAVIGATOR 5000:

    Tractor axle to hitch distance = 800 mm.

    Rear drawbar distance to enter is:

    800 mm + 2250 mm = 3050 mm = 3.050 m.



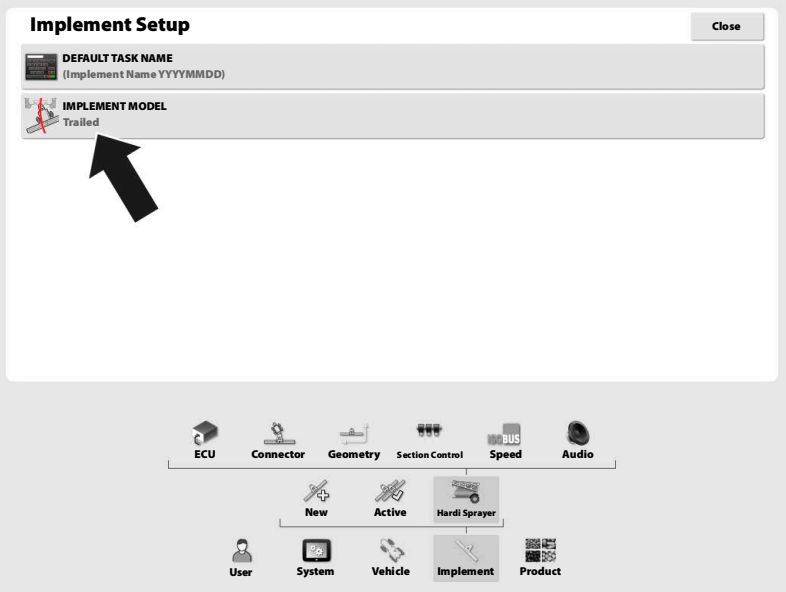
ATTENTION! Always set the tractor geometry to the real lengths, when using it for all other tasks.

14. Confirming this, the setup now completed.

NOTE! Only use this procedure when IntelliTrack is active. If IntelliTrack not active, both the distance "B" on the tractor and the distance set in HARDI Universal Terminal menu 3.3.5 must be set to the real values.

NAVIGATOR without IntelliTrack using X25 and X35

1. Navigate to Implement Setup:
    - Select Implement, then
    - Hardi Sprayer.
2. The button "IMPLEMENT MODEL" should read "Trailed".



AEON with ComfortTrack (EU)

By artificially modifying the position of the axle, it is possible to model active steering using steerable wheels to a location closer to the tractor. This requires modification of the implement geometry.

Only use the below configurations when ComfortTrack is active. If turning off the ComfortTrack, then use a configuration with normal geometry.

To deactivate the steering compensation with adjusted geometry as described, follow the procedures below using the real geometry instead.

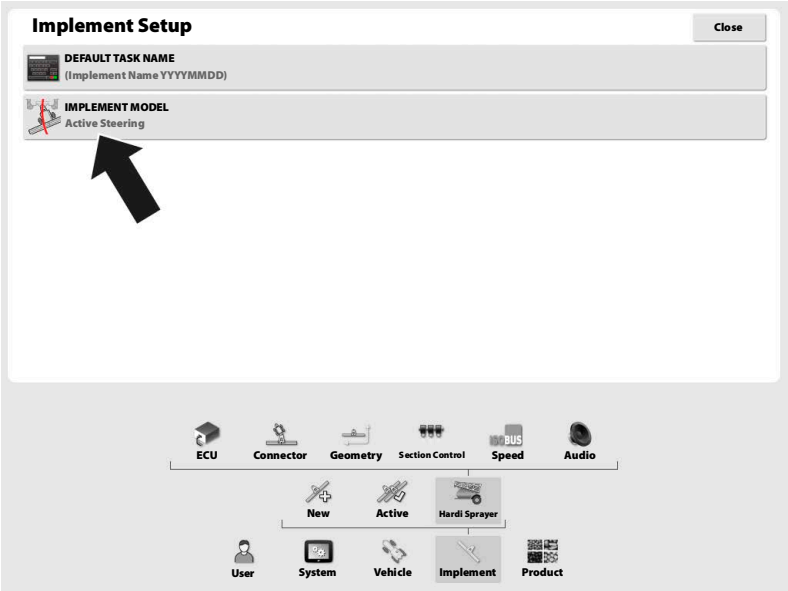
NOTE! Only use this procedure if the controller do not support active steering by steerable wheels.

ComfortTrack together with later HC 8700/9700 Display Software

ATTENTION! For display software 5.02.24 and later.

1. Navigate to Implement Setup:
    - Select Implement, then
    - Hardi Sprayer.
2. The button "IMPLEMENT MODEL" should read "Active Steering".

NOTE! If ComfortTrack deactivated, select "Trailed".



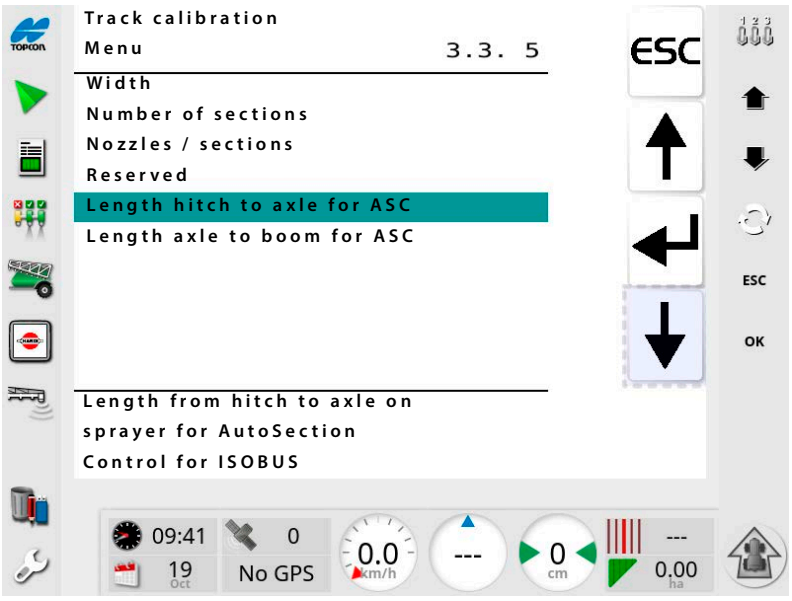
ComfortTrack together with early HC 8700/9700 Display Software

NOTE! For software before SW 5.02.24.

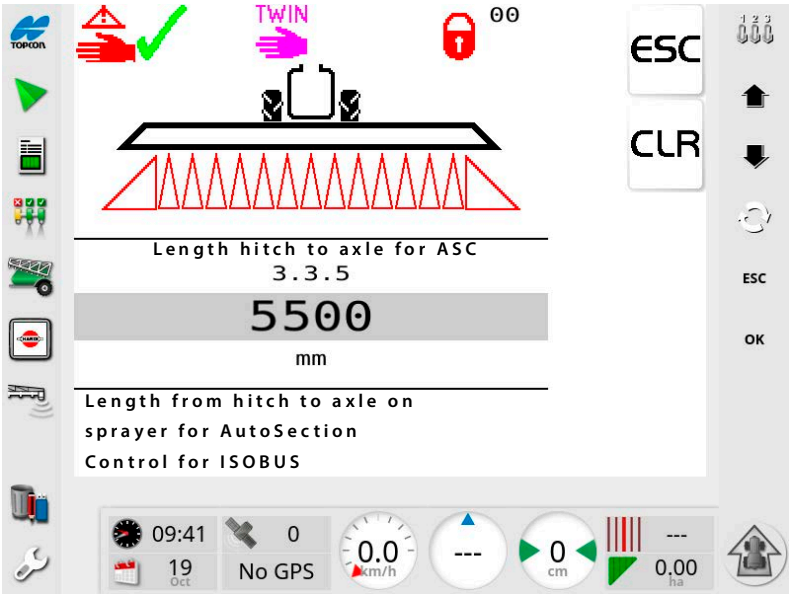
NOTE! If using the sprayer without active ComfortTrack steering, then deactivate the steering compensation. To deactivate active steering, use the procedure as below, using the real geometry instead.

The setup moves the calculated axle location forward in the display. This improves the displayed model of boom behaviour.

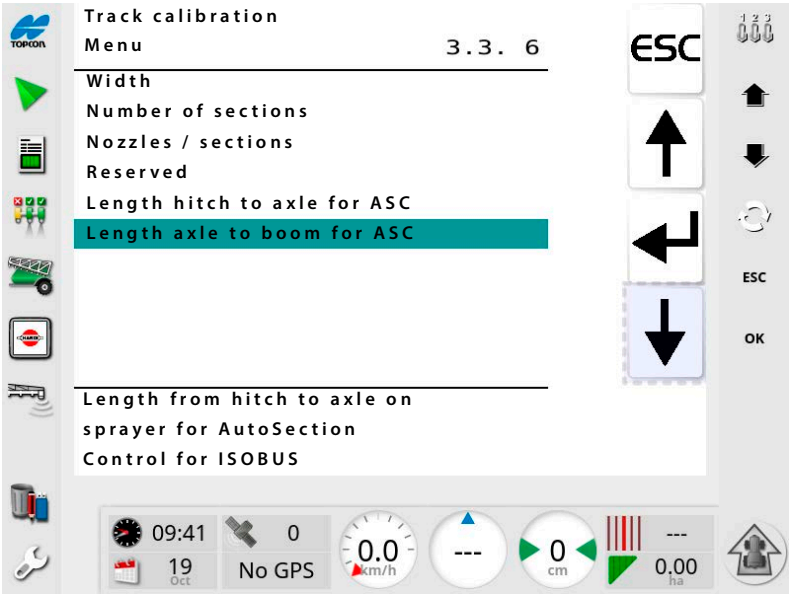
1. Press to enter the HARDI Universal Terminal menu in the HC 8700/9700 display.
2. Navigate to menu no. 3.3.5.



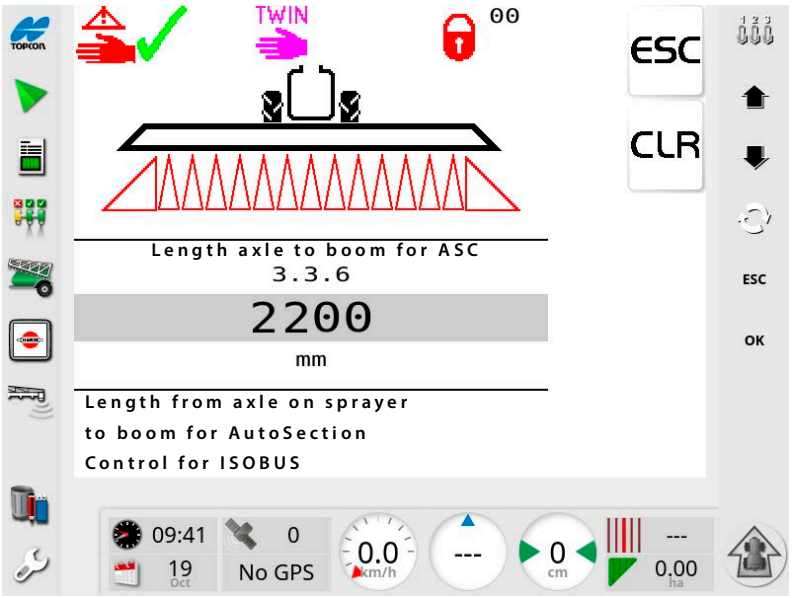
3. Enter 5500 mm as the length from hitch to axle.



4. Navigate to menu no. 3.3.6.



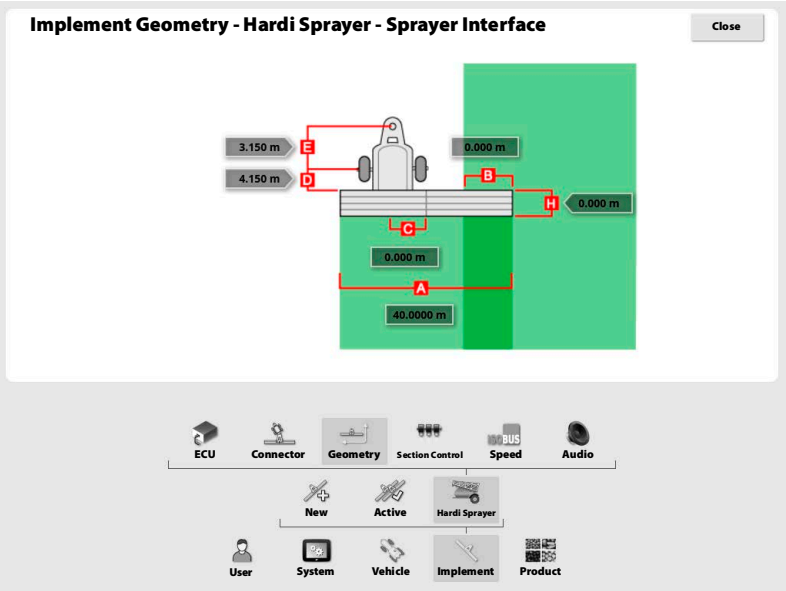
5. Enter 2200 mm as the length from axle to boom.



6. Press **ESC** until the main Universal Terminal screen is visible.
7. Disconnect and reconnect the sprayer by disconnecting and reconnecting the ISOBUS connector.
8. Press on the HC 8700/9700 display.

9. Navigate to Implement Geometry:
    - Select Implement, then
    - Hardi Sprayer, then
    - Geometry.

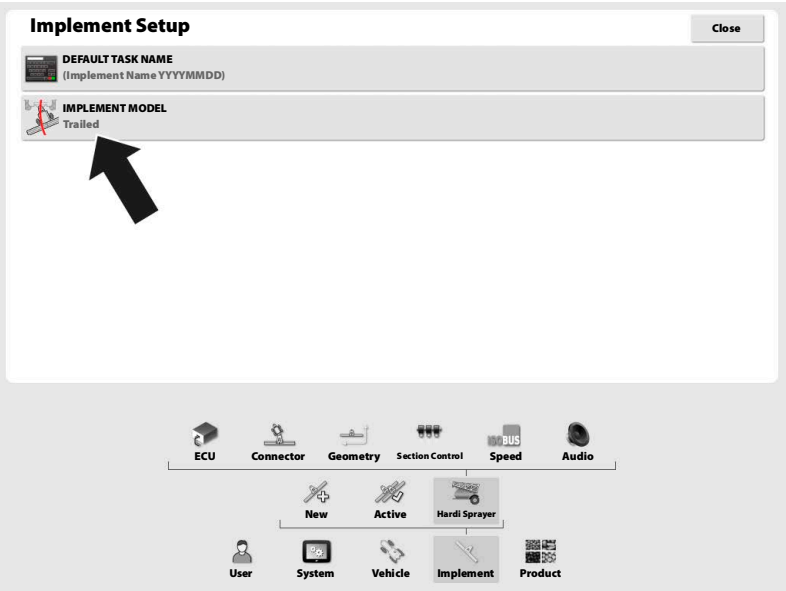
    When correctly adjusted, the screen display the values D and E as set in steps 3 and 5.



10. Navigate to Implement Setup:
    - Select Implement, then
    - Hardi Sprayer.
11. The button "IMPLEMENT MODEL" should read "Trailed".

NOTE! Some early software versions do not have the "IMPLEMENT MODEL" setting.

12. Confirming this, the setup now completed.



Tractor Coupling (EU)

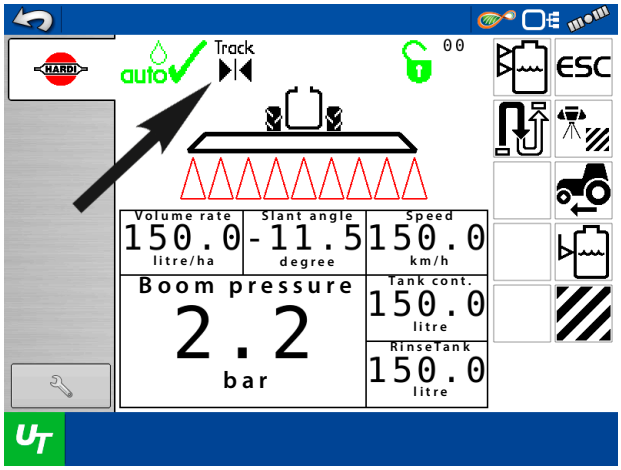
ComfortTrack / IntelliTrack Setup (Trailed Sprayers only)

When attaching a sprayer with ComfortTrack or IntelliTrack to the tractor, the Track sensor needs calibration for the steering to work properly.

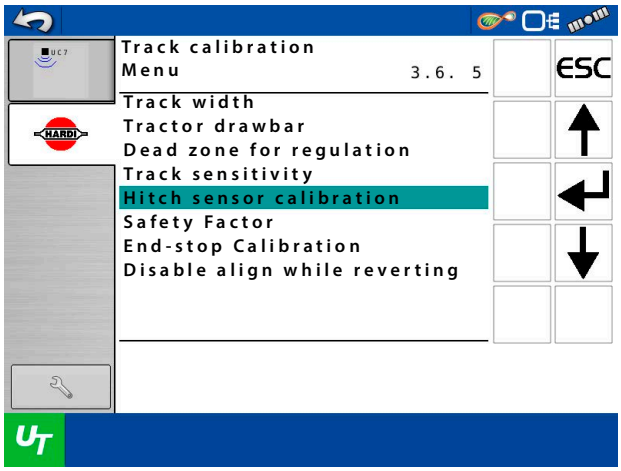
1. Connect the chains for the ComfortTrack / IntelliTrack sensor to the tractor.
2. Find a flat surface where it is possible to drive at least 50 metres in a straight line.

NOTE! A very uneven surface will cause the angle reading to fluctuate, which results in an inaccurate calibration.

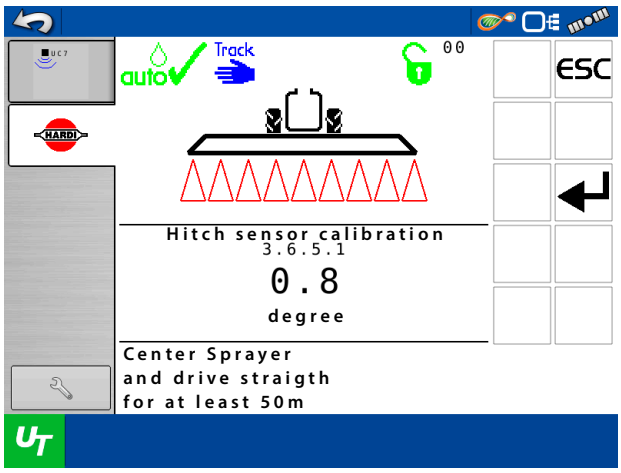
3. Unfold the boom.
4. Align the drawbar by keep pressing . Keep pressing the button until the movement stops in centre position. Check that the Track symbol show in the display.



5. Then go to menu 3.6.5 and press .



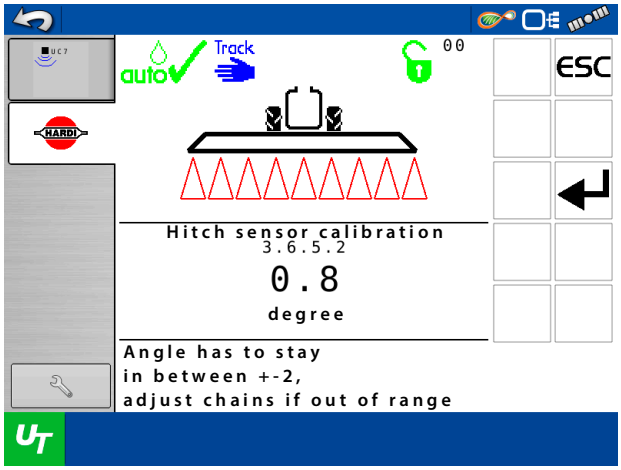
6. When in menu 3.6.5.1 then press ↵



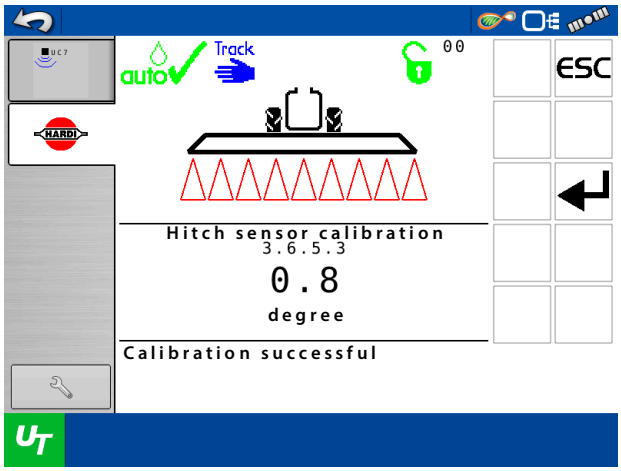
7. Drive 50 metres forwards in a straight line to align the sprayer-drawbar connection. Avoid any swaying when driving.

   The display will now monitor readout from the front angle sensor. Keep an eye to this and assure the angle does not exceed ±2 degrees.

NOTE! If the angle reading exceeds ±2 degrees you will need to refit the angle sensor chains to the tractor, so that the angle reading becomes closer to zero when attempting to calibrate again.



8. When you are sure, that the sprayer follows the tractor in a straight line, press ↵ to set a new zero position.
9. Calibration done and you can exit the menu.



AutoSelect (EU)

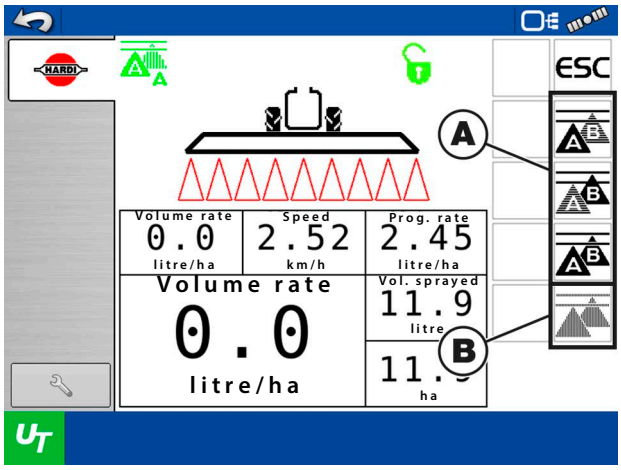
General Info

Before setting up AutoSelect, it is necessary to consider the following:

Modes When Spraying

Consider modes and consider the type of usage:

- Nozzle selection for line A and B in order to be able to change application rate for different spray jobs. In this case, it is preferred to use manual modes (A) to switch between suitable nozzles for each spray job.
- When speed can change during a spray job, e.g. when decreasing speed at obstacles, but when the application rate needs to be constant. In this case, the automatic mode (B) is preferred to use to switch between suitable nozzles for the selected application rate.



Setting up AutoSelect for automatic switching between the boom lines, requires the nozzle choice for each boom line not to be too far from each other. Therefore, selecting a small and a very large nozzle will not work well, and often cause AutoSelect to switch randomly between the boom lines, when in automatic mode.

ATTENTION! HARDI recommend doing nozzle choices as listed in schematics below.

AutoSelect with Automatic Pressure Switching

NOTE! The below nozzle choices are recommended for use with automatic pressure switching. All nozzle combinations are eligible for manual mode use.

Steps to select nozzles for spraying, with the spray pressure as the switching trigger:

1. Use the HARDI Calibration Disc to select two suitable nozzles for the spray job.
    - A small nozzle to suit lower speeds.
    - A larger nozzle to suit higher speeds.

NOTE! Driving slower than the simulated speed value (typically 3.6 km/h), may cause AutoSelect to switch between line A and B. If necessary, enter menu 3.4.7 to change the simulated speed value.

2. Use the first schematic below to decide if the nozzle choice is of a recommended combination for use with AutoSelect:

Line A	Line B	Upper Pressure Level	Lower Pressure Level
0075 -Pink	01 - Orange	5.1	1.4
01 - Orange	015 - Green	4.9	1.5
015 - Green	025 - Lilac	4.9	1.5
02 - Yellow	03 - Blue	4.9	1.5
025 - Lilac	04 - Red	4.7	1.5
03 - Blue	05 - Brown	4.9	1.5
04 - Red	06 - Grey	4.9	1.5
05 - Brown	08 - White	4.7	1.5
06 - Grey	10 - Light Blue	4.9	1.5
08 - White	10 - Light Blue	5.3	1.4
10 - Light Blue	15 - Light Green	4.9	1.5

It is possible to use the following nozzle combinations, but may cause a poor spray job:

ATTENTION! A consequence of selecting one of the below nozzle combinations, are risk of dripping nozzles at low pressure and spray drift at high pressure.

Line A	Line B	Upper Pressure Level	Lower Pressure Level
0075 -Pink	015 - Green	6.1	1.3
01 - Orange	02 - Yellow	6.1	1.3
01 - Orange	025 - Lilac	8.2	1.1
015 - Green	02 - Yellow	5.1	1.4
015 - Green	03 - Blue	6.1	1.3
02 - Yellow	025 - Lilac	5.3	1.4
02 - Yellow	04 - Red	6.1	1.3
02 - Yellow	05 - Brown	8.2	1.1
025 - Lilac	03 - Blue	5.5	1.4
025 - Lilac	05 - Brown	6.1	1.3
025 - Lilac	06 - Grey	7.8	1.1
03 - Blue	04 - Red	5.1	1.4
03 - Blue	06 - Grey	6.1	1.3
04 - Red	05 - Brown	5.3	1.4
04 - Red	08 - White	6.1	1.3
04 - Red	10 - Light Blue	8.2	1.1
05 - Brown	06 - Grey	5.5	1.4
05 - Brown	10 - Light Blue	6.1	1.3
06 - Grey	08 - White	5.1	1.4
06 - Grey	15 - Light Green	8.2	1.1

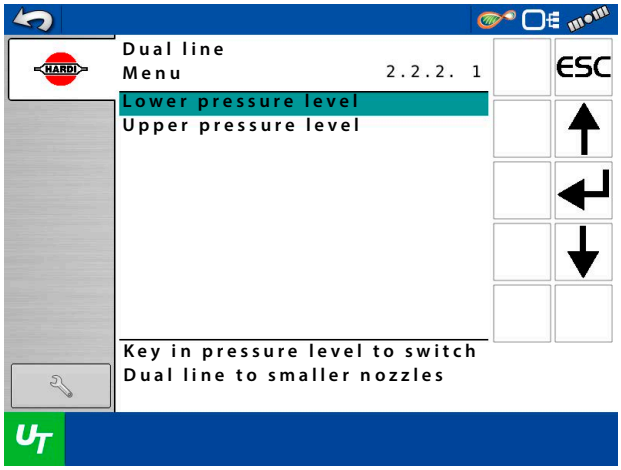
ATTENTION! Do NOT use the below nozzle combinations when in automatic. Doing so may cause AutoSelect not to work correctly! However, it is possible to use these nozzle combinations with manual mode.

Line A	Line B
0075 -Pink	02 - Yellow
0075 -Pink	025 - Lilac
01 - Orange	03 - Blue
015 - Green	04 - Red
03 - Blue	08 - White
05 - Brown	15 - Light Green

3. If not already fitted, physically fit the nozzles to the boom lines.

ATTENTION! It is of great importance to fit the smallest nozzle to boom line A (the front boom line).

4. In the controller go to menu 2.2.2 Dual Line and enter the submenus to fill in values from the schematic above:
   - Menu 2.2.2.1 Lower pressure level
   - Menu 2.2.2.2 Upper pressure level

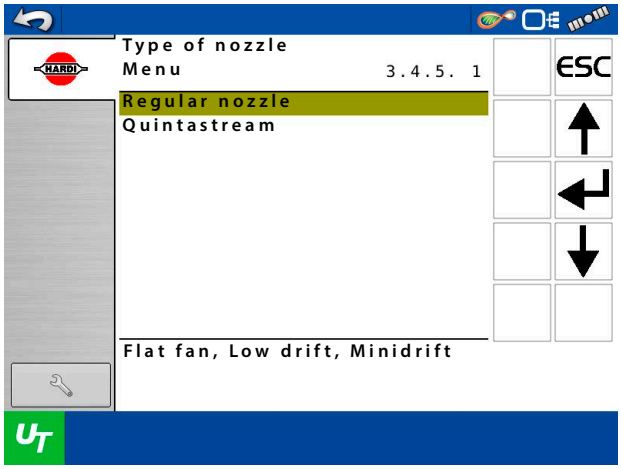


Before Commencing Spray Job

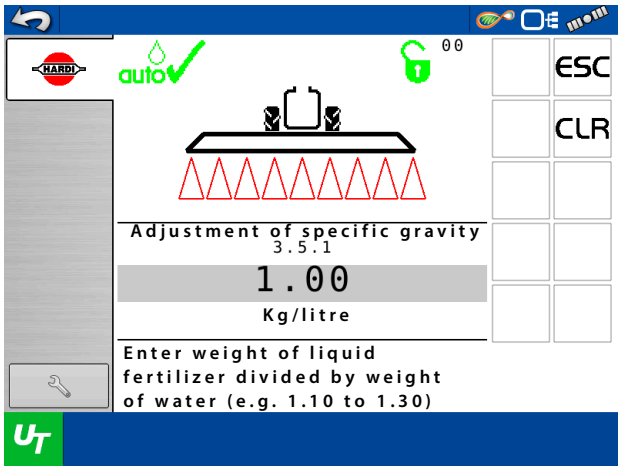
Filling the Tanks

Do the following steps to prepare and fill the sprayer before beginning a spray job.

1. Select the nozzle type to use, depending on planning normal spraying or fertilizer spraying.



2. Adjust specific gravity, depending on planning normal spraying or fertilizer spraying.



3. If necessary, turn on the work light. See "Work Light" on page 118.
4. Completely fill the RinseTank.
5. Fill the MainTank.

   Depending on the FluidBox fitted, follow the filling guidelines in the separate instructions:

   - FluidBox 7000.
   - FluidBox 8000.

Set Up Spray Job

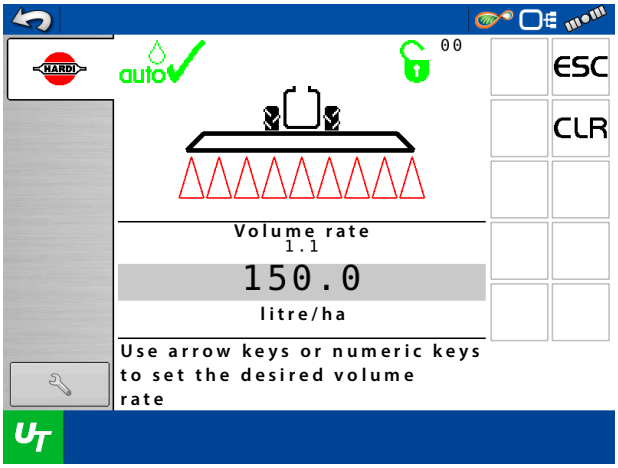
NOTE! Only use this is when spraying without AutoSectionControl or any other field management system.

Do the following steps to set up the sprayer before beginning a spray job.

1. Set the volume rate for the present spray job.

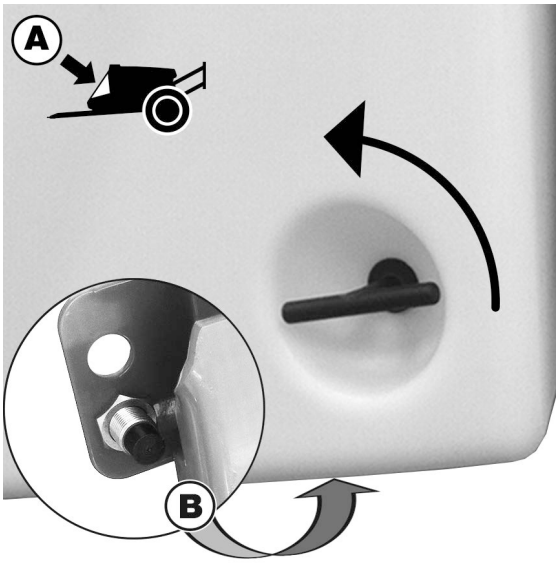
   See "Volume Rate Read and Change" on page 120.

2. Start spraying.



Work Light

NOTE! Start by turning on the SmartCom UT system.



NAVIGATOR

The work light is turned on by opening the left side cover (A), which activates a sensor (B) inside.

AEON

The work light automatically turns on when opening the side cover.

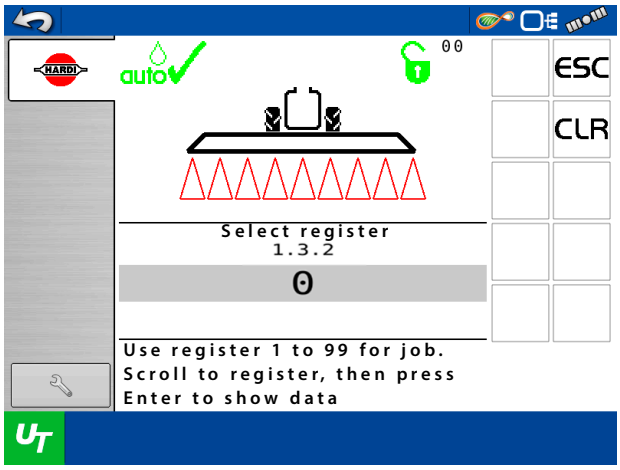
Register Readout and Selection

When spraying, the system logs the spray data. When switching the system off, the data memorizes.

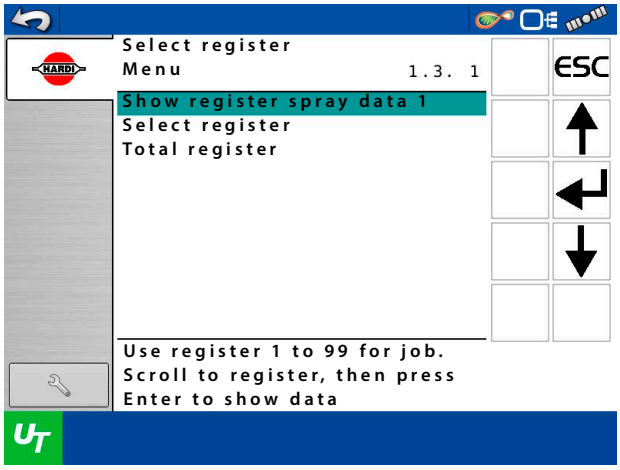
In this menu, it is possible to view the register containing the logged spray data.

To Read the Data in the Register

1. Go to menu [1.3.2 Select register] and choose current working menu.



2. Then go to menu [1.3.1 Show register spray data 1].
3. Press ↵ to enter register and read main data.
4. Press ↵ again to see spray data.
5. Press ESC to exit the menu.



To Reset Register

Press CLR to reset register.

ATTENTION! Reset of a register cannot be stopped, as pressing CLR will immediately reset the register!

NOTE! The active register number is always visible in the right upper corner of the display.

Working in the Field

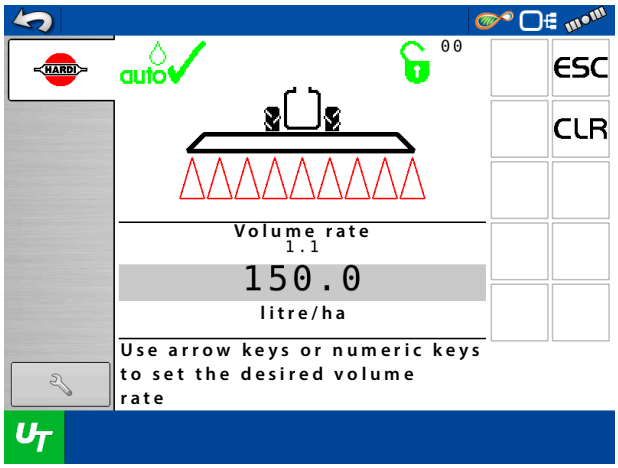
Volume Rate Read and Change

To Read the Volume Rate

Go to menu [1.1 VOLUME RATE] to read volume rate.

To Change Volume Rate

1. Go to menu [1.1 VOLUME RATE].
2. Change the value. Alternatively clear value by pressing Clear and key in value on the numeric keys.
3. Press ↵ to confirm.



Manual Dosage

To switch between Auto-mode auto and Manual mode press on Auto. The current mode is indicated in the top of the display

To dose in manual mode, use the %+ or %÷ to increase or decrease pressure.

NOTE! Under 3.6 km/h, the controller will not regulate automatically.

If necessary, it is possible to change the value in menu 3.4.2 Simulated speed value.

Spraying using DynamicFluid4 Pressure Regulation

Start-up procedure and steps done by the sprayer driver, when beginning a spray job is simple. At the headland, you just turn spraying on by pressing the main ON/OFF and start driving.

However, before starting spraying there are a few things you will need to keep in mind and check:

- The controller always starts up in Auto mode when turned on. Press to change between Manual and Auto mode.

NOTE! If by some reason, the + or − has been pressed, the controller enters manual mode. Then press auto before beginning any spraying.

- Do not adjust the pressure before and while spraying, as the controller does this automatically.
- Keep an eye to the regulation valve LED's (A) to check that it operates properly.

NOTE! It is good practice to regularly service the DynamicFluid4 valve to ensure it works properly in its entire working range.

Refer to "10 Hours Service - Clean DynamicFluid4 Valve Disc" on page 135 for procedure.

The regulation valve is equipped with four LED's (A) that indicate the valve status:

LED Colour and Status	Valve Status
○ ● ○ ○	Motor ON, but not turning. The valve disc is open and in its normal working range. This is normal state when spraying.
✳ ✳ ○ ○	Motor ON and decreasing pressure. The valve disc is open and in its normal working range. This is normal state when spraying.
○ ✳ ✳ ○	Motor ON and increasing pressure. The valve disc is open and in its normal working range. This is normal state when spraying.
○ ○ ● ○	The valve disc is closed and is within the normal working range. Fluid bypass to MainTank or pump.
○ ○ ✳ ○	Valve closed but moving. The valve disc starts to open and is within the normal working range.

✳ ○ ○ ○	The valve disc is out of its normal working range. This does not happen when the regulation valve works correctly. The software will prevent the valve to go out of range, also when manually operated.
○ ○ ○ ✳	
● ○ ○ ○	Valve fault. Contact your local HARDI Service Centre.
○ ○ ○ ●	

○ = Solid ✳ = Blinking

Spraying using Centrifugal Pump

	Centrifugal Pump
Pump principle	RPM gives pressure/flow
Max Rpm	4200
Max pressure	9½ bar
Max flow	400 Litre/Min
2/3 Rpm	2800
Max pressure at 2/3 Rpm	5½ bar Decreases
Max flow at 2/3 Rpm	400 Litre/Min Almost unchanged
Hydraulic motor	Gear tooth wheel
Rpm	Variable 600 to 4200
Rpm Control	Hydraulic proportional valve
Rpm Control	SmartCom
Spray pressure Control	Hydraulic proportional valve
DF4	Starts in DF4ModeManual Operator set in DF4ModeAuto
DF4ModeAuto Headland? Nozzles closed	Df4 adjust to 3 bar Yes
Pump priming	Gravity and low pump speed
Safety valve	Not needed
FastFiller	No need of other pump
AutoWash	No
Run dry	Yes, provided Ace Oasis fluid is present
Maintenance	Air pressure Ace pump 30psi

Start and manual

NOTE! Ensure that there is water in MainTank.

- Open valve from MainTank to Centrifugal pump
- Start tractor diesel engine.
- Enable Hydraulic oil supply.
- Press Centrifugal pump icon, check that it changes to black.
- Wait 10 sec.
- Check that Centrifugal pump icon is still black.

ATTENTION! If no Hydraulic oil supply or no Rpm signal then Centrifugal pump icon will change back to white.

Df4ModeManual for cleaning, for ChemFiller, for powerful agitation

- Go to spray soft keys
- Stay in Df4ModeManual
- Press %+ Df4PercentPlus to increase pump Rpm and water pressure

Auto, spray mode, normal agitation

- Df4ModeAuto
- Open sections. Df4 will aim for application rate set point similar to Df4 membrane pump
- Close sections. Df4 adjusts Centrifugal pump to headland Rpm = Agitation pressure 3 bar (configurable in Selector)
- Stop pump, note Df4 goes into Df4ModeManual

Defect Rpm sensor, disable the oil motor protection

- If Rpm sensor shows 0 Rpm, then SmartCom closes the Hydraulic proportional valve for Centrifugal pump.
- This is to protect the oil motor and the Hydraulic system
- If Rpm sensor shows 0 Rpm then operator stop the diesel engine or disable tractor hydraulic valve.
- When Oil supply is OK, the operator can start Centrifugal pump again
- If sprayer has a defective Rpm sensor, then SmartCom closes hydraulic proportional valve for Centrifugal pump.
- If the operator needs to spray, he can disable the oil motor protection in Menu 4.5.6.
- Df4 can spray accurately even with a defective Rpm sensor.

DynamicFluid4 Operation when a sensor fails Centrifugal pump

See "DynamicFluid4 Operation when a Sensor Fails" on page 151.

RPM	Flow	Pressure	Speed	Mode of Regulation	Extra actions for operator
Use	Use	Use	Use	Full performance	None
Use	Defect	Use	Use	Full performance	Setup new size when changing nozzle
Use	Use	Defect	Use	Reduced performance. Slower	Setup new size when changing nozzle
Use	Defect	Defect	Use	Reduced performance Lower accuracy	Setup new size when changing nozzle. Adjust pressure after mechanical pressure gauge.
Use	Use	Use	Defect	Spray at constant speed.	Keep sprayer at constant driving speed. Type in simulated sprayer speed
Defect	Defect	Defect	Ignore	Manual only.	Adjust pressure after mechanical pressure gauge.
Defect	Use	Use	Use	Full performance	Disable OilMotor protection
Ignore	Ignore	Ignore	Ignore	Manual only. Regulation valve can pass end stop. I.e. when continuing after it was closed, it opens again.	Adjust pressure after mechanical pressure gauge. Check for passing end stop of valve. Compensate for sections change.

Commissioning

- Start system as described above.
- Close Agitation Valve
- Open a single section. This is to obtain little water flow
- Stay in Df4ModeManual
- Press %+ Df4PercentPlus to increase Centrifugal pump Rpm and water pressure
- Check Centrifugal pump Rpm reach 4200 Rpm
- This test requires maximum oil flow but only medium oil pressure
- Stop Centrifugal pump
- The hose shall be dismounted after the pump and before the engine room so that water drains to the ground and not through the nozzles.
- Dismount hose after pump before the engine room, so the water can run-out to the ground (not through nozzles)
- Start system as describe above
- Stay in Df4ModeManual
- Press %+ Df4PercentPlus to increase Centrifugal pump Rpm and water pressure
- Check Centrifugal pump Rpm reach 4200 Rpm
- This test requires maximum oil flow and maximum oil pressure.

End Nozzles

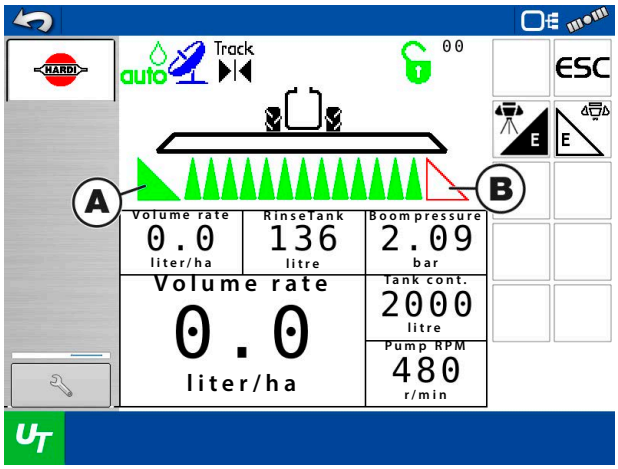
When using end nozzles, they need to be turned on and off separately at each side:

1. Press  to enter the options menu.
2. Press  to enter the end nozzles menu.
3. Select to turn on either left or right end nozzle by pressing:

 Left ON or  Right ON

4. Start spraying.
5. View status on the boom status line:
   A. Active
   B. Inactive
3. When not necessary anymore, turn off the end nozzle by pressing:

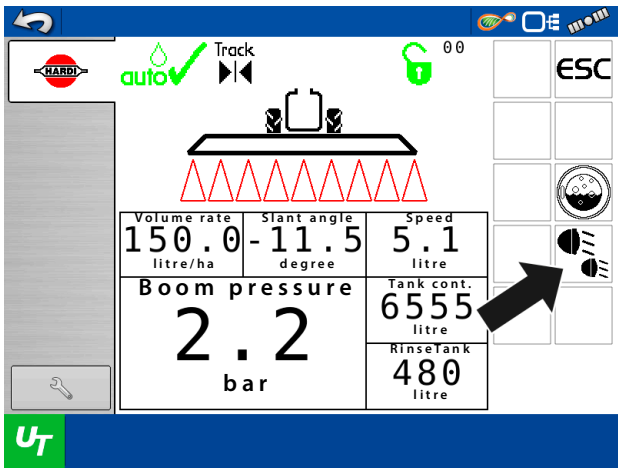
 Left OFF or  Right OFF



Night Spraying Light (optional)

The night spraying light is activated in the SmartCom controller:

1. Press  to enter the options menu.
2. Press  to enter the Night Spraying Light menu.
3. Press  to turn on the night spraying lights.
4. Press  to turn off lights again.



Spray Job Ended

DilutionKit (EU)

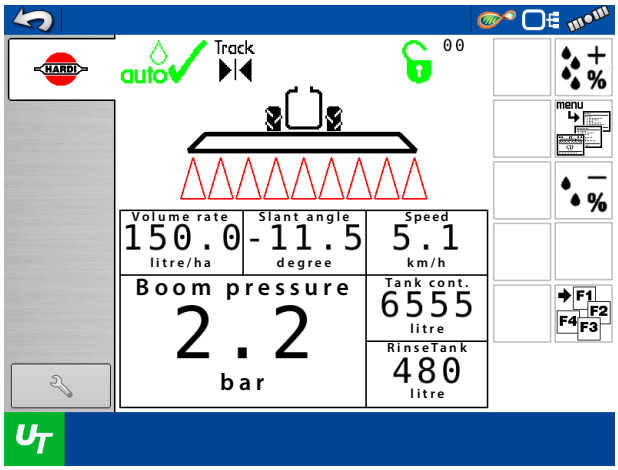
Operate DilutionKit from the SmartCom UT as follows:

NOTE! The dilution kit is NOT a rinsing device. For rinsing the sprayer, please refer to “Cleaning” in the sprayer instruction book for proper cleaning procedure.

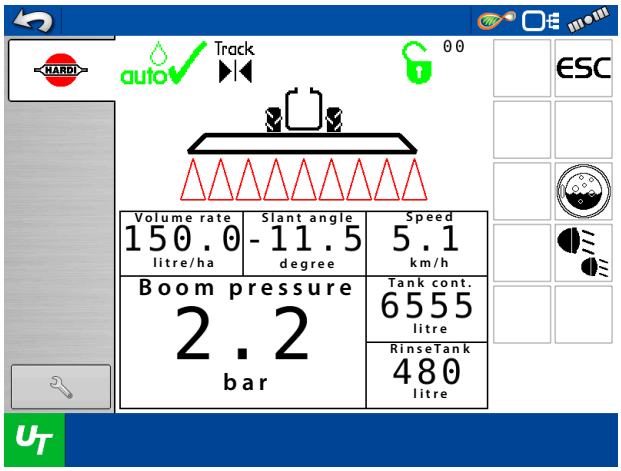
TankDilution

When the MainTank is empty then dilute residual spray-liquid before returning to the farm for refilling:

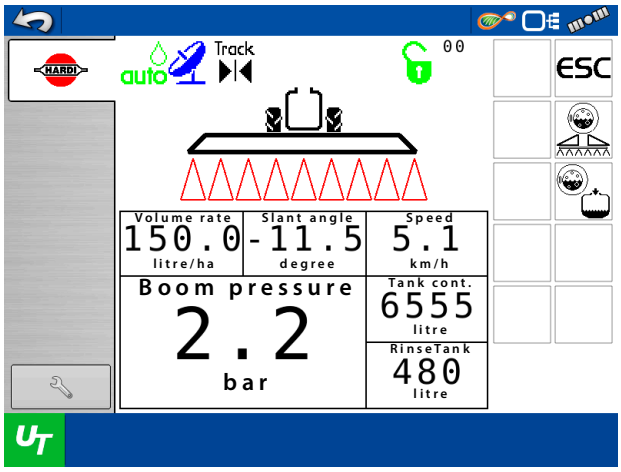
1. Turn off the Main valve ON/OFF .
2. Engage the PTO.
3. Press .



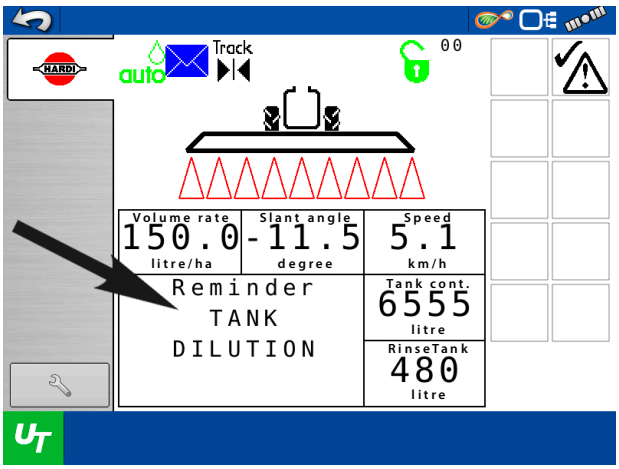
4. Press .



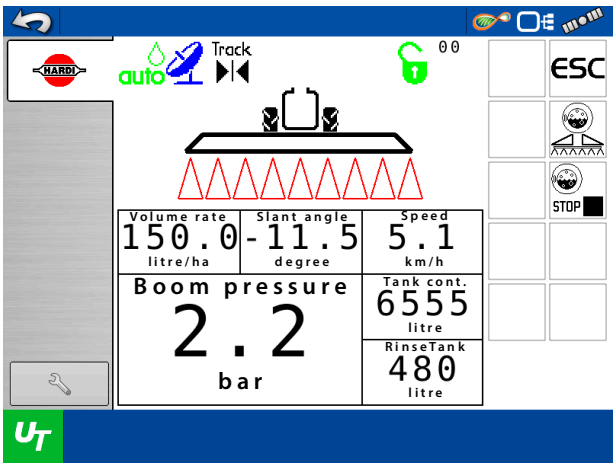
5. Press to start TankDilution.



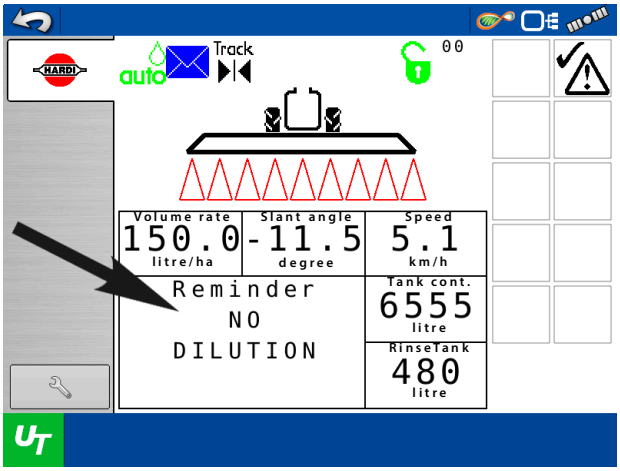
6. The display reminds you that TankDilution now turns on. Confirm this by pressing .
7. DilutionKit now fills water from the RinseTank into the MainTank. Fill approximately 165 litres (1/3 tank).



8. Press STOP to stop the dilution process.



9. The display reminds you that TankDilution now turns off. Confirm this by pressing .



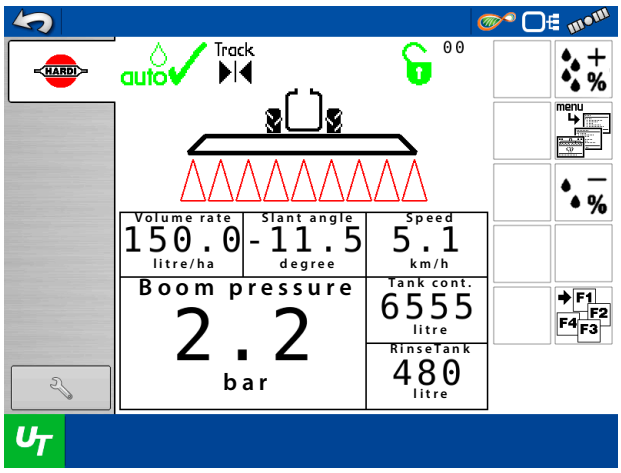
10. If in Auto-mode auto change to Manual mode by pressing Auto.
11. Turn on the Main valve ON/OFF . Resume driving in the field to spray out the diluted spray-liquid.
12. While spraying the diluted liquid, then turn off the Main valve ON/OFF for a short while, and then turn it on again. This also dilutes the return line piping.
13. Repeat step 1-11 twice (until the RinseTank is empty).
14. Disengage the PTO.

BoomDilution (EU)

When interrupting a spray job, then it is necessary to dilute chemical residues in the boom piping, before returning to the farm:

NOTE! Diluting the boom is necessary to prevent deposits of spray-liquid settling in the boom, which could then block the nozzles.

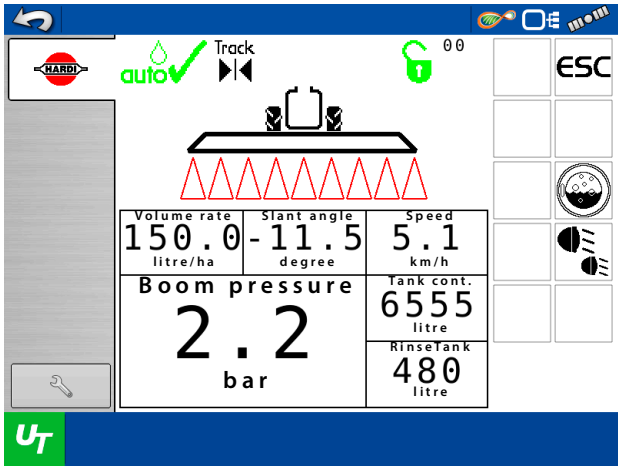
1. Continue driving in the field with the Main valve ON/OFF open and the PTO engaged.
2. Press F1 F2 F4 F3.



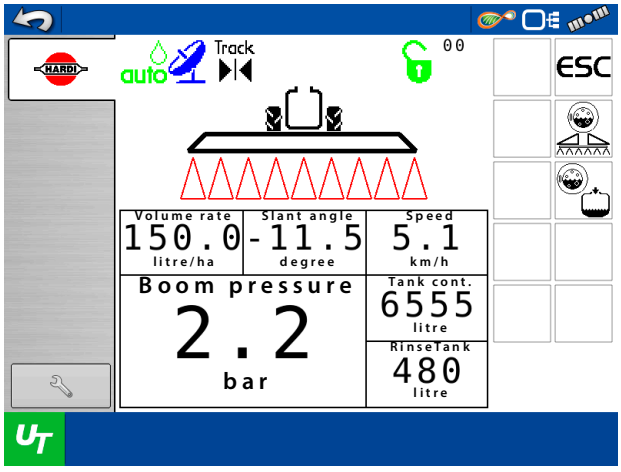
3. Turn on the Main ON/OFF valve to open the spraying.

ATTENTION! It is important to turn on the Main ON/OFF valve, before diluting the boom piping. Not doing this will dilute the remaining spray-liquid in the MainTank!

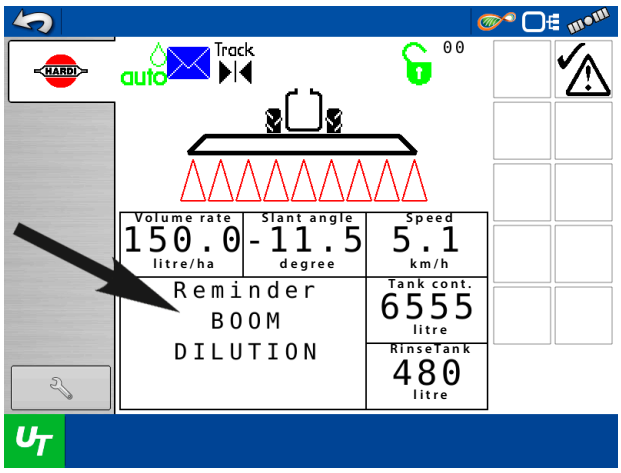
4. Press .



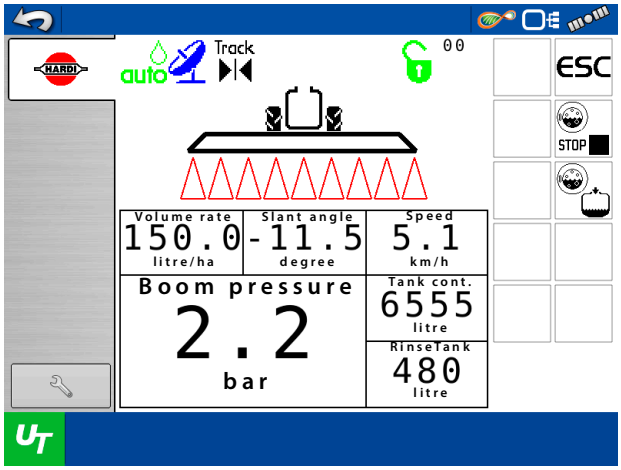
5. Press to start BoomDilution.



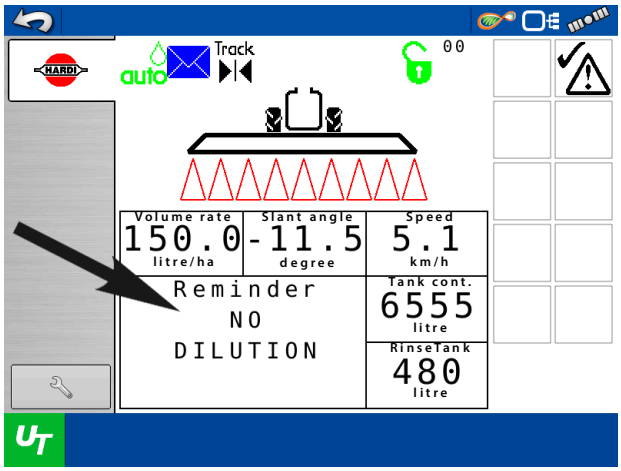
6. The display reminds you that BoomDilution now turns on. Confirm this by pressing .
7. DilutionKit now dilutes the boom piping by spraying water from the RinseTank on the field. Spray out approximately 100 litres (1/5 tank).



8. Press STOP to stop the dilution process.



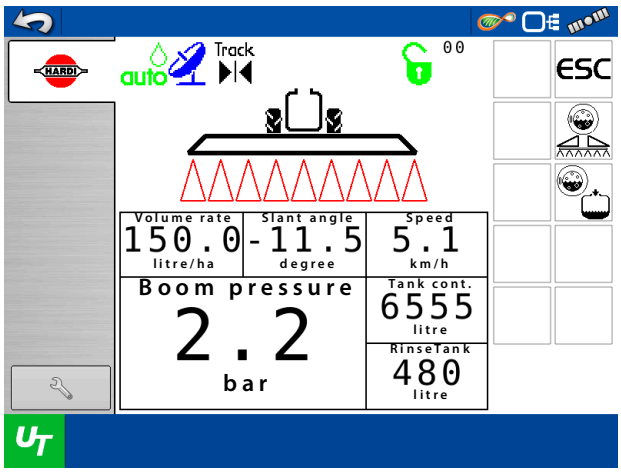
9. The display reminds you that BoomDilution now turns off. Confirm this by pressing .



10. Disengage the PTO to stop dilution of the boom piping.

ATTENTION! Do not turn off the Main ON/OFF valve , while diluting the boom piping. This will dilute the remaining spray-liquid in the MainTank!

11. Select ESC to go back and be ready to resume spraying later.
12. Turn off Main ON/OFF valve and drive home.

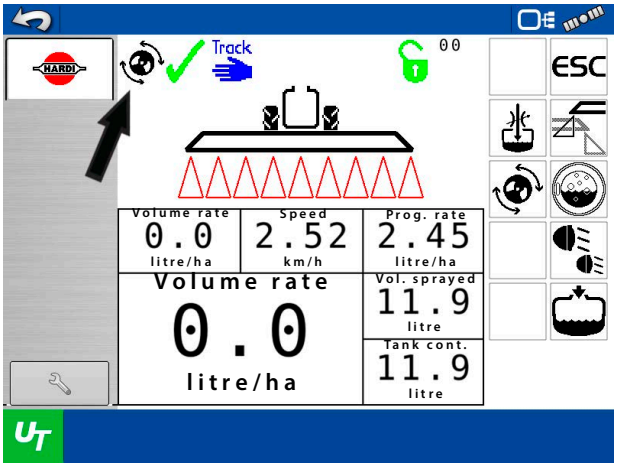


Service and Maintenance Intervals

10 Hours Service - Clean DynamicFluid4 Valve Disc

It is good practice to regularly service the DynamicFluid4 valve to ensure it works properly in its entire working range.

1. When on the main screen, press F1 F2 F4 F3 to enter the functions menu.
2. Press the button to start the cleaning process.
3. The cleaning process takes approximately 2 minutes. Meanwhile in the top bar flashes.



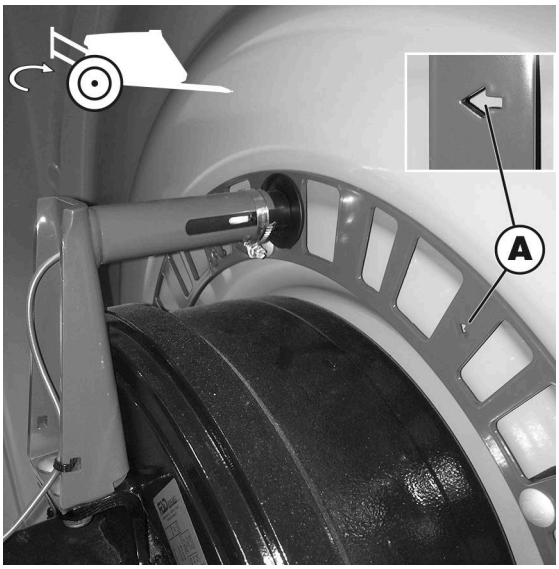
NOTE! The LEDs on the DynamicFluid4 valve will change status during the valve rotation to show the actual valve disc position. Read about valve disc status in "Spraying using DynamicFluid4 Pressure Regulation" on page 121.

4. When the valve cleaning procedure ends, the icon in the top bar disappears. Valve LED number two is solid green to indicate that the valve is in normal working range and ready to start spraying.

Occasional Maintenance

Speed Sensor for Sprayer

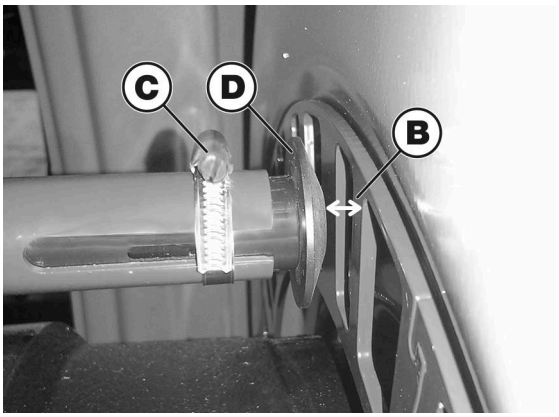
The speed sensor and speed ring is located at the inside of the sprayer's right wheel. The sensor is an inductive type that requires a metallic protrusion like the speed ring to pass by it to trigger a signal.



NOTE! The shown are picture samples, showing the principle of adjustment.

Adjustment

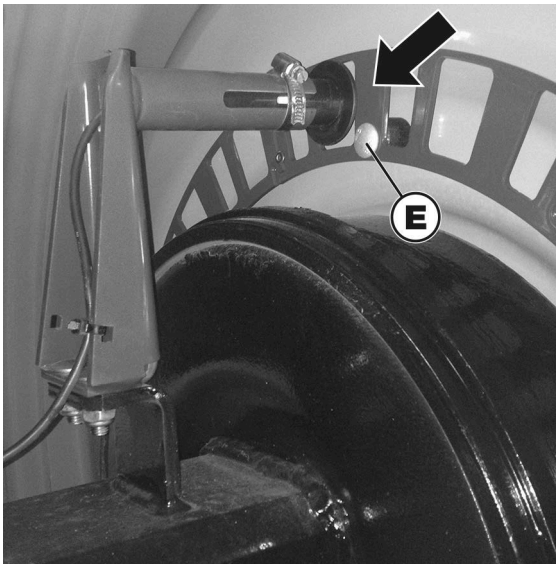
1. Assure that the speed ring fitted correctly to the wheel, so that the arrow (A) follows the rotation of the wheel in the forward driving direction.
2. Check that the black sensor (D) lines up in the middle of the air gaps in the speed ring when looking in vertical direction.



3. Adjustment of the air gap begins with the sensor directly opposite one of the bolts (E) holding the speed ring.

   Loosen the clamp (C) to move the sensor (D) in or out of the grey tube. Re-tighten the clamp when finished.
4. Adjust the air gap (B) between sensor and speed ring to 4 mm.

   Use a feeler gauge or similar tool.



5. After adjustment, spin up the wheel.

   The air gap variation must be less than ± 0.5 mm for the sensor to function correctly.

   Check this at the entire circumference of the wheel.
6. Verify the speed on the controller.

ATTENTION! Continuous flashing from the transducer indicates correct fitting when the wheel rotates.

Off-season Storage

Storage

1. When parking the tractor and sprayer, completely disconnect the power supply to the sprayer. This will stop the system from using power.

ATTENTION! If the LED on the SetBox or Grip lights up or flashes the system still powered!

2. Protect the FluidBox, SetBox and Grip from humidity, and remove them if they are not installed in the tractor cabin.

Testing and Fine Tuning

Calibration of the Flow Constant - PPU

At normal use, the PPU stamped into the flow housing is used. However, if necessary, in special cases it is possible to fine-tune the PPU for the flow transducer.

This can happen if carrying out calibration of the flow transducer with clean water, then spraying in field with pesticides or fertiliser. Then small changes may occur, that will affect the final readings. This is typically noted when the volume displayed on the display does not equal the actual known volume that was sprayed out. The below formula can be used to "fine-tune" the flow transducer PPU for this purpose.

NOTE! The relation is inverse:

- Lower PPU: The volume displayed will increase.
- Higher PPU: The volume displayed will decrease.

$$\text{New PPU} = \frac{\text{Original PPU x Displayed Volume}}{\text{Sprayed Volume}}$$

Example

- The original PPU stamped into the flow housing = 60.0
- Fill the MainTank with 2400 litres of spray-liquid.
- When sprayed out, the display show 2300 litres.

Calculate new PPU:

$$\text{New PPU} = \frac{\text{60.0 PPU x 2300 Litres}}{\text{2400 Litres}} = 57.5$$

7 - Fault Finding

Operational Problems

Fault Finding the System

When having a problem with the system, it is good practice to go through the general fault-finding schematic, before contacting your HARDI dealer.

Problem	Possible Cause	Try/Test	Check/Behavior
DynamicFluid4 pressure regulation valve.	Error code 141 or error code 145.	Contact your local HARDI dealer.	Check manual control of DF4 valve. Spray job can be completed in manual mode.
	No error codes, but unstable.	Check speed, flow and pressure output in menu 4.3.5.1 and 4.3.5.2	Check sensor adjustment. Check if flow sensor is running freely.
Incorrect volume sprayed.	DynamicFluid4 regulation is pressure based. Incorrect volume sprayed can be affected by incorrect speed, flow, pressure input or boom setup.	Check speed, flow, pressure input and boom setup.	Does this fit the actual sprayer setup? Perform a flow calibration, menu 3.2.2 or 3.2.3, using the PPU typed on the flow sensor body.
Incorrect flow.	Incorrect flow readout. Flow on fully open boom = nominal nozzle output x number of nozzles.	Check output in menu 4.3.5.2.6 Boom flow sensor.	Does this correspond to actual flow?
		Check total number of nozzles is equal to number of nozzles physically fitted.	
		Is the flow PPU correct?	Max. 10% deviation from given values.
	No flow readout.	Check flow sensor PPU in menu 3.2.1	At least 1.00 PPU must be present in order to calculate a flow.
		Check if flow sensor wheel is stuck.	If stuck, clean the sensor wheel and body.
Incorrect speed.	No speed readout.	Check LED diode on sensor.	Sensor at metal = ON, Sensor at hole = OFF.
		Check speed PPU menu 3.1.1.1	At least 1.00 PPU must be present in order to calculate a speed.
		Check speed source menu 3.1.2	Correct source selected?
	Unstable speed readout.	Max. deviation ±0,15 km/h.	Distance to wheel speed ring 2-4 mm?
			Are speed ring buckled?
			Does sensor sense middle of holes?
			Does speed ring vibrate when running?
Active boom width.	Incorrect number of nozzles entered.	Check if nozzles per section is correct in menu 3.3.3	Check total number of nozzles is equal to number of nozzles physically fitted.

Checks for Clogging

For functions like AutoWash to work properly, avoid clogging of valves and hoses. If suspicious for clogging, following checks recommended.

DANGER! As water may escape the fluid system, then do the tests with a clean sprayer using clean water, to avoid spot contamination and risks of personal injury.

NOTE! For functions on FluidBox 7000 or FluidBox 8000, please refer to specific FluidBox-instructions.

Manual Valves

	Valve Positions				
Check/Verify	**Suction SmartValve**	**Pressure SmartValve**	**Agitation Valve**	**Pump**	**Other**
Look into the MainTank. Check that water exits from the ejector.				ON	Connect hose from external tank to External filling coupler.
Look into the MainTank. Check that the safety valve opens.				ON	
Look into the MainTank. Check that the safety valve closes and does not leak water.				ON	Boom sections closed.
Look into the MainTank. Check that water exits the pressure filter dump line.				ON	Boom sections closed.
Look into the MainTank. Check that water exits from the agitation tube.				ON	
Look into the MainTank. Check that water exits from the thin tube.				ON	
Check that water comes out of the External filling coupler.				ON	Close the lid on the MainTank. Remove the cap from the External filling coupler.
Check by hand that the rinse nozzles can rotate.	None	None	None	OFF	Pull up the two rinsing nozzles from tank.
Look into the MainTank. Monitor if water exits the rinsing nozzles.				ON at low RPM.	Start pump, run at low RPM.

Checks for External Leak

If suspicious for external leaks:

1. If necessary, clean the sprayer for easier recognition of water escaping the fluid system.

DANGER! To avoid spot contamination and risks of personal injury, caused by water that may escape the fluid system, then do the tests with a clean sprayer using clean water.

2. Run a stationary FastFlush and monitor if water exits sprayer other places than the boom. Particularly monitor the area below the sprayer chassis.

Overview of Fuses

The fuses have a short text print nearby the socket that refer to the function it protects. The schematic below shows an overview of fuses and functions. Be aware that the fuse size and location can vary, depending on the specific sprayer setup.

ATTENTION! The recommended fuses to use are Littelfuse ATOF® blade fuses rated 32 V, unless otherwise mentioned.

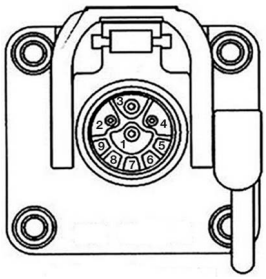
To verify the correct printed circuit board when inspecting a fuse, check the HARDI item number printed on the board.

Printed Circuit Board	PDU Board Item Number	Optional Functions	Fuse Socket	Fuse Rating	Fuse Item Number	PCB Function	Connector
Power Distribution Unit PDU 3	26070300		F1			AUX 1	X1004
Location: Chassis		PulseSystem (PVM)	F2	5 A	261762	AUX 2	X1007
Sprayer: AEON		FluidBox	F3	5 A	261762	Guest 1	X400
			F4			AUX SW 1	X1001
			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800
Power Distribution Unit PDU 3	26070300	PrimeFlow	F1	10 A	28048500	AUX 1	X1004
Location: Boom Centre		UC7**	F2	15 A	261762	AUX 2	X1007
Sprayer: AEON DELTA FORCE		UC7**	F3	10 A	261762	Guest 1	X400
		BoomLight	F4	20A	261340	AUX SW 1	X1001
			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800
Power Distribution Unit PDU 3	26070300	PrimeFlow	F1	10 A	28048500	AUX 1	X1004
Location: Boom Centre		UC7**	F2	15 A	28048600	AUX 2	X1007
Sprayer: AEON TWIN FORCE		UC7**	F3	10 A	28048500	Guest 1	X400
		BoomLight	F4	20A	261340	AUX SW 1	X1001
			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800
		TWINActuator	Finline	15 A	28048600	-	X1102
Power Distribution Unit PDU 2	26070200		F1			AUX 1	X1007
		-	F2	5 A	261762	AUX 2	X1004
			F3			Guest (F3)	X400
		EExxx*	F4	25 A	261605	ECU-IO	X700
		EExxx*	F5	25 A	261605	ECU Master	X600
Power Distribution Unit PDU 3	26070300	-	F1	15 A	28048600	AUX 1	X1004
			F2			AUX 2	X1007
		-	F3	10 A	28048500	Guest 1	X400
			F4			AUX SW 1	X1001
			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800

Printed Circuit Board	PDU Board Item Number	Optional Functions	Fuse Socket	Fuse Rating	Fuse Item Number	PCB Function	Connector
Power Distribution Unit PDU 2	26070200		F1			AUX 1	X1007
Location: Front			F2			AUX 2	X1004
Sprayer:			F3			Guest (F3)	X400
NAVIGATOR DELTA FORCE		EExxx*	F4	25 A	261605	ECU-IO	X700
		EExxx*	F5	25 A	261605	ECU Master	X600
MEGA M 1200/1500 (73468600)							
MEGA M 1800/2200 (73468700)							
Power Distribution Unit PDU 2	26070200	PulseSystem (PWM)	F1	5 A	261762	AUX 1	X1007
Location: Front			F2			AUX 2	X1004
Sprayer:		Tank gauge	F3	5 A	261762	Guest (F3)	X400
NAVIGATOR DELTA FORCE		EExxx*	F4	25 A	261605	ECU-IO	X700
		EExxx*	F5	25 A	261605	ECU Master	X600
Power Distribution Unit PDU 3	26070300		F1			AUX 1	X1004
Location: Front			F2			AUX 2	X1007
Sprayer:			F3			Guest 1	X400
NAVIGATOR DELTA FORCE All features			F4			AUX SW 1	X1001
			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800
Power Distribution Unit PDU 3	26070300		F1	10 A	28048500	AUX 1	X1004
Location: Centre Section		UC7**	F2	15 A	28048600	AUX 2	X1007
Sprayer:		UC7**	F3	10 A	28048500	Guest 1	X400
NAVIGATOR DELTA FORCE		BoomLight	F4	20 A	261340	AUX SW 1	X1001
MEGA M Z-version			F5			AUX SW 2	X1003
			F6			Guest 2	X500
		EExxx*	F7	25 A	261605	ECU-IO 1	X700
		EExxx*	F8	25 A	261605	ECU Master	X600
		EExxx*	F9	25 A	261605	ECU-IO 2	X800

* either 26067700 SMARTCOM 6S15A, 26067800 SMARTCOM 6S31A or 26067900 SMARTCOM 14S19A

** with AutoTerrain/ActiveSlant UC7

Other Fuse Types	HARDI Item Number	Fuse Socket	Fuse Rating	Fuse Item Number	Function on the Sprayer
ISOBUS retrofit kit for tractor	26040600	J03, J04	100 A Early type: MEGA Bolt-down fuse. Later type: MIDI Bolt-down fuse.	Early type: 26076800 Later type: 26076900	Cable between tractor battery and ISOBUS connection, red wire.
ISOBUS breakaway connector (IBBC) 	26040300	-	30 A JCASE cartridge fuse.	26076600	Pin 2 and 4: Medium power for ISOBUS guests.
		-	60 A JCASE cartridge fuse.	26076700	Pin 1 and 3: Main power for all electronics on sprayer.
PrimeFlow 24V/60W Power Supply PCB ASSY (optional)	26087700	F1	10 A	28048500	24V Boom Power Left Side
		F2	10 A	28048500	24V Boom Power Right Side

NOTE! When the tractor has ISOBUS as standard equipment, the fuse rating may depend on the tractor make.

Fault Codes - UT Warnings

In the following is a full table of Alarms, Warnings, etc. that will or can be shown on the Terminal display.

NOTE! These are useful for service staff:

- ID (PG) is the fault identifier. When the alarm triggers, the alarm number shown in the display.

To troubleshoot in field and see if CAN communication works, each computer unit has a LED, which indicates condition and status of this computer.

- LED will light when turning the units on.
- If there is an error, a signal will show in a Morse code if the CAN connection damaged to that specific unit.

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
0	Warning	AutoWash SW fault	TWIN fan RPM speed signal fault.	Disconnected or wrong sensor distance. Check sensor adjustment.
0	Warning	Rinsetank fullswitch fault		
0	Warning	Pumping volume fault		
0	Reminder	AutoWash finished successfully		
1	Warning	Fan rev. speed Signal fault	TWIN fan RPM speed signal fault.	Disconnected or wrong sensor distance. Check sensor adjustment.
3	Alarm	Track Lock Sensor failure		
4	Warning	Fold with unlocked pendulum	Fold with unlocked pendulum.	Lock pendulum before folding boom.
5	Reminder	AutoWash was aborted	Tank AutoWash. Finish aborted. User aborted AutoWash.	User must restart AutoWash. Refill RinseTank.
6	Warning	Not all sections open	Tank AutoWash. Task controller is running.	Disable Task controller before AutoWash.
7	Warning	AutoWash blocked by HW fault	Tank AutoWash. Blocked by Diagnostic Trouble Code.	Possible fault in sensor or valve.
8	Alarm	Track Boom Sensor failure		
9	Warning	Track Fr. Sensor failure	Alarm triggered, if sensor signal is less than 0,5V or exceeds 4,5V. Automatic tracking aborted until rebooting system. SafeTrack shifted to manual. Auto is disabled.	Track front sensor mechanically or electrically disconnected or failing. Automatic tracking aborted. Manual tracking is possible in emergency mode.
10	Warning	Track Rear Sensor failure	Alarm triggered, if the sensor signal is less than 0,5V or exceeds 4,5V. SafeTrack shifted to manual. Auto and Align is disabled.	Track rear sensor mechanically or electrically disconnected or failing. Automatic tracking aborted. Manual tracking is possible in emergency mode.
10	Warning	Track hydr wrong direction	Unexpected movement of steering.	Hydraulic hoses connected to tractor swapped.
11	Warning	Agitation valve Fault	Valve not moving as expected.	Possible fault in sensor or valve.
12	Warning	Fill valve Fault	Valve not moving as expected.	Possible fault in sensor or valve.
14	Warning	No Rinse Tank Flow	AutoWash disabled.	RinseTank empty or no rinse water flow due to other reasons.
15	Warning	Press. valve Fault	Valve not moving as expected.	Possible fault in sensor or valve.
16	Alarm	Regulat. valve Fault		
17	Warning	Suct. valve Fault	Valve not moving as expected.	Possible fault in sensor or valve.
18	Alarm	Tank Gauge Fault	Sensor out of range or disconnected.	Sensor disconnected or mechanically damaged or wrongly calibrated.

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
19	Warning	Software error Terminal		
20	Warning	AutoFill aborted by HW fault	Valve not moving as expected.	Possible fault in sensor or valve.
21	Warning	Software error Grip		
22	Warning	Software error SetBox		
23	Warning	Software error FluidBox		
24	Warning	AutoFill aborted by HW fault	Valve not moving as expected.	Possible fault in sensor or valve.
25	Warning	CAN bus failing to SetBox		
26	Warning	CAN bus failing to Grip		
27	Warning	CAN bus failing to FluidBox		
28	Warning	Track Boom fold Align sprayer		
29	Illegal action	Track unfold Boom		
30	Illegal action	Main on off is on		
31	Illegal action	MainTank not empty	When pressing soft key for FastFlush, MultiRinse while MainTank is not empty. Key press does not start process. Used by AutoWash.	MainTank not empty. Cannot start FastFlush/MultiRinse.
32	Illegal action	No rinse water	When pressing soft key for either BoomFlush, FastFlush, MultiRinse while RinseTank is calculated too empty for that program. Key press does not start process. Used by AutoWash.	Not enough rinse water for selected program. Cannot start AutoWash.
34	Waiting	Start FlexCapacity pump	Valves positioned as in AutoWash table. After press on soft key, computer continues to next step. See also screen layouts. Used by AutoWash.	Start FlexCapacity pump to flush hoses. Stop and start FlexCapacity pump with the hydraulic lever, when warning prompts you to.
34	Waiting	FlexCapacity pump Rpm Too Low		
35	Waiting	Stop FlexCapacity pump	Valves positioned as in AutoWash table. After press on soft key, computer continues to next step. See also screen layouts. Used by AutoWash.	Stop FlexCapacity pump to avoid chemical in boom. Stop and start FlexCapacity pump with hydraulic lever, as warning prompts you to.
36	Waiting	0 Pause 0		
37	Warning	PrimeFlow Comm. Fault		
38	Warning	Output failing to sect 1	Disconnected or faulty section valve.	Disconnected or faulty section valve.
39	Warning	Output failing to sect 2	Disconnected or faulty section valve.	Disconnected or faulty section valve.
40	Warning	Output failing to sect 3	Disconnected or faulty section valve.	Disconnected or faulty section valve.
41	Warning	Output failing to sect 4	Disconnected or faulty section valve.	Disconnected or faulty section valve.
42	Warning	Output failing to sect 5	Disconnected or faulty section valve.	Disconnected or faulty section valve.
43	Warning	Output failing to sect 6	Disconnected or faulty section valve.	Disconnected or faulty section valve.
44	Warning	Output failing to sect 7	Disconnected or faulty section valve.	Disconnected or faulty section valve.
45	Warning	Output failing to sect 8	Disconnected or faulty section valve.	Disconnected or faulty section valve.
46	Warning	Output failing to sect 9	Disconnected or faulty section valve.	Disconnected or faulty section valve.
47	Warning	Output failing to sect 10	Disconnected or faulty section valve.	Disconnected or faulty section valve.
48	Warning	Output failing to sect 11	Disconnected or faulty section valve.	Disconnected or faulty section valve.
49	Warning	Output failing to sect 12	Disconnected or faulty section valve.	Disconnected or faulty section valve.
50	Warning	Output failing to sect 13	Disconnected or faulty section valve.	Disconnected or faulty section valve.

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
51	Warning	Output failing to bypass	Disconnected or faulty section valve.	Disconnected or faulty section valve.
52	Warning	Nozzle valve air pressure too low		
56	Warning	Rinse tank not full	When MainTank was been filled and RinseTank is empty.	Remember to re-fill rinse tank.
69	Warning	Ladder not up		
83	Reminder	Aborted by Keypress	AutoFill Aborted by user.	AutoFill left by ESC button.
85	Reminder	FastFill. valve hi friction		
86	Reminder	Pressure valve hi friction		
87	Reminder	Suctionvalve hi friction		
88	Reminder	Check filters & brakes	Service interval timer: Filter alert.	Check filter/brakes. Reset interval.
89	Reminder	Grease points	Service interval timer: Boom alert.	Grease all grease points. Reset interval.
90	Reminder	Tighten bolts	Service interval timer: Bolts alert.	Re-tighten bolts. Reset interval.
91	Reminder	Miscellaneous service	Service interval timer: Miscellaneous alert.	Do a general sprayer check. Reset interval.
92	Reminder	Check nozzles	Service interval timer: Nozzle alert.	Check nozzle filters. Reset interval.
94	Warning	Rollover-protection activated	Track rollover protection parameters exceeded.	Slow down speed and avoid sharp turns.
95	Changed	Track is in auto		
96	Changed	Track is Locked		
97	Changed	Reversing		
98	Reminder	AutoFill setpoint reached	Tank filling set-point reached.	Tank filling has ended.
103	Warning	Fold with unlocked pendulum		
104	Warning	Boom wing loose		
105	Changed	Agitation in auto		
107	Warning	Slant unrequested movement		
109	Alarm	alarm Pressure Sensor	DynamicFluid4: No pressure when flow alert.	Check sensor, cable and fluid system.
110	Warning	Tank Gauge Fault	TankGauge sensor fault.	Check sensor and cables.
110	Warning	Tank sensor fault	MainTank full switch fault.	Check sensor and cables.
111	Alarm	Switch HC6500 OFF & ON		
112	Changed	Flat 1 Level 1 Hilly 5		
113	Changed	Flat 1 Level 2 Hilly 5		
114	Changed	Flat 1 Level 3 Hilly 5		
115	Changed	Flat 1 Level 4 Hilly 5		
116	Changed	Flat 1 Level 5 Hilly 5		
117	Warning	D-centre incorrect position		
118	Warning	Pendulum locking failed		
119	Warning	Pendulum release failed		
120	Warning	STOP! PENDULUM LOCKED!		
121	Alarm	Pendulum lock sensor		
122	Warning	Edit filled above content	Tank AutoFill set-point too low alert.	Type in a higher volume.
123	Warning	Folding now allowed		

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
124	Reminder	TODO_1 0 0		
125	Reminder	TODO_3 0 0		
126	Reminder	NO DILUTION	Appears when activating dilution kit function and no outputs are active.	Fluid systems works normally.
127	Reminder	TANK DILUTION	Appears when activating dilution kit function and tank output is active.	Suction from rinse tank. Flush tank through tank cleaning nozzles.
128	Reminder	BOOM DILUTION	Appears when activating dilution kit function and boom output is active.	Suction from rinse tank. If nozzles are open - flush feed hoses. If nozzles are closed - flush dump hose.
129	Warning	Pump over speeding 0		
130	Warning	Suspension lock failure	Boom lift suspension lock failure.	Check sensor and cables.
131	Warning	Boom not in transport	Boom lift angle sensor mechanical defect.	Check sensor and cables.
132	Illegal action	One function only		
133	Illegal action	Unfold inner wing		
134	Illegal action	Keep folding 1st outer wing		
135	Illegal action	Keep folding 2nd outer wing		
136	Warning	Lift the boom	Boom lift is in a too low position, to ensure proper function of the transport lock.	Lift the boom to ensure proper function of the transport lock.
137	Warning	Boom not in transport		
138	Reminder	Mismatch Box and setup		
139	Alarm	Dynamic centre sensor		
140	Alarm	Pendulum unlock sensor		
141	Warning	Reg Valve sensor fault	DynamicFluid4 Valve angle: Outdated limit alert. Outdated max/min alert. Rate of change alert.	Check sensor and cables.
142	Warning	Boom flow sensor fault.	If pressure on boom but no flow sensor frequency.	Check sensor and cables.
143	Warning	Boom press sensor falut		
144	Warning	Main pump RPM sensor fault	DynamicFluid4 pressure alert; No RPM when there is flow: Observed erratic FlexCapacity pump signal. Observed erratic Main pump signal.	Check sensor and cables. Check pump RPM sensor distance.
145	Warning	Reg valve motor fault	DynamicFluid4 valve angle: Motor status alert.	Check motor and cables.
146	Warning	Agitation sensor fault		
147	Warning	Agitation motor fault		
148	Warning	Hydraulic valve calib error		
150	Warning	PF motor blocked #		
151	Warning	PF motor short #		
152	Warning	PF motor disconnect #		
153	Reminder	AutoWash completed cycle #		
154	Alarm	FastFillervalvemotor fault		
155	Alarm	FastFiller valve sensor fault		

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
156	Alarm	Pressure valve motor fault		
157	Alarm	Pressure valve sensor fault		
158	Alarm	Suction valve motor fault		
159	Alarm	Suction valve sensor fault		
160	Alarm	Illegal Auto WashSetup		
161	Warning	Pump RPM too low Decrease	PTO rev. too low.	Increase PTO speed.
162	Warning	Pump RPM too high Increase	PTO rev. too high.	Decrease PTO speed.
163	Warning	Increase pump flow 0		
164	Warning	Reduce pump flow 0		
166	Warning	PrimeFlow Bus disconnected	PrimeFlow bus disconnected.	Check PrimeFlow cables.
167	Warning	PrimeFlow LinearMode	PrimeFlow bus Linear Mode.	Check PrimeFlow cables.
168	Warning	Pendulum angle sensor fault	Pendulum angle sensor wiring.	Check wiring for pendulum sensor.
169	Warning	Pendulum not moving	Pendulum not moving.	Check oil pressure or hydraulic system.
170	Warning	Pendulum hydraulic hoses swap	Pendulum hoses swapped.	Swap hydraulic hoses connected to tractor.
172	Warning	Speed too high	Boom fold protection speed too high.	Decrease hydraulic oil flow.
173	Warning	Slow down	Boom fold protection slow down.	Decrease hydraulic oil flow.
174	Warning	Slant angle sensor fault	Boom slant angle sensor wiring.	Check sensor and wiring.
175	Warning	Left tilt angle sensor fault		
176	Warning	Right tilt angle sensor fault		
177	Warning	Left outer1 angle sensor fault		
178	Warning	Right outer1 angle sensor fault		
179	Warning	Left tilt hydraulic hoses swap		Check right tilt cylinder for swapped hoses.
180	Warning	TGC Too Low Final Water Level		
181	Warning	TGC Invalid Calculated PPU Value		
182	Warning	TG Water Level Sensor Fault		
183	Warning	TG Full Switch Sensor Fault		
184	Warning	TGCSudden Water Level Raise		
185	Warning	Right tilt hydraulic hoses swap		Check right tilt cylinder for swapped hoses.
186	Warning	Slant is not aligned or unknown	Folding or unfolding while slant is not neutral.	Align slant.
187	Warning	Blocked by negative tilt	Folding or unfolding while tilt is too high.	Lower to less positive tilt.
188	Warning	Blocked by positive tilt	Folding or unfolding while tilt is negative.	Raise tilt to neutral or positive tilt.
189	Warning	Fold automation ongoing		Automatic folding ongoing.
190	Warning	Boom is folded or unknown	Boom tilted down while boom is folded.	
191	Warning	Transport left sensor fault		
192	Warning	Transport right sensor fault		
193	Warning	Bypass Restriction sensor error	Spray section bypass restriction sensor error.	
194	Warning	Bypass Position not Reachable	Spray section bypass restriction position not reachable.	
195	Warning	Left outer3 angle sensor fault		Check boom left wing outer 3 angle sensor wiring.
196	Warning	Right outer3 angle sensor fault		Check boom right wing outer 3 angle sensor wiring.

ID (PG)	Type	Fault Text at Display	Criteria for Fault Operations Disabled	Additional Info
197	Warning	Left outer4 angle sensor fault		Check boom left wing outer 4 angle sensor wiring.
198	Warning	Right outer4 angle sensor fault		Check boom right wing outer 4 angle sensor wiring.
199	Warning	Boom is not aligned or unknown	Folding or unfolding while boom is not aligned.	Align boom.
200	Warning	Left outer2 angle sensor fault		Check boom left wing outer 2 angle sensor wiring.
201	Warning	Right outer2 angle sensor fault		Check boom right wing outer 2 angle sensor wiring.
202	Warning	Autounfold completed		
203	Warning	Autofold completed		
204	Warning	Left outer1 mechanical fault		
205	Warning	Right outer1 mechanical fault		
206	Warning	Left outer2 mechanical fault		
207	Warning	Right outer2 mechanical fault		
208	Warning	Left outer3 mechanical fault		
209	Warning	Right outer3 mechanical fault		
210	Warning	Left outer4 mechanical fault		
211	Warning	Right outer4 mechanical fault		
212	Warning	Left Tilt mechanical fault		
213	Warning	Right Tilt mechanical fault		
214	Warning	Left Inner mechanical fault		
215	Warning	Right Inner mechanical fault		
216	Warning	Left Inner angle sensor fault		
217	Warning	Right Inner angle sensor fault		
218	Warning	Slant hydraulic hoses swap		
218	Warning	Norac auto mode is not available		
219	Warning	Speed Sensor Fault		

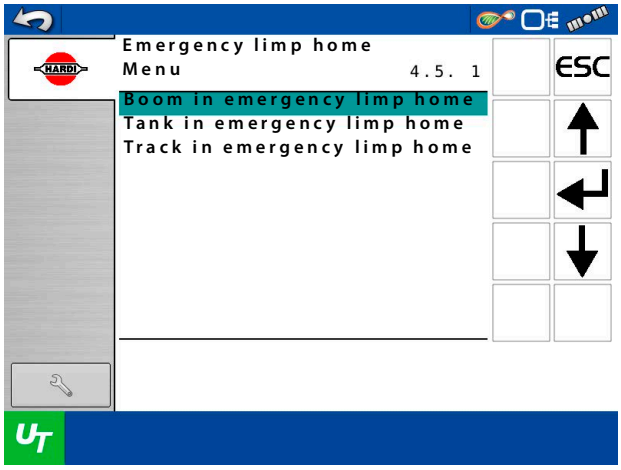
Emergency Operation

In an Emergency Situation

If an error occurs in the system, then choose "Emergency limp home" to disconnect the part of the sprayer that fails.

This menu bypasses the system so all sensors are ignored. Then it is possible to manually fold the boom, align track or operate valves in order to drive home for service.

1. Go to the "Emergency Mode" menu.
2. Choose the function to deactivate with ↑ or ↓.
3. Press ↵ to open the menu.
4. In the submenu, choose to activate or deactivate with ↑ or ↓.
5. Press ↵ to select the option.



ATTENTION! Do not use the emergency limp home modes unless a problem has occurred. This is not for use during normal operation.

DynamicFluid4 Operation when a Sensor Fails

When one of the sensors for RPM, flow or pressure fails, the system will work in a limp home mode, with reduced though acceptable performance. One of the alarm IDs between 140 to 147 will be triggered in the controller display. See also "Emergency Operation" on page 151.

- In the auto mode, the system will not work with two sensors failing; hence, the operator should repair the failing sensor as soon as possible.
- The pressure regulation can use both wheel speed sensor on trailer and GPS speed via ISOBUS.

NOTE! ComfortTrack / IntelliTrack only works using the wheel speed sensor.

The pressure regulation angle sensor both act as feedback to the computer and as the end stop switch. If the angle sensor fails, the operator can continue spraying by turning the regulation valve past the completely closed position.

Fail in the below sensors will cause an inaccurate calculation of the volume rate when spraying. To be able to end a spray job when a sensor fails, do the following:

RPM	Flow	Pressure	Speed	Valve Angle	Mode for Regulation	Extra Actions for Operator
Use	Use	Use	Use	Use	Full performance.	None
Defect	Use	Use	Use	Use	Reduced performance.	None
Ignore	Defect	Use	Use	Use	Reduced performance.	Setup new nozzle size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 68.
Defect	Defect	Use	Use	Use	Reduced performance.	Setup new nozzle size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 68.
Ignore	Use	Defect	Use	Use	Reduced performance.	Setup new nozzle size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 68.
Defect	Use	Defect	Use	Use	Reduced performance.	Setup new nozzle size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 68.
Use	Use	Use	Defect	Use	Spray at constant speed.	Keep the sprayer at constant driving speed. Type in simulated sprayer speed, see "Menu 3.4.2 Simulated speed value" on page 67. Or if possible, use GPS speed.
Ignore	Defect	Defect	Ignore	Use	Manual only.	Adjust the pressure using mechanical pressure gauge.
Ignore	Ignore	Ignore	Ignore	Defect	Manual only. Regulation valve can pass end stop. I.e., when continuing turning after closing, it opens again.	Adjust pressure using mechanical pressure gauge. Check for passing end stop of valve. Compensate for sections change.

Fluid System Test of Pump Capacity and Internal Leakage

1. Close the main ON/OFF valve  .
2. The system must be in Manual mode indicated by  in the top of the display before turning on spraying. Press  to change between Manual and Auto mode.
3. Close the regulation valve by pressing **%+** button to increase the pressure. Yellow diode lights on the regulation valve.
4. Close the agitation valve.
5. Close the bypass valve for the pressure filter.
6. Set the pump from 250 to 300 RPM, while engine is in idle speed.
7. Now all water from the pump should pass the boom flow sensor.
8. Pump condition and possible internal valve leakages can be checked by comparing:
    - Menu 4.3.5.2.3 Pump calc flow. This menu shows the calculated flow from the pump.
    - Menu 4.3.5.2.6 Boom flow sensor. This menu shows the actual measured flow through the flow sensor.

   This indicate a leakage from the operating unit and back to tank when nozzles are spraying.

   A defect bypass valve could cause the leakage.

NOTE! For correct function, the values read in the two menus need to be similar ±10-20 litres.

ATTENTION! When there is a leak from the operating unit back to the MainTank, it takes longer time to fill the measuring jug and the PPU thereby increases. This increase is largest at small nozzles.

NOTE! Contact the HARDI Service Centre for advice.

Materials and Recycling

Disposal of Electronics

Thoroughly clean the operating unit when it has completed its working life.

Aluminium ECU casing:	Can be recycled.
Electronic components, print circuit boards (PCB):	Possible to scrap.
Cardboard:	Can recycle up to 99% and therefore should be put into the waste collection system.
Polyethylene:	Can be recycled.
Synthetic fittings:	Possible to incinerate.

Packaging Information

Materials used for packaging are environmentally compatible. It is possible to safely deposit burnt in an incinerator.

8 - Technical Specifications

Charts

Chart for Recording Values

Menu	Function	1 - Values	2 - Values	3 - Values
[3.2.1 Flow constant]	Flow PPU			
[3.1.1.1 Speed constant]	Speed PPU			

Index

Index

Spare Parts Information

To see updated spare part information, visit the Agroparts website on the internet.

Here all parts information can be accessed in the spare parts catalogue:

1. Go to www.agroparts.com, register for free and log in.
2. Select "HARDI" in the menu on the left.
3. Select "Spare parts catalogue" and find your spare part.
4. Online ordering is also possible.
5. Contact your HARDI dealer for further information on spare parts.

User Evaluation

Dear Reader,

We update our instruction books regularly. Your suggestions for improvement are appreciated and will help us to create ever more user-friendly instructions. Send us your suggestions to this e-mail address:

hau.marketing@hardi.com

Thank you.

HARDI AUSTRALIA

534-538 Cross Keys Rd, Cavan SA 5094 - AUSTRALIA