

CONTROLLER HC 6500 / ISOBUS VT



Original

Instruction book - SW 3.XX

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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.

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.

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

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Operator safety

Symbols

These symbols are used thorough the book to designate where some sort of extra attention has to paid for the reader. The four symbols have following meaning.



This symbol means DANGER. Be very alert as your safety is involved!



This symbol means WARNING. Be alert as your safety can be involved!



This symbol means ATTENTION. This guides to better, easier and more safe operation of your sprayer!



This symbol means NOTE.

Precautions

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.



Press the keys with the underside of your finger. Avoid using your fingernail.



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



Tractor drivers seat is the intended working place during operation.

Service



Test with clean water prior to filling with chemicals. Rinse and wash equipment after use and before servicing.



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 an arc welder is used 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 HC 6500 / ISOBUS VT system

The HC 6500 / ISOBUS VT is for use in agricultural and horticultural production. The components are developed to last many years under agricultural conditions.

The system has a non-volatile memory without battery which simplifies storage. All parameters in the menus are saved in the memory and are not lost when the power is disconnected.

Main components	Location
HC 6500 Terminal or ISOBUS terminal	Tractor/Self-propelled
HC 6300 Grip	Tractor/Self-propelled
SetBox	Tractor/Self-propelled
HC 6200 FluidBox	Sprayer/Self-propelled
HC 6100 JobCom	Sprayer/Self-propelled

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

Optional transducers include pressure and revolutions readout. Other options include a 12 Volt printer and for HC 6500 only, also a foot operated remote ON/OFF for the main ON/OFF.

The HC 6500 terminal has a 4,7" colour display. Working pictures will be shown 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.
- 99 trip registers. It includes a total register that summarizes data from the 98 trip registers.
- Illuminated display so readout is possible even for night-time work (HC 6500 only).



The system is also compatible with Variable Rate Application (VRA) and is prepared for communication with Precision Farming tools (e.g. HARDI AutoSectionControl). Data dump of registers and configuration to a personal computer are possible.

Functions include

- Correct area with closure of up to 13 spray boom sections.
- Many alarm functions and possibility for audio/visual alarm etc.
- Many warnings depending on operation. Alarms and warnings is shown in the bottom left 1/4 corner of the display on HC 6500 and some VT screens. HC 9500 will show alarms in top of the screen.

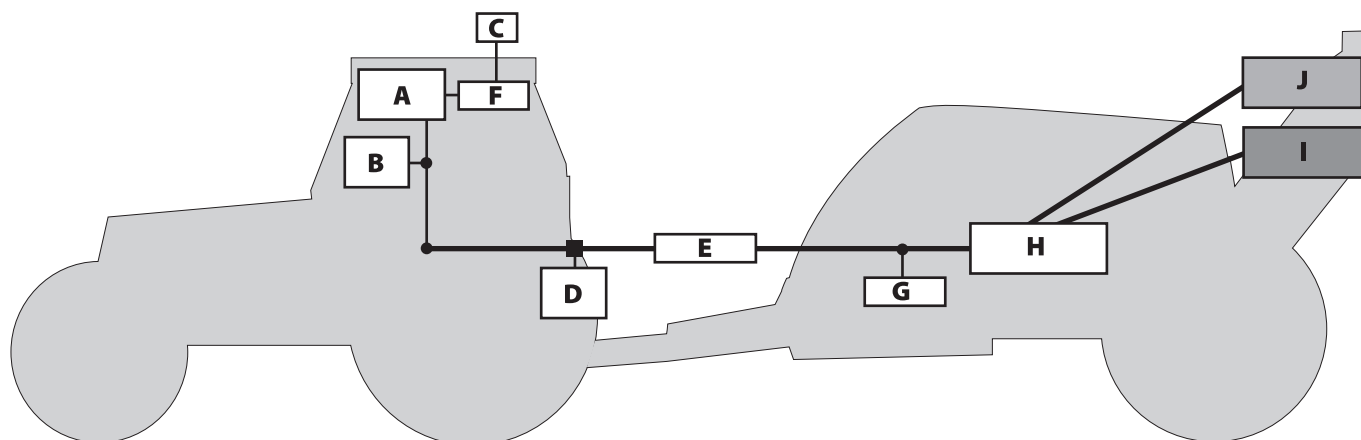
3 - Description

System description

Overall description

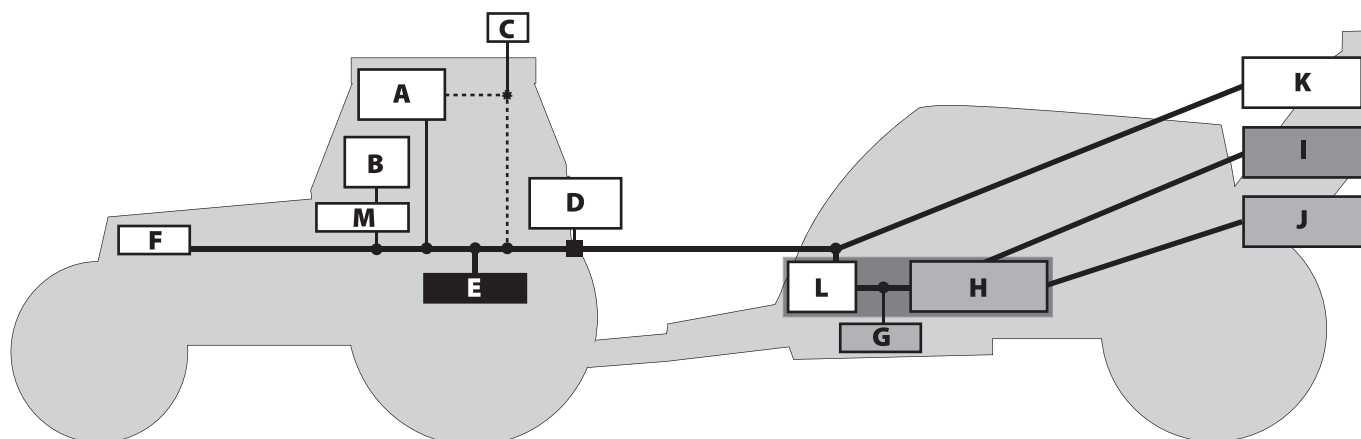
The precise wiring setup can vary, depending on the terminal mounted.

HC 6500 system



- A. HC 6500.
- B. SetBox and Grip.
- C. GPS antenna (optional).
- D. Implement connector.
- E. HARDI-BUS.
- F. AutoSectionControl (optional equipment).
- G. FluidBox (i-sprayers only).
- H. JobCom (Implement ECU).
- I. Centre section junction box.
- J. Hydraulics block.

ISOBUS system



- A. HC 9500 or VT Terminal.
- B. SetBox and Grip.
- C. GPS antenna (optional).
- D. IBBC connector.
- E. Tractor bus.
- F. ISOBUS.
- G. FluidBox (i-sprayers only).
- H. JobCom (Implement ECU).
- I. Centre section junction box.
- J. Hydraulics block.
- K. AutoHeight UC5.
- L. ISOBUS bridge.
- M. Cabin connector.

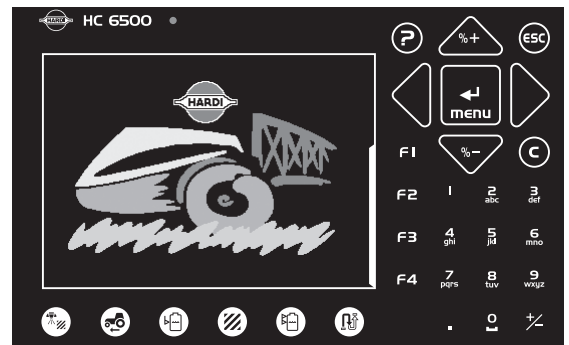
Terminals and boxes

Types of terminals

This software can run with 2 main types of display terminals.

HARDI HC 6500 terminal

- Conventional screen.
- Dedicated physical function buttons.
- Dedicated non-ISOBUS software



ISOBUS terminals

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

- Conventional or touch screen and physical buttons.
- Function buttons are graphical but are operated by physical buttons on the terminal.
- The software runs as a Virtual Terminal (VT) into the terminal software.



HARDI HC 9500 or similar ISO terminals with touchscreen interface. The HC 9500 shown.

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



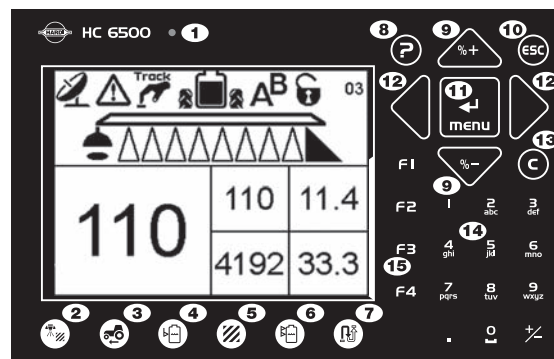
3 - Description

Terminal layouts

In the following the two main terminal layouts and their difference are described.

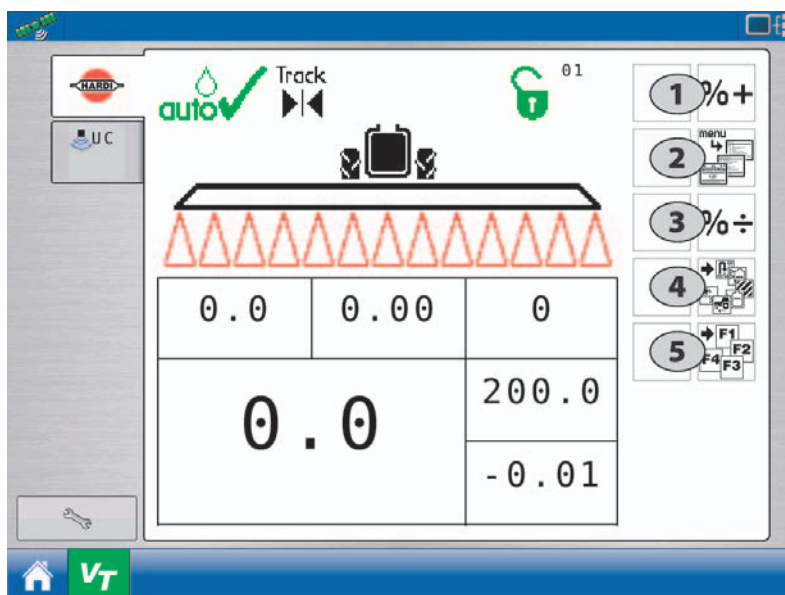
HC 6500 terminal physical buttons

1. Status diode.
2. Preset key - Volume rate.
3. Preset key - Speed.
4. Preset key - Tank contents.
5. Preset key - Area treated.
6. Preset key - Total volume sprayed out.
7. Preset key - Distance or area remaining.
8. Help key.
9. Scroll up or down, change a value or volume rate.
10. Escape a menu.
11. Enter menu or confirm a value.
12. Move cursor to right or left.
13. Clear a value.
14. Numeric keypad.
15. Function buttons.

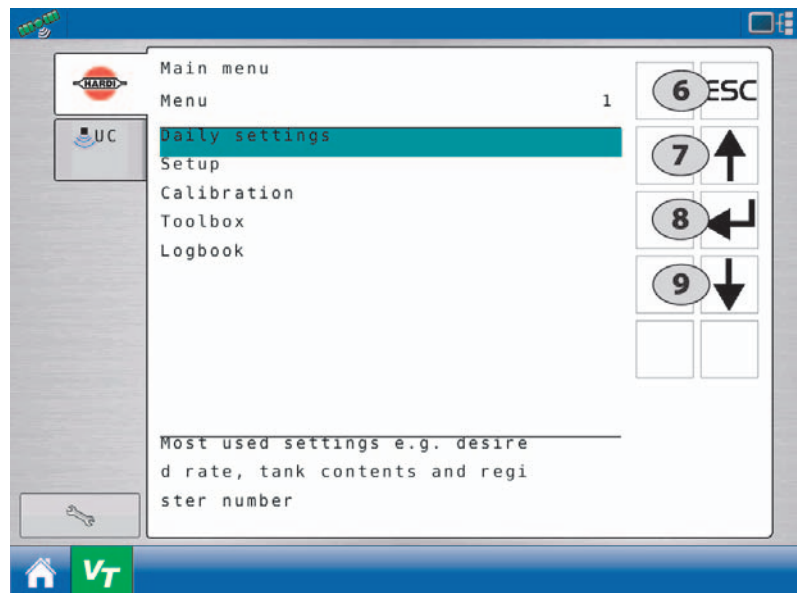


ISOBUS virtual terminal buttons

1. Scroll up, increase a value or volume rate.
2. Enter menu.
3. Scroll down, decrease a value or volume rate.
4. Preset keys.
5. Soft menus.



6. Escape a menu.
7. Scroll up.
8. Enter menu or confirm a value.
9. Scroll down.




3 - Description

Display symbols


These symbols are common for both terminal types.

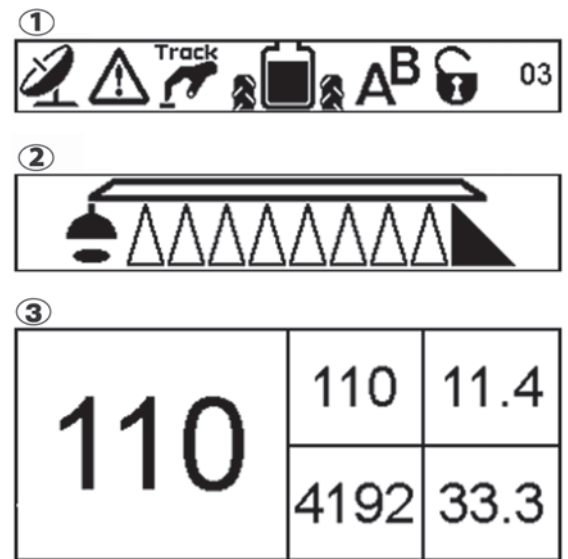
1. The 1st Line is for status symbols, register number and alarm number. All status symbols shown here.

 **ATTENTION!** If an error occurs, alarm/warning error number will be shown instead of register number. The alarm/warning number can be recognized by the exclamation sign in front of the number.








































2. The 2nd Line is for boom status, foam marker and end nozzles indications.
3. HC 6500: The bottom half has 5 boxes with selectable information. When soft keys is activated 4 rows appear beside the F-buttons and replace the four small boxes.

ISOBUS: The bottom half has 6 boxes with selectable information.

 **NOTE!** See "Menu 2.1 Display readout" on page 46 for setup of the display readouts in the bottom half of the terminal display.



1st line status icons

	All "OK"		Information		Warning		Stop (critical)		Over or under application
	Volume rate Automatic		Variable rate (GPS) active		Volume rate Manual		Pendulum Locked		Pendulum Unlocked
	Track Crab left		Track Crab right		Track Lock		Track Automatic		Track Manual
	Headland Assist on		Headland Assist Mirror		Headland Assist Centre slant		Headland Assist waiting mode		
	Options A on		Options B on		Options both on		Options both off		
	Dual Line A on		Dual Line B on		Dual Line both on		Dual Line both off		
	TWIN Preset 1		TWIN Preset 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				
	Increment steps mode Nozzle size calculated		Increment steps mode No flow to sections		Increment steps mode Nozzle size not calculated				

A. Preset keys

Vital information whilst spraying is quick and easy to access.

ISOBUS: Pressing the button will enter a submenu with the preset keys.

HC 6500:

- One preset key press shows information in lower left corner of display.
- On some of the buttons pressing twice will show a graphic information of same readout on volume rate and speed.

B. Soft keys

Soft keys control optional features. They are activated the following way:

ISOBUS: Press the soft key button. A submenu with the features appear.

HC 6500: Press any of the 4 soft keys (F1, F2, F3 or F4) and the soft key menu appears in the display area to the left of the soft keys.



ATTENTION! The number of levels in the soft key menu system depends on the number of functions - see also "Soft keys menu tree" on page 18.

C. Navigation keys

The navigation keys are initially used for set up in the menu system by coding in values. The navigation keys can change the volume rate in a set percentage or fixed volume rate.

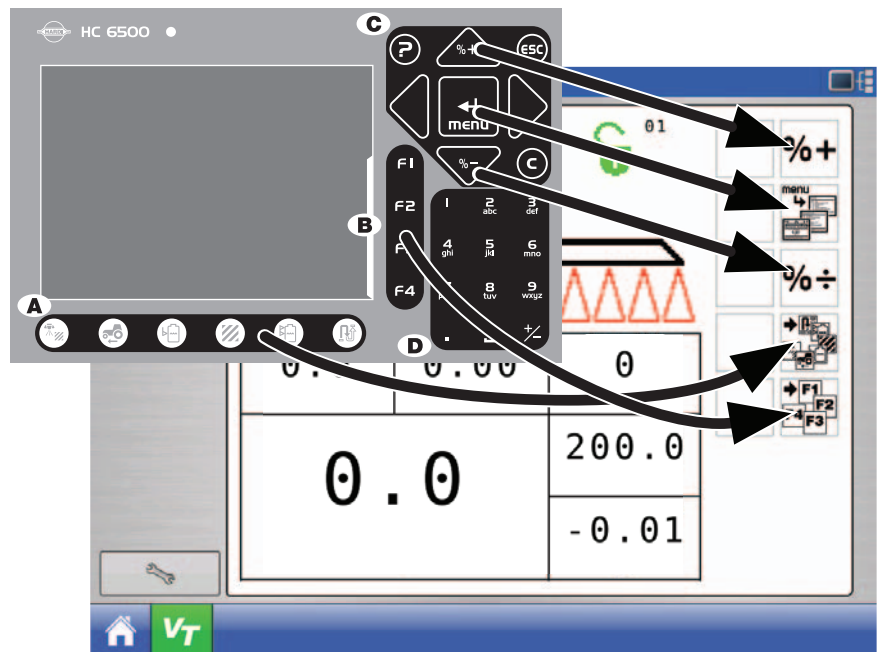
HC 6500	ISOBUS	Description
	CLR This is normally a key in the standard numeric keypad of the specific terminal.	Used to clear a value or register.
	ESC This key appears whenever necessary at respective menus etc. See "ESC key for ISOBUS terminals" on page 47 for setup of this button.	Used to escape back to your working screen.
	Not available on ISOBUS terminals.	Used if you have questions to the menu you are in.

D. Numeric keys

ISOBUS: The keys will be the standard numeric keypad for the specific ISOBUS terminal.

















HC 6500: Physical keys (D) on the terminal.

- Easy to enter text like a field name or when a number is keyed in.
- Used to key in a value or direct access a menu.



3 - Description

Soft keys menu tree


LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4
ISOBUS	HC 6500	ISOBUS	HC 6500	ISOBUS	HC 6500	
	F1 AutoWash		F1 BoomFlush		F1 Start/Break	9 steps flush
					F2 Abort	
			F2 FastFlush		F1 Start/Break	15 steps flush
					F2 Abort	
			F3 MultiRinse		F1 Start/Break	39 steps rinse
					F2 Abort	
	F2 AutoFill		F1 Edit filed		Key in volume	
			F2 Abort			
	F3 EndNozzles		F1 Left ON		Work screen	
			F2 Left OFF			
			F3 Right ON		Work screen	
			F4 Right OFF			
	F4 DualLine		F1 A ON and B OFF			
			F2 B ON and A OFF			
			F3 A and B ON			
			F4 Auto mode			



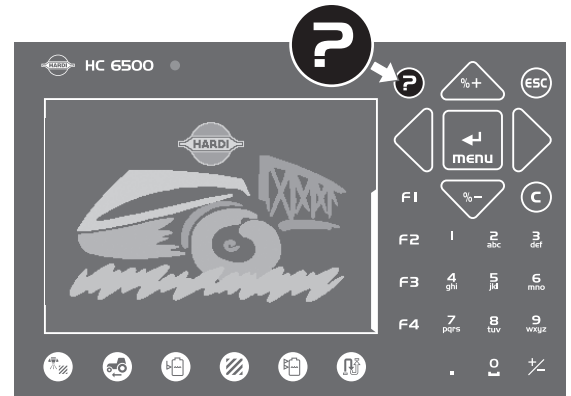
ATTENTION! See paragraph "Auto functions general info" on page 24 for further explanation on menus.

Help key (HC 6500 only)

This is the operator's built-in quick guide and instruction manual. This will free the operator from finding details in the instruction manual.

Press  to activate help text. Press  to leave help function.

- The help key is always active.
- After the help key has been activated, an explanation of any control key or switch is shown on a full screen.
- If a message, warning or service reminder appears, more details are found by pressing the help key.



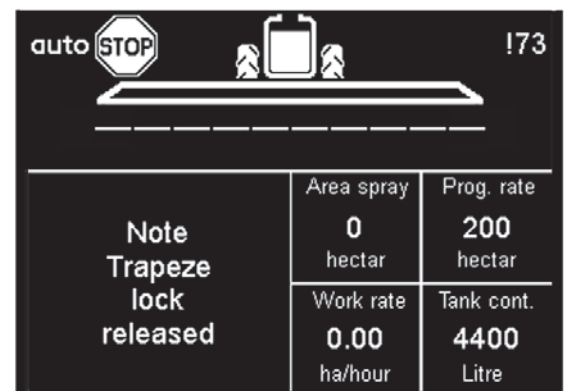
Night illumination (HC 6500 only)

It is possible to choose between day and night illumination.

- Menu [2.7.1 Choose day/night colours] for selection.



ATTENTION! Picture shows night illumination.



3 - Description

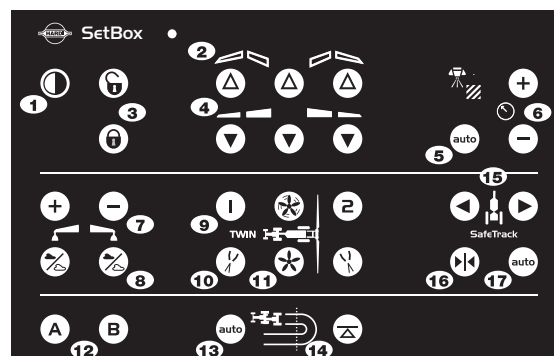
SetBox

The SetBox controls secondary functions. The keys are grouped into control areas to simplify operator understanding.



NOTE! Self-propelled sprayed do not have a SetBox as the controls are built-in into the cabin.

1. Power ON/OFF.
2. Status diode.
3. Pendulum lock controls.
4. Boom fold controls.
5. Automatic volume rate.
6. Manual pressure control.
7. Foam marker regulation.
8. Foam marker Left/Right.
9. TWIN presets.
10. Air slot angle for TWIN.
11. Air volume for TWIN.
12. Optional function A-B (HC 6500 only).
13. HeadlandAssist automatic.
14. HeadlandAssist boom manual lift to preset height.
15. SafeTrack manual control.
16. SafeTrack align.
17. SafeTrack automatic selection.



ATTENTION! Button 1 have different function on ISOBUS sprayers as this turns the JobCom ON/OFF.



ATTENTION! Buttons 13 and 14 can have different function if the sprayer is equipped with AutoHeight.

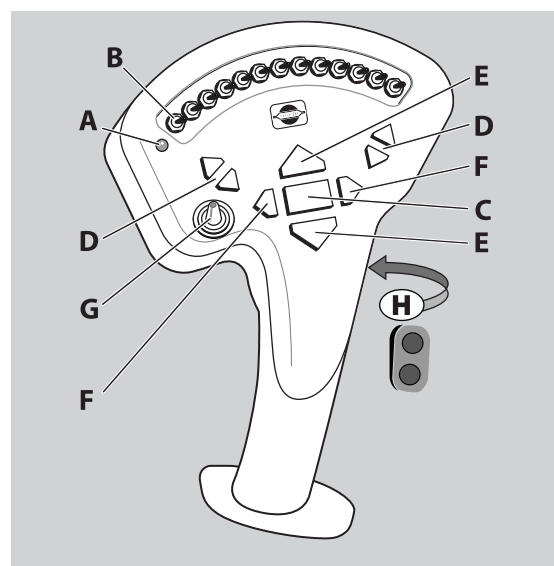
HC 6300 Grip

The Grip is an ergonomically remote unit that can be easily mounted inside the tractor cabin. All common functions required during normal spraying can be operated with the Grip. Also the Grip controls some optional functions.



ATTENTION! The Grip cannot be switched ON/OFF separately. It is automatically switched ON/OFF with the Terminal (HC 6500) or when tractor power is turned ON (ISOBUS).

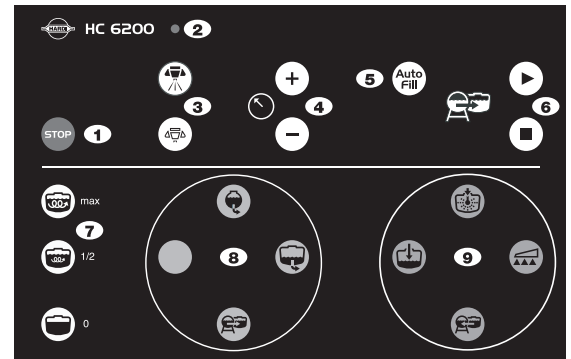
- A. Status LED.
- B. Boom section controls (up to 13).
- C. Main ON/OFF.
- D. Tilt.
- E. Boom height.
- F. Boom slant.
- G. Not used.
- H. TWIN presets.



HC 6200 FluidBox

The FluidBox is used in conjunction with AutoAgitation, AutoFill and AutoWash functions. It is a remote control of the liquid system and is logically placed at the filling area (storage locker).

- All stationary spraying operations can be performed without entering the tractor cabin.
- Operations like activation of the main ON/OFF, can also be done; a neat feature when checking nozzles.



1. Emergency STOP of all functions.
2. Status LED.
3. Main ON/OFF.
4. Spray pressure increase/decrease.
5. AutoFill start.
6. AutoFill manual open of valve and AutoFill pause.
7. AutoAgitation override control.
8. Suction SmartValve override control.
9. Pressure SmartValve override control.

General keystrokes

The first steps to choose a menu are shown below. See also "Full menu structure" on page 33.

Menu selection

1. Press to proceed into the menu.
2. In the menu, the last selected value used, is marked with the symbol (R) (HC 6500) or with a lilac bar (Virtual Terminals).
Move the menu marking >> up and down by using the and keys. On HC 6500 only it can also be done by pressing the menus last digit at the numeric keypad (e.g. pressing "6" for menu [4.6 Speed simulation]).
3. Confirm selection by pressing .

ATTENTION! Press and hold to leave the menu system 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 two >> markings (HC 6500) or the blue/green bar (Virtual Terminals).

4 TOOLBOX	
>>	4.1 Measure
	4.2 Service interval: Hours until
	4.3 Stop-watch
(R)	4.4 Alarm clock
	4.5 Test
	4.6 Speed simulation
	4.7 Emergency track Align
	4.8 Computer CAN status
To measure distance and area. Setup working width	

Menu editing example: Tank contents HC6500

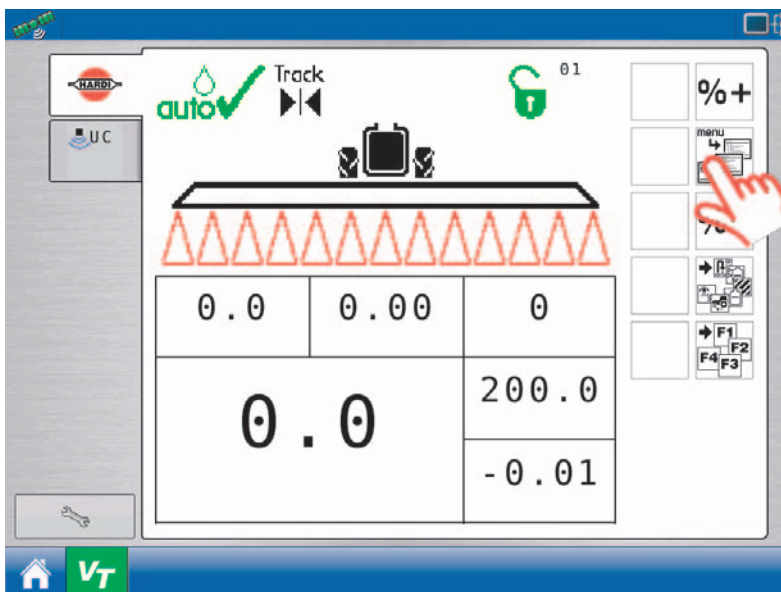
1. Press to enter [1.2 TANK CONTENTS].
2. To clear value move cursor to digit and press .
3. To move the cursor press or .
4. Press or to set the desired value, or key in value on numeric keys.
5. Press to confirm. Press to exit.

auto		03
1.2 Tank contents		
4.00		
litre		
To change displayed tank contents. Use arrow or numeric keys to set.		

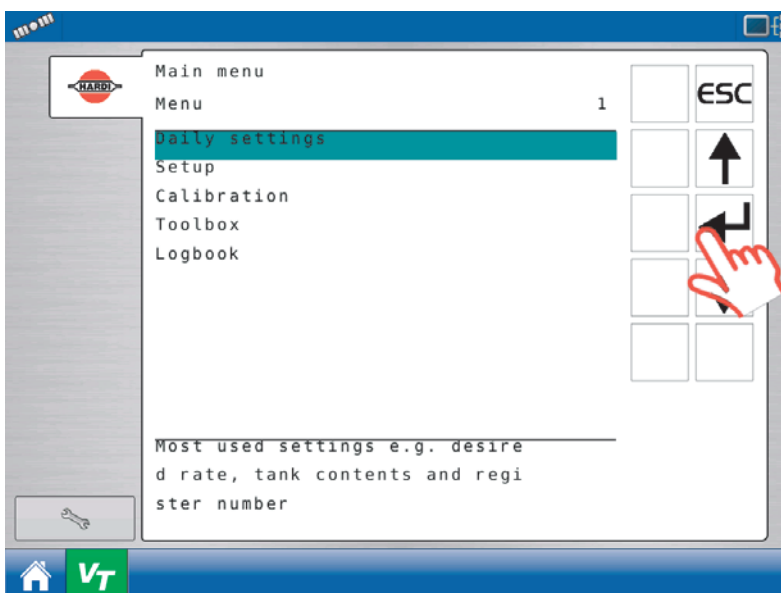
3 - Description

Menu editing example: Tank contents ISOBUS VT

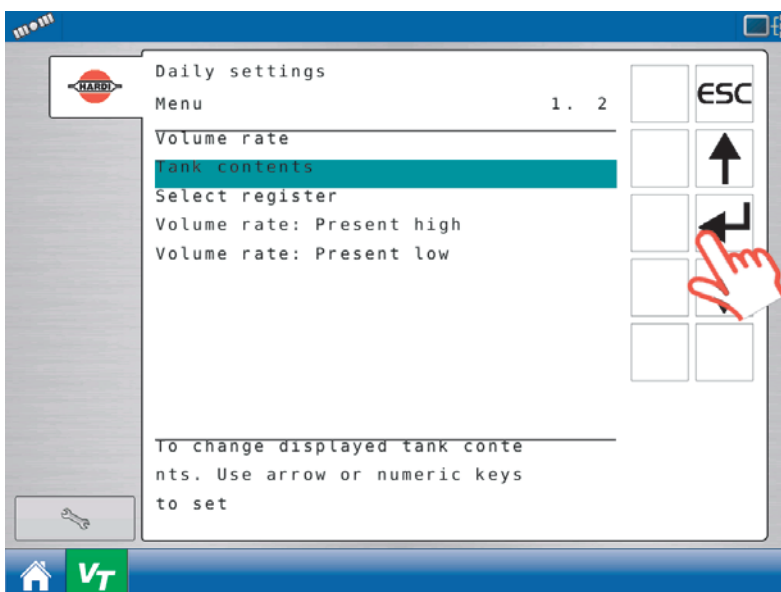
1. At main ISOBUS VT screen select Menu to enter menus.



2. Scroll to "Daily settings" with up or down arrows and select enter to confirm.



3. Scroll to "Tank contents" with up or down arrows and select enter to confirm.

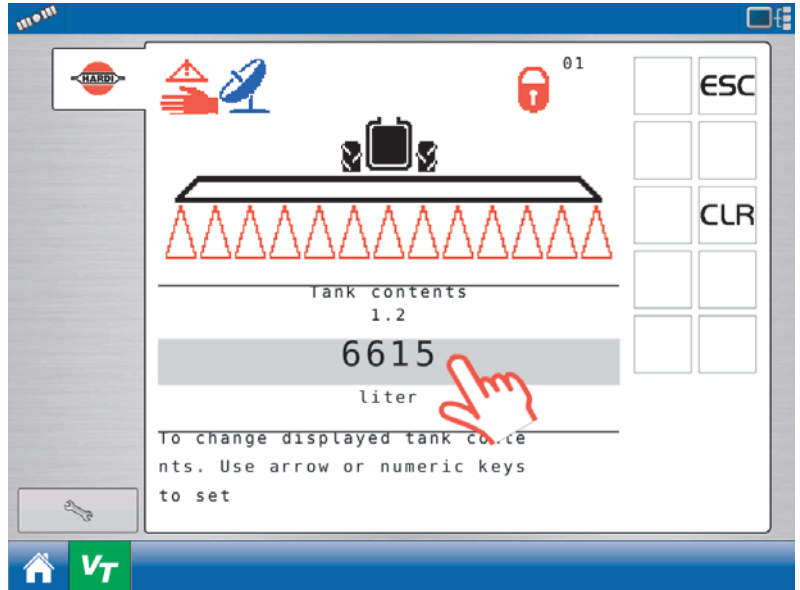


3 - Description

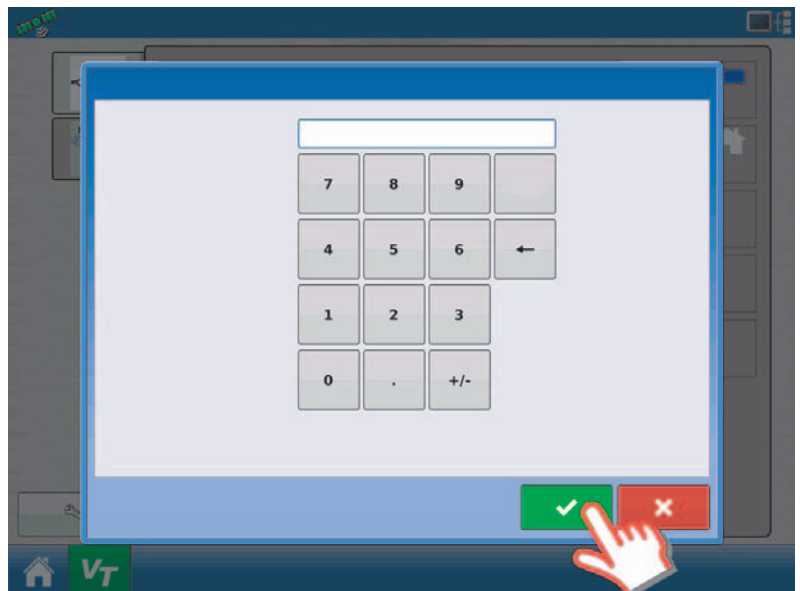


ATTENTION! The procedure for the following two steps can vary between ISOBUS terminals. Procedure for HC 9500 terminal is shown here.

4. Select the value field to enter a value.



5. Enter the new tank contents value on the numeric key pad and select "fly-leg" to confirm.



Extended menu

This menu has been set up by your HARDI Service centre. It contains parameters that are typically set only once, normally before the Controller is used.

- For HC 6500 the extended menu is not visible at normal use.
- For ISOBUS terminals the extended menu is accessible from menu 2.8 and requires a pin code to enter.



ATTENTION! Unless instructed, do not tamper with the settings and values in these menus. Failure to do so may void warranty.

3 - Description

Functions

Auto functions general info

The Soft key buttons used for the functions:

- AutoWash
- End Nozzles
- AutoFill
- Dual Line



ATTENTION! Refer to "B. Soft keys" on page 17 for information about how to enter the soft keys. Also see a complete menu tree in "Soft keys menu tree" on page 18.

AutoWash

Autowash is a series of 3 different automated rinsing/flushing programmes managed by the controller.

General

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 that all intended spray lines have been rinsed.

Depending on the situation one of three different programs can be selected, BoomFlush, FastFlush and MultiRinse. These are fast and easy for the operator:

- The cleaning process is done in the field so the residues do not end up in the farmyard. The operator remains in the cabin thus avoiding contamination from 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 the valves need to be operated.
- When AutoWash operates, it takes control of both suction SmartValve and pressure SmartValve.

The AutoWash functions are meant as an aid for the user to get an complete cleaning of the sprayer. But it is not intended to do the following 3 things:

Do not:

- use AutoWash at stand still. Stationary washing can cause point contamination. This does not apply if a drained filling/washing location is available at the farm.
- put cleaning agent in the rinsing tank.
- pause a wash program and add cleaning agent into the main tank.

Additional info

AutoWash, BoomFlush, FastFlush and MultiRinse are designed for use in the field, and operate 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 be operated stationary.

Other procedures may be required or cannot be done completely 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 crops must be done 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: It should always be cleaned immediately after use, preferably whilst FastFilling.



WARNING! The AutoWash functions are meant as an aid for the user to get an 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 “AutoWash” on page 94.

BoomFlush

BoomFlush rinses the spray lines. This is 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 PrimeFlow valves at nozzles.

- Use approximately 100 litres from the rinsing tank.
- Rinse water is sprayed out at nominal driving speed to avoid overdosing.



NOTE! When doing a BoomFlush the main tank contents will be increased with approximately 40 litres. This is solely spray liquid that are primed back to the main tank before clean rinse water is directed to the nozzles. Therefore the spray chemical is not thinned with water from the rinsing tank.

FastFlush

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

FastFlush both flushes MainTank, the fluid system and the boom. FastFlush reduces sedimentation in all of the sprayer, however the residual concentration is still relatively high.

- Uses approximately 75 litres from the rinsing tank.
- Rinse water is sprayed out 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. The main tank must be empty before attempting to do a MultiRinse.

MultiRinse performs the same sequence of steps as FastFlush, but performs it between 3 and 7 times depending on the sprayers RinseTank size. Hence spray chemical concentration is greatly reduced.

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

- Does the same steps as a FastFlush, but repeats 6 times.
- Uses approximately 450 litres from the rinsing tank.
- Recommended speed is the half of normal spraying speed, whereby dose rate (litres/ha) is increased. This makes driving and washing more comfortable.












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

3 - Description

Cleaning needs

The schematics outlines specific situations of cleaning and their need of 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. brand X morning and evening	E.g. 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				
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. Main tank not empty	 Safe	Depends on chemicals	 Crop damage
MultiRinse	Not possible. Main tank not empty	Safe but overkill	 Safe	Probably ok except when chemical binding occurs
Soak wash (FastFlush & MultiRinse)	Not possible. Main tank 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
Main tank 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	From FastFiller or RinseTank
Approximate time consumed*	3 min.	5 min.	25 min.	2 x 25 min. +	Operate
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.

AutoFill

AutoFill is used when the sprayer has to be filled totally or filled to a specified amount of water.

The specified amount has to be keyed into the Display. Press F1 for "Edit filled" and key in the volume to AutoFill. The filling is started by pressing  on the HC 6200 FluidBox.



4 buttons are active on the FluidBox when a filling amount has been keyed in at the display

-  button: Used to stop any filling.
-  button: Opens FastFiller valve and activate monitoring for stop.
-  button: Opens FastFiller valve. Monitoring for stop is not activated.
-  button: Closes FastFiller valve to pause filling.



ATTENTION! If the system has to be stopped when filling: Press the  or the  button on the HC 6200 FluidBox or "Abort" on the display.



ATTENTION! If the filling process is paused and then resumed by pressing  then AutoFill will fill the tank all way till top! Therefore use  to resume if the keyed in amount of water is to be kept.

AutoAgitation

AutoAgitation will ensure an even agitation as the tank empties. The agitation flow is regulated to prevent foam and minimize liquid residues when the tank is empty. It is possible to select different settings for optimal agitation.

- Is a part of the AutoWash program.

3 - Description

DynamicFluid4 pressure regulation

Traditional fluid regulation starts when the nozzles are opened. With DynamicFluid4 the regulation is a continuous process that continues even if the nozzles are closed. Two ceramic discs regulates the pressure and ensures quick reaction and zero leakages. Sprayer speed, P.T.O. RPM and number of sections activated are parameters used, and the benefit is more precise application rates from the second the sprayer begins spraying.

The DynamicFluid4 use feed forward technology based on 5 sensors that feeds the JobCom computer with data necessary for optimal regulation. It auto-prime at start-up, starts and move the valve towards the final position immediately after the operator makes changes. E.g. when section valves are opened or closed, the regulation valve is started at same time as the section valve motors are started. This avoids overpressure situations e.g. after running empty and refill of main tank.

The 5 sensors are also back-up for each other and ensures the system can continue regulation even if one or more sensor signal fails. Sensors used are:










- Sprayer speed sensor
- Flow sensor
- Pressure sensor
- Pump r.p.m. sensor
- Regulation valve opening angle sensor

The DynamicFluid4 pressure regulation features are:

- Very fast and accurate regulation when all sensors are ok, setup in menus are correct and pump, filters and valves are in good conditions.
- Quick reacting valve when sections are turned ON/OFF.
- Optimized AutoSectionControl feature that predict boom sections to open and nozzle pressure.
- Optimized for different P.T.O. systems.
- Nozzle surveillance. No setup or tuning required for nozzle change.
- Warning in display if failures occur on boom plumbing, such as severe clogging of line or nozzle filters or large leakages on hoses and fittings.
- All functions work though with degraded performance (Limp home modes), if:
 - Faults occur in fluid system, e.g. pump defects, clogged filters, leaking valves.
 - Sensor failure appear on pressure sensor, flow sensor or RPM sensor.
 - There is wrong setup of sprayer data in menus.
- Emergency mode if angle sensor or speed sensor fails.

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 When Automatic Volume Rate button is pressed on the SetBox.	Manual When one of the Manual pressure control buttons is pressed on the SetBox.	Increment steps When the Volume Rate is changed in steps with %-up or %-down buttons on the Terminal.	
			Calibration jug There is flow to section valves. Nozzle size (L/min at 3 bar) has been calculated.
			Drop There is no flow to section valves. The pump is not started or the pressure SmartValve is set to other function than spraying.
			Question mark There is flow to section valves but pressure and flow has not yet been stable, therefore the nozzle size (L/min at 3 bar) has not been calculated. The system uses the previously stored nozzle size.

Regulation valve function diagram



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



3 - Description

DualLine (optional - limited markets only)

If the sprayer is 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.

Choose the right menu for your spraying job. When DualLine is active it will be shown in the display with an icon that show the actual status.

DualLine in the Controller

- The system is set up in menu 2.2.3 if it is active.
- The boom lines are pronounced:
A for front boom lines.
B for rear boom lines.
- The DualLine is set up so it reacts on pressure.

There are four main application methods for which DualLine will be used:

1. To manually switch between nozzle types with the same output.
As spraying conditions change during the course of the day it may be an advantage to change from an F series nozzles to LD series nozzles to overcome off target wind drift (Or LD 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 lines 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 DualLine 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.

End nozzles (Fence line) (optional)

If End nozzles/Bi-jet are fitted, set the value to the equivalent coverage by the boom nozzles. E.g. End nozzle coverage is 2 metres. This is equal to [04 Boom nozzles]. Choose End Nozzles by pressing F3.

- When end nozzle is active it will be shown in the display with two icons in the end of the boom line.
- Set up of end nozzles/Bi-jet can be done from menu 3.3.4.



ATTENTION! It is important that the volume applied from the end nozzle or Bi-jet matches the volume applied under the boom. This is a comparison of volume per minute per length. (Litre/min/metre).

When the end nozzle or Bi-jet is active, the area covered and volume sprayed is calculated and registered. If "Active boom size" is displayed, it will show an increase when the end nozzle or Bi-jet is activated.

PrimeFlow (optional)

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

It is only relevant for sprayers equipped with PrimeFlow valves. The PrimeFlow liquid system has to be set up from the Extended menu at installation. The HARDI Service centre does this.



ATTENTION! The PrimeFlow system is automatic and therefore does not need user action to work.

SafeTrack and IntelliTrack (Trailed sprayers only)

SafeTrack and IntelliTrack are steering mechanisms for the trailed HARDI sprayers. When using a track system, sprayer stability is a common concern. Many factors influence the sprayer and conditions where the sprayer might tip over have to be dealt with.

The factors that the driver can influence with are

- Driving behaviour
- Field conditions
- Tyre width
- Tyre pressure

Read sprayers instruction book for further information. If unsafe driving occurs an alarm will be triggered, and the sprayer will align. Be aware that the alarm can not be turned off as long as unsafe driving still occurs!



ATTENTION! If necessary the level of security can be adjusted - please contact your local HARDI dealer.



DANGER! The system has been calibrated during driving on flat fields. Special attention should be made when driving in hilly conditions.



DANGER! When driving on fields with deep tracks, then the speed must be decreased.

3 - Description

HeadlandAssist (optional)

HeadlandAssist is a function that will close the main ON/OFF and raise the boom. If the boom is slanted to one side it will go to neutral when the main ON/OFF is closed. The boom will automatically slant to opposite side when the main ON/OFF is switched on again (mirror function).

The HeadlandAssist is recognized by two extra potentiometers for sensing of boom lift and slant - both placed on the centre section.

The following rules apply to the enabling of HeadlandAssist

- Only pressing ON/OFF will activate HeadlandAssist. Closing all sections will not start the delay and move the boom. Pressure regulation will remain to function.
- HeadlandAssist can be activated by entering a value in menu 2.2.4.
- Menu 2.2.1 Auto main ON/OFF is only active when HeadlandAssist is in manual mode or when it is disabled.

HeadlandAssist jumps to manual mode in the following situations

- Long press OFF on main ON/OFF button.
- Slowing down below 1.8 km/h while spraying. Note that stopping in the headland can be done with closed nozzles and staying in Auto mode.
- Operating the boom while the system is positioning it.
- Pressing main OFF before the expiry of the delay.
- Folding the inner wing.



NOTE! The function of HeadlandAssist can be different if the sprayer is equipped with AutoHeight. Please refer to separate instruction book.

HARDI AutoSectionControl (optional)

HARDI AutoSectionControl is:

- a fully automatic system that opens and closes booms sections as necessary.
- an extra module connected to the HC 6500 and to a GPS receiver. On ISOBUS VT this can be integrated into the terminal.

HARDI 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 is sprayed first, HARDI AutoSectionControl will now automatically close the sections if the operator passes over a sprayed area.



ATTENTION! Variable Rate Application needs to be enabled for AutoSectionControl to work - refer to "Menu 2.3 Variable Rate Application (VRA) / Remote / HARDI AutoSectionControl" on page 50



ATTENTION! For more information about AutoSectionControl, see the AutoSectionControl instruction book. On ISOBUS terminals AutoSectionControl can be an integrated part - if so, refer to the ISOBUS terminal instruction book.

Menus

Full menu structure

 NOTE! Blank fields are menus without name or description.

 NOTE! Menus marked with a grey box are not for ISOBUS terminals.

Menu number	Menu name	Description / Help text
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	Tank contents	To change displayed tank contents. Use arrow keys or numeric keys to set
1. 3	Select register	Use register 1 to 99 for job. Scroll to register, then press Enter to show data
1. 3. 1		
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. 1. 2	Show register spray data 2	Press C for 5 sec to reset register, Enter to see screen 1, ESC to leave
1. 3. 1. 2. 1	Volume applied	
1. 3. 1. 2. 2	Area covered	
1. 3. 1. 2. 3	Average spray speed	
1. 3. 1. 2. 4	Maximum spray speed	
1. 3. 1. 2. 5	Travelled spray dist	
1. 3. 1. 2. 6	Time used spraying	
1. 3. 1. 2. 7	Work rate	
1. 3. 1. 2. 8	Average volume rate	
1. 4	Volume rate: Present high	Rate selected with 1 press on the arrow up-key
1. 5	Volume rate: Present low	Rate selected with 1 press on the arrow down-key

2	Setup	Customizing 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	Active boom size	Active boom size 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	Wind Speed	Displays wind speed if sensor is fitted
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	Extra sensor 1F	Readout from extra sensor 1 frequency
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 analog
2. 1. 1. 21	Extra sensor 4A	Readout from extra sensor 4 analog
2. 1. 1. 22	Voltmeter	Displays system voltage. Useful when fault finding
2. 1. 1. 23	Agitation	Agitation valve opening

3 - Description

2. 1. 1. 24	RinseTank content	RinseTank calculated content
2. 1. 1. 25	Slant angle,	Headland assist angle sensor, , Slant angle,
2. 1. 1. 26	Boom height,	Headland assist height sensor, , Boom height
2. 1. 1. 27	Reserved	R R
2. 1. 1. 28	Reserved	R R
2. 1. 1. 29	Reserved	R R
2. 1. 1. 30	Reserved	R R
2. 1. 1. 31	Reserved	R R
2. 1. 1. 32	Reserved	R R
2. 1. 1. 33	Nozzle size flow at 3 bar	Actual flow and pressure scaled to flow at 3 bar
2. 1. 1. 34		
2. 1. 1. 35		
2. 1. 1. 36		
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	Active boom size	Active boom size 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	Wind Speed	Displays wind speed if sensor is fitted
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	Extra sensor 1F	Readout from extra sensor 1 frequency
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 analog
2. 1. 2. 21	Extra sensor 4A	Readout from extra sensor 4 analog
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, , Slant angle,
2. 1. 2. 26	Boom height,	Headland assist height sensor, , Boom height
2. 1. 2. 27	Reserved	R R
2. 1. 2. 28	Reserved	R R
2. 1. 2. 29	Reserved	R R
2. 1. 2. 30	Reserved	R R
2. 1. 2. 31	Reserved	R R
2. 1. 2. 32	Reserved	R R
2. 1. 2. 33	Nozzle size flow at 3 bar	Actual flow and pressure scaled to flow at 3 bar
2. 1. 2. 34		
2. 1. 2. 35		
2. 1. 2. 36		
2. 1. 2. 37	PF bus +	Voltage on PrimeFlow databus +
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	Active boom size	Active boom size 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	Wind Speed	Displays wind speed if sensor is fitted
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	Extra sensor 1F	Readout from extra sensor 1 frequency
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 analog
2. 1. 3. 21	Extra sensor 4A	Readout from extra sensor 4 analog
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, , Slant angle,
2. 1. 3. 26	Boom height,	Headland assist height sensor, , Boom height
2. 1. 3. 27	Reserved	R R
2. 1. 3. 28	Reserved	R R
2. 1. 3. 29	Reserved	R R
2. 1. 3. 30	Reserved	R R
2. 1. 3. 31	Reserved	R R
2. 1. 3. 32	Reserved	R R
2. 1. 3. 33	Nozzle size flow at 3 bar	Actual flow and pressure scaled to flow at 3 bar
2. 1. 3. 34		
2. 1. 3. 35		
2. 1. 3. 36		
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	Active boom size	Active boom size 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	Wind Speed	Displays wind speed if sensor is fitted
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
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	Extra sensor 1F	Readout from extra sensor 1 frequency
2. 1. 4. 19	Extra sensor 2F	Readout from extra sensor 2 frequency

3 - Description

2. 1. 4. 20	Extra sensor 3A	Readout from extra sensor 3 analog
2. 1. 4. 21	Extra sensor 4A	Readout from extra sensor 4 analog
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, , Slant angle,
2. 1. 4. 26	Boom height,	Headland assist height sensor, , Boom height
2. 1. 4. 27	Reserved	R R
2. 1. 4. 28	Reserved	R R
2. 1. 4. 29	Reserved	R R
2. 1. 4. 30	Reserved	R R
2. 1. 4. 31	Reserved	R R
2. 1. 4. 32	Reserved	R R
2. 1. 4. 33	Nozzle size flow at 3 bar	Actual flow and pressure scaled to flow at 3 bar
2. 1. 4. 34		
2. 1. 4. 35		
2. 1. 4. 36		
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 (ISOBUS only menu)
2. 1. 5. 1	Show ESC as softkey	Choose this to show ESC key as softkey on ISOBUS terminal (ISOBUS only menu)
2. 1. 5. 2	Do not show ESC as softkey	Choose this if ISOBUS terminal has a separate ESC key. (ISOBUS only menu)
2. 2	AUTO functions	Set up for Auto ON/OFF, Foam marker, HeadlandAssist and optional A/B
2. 2. 1	Main ON/OFF	For automatic operation of the main ON/OFF function at a pre-set speed
2. 2. 2	Foam marker	To operate via the main ON/OFF function and automate side choice
2. 2. 2. 1	Disable	It will only follow the manual setting of the switch on the SetBox
2. 2. 2. 2	Same side	It will automatically activate the same side for race-track spraying
2. 2. 2. 3	Change side	It will automatically change side for up and back spraying
2. 2. 3	Dual Line	To set up lower and upper trigger limits for the operation of line A and line B
2. 2. 3. 1	Lower pressure level	Key in pressure level to switch Dual Line to smaller nozzles
2. 2. 3. 2	Upper pressure level	Key in pressure level to switch Dual Line to bigger nozzles
2. 2. 3. 3	From A to A and B speed level	Key in speed to switch Dual Line from A to A+B
2. 2. 3. 4	From A to B speed level	Key in speed to switch Dual Line from A to B
2. 2. 3. 5	From B to A+B speed level	Key in speed to switch Dual Line from B to A+B
2. 2. 4	HeadlandAssist setup	Boom lift and lower automatically when switching main ON/OFF function
2. 2. 4. 1	ON/OFF delay	Distance delay so the boom will lift or lower via the main ON/OFF
2. 2. 4. 2	Boom height at headlands	Keyin 0 to disable HeadlandAssist Keyin a height to enable
2. 2. 4. 3	Slant mirror or in steps	Activate headland assist slant mirror or slant in steps.
2. 2. 4. 3. 1	Slant mirror and steps disable	Traditional slant. No slant mirror. No slant in steps.
2. 2. 4. 3. 2	Slant mirror enable	Activate opposite slant at headlands. Slant in steps not possible.
2. 2. 4. 3. 3	Slant in steps enable	Activate slant in steps. Set step size in 2.2.4.4. Slant mirror not possible.
2. 2. 4. 4	Slant in steps or traditional	Keyin a 0 for traditional slant or a value per keypress for closed loop Slant in steps
2. 2. 5	TWIN preset shift auto / man	Shifts automatically at main ON/OFF or manually at keypress
2. 2. 5. 1	Manual shift at keypress	Upon keypress it will change to the other preset value
2. 2. 5. 2	Auto shift at main ON/OFF	It will automatically change to the other preset value
2. 2. 5. 3	TWIN controls disabled	TWIN fan, angle and preset controls are disabled
2. 2. 6	AutoAgitation select level	Powerful or soft no Agitation
2. 2. 6. 1	Powerful AutoAgitation	Recommended for powder
2. 2. 6. 2	Soft AutoAgitation	Recommended for liquid chemical
2. 2. 6. 3	No agitation	Never use if sedimentation occurs. Recommended for liquid fertilizer.
2. 2. 6. 4	Fixed agitation	Valve is positioned
2. 2. 6. 5	Agitation switch	Switch increase or decrease agitation
2. 2. 7	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 disappear
2. 3. 2	VRA / Remote control enable	by RS232 data port control enabled. Dish icon will be shown
2. 4	Set clock	Change date and clock time

2. 4. 1	Time format (12 or 24 hour)	Choose between a 12 hour or 24 hour clock
2. 4. 1. 1	12 hour format	You have chosen 12 hours as your time unit
2. 4. 1. 2	24 hour format	You have chosen 24 hours as your time
2. 4. 2	Set time	Set the actual time. Use arrow keys or numeric keys, then press Enter
2. 4. 3	Set date and month	Set date and month. Use arrow keys or numeric keys, then press Enter
2. 4. 4	Set year	Set year. Use arrow keys or numeric keys, then press Enter
2. 5	Alarms	Different alarms can be set up. Choices will be listed
2. 5. 01	Volume rate alarm	Over or under application alarm
2. 5. 01. 1	High volume rate limit	Over application warning for volume rate when over in 20 seconds
2. 5. 01. 2	Low volume rate limit	Under application warning for volume rate when under in 20 seconds
2. 5. 02	Tank contents at minimum	Warning given when tank contents is under this volume
2. 5. 03	Spray pressure	High and low spray pressure alarm
2. 5. 03. 1	High spray pressure limit	Warning given when over this pressure value
2. 5. 03. 2	Low spray pressure limit	Warning given when under this pressure
2. 5. 04	Fan speed alarm	High and low r/min alarm
2. 5. 04. 1	High fan revolutions limit	Warning given when over this value
2. 5. 04. 2	Low fan revolutions limit	Warning given when under this value
2. 5. 05	Speed alarm	Speed maximum and minimum alarm
2. 5. 05. 1	Maximum speed value	Warning will be given if spraying over this value
2. 5. 05. 2	Minimum speed value	Warning will be given if spraying under
2. 5. 07	PTO r/min alarm	PTO revolutions maximum and minimum alarm
2. 5. 07. 1	Maximum value	Alarm value for the maximum revolutions on the PTO
2. 5. 07. 2	Minimum value	Alarm value for the minimum revolutions
2. 5. 08	R/minute alarm	Revolutions maximum and minimum alarm
2. 5. 08. 1	Maximum value	Alarm value for the maximum revolutions on the PTO
2. 5. 08. 2	Minimum value	Alarm value for the minimum revolutions
2. 5. 09	Reserved	
2. 5. 09. 1	Reserved	
2. 5. 09. 2	Reserved	
2. 5. 10	R/minute alarm	Revolutions maximum and minimum alarm
2. 5. 11	R/minute max	Value (PPU) maximum and minimum alarm
2. 5. 13	R/minute min	Value (Volt) maximum and minimum alarm
2. 5. 15	Sections OFF warning	Main ON/OFF is switched to ON and some sections are switched to OFF
2. 5. 15. 1	Enabled	Press Enter to enable warning when sections are OFF
2. 5. 15. 2	Disabled	Press Enter to disable warning
2. 5. 16	Audio level	Audio steps for alarm volume. 0 is for no sound
2. 5. 16. 0	Sound step 0	0 = no sound, 5 is maximum volume
2. 5. 16. 1	Sound step 1	0 = no sound, 5 is maximum volume
2. 5. 16. 2	Sound step 2	0 = no sound, 5 is maximum volume
2. 5. 16. 3	Sound step 3	0 = no sound, 5 is maximum volume
2. 5. 16. 4	Sound step 4	0 = no sound, 5 is maximum volume
2. 5. 16. 5	Sound step 5	0 = no sound, 5 is maximum volume
2. 6	Register names	Register set up. Once done, a name can be copied and edited
2. 6. 1 up to 99	Register name	Toggle numeric keyboard to key in Register name
2. 7	Setup display	Setup for brightness, contrast and day/night colors
2. 7. 1	Choose day/night colors	Color change makes the display easier to read at day and night
2. 7. 1. 1	Day colors	Select this for day-time spraying Black text on white background
2. 7. 1. 2	Night colors	Select this for night-time spraying White text on black background
2. 7. 2	Setup brightness	Brightness can be stepped
2. 7. 2. 1	High brightness	Maximum setting
2. 7. 2. 2	Medium	Medium setting
2. 7. 2. 3	Low brightness	Minimum setting
2. 8	Extended menu	Extended menu for dealers setup to match features on sprayer (ISOBUS menu only)
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

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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		Now key in the exact distance, measured by a measuring tape
3. 1. 1. 2. 3		This is the new constant (pulses per meter or feet)
3. 1. 2	Tractor Alpha speed	Alpha, or sensor located on tractor Sensor cable connected to Terminal
3. 1. 2. 1	Tractor speed constant	
3. 1. 2. 2	Tractor practical	Preferred method. Do in field with spray tank half full for most accurate result
3. 1. 3	Radar speed	Choose if radar speed sensor is used
3. 1. 3. 1	Radar speed constant	
3. 1. 3. 2	Radar practical	Preferred method. Do in field with tank half full for most accurate result
3. 1. 3. 2. 3		This is the new constant (pulses per meter or feet)
3. 2	Flow calibration	Flow sensor calibration. Theoretical (PPU), Nozzle Tank method PrimeFlow
3. 2. 1	PPU theory method	EU: dia/ca PPU: Ø13/120, Ø20/60, Ø36/17 US: dia/ca PPU: Ø13/485, Ø20/225, Ø36/60
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	Nozzle method	This is the PPU constant from the volume previously just measured
3. 2. 2. 4	Open all sections	
3. 2. 2. 5	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	Section 1	Use arrow keys or numeric keys, then press Enter to set up section 1
3. 3. 3. 02	Section 2	Use arrow keys or numeric keys, then press Enter to set up section 2
3. 3. 3. 03	Section 3	Use arrow keys or numeric keys, then press Enter to set up section 3
3. 3. 3. 04	Section 4	Use arrow keys or numeric keys, then press Enter to set up section 4
3. 3. 3. 05	Section 5	Use arrow keys or numeric keys, then press Enter to set up section 5
3. 3. 3. 06	Section 6	Use arrow keys or numeric keys, then press Enter to set up section 6
3. 3. 3. 07	Section 7	Use arrow keys or numeric keys, then press Enter to set up section 7
3. 3. 3. 08	Section 8	Use arrow keys or numeric keys, then press Enter to set up section 8
3. 3. 3. 09	Section 9	Use arrow keys or numeric keys, then press Enter to set up section 9
3. 3. 3. 10	Section 10	Use arrow keys or numeric keys, then press Enter to set up section 10
3. 3. 3. 11	Section 11	Use arrow keys or numeric keys, then press Enter to set up section 11
3. 3. 3. 12	Section 12	Use arrow keys or numeric keys, then press Enter to set up section 12
3. 3. 3. 13	Section 13	Use arrow keys or numeric keys, then press Enter to set up section 13
3. 3. 4	End nozzles and Bi-jet nozzles	If end nozzles are fitted. Set value to equivalent coverage by boom nozzles
3. 3. 4. 1	None	If no end nozzles or Bi-jet nozzles are fitted, select this
3. 3. 4. 2	End nozzles fitted	Select if end nozzles are fitted
3. 3. 4. 2. 1	End nozzles	Key in 'n', number of regular nozzles equivalent to the end nozzle coverage
3. 3. 4. 3	Bi-jet fitted	Select if Bi-jet nozzles are fitted
3. 3. 4. 3. 1	Bi-jet end nozzles	
3. 3. 5 ISOBUS only	Length hitch to axle for ASC	Length from hitch to axle on sprayer for AutoSectionControl for ISOBus
3. 3. 6 ISOBUS only	Length axle to boom for ASC	Length from axle on sprayer to boom for AutoSectionControl for ISOBus
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 flow sensor
3. 4. 2	Simulated speed value	Type in speed for priming at stand still and both flow and pressure are defect
3. 4. 3	Nozzle size flow at 3 bar	0075Pink = 0.3 02Yellow = 0.8 04Red = 1.6 08White = 3.2 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

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3. 4. 6	Regulation parameter	Code for special machines or applications, consult your dealer
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	Water level	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	CME3300 factory calibration	Factory tank gauge table for CME3300
3. 5. 3. 3	CME4500 factory calibration	Factory tank gauge table for CME4500
3. 5. 3. 4	CME7000 factory calibration	Factory tank gauge table for CME7000
3. 5. 3. 5	CME9000 factory calibration	Factory tank gauge table for CME9000 AUS
3. 5. 3. 6	Alpha 2500 factory calibration	Factory tank gauge table for Alpha 2500
3. 5. 3. 7	Alpha 3500 factory calibration	Factory tank gauge table for Alpha 3500
3. 5. 3. 8	Alpha 4100 factory calibration	Factory tank gauge table for Alpha 4100
3. 5. 3. 9	Alpha 3000 factory calibration	Factory tank gauge table for Alpha 3000
3. 5. 3. 10	CME5x00 factory calibration	Factory tank gauge table for CME5x00 AUS
3. 5. 3. 11	CME7x00 factory calibration	Factory tank gauge table for CME7x00 AUS
3. 5. 3. 12	Saritor 4000 factory cal	Factory tank gauge table for Saritor 4000
3. 5. 3. 13	Saritor 5000 factory cal	Factory tank gauge table for Saritor 5000
3. 5. 3. 14	Navigator 3000 factory cal	Factory tank gauge table for Navigator 3000
3. 5. 3. 15	Navigator 4000 factory cal	Factory tank gauge table for Navigator 4000
3. 5. 3. 16	CME5500 factory calibration	Factory tank gauge table for CME5500
3. 5. 4	Offset at empty MainTank	Actual frequency. Accept if empty. Or keyin recorded empty-frequency
3. 5. 4. 1	TankGauge Offset,	
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	Tractor drawbar length is length from tractor rear axle to pin-bolt
3. 6. 3	Dead zone for regulation	Increase for high speed. Decrease for high accuracy
3. 6. 4	Damping of hydraulics	Increase for smooth drive and high speed. Decrease for high accuracy
3. 6. 5	Align offset + right - left	Alignment of sprayer. Positive value moves sprayer right, negative left
3. 6. 6	Calibrate sensitivity	Adjustment of track sensitivity in relation to the tractor hydraulics
3. 6. 6. 01	Sensitivity tractor hydraulic	Press ESC to abort. Press Enter to start calibration of offset and gain
3. 6. 6. 02	Finding offset right side	Press hold 'steer to right' button. Computer will activate valve to find offset
3. 6. 6. 03	Offset right side is Ok	
3. 6. 6. 04	Finding offset right failed	Press Enter to return to Track calibration menu
3. 6. 6. 05	Finding offset left side	Press hold 'steer to left' button. Computer will activate valve to find offset
3. 6. 6. 06	Offset left side is Ok	
3. 6. 6. 07	Finding offset left failed	Press Enter to return to Track calibration menu
3. 6. 6. 08	Finding gain right side	Press hold 'steer to right' button. Computer will activate valve and find gain
3. 6. 6. 09	Gain right side is Ok	
3. 6. 6. 10	Find gain right side failed	Press Enter to return to Track calibration menu
3. 6. 6. 11	Finding gain left side	Press hold 'steer to left' button. Computer will activate valve and find gain
3. 6. 6. 12	Gain left side is Ok	Calibration is OK. Press Enter to return to Track calibration menu
3. 6. 6. 13	Finding gain left side failed	Press Enter to return to Track calibration menu
3. 6. 6. 14	Stop driving	Stop driving
3. 6. 6. 15	Switch to auto	Switch to auto track

4	Toolbox	Helpful tools e.g. measure distance and area, service intervals, test etc
4. 1	Measure	To measure distance and area. Setup working width
4. 1. 1	Measure Distance	This is a simple electronic 'measuring tape'. You can measure distance
4. 1. 1. 1	Measure Distance	Measure stopped. Press C to clear, Enter to start and ESC to exit
4. 1. 1. 2	Measure Distance	Measure started. Press Enter to stop and ESC to exit

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4. 1. 2	Measure Area	If the implement width is Entered, area can also be measured
4. 1. 3	Setup working width	Key in the implement working width
4. 1. 4	Stop-watch	The clock can be used as a stop watch
4. 1. 4. 1	Stopwatch: Not active	Press C to clear. Press Enter to start, Esc to exit
4. 1. 4. 2	Stopwatch: Active	Press Enter to stop and edit. Press Esc to exit. Stopwatch will continue
4. 1. 5	Alarm clock	The clock can be set as an alarm clock
4. 1. 5. 1	Alarm clock: Not active	Key in time. Press C to clear. Press Enter to start. Press ESC to exit.
4. 1. 5. 2	Alarm clock: Active	Press Enter to stop and edit. Press Esc to exit. Alarm clock will continue
4. 2	Service interval: Hours until	Work hours remaining for each part until next service is recommended
4. 2. 1	10 hrs Check filters	
4. 2. 2	50 hrs Grease boom	
4. 2. 3	250 hrs Grease center	
4. 2. 4	Miscellan. service	
4. 2. 5	10 hrs Check nozzles	
4. 3	Service interval reset	Reset timer counter when service has been carried out
4. 3. 1	Check filters reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 3. 2	Grease boom reset	Press Enter to reset hour counter, ESC to leave unchanged
4. 3. 3	Grease track and center	Press Enter to reset hour counter, ESC to leave unchanged
4. 3. 4	Miscellaneous service	Press Enter to reset hour counter, ESC to leave unchanged
4. 3. 5	Check nozzles	Press Enter to reset hour counter, ESC to leave unchanged
4. 4	Reserved	R R
4. 5	Test of sensors	Test screens for buttons, sensor readings PrimeFlow status Valve friction
4. 5. 1	Flow Speed Optional sensors	Activate function to monitor sensor (e.g. drive forwards, start flow)
4. 5. 1. 1	Pressure	
4. 5. 1. 2	Fan Speed	
4. 5. 1. 3	Tank gauge	
4. 5. 1. 4	Boom sensor	
4. 5. 1. 5	Pressure regulation feedback	
4. 5. 1. 6	Flow	
4. 5. 1. 7	Speed	
4. 5. 2	Active keys	Push key to see if a count is registered. If yes, the key or switch function is OK
4. 5. 2. 1	Keys on Terminal	
4. 5. 2. 2	Keys on SetBox	
4. 5. 2. 3	Keys on Grip	
4. 5. 2. 4	Keys on FluidBox	
4. 5. 3	PrimeFlow test	PrimeFlow test for nozzles and PrimeFlow computers on boom
4. 5. 3. 1 to 125	PrimeFlow computer status	Press Arrow DOWN to see next SMCU Arrow UP to see previous
4. 5. 3. 1. 1	Total SMCU's	
4. 5. 3. 1. 2	Total nozzles	
4. 5. 3. 1. 3	This SMCU position	
4. 5. 3. 1. 4	Nozzle order	
4. 5. 3. 1. 5	Nozzle no short cab.	
4. 5. 3. 1. 6	Nozzle medium cable	
4. 5. 3. 1. 7	Nozzle no long cable	
4. 5. 3. 1. 8	Count of data error	
4. 5. 3. 1. 9	Count of power error	
4. 5. 4	Input test	See computer readings of sensors Frequency, switch, analog inputs
4. 5. 4. 1	Frequency 1 Speed, Flow	Test of frequency input sensors: Speed, Flow, Tank gauge, Fan
4. 5. 4. 1. 1	Speed	
4. 5. 4. 1. 2	Flow to sections	
4. 5. 4. 1. 3	Flow from rinse tank	
4. 5. 4. 1. 4	FlexCap pump RPM	
4. 5. 4. 1. 5	Tank gauge	
4. 5. 4. 1. 8	PTO pump RPM	
4. 5. 4. 1. 9	Speed to terminal	
4. 5. 4. 2	Freq. 2 input Extra	Test of frequency 2 sensors: Extra Regulation, agitation valve

4. 5. 4. 2. 1	Regulation valve	
4. 5. 4. 2. 2	Agitation valve	
4. 5. 4. 2. 3	Boom folded Left	
4. 5. 4. 2. 4	Boom folded Right	
4. 5. 4. 3	Switch on/off inputs	Test Switch inputs function 0 equals connected, 1 equals open
4. 5. 4. 3. 1	Pendulum lock	
4. 5. 4. 3. 2	Ladder up	
4. 5. 4. 3. 3	HY interface error	
4. 5. 4. 3. 4	SmartValve switch	
4. 5. 4. 3. 5	Main tank float	
4. 5. 4. 3. 6	Rinse tank float	
4. 5. 4. 3. 7	12V relay DAH box	
4. 5. 4. 3. 8	Foot Switch terminal	
4. 5. 4. 4	Analog 1 inputs Boom	Test Analog 1 sensors on boom: Slant, Height, Tilt, Foam, TWIN
4. 5. 4. 4. 1	Slant	
4. 5. 4. 4. 2	Boom height	
4. 5. 4. 4. 3	Primeflow bus TX+	
4. 5. 4. 4. 4	Primeflow bus TX-	
4. 5. 4. 4. 5	Foam blob distance	
4. 5. 4. 4. 6	TWIN angle	
4. 5. 4. 4. 7	TWIN fan r/min	
4. 5. 4. 4. 8	Agitation angle	
4. 5. 4. 4. 9	Reg valve angle	
4. 5. 4. 5	analogue 2 inputs Extra	Test Analog 2 sensors: Electric smart valves, extra
4. 5. 4. 5. 1	Distance center	
4. 5. 4. 5. 2	PrimeFlow volt left	
4. 5. 4. 5. 3	PrimeFlow volt right	
4. 5. 4. 5. 4	Dynamic centre pos.	
4. 5. 4. 5. 5	Pendulum unlock	
4. 5. 4. 5. 6	Pendulum lock	
4. 5. 4. 5. 7	Suction SV potmeter	
4. 5. 4. 5. 8	Press. SV potmeter	
4. 5. 4. 5. 9	Fill valve potmeter	
4. 5. 4. 6	Track sensor test	Actual sensor signals Under 0.5 volt means not connected
4. 5. 4. 6. 1	Front sensor	
4. 5. 4. 6. 2	Front sensor	
4. 5. 4. 6. 3	Rear sensor	
4. 5. 4. 6. 4	Rear sensor	
4. 5. 4. 6. 5	Boom sensor 1	
4. 5. 4. 6. 6	Boom sensor 1	
4. 5. 4. 6. 7	Boom sensor 2	
4. 5. 4. 6. 8	Lock sensor	
4. 5. 4. 6. 9	Lock sensor	
4. 5. 4. 7	SafeTrack sensitivity view	Higher offset higher current to open Higher gain mean more oil at current
4. 5. 4. 7. 1	Left offset value	
4. 5. 4. 7. 2	Right offset value	
4. 5. 4. 7. 3	Left gain factor	
4. 5. 4. 7. 4	Right gain factor	
4. 5. 4. 8	Twin boom fold sensors	Status=1 is 5 volt or not connected Under 0.5 volt is not connected
4. 5. 4. 8. 1	L outer boom transp.	
4. 5. 4. 8. 2	L outer boom spray	
4. 5. 4. 8. 3	R outer boom transp.	
4. 5. 4. 8. 4	R outer boom spray	
4. 5. 4. 9	Speed, Pumps RPM mounting	Duty cycle indicate distance 70% = too close 20% = too far away
4. 5. 4. 9. 1	Speed frequency	
4. 5. 4. 9. 2	Speed duty cycle 1	
4. 5. 4. 9. 3	Speed duty cycle 2	

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			4. 5. 4. 9. 4	Speed max duty cycle	
			4. 5. 4. 9. 5	Speed min duty cycle	
			4. 5. 4. 9. 6	PTO pump frequency	
			4. 5. 4. 9. 7	PTO pump duty cycle	
			4. 5. 4. 9. 8	FlexCap pump freq.	
			4. 5. 4. 9. 9	FlexCap duty cycle	
4. 5. 5			4. 5. 5	Fluid and valve test	Test of regulation and electric valves
			4. 5. 5. 1	Show SmartValve friction	Turn time increase with friction. Limit 900 msec to 1300msec. C to clear
			4. 5. 5. 1. 1	Suct valve avr CW	
			4. 5. 5. 1. 2	Suct valve avr CCW	
			4. 5. 5. 1. 3	PressurValve avr CW	
			4. 5. 5. 1. 4	PressurValve avr CCW	
			4. 5. 5. 1. 5	FastF.Valve avr CW	
			4. 5. 5. 1. 6	FastF.Valve avr CCW	
			4. 5. 5. 2	Regulation sensors	Details for regulation sensor inputs Boom pressure Flow Pump RPM
			4. 5. 5. 2. 1	Boom pressure	
			4. 5. 5. 2. 2	Boom flow sensor	
			4. 5. 5. 2. 3	Pump RPM	
			4. 5. 5. 2. 4	FlexCapacity RPM	
			4. 5. 5. 2. 5	Reg. valve sensor	
			4. 5. 5. 2. 6	Agt. valve sensor	
			4. 5. 5. 2. 7	Reserved	
			4. 5. 5. 2. 8	Reserved	
			4. 5. 5. 2. 9	Regulator state	
			4. 5. 5. 3	Flow calculations	Check flow calculations are realistic with current settings of sprayer
			4. 5. 5. 3. 1	Boom pressure	
			4. 5. 5. 3. 2	Reg valve calc press	
			4. 5. 5. 3. 3	Pump calc flow	
			4. 5. 5. 3. 4	Agit valve calc flow	
			4. 5. 5. 3. 5	Reg valve calc flow	
			4. 5. 5. 3. 6	Boom flow sensor	
			4. 5. 5. 3. 7	Nozzle SizeQ 3 bar A	
			4. 5. 5. 3. 8	Nozzle SizeQ 3 bar B	
			4. 5. 5. 3. 9	Nozzle SizeQ 3 bar AB	
			4. 5. 5. 4	RS232(COM1) serial test	Inactive, No connection, No data, Wrong CRC, Unsupported command, Valid data
			4. 5. 5. 4. 1	COM1 near bracket	
			4. 5. 5. 4. 2	Signal detec on port	
			4. 5. 5. 4. 3	Valid telegram	
			4. 5. 5. 4. 4	Wrong baud rate	
			4. 5. 5. 4. 5	Overrun error	
			4. 5. 5. 4. 6	CRC err acc. to spec	
			4. 5. 5. 4. 7	Unsupported telegram	
			4. 5. 5. 5	RS232(COM2) serial test	Inactive, No connection, No data, Wrong CRC, Unsupported command, Valid data
			4. 5. 5. 5. 1	COM2 near edge	
			4. 5. 5. 5. 2	Signal detec on port	
			4. 5. 5. 5. 3	Valid telegram	
			4. 5. 5. 5. 4	Wrong baud rate	
			4. 5. 5. 5. 5	Overrun error	
			4. 5. 5. 5. 6	CRC err acc. to spec	
			4. 5. 5. 5. 7	Unsupported telegram	
			4. 5. 5. 6	Extra reg diagnose	Saritor hydraulic valve
			4. 5. 5. 6. 1	Hydr valve offset	
			4. 5. 5. 6. 2	Hydr valve slope	
			4. 5. 5. 6. 3	Hydr valve hysteres	
			4. 5. 5. 7	EVC reg diagnose	EVC regulation diagnose
			4. 5. 5. 7. 1	Boom flow sensor	
			4. 5. 5. 7. 2	EVC change deviation	

4. 5. 5. 7. 3	Reg V. end to end T.	
4. 5. 5. 8	JobCom voltage monitor	
4. 5. 5. 8. 1	12 V battery max	
4. 5. 5. 8. 2	12 V battery min	
4. 5. 5. 8. 3	5 V battery max	
4. 5. 5. 8. 4	5 V battery min	
4. 5. 6	PrimeFlow SMCU status	See nozzle position, nozzle order, counts of data error power error
4. 5. 6. 1	First nozzle for SMCU	Position of first nozzle on boom counted from left
4. 5. 6. 2	SMCU 2 or 3 nozzle	Produced or reprogrammed. SMCU with 3 cables could be changed to 2 nozzles
4. 5. 6. 3	Nozzle order	Show --- when connected in normal order Short Medium Long from left -
4. 5. 6. 4	Count of data error	Times were SMCU did not respond to alive telegram. C to reset counters
4. 5. 6. 5	Count of power error	Times were SMCU shot down due to low voltage. C to reset counters
4. 5. 6. 6	SMCU version	View SMCU versions
4. 5. 7	PrimeFlow motor status	
4. 5. 7. 1	Motor 1-90 disconnect	Motor or connector disconnected Press C to reset
4. 5. 7. 2	Motor 91-180 disconnect	Motor or connector disconnected Press C to reset
4. 5. 7. 3	Motor 1-90 shorted	Motor or connector short circuited Press C to reset
4. 5. 7. 4	Motor 91-180 shorted	Motor or connector short circuited Press C to reset
4. 5. 7. 5	Motor 1-90 blocked	Motor connection ok, but motor cannot move. Press C to reset
4. 5. 7. 6	Motor 91-180 blocked	Motor connection ok, but motor cannot move. Press C to reset
4. 6	Speed simulation	Key in speed value. To disable simulation keyin 0 or power off
4. 7	Emergency	
4. 7. 1	Track align	Emergency only. Align sprayer and fold boom, in case a sensor is defect
4. 7. 1. 1	Front sensor	
4. 7. 1. 2	Front sensor	
4. 7. 1. 3	Rear sensor	
4. 7. 1. 4	Rear sensor	
4. 7. 1. 5	Boom sensor 1	
4. 7. 1. 6	Boom sensor 1	
4. 7. 1. 7	Lock sensor	
4. 7. 1. 8	Lock sensor	
4. 7. 1. 9	SafeTrack mode	
4. 7. 2	Boom fold	Emergency only. Manual lock and fold boom, in case a sensor is defect
4. 7. 2. 1	Dynamic centre pos.	
4. 7. 2. 2	Dyn. centre	
4. 7. 2. 3	Pendulum lock sensor	
4. 7. 2. 4	Pend. unlock	
4. 7. 2. 5	Boom sensor 1	
4. 7. 2. 6	Boom sensor 1	
4. 7. 2. 7	Boom height status	
4. 7. 2. 8	Boom height	
4. 7. 2. 9	Boom hydraulics	
4. 8	Computer CAN status	Menus for a diagnostic system check. Counter of errors. SW HW versions
4. 8. 1	Operating status all computer	Computer detail screens show details in case of faults
4. 8. 1. 1	Terminal HC 6500	
4. 8. 1. 2	JobCom HC 6100	
4. 8. 1. 3	Grip HC 6300	
4. 8. 1. 4	SetBox HC 6400	
4. 8. 1. 5	FluidBox HC 6200	
4. 8. 2	Software versions all computer	Computer detail screens show details in case of faults
4. 8. 2. 1	Terminal HC 6500	
4. 8. 2. 2	JobCom HC 6100	
4. 8. 2. 3	Grip HC 6300	
4. 8. 2. 4	SetBox HC 6400	
4. 8. 2. 5	FluidBox HC 6200	
4. 8. 3	Hardware versions all computer	Computer detail screens show details in case of faults
4. 8. 3. 1	Terminal HC 6500	

3 - Description

4. 8. 3. 2	JobCom HC 6100	
4. 8. 3. 3	Grip HC 6300	
4. 8. 3. 4	SetBox HC 6400	
4. 8. 3. 5	FluidBox HC 6200	
4. 8. 4	Work status Terminal HC 6500	Faults occurred Press C key to reset counters
4. 8. 4. 1	CANbus short circuit	
4. 8. 4. 2	CAN bus open circuit	
4. 8. 4. 3	JobCom not connected	
4. 8. 4. 4	Watchdog reset	
4. 8. 4. 5	Cannot logon	
4. 8. 4. 6	Data missing	
4. 8. 4. 7	Receive data invalid	
4. 8. 4. 8	CAN bus overflow	
4. 8. 4. 9	Internal HW error	
4. 8. 5	Work status JobCom HC 6100	Faults occurred Press C key to reset counters
4. 8. 5. 1	CANbus short circuit	
4. 8. 5. 2	CAN bus open circuit	
4. 8. 5. 3	Reserved	
4. 8. 5. 4	Watchdog reset	
4. 8. 5. 5	Cannot logon	
4. 8. 5. 6	Data missing	
4. 8. 5. 7	Receiv. data invalid	
4. 8. 5. 8		
4. 8. 5. 9	Max. used stack	
4. 8. 6	Work status Grip HC 6300	Faults occurred Press C key to reset counters
4. 8. 6. 1	CANbus short circuit	
4. 8. 6. 2	CAN bus open circuit	
4. 8. 6. 3	JobCom not connected	
4. 8. 6. 4	Watchdog reset	
4. 8. 6. 5	Cannot logon	
4. 8. 7	Work status SetBox HC 6400	Faults occurred Press C key to reset counters
4. 8. 7. 1	CANbus short circuit	
4. 8. 7. 2	CAN bus open circuit	
4. 8. 7. 3	JobCom not connected	
4. 8. 7. 4	Watchdog reset	
4. 8. 7. 5	Cannot logon	
4. 8. 8	Work status FluidBox HC 6200	Faults occurred Press C key to reset counters
4. 8. 8. 1	CANbus short circuit	
4. 8. 8. 2	CAN bus open circuit	
4. 8. 8. 3	JobCom not connected	
4. 8. 8. 4	Watchdog reset	
4. 8. 8. 5	Cannot logon	


5	Logbook	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 single register	A specific register is selected for a Print
5. 1. 1. 1		Key in number of specific register to print. Press Enter to start printing
5. 1. 1. 2		Bytes printed at 9600 8-N-1 baud. Press ESC to cancel
5. 1. 2	Print all registers	Registers in use will be printed. Print starts upon key press on Enter
5. 1. 3	Print configuration	Records all system parameters. Print starts upon key press on Enter
5. 1. 4	Print PrimeFlow status	Print status for all computer. Print starts upon key press on Enter
5. 1. 4. 1		Printing. Press ESC to abort
5. 1. 5	Print PrimeFlow motor status	Print status for all motors
5. 1. 5. 1		Printing. Press ESC to abort
5. 2	Data dump	Register and configuration can be dumped to a PC via e.g. Hyper Terminal
5. 2. 1	Data dump of raw data	Transmits data from all 99 registers in comma-separated file for Excel
5. 2. 2	Hyperterminal service report	Transmits to PC at high speed Configuration ErrorLog Track PrimeFlow

Menu 1 Daily settings

Menu 1.1 Volume rate

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

Setting volume rate is described in "Volume rate" on page 86.


<p>1.1 Volume rate</p> <p>0</p> <p>litre/ha</p>
<p>Use arrow keys or numeric keys to set the desired volume rate</p>


Menu 1.2 Tank contents

This menu is to enter tank contents if no tank gauge is fitted.

- HC 6500 shortcut to function: .


To set tank contents see "Tank contents" on page 88.


 **ATTENTION!** If the sprayer is fitted with Tank gauge, contents readout is automatic.


<p>1.2 Tank contents</p> <p>0</p> <p>litre</p>
<p>To change displayed tank contents. Use arrow or numeric keys to set</p>

Menu 1.3 Select register

- Register 1 to 98 can be used for individual areas.
- Register 99 is a tally of register trips 1 to 98. They are identified with a number and it is also possible to name them. The data is memorized when the system is switched off.

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

 **ATTENTION!** Naming of registers are done in "Menu 2.6 Register names (HC 6500 only)" on page 52.

<p>1.3 Select register</p> <p>>> 1.3.1 Field 651</p> <p>1.3.2 Field 68</p> <p>1.3.3 Field 684</p> <p>1.3.4 Field 64</p> <p>1.3.5 Field 654</p> <p>1.3.6 Field 6541</p> <p>1.3.7 Field 687</p> <p>1.3.8 Field 984</p> <p>1.3.9 Field 1234</p>
<p>Use register 1 to 99 for job. Scroll to register, then press Enter to show data</p>

3 - Description

Menu 2 Setup


General info

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 “Terminals and boxes” on page 13.

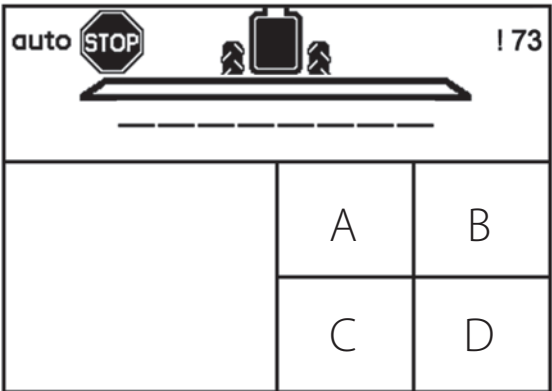
Menu 2.1 Display readout

It is possible to freely choose which functions to be shown in the display.

For a full list of possible readouts, please refer to menu 2.1.1, menu 2.1.2, menu 2.1.3 and menu 2.1.4 in “Full menu structure” on page 33.

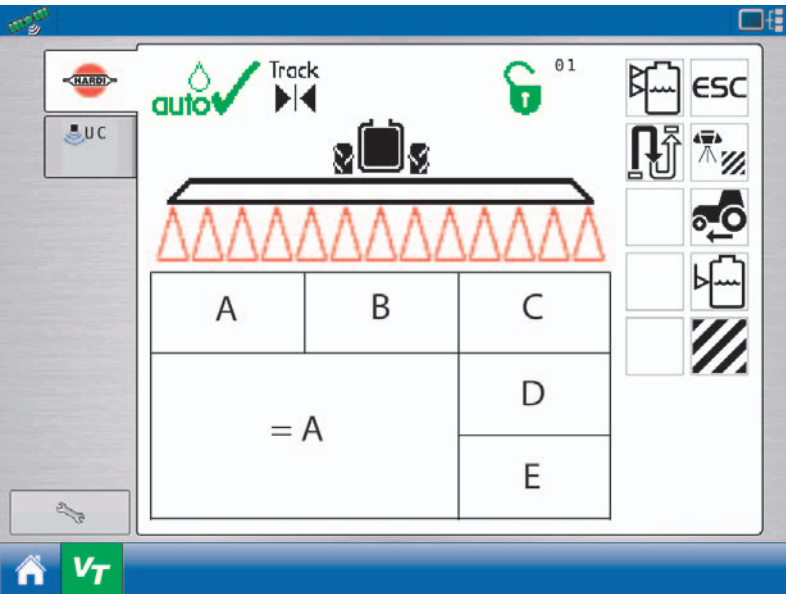
 ATTENTION! As some readouts need extra sensors, the relevant sensor has to be connected to get a readout.

The HC 6500 has 4 different boxes (A, B, C and D).



The ISOBUS terminals has 5 different boxes (A, B, C, D and E).

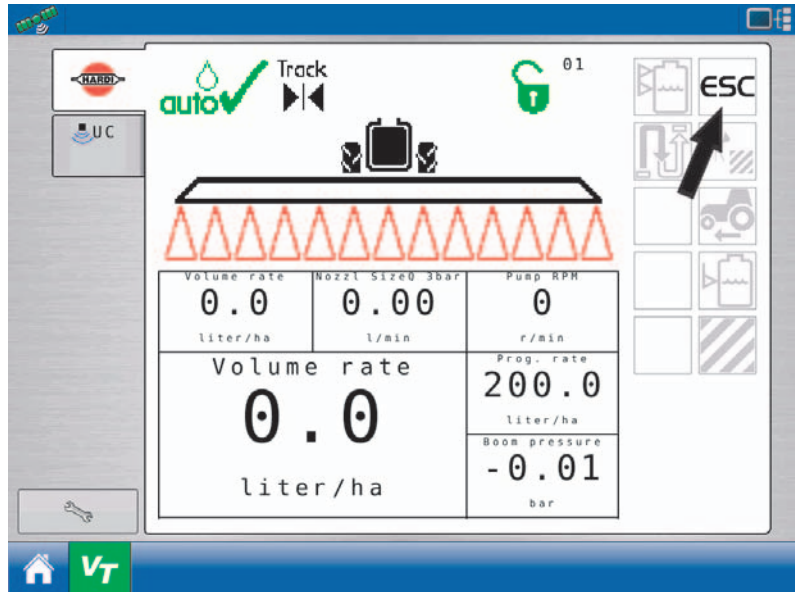
On ISOBUS terminals the large box will always show the same as box (A).



ESC key for ISOBUS terminals

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.



Monitor nozzle size

When selecting menu 2.1.1.33 the operator can monitor the nozzle size in terms of nozzle flow at 3 bar. The value is equal to value in Hardi nozzle catalogue.

Larger value equals a larger hole in the nozzle or and additional hole due to leakage.

- When value increases instantly, a leak has occurred.
- When value increases slowly over weeks nozzles has worn.
- When value decreases nozzle filters or line filters are clogged.

3 - Description

Menu 2.2 Auto functions

In this menu several automatic functions can be set up for specific use. For explanation of the automatic functions, please refer to "Auto functions general info" on page 24.

Menu 2.2.1 Main ON/OFF

The Controller can be set to open the main ON/OFF function above a certain speed and close it below the same speed. This allows the user to concentrate on driving.

- If the speed is set at zero the function is deactivated.
- Suggested speed setting is spraying speed less 20%.

When the Auto ON/OFF is active and the main switch and boom section switches are on, the boom status symbol have a bar across that is blue.



ATTENTION! When AutoSectionControl is used, the function can be deactivated as the AutoSectionControl will overtake control of the main ON/OFF.



WARNING! Remember to set the main ON/OFF switch on the grip to OFF before leaving the field, otherwise the main ON/OFF will open under transport.

Menu 2.2.2 Foam Marker (optional)

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 2.2.3 DualLine (optional)

If the sprayer is 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 2.2.3.1 Lower pressure level

Here the lower limit are selected. Key in pressure level to switch Dual Line to smaller nozzles.

Menu 2.2.3.2 Upper pressure level

Here the upper limit are selected. Key in pressure level to switch Dual Line to bigger nozzles.



ATTENTION! Note this menu is only shown if Jobcom hardware is fitted, and the software is enabled.

Menu 2.2.4 HeadlandAssist setup (optional)

The menu contains 3 submenus to adjust function of HeadlandAssist:

Menu 2.2.4.1

The delay of the main ON/OFF is set in metres from a point, e.g. the front wheel of the tractor or from the drivers seat to the boom. The system will then calculate the time to close the main ON/OFF and lift the boom at the right time.



ATTENTION! A useful tip is to set delay as the distance from boom to a easy-to-use fix point for the driver, of free choice (e.g. drivers seat).

Menu 2.2.4.2

Set the height that the boom should lift when HeadlandAssist is lifting the boom. The value is set in metres. The function is disabled if 0 metre is keyed in.

Menu 2.2.4.3

The slant mirror function can be enabled/disabled here. Select one of the submenus to enable or disable.

Symbols and explanation:



HeadlandAssist not active and pendulum locked.



HeadlandAssist not selected in main settings of controller and pendulum is open (Setting is "0" in menu 2.2.3).



HeadlandAssist is in manual mode.



HeadlandAssist is in AUTO mode.



The system is activated and awaits to execute a function.



The hydraulics is moving the boom.



Nozzles spraying.



Nozzles spraying and awaits to close.



Nozzles not spraying.



Nozzles not spraying and awaits to open.

Menu 2.2.5 TWIN preset shift auto/man (TWIN only)

This menu is to select if TWIN preset shifts is automatically at main ON/OFF or manually at key press.

Select the way to use the function in the submenus:

Menu	Function
2.2.5.1	Selects whether manual operation is done at the SetBox or at the buttons behind the grip.
2.2.5.2	Selects automatic shift every time the main ON/OFF is pressed.
2.2.5.3	Disables the function.

Menu 2.2.6 AutoAgitation select level (optional)

By selecting one of the submenus, it is possible to select the level of agitation:

Menu	Function
2.2.6.1	Powerful AutoAgitation.
2.2.6.2	Soft AutoAgitation.
2.2.6.3	No agitation.
2.2.6.4	Fixed agitation.



NOTE! For fixed agitation the level is set in menu 2.2.7.



ATTENTION! HC 6500 only: Long keypress on  (AutoAgitation override control) will stop agitation. If restarted, agitation has to be setup in the menu again.

3 - Description

Menu 2.2.7 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 [2.2.6.4 Fixed agitation] is selected.

Auto function icons

In the following schematics shows the significance of the icons that will appear in the top right corner of the screen.

1st schematic:

Icons/screen code	Active	Active	Active	Mounted
sa				Regular COMMANDER without extra intelligent features
sb	End nozzles			End nozzles mounted and active
sc	AutoFill			AutoFill is mounted and active
sd	AutoWash			AutoWash mounted and active
se	AutoFill	End nozzles		AutoFill and End nozzles is mounted and active
sf	AutoWash	End nozzles		AutoWash and End nozzles is mounted and active
sg	AutoWash	AutoFill		AutoWash and AutoFill is mounted and active
sh	AutoWash	AutoFill	End nozzles	AutoWash, AutoFill and End nozzles is active

2nd schematic:

Icons/screen code	Possible to do by pressing F1	Possible to do by pressing F2	
vb	Start	Abort	Will be shown before intelligent feature start
vc	Done	Abort	Will be shown during program
vd	Pause	Abort	Will be shown during program

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

If the volume rate is to come from an external source (e.g. a site specific application map, remote sensor or a GPS system like HARDI AutoSectionControl), this menu has to be enabled. This is done by selecting one of the submenus:

- Menu 2.3.1 Disable
- Menu 2.3.2 Enable

The  symbol on the 1st line in the display will be visible. Manual pressure regulation and stepped over/under application is still possible.

COM ports

The external source has to be connected to the systems COM port via a 9 pin sub-D connector.

ISOBUS has one COM port:

- COM 1 on the SetBox.

HC 6500 has two COM ports:

- COM 1 on the Terminal.
- COM 2 on the Terminal.

As default on HC 6500 the external source is connected to the COM 2 port as the COM 1 port is assigned for printer. This can be changed in the extended menu. Both COM-ports cannot be assigned for VRA at the same time as this will cause the system not to work.

For HC 6500 the COM 2 port may have to be set up in the extended menu. Contact your HARDI service centre.



ATTENTION! AutoSectionControl uses Variable Rate Application when connected to HC 6500 / ISOBUS VT. By default AutoSectionControl is connected to:

HC 6500: COM 2 port on the Terminal.

ISOBUS terminals: COM 1 port on the SetBox.

Description of "HARDI AutoSectionControl (optional)" on page 32 and also refer to separate instruction book.

Menu 2.4 Set clock

If the Controller prompts for date and time, then set clock to enable register.

This must be done before the Controller is put into operation for the first time, otherwise no start and stop time will be recorded in the registers. Later changes in date and time can be done by following the procedure in "How to set clock" on page 80.



ATTENTION! If no prompt, the dealer may already have done this.

In submenus it is possible to select and set:

Menu	Function
2.4.1	Time format (12 or 24 hour)
2.4.1.1	12 hour format
2.4.1.2	24 hour format
2.4.2	Set time
2.4.3	Set date and month
2.4.4	Set year

Menu 2.5 Alarms

User selectable alarms can be set with parameters of choices given in the submenus of menu 2.5 - refer to "Full menu structure" on page 33 for available alarms.

- When outside the alarm parameters, the relevant warning will flash lower left corner of the screen.
- Volume rate alarm for over or under application activates after 20 seconds.
- HC 6500 only: The alarm beep can also be adjusted in audio level in menu [2.5.16 Audio level]. Audio level can be selected in steps from 1 to 5. For no audible alarm, set at 0.

2.5 Alarms
>> 2.5.01 Volume rate alarm 2.5.02 Tank contents at minimum 2.5.03 Spray pressure 2.5.04 Fan speed alarm 2.5.05 Speed alarm 2.5.06 Wind Speed 2.5.07 PTO r/min alarm 2.5.08 R/minute alarm
Over or under application alarm

The warnings appear as shown. For more details on warnings see "Fault codes" on page 111.





NOTE! The HC 9500 shows the warnings in the top bar of the screen. Other ISOBUS screens may only be able to show the warnings in the VT - as shown in illustration.

auto ! 73		
Warning Fold with unlocked pendulum	Area spray 0 hectare	Prog. rate 200 Litre/ha
	Tank cont. 4400 litre	Work rate 0.00 ha/hour

3 - Description

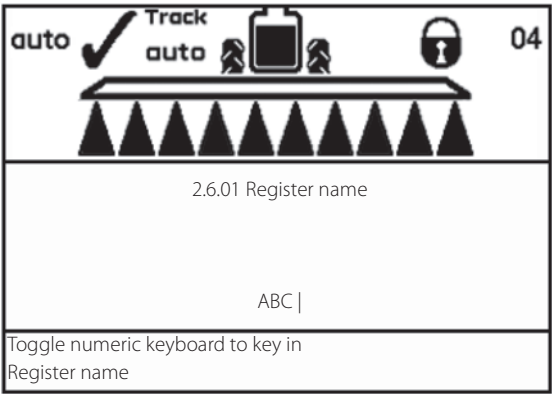
Menu 2.6 Register names (HC 6500 only)

If desired, the registers can be given names:

- 1. Go into menu [2.6 Register names].
- 2. Select the register number that should be named.
- 3. Use the numeric keys to key in name.
- 4. Confirm with .
- 5. When registers has been named, press  to exit to main menu.




ATTENTION! Register name can be of maximum 16 characters!



Menu 3 Calibration

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.





The menu can be reached by navigating via the menu structure. For HC 6500 only the shortcut  can also be 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:
 - [3.1.1 Sprayer] Speed sensor on sprayer
 - [3.1.2 Tractor] Speed sensor on tractor
 - [3.1.3 Radar] Radar speed sensor
- 3. The last confirmed sensor is the active speed sensor.
- 4. Choose submenu.
- 5. The rest of calibration procedure is the same as when using the HC 6500 shortcut - see below.

3.1 Speed calibration
>> 3.1.1 Sprayer speed 3.1.2 Tractor speed 3.1.3 Radar speed
Speed sensor mounted on trailed sprayer Connected to armature junction box

HC 6500 shortcut procedure

- 1. Press  until menu [3.1.1.1 Speed constant] is shown.
- 2. Choose submenu with  or  and press .
- 3. The rest of calibration procedure is the same as when navigating the menus - see below.

From here you are at the same place in the menu whether you did navigate the menus or used the shortcut. It is possible to calibrate the speed sensor in different ways. By entering a theoretical speed constant or by doing a practical calibration.

Select calibration method in the two submenus

Menu	Function
3.1.1.1	Speed constant
3.1.1.2	Speed practical

The procedure of each menu is described in the below parts.
The speed transducer can be calibrated theoretically (See “Menu 3.1.1.1 Sprayer speed constant” on page 54) or practically (See “Menu 3.1.1.2 Sprayer speed practical” on page 54).

3.1.1 Sprayer speed
>> 3.1.1.1 Speed constant 3.1.1.2 Speed practical
Shows and permits change to the constant, Pulses Per Unit (meter / feet)



ATTENTION! The practical method is recommended.



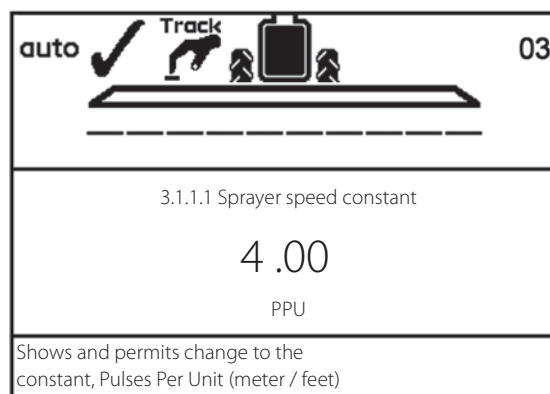
ATTENTION! If the speed can not be calibrated, then deactivate the track function. Contact your HARDI service centre to do this.

3 - Description

Menu 3.1.1.1 Sprayer speed constant

The theoretical speed constant, pulses per unit (PPU), is the distance in metre on the circumference of the wheel between holes (or protrusions / magnets) that the speed sensor records.

Tyre size	PPU
230/95R48 (11.2x48)	5.051
300/95R46 (12.4x46)	5.302
300/95R52 (12.4x52)	5.767
340/85R48 (13.6x48)	5.481
467/80R38 (18.4x38)	5.223
528/80R38 (20.8x38)	5.521
650/65R42 (26x42)	5.831



If mounting another tyre size, the PPU can be calculated from the below formula:

$$PPU = 0,00305 \cdot \left(\frac{\text{Tyrewidth} \cdot \text{Tyreprofile}}{50} + \text{Rimheight} \cdot 25,4 \right)$$

Example

If e.g. changing to a 270/95R44 tyre, the PPU is calculated as follows:

$$PPU = 0,00305 \cdot \left(\frac{270 \cdot 95}{50} + 44 \cdot 25,4 \right)$$

$$PPU = 4,973$$

Menu 3.1.1.2 Sprayer speed practical

Practical calibration of speed is done by driving a measured distance and correcting the display so that the actual and the calculated distances are the same.



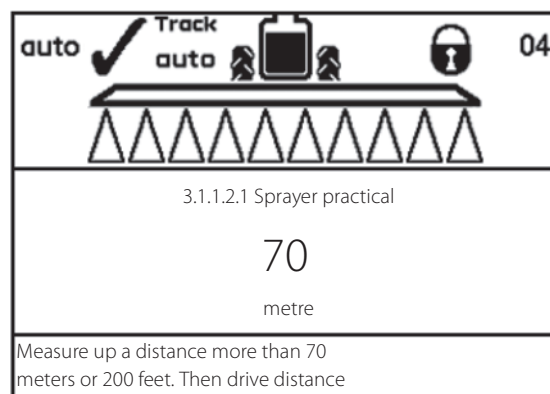
NOTE! Calibration should take place in the field with a half full tank and normal working tyre pressure in order to obtain the wheel's real "working radius".



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 Enter. When zero distance [0 m] shows, drive the distance.
4. Press Enter.
5. Correct the distance shown on the display to read the actual distance.
6. Press Enter to see the new calculated value.
7. Press Enter again to accept the value.





Menu 3.2 Flow calibration

The flow transducer can be calibrated theoretically or calibrated with clean water by using one of the two practical methods.

The practical methods are preferred:

Method	Calibration time	Accuracy
Tank method	Time consuming	Accurate
Nozzle method	Short	Inaccurate

 **ATTENTION!** When changing to nozzles with more than a 100% increase or decrease in output, it is recommended to re-calibrate the flow transducer.

 **ATTENTION!** Calibration is recommended to be done at least once during the spraying season. Use the chart at the back of the book to record the values.


Menu 3.2.1 Flow constant


When spraying both fertiliser and chemical, HARDI recommend to use 2 different flow sensor houses in order to get good pressure regulation. The same flow sensor wheel is used for both flow sensor houses. Flow sensor calibration PPU must be changed each time flow sensor houses are changed.

Correct flow house can easily be selected based on:

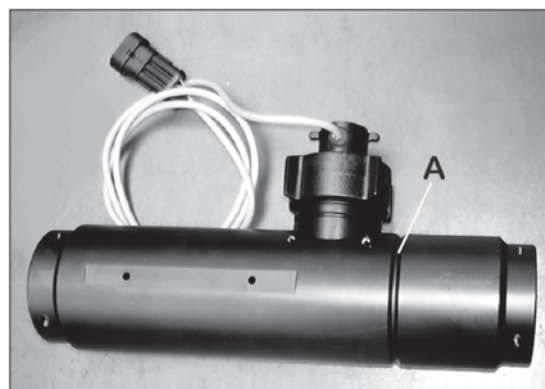
- Sprayer boom width.
- Operator's typical spray pressure in tramline (max. pressure).
- Nozzle ISO size typically selected by operator.

Approximate PPU values for different flow housings used in these selected conditions are as follows in the tables. The different flow housings are designated by groove (A).

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

 **ATTENTION!** The Ø6 mm flow sensor house is appropriate on a small Twin sprayer.

3 Calibration
3.1 Speed calibration
>> 3.2 Flow calibration
3.3 Boom setup
3.4 Regulation constant
3.5 Tank gauge calibration
3.6 Track calibration
3.7 LookAhead calibration
3.8 LookAhead custom nozzles
Flow sensor calibration. Theoretical (PPU), Nozzle Tank method PrimeFlow



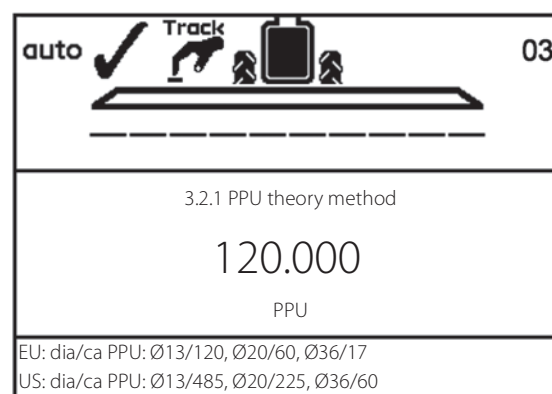
Flow rates at 3 bar spraying pressure			Boom size						
Nozzle	Flow (l/min)	Flow sensor identification	36 m	33 m	30 m	27 m	24 m	21 m	18 m
Pink ISO 0075	0.3	Three grooves Ø6 mm	22	20	18	16	14	13	11
Orange ISO 01	0.4	Three grooves Ø6 mm	29	26	24	22	19	17	14
Green ISO 015	0.6	Four grooves Ø9 mm	43	40	36	32	29	25	22
Yellow ISO 02	0.8	Four grooves Ø9 mm	58	53	48	43	38	34	29
Lilac ISO 025	1.0	Four grooves Ø9 mm	72	66	60	54	48	42	36
Blue ISO 03	1.2	One groove Ø13.5 mm	86	79	72	65	58	50	43
Red ISO 04	1.6	One groove Ø13.5 mm	115	106	96	86	77	67	58
Brown ISO 05	2.0	One groove Ø13.5 mm	144	132	120	108	96	84	72
Grey ISO 06	2.4	No groove Ø20 mm	173	158	144	130	115	101	86
White ISO 08	3.2	No groove Ø20 mm	230	211	192	173	154	134	115
Light blue ISO 10	4.0	No groove Ø20 mm	288	264	240	216	192	168	144
Light green ISO 15	6.0						288	252	216

3 - Description

Flow rates at 4 bar spraying pressure			Boom size						
Nozzle	Flow (l/min)	Flow sensor identification	36 m	33 m	30 m	27 m	24 m	21 m	18 m
Pink ISO 0075	0.35	Three grooves Ø6 mm	25	23	21	19	17	15	13
Orange ISO 01	0.46	Three grooves Ø6 mm	33	30	28	25	22	19	17
Green ISO 015	0.69	Four grooves Ø9 mm	50	46	41	37	33	29	25
Yellow ISO 02	0.92	Four grooves Ø9 mm	66	61	55	50	44	39	33
Lilac ISO 025	1.15	One groove Ø13.5 mm	83	76	69	62	55	48	41
Blue ISO 03	1.39	One groove Ø13.5 mm	100	92	83	75	67	58	50
Red ISO 04	1.85	One groove Ø13.5 mm	133	122	111	100	89	78	67
Brown ISO 05	2.31	No groove Ø20 mm	166	152	139	125	111	97	83
Grey ISO 06	2.77	No groove Ø20 mm	199	183	166	150	133	116	100
White ISO 08	3.70	No groove Ø20 mm	266	244	222	200	178	155	133
Light blue ISO 10	4.62				277	249	222	194	166
Light green ISO 15	6.93							291	249


Flow rates at 5 bar spraying pressure			Boom size						
Nozzle	Flow (l/min)	Flow sensor identification	36 m	33 m	30 m	27 m	24 m	21 m	18 m
Pink ISO 0075	0.39	Three grooves Ø6 mm	28	26	23	21	19	16	14
Orange ISO 01	0.52	Three grooves Ø6 mm	37	34	31	28	25	22	19
Green ISO 015	0.77	Four grooves Ø9 mm	55	51	46	42	37	32	28
Yellow ISO 02	1.03	Four grooves Ø9 mm	74	68	62	56	49	43	37
Lilac ISO 025	1.29	One groove Ø13.5 mm	93	85	77	70	62	54	46
Blue ISO 03	1.55	One groove Ø13.5 mm	112	102	93	84	74	65	56
Red ISO 04	2.07	One groove Ø13.5 mm	149	137	124	112	99	87	75
Brown ISO 05	2.58	No groove Ø20 mm	186	170	155	139	124	108	93
Grey ISO 06	3.10	No groove Ø20 mm	223	205	186	167	149	130	112
White ISO 08	4.13	No groove Ø20 mm	267	273	248	223	198	173	149
Light blue ISO 10	5.16					279	248	217	186
Light green ISO 15	7.75								279

When a PPU value has been found, then use the navigation keys to change the flow constant theoretically.



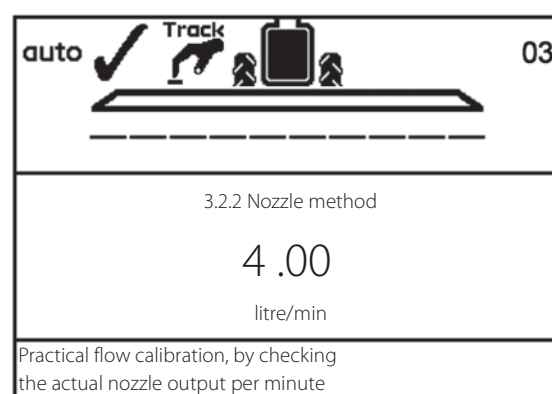
Menu 3.2.2 Nozzle method

Compares the individual nozzle output on the display to the actual individual nozzle output. The output displayed is corrected to read the actual output.

 **ATTENTION!** See menu [3.3 Boom] if no boom data has yet been entered.

Method

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





ATTENTION! If a section has not been opened or a end 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. It is recommended that an average of several nozzles be taken.
5. Press Enter.
6. Correct the output shown on the display to read the average output measured with the calibration jug.
7. Press Enter to see the new value.
8. Press Enter again to accept the value.

Menu 3.2.3 Tank method

The tank is partly emptied through the nozzles while the display calculates the quantity emptied on the basis of the actual calibration value (PPU). The quantity displayed is corrected to read the quantity actually dosed.

This can be done according to the tank contents level indicator or by weight difference before and after.

03
<p>3.2.3.1 Tank method</p> <p style="font-size: 24px;">0 .00</p> <p>litre</p>
<p>The sprayed amount is counted up when the sections are opened</p>

Method

1. Fill the sprayer with a known amount of water, e.g. 1000 litres. It is recommended to weight the sprayer before and after filling in order to get an exact value.
2. Open all boom sections.
3. Go to menu [3.2.3 Tank method], press Enter and switch the main ON/OFF to ON.
4. The display unit will then begin to count the volume being emptied through the nozzles.
5. When for example, 600 litres have been emptied out, as shown by the tank contents level indicator, then switch the main ON/OFF to OFF. Weight the sprayer again to get the exact volume sprayed out.

03
<p>3.2.3.2 Tank method</p> <p style="font-size: 24px;">4 .00</p> <p>litre</p>
<p>Press Enter. The shown volume is adjusted to match the actual volume</p>

6. Press Enter.
7. Correct the volume shown in menu 3.2.3.2 on the display to read the volume shown on the tank contents level indicator.
8. Press Enter to see the new value.
9. Press Enter again to accept the new value.

03
<p>3.2.3.3 Tank method</p> <p style="font-size: 24px;">4 .00</p> <p>PPU</p>
<p>This is the PPU constant from the volume previously just measured</p>

3 - Description

Menu 3.3 Boom


Menu 3.3.1 Width


- 1. Set boom width.
- 2. Press Enter to confirm.


auto

✓


Track







03



3.3.1 Width

0.00

m

The total spray boom width.
Include end nozzles if fitted


Menu 3.3.2 Number of sections


- 1. Set number of boom sections.
- 2. Press Enter to confirm.


auto

✓


Track







03



3.3.2 Number of sections

4

sections

The number of spray boom sections.
Keyin, then press Enter


Menu 3.3.3 Nozzles/sections


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


auto

✓


Track







03



3.3.3.01 Section 1

12

nozzles

Use arrow or numeric keys, then
press Enter to set up section 1

Menu 3.3.4 End nozzles and Bi-jet (optional)

If end nozzles or Bi-jet are fitted, it should be set up corresponding to the number of boom nozzles it covers.

- 1. In menu [3.3 Boom setup] go to the menu [3.3.4 End nozzles and Bi-jet].
- 2. Press Enter.
- 3. Select submenu corresponding to the type of end nozzle:

Menu	Function
3.3.4.1	None
3.3.4.2	End nozzles fitted
3.3.4.3	Bi-jet fitted

- 4. Press Enter.
- 5. In the sub menus [3.3.4.2] and [3.3.4.3] set the value to the equivalent coverage by the boom nozzles. E.g. end nozzle coverage is 2 metres. This is equal to 4 boom nozzles.

3.3.4 End nozzles and Bi-jet nozzles

>>

3.3.4.1 None

3.3.4.2 End nozzles fitted

3.3.4.3 Bi-jet fitted

If no end nozzles or Bi-jet nozzles are
fitted, select this.

3 - Description



ATTENTION! It is important that the volume applied from the end nozzle matches the volume applied under the boom, i.e. end nozzles mounted on boom must have ISO size as the regular nozzles on the boom. This is a comparison of volume per minute per length (Litre/metre).

When the end nozzle is active, the area covered and volume sprayed is calculated and registered. If "Active boom size" is displayed, it will show an increase when the end nozzle is activated.

Table below is based on data from the Hardi Nozzle product guide and is valid at 3 bar pressure.

End nozzles	Width (cm)	Total flow/nozzle (l/min)	Equivalent ISO nozzle size	50 cm flow/nozzle (l/min)
1850 End nozzle 3/8" - SYNTAL				
1850 G-150	155	1.02	Pink ISO 0075	0.33
1850 G-200	195	1.67	Orange ISO 01	0.43
1850 G-250	250	2.89	Green ISO 015	0.58
1850 G-300	280	3.61	Green ISO 015	0.64
1850 G-350	295	5.51	Lilac ISO 025	0.93
1850 G-400	345	7.59	Blue ISO 03	1.10
1740 End nozzle 1/2" - SYNTAL				
1740 G-500	450	9.55	Lilac ISO 025	1.06
1740 G-600	480	11.02	Blue ISO 03	1.15
1740 G-700	510	12.98	Blue ISO 03	1.27
1740 G-800	520	15.19	Red ISO 04	1.46
G - Giant end nozzle - SYNTAL				
G-1000 RED	500	18.00	Red ISO 04	1.80
G-1200 WHITE	600	21.00	Red ISO 04	1.75
G-1600 BLUE	800	28.00	Red ISO 04	1.75

Menu 3.3.5 Length hitch to axle for ASC (ISOBUS only)

Set length from the tractors hitch eye to the sprayers wheel axle. The distance is used when determining the path of the spray rig as it moves around in the field.



ATTENTION! This menu is only for sprayers equipped with ISOBUS and AutoSectionControl.

03

3.3.5 Length hitch to axle for ASC
530
cm

Length from hitch to axle on sprayer for AutoSectionControl for ISOBUS

Menu 3.3.6 Length axle to boom for ASC (ISOBUS only)

Set length from the sprayers wheel axle to the boom, measured at the nozzles. The distance is used when determining the path of the spray rig as it moves around in the field.



ATTENTION! This menu is only for sprayers equipped with ISOBUS and AutoSectionControl.

03

3.3.6 Length axle to boom for ASC
250
cm

Length from axle on sprayer to boom for AutoSectionControl for ISOBUS

3 - Description

Menu 3.4 Regulation user setup

The sensitivity of pressure regulation valve can be adjusted. Values is to be set for obtaining precise regulation, even if sensors fails.

The valve is controlled by up to five main sensors:

- **Sprayer speed sensor:**
This sensor reads the sprayers forward speed which is used for calculating the volume rate at all spraying speeds.
- **Flow sensor:**
This sensor reads the flow at the operating unit which is used for calculating the pressure at all flow rates.
- **Pressure sensor:**
This sensor reads the pressure at the operating unit which is used for calculating the flow at the pressure regulation valve.
- **P.T.O. RPM sensor:**
This sensor read the pump RPM's which is 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 opening angle is known, the flow can be calculated when the pressure is also known. The result is when forward speed, pump RPM's, etc. is known, then the regulation valve can predict setting (Feed Forward) before opening the main ON/OFF. Thereby the volume rate is correct even the forward speed has changed significant since the main ON/OFF was closed (no fluctuation).

3.4 Regulation user setup

- >> 3.4.1 Flow sensor restriction
- 3.4.2 Simulated speed value
- 3.4.3 Nozzle size flow at 3 bar
- 3.4.4 Dual line second nozzle
- 3.4.5 Type of nozzle
- 3.4.6 Regulation parameter

Flow to obtain 1 bar pressure drop
over pressure filter flow sensor

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.

- Select value from the schematic and enter it in this menu.

Flow house	Flow
HARDI 13.5 mm	99 l/min
HARDI 20 mm	156 l/min
HARDI 36 mm	182 l/min

- Default value: 156 l/min

auto



01

3.4.1 Flow sensor restriction

156

l/min

Flow to obtain 1 bar pressure drop
over pressure filter 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 "Simulated speed value". The operator should keep the tractor constantly at this speed to maintain a good regulation with ability to handle changes in application rate and changes in sections.

Speed entered should be appropriate also for headlands. If speed is reduced at headlands, resulting application rate will be higher than set value. I.e if operator selects application rate of 100 litre/ha and speed of 8 km/h and then reduces speed from 8 to 6 km/h at headlands, actual application rate will increase to 133 litre/ha.

Also when spraying speed drops below the lowest speed where a spray job can begin when starting at headland (this speed is set by the HARDI dealer), the speed will be simulated to maintain normal spray pressure until normal spraying speed is maintained.




- Default value: 7.2 km/h



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



ATTENTION! Recommended setting is 75-90% of spraying speed.

auto	✓ Track			01
				
3.4.2 Simulated speed value				
7.2				
km/h				
Type in speed for priming at stand still and both flow and pressure are defect				

3 - Description

Menu 3.4.3 Nozzle size flow at 3 bar

In fault free operation the controller use the flow sensor and the pressure sensor to detect the nozzle size.

In case of flow sensor and/or pressure sensor fault the nozzle flow can be entered to obtain an more accurate regulation of the regulation valve.

If either the flow sensor or the pressure sensor is faulty, the nozzle cannot be identified. The controller stores the last detected nozzle size, and this value is then used.

- Default value: 0.40 l/min



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




Nozzle size is defined as 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 nozzle filter and without Pentalet nozzle holder. The flow restriction from these 2 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

auto



01

3.4.3 Nozzle size flow at 3 bar

0.40

l/min




0075Pink = 0,3; 02Yellow = 0,8
04Red = 1,6; 08White = 3,2 l/min

Menu 3.4.4 Dual line second nozzle

Same as for menu 3.4.3 but for dual line second nozzle, if fitted.

- Default value: 0.40 l/min
- Recommended setting: 0.40 l/min

auto



01

3.4.4 Dual line second nozzle

0.40

l/min

0075Pink = 0,3; 02Yellow = 0,8
04Red = 1,6; 08White = 3,2 l/min

Menu 3.4.5 Type of nozzle

Select the nozzle type to be used when spraying.

- Default value: Regular nozzle.



ATTENTION! Remember to change the gravity of the chemical mix in menu [3.5.1 Adjustment of specific gravity].

3.4.5 Type of nozzle
>> Regular nozzle QuintaStream
Flat fan, Low drift, Minidrift

Menu 3.4.6 Regulation parameter

Code for special machines or applications, consult your HARDI Service Centre.

- Default value: Code 1

	01
3.4.6 Regulation parameter	
1	
Code	
Code for special machines or applications, consult your dealer	

3 - Description

Menu 3.5 Tank gauge

Present accuracy is up to +/- 25 litre. This is at the widest liquid surface area in the tank. The smaller the liquid surface area, the more accurate the readout.



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



ATTENTION! This menu item is only present if the HARDI Tank Gauge is fitted.

3.5 Tank gauge calibration

- 3.5.1 Adjustment of specific gravity
- >> 3.5.2 Calibration of Tank gauge
- 3.5.3 Select factory calibration
- 3.5.4 Offset at empty MainTank

Calibrate if factory calibration is not adequate. Disable SafeTrack

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.


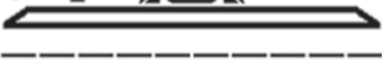
For liquid fertilisers, the specific gravity may range up to 1.3 kg/litre. The value in this case would be 1.30 kg/litre.



ATTENTION! Remember to set type of nozzle to be used in menu [3.4.5 Type of nozzle].

Method

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

auto		01
		
3.5.1 Adjustment of specific gravity		
1.00		
kg/litre		
Enter weight of liquid fertilizer divided by weight of water (e.g. 1.10 to 1.30)		

Menu 3.5.2 Calibration of Tank gauge



ATTENTION! Prior to attempting a custom calibration the SafeTrack/IntelliTrack must be disabled in the extended menu.

Calibration of the HARDI Tank Gauge is necessary if the factory calibration shows inaccurate. E.g. 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 begin the custom calibration with connecting the sprayer to the tractor that will be used for spraying. Later changes of tractor can affect the accuracy of the Tank gauge.

Custom calibration

1. First enter menu [3.5.3.01 Custom calibration of gauge].

3.5.3 Select factory calibration

- >> 3.5.3.01 Custom calibration of gauge
- 3.5.3.02 NCM 3200 factory calibration
- 3.5.3.03 NCM 4400 factory calibration
- 3.5.3.04 NCM 6600 factory calibration
- 3.5.3.05 NCM 9000 factory calibration
- 3.5.3.06 Alpha 2500 factory calibration
- 3.5.3.07 Alpha 3500 factory calibration
- 3.5.3.08 Alpha 4100 factory calibration
- 3.5.3.09 Alpha 3000 factory calibration

Tank gauge table from custom Calibration

2. Go to menu [3.5.2.1 Water level].
3. Fill the sprayer up to nominal tank contents, using an external calibrated flowmeter. Alternatively weight the sprayer before and after filling, and note the weight difference.
4. Press Enter.



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. Same accuracy of 2% must be kept if weighting the sprayer before/after filling is used.



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.

5. Press Enter after ensuring the sprayer is level. Refill the tank up to the tank lid if the sprayer is re-levelled.

	01
3.5.2.1 Water level	
0 mm	
Fill up the tank to the max level, then press Enter	

	01
3.5.2.2 Water level	
0 mm	
Level the sprayer, then press Enter	

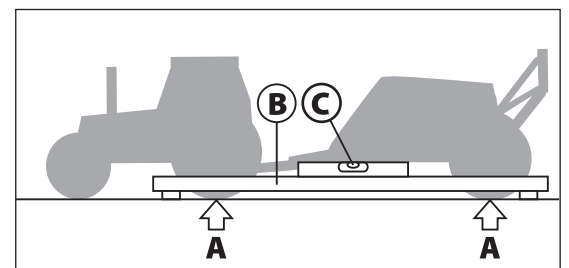


ATTENTION! Levelling the procession of sprayer is of great importance as the accuracy is directly affected!

Assumed that the same tractor will be used after custom calibration, it is not necessary for the sprayer to be level itself. But the whole procession of tractor and sprayer (A) need to be level.

Use e.g. a beam (B) of approximately 6 m length, placed on two wooden blocks at the location where the calibration will take place. Place a level (C) on the beam (B) to find the level point of the calibration location.

6. Engage the pump and set P.T.O. revolutions at 540 rpm or 1000 rpm (depending on pump model).
7. Open all boom sections and empty the tank. The pulses from the flow transducer are logged as data points.



	01
3.5.2.3 Water level	
0 mm	
Empty sprayer through main flow meter at boom. Computer will register flow	

During this session the screen shows:

[xxxx] as the actual water level in millimetres and

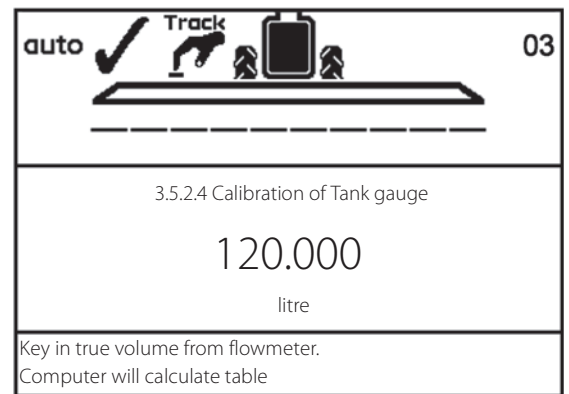
[yyyyyy] is the number of pulses from the flow meter.



ATTENTION! The definition of having an empty tank, is when no spray comes out of the nozzles anymore. Note that when empty, there will still remain about 10 litre in the sump of the tank.

3 - Description

8. Press Enter when the tank is empty.
9. Correct the displayed volume to the actual volume sprayed out.
10. Press Enter. The new custom gauge table is calculated and the calibration of the HARDI Tank Gauge is finished.



Menu 3.5.3 Select factory calibration

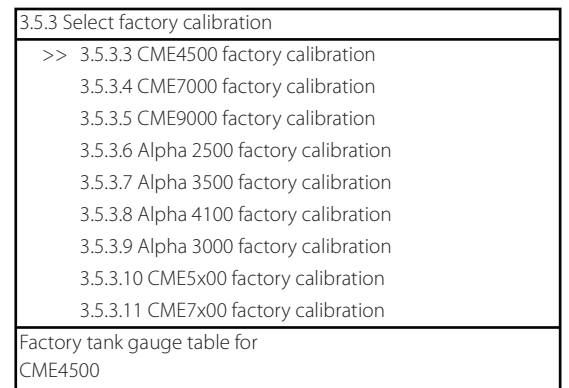
This menu may have been set up by your HARDI service centre. Selection can only be done with no water in the tank. See "Menu 3.5.4 Offset at empty main tank" to check if empty.

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

- Level sprayer; When mounted to the tractor then the sprayer should be level.

Check if level by placing a level on the frame of the COMMANDER sprayer as follows:

COMMANDER model	Place of level
3300, 4500 and 5500 litre	Underside of the frame.
7000 litre	Upper side of the frame (Important as frame is not parallel).



Height of hitch point when mounted to tractor; The height of hitch point measured from the ground should be 550 mm. Measure of tank contents changes with the height of the hitch point.



ATTENTION! If one of the prerequisites are not fulfilled, then refer to "Menu 3.5.2 Calibration of Tank gauge" to make a custom calibration of the tank gauge.

Menu 3.5.4 Offset at empty MainTank

In menu [3.5.4.1 TankGauge Offset] read out the frequency (Hz) at empty tank. If the main tank is empty, then press Enter to accept the frequency.

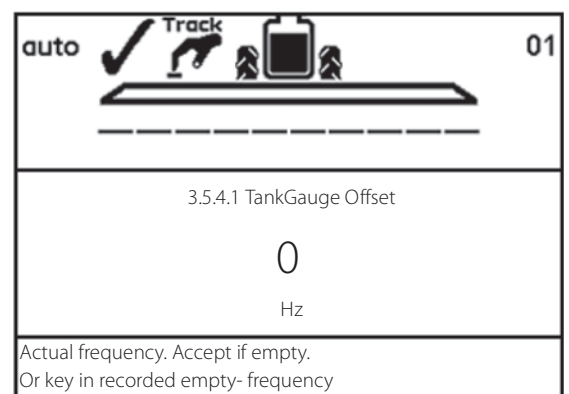
In case the main tank is not empty, this menu can only be used to correct the empty-frequency if it is known to the user.



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



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



Menu 3.6 Track

There is no standard setting for the Track setup. The Track needs to be adjusted for different kinds of tractors, the sprayer and spraying practices and can only be found under the actual conditions.

Spraying speed	Track setup
High speed (20 to 25 km/h)	Must react slowly: The dead zone must be increased.
Low speed (7 to 10 km/h)	For high precision: The dead zone can be reduced.

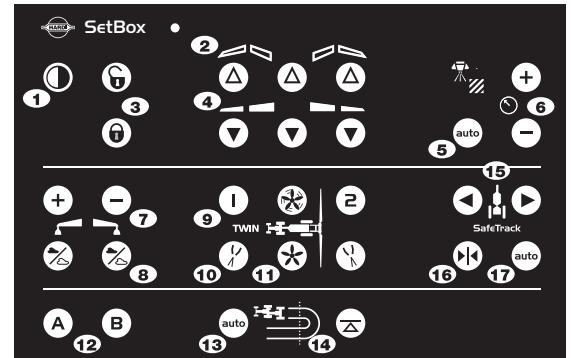
For each adjustment is described what happens if the setting is changed and what effect will it have on the sprayer.


SafeTrack/IntelliTrack

The SafeTrack/IntelliTrack is operated at the SetBox.

Track selection switches has 3 functions:

1. Align button (16) will align the sprayer. Used before folding the boom.
2. Auto button (17) switches SafeTrack or IntelliTrack into auto mode and the sprayer will follow the track from the tractor.
3. Manual buttons (15) will steer the sprayer right and left. Auto is OFF when using manual buttons (15).



 **ATTENTION!** If unsafe driving occurs an alarm will be triggered, and the sprayer will align.


- Press Enter to turn alarm off.
- Pressing "align" (16) will also turn alarm off. Be aware that the alarm can not be turned off as long as unsafe driving still occurs!

Menu 3.6.1 Track width

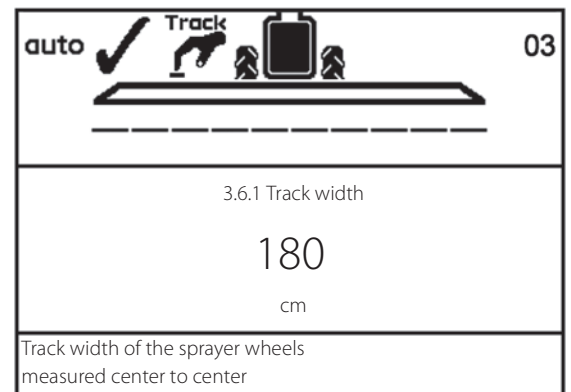
Here the track width can be entered.

- The track width is measured from right side tyre centre to left side tyre centre of the sprayer wheels.

It is important that the right track width is entered. The controller will calculate the speed at the centre of sprayer, and not at the wheel sensor as speed would vary in right and left turns.

 **ATTENTION!** If the track width is incorrect, it will influence on track precision and the safety factor.

Factory setting: 180 cm



Menu 3.6.2 Tractor drawbar

Here the length of the tractor drawbar is entered.

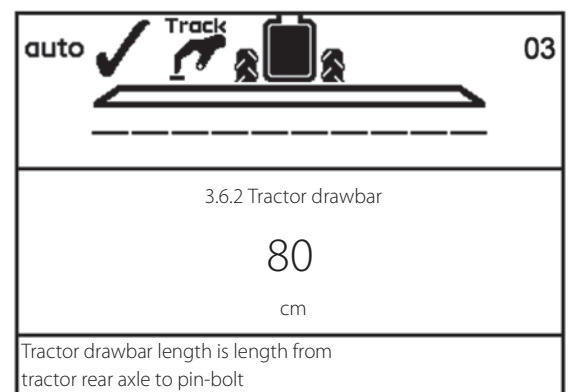
- The measurement is from the centre of the tractor rear axle to the centre of the drawbar pin.

This has to be adjusted every time a new tractor is hooked on to the sprayer. When hooked on, check the rigidity of the tractor drawbar mounts. There must be no sideways movement.

Factory setting: 80 cm

Too short measurement: The Track reacts faster, but will make the sprayer steer too large curves.

Too long measurement: The Track reacts slower, but will make the sprayer steer to short curves.



3 - Description


Menu 3.6.3 Dead zone for regulation

This is the non regulation zone when the sprayer is straight behind the tractor. If the sprayer is oscillating in the hydraulics when driving straight, this value must be increased.

Factory setting: 5 cm; Over 15 cm not recommended.

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

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

	03
3.6.3 Dead zone for regulation	
5 cm	
Increase for high speed. Decrease for high accuracy	


Menu 3.6.4 Damping of hydraulics

If the system is too aggressive the damping constant must be increased. Failure to do so may damage the boom.

Factory setting: 50%




No damping (0%): High precision, but very unsteady. Fast reaction time, but more aggressive movement that potentially can damage the boom.

Full damping (100%): Low precision, but very steady. Slow reaction time, but less aggressive.

	03
3.6.4 Damping of hydraulics	
50 %	
Increase for smooth drive and high speed. Decrease for high accuracy.	


Menu 3.6.5 Align offset + right - left

This is to compensate if the front potentiometer is placed offset to the centre line when the sprayer is attached.

 NOTE! HC 6500 only: The +/- can be changed with  and .

Factory setting: 0 cm

Negative setting will move the sprayer to the left of the track, and positive setting will move the sprayer to the right of the track. The sprayer must follow the tractor in a straight line in all situations. If the value is over 10 cm, it is recommended to manually adjust position of the front angle sensor.


	03
3.6.5 Align offset + right - left	
0 cm	
Alignment of sprayer. Positive value moves sprayer right, negative left.	


Menu 3.6.6 Calibrate sensitivity

This adapts the track regulation to the tractor hydraulics and to the characteristics of the sprayer hydraulics system.

Calibration procedure is divided into 4 parts where an offset and gain value is found to both left and right movement, 4 values in all.

Method

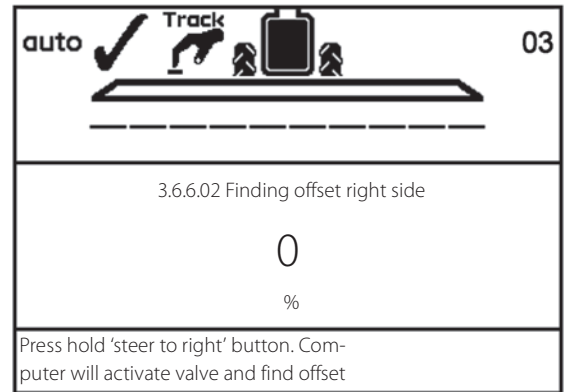
1. Unfold boom and without driving set P.T.O. to spraying R.P.M.
2. Align sprayer and press  to enable "auto" at the SetBox. First left/right offset is found:
3. Go to menu [3.6.6 Sensitivity] and select "Yes" and press Enter. Press Enter again and calibration starts.

	03
3.6.6.01 Sensitivity tractor hydraulic	
0 %	
Press ESC to abort. Press Enter to start calibration of offset and gain	

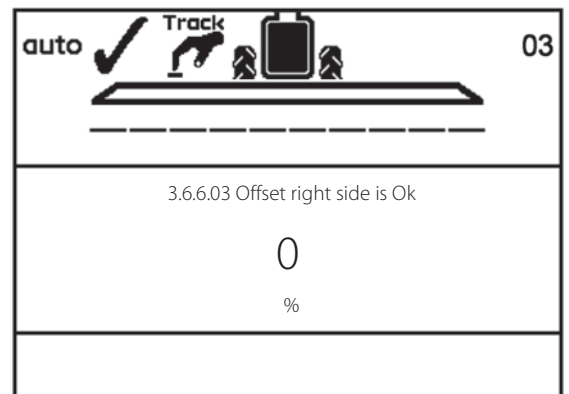
4. Press and hold the manual "steer to right" button (A).



5. Display will show a counting percentage.



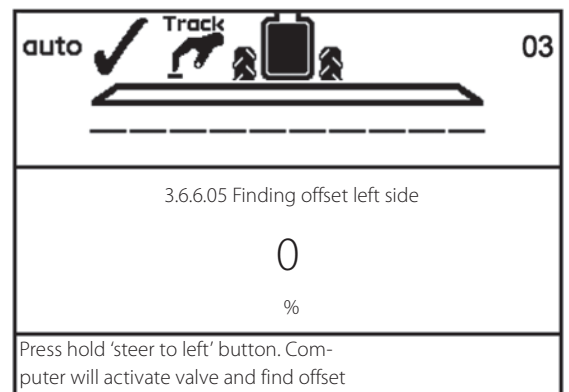
6. When offset is found it ends with an "OK" message.



7. Press and hold the manual "steer to left" button (B).

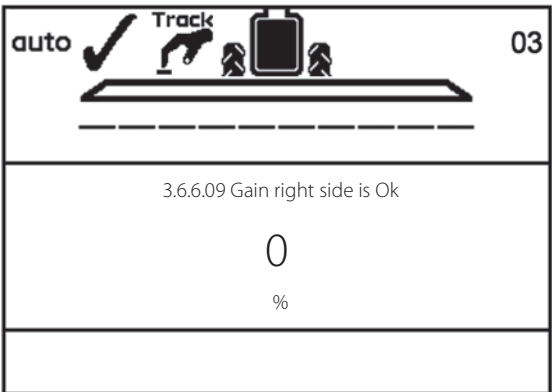
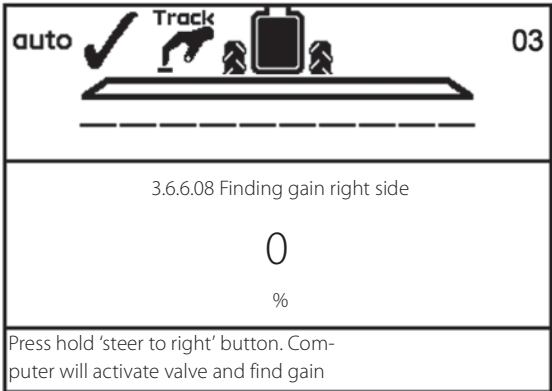
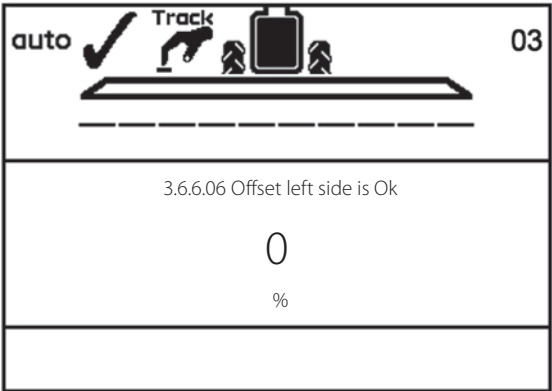


8. Display will show a counting percentage.



3 - Description

9. When offset is found it ends with an “OK” message.
10. Then calibration automatically continues with gain calibration. Press and hold the manual “steer to right” button (A).
11. Display will show a counting percentage.
12. When offset is found it ends with an “OK” message.
13. Press and hold the manual “steer to left” button (B).



14. Display will show a counting percentage.

auto

✓

Track

03

3.6.6.11 Finding gain left side

0

%

Press hold 'steer to left' button. Computer will activate valve and find gain

15. The display reads "Calibration is OK" when calibration has finished. Confirm and leave menu by pressing Enter.

auto

✓

Track

03

3.6.6.12 Gain left side is Ok

0

%

Calibration is OK. Press Enter to return to Track calibration menu

Emergency Track

If a problem with the Track should occur, please see "Menu 4.7 Emergency Track".

3 - Description

Menu 4 Toolbox

Menu 4.1 Measure

This is a simple electronic trip meter. You can measure distance. If the implement width is entered in menu [4.1.3 Working width], area can also be measured in menu [4.1.2 Area].

1. Press Clear to clear the value.

Following submenus are possible:

[4.1.1 Distance]	Measures a distance being travelled.
[4.1.2 Area]	Measures the area the boom covers at a travelled distance.
[4.1.3 Working width]	Menu for entering the boom working width to be measured.
[4.1.4 Stop watch]	Measures the time being used.
[4.1.5 Alarm clock]	Can give an alarm at a preset time.

Menu 4.2 Service intervals

Service intervals and a nozzle check are programmed into the Controller. This makes it easier for the operator to remember the service intervals.

From the factory, the Controller is set up with three service and a nozzle check reminder.

Menu & interval	Hours	Action
[4.2.1 Check filters]	10	See sprayer instruction book, Maintenance.
[4.2.2 Grease boom]	50	See sprayer instruction book, Maintenance.
[4.2.3 Grease track and centre]	250	See sprayer instruction book, Maintenance.
[4.2.4 Miscellaneous service]	-	Not defined from factory.
[4.2.5 Check nozzles]	50	Check flow rate. Change nozzles if more than 10% of rated flow.

Entering the above menu's will display the hours remaining until next service. The importer or dealer may have added a "Miscellaneous service" interval. If no interval is set, [Miscellaneous service not defined] is shown.

Press Enter to register service or control, if displayed when switched on. The warning  will remain present until the service interval is reset.

Menu 4.3 Service interval reset

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

Menu & interval	Hours	Action
[4.2.1 Check filters reset]	10	See sprayer instruction book, Maintenance.
[4.2.2 Grease boom]	50	See sprayer instruction book, Maintenance.
[4.2.3 Grease track and centre]	250	See sprayer instruction book, Maintenance.
[4.2.4 Miscellaneous service]	-	Not defined from factory.
[4.2.5 Check nozzles]	50	Check flow rate. Change nozzles if more than 10% of rated flow.

1. Press Clear to reset hour meter.
2. Press Enter to confirm.

Menu 4.4 Reserved

Reserved function - This menu is not used

Menu 4.5 Test

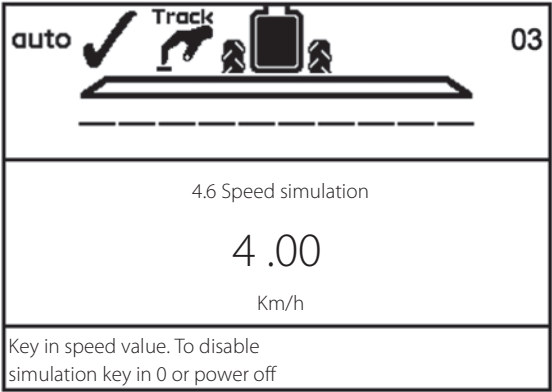
All readouts for the transducers are in accumulated counts, i.e. one signal gives one count, except for the optional (analog) transducer that is read in milliampere.

- 1. Go to menu [4.5 Test].
- 2. Choose the item to be tested and open the menu.
- 3. Activate sensor and see if the signal is detected.

Menu	Help text
4.5.1 Flow Speed Optional sensors	Activate function to monitor sensor (e.g. drive forwards, start flow).
4.5.2 Active keys	Push key to see if a count is registered. If yes, the key or switch function is OK.
4.5.3 PrimeFlow test	PrimeFlow test for nozzles and PrimeFlow computers on boom. Not for ISOBUS
4.5.4 Input test	See computer readings of sensors. Frequency, switch, analog inputs.
4.5.5 Valve test	Self test.
4.5.6 PrimeFlow SMCU status	See nozzle position, nozzle order, counts of data error power error.
4.5.6 PrimeFlow motor status	See nozzle motor status.

Menu 4.6 Speed simulation

Speed may be simulated for certain purposes. A two figure value may be entered. The state remains valid until the Controller is restarting or the value is set to "0".



3 - Description

Menu 4.7 Emergency track Align

This menu bypasses the system so all sensors are ignored. Then it is possible to fold the boom manually and drive home. The sensor status and voltages can be checked, which is useful for the HARDI service to solve the problem.

In menu 4.7.1 the sensor status and voltages can be checked when aligning the sprayer.



NOTE! Values shown in illustration is an example only.

4.7.1 Track align		
>>	Front sensor	2.38 Volt
	Front sensor	1.9 Degree
	Rear sensor	Volt
	Rear sensor	Degree
	Boom sensor 1	5.00 Volt
	Boom sensor 1	Folded
	Lock sensor	0.80 Volt
	Lock sensor	Locked
Emergency only. Align sprayer and fold boom in case a sensor is defect.		

In menu 4.7.2 the sensor status and voltages can be checked when folding the boom.



NOTE! Values shown in illustration is an example only.

4.7.2 Boom fold		
>>	Dynamic centre pos.	0.00
	Dyn. centre	99
	Pendulum lock	0.00
	Pend. unlock	0.0
	Boom sensor 1	0.00
	Boom sensor 1	1
	Boom height status	0
	Boom height	0.00
	Boom hydraulics	0
Emergency only. Manual lock and fold boom, in case a sensor is defect		

Lock sensor:

Lock sensor indication	Track selection switch	Left/right steer	Fold inner
Released (high voltage)	Auto or Manual	Possible	Possible
Locked (low voltage)	Auto or Manual	Not possible	Possible

If the track selection switch is switched to “align” the trapeze lock is attempted locked disregard any sensor reading. No automatic align is attempted. Manual or automatic tracking is not possible.

Once the boom is folded into transport position, exit the menu. This will activate the track lock if it is not damaged. As an extra security, stop oil flow to the sprayer and switch power to OFF on the SetBox in order to turn off the JobCom.



DANGER! Emergency only. Don't track with the boom folded! Safety system is disabled.

Menu 4.8 Computer CAN status

In this menu you can see if there is communication between the units, Controller, Jobcom and Track. See part “Emergency operation”.

Menu 4.8.X Computer CAN status:

[4.8.1 Operating status all computer]	Show operating status details in case of faults.		
[4.8.2 Software versions all computer]	Show software versions details in case of faults.		
[4.8.3 Hardware versions all computer]	Show hardware versions details in case of faults.		
[4.8.4 Work status Terminal HC 6500]	Show faults occurred since power-up.	Press Clear key to reset counters.	
[4.8.5 Work status JobCom HC 6100]	Show faults occurred since power-up.	Press key to reset counters.	Not for ISOBUS
[4.8.6 Work status Grip HC 6300]	Show faults occurred since power-up.	Press key to reset counters.	Not for ISOBUS
[4.8.7 Work status SetBox HC 6400]	Show faults occurred since power-up.	Press key to reset counters.	Not for ISOBUS
[4.8.8 Work status FluidBox HC 6200]	Show faults occurred since power-up.	Press key to reset counters.	Not for ISOBUS

Menu 5 Logbook

Menu 5.1 Print

This menu has to do with printing of data. The following can be printed via the 12 volt printer.

Menu	Help text
[5.1.1 Print single register]	A specific register is selected for a print.
[5.1.2 Print all registers]	Register in use will be printed. Print starts upon key press on Enter.
[5.1.3 Print configuration]	Records all system parameters. Print starts upon key press on Enter.
[5.1.4 Print PrimeFlow status]	Print status for all computer. Print starts upon key press on Enter.
[5.1.5 Print PrimeFlow motor status]	Print status for all motors Print starts upon key press on Enter.

Two examples of printouts is shown. To the left is a printout of a specific register (menu 5.1.1). To the right is a printout of the configuration (menu 5.1.3).

<pre>***** HARDI HC6500 ***** Serial number 0 Register 2/BENT Volume applied 1588 L Area 3 ha Travelled spray distance 1.7 km Start date 11.03.08 Start time 11:27 Stop date 11.03.08 Stop time 15:40 Time Used (spraying tim) 00 Work rate 8.75 ha/h Average spray speed 5.2 km/h Max. spray speed 9.7 km/h Average volume rate 558 L/ha Date printed 11.03.08 Time printed 15:55 Notes</pre>	<pre>***** HARDI HC6500 - configuration ***** Date printed: 11;03;08 Time printed: 14;29 ***** Terminal Serial number: 7011376 JobCom Serial number: 7041057 Terminal SW version: 1.09 JobCom SW version: 1.12 Register: 1 Total volume applied: 1257 L Total area: 1.91 ha Tot travel spray distanc: 1.4 km Start date: 11;03;08 Start time: 11;00 Stop date: 11;03;08 Stop time: 11;47 Tot time used spray time: 0 Total work rate: 2.91 ha/h Total averag spray speed: 2.2 km/h Total max. spray speed: 7.2 km/h Total averag volume rate: 657 L/ha *****Configuration***** Programmed volume rate: 200 L/ha Selected register number: 1 GPS remote: OFF Clock set up: 24 Language: UK</pre>
---	---

3 - Description

Menu 5.2 Data dump

Enables data dump to an office printer. This could be done for example, by using the HyperTerminal function in Microsoft Windows.

Menu	Help text
[5.2.1 Data dump of raw data]	Transmits data from all 99 registers in comma-separated file for Excel.
[5.2.2 Hyperterminal service report]	Transmits to PC at high speed. Show Configuration, Error Log, Track, PrimeFlow.

For HyperTerminal to communicate properly the COM port settings must be set as shown before transmitting data.

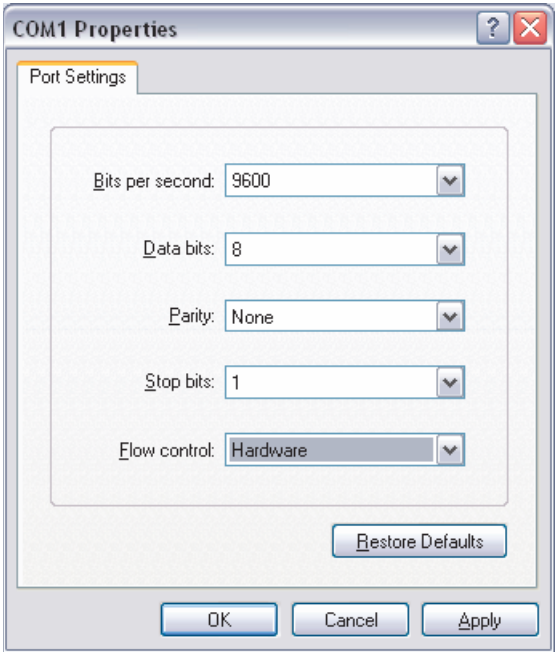
The Hyper Terminal has to be activated on the PC and a communication cable (ref. no. 72271600) must be connected to the COM port:

ISOBUS:

- COM 1 on the SetBox.

HC 6500:

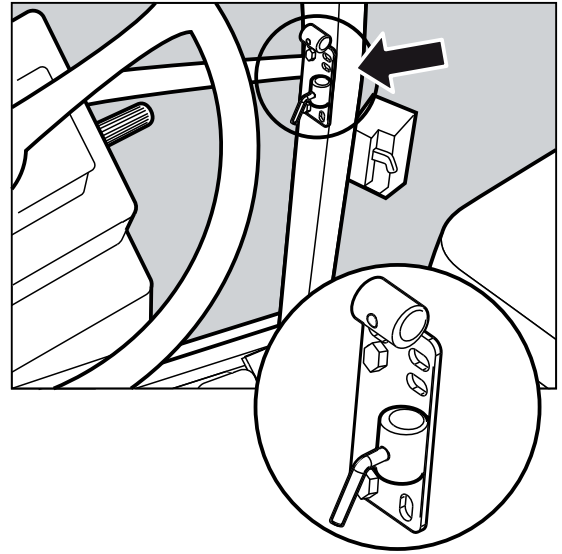
- COM 1 on the Terminal (default).
- COM 2 on the Terminal if assigned instead of COM 1. This can be changed in the extended menu.



Tractor installation

Installation of control unit brackets

Find a suitable place in the tractor's cabin to secure the control units from movement. Best recommended placement is to the right of the driver seat.



The supplied tractor pillar bracket (A) has a hole spacing of 100 and 120 mm and will fit most tractors. Threaded mounting holes may be hidden behind front corner cover.



ATTENTION! Check tractor instructions manual for information regarding attachment points.

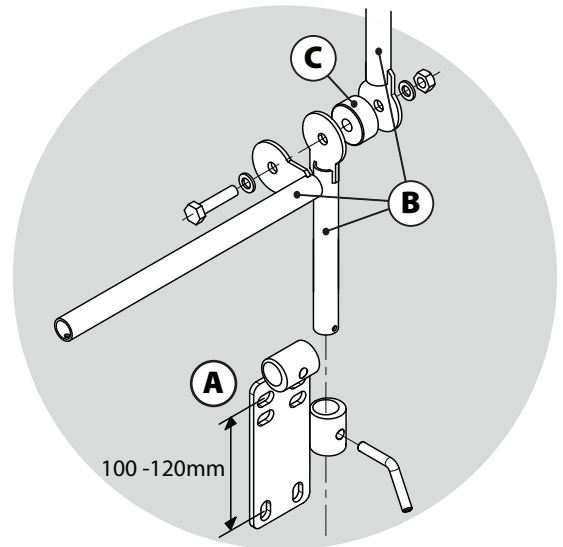
Three tubes (B) are supplied. One, two or all 3 may be used. They can be bent and shortened. A spacer (C) is also supplied to allow further attachment possibilities. Find the best solution for your tractor or vehicle.

Tube (B) plate is staggered so if correctly orientated, all boxes will line up.

The recommended setup is to place the spacer (C) between the two tubes (B) used for the controllers and the 3rd tube (B) which is to be mounted in the bracket (A), as shown on the picture.



ATTENTION! An extension cable is available as an option if the HC 6500 control unit is to be placed further away from the EFC control unit. (Ref. no. 261933)



4 - System setup

Power supply (HC 6500 only)

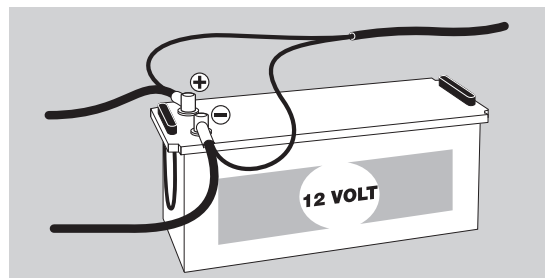
The power requirement is 12-15 Volt DC. Always note polarity!

- Red wire is positive (+).
- Black wire is negative (-).

Power supply must come directly from the battery. For proper function of the electric equipment, the wires must have suitable cross sectional areas and correct fuses to ensure a sufficient power supply.

The delivered power connectors follows the standard of most newer tractors. If having a tractor with another power connector it is necessary to disassemble connector and fit it to the actual tractor connector.

Use the HARDI power cable 26013900. A 25 amp fuse is located on the positive connection. Use the HARDI Electric distribution box (Ref. no. 817925) if the tractor has a doubtful wiring.



WARNING! Do not connect to the starter motor or generator/alternator. Warranty is void if this is done.



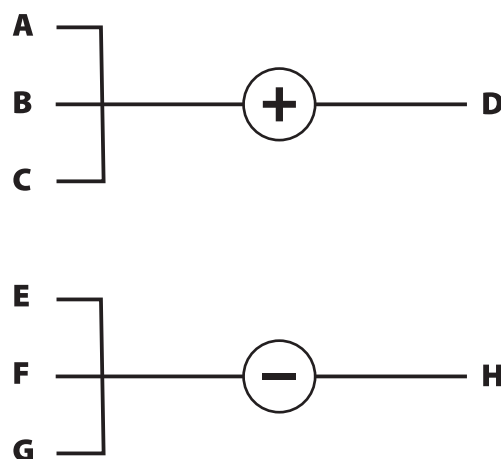
ATTENTION! See "System start-up" on page 81 for more about connecting the controller.

Mounting of tractor harness (HC 6500 only)

Mount fuse on (+) pole at tractor battery.

Connections are as follows:

- A. Red.
- B. Red/Brown.
- C. Yellow.
- D. Mounted on (+) pole at tractor battery.
- E. Black.
- F. Black/White.
- G. Blue.
- H. Mounted on (-) pole at tractor battery.



WARNING! Connector "H" must be connected to (-) pole on the battery. Do NOT connect to ground on tractor as this might blow the controller!

Printer

If the 12 Volt printer is fitted, the supplied tube can be utilised to fit the printer on the Controller brackets.



ATTENTION! The Controller should be protected from moisture and should be removed when not in use, if the tractor does not have a cabin.

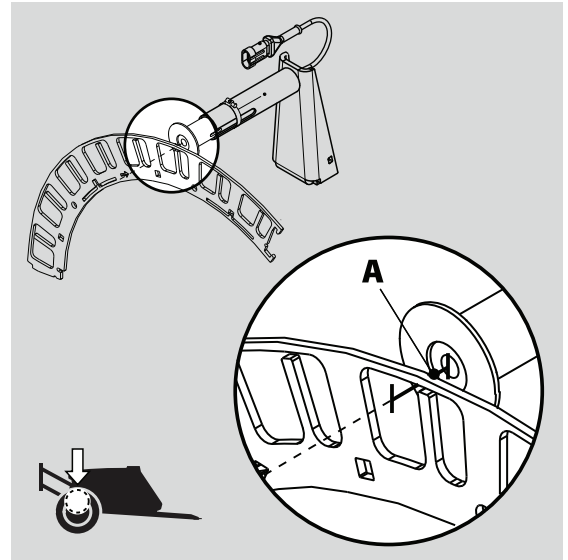
Speed transducer for sprayer

The speed transducer and speed ring are located at the inside of the sprayers right wheel.

The sensor is an inductive type that requires a metallic protrusion to pass by it to trigger a signal. To trigger a speed ring is used. It should be adjusted so transducer is placed to the centre of the holes in the speed ring (vertical direction). Recommended distance between protrusion and transducer (A) is 3 to 6 mm. Check this at the entire circumference.

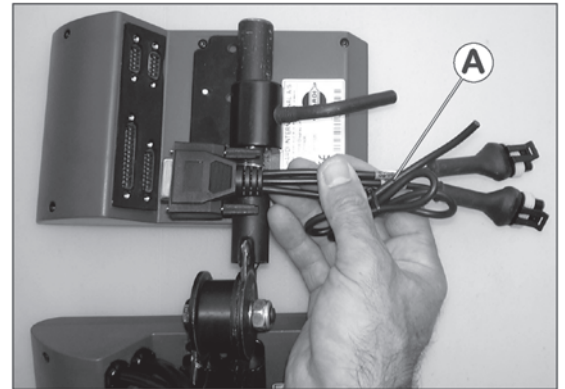


ATTENTION! Correct fitting is indicated by continuous flashing from transducer when the wheel rotates.



Speed transducer for tractor (HC 6500 only - not for SafeTrack)

It is possible to connect a speed sensor from tractor gearbox or radar/GPS to the controller. A speed/switch harness (A) and extension cable are necessary to connect the speed transducer to the Controller.



Foot pedal remote ON/OFF (optional - HC 6500 only)



NOTE! The following should be noted if the Foot pedal remote is to be fitted.

Remote ON/OFF switch has to be activated from the extended menu at installation. The HARDI Service centre does this.

The speed/switch harness (A) is connected to the Controller. Connect the plug from the Foot pedal ON/OFF to the correct connector on harness (A).



ATTENTION! The main ON/OFF valve switch at Grip overrides all remote switches. It must be set to ON for the optional remote ON/OFF switch to function.


































4 - System setup

How to set clock

If time or date is out of adjustment it can be corrected as follows.



ATTENTION! This must be done at very first start-up, when prompted. If no prompt, the HARDI dealer may have done this.

1. Press .
2. Press  to menu [2 Setup]. Press .
3. Press  to menu [2.4 Set clock].
4. Press  to enter first submenu, menu [2.4.1 Time format (12 or 24 hour)].
5. By using  or  you can choose between:
 - Menu [2.4.1.1 12 hour format].
 - Menu [2.4.1.2 24 hour format].
6. Press  and return to previous menu by pressing .
7. Press  to menu [2.4.2 Set time].
8. Press  and set minutes and hours with  or  and  or . Alternatively use the numeric keys.
9. Press  to confirm.
10. Press  to menu [2.4.3 Set date and month].
11. Press  and set day and month with  or  and  or . Alternatively use the numeric keys.
12. Press  to confirm.
13. Press  to menu [2.4.4 Set year].
14. Press  and set year with  or  and  or . Alternatively use the numeric keys.
15. Press  to confirm.
16. Press  and hold to exit menu system.

Initial settings

System start-up

When turned ON:

- The system initiates itself.
- If the system is put into operation for the very first time it will prompt for date and time. Set clock to enable register. Refer to "How to set clock" on page 80 for details on setting of clock.

Display readout

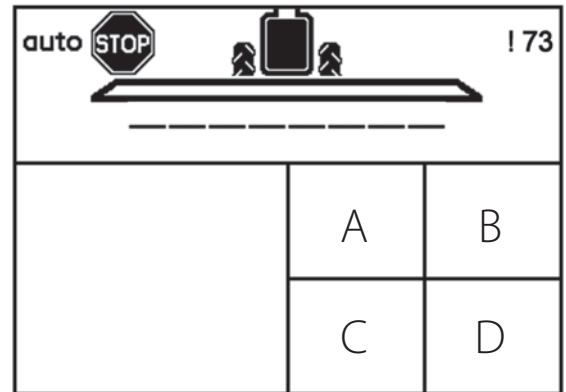
It is possible to freely choose which functions to be shown in the 4 different boxes (A, B, C and D) of the display.



ATTENTION! Read more about difference between HC 6500 and ISOBUS in "Menu 2.1 Display readout" on page 46.

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 (A)
 - 2.1.2 Show upper right (B)
 - 2.1.3 Show lower middle (C)
 - 2.1.4 Show lower right (D)
3. Choose a submenu e.g. menu [2.1.1.04 Work rate]. Press to confirm.
4. Press to leave menu.

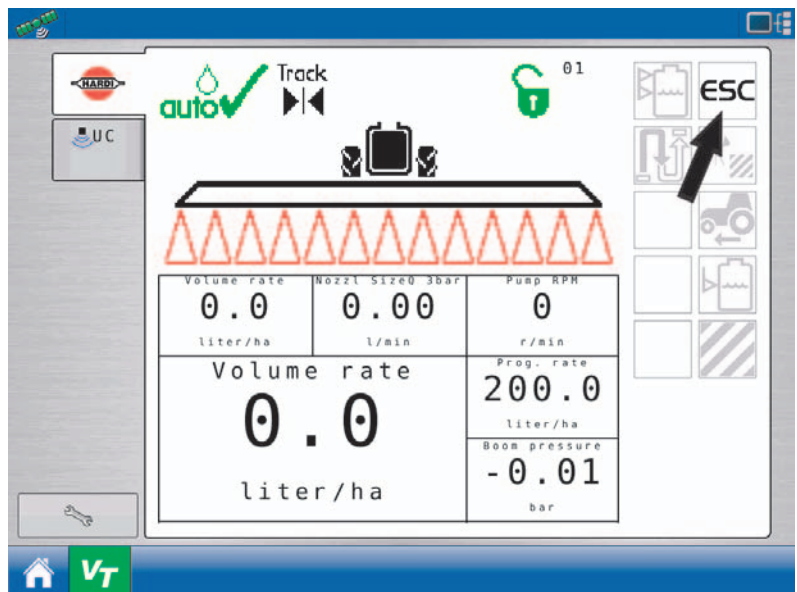


ATTENTION! For a full list of possible readouts, please refer to menu 2.1.1, menu 2.1.2, menu 2.1.3 and menu 2.1.4 in "Full menu structure" on page 33.

ESC key for ISOBUS terminals

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.



4 - System setup

Testing and fine tuning

Fine tuning the flow constant - PPU

Calibration of the flow transducer is carried out with clean water but small changes may occur when adding pesticides or fertiliser. This will effect 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.

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

For example, the spray tank is filled with 2400 litres of spray liquid.

When sprayed out, the display showed a total of 2300 litres. (Original PPU = 120.0)

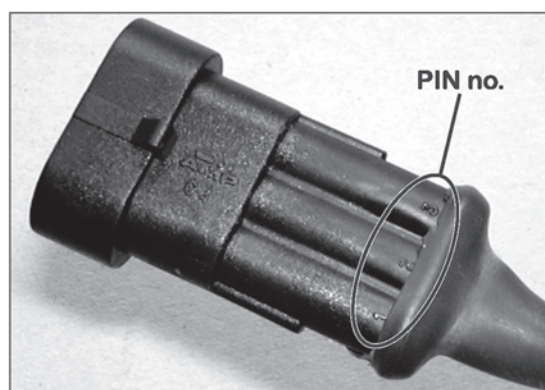
$$\text{New PPU} = \frac{120,0 \text{ PPU} \times 2300 \text{ Litres}}{2400 \text{ Litres}} = 115,0 \text{ PPU}$$

Note the relation is inverse:

- To raise the displayed volume, the PPU is lowered.
- To lower the displayed volume, the PPU is raised.

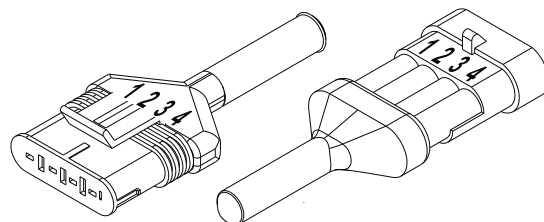
Pin & Wire connection

AMP Super Seal	Box	Color coding
1	Negative	Black
2	Positive	Brown
3	Signal	Blue



PrimeFlow

AMP Super Seal	Function	Color coding
1	GND Power	White
2	Bus +	Brown
3	Vcc 24VDC	Green
4	Bus -	Yellow



Testing flow transducer

- BROWN wire to positive of 12 volt battery.
 - BLACK wire to negative.
 - BLUE wire to multimeter positive.
1. Check the rotor turns freely.
 2. Each vane in the rotor has a magnet in it with the pole facing out. Check that the 4 magnets are present.
 3. Use a magnet to check that every second magnet in the rotor has the same pole orientation. The rotor magnets must be N - S - N - S.
 4. Connect negative from multimeter to negative of battery.
 5. Set multimeter to DC volt.
 6. By turning the mill wheel slowly, this will register approximately 8.0 +/- 1 volt with the diode on and 0.3 +/- 0.1 volt with the diode off with every second magnet.

Testing speed transducer

This transducer are used for speed, Twin speed, Boom fold, SafeTrack, Main pump/FlexCapacity RPM.

- BROWN wire to positive of 12 volt battery.
 - BLACK wire to negative.
 - BLUE wire to multimeter.
1. Connect negative from multimeter to negative of battery.
 2. Set multimeter to DC volt.
 3. Bring a metallic object (distance 3 to 5 mm) up to the transducer. This will register 1.4 +/- 0.2 volt and the diode will turn on.
 4. By removing the object, this will register 12.0 +/- 1.0 volt. Diode is OFF.

Working in the field

Set up before spray job


The following steps is to be taken to set up the sprayer before beginning a spray job.


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


auto

✓

Track







03

1.1 Volume rate

0

litre/ha

Use arrow keys or numeric keys to set the desired volume rate

2. Select the nozzle type to be used for normal spray or fertilizer spraying.

3.4.5 Type of nozzle

>> Regular nozzle
QuintaStream


Flat fan, Low drift, Minidrift


3. Adjust specific gravity when changing between a normal spray job and fertilizer spraying.


auto

✓

Track







01

3.5.1 Adjustment of specific gravity

1 .00

kg/litre


Enter weight of liquid fertilizer divided by weight of water (e.g. 1.10 to 1.30)


4. If the sprayer is not equipped with Tank Gauge, then type in the contents filled into the main tank.


auto

✓

Track







03

1.2 Tank cont.

0

litre

To change displayed tank contents. Use arrow or numeric keys to set

5 - Operation

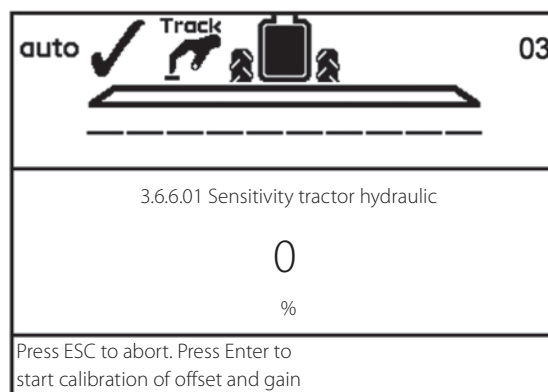
5. Select register for the present spray job.

1.3 Select register	
>>	1.3.1 Field 651
	1.3.2 Field 68
	1.3.3 Field 684
	1.3.4 Field 64
	1.3.5 Field 654
	1.3.6 Field 6541
	1.3.7 Field 687
	1.3.8 Field 984
	1.3.9 Field 1234
Use register 1 to 99 for job. Scroll to register, then press Enter to show data	

6. For SafeTrack the sensitivity of the tractor hydraulic must be calibrated. Follow the instructions written in the bottom of the display.



NOTE! The calibration can only be done with the boom unfolded!



Volume rate



NOTE! When used on a HC 9500 ISOBUS terminal the volume rate must be set in the HC 9500 software when its graphical field functions are used (not running Virtual Terminal only). In such case, please refer to the HC 9500 instruction book for set up of volume rate.

If running Virtual Terminal only on a HC 9500 the following procedure applies.

The volume rate can be changed by

- Setting the desired rate in the Controller.
- Manually raising or lowering the pressure via the SetBox.
- Pressing or to apply over or under in a preset percentage, e.g. 10% (the %-icon in the display indicates when this is active).

To read the volume rate

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

HC 6500 only:

Shortcut

Press and hold until menu [1.1 VOLUME RATE] is shown.

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 Enter to confirm.

Manual dosage

To dose in manual mode, use the pressure buttons on the SetBox. The manual mode is indicated by the symbol at the top of the display.

To go from manual to preset volume rate, press AUTO.




ATTENTION! Under 0.5 km/h, the Controller will not regulate automatically.

Register readout and selection

Registers are identified with a number and it is also possible to name them. The data is memorized when the system is switched off.


- Register 1 to 98 can be used for individual areas.
- Register 99 is a tally of register trips 1 to 98.

To read the totals of all registers:


1. Go to menu [1.3 Select register]. For HC 6500 only it is also possible to press shortcut  and hold until the menu is shown.
2. Go to register 99.
3. Press Enter to enter the register and read main data.
4. Press Enter again to see spray data.
5. Press Escape to exit the menu.

1.3 Select register	
>>	1.3.1 Field 651
	1.3.2 Field 68
	1.3.3 Field 684
	1.3.4 Field 64
	1.3.5 Field 654
	1.3.6 Field 6541
	1.3.7 Field 687
	1.3.8 Field 984
	1.3.9 Field 1234
Use register 1 to 99 for job. Scroll to register, then press Enter to show data	

To read the data in the active register:

1. Go to menu [1.3 Select register]. For HC 6500 only it is also possible to press shortcut  and hold until the menu is shown.
2. Press Enter to enter register and read main data.
3. Press Enter again to see spray data.
4. Press Escape to exit the menu.

To change the register:

1. Go to menu [1.3 Select register]. For HC 6500 only it is also possible to press shortcut  and hold until the menu is shown.
2. Press up or down arrow to change the register.
3. Press Enter. If necessary, the register can be reset - see below.
4. Press Escape to exit the menu.

To reset register:

Press Escape and hold for 5 seconds to reset register. Status diode will blink once, and then blink again to indicate that register has been reset.

Reset of a register can be stopped if the Escape key is released before the status diode is blinks again.



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





ATTENTION! Naming of registers are done in menu 2.6 - see "Menu 2.6 Register names (HC 6500 only)" on page 52.

5 - Operation

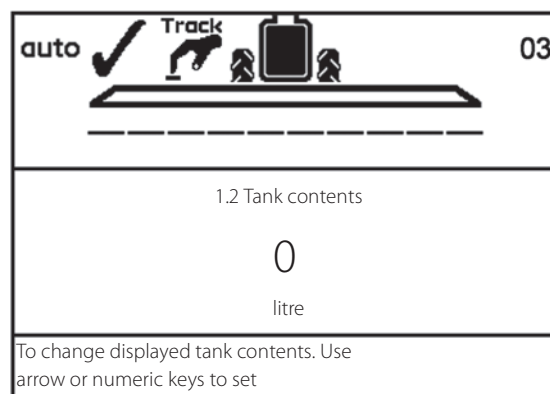
Tank contents

To change the displayed tank contents:

1. Go to menu [1.2 Tank contents]. For HC 6500 only it is also possible to press shortcut  and hold until the menu is shown.
2. Set the value.
3. Press Enter to confirm.
4. The maximum size of the tank is displayed.
5. HC 6500 only: Press  again and the tank contents maximum value is shown.



ATTENTION! If the sprayer is fitted with Tank gauge, contents readout is automatic.



TWIN Preset

Air volume and air angle can be set in 2 different positions:

- Headwind
- Tail wind

Store manual preset

1. Set air volume and air angle for headwind.
2. Press a long key press at button for position 1 on the grip to store the present setting.
3. Do the same setting for position 2 tailwind.

Store auto preset


TWIN preset can be setup so it will shift automatically from position 1 to position 2 when the main ON/OFF is activated (menu 2.2.5 to 2.2.5.2).

AutoFill




There are 2 methods of filling the sprayer, which is described in the following

- A. Use AutoFill to fill the main tank.
- B. Use AutoFill to fill the main tank, then pausing to use the TurboFiller and then continue with use of AutoFill.

Method A:

1. Press F1 for "Edit filled" and key in the volume to AutoFill.
2. Press the  button.
3. AutoFill stops filling at the selected amount of litres or when the main tank is full - whatever comes first.

Method B:

1. Press F1 for "Edit filled" and key in the volume to AutoFill.
2. Press the  button.
3. Press  button to close the FastFiller valve, which pauses the filling.
4. Set the Suction and Pressure SmartValves for use of TurboFiller on the blue and green buttons at the FluidBox.
5. Operate the manual valves for TurboFiller while filling chemicals (see separate instruction book).
6. Close the lid on the TurboFiller.
7. Press the  button to continue the AutoFill process.
8. AutoFill stops filling at the selected amount of litres or when the main tank is full - whatever comes first.
9. Remember to operate the manual valves for TurboFiller to rinse the TurboFiller with clean water from the rinsing tank.



ATTENTION! Agitation will stop when filling, and re-start when filling has been stopped.



ATTENTION! AutoFill function can not be used when boom is unfolded.

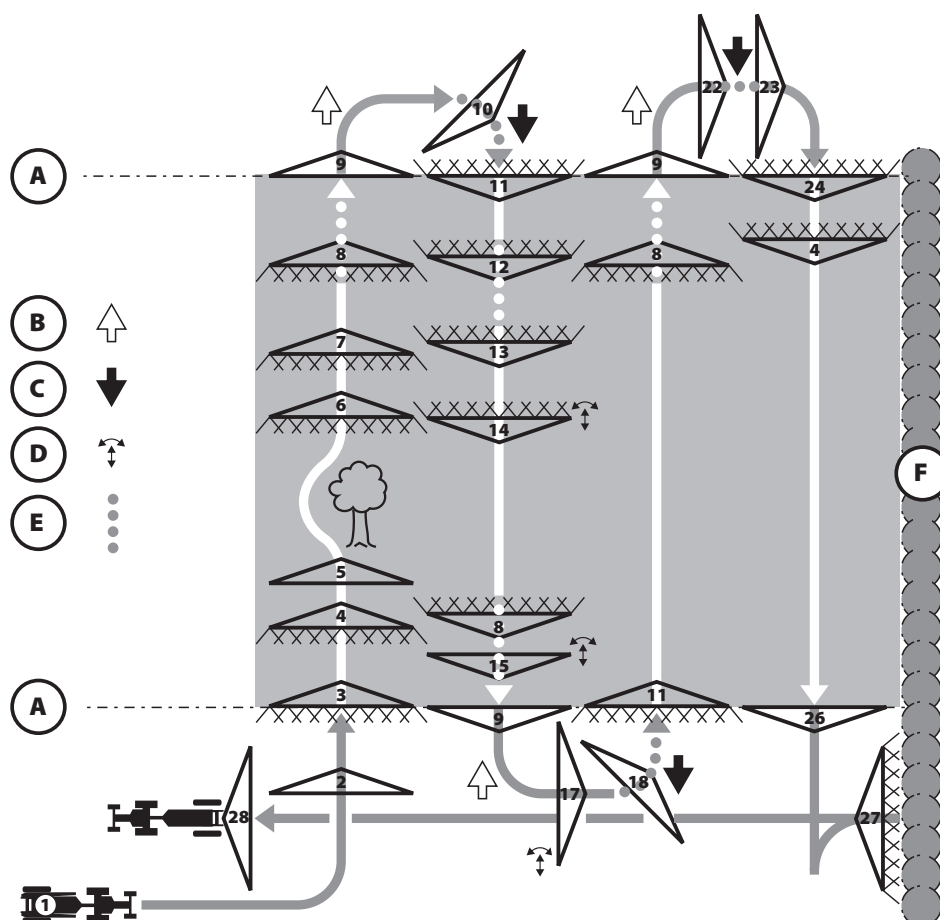
5 - Operation

HeadlandAssist







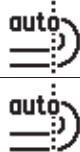







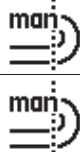

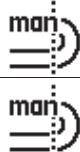

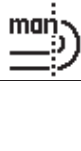









NOTE! When having AutoHeight the function of HeadlandAssist can be different. Please refer to the AutoHeight instruction book.

- A. Headland
- B. Raise boom & adjust slant
- C. Lower boom & adjust slant
- D. Manual adjust of boom
- E. Headland Assist Delay
- F. Vegetation line



	Status	Status Icon	Nozzle Icon
1	When folded it is assumed that the sprayer has just arrived in the field and therefore has not or has just been powered up (booted).		
2	After unfolding the boom no spraying height has yet been recorded and AUTO mode isn't possible yet.		
3	When the nozzles are opened for the first time the system changes from MANUAL OFF to MANUAL ON. The boom height is already or is now in the process of being adjusted by the operator.		
4	Now AUTO at the HeadlandAssist icon can be pressed. Manual control of the boom is still possible at this point.		
5	In the event of an obstacle - known or suddenly appearing - the set delay can be overridden by a long press on the OFF button.		
6	After clearing the obstacle the boom is readjusted, the operator presses ON and starts moving. As the machine is in MANUAL the nozzles open immediately.		
7	Now AUTO is pressed and spraying continues normally.		
8	When pressing OFF HeadlandAssist is activated. The machine continues with normal pressure regulation through the predefined delay.		

9	When the HeadlandAssist delay has been travelled, the nozzles close, the spraying height and slant angle is registered and the boom is lifted and the slant is centred as simultaneously as possible. From the moment the nozzles close, LookAhead takes over the positioning of the regulation valve.		
10	When pressing ON the lowering of the boom and the mirroring of the slant angle is initiated as simultaneously as possible. The distance driven starts counting up to the set HeadlandAssist delay. LookAhead still controls pressure regulation.		
11	When the HeadlandAssist delay is driven the nozzles are opened. Until the regulation delay has expired, LookAhead controls the regulation valve.		
12	If OFF is pressed by accident and it is detected by the operator before the HeadlandAssist delay has expired...		
13	... the operator can press ON and spraying is resumed without incident. The driven distance under the HeadlandAssist delay must be reset so the nozzles don't close too soon next time OFF is pressed.		
14	During spraying the operator can adjust boom height and slant angle. This doesn't affect the AUTO mode.		
15	After pressing OFF and before the nozzles close the operator adjusts boom height and slant angle. This doesn't affect the AUTO mode as the boom height and slant angle are not registered until at step 16 when the nozzles close.		
17	During turning in the headland the operator adjusts boom height and slant angle. This doesn't affect the AUTO mode. Likewise the operator can stop the sprayer to take a break without interfering with the AUTO mode.		
18	When pressing ON the boom is moved to the last registered spraying height. The slant angle of the boom in step 16 is used to calculate the new slant angle regardless of the corrections made in step 17.		
22	If ON is pressed unintentionally, the boom will begin moving to the last registered spraying height and mirror the last registered slant angle immediately.		
23	Before the expiry of the HeadlandAssist delay OFF is pressed which causes the system to stop the boom immediately and return to MANUAL mode with the nozzles closed. An audible and visual alarm is given to the operator.		
24	The nozzles are opened by pressing ON. As the system is in MANUAL mode, the nozzles open immediately. LookAhead controls the regulation valve until the expiry of the regulation delay. After pressing ON the operator can switch to AUTO mode.		
26	At the end of the last tramline the sprayer is stopped which causes the system to enter MANUAL mode. OFF is pressed and the nozzles close immediately. The operator manoeuvres the sprayer to the end of the headland in order to spray this last part of the field.		
27	The operator lowers the boom manually, presses ON and commences forward driving.		
28	When the operator stops at the far end of the headland no warning is given as the system was in MANUAL mode.		

5 - Operation

Spraying with DynamicFluid4 pressure regulation

Start up procedure and steps done by the spray driver when beginning a spray job at the headland in the field is described in the below.

- The controller always start up in automatic mode.
- If by some reason the \oplus or \ominus 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.

Regulation valve LED's

The regulation valve is equipped with 4 LED's as indication of valve status:

LED colour	Valve status
2 x Red	Out of 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.
Yellow	Valve closed. The valve disc is closed or starts to open, and is within the normal working range.
Green	Open and in work range. The valve disc is open and in its normal working range. This is normal state when spraying.

Spraying with FlexCapacity pump

On conventional P.T.O. systems both the P.T.O. pump and the hydraulic FlexCapacity pump delivers constant flow when engaged. Therefore the spray pressure is controlled by the regulation valve when:

- Valves/sections are opened or closed.
- Speed is increased or decreased etc.

When specific driving conditions or large nozzles makes the regulation valve unable to adjust to correct pressure because of too large or too low flow, i.e. regulation valve is completely open or closed, it requires the FlexCapacity pump to be turned ON/OFF - in general:

- Turn FlexCapacity pump ON when nozzle pressure gets too low. Controller prompts the warning "Increase pump flow".
- Turn FlexCapacity pump OFF when nozzle pressure gets too high. Controller prompts the warning "Reduce pump flow".

Nozzles sizes that will require the use of FlexCapacity pump during your spray job:

Boom width	3 bar pressure - no agitation	3 bar pressure - with agitation	5 bar pressure - no agitation	5 bar pressure - with agitation
27	Light blue	White	Light blue	Grey
32	Light blue	White 08	White	Brown
36	Light blue	Grey 06	Grey	Brown
39	White	Grey 06	Grey	Red
40	White	Grey 06	Grey	Red
42	White	Grey 06	Grey	Red

DualLine (optional equipment - certain markets only)

Steps to select nozzles for Dual Line control:

1. What is the required application rate and the average forward speed? (e.g; 50 l/ha at 20 km/h).
2. What will be the minimum and maximum forward speeds? (e.g; 14 km/h to 30 km/h).
3. At the minimum forward speed read off the nozzle output in l/min. (e.g; 0.58 l/min at 14 km/h).
4. Use the schematic below to choose a nozzle for boom line A that will provide you with a similar nozzle output at your minimum forward speed at the lowest acceptable operating pressure. (e.g; F02 at 1.5 bar will deliver 0.57 l/min).
5. In auto mode, you can increase your forward speed and when the pressure reaches the high pressure point set the second boom line will turn on.
6. It is important to note that if the combined nozzle output of boom lines A + B is greater than the output of boom line A at the high pressure point then the second boom line will oscillate on and off. To correct this symptom the high or low point pressure levels should be adjusted.
7. The maximum forward speed in auto mode will depend on the maximum acceptable operating pressure.
8. When reducing your forward speed the second boom line will turn off when the low pressure point is reached.

Points to note

- When using Dual Line it is important to consider the pumps capacity. It may not be possible to achieve the maximum forward speed desired if the pump is too small for the job.
- Please refer to your nozzle specification for recommended operating pressures.
- Boom lines A and B should only be fitted with the same size nozzles when used in MANUAL mode.
- If boom line A is fitted with the same size nozzle as boom line B in AUTO mode, the Controller will oscillate between A and B as the pressure rises above upper pressure level and falls below low pressure level. In AUTO mode it is recommended to use nozzles 2 sizes smaller in boom line B. If one size smaller only, the upper pressure level will need to be adjusted.

5 - Operation

Cleaning

AutoWash

Procedures for using AutoWash programmes.



ATTENTION! Refer to "AutoWash" on page 24 for description of AutoWash functions.

Preconditions

In order to start a AutoWash program the following must be fulfilled:

- MainTank content below 40 litres.
- Rinse tank completely full.

In case the amount of water in the rinsing tank is not enough for the selected AutoWash program, the Controller will prompt "Not enough rinse water". You will need to fill the rinsing tank before attempting to use the AutoWash program again.

- TurboFiller is cleaned prior to AutoWash.

If TurboFiller is rinsed after AutoWash has been run, chemical might have entered the FastFiller line. The FastFiller line is not cleaned, when performing a TurboFiller rinsing!

- Cyclone pressure filter 3 position valve is open.

If 3 position valve is closed AutoWash cannot flush boost line.

- Pressure draining coupler must be closed with a plug.

If open or not tight, water with chemical will exit when flushing this line.

- FastFiller valve is closed (when not equipped with AutoFill).

If open, a pocket of water with chemical will not get flushed out.

- Nozzle carousel is not set on a blind nozzle.

Blind nozzles at boom tube ends will cause pocket of water with chemical not flushed out.

- P.T.O. revolutions set to RPM's according to table below.

In case P.T.O. revolutions is outside range the display will show the warning "RPM is too low, increase" or "RPM is too high, decrease".

Pump	P.T.O. Low limit RPM	P.T.O. High limit RPM
463 540RPM	486	540
463H 540RPM	417	463
463H 540RPM FlexCapacity		
463 1000RPM	814	905
463H 1000RPM	714	793
463H 1000RPM FlexCapacity		

- Valve for external cleaning (hosing) is closed.
- The sprayer fluid system must be well maintained and able to operate as designed.

Filters must not be clogged or cause large pressure drop, no leaks from the fluid system or faulty sensors.



ATTENTION! When AutoWash has ended and main ON/OFF is being activated, then both suction and pressure valves automatically turn back to correct positions used when spraying.

Driving speed during AutoWash

AutoWash will spray water with remains of spray chemical out on the field. To avoid spot contamination, AutoWash should always be done while driving (except when a drained filling/washing location is available at the farm).

BoomFlush, FastFlush and the first cycle of MultiRinse should be done at normal driving speed, due to high concentration of chemical. Subsequent cycles (cycle 2 and onwards) of MultiRinse can be done at half of normal driving speed, as the chemical in the sprayer is diluted. An example of driving speed for MultiRinse:

Cycle	Driving speed	Driving distance
First cycle	9.0 km/h	800 metres
Cycle 2 and onwards	4.5 km/h	1700 metres

Step	Approximate time	Driving?	Action
1-4	30 seconds	Possible to stand still	Washing fluid system - Not spraying
5-8	30 seconds	Must drive forwards	Spraying wash water

Cycle and step counter

When AutoWash runs a cycle and step counter is shown in the display. The cycle and step counter has 3 digits such as AB:C

- A is cycles finished.
- B are current step in cycle.
- C is total number of steps in the wash program.

If e.g display shows 12:8 this indicates Cycle 1, step 2 out of 8 steps.

Pause function

AutoWash can be paused by:

- Pressing Grip main off.
- Pressing terminal soft key "Pause".
- Switching P.T.O. off.

AutoWash is resumed by pressing terminal soft key "Start".

Pause operates SmartValves and regulation valve so all pump capacity circulates through the regulation valve.



ATTENTION! AutoWash will transfer a few litres of water from rinse tank to main tank when changing to and from Pause. Excessive use of pause might cause the wash program being unable to complete the desired cycles because of too less water in the rinse tank. Also it will dilute the spray solution in the main tank.

<div> <div>auto</div> <div> </div> <div>! 73</div> </div>		
Warning Pump RPM too low Increase	Area spray 0 hectare	Prog. rate 200 Litre/ha
	12:8	Rinse tank. 273 litre

Checks while washing in field

While washing, 2 checks are recommended to see if AutoWash function is correct.

- Check 1:
When AutoWash spray wash water, verify that the spray pressure is in set range. Spray pressure is adjustable, default 5 bar. Circulation pressure is adjustable, default 2 bar. If in doubt then ask your HARDI dealer.
- Check 2:
Check on the Rinsetank gauge that each cycle consumes 75 litres.
- Check Reminder:
Autowash completed, note number of cycles.

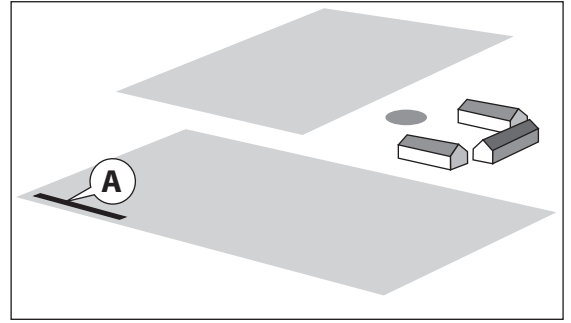
Register

AutoWash work is stored in register 98.

5 - Operation

BoomFlush

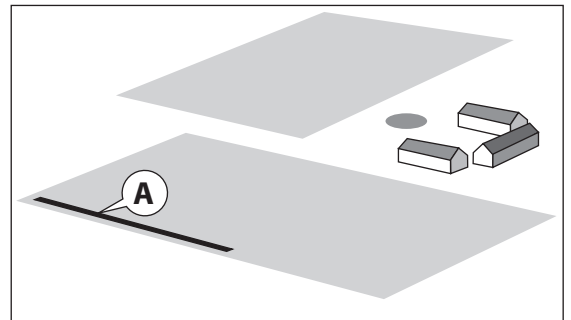
1. Activate "Soft keys" by pressing one of the keys F1-F4 (F-keys button on ISOBUS).
2. Press Soft key for BoomFlush.
3. Begin driving in the field just sprayed (A). Spray at normal driving speed to avoid over-dosing.
4. Press Soft key for "Start" to start the program.
5. In field (A), drive approximately 500 metres (9 km/h) until BoomFlush has finished.



NOTE! When doing a BoomFlush the main tank contents will be increased with 40 litres. This is solely spray liquid that are primed back to the main tank before clean rinse water is directed to the nozzles.

FastFlush

1. Activate "Soft keys" by pressing one of the keys F1-F4 (F-keys button on ISOBUS).
2. Press Soft key for FastFlush.
3. Begin driving in the field just sprayed. Spray at normal driving speed to avoid over-dosing.
4. Press Soft key for "Start" to start the program.
5. In field (A), drive approximately 800 metres (9 km/h) until FastFlush has finished.



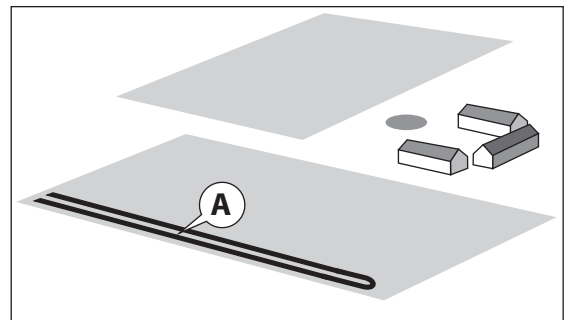
ATTENTION! For sprayers with FlexCapacity pump, the controller prompts when to turn the pump ON/OFF during the FastFlush/MultiRinse program.



NOTE! External fill hoses from injector to External filling coupler and to suction SmartValve is not flushed. This contains approximately 8 litres.

MultiRinse

1. Activate "Soft keys" by pressing one of the keys F1-F4 (F-keys button on ISOBUS).
2. Press Soft key for MultiRinse.
3. Begin driving in the field just sprayed. Spray at half of normal spraying speed, whereby dose rate (litres/ha) is increased.
4. Press Soft key for "Start" to start the program.
5. In field (A), drive approximately 800 metres (4.5 km/h) at first cycle, then further 1700 metres (9 km/h) until MultiRinse has finished.



NOTE! Driving speed reduction must be due to lower gear selection to keep nominal P.T.O. revolutions. The operator is given a warning in the controller display if the P.T.O. revolutions get to low or high for AutoWash to operate.



NOTE! External fill hoses from injector to External filling coupler and to suction SmartValve is not flushed. This contains approximately 8 litres.

Soak wash

Wash of sprayer between jobs with incompatible crops must be done 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.

Overview over procedure for wash with a cleaning agent:

Part 1: Wash sprayer in field with MultiRinse.

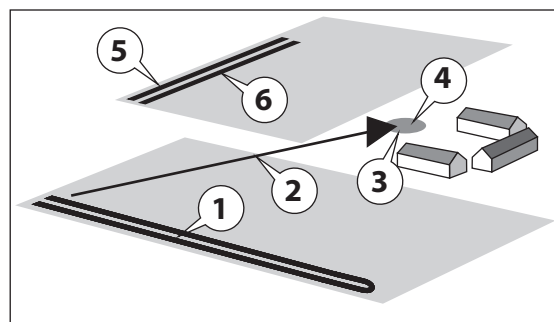
Part 2: Drive to farm fill station.

Part 3: Prepare sprayer for cleaning with cleaning agent.

Part 4: Operate sprayer according to cleaning agent instructions.

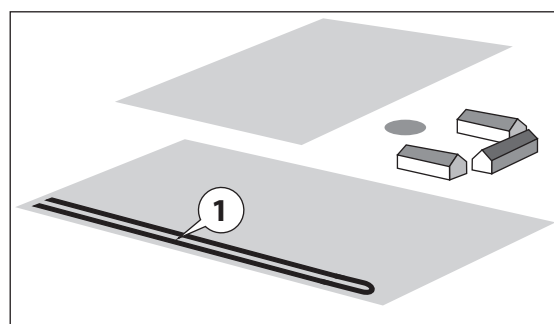
Part 5: Spray out water with cleaning agent and chemical residue.

Part 6: Wash out remains of cleaning agent.



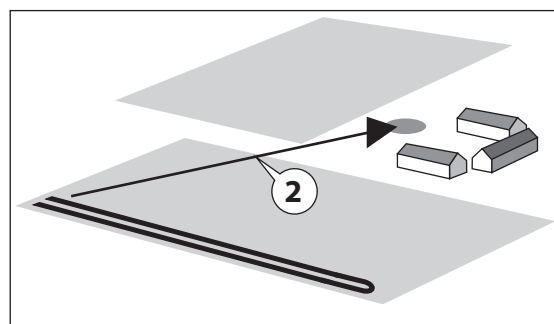
Part 1

Wash sprayer in field with MultiRinse.



Part 2

Drive to farm fill station.



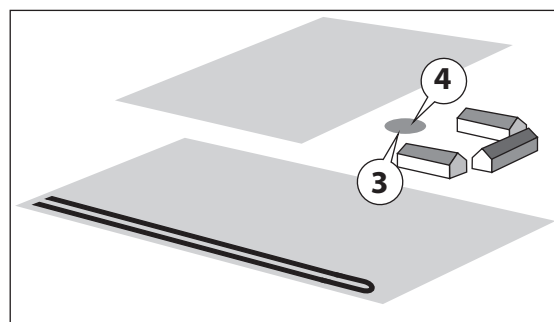
Part 3

Prepare sprayer for cleaning with cleaning agent. Fill water in the main tank to 10% of capacity. Fill the rinsing tank completely. This water is used later in part 6.

Part 4

With the FluidBox, operate sprayers valves according to cleaning agent instructions.

- Wash the main tank with the cleaning nozzles.
- Fill the boom tubes with cleaning agent from the main tank.
- Rinse the safety valve.
- Rinse the PressureEmpty hose.
- Rinse the Agitation valve, hose and tube.

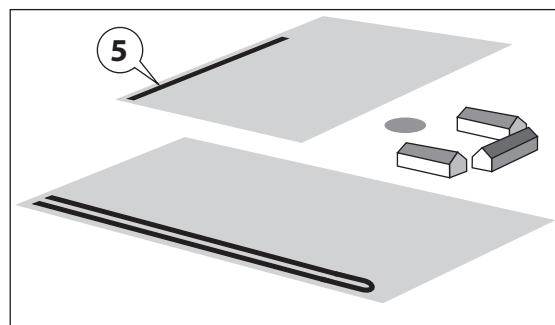


Wash the TurboFiller with cleaning agent water from the main tank. This also rinse ejector with cleaning agent water.

5 - Operation

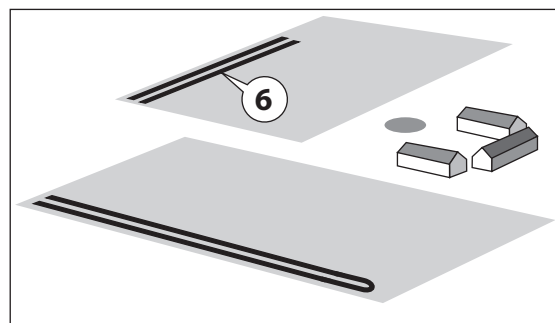
Part 5

Spray out water with cleaning agent and chemical residue. Note that this still contains active chemical and choose an appropriate area to spray out this. Be aware of chemical accumulation in case the same area is used repeatedly.



Part 6

Use FastFlush to wash out all remains of the cleaning agent. This is to avoid that the cleaning agent remains in the fluid system. Remains could damage the next spray chemical filled into the main tank.



AutoWash with AutoSectionControl

When AutoWash is used the HARDI AutoSectionControl needs to be disabled when spraying out the diluted rinse water in the field just sprayed.

Disabling the HARDI AutoSectionControl can be done as follows:

HC 6500 / ISOBUS VT

There are two ways:

- A. Resetting the treatment data in HARDI AutoSectionControl. This method is not recommended when interrupting an ongoing spray session.
- B. Go to menu [2.3 VRA / Remote control] and select sub- menu [2.3.1 VRA / Remote control disable]. This intervenes the HARDI AutoSectionControl's covering of treated areas and allow to spray out the diluted rinse water at an already treated area.

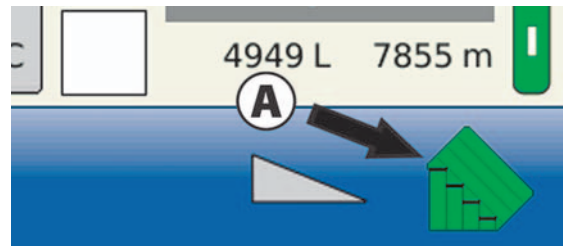
2.3 VRA / Remote control
>> 2.3.1 VRA / Remote control disable 2.3.2 VRA / Remote control enable
Variable Rate Application / Remote control disabled. Dish icon will disappear.

HC 9500 with ISOBUS VT

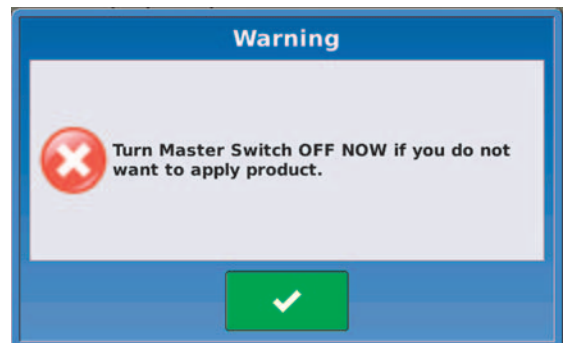


ATTENTION! This is used if a spray job has been set up in the HC 9500 terminal (field view). If running ISOBUS Virtual Terminal only the "HC 6500 / ISOBUS VT" method must be used.

1. Press the field icon (A) to disable AutoSectionControl (AutoSwath).



2. This warning message appears. Press fly-leg to accept as you want to spray out fluid while doing an AutoWash.



ATTENTION! Instead of the above, the recommendation is to create and start a new spray job called "AutoWash in Field" and account the wash work here.

Off-season storage

Storage

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



ATTENTION! If the light emitting diode on the SetBox or Grip lights or flashes the system is still powered!

The HC 6500, SetBox and Grip should be protected from moisture and should be removed if the tractor does not have a cabin.

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
Flow	Are there flow readout?	Select l/min in the system menu.	Does this correspond to actual flow?
		Use test menu. (menu 4.5.1 + 4.5.4.1)	Are there signal from flowmeter?
		Are flow PPU correct?	Max. 10% change from given values.
		Does pressure equalization valves leak? (Not COMMANDER/EFC).	
Speed	Are there speed readout?	Use test menu. (menu 4.5.1 4.5.4.1)	Any signal from sensor?
		Check LED diode on sensor.	Sensor at metal = ON, Sensor at hole = OFF.
	Are speed stable?	Max. deviation $\pm 0,15$ km/h	Distance to wheel speed ring 4-5 mm?
			Are speed ring buckled?
			Does sensor sense middle of holes?
Active boom width	Signal received?	Select boom width menu.	Does speed ring vibrate when running?
DynamicFluid4 pressure regulation valve	Does manual control work?	Turn valve to maximum.	Correspond to actual boom width?
			Can the valve turn reverse, both at min. and max.?

7 - Fault finding

AutoWash cannot be completed

If AutoWash cannot be completed, wash the sprayer by operating the FluidBox, using the instruction for sprayers with hand operated (non-electric) valves.

Checks for clogging

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



DANGER! As water will be flushed out tests is to be done with a clean sprayer, in order to avoid spot contamination and risks personal injury.

Valve positions						
Suction SmartValve	Pressure SmartValve	External fill valve	Agitation valve	Pump	Other	Verify
External fill	To MainTank	(Open)	Closed	Turned ON	Connect hose from external tank to External fill	Look in MainTank. Check that water exits from ejector
From MainTank	Pressure Empty	(Closed)	Closed	Turned ON		Look in MainTank. Check that safety valve opens
From MainTank	Spraying	(Closed)	Closed	Turned ON	Boom sections closed	Look in MainTank. Check that safety valve closes and not leaking water
From MainTank	Spraying	(Closed)	Closed	Turned ON	Boom sections closed	Look in MainTank. Check that water exits pressure filter dump line
From MainTank	Pressure Empty	(Closed)	Agitation	Turned ON		Look in MainTank. Check that water exits from agitation tube
From MainTank	Pressure Empty	(Closed)	Closed	Turned ON		Look in MainTank. Check that water exits from thin tube
From MainTank	External fill	(Open)	Closed	Turned ON	Close lid on MainTank. Dismount cap on External filling coupler	Check that water comes out of External filling coupler
From MainTank	External fill	(Closed)	Closed	Turned OFF	Pull the 2 rinsing nozzles up from tank	Check by hand that rinse nozzles can rotate
From MainTank	External fill	(Closed)	Closed	Turned ON at low R.P.M.	Start pump, rum at low RPM	From tractor cab, monitor water exits rinse nozzles

Checks for external leak

If suspicious for external leaks:

1. Clean sprayer if necessary, as water will be flushed out later.



DANGER! As water will be flushed out test is to be done with a clean sprayer, in order to avoid spot contamination and risks personal injury.

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

PrimeFlow test menus

There are some test menus where it is possible to check the health or find faults in the PrimeFlow system. Prior to a practical fault finding check these menus to read out the settings and errors notice by the system.

The "Menu 4.5 Test of sensors" has three submenus with PrimeFlow tests:

- 4.5.3 PrimeFlow test (HC 6500 only)
- 4.5.4 Input test
- 4.5.6 PrimeFlow SMCU status
- 4.5.7 PrimeFlow motor status

4.5 Test of sensors	
4.5.1	Flow Speed Optional sensors
4.5.2	Active keys
» 4.5.3	PrimeFlow test
4.5.4	Input test
4.5.5	Fluid and valve test
4.5.6	PrimeFlow SMCU status
4.5.7	PrimeFlow motor status
PrimeFlow test for nozzle and PrimeFlow computers on boom	

Menu 4.5.3

Shows the detail data for each single SMCU mounted in the system. Select the SMCU to read out details.

The last two digits in the menu number is the SMCU number, e.g. 4.5.3.08 is the details for SMCU number 8 counted from the left side of the boom.



NOTE! This menu is not available in a ISOBUS system.

Details for SMCU number 8.

4.5.3.08 PrimeFlow computer status		
Total SMCU's	16	No
Total nozzles	43	No
This SMCU position	8	No
Nozzle order	SML	No
Nozzle no short cab.	1	No
Nozzle medium cable	2	No
Nozzle no long cable	3	No
Count of data error	0	Counts
Count of power error	0	Counts

Menu 4.5.4.5

Shows the PrimeFlow power supply voltage supplied to the left and right boom.

The readout is from the central junction box PCB and does not show the actual voltage on the boom.

If fuse F1 or F2 on the central junction box PCB is burned the voltage readout will be 0 Volt for the actual fuse.

4.5.4.5 Analog 2 inputs Extra		
Distance center	0.00	Volt
PrimeFlow volt left	24	Volt
PrimeFlow volt right	24	Volt
Dynamic centre pos.	0.00	Volt
Lock sensor	0.00	Volt
Pendulum lock	0.00	Volt
Suction SV potmeter	0.00	Volt
Press. SV potmeter	0.00	Volt
Fill valve potmeter	0.00	Volt
Test Analog 2 sensors:		
Electric smart valves, extra		

7 - Fault finding

Menu 4.5.6

Shows whether the mounted SMCU is a 2 or 3 nozzle SMCU

- Menu 4.5.6.1 lists all the SMCU with the first nozzle number counted from the left.
- Menu 4.5.6.2 shows number of SMCU on the boom.
- Menu 4.5.6.3 shows whether there are changed nozzle order in some of the SMCU's.
- Menu 4.5.6.4 shows how many times a SMCU did not respond to a alive telegram, data signal, from the JobCom.
- Menu 4.5.6.5 shows how many times a SMCU did shut down due to low voltage power supply.
- Menu 4.5.6.6 View SMCU hardware version.

4.5.6 PrimeFlow SMCU status	
» 4.5.6.1	First nozzle for SMCU
4.5.6.2	SMCU 2 or 3 nozzle
4.5.6.3	Nozzle order
4.5.6.4	Count of data error
4.5.6.5	Count of power error
4.5.6.6	SMCU version
Position of first nozzle on boom counted from left	

Menu 4.5.6.1

Show that there are 16 SMCU on the boom.

SMCU number 1 has nozzles number from 1 to 3. SMCU number 2 has nozzles number 4,5 and 6. SMCU 16 has first nozzle as number 42.

In this menu is it not possible to see how many nozzle each SMCU controls, see menu 4.5.6.2.

The "-->" show the live update of the counting.

4.5.6.1 First nozzle for SMCU											
1:	1	4	7	10	12	15	18	20	23	25	
11:	27	30	33	36	39	42					
21:											
-->											
41:											
51:											
61:											
71:											
81:											
Position of first nozzle on boom counted from left											

Menu 4.5.6.2

Show that there are 16 SMCU on the boom.

SMCU 4,7,9,10 and 16 are 2 nozzles SMCU's.

SMCU 1,2,3,5,6,8,11,12,13,14 and 15 are 3 nozzles SMCU's.

The "-->" show the live update of the counting.

4.5.6.2 SMCU 2 or 3 nozzle											
1:	3	3	3	2	3	3	2	3	2	2	
11:	3	3	3	3	3	2					
21:											
-->											
41:											
51:											
61:											
71:											
81:											
Produced or reprogrammed. SMCU with 3 cables could be changed to 2 nozzles											

Menu 4.5.6.3

Show that SMCU number 1 has changed nozzle order from SML, Short Medium Long, cable to LSM, Long Short Medium.

All other SMCU are normal with SM or SML nozzle order.

4.5.6.3 Nozzle order											
1: LSM	-	-	-	-	-	-	-	-	-	-	
11:	-	-	-	-	-	-					
21:											
-->											
41:											
51:											
61:											
71:											
81:											
Show - - - when connected in normal order Short Medium Long from left											

Menu 4.5.6.4

Shows that SMCU 2,3 and 4 has not respond to a alive telegram from the JobCom one time each.

The counter is only counting when there is no connection on the data line. If there is a short circuit between two cables the counter will not increase.

The **C** reset the counter.

4.5.6.4 Count of data error										
1:	0	1	1	1	0	0	0	0	0	0
11:	0	0	0	0	0	0				
21:										
-->:										
41:										
51:										
61:										
71:										
81:										
Times were SMCU did not respond to alive telegram. C to reset counters										

Menu 4.5.6.5

Shows that SMCU 5,7,8,9 and 13 did shut down due to low power supply voltage.

The **C** reset the counter.

4.5.6.5 Count of power error										
1:	0	0	0	0	1	0	1	1	1	0
11:	0	0	1	0	0	0				
21:										
-->:										
41:										
51:										
61:										
71:										
81:										
Times were SMCU shot down due to low voltage. C to reset counters										

Menu 4.5.6.6

Shows the hardware version of the SMCU.

4.5.6.6 SMCU version										
1:	1	1	1	1	1	1	1	1	1	1
11:	1	1	1	1	1	1				
21:										
-->:										
41:										
51:										
61:										
71:										
81:										
View SMCU versions										

Menu 4.5.4.4

Shows the PrimeFlow bus voltage.



NOTE! PF bus + and PF bus -

JobCom hardware version 2.x will only show these values if a cable is mounted between connector J1 "Tx-" and J11 "TILT R" and J1 "Tx +" and J11 "TILT L" on the PrimeFlow central Junction box PCB #97.

4.5.4.4 Analog 1 inputs Boom		
Slant	0.00	Volt
Boom height	0.00	Volt
PF bus +	2.41	Volt
PF bus -	2.57	Volt
Foam blob distance	0.0	mAmp
TWIN angle	0.0	mAmp
TWIN fan r/min	0.0	mAmp
Agitation angle	0.00	Volt
Reg valve angle	0.00	Volt
Test Analog 1 sensors on boom: Slant Height, Tilt, Foam, TWIN		

7 - Fault finding

Menu 4.5.7

PrimeFlow motor status.

4.5.7 PrimeFlow motor status	
» 4.5.7.1	Motor 1-90 disconnect
4.5.7.2	Motor 91-180 disconnect
4.5.7.3	Motor 1-90 shorted
4.5.7.4	Motor 91-180 shorted
4.5.7.5	Motor 1-90 blocked
4.5.7.6	Motor 91-180 blocked
Motor or connector disconnected	
Press C to reset	

Menu 4.5.7.1 Motor 1-90 disconnect.

4.5.7.1 Motor 1-90 disconnect										
1:	0	0	0	0	0	0	0	0	0	0
11:	0	0	0	0	0	0				
21:										
-->:										
41:										
51:										
61:										
71:										
81:										
Motor or connector disconnected										
Press C to reset										

Menu 4.5.7.2 Motor 91-180 disconnect.

4.5.7.2 Motor 91-180 disconnect										
91:	0	0	0	0	0	0	0	0	0	0
101:	0	0	0	0	0	0				
111:										
-->:										
131:										
141:										
151:										
161:										
171:										
Motor or connector disconnected										
Press C to reset										

Menu 4.5.7.3 Motor 1-90 shorted.

4.5.7.3 Motor 1-90 shorted										
1:	0	0	0	0	0	0	0	0	0	0
11:	0	0	0	0	0	0				
21:										
-->:										
41:										
51:										
61:										
71:										
81:										
Motor or connector short circuited										
Press C to reset										

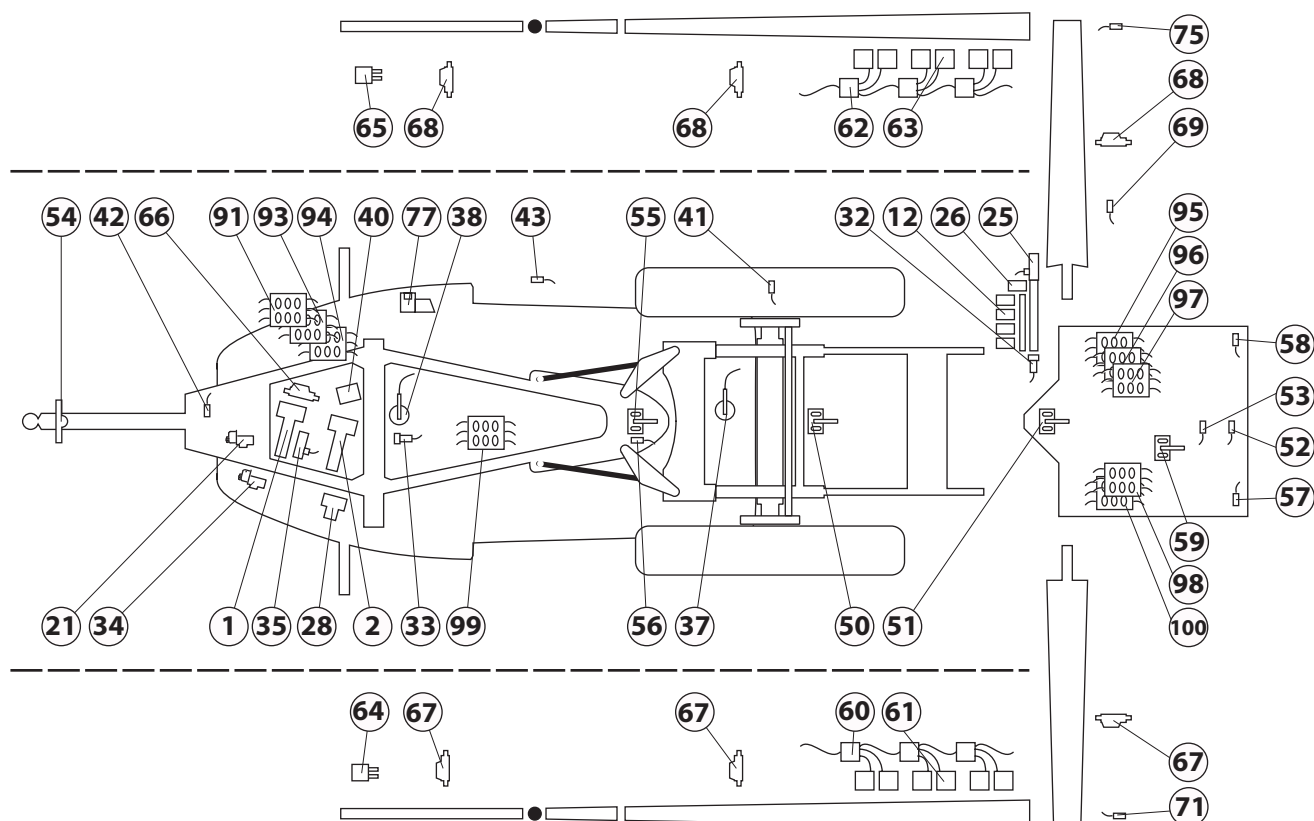
Menu 4.5.7.4 Motor 91-180 shorted.

4.5.7.4 Motor 91-180 shorted										
91:	0	0	0	0	0	0	0	0	0	0
101:	0	0	0	0	0	0				
111:										
-->:										
131:										
141:										
151:										
161:										
171:										
Motor or connector short circuited										
Press C to reset										

7 - Fault finding

Location of sensors

A complete list of sensors on HARDI COMMANDER sprayers. The function of some sensors can be viewed in menu 4.7 Emergency track Align, others function can be viewed in the submenus of menu 4.5 Test of sensors.



Sensor number	Description
1	Suction SmartValve
2	Pressure SmartValve
12	Distribution valves
21	Pressure control valve
25	Boom flow meter
26	Boom bypass valve
28	External fast filling valve
32	Pressure sensor
33	Main tank gauge
34	AutoAgitation valve
35	RinseTank flow meter
37	RinseTank full sensor
38	Main tank full sensor
40	Boost line valve
41	Forward speed sensor
42	PTO Pump speed sensor
43	FlexCapacity speed sensor
50	Paralift height sensor
51	Slant angle sensor
52	Pendulum lock sensor
53	Pendulum un-lock sensor
54	SafeTrack front sensor
55	SafeTrack rear sensor
56	SafeTrack lock sensor
57	Boom sensor Left

Sensor number	Description
58	Boom sensor Right
59	Dynamic sensor
60	PrimeFlow SMCU Left
61	PrimeFlow step motor Left
62	PrimeFlow SMCU Right
63	PrimeFlow step motor Right
64	End nozzle Left
65	End nozzle Right
66	TWIN fan speed actuator
67	TWIN angle actuator Left
68	TWIN angle actuator Right
69	TWIN Fan speed sensor
71	Middle fold lock sensor Left
75	Middle fold lock sensor Right
77	Foam marker compressor
91	JobCom
93	DAH PCB
94	PrimeFlow step-up transformer
95	9 sec. Central Junction box PCB
96	13 sec. Central Junction box PCB
97	PrimeFlow Cent. Junction box PCB
98	HY Cent. Junction box PCB
99	Dilution kit box PCB
100	TerraForce HY Junction box PCB

Fault codes

Under these menus you can check if the communication is ok. This is used both by technicians and skilled operators.

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

- It will give out light when the units are turned on.
- If there is an error, a signal will show in a morse code if the CAN connection is damaged to that specific unit.

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



NOTE! These are useful for service staff:

ID is the fault identifier and is the number shown in the display.

Pr is alert priority.

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
01	Alarm	Sensor 12V supply failure	While the short circuit is present. SafeTrack shifted to manual. Auto is disabled.	Sensor 12V supply failure	1
02	Alarm	Sensor 5V supply failure	While the short circuit is present. SafeTrack shifted to manual. Auto is disabled.	Sensor 5V supply failure	2
03	Alarm	Track Lock sensor failure	Sensor signal is less than 0,5V. All SafeTrack keys are disabled. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	Track Lock sensor failure. All SafeTrack keys are disabled. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	3
04	Alarm	Trapeze lock locked illegally	Lock is detected locked unintentionally. All SafeTrack keys are disabled. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	Lock is detected released unintentionally. Missing hydraulic pressure on lock cylinder. Mis adjusted lock sensor. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	4
05	Alarm	Trapeze lock not locking	Attempt to lock, but no "lock" signal on sensor input. All SafeTrack keys are disabled. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	Attempt to lock, but no "lock" signal on sensor input. Lock sensor mis adjusted. Mechanical defect prevents lock to penetrate hole. Mis adjusted rear angle sensor. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	12
06	Alarm	Trapeze lock released illegally	Lock is detected released unintentionally. All SafeTrack keys are disabled. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	Lock is detected released unintentionally. Poor lock sensor adjustment. Lock cylinder fallen off. Manual tracking, "Align" and "Boom fold inner in" is only possible from menu 4.7.	13
07	Alarm	Trapeze lock not released	When pressing auto to release lock but no "release" signal from lock sensor. Auto and manual are disabled.	Trapeze lock not released. Attempt to release lock, but no "release" signal from lock sensor. No hydraulic pressure. Mis adjusted lock sensor. Mechanical defect.	14
08	Alarm	Track Boom sensor failure	The boom sensor signal is less than 0,5V. The boom sensor changes state, without "Boom fold inner" button is active. Auto and Manual is disabled. Only "Align" function is possible.	Track Boom sensor failure. Automatic and manual tracking is aborted. Only "Align" function is possible.	15

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
09	Alarm	Track Front sensor failure	The alarm is generated, if the sensor signal is less than 0,2V or exceeds 4,8V. Automatic tracking is aborted until the system has been rebooted. SafeTrack shifted to manual. Auto is disabled.	Track front sensor failing. Automatic tracking is aborted. Manual tracking and "Align" function is possible. Pressing "Enter" will remove the alarm from the display until the system has been rebooted.	16
10	Alarm	Track Rear sensor failure	The alarm is generated, 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 failure. Automatic tracking is aborted until the system has been rebooted. If "Align" mode is selected no movement takes place, but trapeze is attempted locked. Manual tracking still possible.	17
11	Alarm	Agitation valve fault	Error detection not active, profet error detection not used. On fault following occurs: AutoWash disabled AutoFill disabled Used by Autowash/AutoFill	Agitation valve fault. Motor disconnected. Motor short circuit or blocked. Sensor failing.	18
12	Alarm	Reserved	Reserved, replaced by ID154-159 Error detection not active, profet error detection not used. On fault following occurs: AutoWash allowed AutoFill disabled Clear alarm by reboot Used by Autowash/AutoFill	Fill valve fault. Motor disconnected. Motor short circuit or blocked. Sensor failing.	19
13	Alarm	Fluid system fault	When suction SmartValve is on other port than RinseTank and RinseTank flow exceed 10 l/min. On fault following occurs: AutoWash disabled. AutoFill disabled. Used by Autowash/AutoFill	Illegal flow is detected in Sections line or in RinseTank line.	20
14	Alarm	No RinseTank flow	Error detection. On fault following occurs: AutoWash disabled. AutoFill allowed. Clear alarm by RinseTank full switch or flow from RinseTank Used by Autowash/AutoFill	RinseTank empty or no rinse water flow due to other reasons.	21
15	Alarm	Reserved	Reserved, replaced by ID154-159 Error detection not active, profet error detection not used. On fault following occurs: AutoWash disabled AutoFill disabled Used by Autowash/AutoFill	PressureValve fault. Motor disconnected. Motor short circuit or blocked. Sensor failing.	22
16	Alarm	Reserved	Reserved, replaced by ID141-145 Error detection not active, profet error detection not used. On fault following occurs: AutoWash disabled AutoFill allowed Used by Autowash/AutoFill	Regulation valve fault. Motor disconnected. Motor short circuit or blocked. Sensor failing.	23

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
17	Alarm	Reserved	Reserved, replaced by ID154-159 Error detection not active, profet error detection not used. On fault following occurs: AutoWash disabled AutoFill disabled Used by Autowash/AutoFill	SuctionValve fault. Motor disconnected. Motor short circuited or blocked. Sensor failing.	24
18	Alarm	TankGauge fault	When TankGauge is enabled and frequency is below 50Hz. AutoWash is disabled. AutoFill is disabled. Used by Autowash/AutoFill	TankGauge fault. TankGauge frequency is detected below 50Hz.	25
19	Warning	Software error Terminal	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	26
20	Warning	Software error JobCom	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	27
21	Warning	Software error Grip	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	28
22	Warning	Software error SetBox	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	29
23	Warning	Software error FluidBox		Turn off PTO to stop spray. Turn off power to stop hydraulics.	30
24	Warning	CAN bus failing to JobCom	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	31
25	Warning	CAN bus failing to SetBox	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	32
26	Warning	CAN bus failing to Grip	Close hydraulic valves	Turn off PTO to stop spray. Turn off power to stop hydraulics.	33
27	Warning	CAN bus failing to FluidBox		Turn off PTO to stop spray. Turn off power to stop hydraulics.	34
28	Illegal action	Track Boom fold. Align sprayer	User starts to fold the boom, and the sprayer trapeze is not locked. BoomFoldInner is disabled.	Track Boom fold Align sprayer. The alarm is present while the sprayer is not locked, and a "fold inner" button is pressed. No folding takes place.	38
29	Illegal action	Track unfold Boom	Alarm for attempt to switch to "Manual" or "Auto" mode in a situation where boom is not detected unfolded. When the boom is detected unfolded the trapeze lock is unlocked and the message disappears. Auto and manual is disabled.	Track unfold Boom. Alarm for attempt to switch to "Manual" or "Auto" mode in a situation where boom is not detected unfolded. Unfold the boom. In half steer mode: Risk of bending folded side. Contact service.	39
30	Illegal action	Main on/off is on	When pressing softkey for BoomFlush, FastFlush, MultiRinse while Main on off is on. Keypress does not start process. Used by Autowash/AutoFill	Main on off is on. Turn Main ON OFF to off before starting AutoWash.	40
31	Illegal action	MainTank not empty	When pressing softkey for BoomFlush, FastFlush, MultiRinse while MainTank is not empty. Keypress does not start process. Used by Autowash/AutoFill	MainTank not empty. AutoWash cannot be started.	41
32	Illegal action	No rinse water	When pressing softkey for either BoomFlush, FastFlush, MultiRinse while RinseTank is calculated too empty for that program. Keypress does not start process. Used by Autowash/AutoFill	Not enough rinse water for selected program. AutoWash cannot be started.	42

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ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
33	Illegal action	Steering not active - Over speeding!	When speed is too high for steering (SafeTrack ESP). Speed too high for steering - slow down! SafeTrack is disabled. Steering is enabled upon keypress SafeTrack auto.		43
34	Waiting	Start pump 2	Valves are positioned as in AutoWash table. After press on softkey computer continues to next step. See also screen layouts. Used by Autowash/AutoFill	Double pump must be started to flush hoses. Stop and start Double pump with hydraulic lever, as Warning prompts you to.	44
35	Waiting	Stop pump 2	Valves are positioned as in AutoWash table. After press on softkey computer continues to next step. See also screen layouts. Used by Autowash/AutoFill	Double pump must be stopped to avoid chemical in boom. Stop and start Double pump with hydraulic lever, as Warning prompts you to.	45
36	Waiting	Pause	Upon press of softkey or low or high PTO pump RPM or Flexcap RPM See also screen layouts Used by Autowash/AutoFill	AutoWash is paused by keypress.	46
37	Warning	PrimeFlow Comm fault		Communication to PrimeFlow SMCU's are failing. Fault is probably due to broken cable or bad connectors for power or data.	47
38	Warning	Output failing to sect 1	Detected by H-bridge on I2C bus	Output failing to sect 1	48
39	Warning	Output failing to sect 2	Detected by H-bridge on I2C bus	Output failing to sect 2	49
40	Warning	Output failing to sect 3	Detected by H-bridge on I2C bus	Output failing to sect 3	50
41	Warning	Output failing to sect 4	Detected by H-bridge on I2C bus	Output failing to sect 4	51
42	Warning	Output failing to sect 5	Detected by H-bridge on I2C bus	Output failing to sect 5	52
43	Warning	Output failing to sect 6	Detected by H-bridge on I2C bus	Output failing to sect 6	53
44	Warning	Output failing to sect 7	Detected by H-bridge on I2C bus	Output failing to sect 7	54
45	Warning	Output failing to sect 8	Detected by H-bridge on I2C bus	Output failing to sect 8	55
46	Warning	Output failing to sect 9	Detected by H-bridge on I2C bus	Output failing to sect 9	56
47	Warning	Output failing to sect 10	Detected by H-bridge on I2C bus	Output failing to sect 10	57
48	Warning	Output failing to sect 11	Detected by H-bridge on I2C bus	Output failing to sect 11	58
49	Warning	Output failing to sect 12	Detected by H-bridge on I2C bus	Output failing to sect 12	59
50	Warning	Output failing to sect 13	Detected by H-bridge on I2C bus	Output failing to sect 13	60
51	Warning	Output failing to bypass			61
52	Warning	Electronic fuse 1 is on	Measurement of voltage drop over "lammeører"		62
53	Warning	Electronic fuse 2 is on	Measurement of voltage drop over "lammeører"		63
54	Warning	Electronic fuse 3 is on	Measurement of voltage drop over "lammeører"		64
55	Warning	Electronic fuse 4 is on	Measurement of voltage drop over "lammeører"		65
56	Warning	RinseTank not full	When main tank has been filled and rinse tank is empty. Remember to re-fill rinse tank.		66
57	Warning	Main tank nearly empty	Main tank empty (tank gauge value set in menu 2.5.2).	Main tank is nearly empty. Consider distance left before leaving field.	67
58	Warning	Sections OFF	If main ON/OFF is switched ON and one or more sections are OFF.	Note that one or more sections are switched OFF.	68
59	Warning	Spray pressure too high	Spray pressure too high (limit set in menu 2.5.3.1).	Decrease speed or change to nozzles with larger capacity.	69
60	Warning	Spray pressure too low	Spray pressure too low (limit set in menu 2.5.3.2).	Change to nozzles of less capacity or increase speed if safe.	70

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
61	Warning	Speed too high	Speed too high (limit set in menu 2.5.5.1).	Decrease speed. Pressure will be too high.	71
62	Warning	Speed too low	Speed too low (limit set in menu 2.5.5.2).	Increase speed if safe. Pressure will be too low.	72
63	Warning	Appl. volume too high	Application volume too high (% limit set in menu).	Increase speed if safe or change nozzle size. Check regulation valve hoses and filters.	73
64	Warning	Appl. volume too low	Application volume too low (% limit set in menu).	Decrease speed or change nozzle size. Check regulation valve.	74
65	Warning	Fan speed too high	Fan speed too high (limit set in menu 2.5.4.1).	Reduce fan speed	75
66	Warning	Fan speed too low	Fan speed too low (limit set in menu 2.5.4.2).	Increase fan speed	76
67	Warning	PTO speed too low	PTO rev. too low (limit set in menu).	Increase PTO speed	77
68	Warning	PTO speed too high	PTO rev. too high (limit set in menu).	Decrease PTO speed	78
69	Warning	Ladder not up		Raise ladder, to avoid damage to ladder or crop.	79
70	Warning	Wind Speed too high	Wind Speed too high (limit set in menu).	Stop spraying or consider other nozzle types like HARDI LowDrift.	80
71	Warning				81
72	Warning				82
73	Warning				83
74	Warning				84
75	Warning	Opt. sensor 1 too high	Limit set in menu.	This will be help text	85
76	Warning	Opt. sensor 1 too low	Limit set in menu.	This will be help text	86
77	Warning	Opt. sensor 2 too high	Limit set in menu.	This will be help text	87
78	Warning	Opt. sensor 2 too low	Limit set in menu.	This will be help text	88
79	Warning	Opt. sensor 3 too high	Limit set in menu.	This will be help text	89
80	Warning	Opt. sensor 3 too low	Limit set in menu.	This will be help text	90
81	Warning	Opt. sensor 4 too high	Limit set in menu.	This will be help text	91
82	Warning	Opt. sensor 4 too low	Limit set in menu.	This will be help text	92
83	Reminder	Aborted by keypress	Upon press of softkey Used by Autowash/AutoFill	AutoWash is Aborted by keypress.	93
84	Reminder	Aborted by exception #	Aborted by exception, then show number from AW source code Previously AutoWash completed	AutoWash is completed	94
85	Reminder	FastFiller valve high friction	After valve self test	AutoAgitation valve has high friction or poor cabling. Valve will fail within some time. Arrange repair.	95
86	Reminder	Pressure Valve high friction	After valve self test	PressureValve has high friction or poor cabling. Valve will fail within some time. Arrange repair.	96
87	Reminder	Suction Valve high friction	After valve self test	SuctionValve has high friction or poor cabling. Valve will fail within some time. Arrange repair.	97
88	Reminder	Check filters and brakes	Periodically, period defined in extended menu. (Only checked at power up)	It is now time to check the suction and pressure filters. The Cyclone pressure filter is hidden under the grey right-hand cowling at the front of the sprayer. Check line and nozzle filters too. Check brakes.	98
89	Reminder	Grease boom and track	Periodically, period defined in extended menu. (Only checked at power up)	The boom now needs to be lubricated. Yellow labels indicate lubrication points other- wise see operators manual.	99

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
90	Reminder	Grease misc.	Periodically, period defined in extended menu. (Only checked at power up)	The track system now needs to be lubricated. Yellow labels indicate lubrication points otherwise see operators' manual.	100
91	Reminder	Miscellaneous service	Periodically, period defined in extended menu. (Only checked at power up)	See operators' manual for specific sprayer service.	101
92	Reminder	Check nozzles	Periodically, period defined in extended menu. (Only checked at power up)	You need to check the individual nozzle flow per minute. A stopwatch and good quality measuring jug is needed. Do the test with clean water. Nozzles with over 10% of rated new capacity must be discarded.	102
93	Reminder	Stop watch is zero		Stop watch is zero	103
94	Changed	Track in manual		Operator has put Track in manual	104
95	Changed	Track in auto		Operator has put Track in auto	105
96	Changed	Track is locked		Operator has locked Track	106
97	Changed	Reversing		Operator is reversing	107
98	Changed	Track unlocked		Lock is detected released. Hydraulic pressure established. Mis adjusted lock sensor.	108
99	Alarm	PrimeFlow data cable weakness	JobCom does not receive the data it sends. Shift the relay to Full duplex (transmit to both ends). Data cable defect is only detected at Half duplex (listen only right end). No further Data cable defect are detected at Full duplex (transmit to both ends).	PrimeFlow bus cable fault is detected. A failure handling circuit is enabled. PrimeFlow is in full operation.	35
100	Alarm	Low PrimeFlow voltage	JobCom measure PrimeFlow supply voltage after fuse for left and right boom part at AI11 and AI12. Alarm occur when voltage is below 14 volts.	A fuse is open or too many rapid shifts on and off of sections has drained the power supply.	36
101	Warning	PrimeFlow power cable defect	Low power warning from SMCU, when supply is re-established. First low power warning received after power up of system is not valid. First low power warning received after "Low voltage on supercap" is not valid.	Poor power wiring to PrimeFlow computers. One of the 2 power lines are disconnected or connectors are corroded and gives high resistance.	109
102	Warning	PrimeFlow computer defect	SMCU does not reply on status. No status request while "Low voltage on supercap" occurs.	Internal fault in PrimeFlow computer. Can also be caused by 2 or more defects in PrimeFlow data cable. Check for PrimeFlow data cable weakness.	110
103	Warning	Fold with unlocked pendulum	When pressing FoldCenterIn, FoldLeftIn or FoldRightIn and pendulum is unlocked.	Fold with unlocked pendulum.	111
104	Warning	Boom wing loose	Buttons FoldLeftIn or FoldRightIn are not pressed but the 4 sensors on outer boom wings change from "In spray" to "Not in spray" respectively when they change from "In transport" to "Not in transport".	Boom wing loose.	112
105	Changed	Agitation in Auto	Forward speed > 0,5 km/h and Main On/Off = On	Agitation in Auto	113
106	Warning	Regulation valve in end-stop	Warning appears when pressure regulation algorithm tries to close Regulation valve to increase pressure, but encoder does not give any signals, as micro switch has turned of motor. Alarm should not appear at self test at start up. Pressure regulation is unchanged.	JobCom detected that pressure regulation valve does not turn and cannot close and increase pressure and flow any further. Increase PTO RPM. Review flow used for agitation. Check for internal leakages.	114

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
107	Alarm	Slant angle sensor fault	Alarm is active when 2.2.4.3 Slant mirror is enabled and/or if 2.2.4.4 Slant in steps is enabled. The alarm is generated, if the sensor signal is less than 0.2 Volt or exceeds 4.8 Volt.	Check sensor and cable on pendulum. Disable HeadLandAssist. Disable Slant in steps.	115
108	Alarm	Boom height sensor fault	Alarm is active when 2.2.4.2 Boom height at headlands is enabled. The alarm is generated, if the sensor signal is less than 0.2 Volt or exceeds 4.8 Volt.		116
109	Alarm	Pressure sensor alarm	Alarm is active when Menu E8.1.7.1 is "Active" The alarm is generated, if the sensor signal on AI26 (J10_33, J11_33) is less than 3mA or exceeds 21mA.	Check connection to boom pressure sensor at distribution valve junction box.	117
110	Alarm	JobCom Resetting		Refer to HC 6500 service manual.	124
111	Alarm	JobCom Resetting Done		Refer to HC 6500 service manual.	125
112	Changed	Flat 1 Level 1 Hilly 5	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7, the setbox TWIN buttons are dedicated to select the Dynamic centre setting. The information pops up when a button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom. Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.	118
113	Changed	Flat 1 Level 2 Hilly 5	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7, the setbox TWIN buttons are dedicated to select the Dynamic centre setting. The information pops up when a button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom. Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.	119
114	Changed	Flat 1 Level 3 Hilly 5	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7, the setbox TWIN buttons are dedicated to select the Dynamic centre setting. The information pops up when a button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom. Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.	120
115	Changed	Flat 1 Level 4 Hilly 5	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7, the setbox TWIN buttons are dedicated to select the Dynamic centre setting. The information pops up when a button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom. Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.	121
116	Changed	Flat 1 Level 5 Hilly 5	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7, the setbox TWIN buttons are dedicated to select the Dynamic centre setting. The information pops up when a button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom. Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.	122
117	Warning	D-centre incorrect position	Time-out on sensor signal AI25. TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7 Buttons has been activated to move the Dynamic centre. The selected setting has not been reached within 10 seconds. Reset by keypress "enter" or attempt to move Dynamic centre.	Attempt to move Dynamic centre cylinder did not succeed within the given time frame. Check the hydraulics connections and pressure. Check Dynamic centre position sensor.	37
118	Warning	Pendulum locking failed.	Time-out on sensor signal AI1 when attempting to lock. See table "TerraForce Pendulum lock" in terminal specification xxxx Reset by attempt to lock.	Attempt to move Pendulum lock cylinder did not succeed within the given time frame. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.	5

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
119	Warning	Pendulum release failed.	Time-out on sensor signal AI1 (E0.7.4 setting) when attempting to unlock. See table "TerraForce Pendulum lock" in terminal specification xxxx Reset by attempt to release.	Pendulum is locked unintentionally. The suspension will be damaged. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.	6
120	Warning	STOP! PENDULUM LOCKED!	Time-out on sensor signal AI1 (E0.7.4 setting) when attempting to unlock and speed >E0.7.2 setting. See table "TerraForce Pendulum lock" in terminal specification ver 35 Reset by removal of coarse (either unlock succeeded or speed<E0.7.2).	Pendulum is locked unintentionally when attempting to spray. The suspension will be damaged. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.	7
121	Alarm	Pendulum lock sensor.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7 The alarm is generated: <ul style="list-style-type: none"> if the sensor signal on AI1 is less than 0,5V. Illegal transition. See table "TerraForce Pendulum lock" in terminal specification ver 35 	No or wrong signal from sensor. Shorted or disconnected. Check Pendulum lock sensor adjustment and/or connection.	8
122	Warning	Dynamic Centre sensor.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7 The alarm is generated, if the sensor signal on AI25 is less than 0,2V or exceeds 4,8V. Reset by keypress "enter".	Signal from sensor out of range. Shorted or disconnected. Check Dynamic centre position sensor adjustment and/or connection.	11
123	Warning	Folding not allowed.	Attempt to fold when speed >E0.7.2 km/h. Folding blocked. Reset when speed <E0.7.2 km/h or when fold buttons are released.	It is not allowed to fold or unfold the boom whilst driving. Stop the vehicle.	123
124	Reminder	ISOBus terminal recovered			126
125	Reminder	ISOBus bridge recovered			127
126	Reminder	No Dilution	Appears when dilution kit function is activated, and no outputs are active.	Fluid systems works normally.	128
127	Reminder	Tank Dilution	Appears when dilution kit function is activated, and tank output is active.	Suction from rinse tank. Flush tank through tank cleaning nozzles.	129
128	Reminder	Boom Dilution	Appears when dilution kit function is activated, and Boom output is active.	Suction from rinse tank. If nozzles are open - flush feed hoses. If nozzles are closed - flush dump hose.	130
129	Warning	Pump over speeding	Pump RPM exceed 5000 RPM.	Pump RPM exceed manufacturers limitation.	131
130	Warning	Vehicle over speeding	Forward speed exceed setting in E0 menu, and MainFlowOnOff is on.	Vehicle over speeding while spraying.	132
131	Warning	Boom not in transport.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8 The alarm is generated, if an attempt to bring the boom into transport position failed, or if the user forgot to bring it there.	Place boom in transport position before driving. Check transport lock function. Check boom height sensor.	10
132	Illegal action	One function only!	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8 Appears on TERRA FORCE booms when the user tries to us more than one function at a time.	It is not allowed to use multiple folding buttons/functions simultaneously.	133
133	Illegal action	Unfold inner wing.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8. Wrong folding sequence.	Do not attempt to fold outer wings, if inner wing is not fully unfolded.	134
134	Illegal action	Keep folding 1 st outer wing.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8. Wrong folding sequence.	Finish the folding of 1 st outer wing.	135

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
135	Illegal action	Keep folding 2 nd outer wing.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8. Wrong folding sequence.	Finish the folding of 2 nd outer wing.	136
136	Warning	Lift the boom.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7+8. The boom lift is in a too low position, to ensure proper function of the transport lock.	The boom lift is in a too low position, to ensure proper function of the transport lock.	137
137	Warning	Boom not in transport.	See state machine table "TERRA FORCE transport lock and suspension relief".	Place the boom correctly in transport position before driving. Check transport lock function. Check boom height sensor.	138
138	Reminder	Mismatch Box and setup.	When setup in E8.5.8 Grip, SetBox, armrest does not match jumper positions in SetBox PCB for armrest and Outside switches. Reminder is not sent when boxes are not connected or software has no jumper positions PG	Setup in E8.5.8 Grip, SetBox, armrest does not match jumper positions in SetBox PCB for armrest and Outside switches.	139
139	Alarm	Dynamic centre sensor.	When dynamic centre function is enabled in menu E.8.6.7		139
140	Alarm	Pendulum unlock sensor.	When TERRA FORCE boom hydraulics set-up has been selected in menu E8.6.3.7 The alarm is generated: <ul style="list-style-type: none"> if the sensor signal on AI5 is less than 0,5V. Illegal transition. See table "TerraForce Pendulum lock" in terminal specification ver 53 	No or wrong signal from sensor. Shorted or disconnected. Check Pendulum unlock sensor adjustment and/or connection.	9
141	Warning	Reg. Valve sensor fault.			140
142	Warning	Boom flow sensor fault.			141
143	Warning	Boom press sensor fault.			142
144	Warning	Pump sensor fault.	Used by Autowash/AutoFill		143
145	Warning	Reg. Valve motor fault.			144
146	Warning	Agitation sensor fault	Not used 11 Alarm Agitation valve fault is used instead		145
147	Warning	Agitation motor fault	Not used 11 Alarm Agitation valve fault is used instead		146
148	Warning	Centrifugal valve calib failed	When Regulation SW cannot detect and calculate X axis crossing or slope of hydraulic valve characteristic Used by Regulation		
149	Warning	Stack overflow			148
150	Warning	PF motor blocked #xxx	PrimeFlow. When command 09h is "Status advanced" is read, each motor can be detected blocked, shorted or disconnected. The "#xxx" indicates the actual nozzle number.	A PrimeFlow motor is detected blocked. Inspect motor and nozzle condition. Clean or replace valve if necessary.	149
151	Warning	PF motor short #xxx	PrimeFlow. When command 09h is "Status advanced" is read, each motor can be detected blocked, shorted or disconnected. The "#xxx" indicates the actual nozzle number.	A PrimeFlow motor is detected shorted. Inspect motor and connector condition.	150
152	Warning	PF motor disconnect #xxx	PrimeFlow. When command 09h is "Status advanced" is read, each motor can be detected blocked, shorted or disconnected. The "#xxx" indicates the actual nozzle number.	A PrimeFlow motor is detected disconnected. Inspect motor, SMCU and connector condition.	151

7 - Fault finding

ID	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text	Pr
153	Reminder	AutoWash completed xx cycles	When program is completed Used by Autowash/AutoFill	AutoWash is completed AUTOWASH_CYCLE_COMPLITED	
154	Warning	FastFiller valve motor fault	Sensor does not change 0,5 volt when motor is activated for 1 sec Or Valve do not get into position within 4 sec Or verify speed 50 mV /100 msec Bevare of blind zone See also alert ID13 Used by Autowash/AutoFill	FAST_FILL_VALVE_MOT_FAULT	
155	Warning	FastFiller valve sensor fault	Sensor changes more than 100 mV when motor is not activated Or Speed below 50 mV /100 msec Used by Autowash/AutoFill	FAST_FILL_VALVE_SENS_FAULT	
156	Warning	PressureValve motor fault	Sensor does not change when motor is activated Used by Autowash/AutoFill	PRESSURE_VALVE_MOT_FAULT	
157	Warning	PressureValve sensor fault	Sensor changes when motor is not acti-vated Used by Autowash/AutoFill	PRESSURE_VALVE_SENS_FAULT	
158	Warning	SuctionValve motor fault	Sensor does not change when motor is activated Used by Autowash/AutoFill	SUCTION_VALVE_MOT_FAULT	
159	Warning	Suction Valve sensor fault	Sensor changes when motor is not activated Used by Autowash/AutoFill	SUCTION_VALVE_SENS_FAULT	
160	Alarm	Illegal AutoWash Setup	Illegal pumps chosen Autowash will not start (preconditions not fulfilled) Used by Autowash/AutoFill	ILLEGAL_AWASH_SETUP	
161	Warning	Pump RPM too low Increase	Pump RPM is below table limits Increase to go to Pause Used by Autowash/AutoFill	PUMP_RPM_TOO_LOW	
162	Warning	Pump RPM too high Decrease	Pump RPM is above table limits Decrease to go to Pause Used by Autowash/AutoFill	PUMP_RPM_TOO_HIGH	
163	Warning	Increase pump flow	With EFC or PrimeFlow: When valve is closed and regulator is in state 6x With EVC: When valve is in closed end stop and flow is over threshold Used by Regulation	INC_PUMP_FLOW,	
164	Warning	Reduce pump flow	With EFC or PrimeFlow: When valve is open and regulator is in state 6x With EVC: When valve is in open end stop and flow is over threshold Used by Regulation	RED_PUMP_FLOW,	
165	Warning	Jobcom Fram defect	Write data to FRAM then read If read data is different from wite data Clear alarm by power off p power on		

Emergency operation

In an emergency situation

If an error occurs in the system then choose Computer CAN status. This test will show if there is communication between the units. The menu will be as shown.



ATTENTION! See also "Menu 4.7 Emergency track Align" on page 74.

4.8 Computer CAN status

- >> 4.8.1 Operating status all computer
- 4.8.2 Software versions all computer
- 4.8.3 Hardware versions all computer
- 4.8.4 Work status Terminal HC6500
- 4.8.5 Work status JobCom HC6050
- 4.8.6 Work status Grip HC6300
- 4.8.7 Work status SetBox HC6400

Computer detail screens show details in case of faults

Operation when a sensor fails

When one of the sensor for RPM, flow or pressure fails, the system will work in a limp home mode, with reduced though acceptable performance. One of the alarm ID's between 140 to 147 will be triggered in the controller display. See also "Fault codes" on page 111.

- In the auto mode, the system will not work with 2 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! SafeTrack/IntelliTrack only works with wheel speed sensor.


Pressure regulation angle sensor works both as a feed back to the computer and as the end stop switch. If angle sensor fails, the operator can continue turning regulation valve passing the completely closed position.

Fail in the below sensors will cause an inaccurate calculation of the volume rate when spraying. In order 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 size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 62.
Defect	Defect	Use	Use	Use	Reduced performance	Setup new size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 62.
Ignore	Use	Defect	Use	Use	Reduced performance	Setup new size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 62.
Defect	Use	Defect	Use	Use	Reduced performance	Setup new size when changing nozzle, see "Menu 3.4.3 Nozzle size flow at 3 bar" on page 62.
Use	Use	Use	Defect	Use	Spray at constant speed	Keep sprayer at constant driving speed. Type in simulated sprayer speed, see "Menu 3.4.2 Simulated speed value" on page 61.
Ignore	Defect	Defect	Ignore	Use	Manual only	Adjust pressure after mechanical pressure gauge.
Ignore	Ignore	Ignore	Ignore	Defect	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.

7 - Fault finding

Fluid system test

1. Close the main ON/OFF valve.
2. Close the regulation valve by pressing  button to increase the pressure. Yellow diode lights on the regulation valve.
3. Close the agitation valve.
4. Close the pressure filter bypass valve.
5. Set pump from 250 to 300 RPM, engine in idle speed.
6. Now all water from pump should pass boom flow sensor.
7. Pump condition and possible internal valve leakages can be checked by comparing:
 - Menu 4.5.5.3.3 Pump calc flow. This menu shows the calculated flow from the pump.
 - Menu 4.5.5.3.6 Meas boom flow. This menu shows the actual measured flow through the flow sensor.

Specifications

Specifications

Supply voltage:	12 Volt DC
Controlled shutdown "low battery":	9 Volt DC
Maximum supply:	16Volt DC
Maximum peak:	28 Volt DC
Ambient temperature:	– 5°C to + 70°C
Memory:	Flash PROM non-volatile
Digital transducers (option 2, 3 and 4):	Square signal
Frequency:	0.5 Hz to 2 kHz
Trigger high:	4.0 to 12.0 Volt DC
Trigger low:	0.0 to 2.0 Volt DC
Analog transducers (option 1):	
Supply:	12 V
Input:	4 to 20 mA
Minimum speed for volume regulation	0.5 km/h

Flow ranges for the flow transducers

Housing	Housing identification (A)	Flow range L/min.	Orifice mm	PPU value
S/67	Three grooves	1-30	6.0	310.00
S/67	Four grooves	2.5-75	9.5	180.00
S/67	One outside groove	5-150	13.5	120.00
S/67	No groove	10-300	20.0	60.00
S/67	Two outside grooves	35-600	36.0	17.00

Pressure drop over 13.5 mm orifice is 1 bar at 150 l/min.

8 - Technical specifications

Electrical connections

Types of plugs and fuses

Fuses are located into the JobCom:

- 15 A auto fuse
- TWIN versions also 2x10 A auto fuse.

Breakout PCB:

- 2x 10 A auto fuse.

DAH PCB:

- 10 A slow blow fuse.

PrimeFlow power:

- PCB glass fuse 10 A slow blow.

PrimeFlow step-up transformer converter has two fuses:

- 30AT F2 / 32V
- 10AT F1 / 32V, Hardi P/N 26023500.

Plugs

- AMP Super Seal 1.5 with 2, 3 and 4 pins.
- 13 pin plug ISO 11446.
- DAH: DB25F and DB37F connector.
- 13 pin ISO 11446M.
- ISOBUS: 9 pin IBBC F connector.

Materials and recycling

Disposal of electronics

Cardboard: Can recycle up to 99% and therefore should be put into the waste collection system.

Polyethylene: Can be recycled.

When the operating unit has completed its working life, it must be thoroughly cleaned. The synthetic fittings can be incinerated. The printed circuit boards and metallic parts can be scrapped.

Packaging information

Materials used for packaging are environmentally compatible. They can be safely deposited or they can be burnt in an incinerator.

8 - Technical specifications

Charts

Chart for recording values

[illegible]

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Spare parts

To see updated spare part information the website www.agroparts.com can be visited. Here all parts information can be accessed when free registration has been made.



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