# CONTROLLER
# HC5500

## Instruction book - sw 3.16

67021003 - Version 1.10
US - 05.2006

# Table of Contents

# Table of Contents

## 6 - Menu 2 Setup



## 7 - Menu 3 Calibration

# Table of Contents

## Welcome letter

Dear Owner,

Thank you for purchasing a HARDI® product and welcome to the ever-increasing family of HARDI® sprayer owners.

Our sprayers and accessories are rapidly becoming a familiar sight on North American farms. We believe that this results from growers becoming increasingly conscious of crop protection input costs and the vital need for cost effective spray application equipment.

Please take the time to thoroughly read the Operator's Manual before using your equipment. You will find many helpful hints as well as important safety and operation information.

Some of the features on your HARDI® sprayer were suggested by growers. There is no substitute for "on farm" experience and we invite your comments and suggestions. If any portion of this instruction book remains unclear after reading it, contact your HARDI® dealer or service personnel for further explanation before using the equipment.

**For Product, Service or Warranty Information:**
- Please contact your local HARDI® dealer.

**To contact HARDI® directly:**
- Please use the HARDI® Customer Service number: 1-866-770-7063
- Or send your email to CUSTSERV@hardi-us.com

**HARDI® Inc.** **Visit us online at: www.hardi-us.com**

HARDI® MIDWEST
1500 West 76th St.
Davenport, Iowa 52806
Phone: (563) 386-1730
Fax: (563) 386-1710

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290 Sovereign Rd.
London, Ontario N6M 1B3
Phone: (519) 659-2771
Fax: (519) 659-2821

HARDI® WEST COAST
8550 W. Roosevelt Avenue
Visalia, California 93291
Phone: (559)651-4016
Fax: (559) 651-4160

Sincerely,

Tom L. Kinzenbaw
President

## Operator safety


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!

### General info

Note the following recommended precautions and safe operating practices.


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.


Keep children away from the equipment.


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


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.


Test with clean water prior to filling with chemicals.


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


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

## Local poison information center

If you live anywhere in the United States, the following toll free number will connect you to your Local Poison Information Center.

PHONE NO. 1 - 800 - 222 - 1222

If you live outside the United States, find the number for the poison control center in your phone book and write it in the space below:

PHONE NO._____ - _____ - _____

Keep a list, in the space provided below, of all the chemicals that you have in use.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

## General info

### General info

The HARDI® Controller 5500 is for use in agricultural and horticultural production. The Controller permits automatic control of application rate.

Main components are:

* Controller

* Spray Box

* Junction box (on sprayer)

* Jobcomputer (for SafeTrack function)

* Flow transducer (on sprayer)

* Speed transducer (on sprayer or tractor)

The Controller has a four line display permitting much information to be shown at the same time. Display readout includes volume rate, speed, liquid rate per minute, total covered area, total volume sprayed and 99 trip registers. It includes a total register that summarizes data from the 98 trip registers. It is illuminated internally so readout is possible even for night-time work.

Functions include correct area with closure of up to 7 spray boom sections, alarm functions for volume rate, minimum tank contents, speed min./max. and possibility for audio/visual alarm.

The Spray Box has integrated controls for the spray functions, foam marker, end nozzles and optional electric valves.

The transducers utilized are chosen for long service life and good signal quality. The speed and flow transducer has a diode built into the housing to aid servicing. As the wheel or rotor turns, the diode will flash thereby indicating it is functioning correctly.

The Controller is also compatible for Variable Rate Application and is prepared for communication with Precision Farming tools.

Data dump of registers and configuration to a personal computer is possible.

The system has a non-volatile memory with no battery which simplifies storage. All parameters in the menus are saved in the Controller's memory and are not lost when the power is disconnected.

The components are rain and dust proof and have been developed to last many years under agricultural conditions.

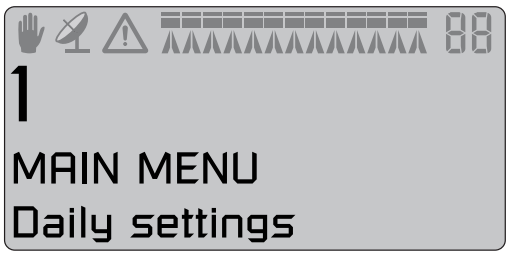
Optional transducers include pressure, revolutions and area meter. Other options include a 12 Volt printer and a foot operated remote ON/OFF for the Main ON/OFF.

# 3 - Description

### Glossary and pictorial symbols

| | |
|---|---|
| Controller | HARDI® Controller 5500 with display. |
| Spray Box | HARDI® Control Box with all basic control functions. |
| Junction box | Box on the sprayer for Controller and Control Box. |
| Jobcom | Box on the sprayer with SafeTrack computer. |
| Transducer | Device that transforms variations to a signal. Also called a sensor. |
| [ abc ] | Text shown on the Controller display. |
| [ X ] or [ Y ] | Variable figures. |
| PPU | Pulses per unit. For speed and flow calibration, the unit measure is feet and gallon respectively. |
| EVC | Electric Valve Control unit. |
| EFC | Electric Fast Control unit. |
| VRA | Variable Rate Application (often referred to "GPS"). |

Text shown in the shaded rectangular windows are what will be seen on the Controller display when pressing buttons as described in the explanations. An example of display read-out is shown to the right.




ATTENTION! The first line with icons will stay shaded except where first line is relevant.

### HARDI® LookAhead (for sprayers with regulation feedback)

With LookAhead, the pressure regulation valve can foresee the correct setting before the main switch goes to ON. It improves application precision, especially when re-starting after a tank fill.

The LookAhead feature is active when the boom is unfolded, regulation valve is fitted with position transducer and the LookAhead menu is activated.

When the power is switched to ON, note the regulation valve will adjust from the actual setting to the minimum setting and then back again.

For LookAhead to function correctly the controller must know which nozzles and application rate will be used. This is selected from a number of nozzle choices stored in memory. At start up of the controller, it will prompt user for a choice between using nozzles used at last spray job or select a new nozzle to be used.

ATTENTION! The tractor gearbox must be an automatic or semi-automatic type with constant R.P.M. P.T.O., or the tractor must be driven with constant R.P.M. for the LookAhead to work properly.

**SafeTrack**

SafeTrack is a steering mechanism for the HARDI® COMMANDER sprayer that is fully controlled from the HC 5500. 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 are:

- Driving behavior
- Field conditions
- Tire width
- Tire pressure

Read sprayers instruction book for further information.

If unsafe driving occurs, an alarm will be triggered and the sprayer will align. Press ↵ to turn alarm off. Pressing switch (12) to "manual" or to "align" will also turn alarm off. Be aware that the alarm cannot be turned off as long as unsafe driving still occurs!

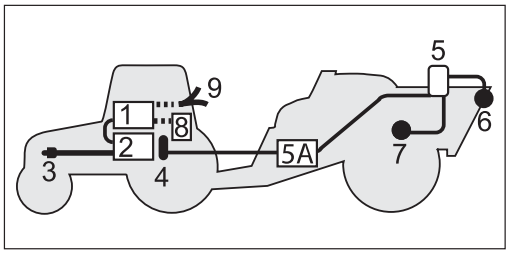
ATTENTION! If necessary, the level of security can be adjusted - please contact your local HARDI® dealer.

WARNING! When backing, the SafeTrack should always be aligned and set to "manual" on the hydraulic control box.

# 3 - Description

## System description

### Overall description

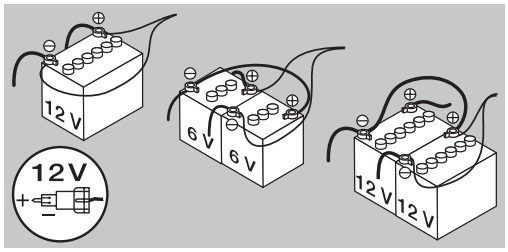



1. Controller
2. Spray Box
3. To 12 Volt power supply
4. Multi wire plug and cable
5. Junction box (on sprayer)

5A. New COMMANDER only

6. Flow transducer
7. Speed transducer
8. Printer (optional)
9. Harness for tractor speed/area switch/foot remote ON/OFF

### Power supply




The power supply is 12 Volt DC.

Brown wire is positive (+)

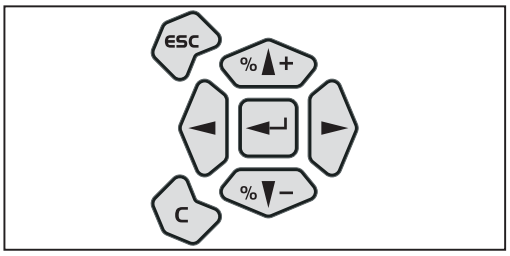
Blue wire is negative (-).

Power supply must come directly from the battery. The wires must be at least 16 awg. to ensure sufficient power supply.

Use the HARDI® Electric distribution box (Ref. no. 817925) to ensure a good connection.

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

## Navigation keys




### Navigation keys

The navigation keys are initially used for set up in the menu system. Press ↵ to start this process. Then buttons can be used for the following:
Pressing %+ will:
Scroll up,
Increase a value,
Increase volume rate in steps or select another preset application rate.
Pressing %− will:
Scroll down,
Decrease a value,
Decrease volume rate in steps or select another preset application rate.
Pressing ◄ will:
Move the cursor to the left.
Pressing ► will:
Move the cursor to the right.
Pressing ESC will:
Escape a menu (hold to escape all menus),
Escape without changing a value.
Pressing C will:
Clear a value,
Reset the active register (hold until countdown is finished).
Pressing ↵ will:
Enter a menu,
Confirm (accept) a value.

ATTENTION! Some keys have other functions that can be used while spraying.

### General keystrokes and menu system

The following is a general description in keystrokes and display readout. The following example of changing the Tank contents value is used to illustrate this. Try it! The same method is used in all the menus.

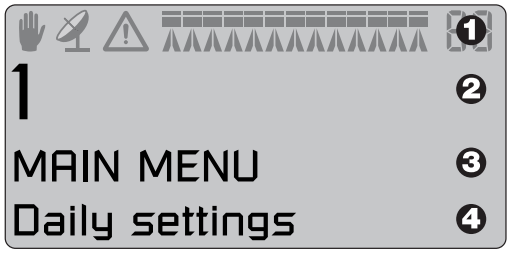
ATTENTION! When a menu is open, the blinking number or value is the one that can be altered.

# 3 - Description

**Menu system, main menu**

Press [↵] to enter the menu system [1 MAIN MENU].

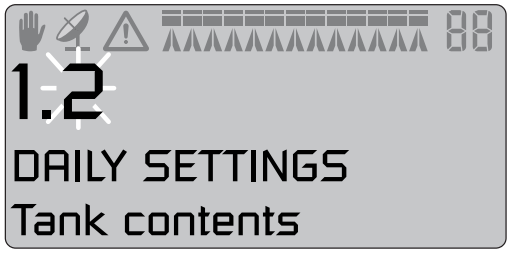
The 2nd line will show the menu number.
The 3rd line will read the present menu.
The 4th line will show a choice.
Note the menu number [1] is blinking.




**General keystrokes, daily settings**

Press [↵] to enter menu [1.1 Daily settings].
Press [%▲+] or [%▼−] to scroll to [1.2 Tank contents].

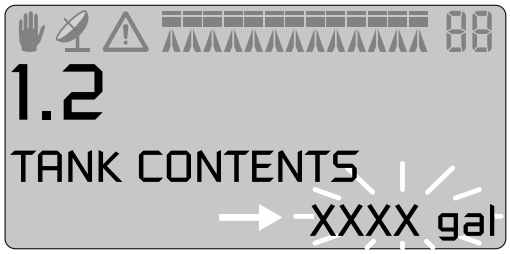
Note the last digit of the menu number [1.2] is blinking.




**General keystrokes, tank contents**

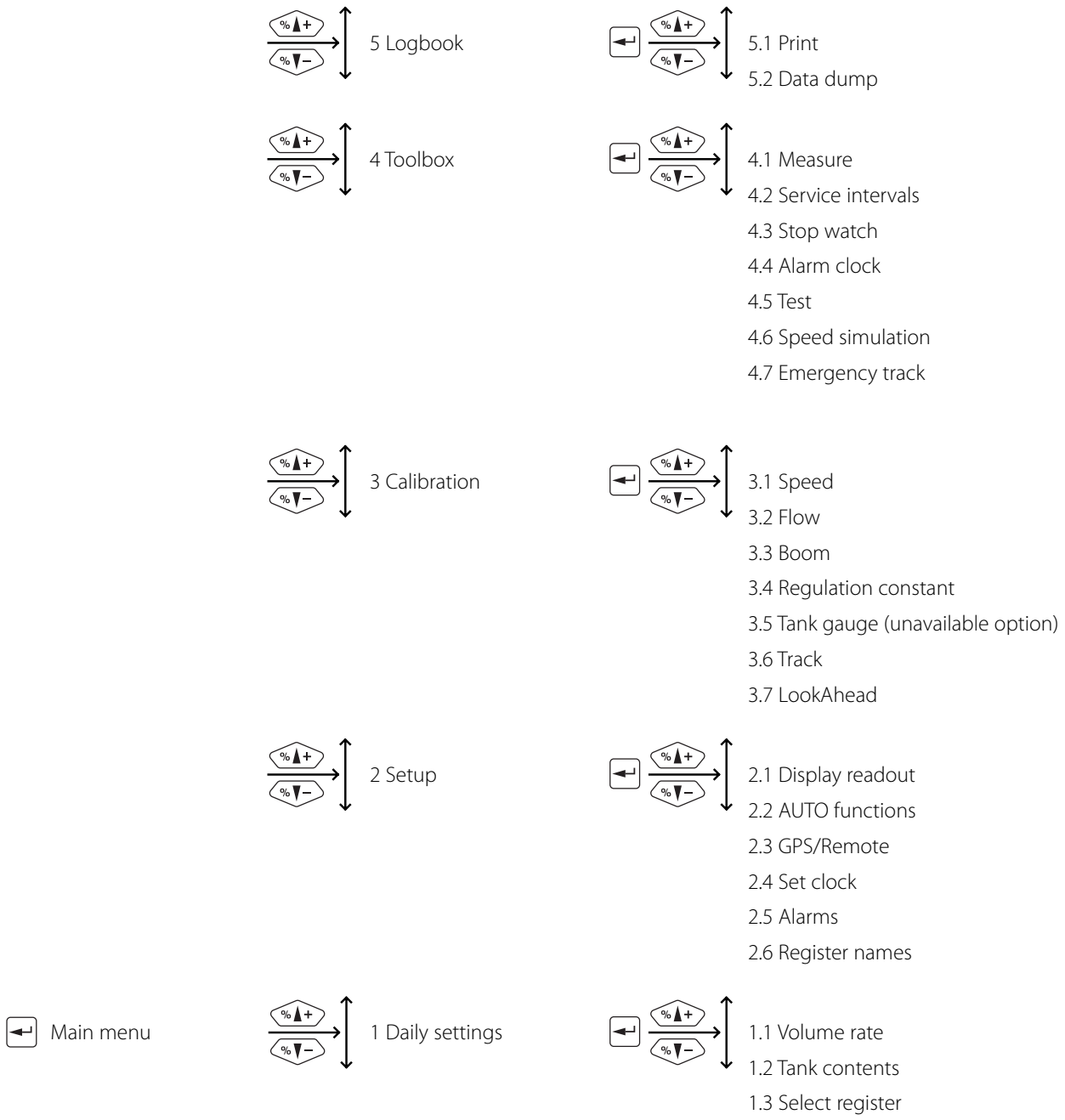
Press [↵] to enter [1.2 TANK CONTENTS].

Note the value that can be changed is blinking.
Press [←] or [→] to move the cursor.
Press [%▲+] or [%▼−] to set the desired value.
Press [↵] to confirm.
Press [esc] and hold, to exit the menu system.



**Keystroke menu tree**

The first steps to choose a menu are shown below.
Press ↵ to proceed into the menu. See the relevant section in the book.
Press esc and hold to exit the menu system.




**Extended menu**

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

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

# 3 - Description

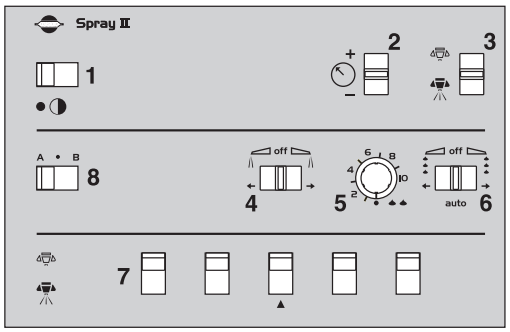
## Overview of buttons and switches

### HC 5500 Display


1. Display
2. Navigation keys*
3. Shortcut keys*

*pictorial symbols match icons used throughout manual.

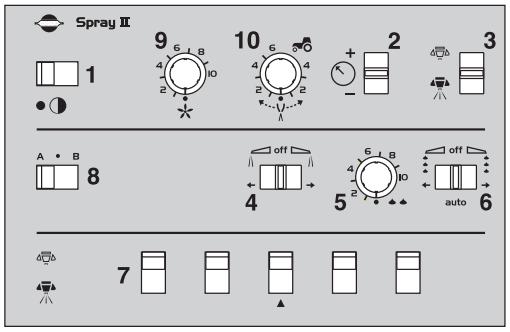
### Spraybox II




1. Power switch
2. Manual pressure regulation
3. Main ON/OFF
4. End nozzle (Left/OFF/Right)*
5. Foam marker regulation*
6. Foam marker (Left/OFF/Right)*
7. Boom section valves
8. Valve function A-B*

*optional equipment

### Spraybox II (TWIN only)




1. Power switch
2. Manual pressure regulation
3. Main ON/OFF
4. End nozzle (Left/OFF/Right)*
5. Foam marker regulation*
6. Foam marker ON/OFF*
7. Boom section valves
8. Valve function A-B*
9. Valve function C-D*
10. Air volume (TWIN only)
11. Air slot (TWIN only)

*optional equipment

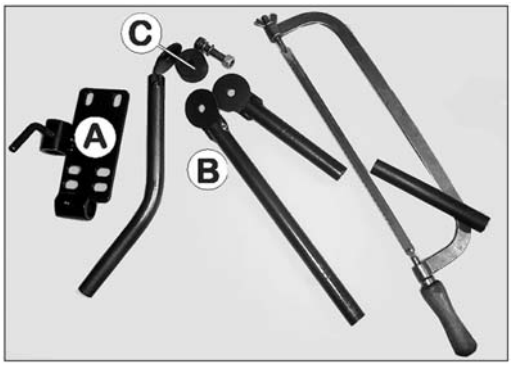
## Tractor installation

### Brackets

The supplied tractor pillar bracket (A) has a hole spacing of 3.9 in. (100mm) and 4.7 in. (120 mm). Check tractor instructions manual for information regarding attachment points.

Three tubes (B) are supplied. One, two or all three 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 all boxes will line up if correctly oriented.




### Spray box

Best placement is to the right of the driver seat and in combination with the Controller. It should be secured from movement.


### Controller

Mount it in the tractor cabin at a convenient place.

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

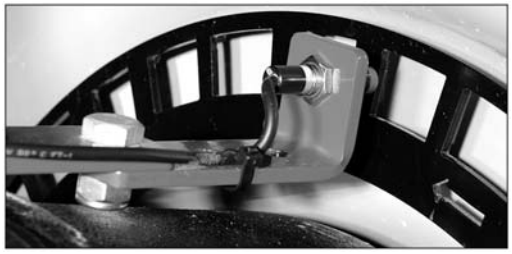
### Printer

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

ATTENTION! The Controller/Terminal should be protected from moisture and should be removed if the tractor does not have a cabin.

# 4 - System setup

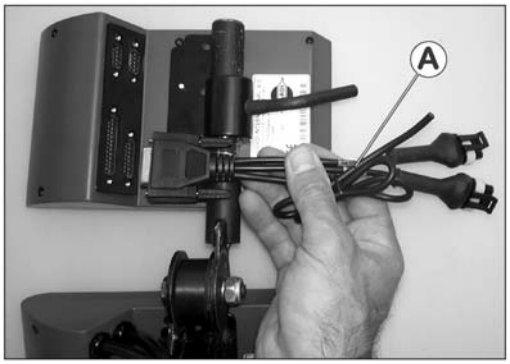
### Speed transducer for tractor/sprayer



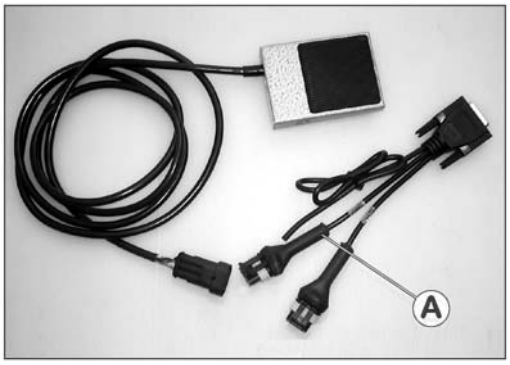
Note the following if the speed transducer is fitted to the tractor or vehicle.

The speed transducer is an inductive type. It requires a metallic protrusion (e.g. bolt head) to pass by it to trigger a signal.
Recommended distance between protrusion and transducer is 1/8" to 3/16" (3 to 5 mm).

A speed/switch harness (A) and extension cable are needed to connect the speed transducer to the Controller/Terminal.




### Foot pedal remote ON/OFF (optional)



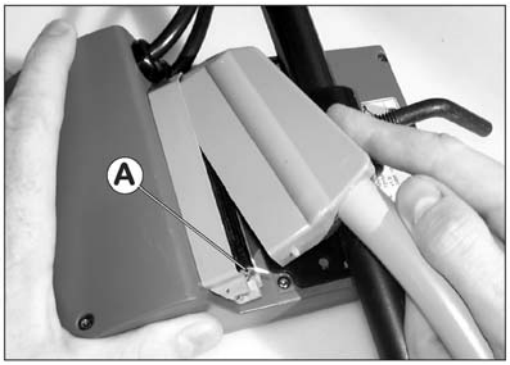

Note the following if the Foot pedal remote is to be fitted.

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

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

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

### System start-up




When connecting the 39 pin plug from the sprayer, note the lock tab (A) clicks in place to secure the plug in the socket.
When disconnecting the plug, the metallic tab must be pushed back before the plug is pulled out.

After connecting the plugs, the power is turned on at the Spray Box. Model, software version number, number of sections and size are displayed briefly. At initial start up, Controller also prompts for input of time and date. [Set clock to enable register].
Press ↵ to continue.

ATTENTION! At first start-up the clock must be set. See "Menu 2.4 Set clock".

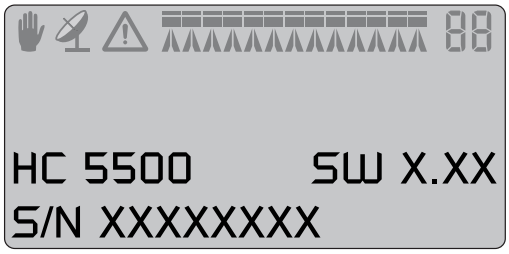
### Screen contrast adjustment

The screen contrast can be adjusted by pressing esc and then use the %▲+ or %▼− to find the correct setting. This can only be done when "driving screen" is active, i.e. not when any menus are active.
Note that this function will only be available on hardware version 2.0 and higher

### Boot sequence

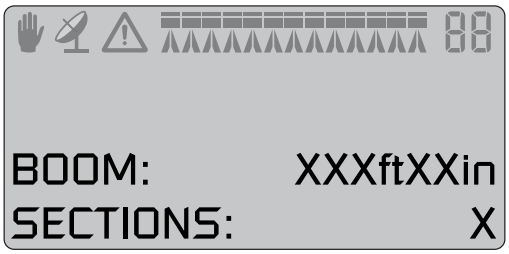
When the HC 5500 is turned on, a boot sequence is started while the controller is initiating it self. During start-up, it shows information about itself in the following order:

1. A screen showing that the controller is an HC 5500 and a software version in 3rd line of display. In lowest line of display a serial number for the specific controller is shown.

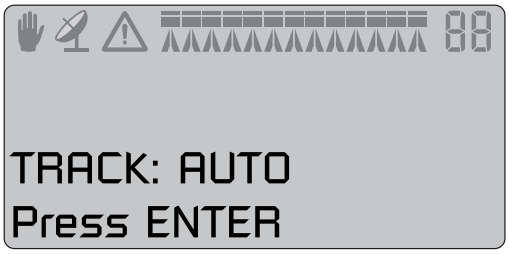



2. A screen showing boom length in 3rd line of the display. Number of sections programmed into the controller are shown in the 4th line. These datas should reflect the datas the sprayer it is mounted to - if not, please contact your local HARDI® dealer to correct this.

3. If the sprayer is equipped with LookAhead and this is enabled in the HC 5500, it will prompt user for a nozzle choice - see section "LookAhead nozzle choice". If no LookAhead is available this screen will not appear and HC 5500 will be ready for use.

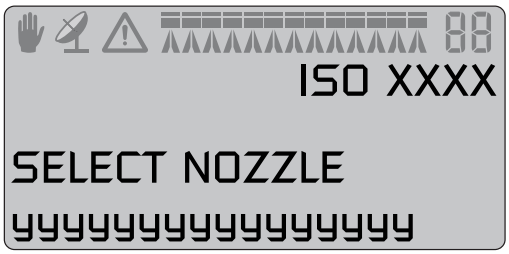



4. If by some reason the HC 5500 is started while the boom is unfolded and track switch on the hydraulic control box is set to "auto" the display tells that "auto" is on. This is to inform user so no unintended SafeTrack movements will be done. Press ↵ to confirm this and then the controller is ready to use.

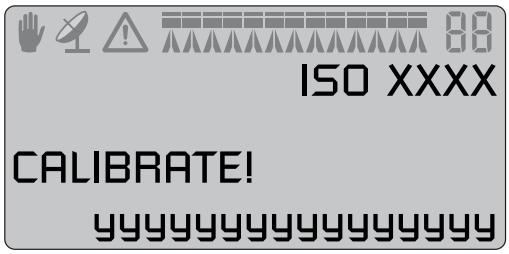



### LookAhead nozzle choice

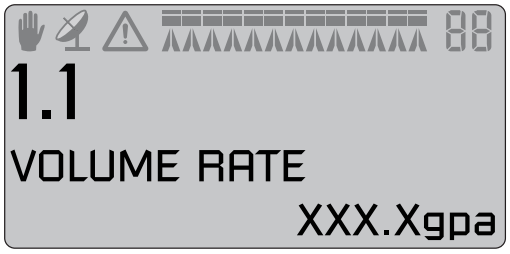
If the sprayer is equipped with LookAhead and this is enabled in the HC 5500, it will prompt user for a nozzle choice at every start-up of the controller. Display will show last used nozzle by displaying its color and ISO code in the display.
If the nozzle used at last spray job is going to be re-used, then press ↵.
Selecting another nozzle:
1. Select another nozzle by pressing %▲+ or %▼−.
2. Confirm the choice by pressing ↵.




3. If a selected nozzle holds no LookAhead calibration in the HC 5500 memory then it should be calibrated - see section "Menu 3.7 LookAhead" in the chapter "Menu 3 Calibration".



## Menu 1.1 Volume rate




**How to change the volume rate**

The volume rate can be changed by:
1. Setting the desired rate in the Controller.
2. Manually raising or lowering the pressure via the Spray Box.
3. Pressing %▲+ or %▼− to apply over or under in a preset percentage, e.g. 10% (the 3rd line indicates when this is active) or
4. Pressing %▲+ or %▼− to change to one of 3 preset volume rates.

Items 3 or 4 are only possible for broad-acre spraying.

To read the Volume rate:
Shortcut
Press and hold until menu [1.1 VOLUME RATE] is shown.

To change volume rate:
Move cursor with ◄ or ► to the value to be changed.
Use %▲+ or %▼− to change the value.
Press ↵ to confirm.
Press esc and hold to exit the menu system.

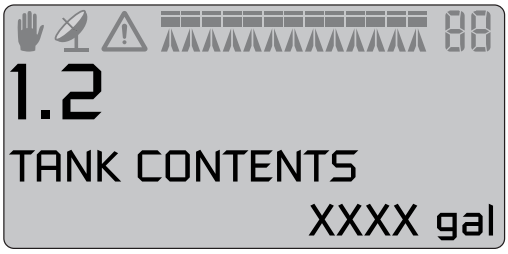
If the volume rate is set up with 3 programmable rates, there are three possibilities to enter volume rate.
[1.1.1 Rate 1] (Default)
[1.1.2 Rate 2]
[1.1.3 Rate 3]

Manual dosage
To dose in manual mode, use the pressure switch on the Spray Box.
The manual mode is indicated by the ✋ symbol at the top of the display.
To go from manual to preset volume rate, press ⚠.

ATTENTION! Under 0.3 mph (0.5 km/h), the Controller will not regulate automatically.

# 5 - Menu 1 Daily settings

## Menu 1.2 Tank contents




**To change the displayed Tank contents**

Shortcut

Press and hold until menu [1.2 TANK CONTENTS] is shown.
The maximum size of the tank is displayed

Press again and the tank contents maximum value is shown.
Press or to move the cursor to the value to be changed.
Press or to set the desired value.
Press to confirm.
Press and hold, to exit the menu system.

## Menu 1.3 Select register

### Menu 1.3.1 Register readout and selection


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 saved when the system is switched off.

To read the totals of all registers:
Shortcut
Press and hold until menu [1.3.1 Register XX] is shown.
Press or to go to register 99. The number is shown on the 1st line and if present, the name on the 4th line.
Press to enter the register.
Press to scroll through the data.
Press and hold to exit the menu system.

To read the data in the active register:
Shortcut
Press and hold until menu [1.3.1 Register XX] is shown.
Press to enter register.
Press to scroll through the data.
Press and hold to exit the menu system.

To reset register:
Press and hold until the countdown has ended.
Reset of a register can be stopped if the key is released before countdown has ended.

---

To change the register:
Shortcut
Press and hold until menu [1.3.1 Register XX] is shown.
Press or to change the register.
The number is shown on the 1st line and if present, the name on the 4th line.
Press . If necessary, the register can be reset.
Press until the countdown has ended.
Press and hold to exit the menu system.

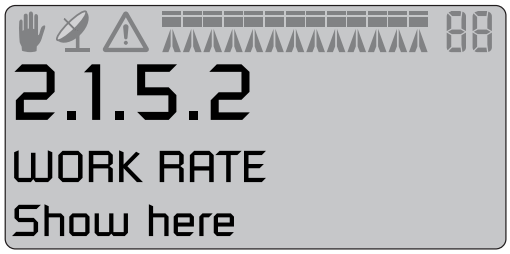
ATTENTION! The active register number is always visible in the right upper corner of the display.

## Menu 2.1 Display readout

### General info

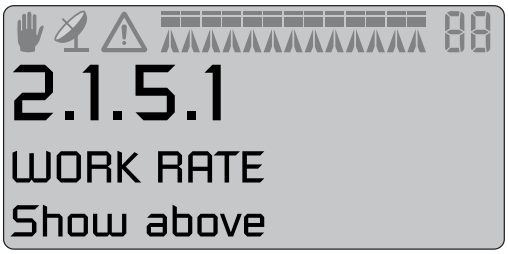
The following menu explanations assume you have mastered the general keystrokes and you can "find your way" to the specific menu. If this is not so, please re-read section "Navigation keys".

### Menu 2.1.5 Work rate




It is possible to freely choose which function is to be shown on the 3rd or 4th line of the display. Choose the submenus of menu [2.1 Display readout].

Choose a submenu e.g. menu [2.1.5 Work rate].
Press ↵ to confirm.
Use %▲+ or %▼− to choose which line is to show data. Picture will change as shown.
Press ↵ to confirm.




| DISPLAY TEXT | DESCRIPTION |
|---|---|
| [2.1.1 Program: Actual] | Programmed and actual application rate |
| [2.1.2 Flow rate] | Flow rate out to the boom |
| [2.1.3 Optional sensor] | There are 8 sub-choices |
| [2.1.4 Time] | Actual time |
| [2.1.5 Work rate] | Rate shown in acres per hour |
| [2.1.6 Volume rate] | Actual rate in gallons per acre |
| [2.1.7 Tank contents] | Main tank contents |
| [2.1.8 Speed] | Driving speed |
| [2.1.9 Volume: Area] | 2 readouts on the same line |
| [2.1.10 Active boom size] | Active boom size including end nozzle |

# 6 - Menu 2 Setup

## Menu 2.2 Auto functions

#### Menu 2.2.1 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 on the 1st line will blink when speed is under the trigger value.

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

#### Menu 2.2.2 Foam Marker

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.

| Setting | Activity |
|---|---|
| [Disable] | The marker will only follow the setting of the switch on the Spray Box. |
| [Same side] | The Controller will automatically activate the same side for race-track spraying. |
| [Change side] | The Controller will automatically change side for up and back spraying. |

Foam marker status is shown briefly on the line 4 of the screen.

#### Menu 2.2.3 Dual line (not used in North America)

This menu is not used in North America.

## Menu 2.3 Variable Rate Application

#### Variable Rate Application (VRA) / Remote

If the volume rate is to come from an external source (e.g. a site specific application map or a remote sensor), this menu has to be enabled.

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

The external source is connected to the COM 1 or COM 2 via a 9 pin sub D connector.

ATTENTION! The COM port may have to be set up in the extended menu. Contact your HARDI® service center.

## Menu 2.4 Set clock

### How to set clock

If the Controller/Terminal prompts for date and time, [Set clock to enable register]:

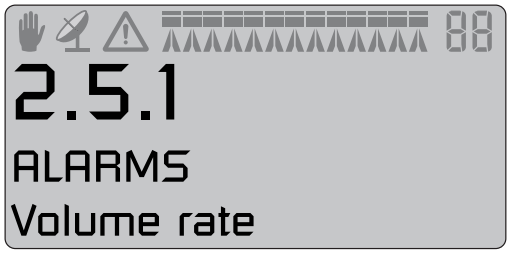
This must be done before the Controller/Terminal is put into operation for the first time, otherwise no start and stop time will be recorded in the registers.

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

Press ↵.
Press %▲+ to menu [2 Setup].
Press ↵.
Press %▲+ to menu [2.4 Set clock].
Press ↵ to enter menu [2.4.1 SET CLOCK].
Now you can choose between 24 hour or 12 hour clock with %▲+.
Press ↵.
Set minutes, hours, year, month, day with %▲+ and ◁.
Press ↵ to confirm.
Press esc and hold to exit menu system.

## Menu 2.5 Alarms

### How to set up alarms

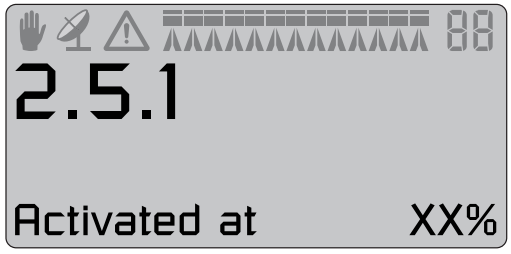



Six different alarms can be set up. Choices are listed as follows.

| DISPLAY TEXT | NOTES |
|---|---|
| [2.5.1 Volume rate] | Suggested setting is 10% |
| [2.5.2 Tank contents] | Measured in Gallons |
| [2.5.3 Spray pressure] | High/low pressure |
| [2.5.4 Fan speed] | High/low rpm |
| [2.5.5 Speed] | Speed max./min. |
| [2.5.6 Audio level] | 0 = no sound, 5 is max. volume |
| [2.5.7 Sections off] | Sections switched to OFF |

When outside the alarm parameters, the relevant warning will flash. The alarm beep can also be adjusted in audio level in menu [2.5.6 Audio level].

Examples shows volume rate alarm for over or under application for more than 20 seconds.




Suggested setting is 10%. For no alarm, set at 0.

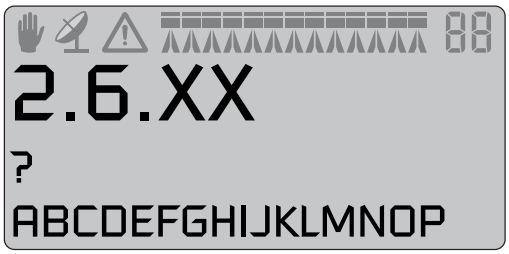
## Menu 2.6 Register names

### How to register names

If desired, the registers can be given names. Once set up, a name can be copied and edited.

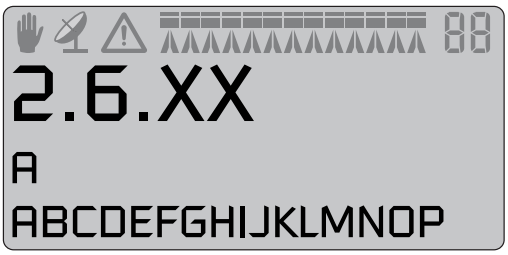
Press %▲+ or %▼- to toggle between [Yes] or [No].
Press ↵ if the name can not be copied or edited.
A "?" will blink on the 3rd line.

### Menu 2.6.XX Copy name




Register number
Menu number
3rd line blinking
Character set

→ Moves "?" one step to right.
← Moves "?" one step to left.
%▲+ or %▼- Changes character set.
↵ Activates cursor in 4th line exchanging with "?" in 3rd line.
esc Leaves the menu.
c No effect.

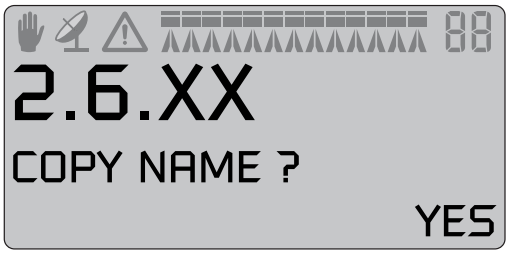



Assuming ↵ is pressed, "A" will blink in both 3rd and 4th line.

→ "B" will blink in both 3rd and 4th line.
← "P" will blink in both 3rd and 4th line.
%▲+ or %▼- Changes character set.
↵ Selects character and returns to 3rd line.

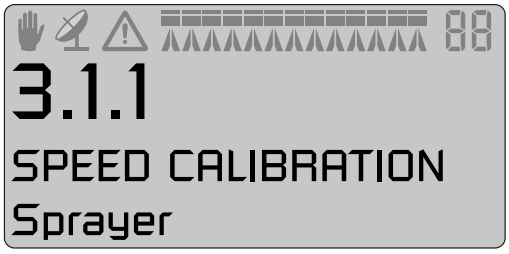
The second letter can now be selected.

Press ↵ to select [Yes].
Press %▲+ or %▼- to scroll through the defined names. The register number on the 1st line will change accordingly.
Press ↵ to select.
The name can be copied and edited. The blinking cursor is for editing.



## Menu 3.1 Speed calibration

### Menu 3.1.1 Sprayer




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

Shortcut

1. Press until menu [3.1.1 Sprayer] is shown.

It is possible to connect the speed sensor at different locations. They are calibrated in the following menus:

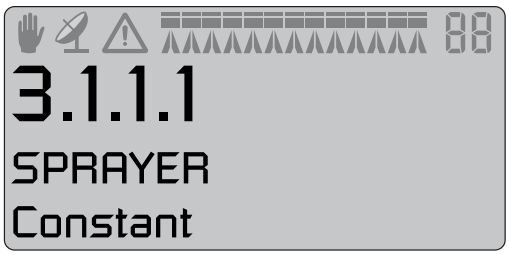
[3.1.1 Sprayer] Speed sensor on sprayer
[3.1.2 Tractor] Speed sensor on tractor
[3.1.3 Radar] Radar speed sensor

2. Choose with the navigation keys.
3. Press to confirm. The last confirmed sensor is the active speed sensor.

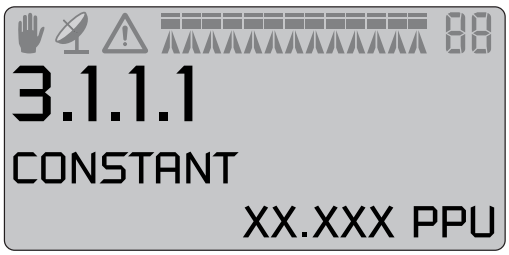
Shortcut

4. Press until menu [3.1.X "Speed abc"] is shown.
5. Choose speed transducer. (Sprayer, Tractor or Radar) [3.1.1 Sprayer]
6. Press to confirm.
7. Press to read PPU value.

The speed transducer can be calibrated theoretically or practically. The practical method is recommended.




### Menu 3.1.1.1 Constant




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

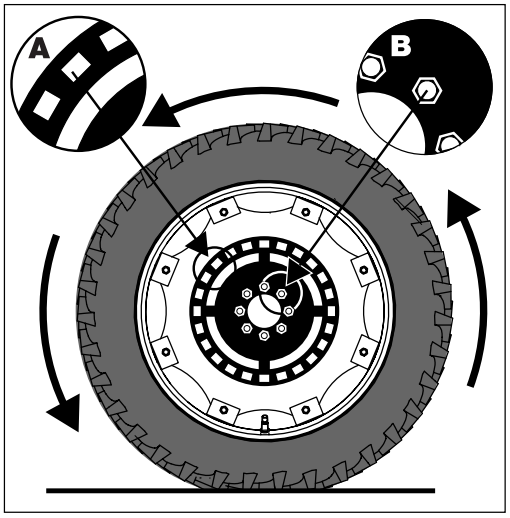
# 7 - Menu 3 Calibration

The PPU value can be calculated in the following formula.

PPU = Number of holes / Wheel circumference

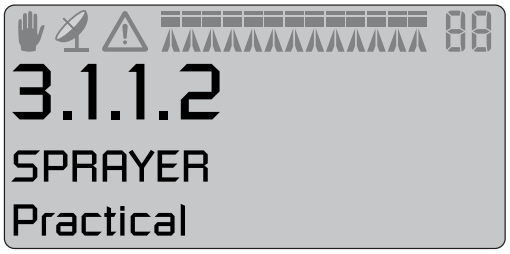
E.g. If the wheel circumference is 6.00 ft. and there are 24 holes (protrusions) for the sensor, PPU is 4.000:

PPU = 24 pcs / 6.00 ft. = 4.000 pulses per unit



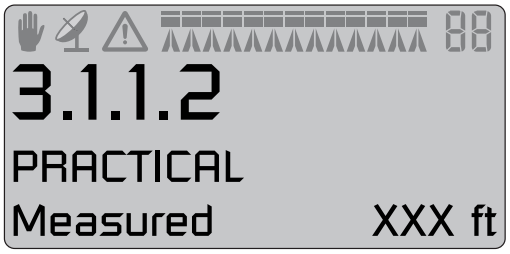

**Menu 3.1.1.2 Practical**

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



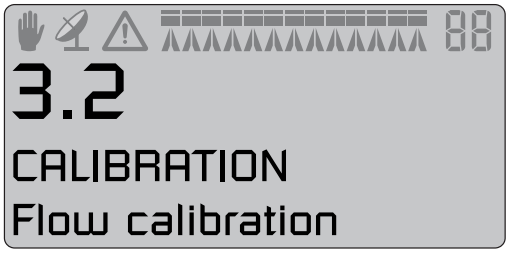

Method:

1. Measure a distance not less than 250 ft.
2. Park the tractor at the start of the measured distance.
3. Press ↵. When zero distance [ 0 ft ] shows, drive the distance.
4. Press ↵.
5. Correct the distance shown on the display with the %+ or %− to read the actual distance.
6. Press ↵ to confirm.



## Menu 3.2 Flow calibration

### Which method to use

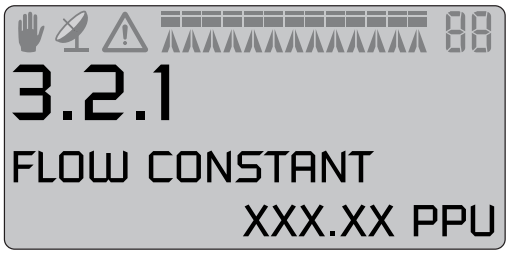



The flow transducer can be calibrated theoretically or with two practical methods. The practical methods are preferred. Calibration is done with clean water. The Flow Tank method is time consuming, but is more accurate than the Flow Nozzle method.

When changing to nozzles with more than a 10% increase or decrease in output, it is recommended to recalibrate the flow transducer.

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



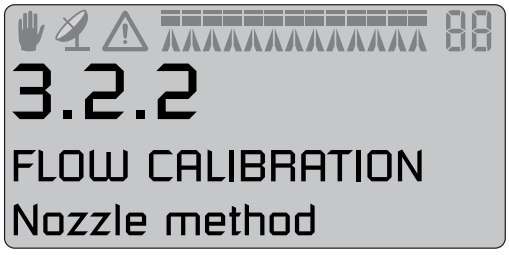

Use the navigation keys to change the flow constant theoretically.

Approximate PPU values for different flow housings are as follows in the table. Different flow housings are designated by groove (A).

| Housing | Housing identification (A) | Flow range | Orifice | PPU |
|---|---|---|---|---|
| | | g/min | mm | value |
| S/67 | One outside groove | 2 - 30 | 13.5 | 485.00 |
| S/67 | No groove | 4 - 70 | 20.0 | 225.00 |
| S/67 | Two outside grooves | 4 - 160 | 36.0 | 475.00 |


ATTENTION! PPU indicates the number of pulses which theoretically come from the flow transducer while 1 gallon of liquid passes through.

### Menu 3.2.2 Nozzle method




During practical flow calibration, the individual nozzle output on the display is compared to the actual individual nozzle output. The output displayed is corrected to read the actual output.

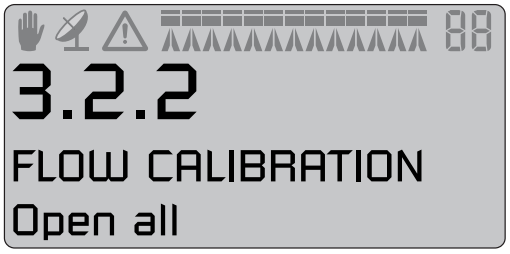
ATTENTION! See menu [3.3 Boom] if no boom data has yet been entered.

# 7 - Menu 3 Calibration

Method:

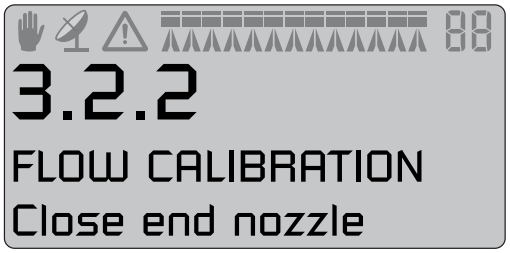
1. Open all boom sections. Switch the main ON/OFF to ON. Close end nozzles (if fitted).

2. Go to menu [3.2.2 Nozzle method]. The display- will then show the individual nozzle output per minute.

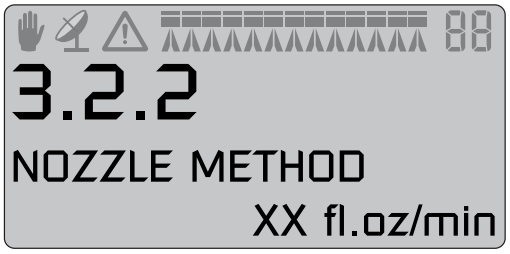



ATTENTION! If a section has not been opened or an end nozzle is not closed, the warnings below will show up in the lowest line on display. If the boom symbol on the 1st line blinks, set menu [2.2.1 ON/OFF] to [0.0 mph].

3. Using a HARDI® calibration jug, check the actual nozzle output per minute. It is recommended that an average of several nozzles be taken.



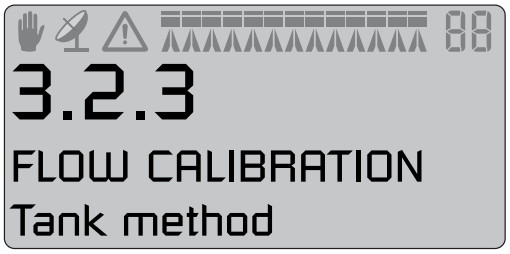

4. Press ↵.
5. Correct the output shown on the display with the navigation keys to read the average output measured with the calibration jug.
6. Press ↵ to confirm.




**Menu 3.2.3 Tank method**

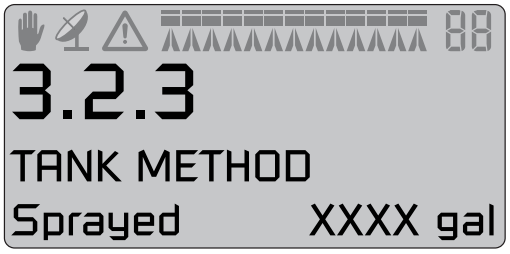
During practical flow calibration, the tank is partly emptied through the nozzles. While emptying, the display calculates the quantity emptied on the basis of the actual calibration value (PPU). The quantity displayed is compared with the quantity actually dosed.

This can be according to the tank contents level indicator or by weight difference before and after. The quantity displayed is corrected to read the quantity actually dosed.



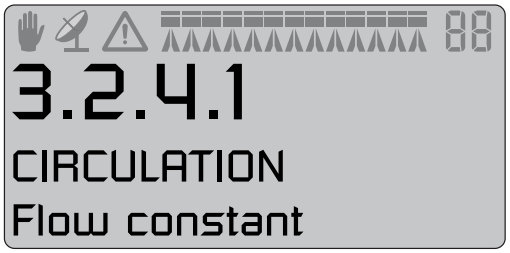
Method:

1. Place the tank on level ground and fill it up with water until the level reaches a unique mark on the tank contents level indicator, e.g. 500 gallons.
2. Open all boom sections.
3. Go to menu [3.2.3 Tank method] and switch the main ON/OFF to ON.
4. Engage the P.T.O. The display- unit will then begin to count the volume being emptied through the nozzles.
5. When for example, 300 gallons have been emptied out, as shown by the tank contents level indicator, disengage the P.T.O. and switch the main ON/OFF to OFF.
6. Press ↵.
7. Correct the volume shown on the display with the navigation keys to read the volume shown on the tank contents level indicator.
8. Press ↵ to confirm.

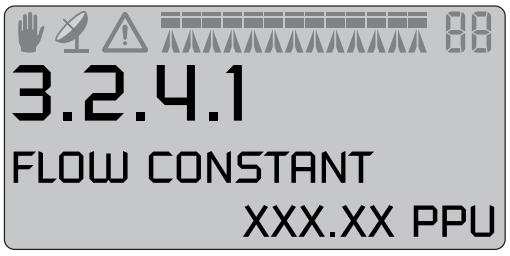



**Menu 3.2.4 Circulation**

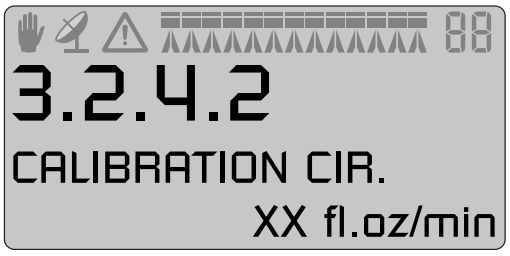
The following is only relevant for sprayers equipped with circulation liquid system with 2 flowmeters. The circulation type liquid system has to be set up from the Extended menu at installation. The HARDI® Service center does this.




See menu [3.2 Flow calibration] for calibration of "Flow 1". Flow constant from "Flow 1" is shown.

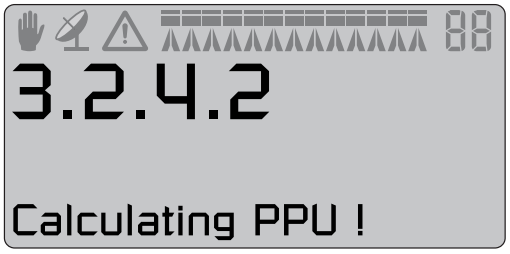



"Flow 1" is used as a reference when calibrating circulation flow, "Flow 2".



Method:

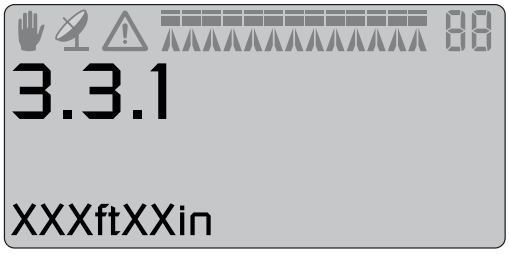
1. Ensure all boom sections and end nozzles are closed.
2. Go to menu [3.2.4.2 Calibrate circulation].
3. Press [↵]. The automatic calibration is initiated and line 4 will show "Calculating PPU".
4. When finished the menu returns to [3.2.4.1 Flow constant] to show the new PPU.



## Menu 3.3 Boom

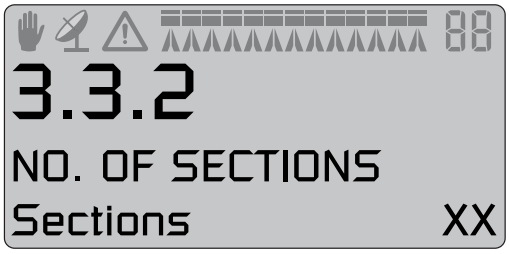
### Menu 3.3.1 Width

Use the navigation keys to enter boom width.
Press ↵ to confirm.



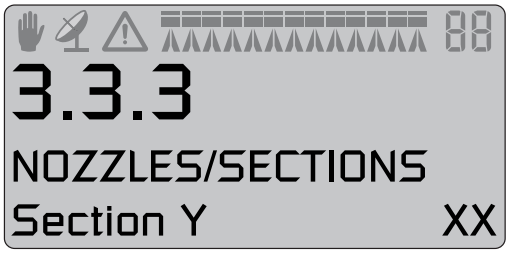

### Menu 3.3.2 Number of sections

Use the navigation keys to set number of boom sections.
Press ↵ to confirm.



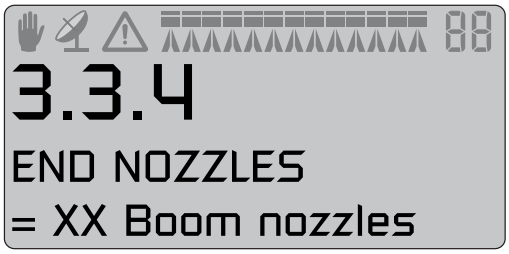

### Menu 3.3.3 Nozzles/section

Use navigation keys to set correct number of nozzles per section.
Press ↵ to continue to next boom section.
Press ↵ after the last section.




### Menu 3.3.4 End nozzles (optional)

If end nozzles are fitted, set the value to the equivalent coverage by the boom nozzles. E.g. End nozzle coverage is 5 feet. This is equal to [03 Boom nozzles].




ATTENTION! It is important that the volume applied from the end nozzle matches the volume applied under the boom. This is a comparison of volume per minute per length. (Gallon/min/foot).

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.

# 7 - Menu 3 Calibration

## Menu 3.4 Regulation constant

**Regulation constant**

The sensitivity of pressure regulation valve can be adjusted. Increasing the regulation constant will give a faster response on the pressure regulation valve. If the constant is too high, the valve will become unstable. There will also be excessive wear on the valve. The range is in percent. The factory default is 50%.

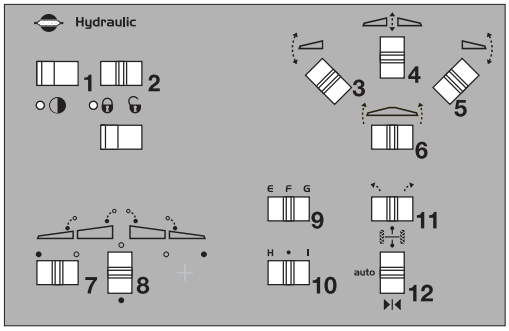
ATTENTION! For sprayers with regulation feedback the value can be reduced to 30 %.

## Menu 3.5 Tank gauge (not used in North America)

This menu item is not used in North America.

## Menu 3.6 SafeTrack

### SafeTrack




The SafeTrack is operated at the hydraulic control box. Track selection switch (12) has 3 positions:

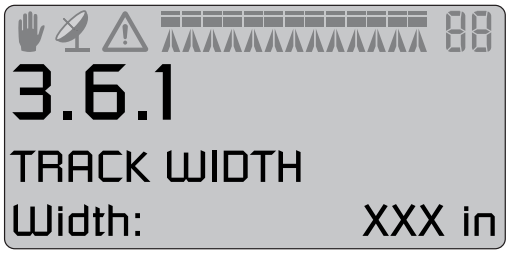
1. When pressed downwards, the sprayer will align to be in position for folding the boom.

2. When the switch is the middle position, the system is in auto and the sprayer track will follow the track from the tractor.

3. When the switch is in the upper position, the system is in manual, and the switch (11) can be used for steering the sprayer right and left.

ATTENTION! When driving in hilly terrain, the manual steer button (11) can be used to optimize the tracking. Before reaching the headland, switch the track selection switch (12) to manual and back to auto to neutralize the offset.

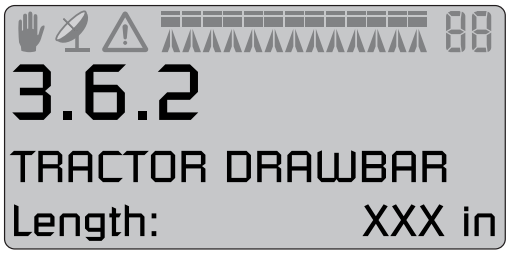
### Menu 3.6.1 Track width




Here the distance from right side tire center to left side tire center can be entered.

Factory setting: 71 in

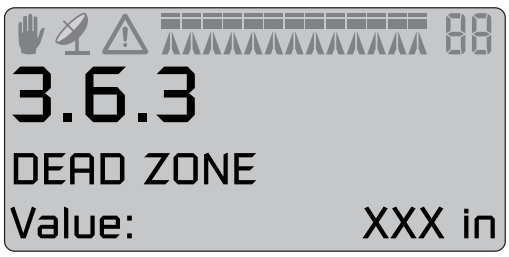
### Menu 3.6.2 Tractor drawbar




Here the length of the tractor drawbar is entered. The measurement is from the center of the tractor rear axle to the center of the drawbar pin.

Factory setting: 31 in

### Menu 3.6.3 Dead zone



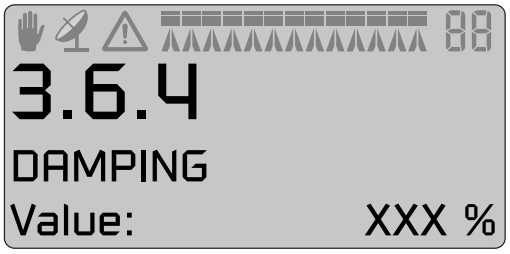

This is the non regulation zone when the sprayer is straight behind the tractor, if the sprayer is oscillating in the hydraulics when driving straight, this value can be increased.

Factory setting: 2 in

### Menu 3.6.4 Damping

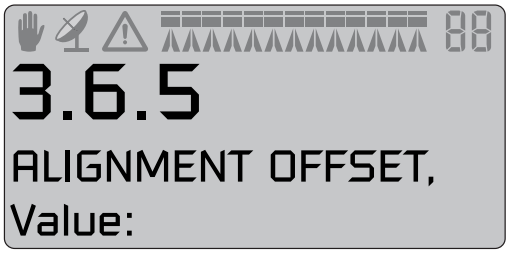
If the system is too aggressive, the damping constant can be increased.

Factory setting: 50%




### Menu 3.6.5 Alignment offset

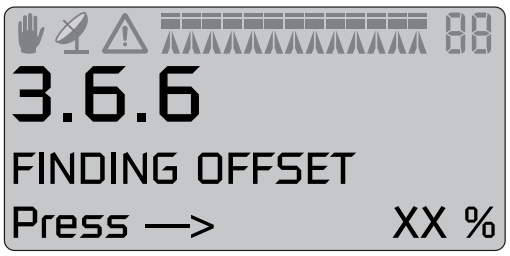
Here the fine tuning of tractor and sprayer alignment is done. This is to compensate if the front potentiometer is placed slightly different when the sprayer is attached to the tractor from time to time.
Note +/- can be changed with %▲+ and %▼−
Factory setting: 0



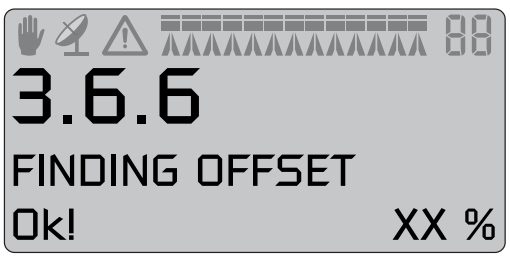

### Menu 3.6.6 Sensitivity

The purpose of this menu, is to adapt the track regulation to the tractor hydraulics and to the characteristics of the sprayer hydraulics system.
Calibration procedure is divided into 4 acts 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 controller.
First left/right offset is found:
3. Go to menu [3.6.6 Sensitivity] and select "Yes" with %▲+ or %▼− and press ↵. Calibration starts.

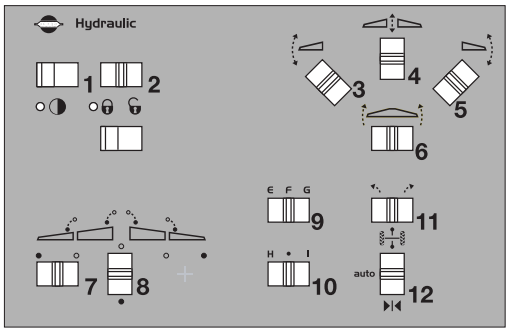

4. Press and hold the manual track button (11) to the direction indicated by the arrow in the display. Display will show a counting percentage ending with an "OK" when offset is found.



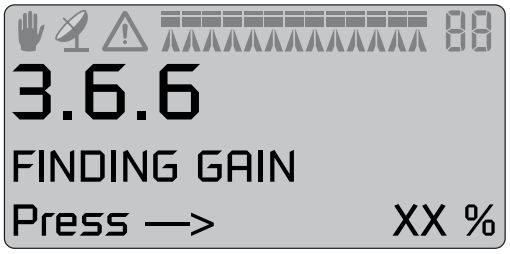

5. Confirm by pressing ↵. Afterwards same procedure is repeated for opposite direction.



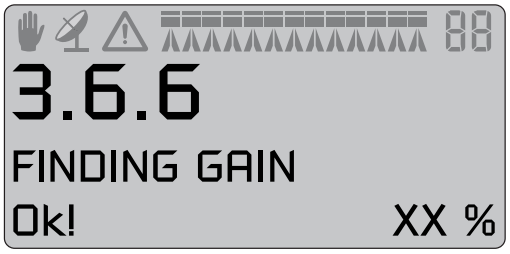
Then calibration automatically continues with gain calibration:



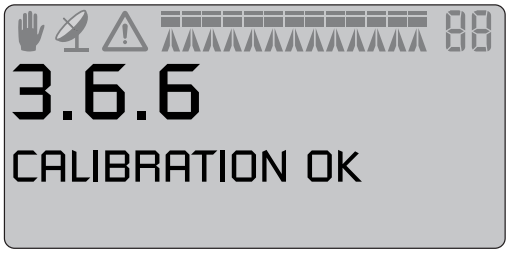

6. Press and hold the manual track button (11) to the direction indicated by the arrow in the display. Display will show a counting percentage ending with an "OK" when gain is found.




7. Confirm by pressing ↵. Afterwards same procedure is repeated for opposite direction.




8. The display reads "CALIBRATION OK" when calibration has finished. Confirm and leave menu by pressing ↵.




ATTENTION! If values has not been reached at 40 % the display will read "Fail!". Accept this by pressing ↵. Then increase hydraulic oil flow from tractor and retry calibration again.

**Emergency Track**

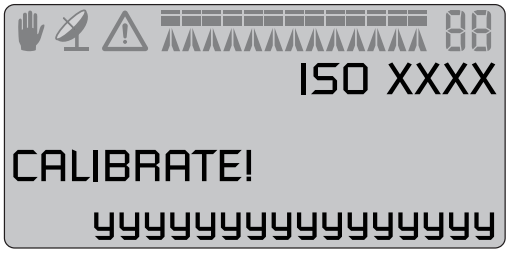
See "Menu 4.7 Emergency Track"

# 7 - Menu 3 Calibration

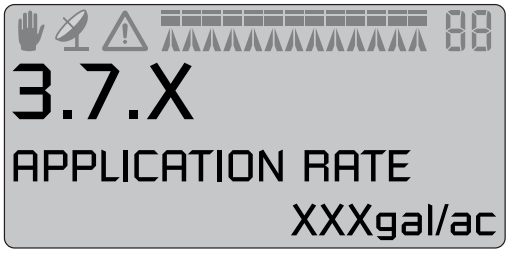
## Menu 3.7 LookAhead

### Menu 3.7.X LookAhead calibration

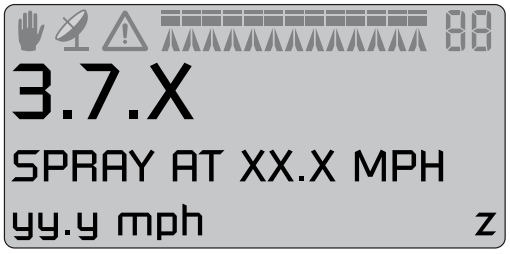
At start-up of the HC 5500, the user is prompted for a nozzle choice. If the selected nozzle holds no LookAhead calibration in the HC 5500 memory, it will need to be calibrated. Press [auto] to enable "auto" mode prior to calibration.



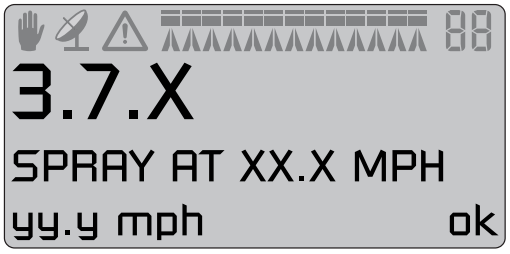

Calibration method:
1. Press [↵] to begin calibration. Enter an application rate in the display.
2. Confirm by pressing [↵].
Two spraying speeds for calibration are now calculated in the HC 5500.



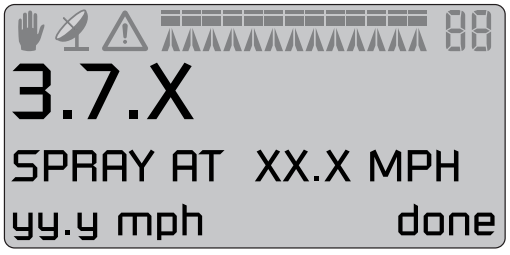

3. Start spraying at the calculated speed. Tacho in 4th line of display shows actual speed.




4. Meanwhile spraying at calculated speed, a digit in lower right corner of display is counting up to 9. If calibration value is found, "ok" is shown in the display. If a value is not found, the digit start re-counting up to 9 until a value is found.

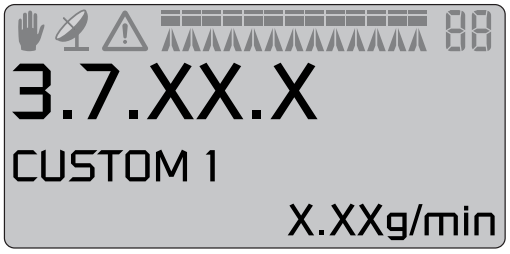



5. Another calculated speed is now shown in the display. Repeat point 3 and 4 again for this 2nd calculated speed.
6. The digit in right corner counts up as told in point 4. But when a value is found this time, it will be shown with a "done" as calibration has now finished.
7. Leave calibration by pressing [↵].



If custom nozzle LookAhead calibration is selected, the flow at 43.5 PSI (3 bars )must first be defined.

1. Enter value.
2. Confirm by pressing ↵.
3. Do all the above calibration routine as usual.




ATTENTION! To calibrate when auto is on, the speed must exceed the minimum "auto" speed set in the controller memory. If minimum "auto" driving speed is set too high, please contact your local HARDI® dealer.

ATTENTION! If all section valves are turned off, then LookAhead is standby. When turning single sections off, then last valve must be turned off by using the main on/off.

ATTENTION! During the entire calibration process, the system should be in "Auto" mode. If not, press auto to enable it.

ATTENTION! When using very large nozzles it could be necessary to reduce speed until application rate is stable.

ATTENTION! If controller suggests a speed lower than min. regulation speed, then choose a higher application rate.

## Menu 4.1 Measure

### Measuring tape

This is a simple electronic "measuring tape". 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].
Use C to clear the value.

## Menu 4.2 Service intervals

### Menu and 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 Interval A] | 10 | See sprayer instruction book, Maintenance. |
| [4.2.2 Interval B] | 50 | See sprayer instruction book, Maintenance. |
| [4.2.3 Interval C] | 250 | See sprayer instruction book, Maintenance. |
| [4.2.4 Interval D] | - | Not defined from factory. |
| [4.2.5 Nozzle] | 50 | Check flow rate. Change nozzles if more than 10% of rated flow. |

Entering the above menu's will display the hours used.
The importer or dealer may have added Interval D. If no interval is set,
[D Not defined] is shown.
Press ↵ to register service or control, if displayed when switched on.
The warning ⚠ will remain present until the service interval is reset.

### Service interval reset

To reset service interval, go to relevant interval [4.2.X Interval X or Nozzle].
Press C to reset hour metre.
Press ↵ to confirm.

X = Variable values here

# 8 - Menu 4 Toolbox

## Menu 4.3 Stop watch

#### Menu 4.3.2 Activate Stop watch

The clock can be used as a timer.
Press ↵ to start and stop.
Use C to clear the value.

## Menu 4.4 Alarm clock

#### How to use alarm

The clock can be set to give an alarm when the time is reached.
Press %▲+ or %▼−. Use navigation keys to set alarm.

## Menu 4.5 Test

#### How to 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 milli-ampere.

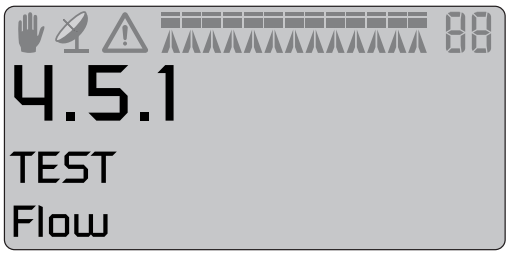
Go to menu [4.5 Test]. Choose the item to be tested and open the menu. Activate sensor and see if the signal is detected.

[4.5.1 Flow]. Enter this menu to test the flow sensor.

[4.5.2 Speed].

[4.5.3 Optional sensor].

[4.5.4 Active switches].



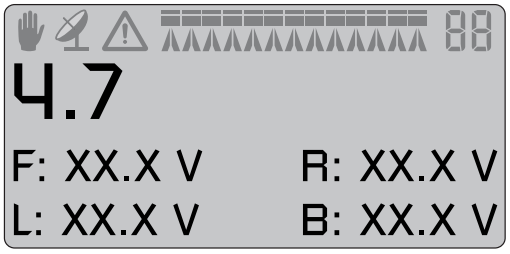

## Menu 4.6 Speed simulation

#### How to use speed simulation

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

## Menu 4.7 Emergency Track

**Emergency Track**




In this menu all sensors are ignored, and the system can be operated manually, and the sensor values can be checked.

F: Front potentiometer

R: Rear potentiometer

L: Lock sensor

B: Boom sensor

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, switch power to HC 5500 to OFF and stop oil flow to the sprayer.

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

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

## Menu 5.1 Print

### What you can print

This menu has to do with dumping and printing of data.

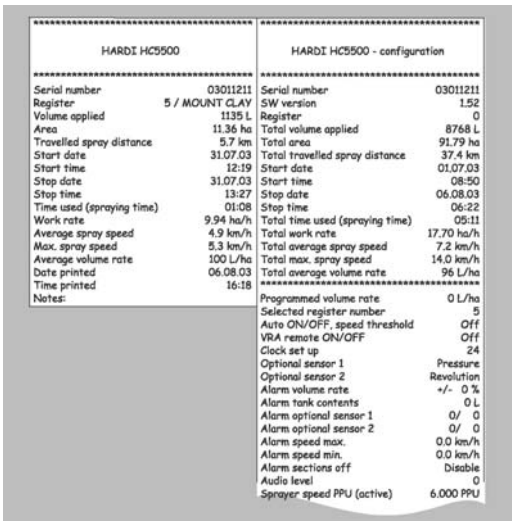
The following can be printed via the 12 volt printer.

[5.1.1 Register number] A specific register

[5.1.2 All registers] Register 1 to 99. Only active ones will be printed.

[5.1.3 Configuration] This records all the parameters of the Controller.

Two examples of printouts are 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).This menu has to do with dumping and printing of data.



HARDI HC5500

| | |
|---|---|
| Serial number | 03011211 |
| Register | 5 / MOUNT CLAY |
| Volume applied | 1135 L |
| Area | 11.36 ha |
| Travelled spray distance | 5.7 km |
| Start date | 31.07.03 |
| Start time | 12:19 |
| Stop date | 31.07.03 |
| Stop time | 13:27 |
| Time used (spraying time) | 01:08 |
| Work rate | 9.94 ha/h |
| Average spray speed | 4.9 km/h |
| Max. spray speed | 5.3 km/h |
| Average volume rate | 100 L/ha |
| Date printed | 06.08.03 |
| Time printed | 16:18 |

Notes:

HARDI HC5500 - configuration

| | |
|---|---|
| Serial number | 03011211 |
| SW version | 1.52 |
| Register | 0 |
| Total volume applied | 8768 L |
| Total area | 91.79 ha |
| Total travelled spray distance | 37.4 km |
| Start date | 01.07.03 |
| Start time | 08:50 |
| Stop date | 06.08.03 |
| Stop time | 06:22 |
| Total time used (spraying time) | 05:11 |
| Total work rate | 17.70 ha/h |
| Total average spray speed | 7.2 km/h |
| Total max. spray speed | 14.0 km/h |
| Total average volume rate | 96 L/ha |
| Programmed volume rate | 0 L/ha |
| Selected register number | 5 |
| Auto ON/OFF, speed threshold | Off |
| VRA remote ON/OFF | Off |
| Clock set up | 24 |
| Optional sensor 1 | Pressure |
| Optional sensor 2 | Revolution |
| Alarm volume rate | +/- 0 % |
| Alarm tank contents | 0 L |
| Alarm optional sensor 1 | 0/ 0 |
| Alarm optional sensor 2 | 0/ 0 |
| Alarm speed max. | 0.0 km/h |
| Alarm speed min. | 0.0 km/h |
| Alarm sections off | Disable |
| Audio level | 0 |
| Sprayer speed PPU (active) | 6.000 PPU |

ATTENTION! For configuration printout, total area and total average volume rate values are not relevant.

# 9 - Menu 5 Logbook

## Menu 5.2 Data dump

#### How to dump data

Enables data dump to an office printer. This could be done for example, by using the Hyper Terminal function in Microsoft Windows. Note the Hyper Terminal has to be activated and a communication cable (ref. no. 72271600) and 12 volt power supply to the Controller and Spray Box is needed.

If only the display unit is to be removed from the tractor, a 12 Volt power supply cable (ref. no. 72244500) is necessary.

The following can be printed to an office printer.

[5.2.1 Raw data]

[5.2.2 With header] Permits data to be set up with a column header.

## Off-season storage

### Storage

When the tractor and sprayer is parked, disconnect the power supply to the Spray Box. This will stop the system from using power.

The Controller and Spray Box should be protected from moisture and should be removed if the tractor does not have a cabin.

## Emergency operation

#### In an emergency situation

The Spray Box can operate the control unit without the Controller. If you suspect the Controller is faulty, disconnect it from the Spray Box. Spraying can now be continued. If the fault persists, it is not the Controller.

# 11 - Fault finding

## Operational problems

### Operational faults

| FAULT | PROBABLE CAUSE | CONTROL/REMEDY |
|---|---|---|
| Area is not being measured. | Boom width or speed constant have not been entered. | Enter the values in menu [3.3.1 Width] and [3.1 Speed calibration]. |
| | No pulses are coming from the speed sensor. | Check the sensor, check the cable to the sensor for damage. If necessary, replace the sensor. |
| | | Check sensor location [3.1 Speed calibration]. |
| The volume rate gpa is continuously displayed at "0". | Constant has not been entered. | Enter constant in menu [3.2.1 Flow calibration]. |
| | Pulses of the flow meter are not reaching the sprayer control unit. | Check wiring. Check the impeller of the flow meter - it may be stuck. |
| The volume rate display is not correct. | The flow meter is not working properly. | Test the flow meter using menu [4.5.1 Flow]. |
| | The area is not being registered. | Check boom width and adjust if necessary. |
| | | Re-calibrate speed [3.1 Speed]. |
| The intended volume rate cannot be reached. | The pressure motor has been wrongly poled. The rate is controlled downwards instead of upwards. | Check the control by using the +/- keys in manual mode. Change the control motor connections if necessary. |
| The volume is below the pre-set rate. | The pump cannot deliver the required amount. | Increase PTO speed. Change to a lower gear. |
| | The filters are blocked. | Clean the filter. |
| The volume rate lies above the pre-set rate. | The pressure motor has been wrongly poled. The rate is controlled downwards instead of upwards. | Check the control by using the +/- keys in manual mode. Change the control motor connections if necessary. |
| | The return flow from the pressure motor to the tank cannot take superfluous quantity. | Check the tube system. Reduce the power of the pump (lower PTO speed, higher gear). |
| Volume application rate not stable when only one or two boom sections are open. | Flow below minimum frequency of flow transducer. | Set pressure manually when spraying with fewer sections. |
| | | Install a pressure transducer. Under 5 Hz from the flow transducer will result in the system switching to pressure based sensing for volume application rate. |
| Incorrect response from Jobcom. When calibrating sensitivity in menu 3.6.6 the per cent will com above 40% and display FAIL! | The Jobcom does not respond correctly after uploading the newest software. Error under uploading of software. The DAH PCB has to be hardware version 1.2. | Upload the software one more time, and then reset the Jobcom. Use the test procedure for Track / Manual, reset also the HC 5500 by pressing arrow left, enter, arrow right and area remaining. |
| Safetrack not responding. | Sensor not reading correctly. | Check menu 4.7 and correct sensor distance, replace sensor. |
| Jobcom not responding! | Check If the 3 green LED´s Rx/Tx are flashing 3-4 times per second and N28/D27 red and green is Flashing 2 times per second it means communication between Jobcom and HC5500 is OK. | |

| FAULT | PROBABLE CAUSE | CONTROL/REMEDY |
|---|---|---|
| Will not upload software successfully. | Cable incorrect, or incorrectly fitted. | Cable 72271600 has to be used. The plug with the yellow tag has to be mounted in the Jobcom. |
| No response from the hydraulic. | Burned Jobcom PCB. If there is a brown circle on the PCB there has been extreme heat. | Bypass the Jobcom by taking the blue cable from J14 and assemble it with cable from the Hydraulic box J13. |

# 11 - Fault finding

### Mechanical faults

| FAULT | PROBABLE CAUSE | CONTROL/REMEDY |
|---|---|---|
| No speed readout. | Incorrect speed sensor location chosen. | Select the correct sensor on Sprayer,<br>Tractor or Radar in menu [3.1.1 , 3.1.2 or 3.1.3]. |
| Error message that fuse is active. | Short circuit in system.<br>Fuse 1 = Section valves to left of center and center.<br>Fuse 2 = Section valves to right of center.<br>Fuse 3 = Short circuit in all other switches. | Turn power OFF and locate problem. |
| Error message "Low voltage". | Low voltage. | Check battery and connections. |
| Speed readout not stable. | Perforated wheel transducer plate fitted back the front.<br>Speed transducer set too close to upper or lower sides of perforated wheel sensor plate. | Relocate transducer. |
| Attempt to release lock, but no "release" signal from lock sensor. | No hydraulic pressure. Misadjusted lock sensor. Mechanical defect. | Check pressure from tractor. Adjust sensor gap to lock to max. 3/16" (5 mm).Change defected parts. |
| Attempt to lock, but no "lock" signal on sensor input. | Lock sensor misadjusted. Mechanical defect prevents lock to penetrate hole. Misadjusted rear angle sensor. | Adjust lock sensor gap to max. 3/16" (5 mm). Change defective parts. Adjust rear angle sensor to center. |
| Lock is detected released unintentionally. | Poor lock sensor adjustment. Lock cylinder fallen off. | Re-fit new lock cylinder. |
| Lock is detected released. | Hydraulic pressure established. Misadjusted lock sensor. | Adjust lock sensor gap to max. 3/16" (5 mm). |
| Lock is detected locked unintentionally. | Missing hydraulic pressure on lock cylinder. Misadjusted lock sensor. | Check pressure from tractor. Adjust sensor gap to lock to max. 3/16" (5 mm). |
| No lock release when hydraulic pressure is established, and the HC 5500 is powered up. | Hydraulic pressure hoses P and T are turned around. | Turn hydraulic pressure around.<br>T = blue P = red. |
| Power to Jobcom. | Power supply not sufficient. The power cable to the Jobcom has to be a unbroken power line from the battery. | The cable from the battery to Jobcom has to be 10 awg. Fit 72266300 tractor power cable. The fuse on the cable has to be 25A. |
| Rear angle sensor alarm. | In menu 4.7 the rear angle sensor will read app. 0.02 Volt. | Check 10A fuse on DAH PSB in the Jobcom. |
| Unable to lock the Safetrack. | The back angle sensor possibly need adjustment. | A 16-17 mm bolt is pasted in the calibrating hole on the lock. Then the rear angle sensor is adjusted to 2.50 Volt. |
| Jobcom not responding or unintended function. | Communication error. | Check menu E9.2 All cables connections in the Jobcom, Junction box and track assembly box is checked, retighten screw on the cables plugs. |

| FAULT | PROBABLE CAUSE | CONTROL/REMEDY |
|---|---|---|
| Alarm # 1 | Lock is locked but it should be open. | Activate tractor hydraulics. Check/adjust lock sensor. Mechanical defect. |
| Alarm # 2 | Attempted to lock but lock sensor signals not achieved. | Check/adjust lock sensor. Mechanical defect. Check/adjust angle sensor. |
| Alarm # 3 | Lock is detected released unintentionally. | Poor lock sensor adjustment. Lock cylinder fallen off. |
| Alarm # 4 | Lock is detected released unintentionally. | Missing hydraulic pressure on lock cylinder. Misadjusted lock sensor. |
| Alarm S1 - S13 | Section valve defective. | Change valve. |

# 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 fertilizer. 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 formula below can be used to "fine tune" the flow transducer PPU.

New PPU = (Original PPU x Displayed Volume) / Sprayed Volume

For example, the spray tank is filled with 1000 gallons of spray liquid. When sprayed out, the display showed a total of 900 gallons. (Original PPU = 485.0)

New PPU = (485.0 (Original PPU) x 900 (Displayed Volume)) / 1000 (Sprayed Volume) = 436.5

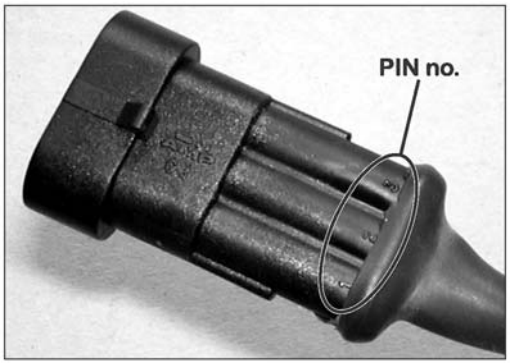
Note the relation is inverse:

* 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 |
|---|---|---|
| 2 | + | Brown |
| 3 | Sig. | Blue |
| 1 | - | Black |




### 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.

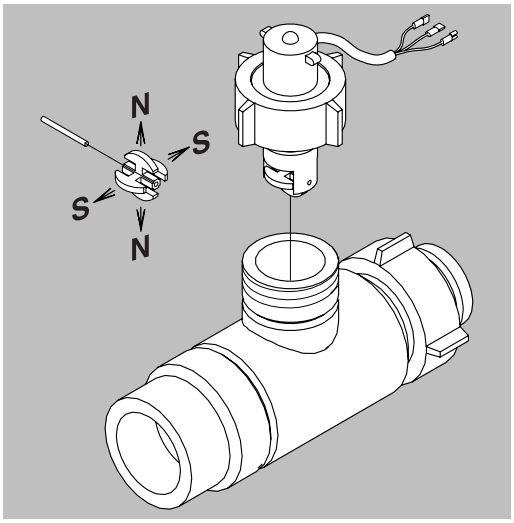
2. Each vane in the rotor has a magnet in it with the pole facing out. Check that the 4 magnets are present.

3. Check every second magnet has the same pole orientation so the rotor magnets are 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 approx. 8.0 +/- 1 volt with the diode on and 0.3 +/- 0.1 volt with the diode off with every second magnet.



# 12 - Testing and fine tuning

### Testing speed transducer

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 within 1/8" to 3/16" (3 to 5 mm) from 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.

# Specifications

## Specifications

| | |
|---|---|
| Supply voltage: | 12 Volt DC |
| Controlled shutdown "low battery": | 9 Volt DC |
| Maximum supply: | 16 Volt DC |
| Maximum peak: | 28 Volt DC |
| Ambient temperature: | 23°F to 158°F (– 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 | 0.3 mph (0.5 km/h) |

## Flow ranges for the flow transducers

| Housing | Housing identification (A) | Flow range | Orifice | PPU |
|---|---|---|---|---|
| | | g/min | mm | value |
| S/67 | One outside groove | 2 - 30 | 13.5 | 485.00 |
| S/67 | No groove | 4 - 70 | 20.0 | 225.00 |
| S/67 | Two outside grooves | 4 - 160 | 36.0 | 475.00 |

# 13 - Technical specifications

## Materials and recycling

### Packaging information

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

### 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.

## Charts

### Chart for recording values

| Menu | Function | 1 - Values | 2 - Values | 3 - Values |
|---|---|---|---|---|
| [3.2.1 Flow constant] | Flow PPU | | | |
| [3.1.X.1 Speed constant] | Speed PPU | | | |
| [3.4 Regulation constant] | % | | | |

## Warranty policy and conditions

HARDI® INC. , 1500 West 76th Street, Davenport, Iowa, USA; 8550 W. Roosevelt Avenue, Visalia, California, USA and 290 Sovereign Road, London, Ontario, Canada hereinafter called "HARDI®", offers the following limited warranty in accordance with the provisions below to each original retail purchaser of HARDI® new equipment of its own manufacturer, from an authorized HARDI® dealer, that such equipment is at the time of delivery to such purchaser, free from defects in material and workmanship and that such equipment will be warranted for a period of one year from the date of delivery to the end user providing the machine is used and serviced in accordance with the recommendations in the Operator's Manual and is operated under normal farm conditions.

1. This limited warranty is subject to the following exceptions:

   a)This warranty will be withdrawn if any equipment has been used for purposes other than for which it was intended or if it has been misused, neglected, or damaged by accident, let out on hire or furnished by a rental agency. Nor can claims be accepted if parts other than those manufactured by HARDI® have been incorporated in any of our equipment. Further, HARDI® shall not be responsible for damage in transit or handling by any common carrier and under no circumstances within or without the warranty period will HARDI® be liable for damages of loss of use, or damages resulting from delay or any consequential damage.

2. We cannot be held responsible for loss of livestock, loss of crops, loss because of delays in harvesting or any expense or loss incurred for labor, supplies, substitute machinery, rental for any other reason, or for injuries either to the owner or to a third party, nor can we be called upon to be responsible for labor charges, other than originally agreed, incurred in the removal or replacement of components.

3. The customer will be responsible for and bear the costs of:

   a)Normal maintenance such as greasing, maintenance of oil levels, minor adjustments, etc.

   b)Transportation of any HARDI® product to and from where the warranty work is performed.

   c)Dealer travel time to and from the machine or to deliver and return the machine from the service workshop for repair.

   d)Dealer traveling costs.

4. This warranty will not apply to any product which is altered or modified without the express written permission of HARDI® and/or repaired by anyone other than an Authorized Service Dealer.

5. Warranty is dependent upon the strict observance by the purchaser of the following provisions:

   a)That this warranty may not be assigned or transferred to anyone.

   b)That the Warranty Registration Certificate has been correctly completed by dealer and purchaser with their names and addresses, dated, signed and returned to the appropriate address as given on the Warranty Registration Certificate.

   c)That all safety instructions in the operator's manual shall be followed and all safety guards regularly inspected and replaced where necessary.

6. No warranty is given on second-hand products and none is to be implied.

7. HARDI® reserves the right to incorporate any change in design in its products without obligation to make such changes on units previously manufactured.

8. The judgement of HARDI® in all cases of claims under this warranty shall be final and conclusive and the purchaser agrees to accept its decisions on all questions as to defect and to the exchange of any part or parts.

9. No employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of HARDI® at it's head office.

10. Any warranty work performed which will exceed $400.00 MUST be approved IN ADVANCE by the Service Manager.
11. Claims under this policy must be filed with HARDI® within thirty (30) days of work performed or warranty shall be void.
12. Parts requested must be returned prepaid within thirty (30) days for warranty settlement.
13. Warranty claims must be COMPLETELY filled out properly or will be returned.

DISCLAIMER OF FURTHER WARRANTY

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, EXCEPT AS SET FORTH ABOVE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCT CONTAINED HEREIN. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES (SUCH AS LOSS OF ANTICIPATED PROFITS) IN CONNECTION WITH THE RETAIL PURCHASER'S USE OF THE PRODUCT.