

CONTROLLER

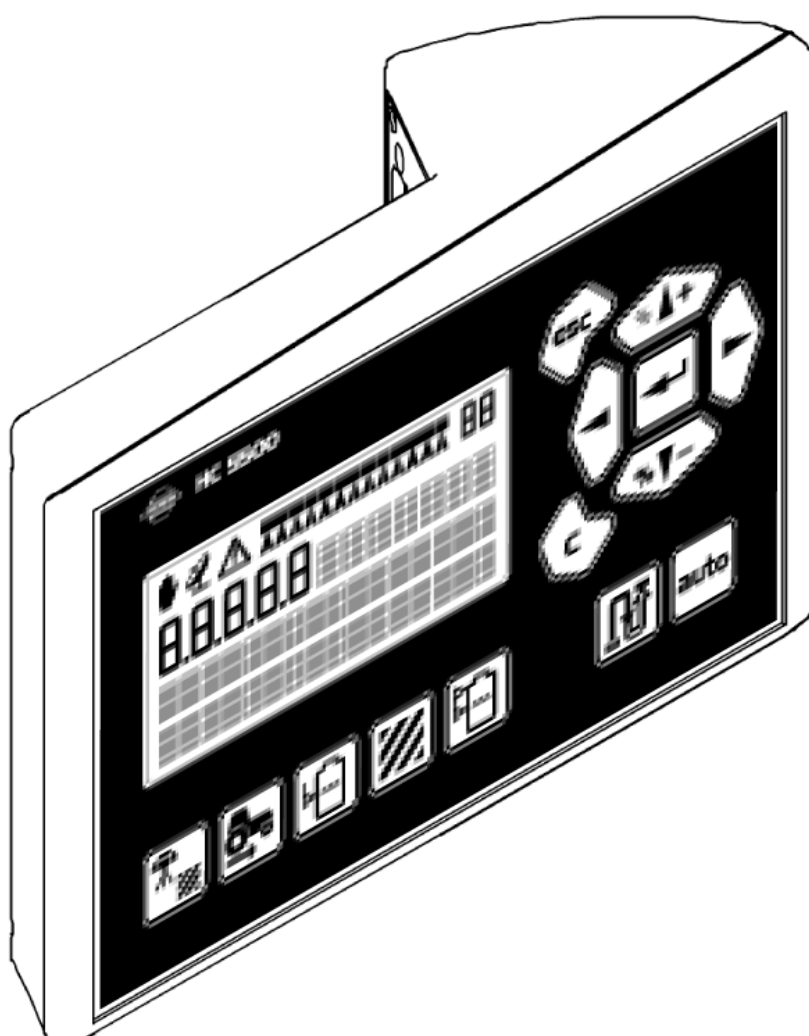
HC5500



Service Manual – SW 4.XX

679060-702 – Version 7.02

GB – 11.2008





Service Manual HC5500

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Introduction

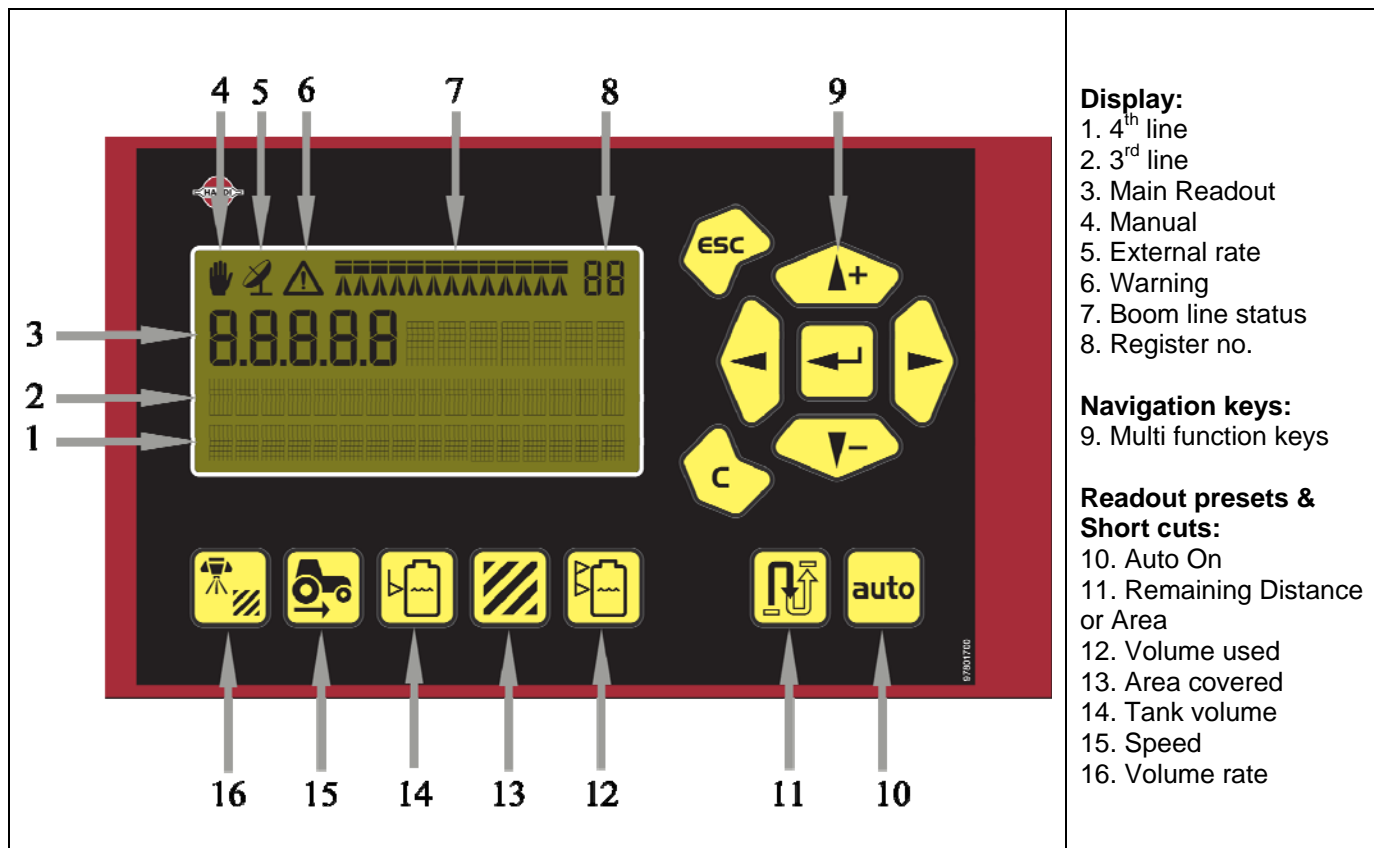
This manual covers the HARDI Controller 5500 and the options it supports like SafeTrack on the Commander and IntelliTrack on Navigator.

It assumes the reader has knowledge of the more basic HC2500. The menu systems, calibration and operations of the HC5500 are built up from the HC2500. The sensors used are also similar or the same.

This manual also at times has notes on the HC6500. This is because the HC6500 is built up around the HC5500 and has many similarities.

Specifications

HARDI HC5500 Controller:



HC5500, Spray box and JobCom power supply and protection

Power supply:

Operating range:

9-16V DC

Controlled processor shut down:

< 9 VDC

Protected against over voltage:

28 VDC

The electronics are protected against reverse polarisation of the power input.

Ambient temperature:

– 5°C to + 70°C

Memory:

Flash PROM non-volatile

Analog transducers typ. press. (Option 1):

Supply:

12 V

Input:

4 to 20 mA

Minimum speed for volume regulation:

0.5 km/h

Digital transducers type fan speed (option 2): Square signal

Frequency:

0.5 Hz to 2 kHz

Trigger high:

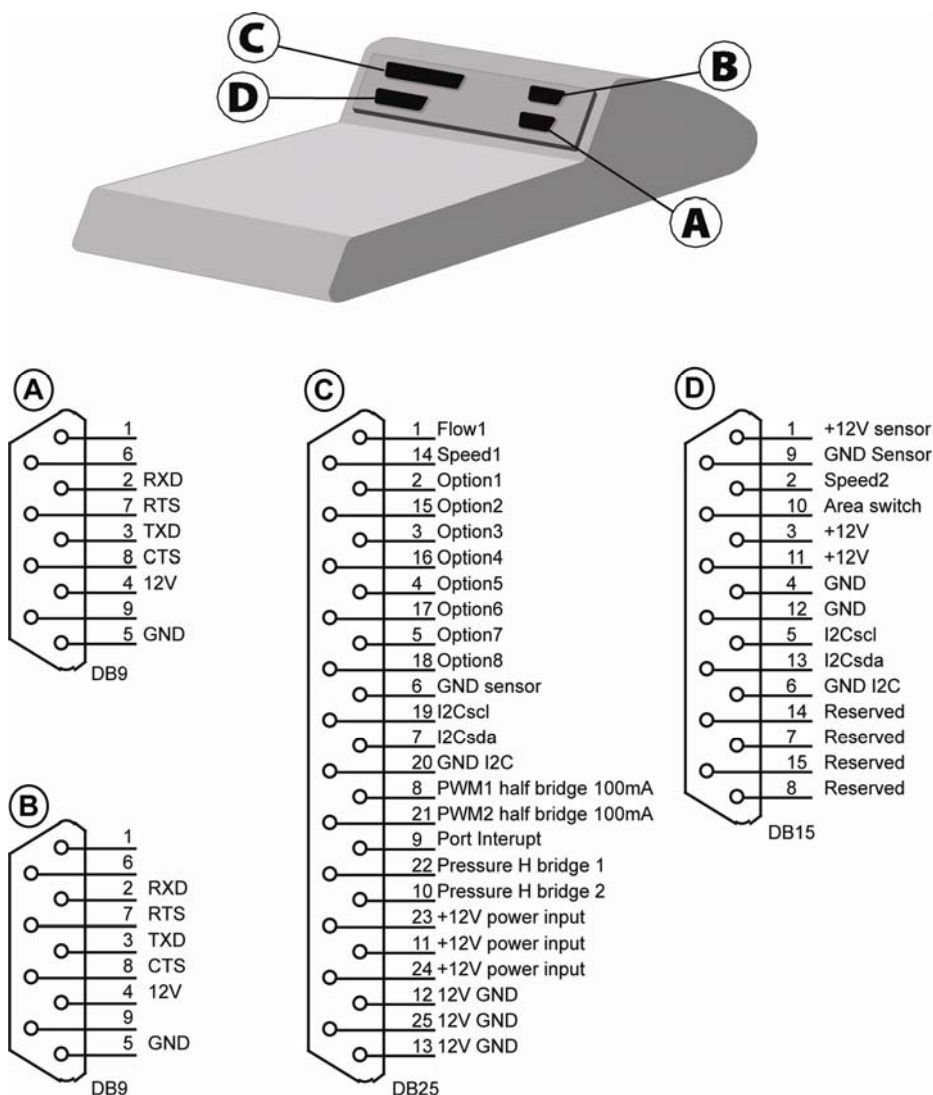
4.0 to 12.0 Volt DC

Trigger low:

0.0 to 2.0 Volt DC

Functions and functionality

Connectors at the back of the HC5500:



The connector's functions are:

A: COM 1:

This can be used for dumping data, receiving data or for the connection to the printer. Use COM 1 for software updates.

B: COM 2:

This has the same function as COM 1, though not for software updates.

C: Control box:

This is used for the liquid control box Spray I or Spray II box.

D: AUX:

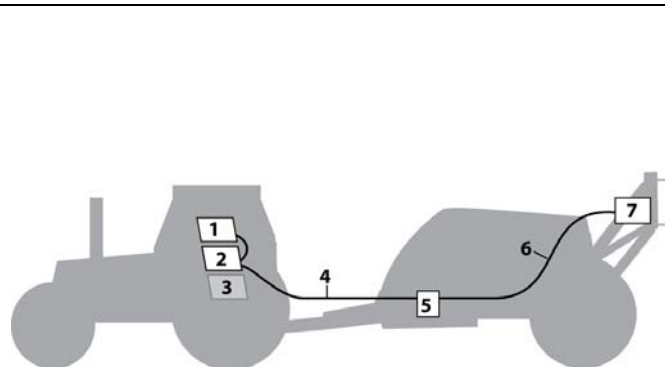
This is used if the tractor speed sensor or the foot pedal is connected to the HC5500. Harness P/N 28027600 is necessary.

Sprayer connection:

Fluid cables

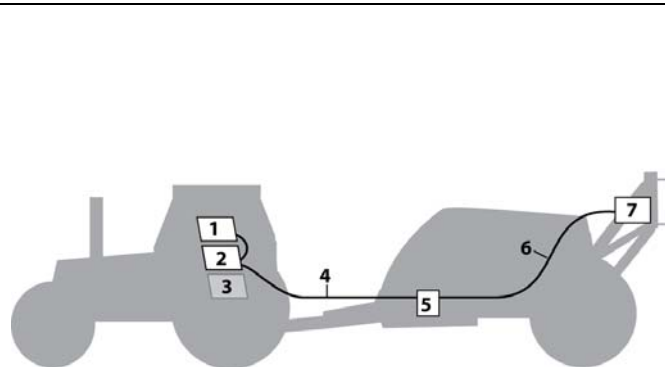
Cables details can be found in the cables configuration chapter.

COMMANDER:



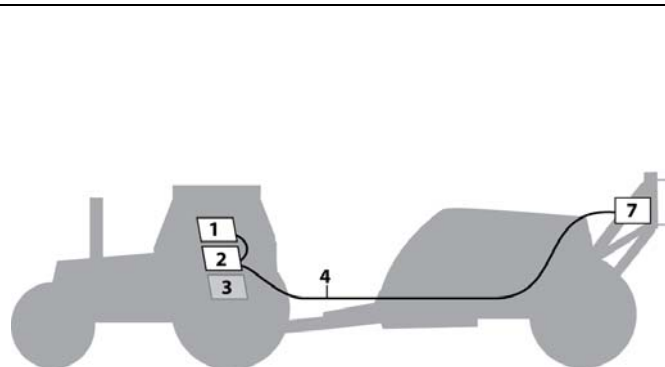
1. HC2500/5500
2. Spray II
3. Hydraulic Box
4. Cable:
 - 26004200 L=17,5m
 - 28028700 L=14m
 - 28027500 L=11,5m
 - 28028900 L=8m
 - 28028800 L=5m
 - 26003900 L=2m
 - 26028300 L = 0,5m
5. JobCom or Breakout PCB
6. Cable P/N 26004900
7. 13 sec PCB P/N 26004800

NAVIGATOR:



1. HC5500
2. Spray II
3. Hydraulic Box
4. Cable P/N:
 - 26004200 L = 17,5m
 - 28028700 L=14m
 - 28027500 L=11,5m
 - 28028900 L=8m
 - 28028800 L=5m
 - 26003900 L=2m
 - 26028300 L = 0,5m
5. JobCom
6. Cable P/N 26023800
7. 9 sec PCB P/N 72173900

NAVIGATOR or RANGER:

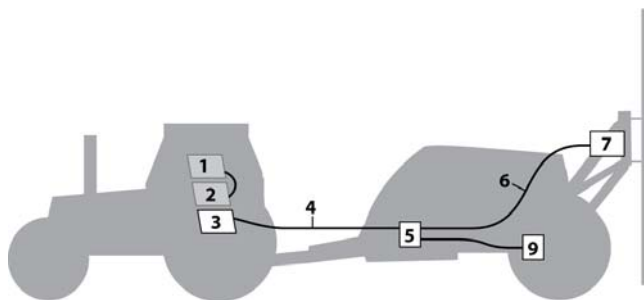


1. HC2500/5500
2. Spray II
3. Hydraulic Box
4. Cable:
 - 26004200 L = 17,5m
 - 28028700 L=14m
 - 28027500 L=11,5m
 - 28028900 L=8m
 - 28028800 L=5m
 - 26003900 L=2m
 - 26028300 L = 0,5m
5. 9 sec PCB P/N 72173900
6. Cable (connecting sprayer to nozzle)
7. 9 sec PCB (on sprayer)

Hydraulic cables

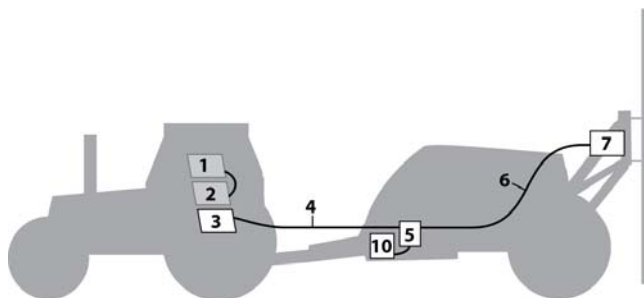
Cables details can be found in the cables configuration chapter.

Commander with JobCom:



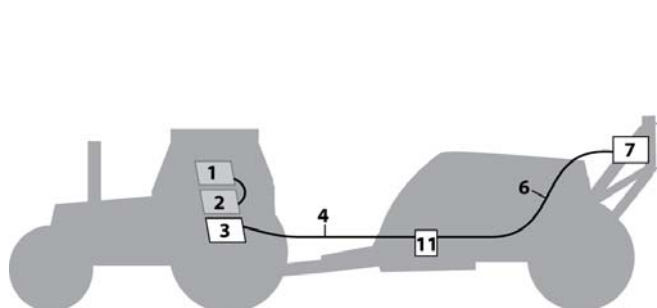
1. HC5500
2. Spray II Box
3. Hydraulic Box
4. Cable P/N: 72236600, L=5m
72236400, L=8m
5. JobCom with DAH Interface
6. Cable P/N 26016900
7. Hydraulic junction box
9. SafeTrack and lock cable P/N26024000

Navigator with JobCom:



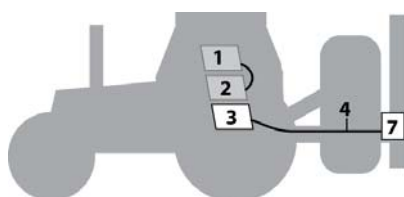
1. HC5500
2. Spray II Box
3. Hydraulic Box
4. Cable P/N: 72236600, L=5m
72236400, L=8m
5. JobCom DAH Interface
6. Cable P/N 26016900
7. Hydraulic junction box
10. IntelliTrack cable P/N26024100

Commander, Navigator and Ranger without JobCom:



1. HC5500
2. Spray II Box
3. Hydraulic Box
4. Cable P/N: 26008400, L=8m
6. Cable P/N 26016900
7. Hydraulic junction box
11. Breakout PCB

Master



1. HC5500
2. Spray II Box
3. Hydraulic Box
4. Cable P/N: 72168100, L=8m
72278300, L=12m
7. Hydraulic junction box

AMP connectors

The AMP connectors have each of the legs numbered so they are easy to identify. The table shows how the wires are mounted in the plug and what function the wires have.

AMP plug	Pin & Wire connection		
	AMP Super Seal	Function	Colour
	2	+	Brown
	3	Signal	Blue
	1	-	Black



Optional extras for the HC5500

Printer

A printer can be fitted for the HC5500, as shown on Picture 1.



Picture 1: Printer for the HC5500

The printer can print out several kinds of data from the HC5500.

Picture 2 is an example of a printed register and Picture 3 a printed configuration.

Register printout gives the user sprayed area, volume rate that has been used etc.

The configuration print is very useful for a quick overview of how the controller is set up and for spotting errors.

***** HARDI HC5500 *****		***** HARDI HC5500 - Configuration *****	
Serial number	6023892	Serialnumber	6023892
Register	12	SW version	4.00
Volume applied	0 L	*****	
Area	0.00 ha	1	Daily settings
Travelled spray distance	0.0 km	1.1	Volume rate 300 L/ha
Start date	00.00.00	1.2	Tank contents 29 L
Start time	00:00	1.3	Select register 12
Stop date	00.00.00	2	Setup
Stop time	00:00	2.1	Display readout
Time used (spraying time)	00:00	2.1.11	Pressure
Work rate	0.00 ha/h	2.1.2	Flow rate
Average spray speed	0.0 km/h	2.2	AUTO functions
Max. spray speed	0.0 km/h	2.2.1	Auto ON/OFF Off
Average volume rate	0 L/ha	2.2.2	Foam marker Disable
Date printed	19.02.08	2.2.3	Dual line Disable
Time printed	18:35	2.3	VRA/Remote Off

Picture 2: Print of the register

Picture 3: Print of the configuration

The connection from the printer to the HC5500 is done through COM 1 or COM 2. The printer is powered through the COM port so there is only one plug for the connection. The configuration of the com port is done in Extended Menu 4.

In menu E4.1.1 *Equipment type*, Printer must be chosen and in menu E4.1.2 the baud rate must be set to 9600.

In the section "Configuration of HC5500 to dump data" is a detailed description of the setup. If the printer does not work, then check the connection to the COM port and see if it is correct.

If it does not print, check the paper is threaded correctly (not reverse side).



Foot pedal for main ON/OFF function

The foot pedal is an extra option for the HC5500. The pedal is connected through the wire harness that can be seen on Picture 4 and Picture 5.

The wire harness is plugged into the AUX connector.

The "Speed2" connector has GND on pin1, +12V on pin 2 and Speed signal on pin 3.

The "Switch" connector has GND on pin 1, +12V on pin 2 and Switch signal on pin 3.



Picture 4: Foot pedal for the HC5500



Picture 5: Wire harness for the HC5500

The setup of the foot pedal to the HC5500 is done in E8.5.1. The menu tree can be seen in section "Extended Menu 8". There are two choices depending on the switch type.

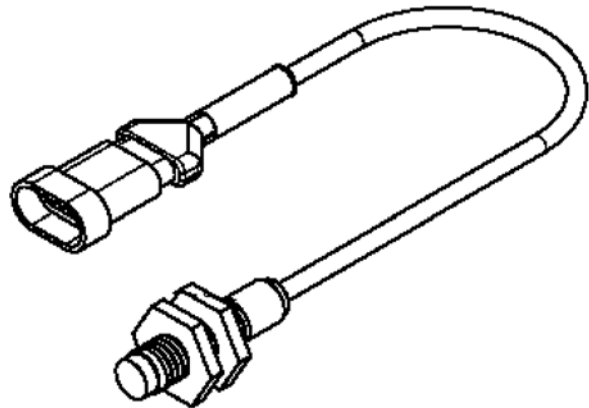
The HC5500 can be set to a toggle or a pulse function. The standard HARDI foot pedal is a toggle type.

Sensors:

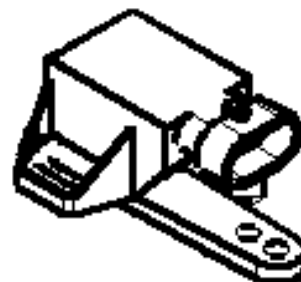
	Angle sensor	Sensor	AMP Con	PCB
Blue	Signal	Signal	3	Signal
Black	GND	GND	1	-
Brown	+12V	+12V	2	+

Speed, TWIN, Boom and SafeTrack lock sensor

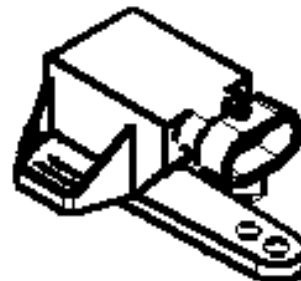
Hardi P/N: 28047500
 Type: Inductive
 Range: 0-8mm
 Signal: 0-200Hz
 Operation indicator: Yellow light when active (0,8V)
 Power: 12V
 Visual indicator: LED to indicate active status
 Hardi Pin assignment: Brown +
 Blue signal
 Black -

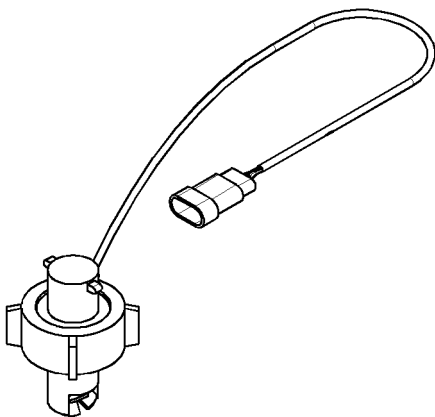
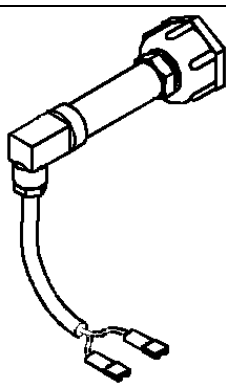

Front angle sensor:

Hardi P/N: 26005700
 Type: Potentiometer
 Range: 0-70°
 Signal: 0,5 - 4,5V
 Centre position: 2,5 V
 Power: 12V
 Hardi Pin assignment: Brown +
 Blue signal
 Black -


SafeTrack rear sensor:

Hardi P/N: 26005800
 Type: Potentiometer
 Range: 0-120°
 Signal: 0,5 - 4,5V
 Centre position: 2,5 V
 Power: 12V
 Hardi Pin assignment: Brown +
 Blue signal
 Black -



<p>Flow sensor:</p> <p>Hardi P/N 72117500</p> <p>Type: Inductive</p> <p>Range: On, 0,2-0,5 V Off, 6,5-7,0 V</p> <p>Visual indicator: Red light at Off (0,8V)</p> <p>Power: 12V</p> <p>Hardi Pin assignment: Brown + Blue signal Black -</p>	
<p>Pressure sensor:</p> <p>Hardi P/N 842022</p> <p>Type: Pressure</p> <p>Range: 0-10 Bar</p> <p>Signal: 4-20mA</p> <p>Power supply: 8-30V</p> <p>Hardi pin assignment: Brown + Blue Signal Black N/C</p>	

Speed sensor for Tractor: Wheel, gearbox or radar

The HC5500 can have several different kinds of speed sensors. It can have an inductive sensor mounted on the back wheel, the same sensor as on the trailed sprayers, or it can be connected to the tractors speed sensor, in the gearbox, or radar.

The sensors are connected to the HC5500 through wire harness on
Picture 5.

The signal from the tractor or the radar must be between 0 - 5 Volt and below 2,000 Hz. Most radar's have this signal range.

The signal from the tractors can however change a lot from brand to brand; consult your manual or tractor dealer for more information.

The setup of the speed sensors in the HC5500 is done in the menu 3.1. Further instructions about the connection and calibration can be found in the instruction book.

Pressure sensor

An optional 4 to 20 mAmp pressure sensor can be fitted to the liquid system.

With the sensor, the controller can switch to pressure based regulation when the flow drops below the minimum rate measurable by the flow meter. Preventing LookAhead from winding the pressure regulation valve down too far when driving very slowly.

In menu E8.1.7 the sensor has to be set to "Active".

The sensor can be set for a minimum pressure. If the pressure drops below the set value, pressure regulation stops.

The HC5500 has min and max pressure alarm that will be shown in the display menu.

The cable is connected to the "PCB for section valves".

The version of the PCB used depends of what type of sprayer the sensor in mounted on.

For the wire connections to the PCB, see section “PCB’s” on pages 70.

When the pressure sensor is mounted on the sprayer, the HC5500 is setup to the sensor. In menu “5” on pages 21, the setup is shown.

The pressure sensor has a fixed measuring range in Bar or PSI.

In Menu E5.1.1 the minimum value is typed in and in menu E5.1.2 the maximum is typed in.

The measuring range is written on the pressure transducer. Our standard is 0 to 10 Bar.

Note that the sensor is ignored if the minimum input is less than 3 mAmp.

In menu E8.1.3 is the minimum allowed pressure typed in. In practice, this means the regulation will stop if the pressure goes below this value.

These setting are done in the Extended Menu.

For a readout, the sensor must be setup. In Menu 2.1 Display readout / Optional sensor

Menu 2.1.3, the pressure sensor is chosen so the actual pressure can be seen.

Fan speed on TWIN

The Fan speed sensor can measure the revolutions on the blower unit on a TWIN sprayer.

The sensor is mounted on blower as shown in Picture 6.

For connecting the wiring from the Fan speed sensor see section “PCB’s” on pages 70.



Picture 6 Fan speed sensor

When the Fan speed sensor is mounted and the wires are connected, the HC5500 must be setup for the sensor. In menu E5.2 the PPU value is set. The PPU value can be seen in the menu E5.2.1. The default value is 1.

For a reading on the HC5500 display, the Fan speed sensor must be setup for the display.

In Menu 2.1, Display readout / Optional sensor, Menu 2.1.3, is the Fan speed sensor chosen so the fan r/min can be seen.

Note the following for the Linak actuators on the TWIN FORCE sprayers

Spray II box & Linak actuator	AMP connector	Linak Part no.	Voltage (min to max stroke)	Signal
Breakout PCB	4 pin	262034	1.0 to 5.0 V	Analogue
JobCom PCB	4 pin	262034	1.0 to 12.0 V	PWM (Hz)

TankGauge

The TankGauge (digital contents sensor) is a sensor that can measure how much liquid is in the tank. It has no automatic function. It can give a warning when the tank is about to run dry.

Connecting TankGauge

Wire between JobCom and 26007300

AMP Super Seal	PCB	Wire	Wire (old version)
2	+	Brown	Green
3	Sig	Blue	White
1	-	Black	Brown

Figure 1 Wire for connection between JobCom and TankGauge

The cable is fitted with an AMP plug and three loose wires at the other end. It is attached to the JobCom at J1, "Tank gauge".

For JobCom with hardware version before 2.0, a 10Kohm resistor is fitted between connector 2 & 3 on the JobCom.

Figure 2 shows the resistor location.

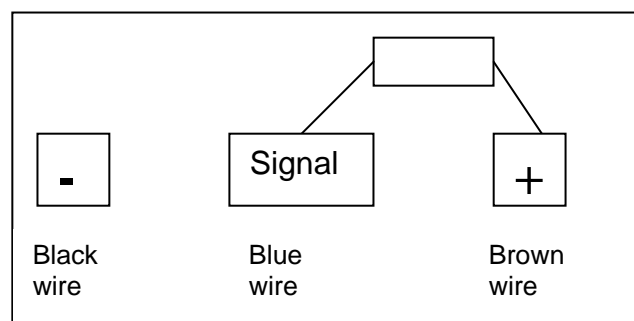


Figure 2 Mounting of the 10 K ohm resistance in the JobCom

Models without JobCom:

A. TankGauge is mounted on PCB in distribution valves junction box. Green/Grey wire is connected to the blue wire from TankGauge.

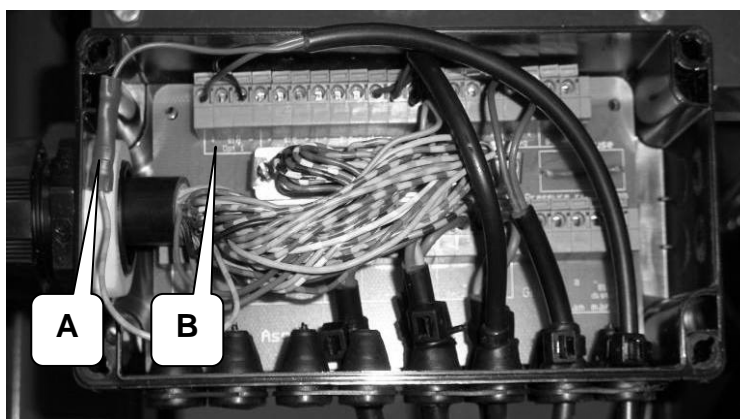
B. Is mounted in OPT 1 as shown.

Brown wire +

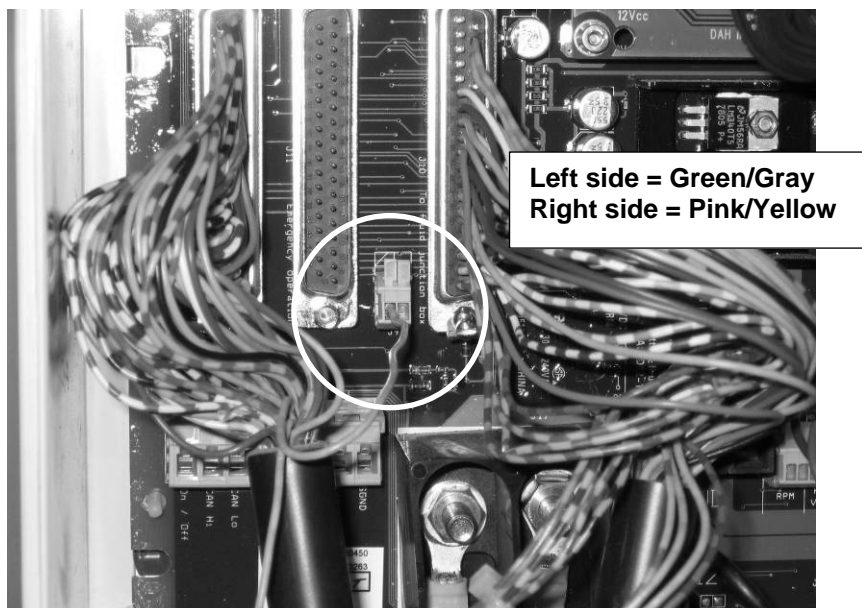
Black wire -

If a speed sensor is present, connect it in parallel.

Distribution Valves Junction Box



The cable from the Spray box has two loose wires which are not connected in the JobCom. These must be attached to the plug as shown on Picture 7



Picture 7 Connection of the two wires from Spray box cable

The sensor is mounted on the back side of the sump of the tank.

Settings in the HC5500

“Extended Menu 5 Optional sensors” is the setup menu. In Menu E5.3.1 chose “HARDI”. To check the connections, the frequency with an empty tank can be checked. Menu 4.5.3.3, Tank Gauge, should read be between 100 and 200 Hz.

How does it work?

The TankGauge sensor measures the pressure created by the water in the tank. The sensor sets data points for each 25 mm of water level. 100 data points are available. The data points are registration marks where the tank sensor registers the pressure and therefore how much water there is left in the tank at this water level.

The data points can be seen in Menu E8.2.3. They can also be edited in this Menu.

For setting the data points, the flow sensor must first be calibrated.

Next step is to fill the tank completely with a known quantity of water.

When the calibration starts, the flow sensor will register how much water is sprayed out and the tank sensor will register the pressure for every 25 mm water level until the tank is empty. At the end of the calibration, the actual verses the theoretical quantity of water is set just like doing a “Tank Method” calibration of the nozzles. This will fine tune the flow sensor PPU.

The calibration of the TankGauge is described in the instruction book.

When the TankGauge is used in use, there are two modes:

- When the sprayer is moving
- When the sprayer is stationary

When the sprayer is moving, the HC5500 will calculate an average value of the read out from the TankGauge. The average value is necessary because of the movement of the liquid in the tank will when the sprayer is moving. If a not averaged value was shown, the readout would be useless for the driver.

When stationary, the value is not averaged. The movement of the liquid in the tank should stop and the average value is therefore not necessary.

End nozzle kit

The End nozzle kit is connected to the “PCB for section valves”, seen on page 71. For accurate boom width whilst using the end nozzles, Menu 3.3.4 needs to be set up. For more information, see in the instruction book for the HC5500.



Picture 8 End Nozzle kit



Extended Menu for SW 4.XX

To access Extended Menu, press and hold the “ESC” button, switch the power ON and wait until the menu is opened.

The “[xxx]” indicates the choices or range.

The factory default and helpful notes like increments of change are in *italics*.

Extended Menu 1 Language: Here the is language choice. There are standard languages and place for two local languages that can be uploaded to the HC5500 by a service person. Note: For Russian, the HC5500 hardware version with Cyrillic text is used.

Extended Menu 2 Unit: Is for what unit the controller shall use.

Extended Menu 3 Sprayer type: The basis setup of what kind of sprayer is the HC5500 attached to and what kind of liquid system is mounted on the sprayer.

Extended Menu 4 Data exchange: Setup of the data communication.

HC5500 can be attached to other units like a PC, printers, variable Rate Application or remote control. The communication between the HC5500 and the unit has to be set up correctly.

The setup and use of the com ports are described in the “Software” section of this manual.

Extended Menu 5 Optional sensors: Setup of optional sensors that can be fitted. It is typically the pressure, fan revolutions and tank contents (TankGauge).

Extended Menu 6 Service interval: Setup of the service interval.

Extended Menu 7 Factory settings: Setup of factory settings

Extended Menu 8 Settings: Settings of the regulation, tank, track and misc. settings are done.

Extended Menu 9 JobCom: Is for setup of the JobCom, TWIN actuators and read out of the software version and serial number.

Extended Menu 1 Language

E1 Language [UK, D, DK, F, SF, HU, Local 1, Local 2]

Default is UK.

Local 1 & 2 are languages that can be added with a PC and the “HC 5500 Language config” software or another HC5500.

Extended Menu 2 Unit

E2 Unit [Metric, US]



Extended Menu 3 Sprayer type

E3	Sprayer type	E3.1	Field sprayer	E3.1.1	Liquid system	[Equalization, Not equalization, Circulation] Default is Equalization. Equalization = System with liquid return to tank from section valves; e.g. EVC. Not equalization = System without returns to tank; e.g. EFC on CM05. Circulation = System where liquid constantly circulates in the boom lines.
				E3.1.2	Dual Line	
				E3.1.2.1	System type	[Not present, 2 stage, 3 stage] Default is Not present. 2-stage: Line A will always be open, and Line B can be switched on and off automatically. 3-stage: Line A switches to B, then Line A comes on so both A & B are on.
				E3.1.2.2	Sensor type	[Pressure, Speed] If a pressure transducer is fitted, pressure is used to trigger the line change.
				E3.1.2.3	System lag	[Second] Default is 1.0 sec. System lag prevents oscillation when spray lines change.
				E3.1.2.4	Line overlap	[Second] Default is 1.5 sec. System overlap allows the activated spray line to stabilise before the other line is turned off.
		E3.2	Mistblower	E3.2.1	Liquid system	[Equalization, Not equalization, Circulation] Default is Equalization. Equalization = System with liquid return to tank from section valves; e.g. EVC. Not equalization = System without returns to tank; e.g. Solenoid controls. Circulation = System where liquid constantly circulates in the boom lines
				E3.2.2	Sub unit	[Standard, UCR] Default = Standard (UCR affects menu 3.3) UCR = Unit Canopy Row. Bases application on the size of the tree canopy.



Extended Menu 4 Data exchange

E4	Data exchange	COM 1 setup	E4.1	E4.1.1	Equipment type	[Printer, Dump, Printer & dump, GSM, VRA/remote] <i>Dump is for data transfer to a PC via for example Microsoft HyperTerminal. GSM is not used. Variable Rate Application/remote is signal from an external source.</i>
				E4.1.2	Baud rate	[19200, 9600, 4800, 2400, 1200] <i>Default is 9600. Use 9600 for HARDI 12 volt printer.</i>
				E4.1.3	Protocol select	[HARDI VRA proto.] <i>Only one protocol available at the moment.</i>
		COM 2 setup	E4.2	E4.2.1	Equipment type	[Printer, Dump, Printer & dump, GSM, VRA/remote] <i>Dump is for data transfer to a PC via for example Microsoft HyperTerminal. GSM is not used. Variable Rate Application/remote is signal from an external source.</i>
				E4.2.2	Baud rate	[19200, 9600, 4800, 2400, 1200] <i>Default is 9600. Use 9600 for HARDI 12 volt printer.</i>
				E4.2.3	Protocol select	[HARDI VRA proto.] <i>Only one protocol available at the moment.</i>



Extended Menu 5 Optional sensors

E5	Optional sensor	E5.1	Pressure	E5.1.1	Minimum	[-9.9 to 9.9] Default is 0.0 Bar 4 -20 mA sensor. See sensor for minimum value. See "Pressure sensor" section.		
			Connected to section valve PCB.	E5.1.2	Maximum			
						[0 to 99.9] Default is 10.0 Bar See sensor specifications for maximum value.		
		E5.2	Fan speed	E5.2.1	PPU	[0 to 99.99 PPU] Default is 1 Digital input. One pulse per revolution = 1.00 PPU. See "Fan speed" on TWIN section		
			Connected to section valve PCB.					
		E5.3	TankGauge	E5.3.1	Sensor Type	[Not present, Fillmeter, ME Tank Control, Hardi] For Hardi TankGauge, choose Hardi.		
			For sprayers with Breakout PCB or JobCom.	E5.3.2	PPU			
						[0.000 to 999.999 PPU] Connect to Breakout PCB or JobCom. See "TankGauge" section. Hardi has the TankGauge 0-250mbar pressure transducer fitted to sump.		
		E5.X	Sensor x			Unit	Default	
			Only with Breakout PCB or JobCom					
				E5.4	Wind speed	PPU	1	
				E5.5	Wind direction	E5.5.1	min	0
						E5.5.2	max	359
				E5.6	Air temperature	E5.6.1	min	-20
						E5.6.2	max	70
				E5.7	Relative humid	E5.7.1	min	0
						E5.7.2	max	100
				E5.8	RPM sensor	PPU	1	
				E5.9	Extra 1	PPU	1	
				E5.10	Extra 2	PPU	1	
				E5.11	Extra 3	E5.11.1	min	0
						E5.11.2	max	5
				E5.12	Extra 4	E5.12.1	min	0
						E5.12.2	max	5

Extended Menu 6 Service interval

E6	Service interval	E6.1	A hours	10 hours.
		E6.2	B hours	50 hours.
		E6.3	C hours	250 hours.
		PIN = 04711	E6.4	D hours
		E6.5	Nozzle	50 hours.

Extended Menu 7 Factory settings

E7	Factory settings	E7.1	Total register	E7.1.1		Register 0. Shows start & stop dates & time.
				E7.1.2		Shows total volume & area.
				E7.1.3		Shows average & max. speed.
				E7.1.4		Shows distance travelled & spraying time.
				E7.1.5		Show work rate & average volume rate.
			E7.2	Master reset		
		E7.3	PIN = 12345 Send configuration	E7.3.1	Config only	Readable text file that can be sent to a HC 5500 or a PC.
				E7.3.2	With language	Readable text file
		E7.4	Receive configuration	E7.4.1	Config only	Readable text file that can be received from a HC 5500 or a PC.
					E7.4.2	With languages
		E7.5	Send program			For sending HC 5500 program to PC
		E7.6	Receive program			For receiving HC 5500 program from PC
		E7.7	Send Language	E7.7.1	Box to box	[UK, D, DK, F, SF, HU, Local 1, Local 2] Readable text file. Select language. Use communication cable Ref. No. 72271600.
				E7.7.2	Box to PC	[UK, D, DK, F, SF, HU, Local 1, Local 2] Readable text file. Select language.
		E7.8	Receive Language	E7.8.1	Box to box	Readable text file. Use communication cable Ref. No. 72271600.
E7.8.2	PC to box			Readable text file. Use communication cable Ref. No. 72271600.		



Extended Menu 8 Settings

E8 Settings	E8.1	Regulation	E8.1.1	Min. duty cycle	[2%] Minimum and default is 2%. Increase value if motor hesitates to turn. For LookAhead, set to 5% +/- 1%. See "Description 2 Min. duty cycle" on page 28
			E8.1.2	Min. speed	[0.5 km/h] Minimum speed required before regulation valve will operate. Default is 0.5 km/h.
			E8.1.3	Min. pressure	[0.0 Bar] Default is 0.0 Bar. At 0.0 Bar, feature is disabled. Pressure transducer needed. If pressure drops below the set value, the pressure regulation will stop.
			E8.1.4	Valve test	[Start test? Yes, No] This tests the regulation valve with position feedback. Valve must not be at max. setting. Valve will increase 2 turns and then decrease 2 turns.
			E8.1.5	Look Ahead	[Yes, No] See "LookAhead" on page 34 Default = No. Regulation valve must have position feedback transducer and Boom sensor must be fitted.
			E8.1.6	Regulation delay	[0 to 9 sec] Default = 3 seconds. This is time the regulation valve waits before starting. Delay allows fluid system to stabilise before regulation valve starts operation. For few boom sections and or big liquid flow, 3 s is recommended. For many boom sections and or small liquid flow, 1 or 2 s is recommended.
			E8.1.7	Sensor	E8.1.7.1 Pressure [Active, Passive] Default = Passive E8.1.7.2 Rpm [Future use]
			E8.2	Tank	E8.2.1 Tank size [L] Default is 1000 Value set if a TankGauge is not fitted. Maximum fill: CM 3200=3500 CM 4400=4900 CM 6600=7000 NAV 3000=3300 NAV 4000=4400 E8.2.2 (Future use) E8.2.3 Data points [0000] Calibration values for HARDI TankGauge. Can be edited by use of Navigation and Enter keys.



E8	Settings	E8.3	(Future use)	
		E8.4	Track	E8.4.1
				Enable
				[No, Yes]
				To enable Safe- or IntelliTrack function.
			E8.4.2	Sensor
				test
				E8.4.2.1 Front sensor <i>Approx. 2.50 V when straight.</i> <i>Alarm given if < 0.2 Volt or > 4.8 Volt.</i> E8.4.2.2 Rear sensor E8.4.2.2.1 Readout in deg and Volts <i>Approx. 2.50 V when straight</i> <i>If DAH interface is used, an alarm given if</i> <i>< 0.5 Volt or > 4.5 Volt.</i> E8.4.2.2.2 CALIBRATE (Only NAV) <i>Turn the drawbar full right</i> E8.4.2.2.3 - - > (Only NAV) <i>Readout and setting right extreme</i> E8.4.2.2.4 < - - (Only NAV) <i>Readout and setting left extreme</i> E8.4.2.3 Boom sensor 1 <i>For CM: 0.8 V when unfolded and 5.0 V</i> <i>when folded.</i> <i>For NAV: 0.0 V. Sensor is optional.</i> <i>Values < 0.5 V = not connected</i> E8.4.2.4 Boom sensor 2 <i>0.8 V when unfolded and 5.0 V when folded.</i> <i>Value < 0.5 V = not connected.</i> E8.4.2.5 Lock sensor <i>For CM: 0.8 V when locked and 5.0 V when</i> <i>unlocked.</i> <i>For NAV: 0.0 V. Sensor is optional.</i> <i>Values < 0.5 V = not connected</i>
			E8.4.3	Chassis
				[CM05 S, CM05 M, CM05 L, NAV S, NAV M] <i>Default is CM05 M</i> <i>For CM:</i> <i>Use S for 3200, M for 4400, L for 6600.</i> <i>For NAV3000L and 4000L:</i> <i>Use NAV 07 M.</i>
			E8.4.4	Sprayer
				drawbar
				[0-200cm] <i>Default for CM: 101 cm</i> <i>Length from drawbar pin hole to front anchor</i> <i>bolt for drawbar.</i> <i>Default for NAV: 100 cm</i> <i>Length from drawbar pin hole to rear bolt on</i> <i>pump base.</i>
			E8.4.5	Manual
				angling
				[- 9 to 9%] <i>Default is 0.</i> <i>Sets the manual steering speed.</i> <i>Note + and - can be changed by toggling.</i> <i>Use steps of 10% as a guide.</i>



		E8.4.6	Boom sensors	[0, 1, 2] <i>Default: 1. This is the number of boom fold sensors present. For CM: Choose 1 or 2 For NAV: Choose 0</i>
		E8.4.7	Error print	[Yes] <i>Prints last 3 hazardous situations and shows Alteration log changes.</i>
		E8.4.8	Minimum radius	[6.0 m] <i>Default = 6.0 m for NAV. CM Minimum turning radius allowed for the trailer. Tank size 3200 L= 6.5, 4400 L= 7.0, 6600 L= 9.0. Increase to achieve a soft-stop (prevent bottoming out) on trapeze cylinders.</i>
		E8.4.9	Half steer	[No, Yes] <i>Default = No SPC/SPZ, only active with 2 boom sensors</i>
		E8.4.10	Safety factor	[100%] <i>Raising this value increases cautiousness. Default is 100% for a CM 4400. For CM 3200, use 90% For CM 6600, use 120%. Use steps of 10% as a guide to changes.</i>
		E8.4.11	Boom type	[L, M, H] <i>Not active Default: M Classification of boom type. Light, Medium or Heavy.</i>
E8.5	Misc.	E8.5.1	Foot switch	[Disable, On/off level, On/off pulse] <i>For remote ON/OFF of main switch, it allows the use of other switch systems. See "Foot pedal" section.</i>
		E8.5.2	Rate deviation	[Step size: XX %] <i>Default is 10%. Can be altered. If set at 0%, this allows 3 rates to be set up in menu 1.1.</i>
		E8.5.3	Capacity left	[Distance, Area] <i>Affects readout from Display icon. Will show distance or area remaining.</i>



Extended Menu 9 JobCom

E9	E9.1	Enable	[Yes, No] Must be enabled for use with Track or AutoSectionControl.				
	E9.2	Communication	[ID x; ACK: x NACK: x; Timeout x] <i>ACK=acknowledged message, NACK= not acknowledged.</i> <i>ID= identification where "0" is JobCom, Timeout=No answer from JobCom.</i>				
	E9.3	ComLog	E9.3.1	Date and time for error, ID of hardware with fault, M = Message No., E = Error.			
		9 latest communication errors	E9.3.X	As above			
			E9.3.9	As above			
	E9.4	Input test	E9.4.1	Frequency	E9.4.1.1	Speed	Hz
		Shows actual sensor reading.			E9.4.1.2	Flow1	Hz
				E9.4.1.3	Flow2	Hz	
				E9.4.1.4	Flow3	Hz	
				E9.4.1.5	TankGauge	Hz	
				E9.4.1.6	Wind speed	Hz	
				E9.4.1.7	Fan speed	Hz	
				E9.4.1.8	RPM sensor	Hz	
				E9.4.1.9	Extra 1	Hz	
					E9.4.1.10	Extra 2	Hz
			E9.4.2	Switch	E9.4.2.1	Pendulum lock	hi/lo
					E9.4.2.2	Ladder up	hi/lo
					E9.4.2.3	(Future use)	
					E9.4.2.4	Filter S	hi/lo
					E9.4.2.5	Filter P	hi/lo
	JobCom						

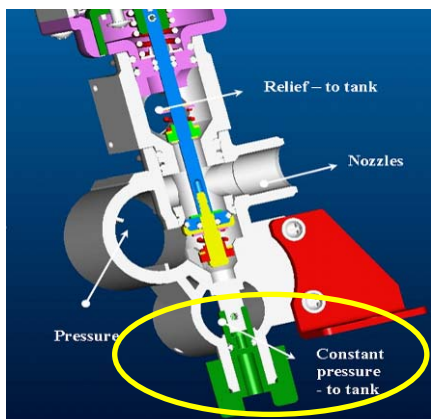
E9.4.3	Analogue	E9.4.3.1	Slant	Volt
		E9.4.3.2	Boom height	Volt
		E9.4.3.3	Tilt L	Volt
		E9.4.3.4	Tilt R	Volt
		E9.4.3.5	Foam blob dist	Volt
		E9.4.3.6	Twin angle	Volt
		E9.4.3.7	Twin fan speed	Volt
		E9.4.3.8	Distance L	Volt
		E9.4.3.9	Distance R	Volt
		E9.4.3.10	Distance centre	Volt
		E9.4.3.11	Extra 3	Volt
		E9.4.3.12	Extra 4	Volt
		E9.4.3.13	Air temperature	Volt
		E9.4.3.14	Relative humid	Volt
		E9.4.3.15	Wind direction	Volt
		E9.4.3.16	SmartValve1 setpoint	Volt
		E9.4.3.17	SmartValve2 setpoint	Volt
E9.5	Reset JobCom	Reset of JobCom		
	PIN = 74650			
E9.6	TWIN actuators	E9.6.1	Fan speed	[Fwd. Rev] To reverse present setup for actuator.
		E9.6.2	Air angle	[Fwd. Rev] To reverse present setup for actuator.
E9.7	Serial number	Shows software version and serial number		

Description 1 EVC compared to EFC

The difference between the EVC and the EFC section valve is that the EFC section valve has no pressure equalisation. The equalisation is adjusted by the pressure regulation valve and is controlled by the computer.

Picture 9 shows the EVC section valve, the circled being the equalisation valve. This is the clearest difference between the EVC and the EFC when looking at the section valves.

Picture 10 shows the EFC. Here there are no equalisation adjustment valves.



Picture 9 EVC with the equalization system



Picture 10 EFC without the equalization

Description 2 Min. duty cycle (or PWM, Pulse Width Modulation)

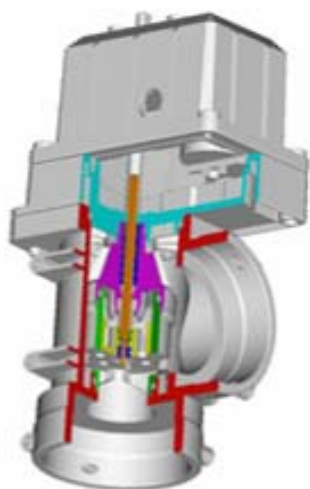


Figure 3 Pressure regulation valve

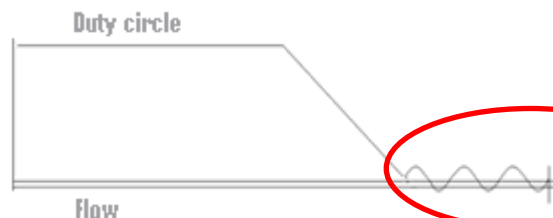


Figure 4 Duty circle for the pressure regulation

Menu: E 8.1.2

Minimum duty cycle (or PWM) is for adjusting the speed of the pressure regulation valve.

When the valve is trying to find the right flow, the speed of the valve must not be too high or too low. If the speed is too high, the valve will be unsteady – if the speed is too low, the valve not move as it can not overcome the friction.

Adjustment of the valve can therefore be as follows; find out where the valve is unsteady and then reduce the min. duty cycle a bit.

The best setting for duty cycle is shown on Figure 4 in the circle. It shows the duty circle as the setting should be. The flow, bottom line, is stable and the duty circle is circling around the flow setting until it finds the right position.

Track setting in Extended Menu:

The configuration of the sprayer is saved in the controller; these setting should only be set again after a master reset of the controller.

Menu E 8.4.1 Enable

Tracking can be either enabled/disabled in this Menu. If tracking is set to disabled, it will trail as a normal trailer.

Menu E 8.4.2 Sensor test

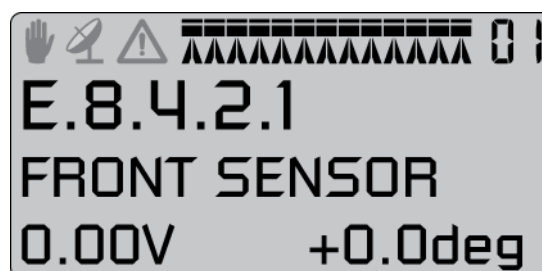
Front sensor adjustment:

COMMANDOR and NAVIGATOR

E8.4.2.1 Front sensor

Adjust front potentiometer to 2.50 V when straight.

Alarm given if < 0.2 Volt or > 4.8 Volt.



Only NAVIGATOR

Use the protractor, ref. no. 72547300 to adjust the drawbar angle to 0 degrees



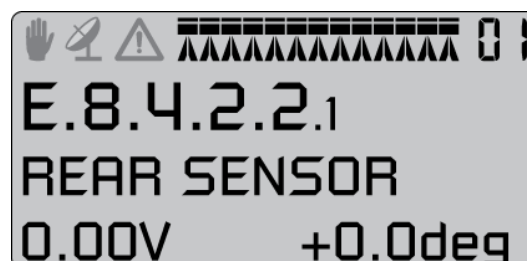
COMMANDOR and NAVIGATOR

Enter menu:

E8.4.2.2.1 Rear sensor

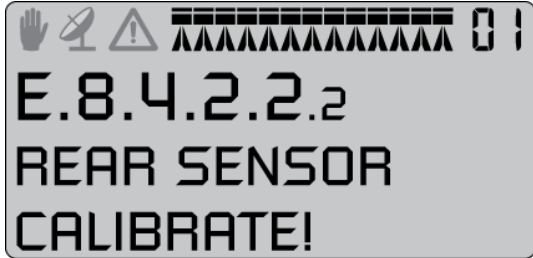
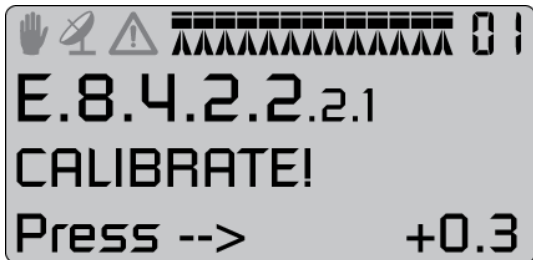
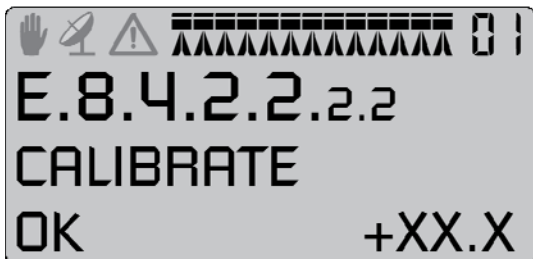
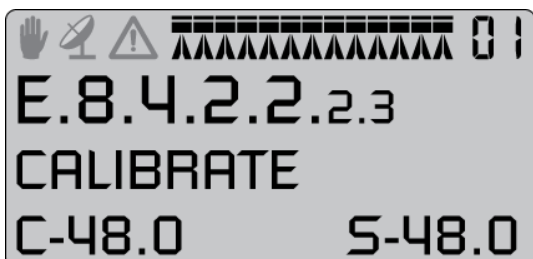
Adjust rear potentiometer to 2.50 V when straight.


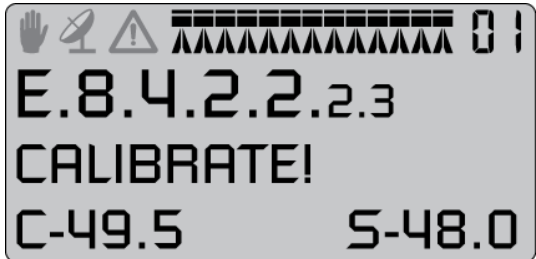
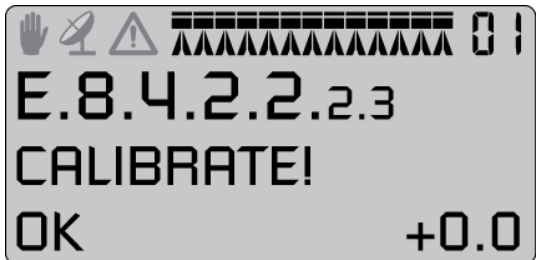
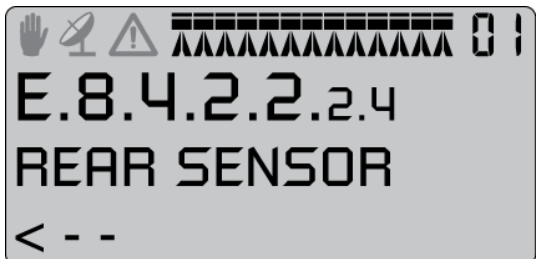

Alarm given if < 0.2 Volt or > 4.8 Volt



IntelliTrack rear sensor calibration:

At the factory of the angle of the drawbar is measured and there should be a label with the angle inside the JobCom lid of the sprayer. If you find the label with the angle it is not necessary to do the following measurement with the protractor, you can just put in the angle. If you do not find the label with the angle do following measurement:

<p>E8.4.2.2.2 CALIBRATE</p> <p>Open menu E.8.4.2.2.2 to program the controller</p>	
<p>Turn the drawbar to full right</p> <p>E8.4.2.2.2.1</p>	
<p>Program the measured angle in the controller</p> <p>E8.4.2.2.2.2</p>	
<p>This is the measure result for right angle.</p>	

<p>Use the protractor, (72547300), to measure the maximum right angle</p>	
<p>Key in values in E.8.4.2.2.2.3 as shown. S: Value from rear sensor. C: This is the actual physically measured value with the protractor.</p> <p>Use the arrow keys to change the value, finish with ENTER, and continue with the calibration.</p>	
<p>E8.4.2.2.3 --> <i>Readout and setting right extreme</i></p>	
<p>Do the same for the left angle in menu E8.4.2.2.4 <--</p>	
<p>Note the measured values inside the JobCom lid. In case of master reset the calibrations procedure must be done again. H=right L=left</p>	

Menu: E 8.4.3 Chassis

The correct chassis with tank size must be set. Choices are:

COMMANDER	Setting	NAVIGATOR	Setting
3200 L	CM05 S	3000 L	NAV 07 S
4400 L	CM05 M	4000 L	NAV 07 M
6000 L	CM05 L		

If the HC5500 is not set up to the correct chassis, the system will not be accurate.

Menu: E 8.4.4 Sprayer drawbar**SafeTrack on COMMANDER**

Sprayer drawbar length is measured from the drawbar pin hole to the middle of the first bolt that holds the drawbar on the sprayer. See Figure 5

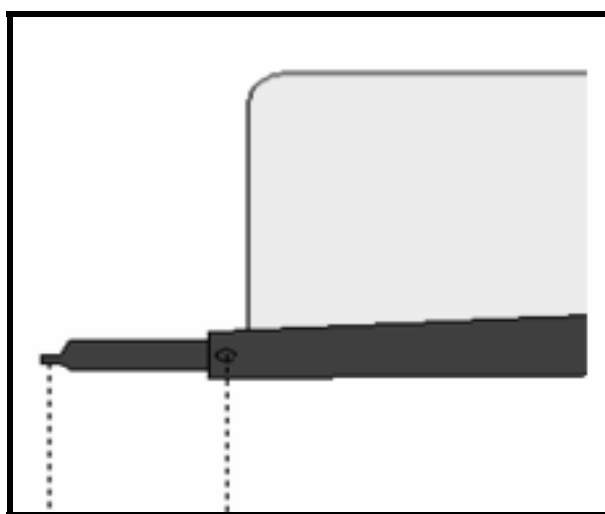
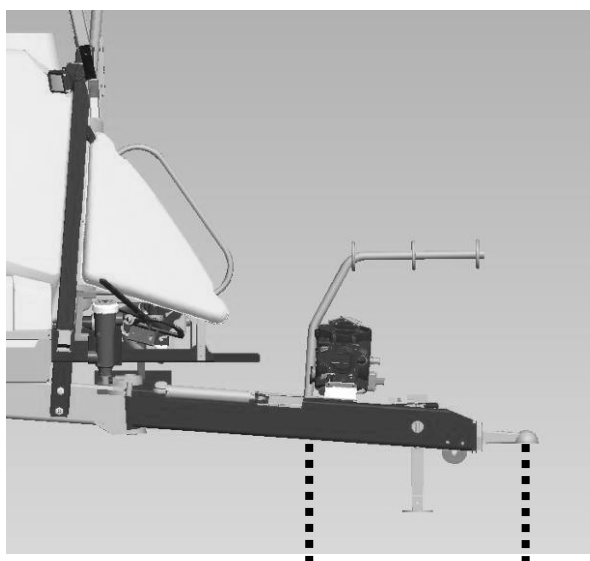


Figure 5 Sprayer drawbar for CM

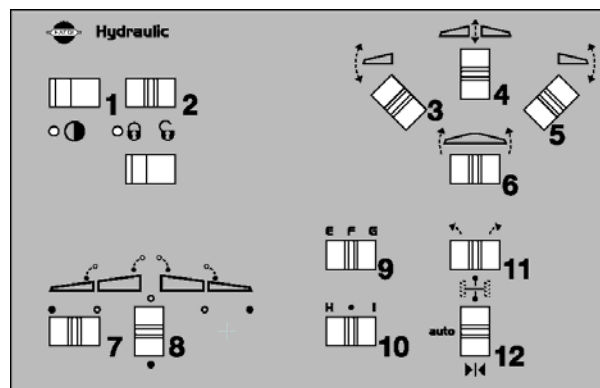
IntelliTrack on NAVIGATOR

Sprayer drawbar length is measured from the drawbar pin hole to rear bolt on pump base.



Menu E 8.4.5 Manual angling

The manual angling speed is how fast the sprayer will turn when the sprayer is manoeuvred manually. Switch 11 is used when the sprayer is manoeuvred manually. See Picture 11.



Picture 11 Hydraulic control box with track

Menu E 8.4.6 Boom sensor

The sensor detect whether the boom is folded or unfolded.

For CM, boom sensor is normally set to one.

For SPC and Eagle boom, there will be 2, one for each boom wing on CM.

For NAV, this sensor is optional. If it is not present, set value to "0".

Menu E 8.4.7 Error print

A menu used to print track errors and setup in the event of an accident.

Menu E 8.4.8 Minimum radius

Minimum radius is normally set to the sharpest possible turning radius and allow for a soft stop of the cylinder before it bottoms out.

Menu E 8.4.9 Half steer

Select half steer for SPC/SPZ boom, only active with 2 boom sensors

Menu E 8.4.10 Safety factor

The Safety factor combines many parameters to help the operator out of a potentially dangerous situation. The safety factor is a combination of:

Speed

Track wide

Angle of the front potentiometer

Tank contents (if TankGauge is fitted)

The Safety factor change the reaction of the sprayer, the higher the value is more safe is the sprayer to drive, but it will also give more alarms.

If the speed is too high when turning, it will straighten the sprayer so it will not follow the tractor tracks and prevent it from tipping over.

The Safety factor will give an alarm and then straighten up the sprayer.

The alarm can be accepted by pressing "Enter" on the HC5500 and it will operate normally again once the track is set to "Manual" and back to "Auto" on the Hydraulic control box.

Menu E 8.4.11 Boom type

In this Menu is the boom type is chosen. At the moment it has no influence and is reserved for future developments.

LookAhead

The LookAhead can be activated in the Extended Menu E8.1.5; this is only for EFC regulation.

There are no adjustments for the system, it can only be activated or disabled.

In section "Extended Menu 8" on page 23, it shows where the LookAhead system is activated or disabled in the HC5500.

What is the LookAhead?

The LookAhead is a system using the following components:

- Motor with a pulse generator (pressure regulation valve)
- Speed input (speed sensor)
- Boom position (boom sensor)
- Flow registration (flow sensor)
- Detection of section status (Spray box)

If the optional pressure sensor is fitted, menu E.8.1.7, the system switches from flow based sensing when less than 5 Hz to pressure based sensing.

A description of how the pressure regulation valve works is in section "Pressure regulation valve for LookAhead" on page 36.

The LookAhead can predict the correct setting of the pressure regulation valve when the main ON/OFF function is OFF e.g. on the headland. The pressure regulation valve will continue to regulate in relationship to the speed and number of active sections.

When the main ON/OFF function is switched ON again e.g. in the crop, the pressure regulation valve will be very close to the right position for the right flow.

When spraying, the LookAhead logs the valve position every time the correct application has been maintained for more than 10 seconds.

The logged position is related to the calibrated value and an offset is done if it is not the same. This could be due to, for example, a different setting on the agitation. LookAhead learns as it sprays.

When the sprayer is in transport position, the boom sensor deactivates the LookAhead so it will not function on the road.

Figure 6 shows the LookAhead system compared to the old pressure regulation valve. The main difference between the two valves is how fast the pressure regulation valve finds the right flow. The three circles mark where changes are made in the flow.

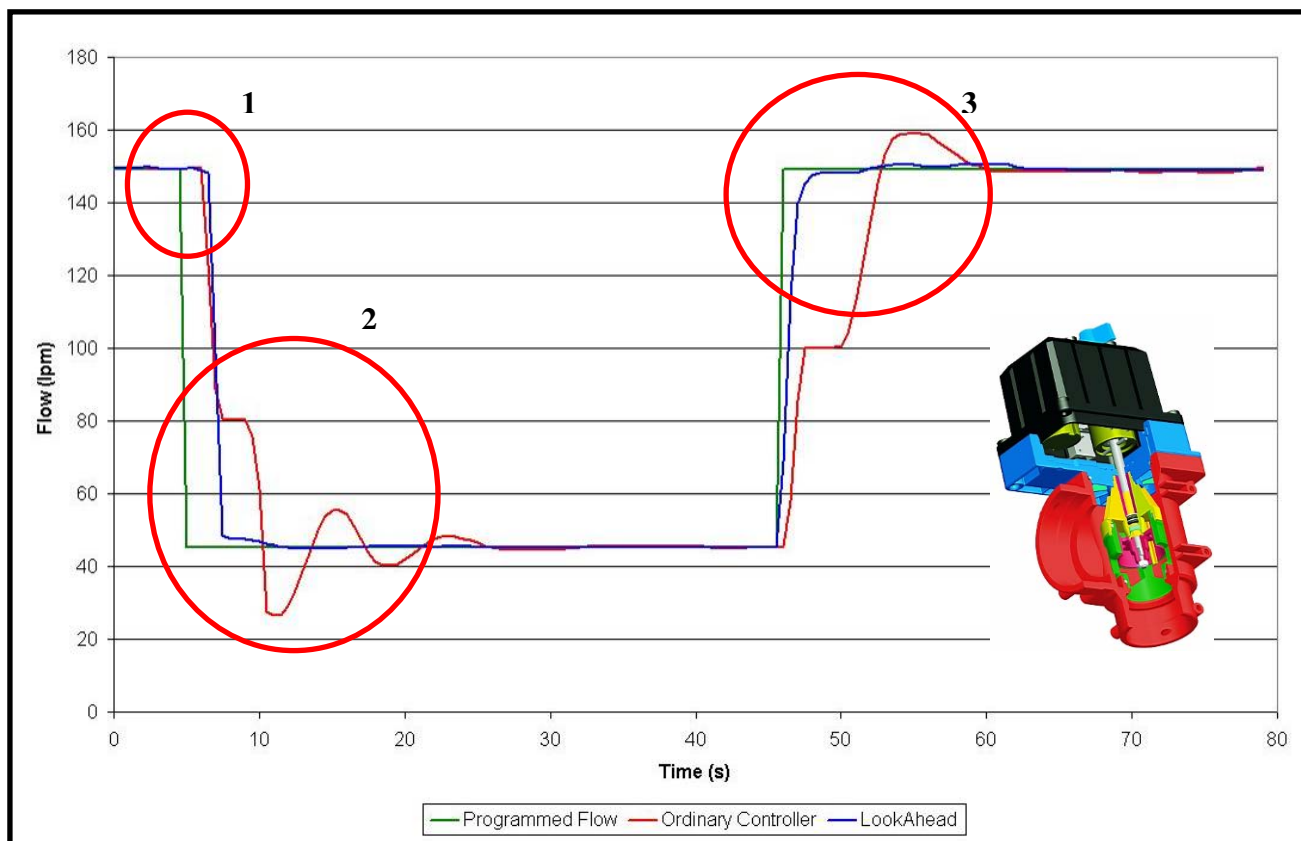


Figure 6 LookAhead system compared to the old pressure regulation valve.

Circle 1: Start position, the flow is set for 150 l/min, the flow is changed for 50 l/min and the flow starts to drop.

Circle 2: An ordinary pressure regulation valve drops down to 80 l/min and has to wait for a stable flow before proceeding.

LookAhead knows where to go, so it is not necessary to wait for the flow sensor. The LookAhead makes a fine adjustment on the pressure regulation valve and finds the correct flow quickly.

The ordinary regulation valve makes more adjustments before the right position is found and this takes more time.

Circle 3: When the flow increases to 150 l/min, the same happens again.

How to use the LookAhead

Operators with tractors that can change gear without using the clutch are basically the ones that will benefit mostly with Look Ahead.

New tractors are often driven with clutch free gearboxes, e.g. Vario – Dynashift – CVX. These new gearboxes corrupt the Hardi-Matic system in the liquid system of the sprayer because they can change the ground speed without changing the rpm on the engine, PTO hence or liquid pump on the sprayer.

When the LookAhead is active, the rpm on the PTO should be constant at all time, also in the headland. The reason for this is that the pressure regulation valve reads the position on the regulation valve and it registers the flow from the pump as well.

If the PTO rpm is changed, the flow and valve position relationship will be altered thus making the logged LookAhead values less accurate.

Calibration of LookAhead

LookAhead needs to be calibrated to the capacity of the nozzles. Boom size and number of sections also have an influence so no standard calibration value that can be put into the HC5500.

In some cases, LookAhead may have limited effect. For example:

1. Nozzles of low capacity are used (e.g. ISO 01, ISO 02).
2. The boom has many sections.
3. A combination of all the above.

Recommendation is as follows:

Extended Menu E8.1.1	Min. Duty Cycle (PWM) = 5%
Extended Menu E8.1.6	Regulation delay = 3 seconds
Menu 3.4	Regulation constant = 50%

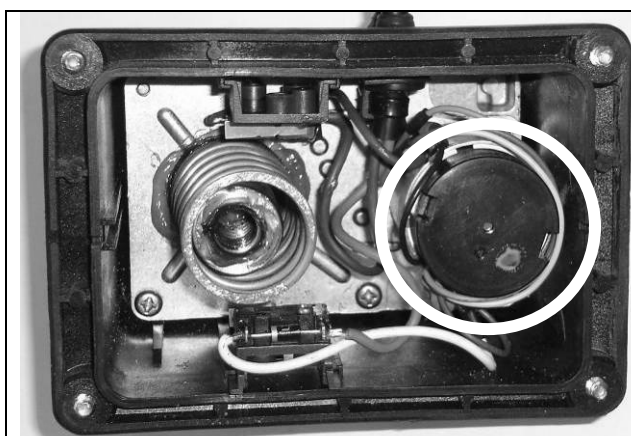
A lower PWM value (e.g. 2%) will result in the pressure regulation valve takes longer to reach the correct application rate.

Pressure regulation valve for LookAhead

The new pressure regulation valve that works with the LookAhead system has a pulse generator built on to the motor. See Picture 12.

It counts how many revolutions the motor has taken and hereby the electrical motor finds marked positions.

When sprayer starts spraying, LookAhead registers the position (revolutions number on the motor), speed and the flow to this position. When the sprayer stop, LookAhead will use the registered flow, speed and valve positions and thereby be able to predict the position of the pressure regulation valve when the sprayer is driving again at different forward speed.



Pressure regulation valve knob is colour-coded Yellow.

The ratio between knob and motor turns is 1 to 150.

1 pulse pr. motor rpm.

Picture 12 Pressure regulation valve with the pulse generator

Software

The software in the HC5500 and JobCom can be upgraded. Examples for this are improvements for better performance and bug fixes.

When the software for the controller is changed, it will be available from Hardi's Technical Service department. The software can be sent as an attached Zipped file on the E-mail.

Uploading new software to the controller will normally not have any visible effects and will delete the settings / memory of the controller.

A master reset can delete the settings and memory in the controller. After a master reset all settings in the controller must be set again, perform always a master reset after a software update.

To prevent too manually setup of all parameters in the HC5500 after a software update or master reset is it possible to save the configuration to a computer and transfer it again to the controller after the update or reset.

For software versions higher than 4.01 can all parameters be saved in a configuration file on a PC.

To save the parameters from the JobCom it should be enabled in menu E.9.1 prior to a configuration dump.

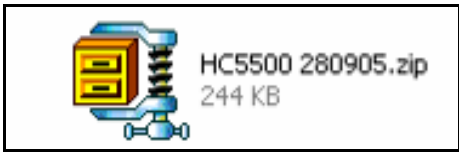

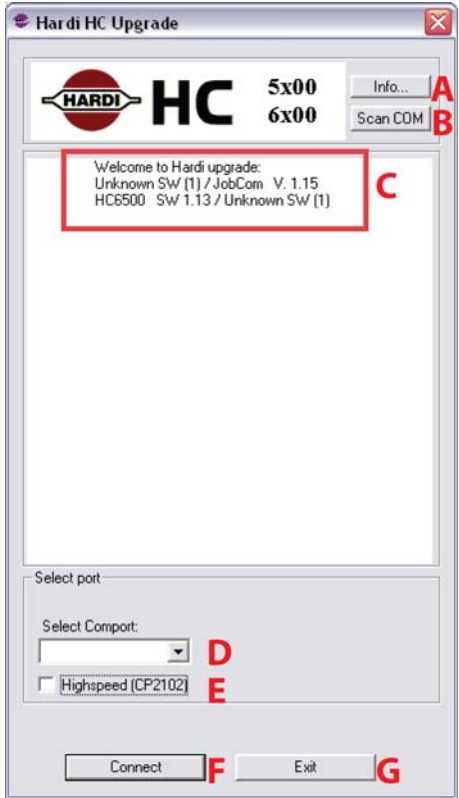
If the JobCom is enabled and defect, the HC5500 will give the error message "Incomplete". The HC5500 parameters, without the JobCom parameters, will be saved in the configuration file and can be transferred to the HC5500 and a new JobCom.

See the chapter "Handling the Configuration file" how to save and send the configuration file to the controller and JobCom.

HC5500 software versions lower or equal to 4.00 will not save all parameters from the HC5500 and JobCom. Following parameters will not be saved and should be setup manually:

Menu	Parameter	Menu	Parameter
E8.1.7.1	Pressure	E9.6.1	Fan speed
E8.4.1	Enable	E9.6.2	Air angle
E8.4.2.2.3	----->		
E8.4.2.2.4	<----	3.6.1	Track width
E8.4.3	Chassis	3.6.2	Tractor drawbar
E8.4.4	Sprayer drawbar	3.6.3	Dead zone
E8.4.5	Manual angling	3.6.4	Damping
E8.4.6	Boom sensors	3.6.5	Alignment offset
E8.4.8	Minimum radius	3.6.6	Sensitivity
E8.4.9	Half steer	3.7	Look Ahead
E8.4.10	Safety factor		All menu 3.7.1 to 3.7.x

Software program for the controller

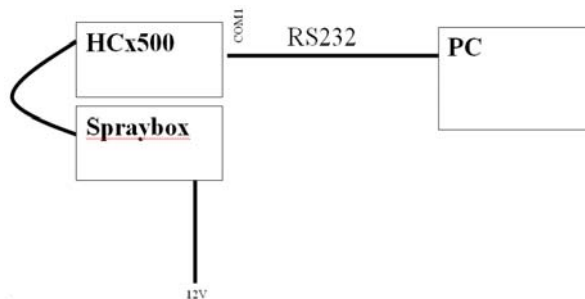
<p>The software sent in a mail as Zip file.</p> <p>The Zip file must be unpacked and put into a folder.</p>	
<p>The top file (HardiExeUploadWinvxxx.exe) is the upgrade program.</p> <p>The two other files (xxx.bin) are the software for the controller and the JobCom.</p> <p>This example show HC5500 software file "HardiV316.bin" with software version is 3.16.</p> <p>The JobCom reads "HardiJCV1.11.bin" with software version 1.11.</p> <p>Note: It is very important that these three files are in the same folder at all time otherwise will the upgrade program not work.</p>	
<p>Run Hardi HC Upgrade, double click on HardiExeUploadWin.exe and you will get a window like this:</p> <p>How to use the Hardi upgrade program is described in section "Software upload HC5500" and "Software upload JobCom".</p> <p>A: Information about the current version of Hardi HC Upgrade.</p> <p>B: Here you do a complete serial port scan</p> <p>C: Shows the software available for upgrade.</p> <p>D: Here you select the comport, which is connected to the unit you use.</p> <p>E: Check this button if you wish to use high-speed transfer, this is only possible with a "CP210x USB to UART Bridge Controller" and only together with HC6500.</p> <p>F: Connect and upgrade unit.</p> <p>G: Exit program.</p>	

The "Info" button shows the version information of the Hardi PC Uploader and software in the connected controllers.

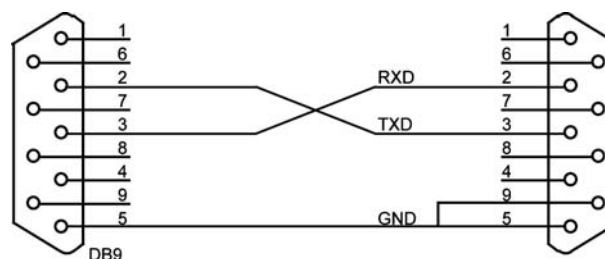


Communication cable

The connection from the PC to the controller is made with HARDI cable P/N 72271600. The cable has a short circuit in one of the connector, normally where the label is.
For software update this means HC5500

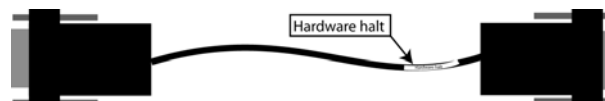


Loop in communication cable.
Port 1 (Com 1) is used as communication port on the HC5500.



The cable is marked with "Hardware halt" at the end with the loop. The mark is on the cable or with a yellow sticker on the connector.
If the cable is turned the wrong way, the software transfer procedure may not be possible.

The communication cable is shown on the spare part CD, pages M302.
Part number for the cable is 72271600 and can be ordered as a normal spare part.



USB to RS232 Converter

If there is no RS232 port, or problems with the Com port on the computer, use a converter from USB to RS232.
The systems requirement to use a converter is:
A computer with Windows XP or later.
USB to RS232 serial converter, Hardi P/N 26025900.
Serial NULL-modem cable, or Hardi "Communication cable" P/N 72271600.



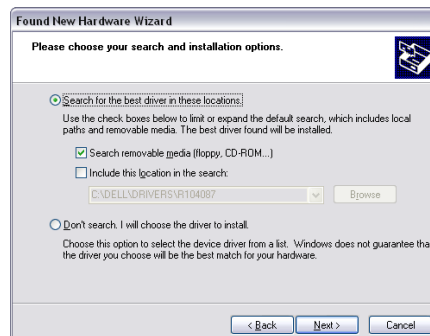
Install the USB to RS232 serial converter using the instructions and driver, which should be included with the USB to RS232 serial converter.

NOTE:

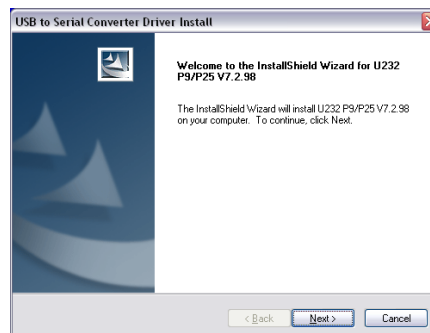
Do not plug the USB-RS232 converter into the system before the driver is finished installing



Insert the CD-Rom with the driver in the drive.
Select "Search for the best driver in these locations" and "Search removable media floppy, CD-ROM" and select Next>



At this screen select "Next>"



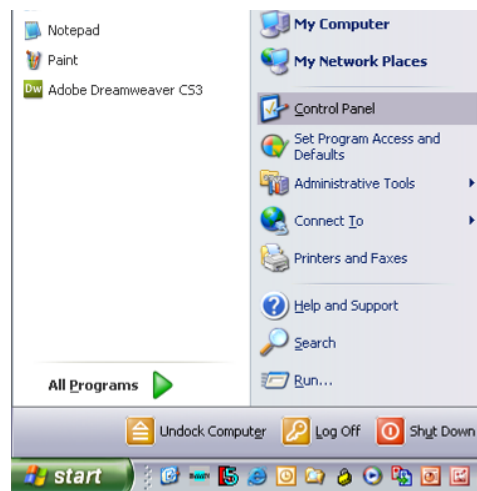
Accept the “Information” window by pushing the “Next>” button



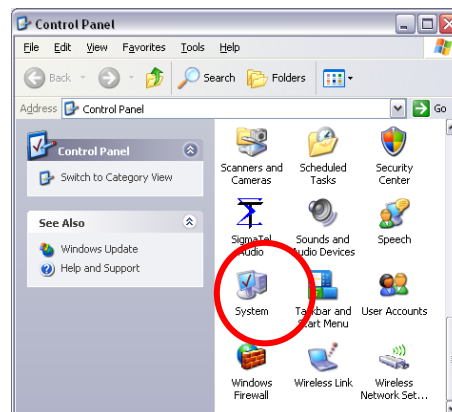
Select if you want to restart the computer now or later.
Push the “Finish” button. After a restart of the computer the adaptor is ready to use.



Verify comport number.
Before you can start upgrading your Hardi controller, you need to find the number of the USB-serial Converter.
Click on the Windows “start” button and select “Control panel”.

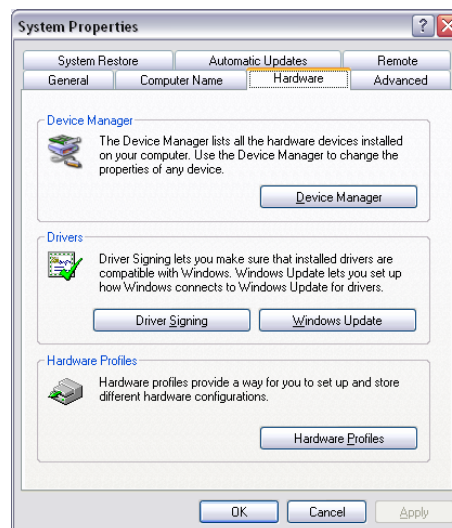


Double-click on the “System” icon.



Click on the “Hardware” tab.

Click on the “Device manager” button

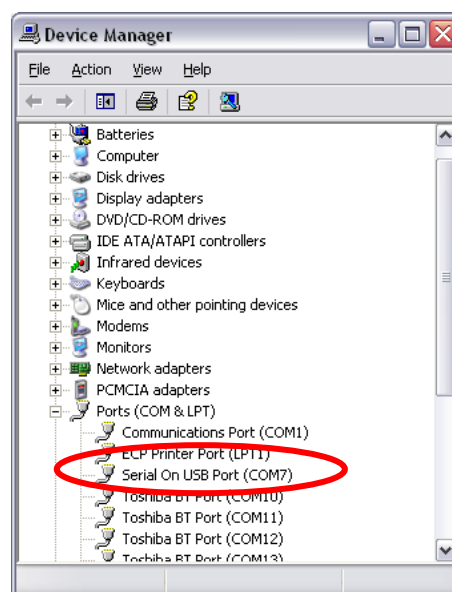


Find and expand the “Ports” icon by clicking on the ‘+’ left to the icon. Now you will see a screen not so different from the picture above. Here you see that there are many devices using a COM number, This may varies from PC to PC.

COM7, the one we need is called “Serial On USB Port (COM7).

With that number in mind you can close the Device Manager window, and continue to next step.

The number connected to the “Serial On USB Port” is in this case 7. But keep in mind, that this is just a guide, you need to see your self, what number your “Serial On USB Port” has been installed on.



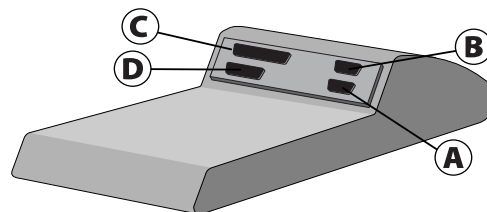
Software upload HC5500

The HC5500 software version is shown every time the controller is switched on.

The communication cable without the "Hardware halt" is plugged into the PC.

This is done before the computer is powered up.

The communication cable with the "Hardware Halt" is attached to the HC5500 in COM 1 (A) port).



Power ON the PC.

Power ON the HC5500

When the HC5500 is ON, the display will write "Hardware halt".

The controller awaits contact to the Hardi HC5500 upgrade software programme.

Hardware halt.
Wait for connect

On the PC, the upgrading program can be started up and the PC dialogue box should look like this.

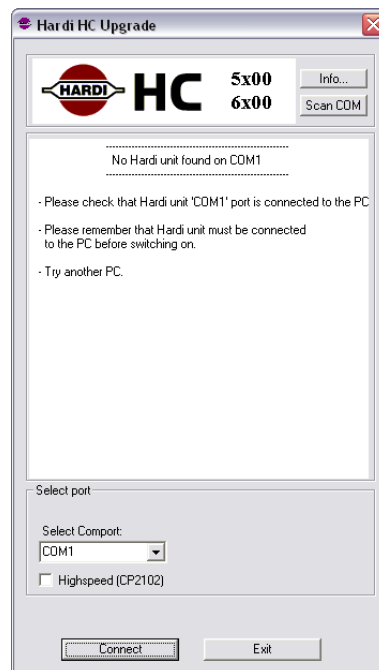
The dialogue box shows what software version will be uploaded to the HC5500 Controller.

Communication port has to be chosen. If the Com port not is shown, select Scan COM and see section "USB to RS232 Converter" how to find the Com port number to use.

High-speed (CP2102) can only be used with the HC6500 Controller.



The upgrading program will tell what kind of error there is with the connection and what can be done to solve the problem.



The dialogue box will ask if the software should be uploaded to the selected version.

Select "OK".

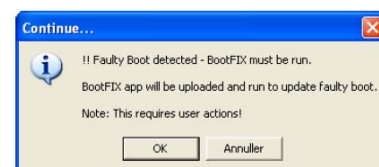
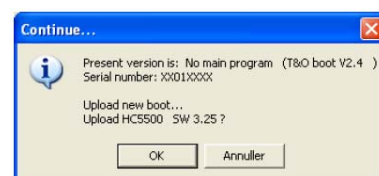
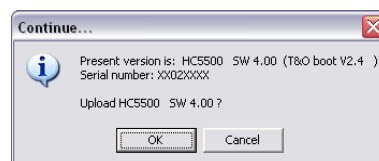
The display in the HC5500 will change. If the display does not change, something is wrong with the connection.

There are three versions of this window:

One where you have to upload a new application

One where you have to upload a new boot and a new application.

The third version is only seen on the HC5500 with boot software older than v2.4. This version of the boot software contains a problem that requires a special update sequence to be executed.



The only difference between the two first versions is the "Upload new boot..." line. This is because it isn't always necessary to upload a new boot, to upload new application software.

- Click "OK" to upgrade HC5500.
- If HC5500 needs to upgrade boot software it will erase the old one, and the "Hardi HC Upgrade" will upload a new version.
- Afterwards "Hardi HC Upgrade" will erase the current application on HC5500 and upload the new one.