

Product guide

NAVIGATOR

3000 · 4000 · 5000 · 6000



The Sprayer



Product guide

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HARDI reserves the right to change the specifications without notice. Illustrations shown may include optional extras and accessories.

Welcome to the Product guide



Value for money, Ease of use, Safety, Reliability and Quality

These values were the cornerstones when the NAVIGATOR was introduced in 2007 and updated 2014. And they are also the cornerstones today where the family has been extended by two additional tank sizes, new electronics and new booms. Now available in 3000, 4000, 5000 and 6000 l and with booms from 18 to 39 m.

In the present Product guide you will find well-known and well proven features. As you will see, new features have been added, ensuring that the NAVIGATOR will keep the position on the market.

Value for money – the sprayer should be long lasting, meeting the farmers’ present as well as future demands, so that also in 5 years’ time, they would have a modern looking product of favourable trade value even as a second hand machine.

Ease of use – the sprayer must work without too much concentration of small details. Farmers would like a well equipped sprayer that is easy to operate and allows for quick filling and cleaning, just as it should offer all the features of a modern sprayer.

Safety – the sprayer should be easy to use with a high safety standard for the operator as well as for the environment.

Reliability and Quality – the sprayer should be of a high overall reliability and quality, meaning high quality materials, good design and excellent finish.

The NAVIGATOR is HARDI’s answer to the demands of this customer segment, but how should the farmer know what choices and opportunities he has? Here we need you as a sales expert to tell him what the NAVIGATOR has to offer.

With this Product guide you have a marketing tool that goes far more into the depth with the technical argumentation than brochure material. Possibly, use the Product guide together with the interactive CD-ROM in order to get full benefit and the most satisfactory introduction to the NAVIGATOR.

Enjoy!

Confidential

This is your personal sample of the NAVIGATOR Product guide and should be used as your personal sales tool - please treat it confidentially.

Date: _____

Signature: _____

The Obvious Choice

CONCEPT

Value for money

Modern design

Long lasting design
High resale value

HARDI pump

Easy maintenance
Can run dry
Greater range of operating pressures

1. IntelliTrack

Precisely steered
Easy calibration

2. ManualTrack

Manual track correction on slopes

SmoothRide suspension

Minimizing shocks
Better boom performance

Clearance

Excellent clearance and low centre of gravity
Reduced crop loss

Filling

1. PumpFiller
2. FastFiller

DynamicFluid4

Fast and precise liquid regulation

EFC section valves

BoomPrime

Spray job can be started directly in the field – less downtime

4 boom alternatives

VPZ
EAGLE
DELTA
DELTA FORCE

Competitive price

Focus on value for money
High price on second hand machines

Ease of use

Logical working zone with SmartValve and manifold valves

Easy to control
Easy to operate

SafeSpray

Vacuum gauge
Filter blockage warning

TurboFiller

High capacity
Easy and fast to operate

CycloneFilter

Self-cleaning and low maintenance

Electronics

LogicMenu on controllers
User-friendly control
SprayBox
HyBox
HC 5500
HC 6500
HC 8600
HC 9600
SprayRover 570

AutoSectionControl

No overspray
Up to 5 % reduction of chemicals
Easy control of multiple-section booms

Service

Easy daily service – every component is easy to inspect and reach

Safety

WorkZone

High safety level through design during connection, operation and filling

EasyClean suction filter

Safe cleaning, less chemical contact

SafetyLocker

Easy access
Placed in service area

Low centre of gravity

High stability
Higher driving comfort

RinseTank

RinseTank located at the rear – better balance than competitors, improves driving performance

Reliability and Quality

Integrated design

No add-on solutions

Surface treatment and high paint quality

Zinc phosphate surface treatment
Strong durable paint

Choice of materials and manufacture quality

Domex steel
Laser-cut steel plates and tubing
CNC bending
Robot welding
High standard on finish
Long lasting high-quality components

HARDI test procedures

Spray scanner and multi-functional test

Market leader

HARDI is seen as the industry leader of spray technique and has a high know-how – HARDI – The Sprayer

Test

JKI (ISO 16122), NSTS and Danish Inspection scheme (EN 13790) accredited final test

WorkZone



1. SmartValve - pressure
2. Valve for filling
3. Suction valve main tank/RinseTank
4. EasyClean filter
5. CleanWater tank valve
6. Filling valves/PumpFiller coupling
7. SafetyLocker
8. PressureEmpty
9. RinseTank coupling
10. TurboFiller
11. TurboFiller operating unit
12. Level indicator main tank
13. Level indicator RinseTank



The NAVIGATOR has been designed with a strong focus on user-friendliness and ease of operation, and the WorkZone is a fine example of this. In this area, everything you need to operate the sprayer is available, with all primary functions placed in easy to reach positions and everything designed to be simple and logical to operate.

The SafetyLocker is placed behind the cover, right above the WorkZone.

Frame

CHASSIS



The heavy-duty NAVIGATOR chasis is built in high-tensile Domex steel ensuring exceptional strength.

The chasis is built to endure under the most difficult conditions anywhere in the world.

Low centre of gravity

A sprayer with a high centre of gravity would be very dangerous to operate, and therefore, large efforts have been done to ensure the lowest possible centre of gravity for the NAVIGATOR without compromising the clearance under the sprayer.



Unique design with long drawbar

The long drawbar is bolted underneath the frame, providing good driving stability and absorbing up and down forces at high-speed driving.

Excellent crop clearance

The unique design of axle and frame ensures excellent crop clearance, reducing crop damage to the absolute minimum. No brake rods or steering components are lower than the axle.

The drawbar connection on the tractor will always be the lowest point on the sprayer, and, in most cases, also the tractor axle is lower than the sprayer chasis. Important features of the NAVIGATOR design are the drawbar being small in width and one line upwards from the linkage to the axle. The vital clearance under the sprayer axle is excellent, varying from 70 – 80 cm depending on tyre and wheel set-up.

- Domex steel
- Laser-cut tubing
- CNC bending
- Robot welding
- Excellent crop clearance
- Low centre of gravity

Drawbar and support leg



Drawbar load:

- 3000 l
max. 1350 kg
- 4000 l
max. 1450 kg
- 5000 l
max. 2000 kg
- 6000 l
max. 2150 kg

There is a choice between low- and high-hitch drawbar versions. These drawbars can be equipped with different coupling parts, which are either bolted or welded.

The low version is available as a fixed or a steered model. With the high hitch the turning part comes standard. The non-steered version has rods instead of cylinders. A drawbar bushing can be fitted into a standard 50 mm hole to reduce the hole size to 33 mm.

A 3,000 kg support stand that is easily removed is standard. The support stand can be used from both sides of the drawbar.

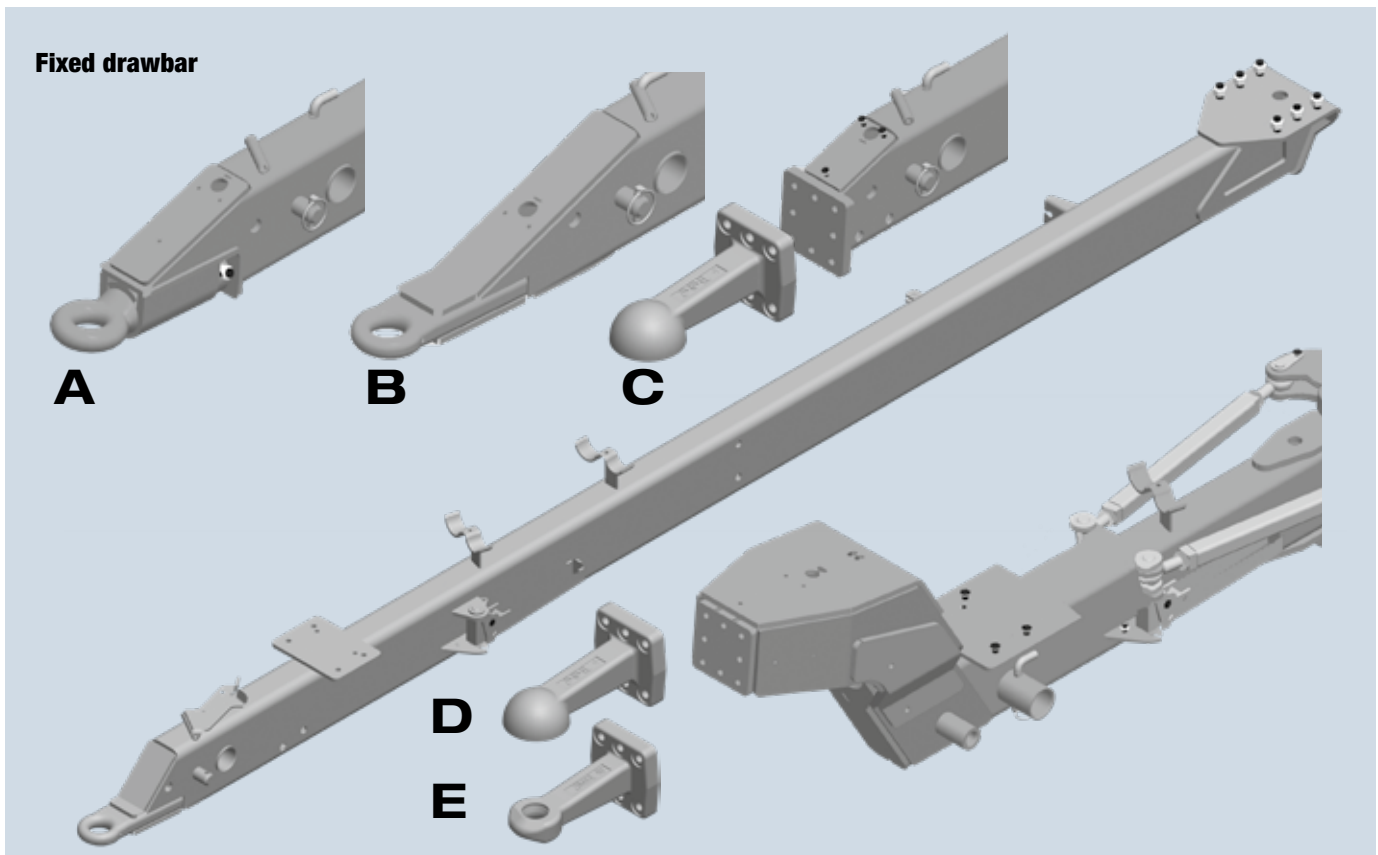


The machine is available with different combinations of drawbar systems.

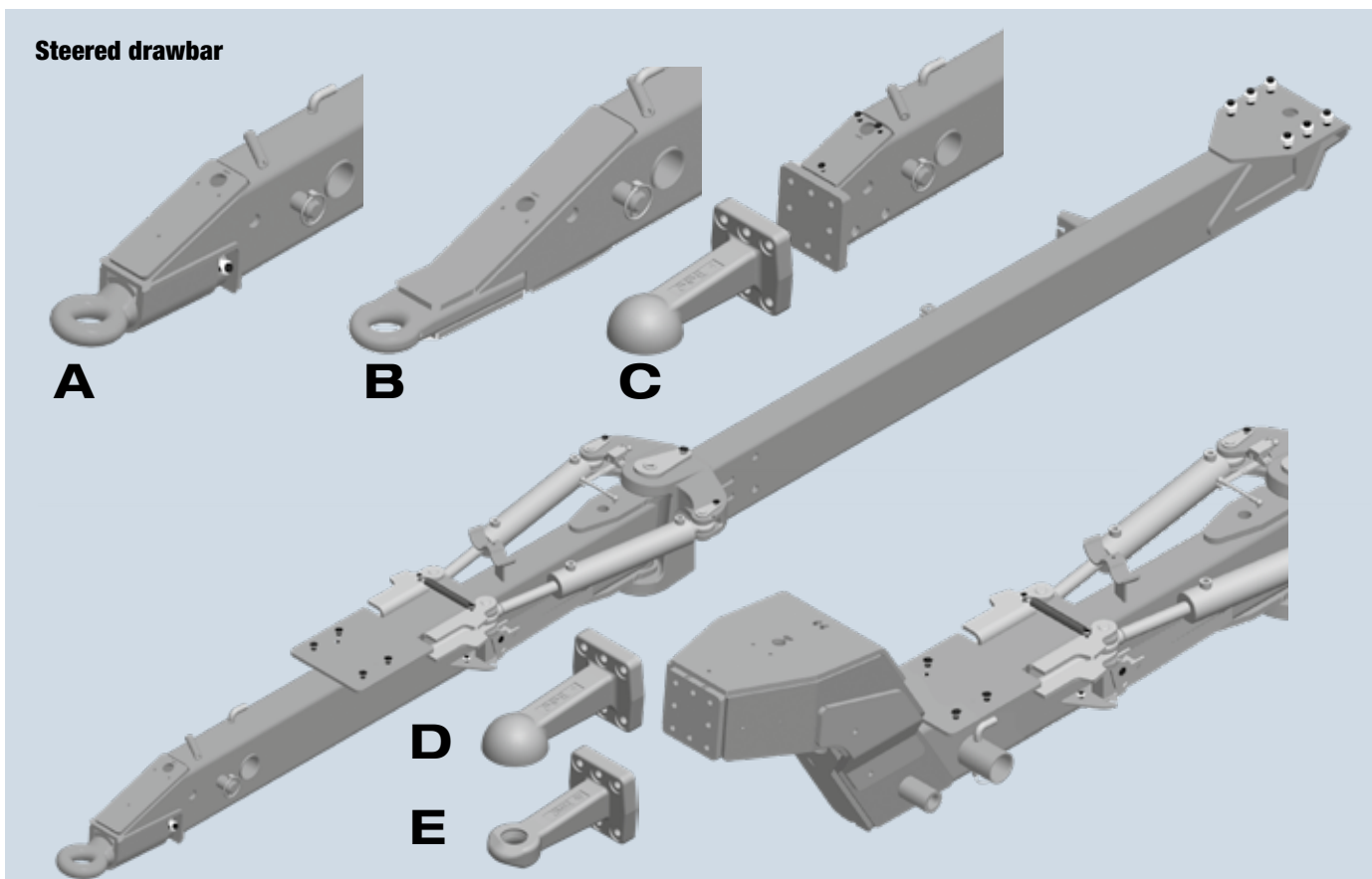
Hitch type	Hitch attachment	High/Low	Drawbar type	
Swivel Ø50/33	Welded	Low	Fixed or steered	A
Hitch Ø50	Welded	Low	Fixed or steered	B
Scharmüller Kugel K80	Bolt-on	Low	Fixed or steered	C
Scharmüller Kugel K80	Bolt-on	High	Steered with rods/steered	D
Zugmaul Ø40 high	Bolt-on	High	Steered with rods/steered	E

Drawbar

Fixed drawbar



Steered drawbar



Service area



Platform height over ground: 130 cm

Platform Width 62 cm Depth 50 cm

Easy inspection of the tank

The lid is located in close proximity to the platform, allowing easy inspection of the tank. The design of the tank gives the operator excellent visibility of the sides as well as the bottom of the tank.

Footstep for easy access

A traversable footstep is fixed at the drawbar to facilitate access to the platform.

Relatively low platform placement

The platform is placed as low as possible for easy access.

Access to electronic system by lifting right cover

To aid in service accessibility the majority of electronic components and connections are located in a box behind the right front cover.

Easy access to fluid system

Excellent service access to the fluid system can be gained through the floor plate of the platform.

Protected placement of gauges

Gauges for monitoring the condition of the suction filter and the pressure gauge are mounted over the platform. This provides excellent visibility from the tractor and good protection from the elements.

Tracking set-ups

The NAVIGATOR can be equipped with 3 different steered versions depending on which hydraulic and electronic equipment the customer will order. More information about hydraulics can be found on pages 73-76.

IntelliTrack Z-version

Direct hydraulics (DH) being standard equipment on the NAVIGATOR, the sprayer comes with a high-end hydraulic system, and the IntelliTrack can easily be operated with the hydraulic control box. The sprayer will automatically follow the tractor track when turning on headland. The IntelliTrack Z-version requires minimum HC 6500 controller.

ManualTrack Z-version

Direct hydraulics (DH) being standard equipment on the NAVIGATOR, the sprayer comes with a high-end hydraulic system.

ManualTrack Y-version

The NAVIGATOR hydraulics will be operated through the tractor hydraulic outlets. The ManualTrack will also be operated through an additional double-acting hydraulic outlet. ManualTrack is used for track correction on slopes, making the sprayer drive a little uphill and follow the track of the rear tractor wheels.

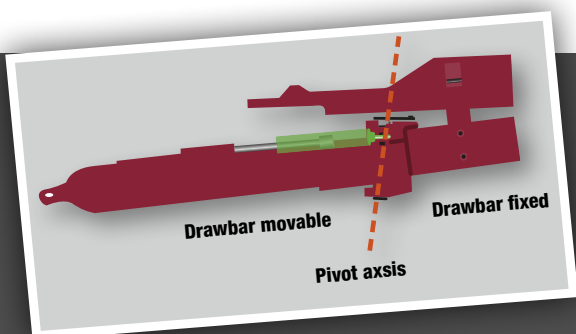
IntelliTrack Z-version

- 1 double-acting outlet
- Automatically steered
- Manual correction on slopes

ManualTrack

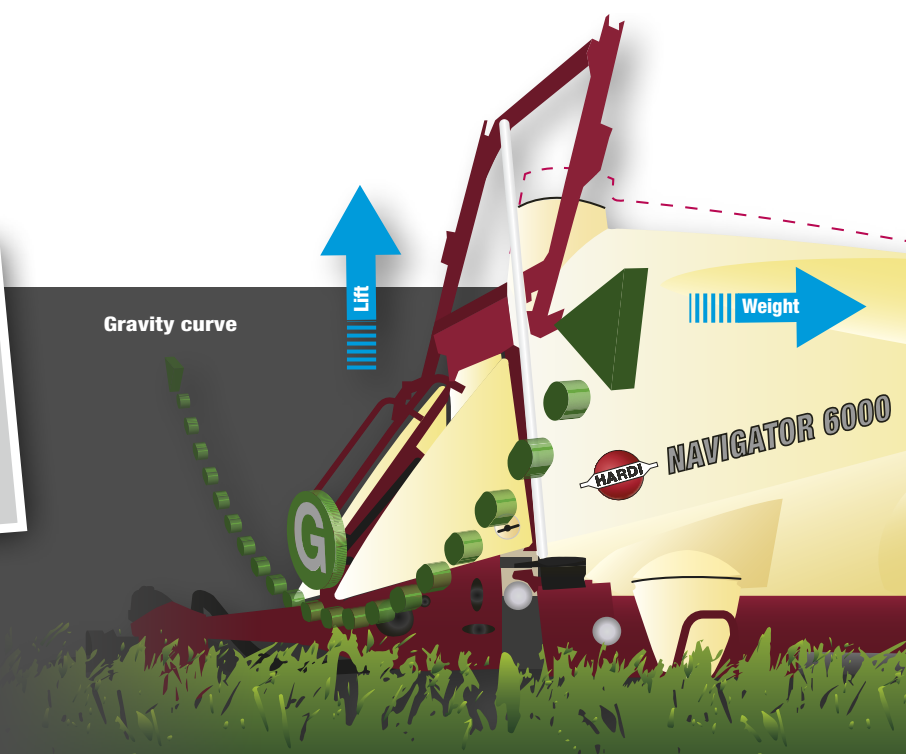
- 1 double-acting outlet
- Manual correction on slopes

CHASSIS

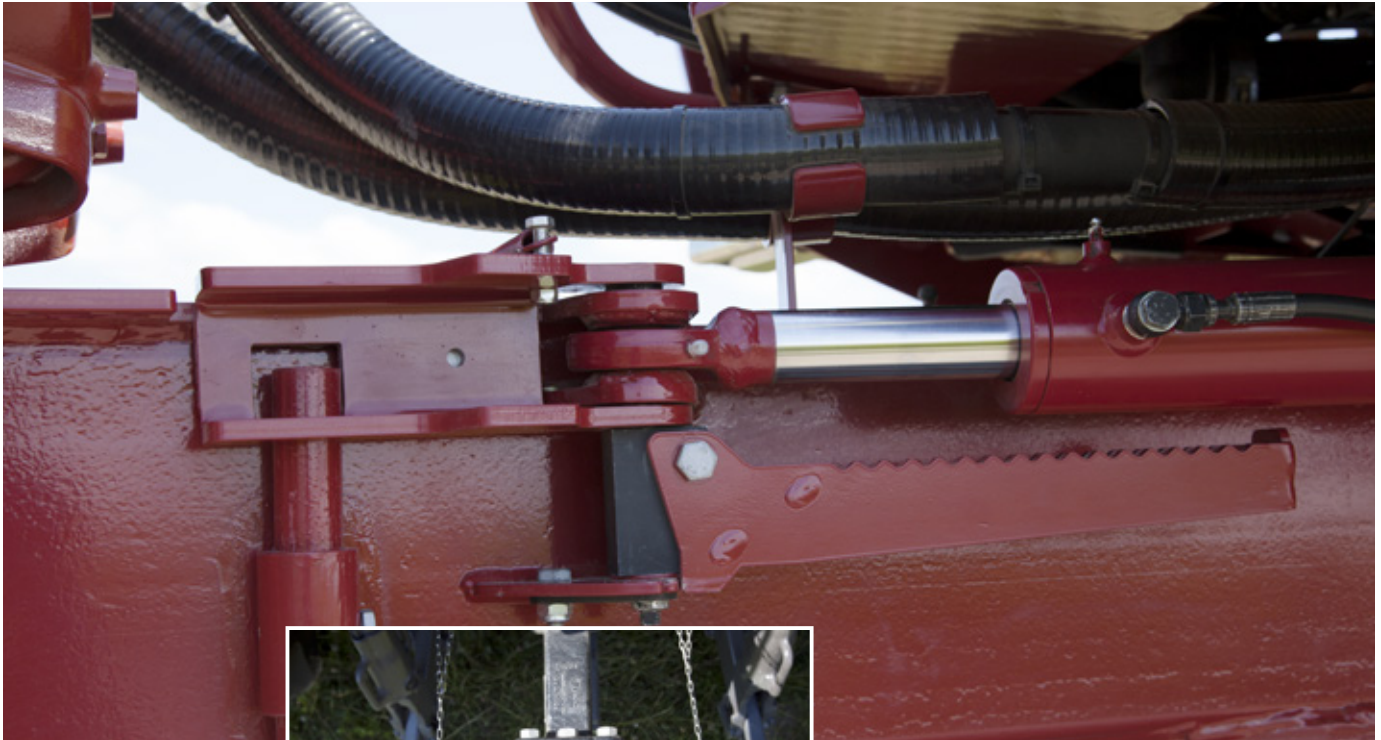


Steering geometry

The steering geometry and the angled pivot axis ensure that the centre of gravity of the trailer is following the gravity curve and minimize the risk of tilt over.



IntelliTrack



- DEC
- 2 cylinders
- Software lock
- Proportional valve
- Easy connection

The NAVIGATOR is also available as a tracked version, where the drawbar is divided in two - a rear part fixed on the frame and a movable front part. The concept of a rearwards inclined pivot axle ensures the best possible geometry for stability and the hydraulic system.

Dynamic Electronic Control (DEC)

IntelliTrack has an integrated safety feature which prevents the cylinders from steering the drawbar when the driving speed is too high for the given track width.

2 cylinders as standard

Tests have shown that 2 cylinders on the drawbar provide better driving stability and far smoother turning of the machine due to the higher oil demand and equal displacement.

Easy connection to the tractor

Once the NAVIGATOR IntelliTrack has been calibrated, the operator only needs to attach 2 small chains to the tractor before starting to spray.

The two connection chains together with the brackets build a parallelogram, which tolerates slacks produced by the coupling bolt or by drawbar torsion.



Transport lock

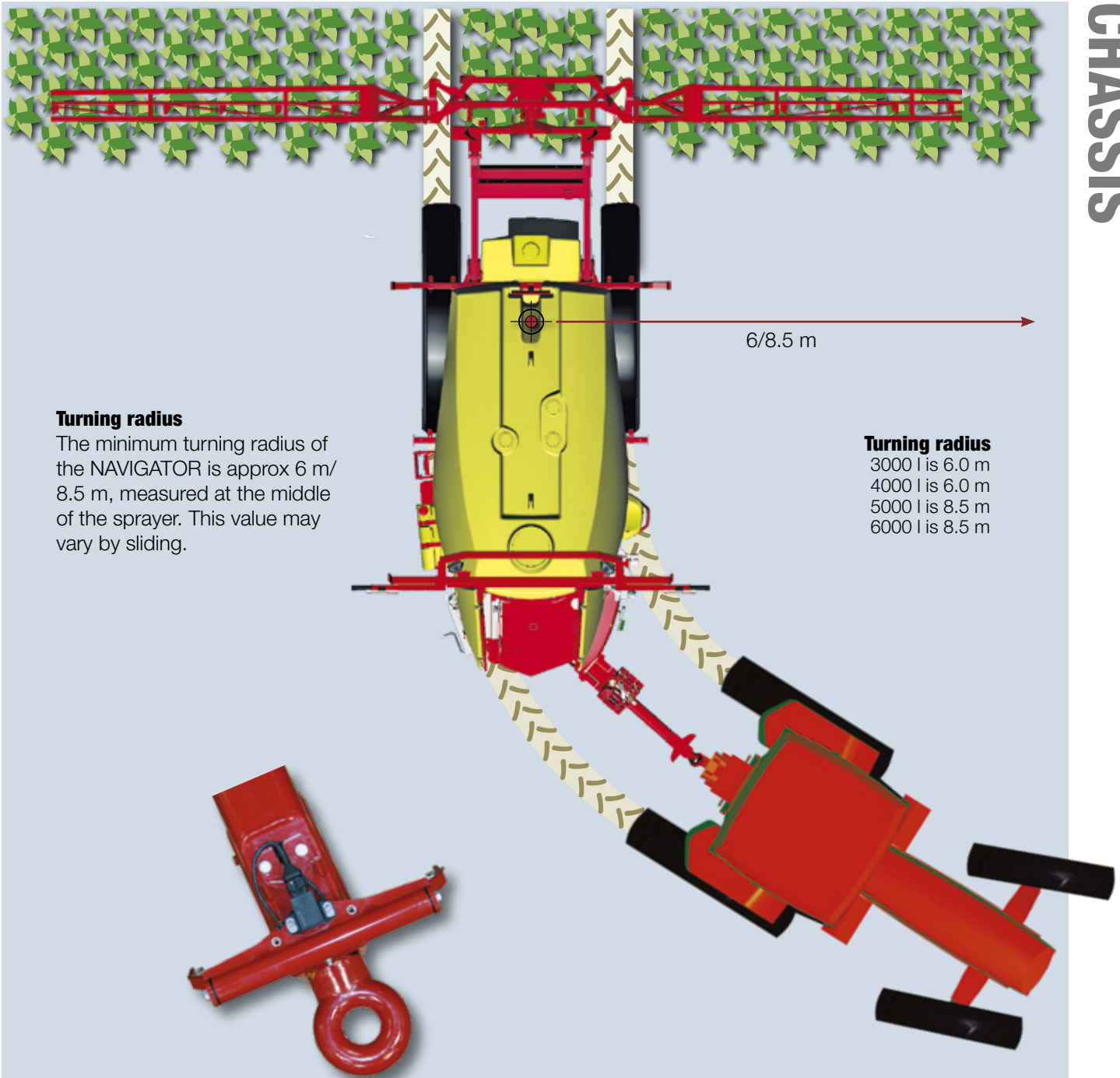
The drawbar is automatically centred for road transport by pressing the centre position button in the HydraulicBox. An integrated spring-loaded bracket can be manually locked, so the sprayer can be driven safely on the road.

High performance with proportional valve

An integrated proportional valve ensures that the turning reaction is adapted to the required turning angle of the drawbar as well as to the driving speed in order to avoid horizontal boom movements after turning on the headland.

Tracking

CHASSIS

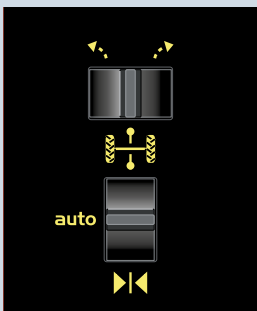


Turning radius

The minimum turning radius of the NAVIGATOR is approx 6 m/ 8.5 m, measured at the middle of the sprayer. This value may vary by sliding.

Turning radius

- 3000 l is 6.0 m
- 4000 l is 6.0 m
- 5000 l is 8.5 m
- 6000 l is 8.5 m



IntelliTrack operated from HydraulicBox



Axles / brakes



Fixed or adjustable axle

The NAVIGATOR 3000 and 4000 is available with a fixed axle with 1.90 m hub distance, allowing for 1.80 m or 2.0 m track width. The individual track width is obtained by turning the wheels. Adjustable axles are available as an option for all models; they are easily adjusted by loosening the bolts.

Excellent crop clearance

The brake system is designed so that no brake components, like brake arms or cylinders, are lower than the main axle.

Brakes

The NAVIGATOR concept allows the farmer to choose whichever brake system he prefers. 5 different options are available. For the 4000-6000 I model, however, a brake must be ordered, leaving only 4 possible choices. Be aware that the road transport laws of the different markets are to be followed.

Minimum inner dimension

The minimum inner dimension between the tires is: 118 cm + space between tyre an frame

Excellent crop clearance

Fixed axle or adjustable axle

Parking brake as single option



Stub axle

NAVIGATOR 3000/4000:

8 pcs. M22x1.5 @ Ø275 mm
Pilot hole Ø220.8 mm
Flat-headed nuts (DIN 74361 -3)

NAVIGATOR 5000/6000:

10 pcs. M22x1.5 @ Ø335 mm
Pilot hole Ø280.8 mm
Flat headed nuts (DIN 74361-3)

Brake systems available for the NAVIGATOR

	3000	4000-6000
No brakes	Standard	N/A
Hydraulic brakes	Option	Option
Hydraulic brakes with parking brake	Option	Option
Pneumatic brakes – 1-circuit with parking brake	Option	Option
Pneumatic brakes – 2-circuit with parking brake	Option	Option

Wheel	Width	Fixed axle	Short axle	Long axle	Clearance under axle mm
		1.80 or 2.0 m mm	1.5-2.0 m mm	1.8-2.25 m mm	
11.2x48"	270/95R48	1800 or 2000	1500-2000	1800-2250	760
12.4x46"	300/95R46	1800 or 2000	1500-2000	1800-2250	760
12.4x52"	300/95R52	1800 or 2000	1500-2000	1800-2250	840
13.6x48"	340/85R48	1800 or 2000	1540-2000	1800-2250	790
16.9x38"	420/85R38	1800 or 2000	1620-2000	1800-2250	720
18.4x38"	460/85R38	—	1650-2000	1800-2250	770
20.8x38"	520/85R38	—	1720-2000	1800-2250	810
20.8x42"	520/85R42	—	—	1800-2250	745
650/65R42"	650/65R42	—	—	1950-2250	785
520/85x46"	520/85R46	—	—	1800-2250	835
900/50x42"	900/50R42	—	—	2115-2250	785

Wheels



Different wheel sizes are available for the NAVIGATOR, which can also be ordered with transport wheels.

Mudguards

As optional, the NAVIGATOR can be equipped with mudguards. 4 types of robust polyethylene mudguards are available. It is not possible to order mudguards smaller than the chosen tyre.

Tyre size	Name	Diameter mm	Width mm	Load index	Axle load cap. kg 25 km/h	Axle load cap. kg 40 km/h	Axle load cap. kg 50 km/h	Brand	Model	Mudguards
NAVIGATOR 3000										
11.2x48	270/95R48	1710	284	142 A8	6280	5800	5560	Alliance	350	narrow
12.4x46	300/95R46	1727	315	151 A8	7460	6900	6620	Alliance	350	narrow
12.4x52	300/95R52	1890	310	151 A8	7460	6900	6620	Alliance	350	N/A
13.6x48	340/85R48	1805	345	151 A8	7460	6900	6620	Alliance	350	narrow
16.9x38	420/85R38	1680	415	144 A8	6050	5600	5600	Alliance	FarmPRO II	wide
18.4x38	460/85R38	1740	455	149 A8	7000	6500	6500	Alliance	FarmPRO II	wide
20.8x38	520/85R38	1850	525	155 A8	8350	7750	7750	Alliance	FarmPRO II	wide
NAVIGATOR 4000										
12.4x46	300/95R46	1727	315	151 A8	7460	6900	6620	Alliance	350	narrow
12.4x52	300/95R52	1890	310	151 A8	7460	6900	6620	Alliance	350	N/A
13.6x48	340/85R48	1805	345	151 A8	7460	6900	6620	Alliance	350	narrow
18.4x38	460/85R38	1740	455	149 A8	7000	6500	6500	Alliance	FarmPRO II	wide
20.8x38	520/85R38	1850	525	155 A8	8350	7750	7750	Alliance	FarmPRO II	wide
NAVIGATOR 5000/6000										
20.8x42	520/85R42	1951	516	157 A8	8900	8250	8250	Alliance	FarmPRO II	wide
	650/65R42	1924	633	158 A8	9120	8500	8500	Taurus	Point 65	std.
	520/85R46	2050	520	173 A8	14430	13000	11700	Alliance	375	high
	900/50R42	1947	861	168 A8	13280	12260	11760	Alliance	378 AGRISTAR XL	wide

SmoothRide

Suspension travel
100 mm

Suspension range
1,000 - 10,000 kg

More stable
Less roll than with
air suspension

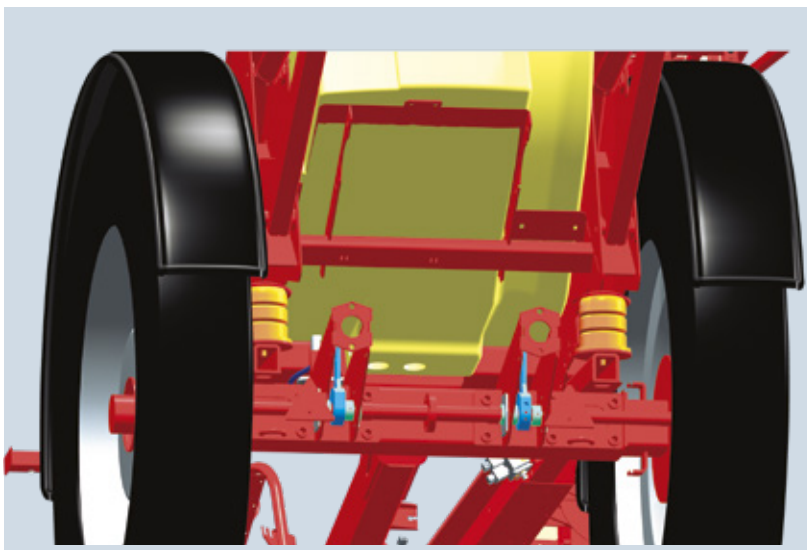


The optional SmoothRide suspension system is incomplex and reliable, requiring little or no service. The suspension gives a better ride of the sprayer, resulting in higher capacity as well as comfort.

2 polyurethane dampers absorb the movements. The dimensions of the dampers ensure that they do not get over-compressed when the tank is empty, which will make them last longer.

During road transport the trailer and consequently the boom will not be pushed so hard.

In field conditions the boom suspension will work better so the boom can be run in optimum height over the crop.



ParaLift



Parallelogram lift systems are standard on modern sprayers. The HARDI ParaLift concept has shown its excellent performance on more than 20,000 trailer sprayers. No gliding parts, only horizontal bolts and an automatic mechanical transport lock ensure excellent boom stability with more or less no service. The ParaLift is a push type meaning the cylinder is out when the boom is up.

Easy service

The HARDI ParaLift requires a minimum of service (lubrication, adjustment etc.) compared to traditional H-frame systems.

The HARDI ParaLift ensures high clearance above any crop

The long lift arms allow for very flexible height adjustment. The boom height is adjustable in a range of 187 cm from 30 cm to 227 cm, depending on the sprayer wheel combination.

Wide attachment to the boom suspension ensures high performance of the boom.

The outer dimension of the ParaLift is 107 cm this ensures a very stable attachment of the boom.

Hydraulic transport lock

Adjustable hooks lock the ParaLift automatically when the boom is folded in. Thus, the boom and the hydraulic lift cylinders will not be damaged during road transport, and exact transport position is obtained.

Hydro pneumatic damped ParaLift

Pushing cylinders give a linear pressure curve when lifting the boom. This will secure full benefit of the nitrogen damper.

Plunger cylinders have no dry side. No dust and condense can be accumulated.

Bigger cylinders give more lifting power at the same pressure.

ParaLift will go lower than a 50 cm boom height. This is to remaining oil in the cylinder when spraying at 50 cm and the suspension will work also in this height.

Suspended ParaLift allows a more simple centre. No suspension in the centre means no wearing parts.

ParaLift light
VPZ
DELTA
EAGLE
18 - 21 m
24 - 30 m SPY

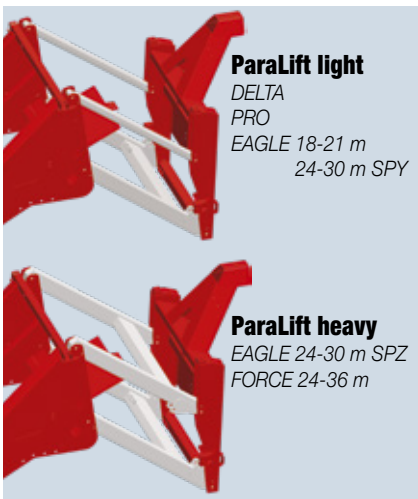
ParaLift heavy
EAGLE
24 - 30 m SPZ
DELTA FORCE
24 - 39 m

Flexible height adjustment:
Down to 40 cm
Up to 227 cm

ParaLift width:
107 cm

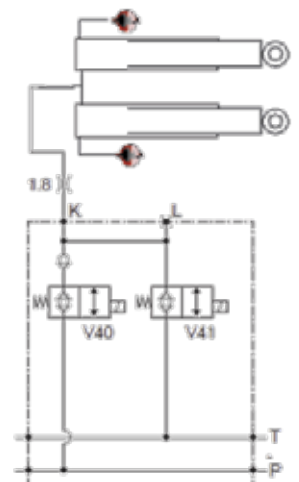
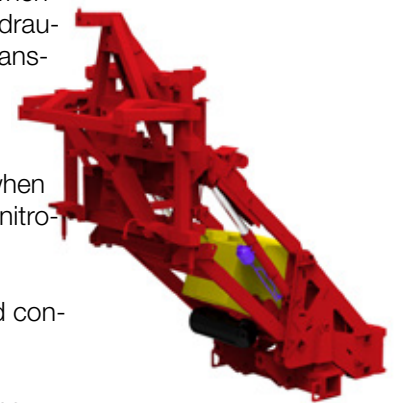
Automatic transport lock

Suspended ParaLift allows more simple center with less maintenance and less setup



ParaLift light
DELTA
PRO
EAGLE 18-21 m
24-30 m SPY

ParaLift heavy
EAGLE 24-30 m SPZ
FORCE 24-36 m



Main tank

Material:

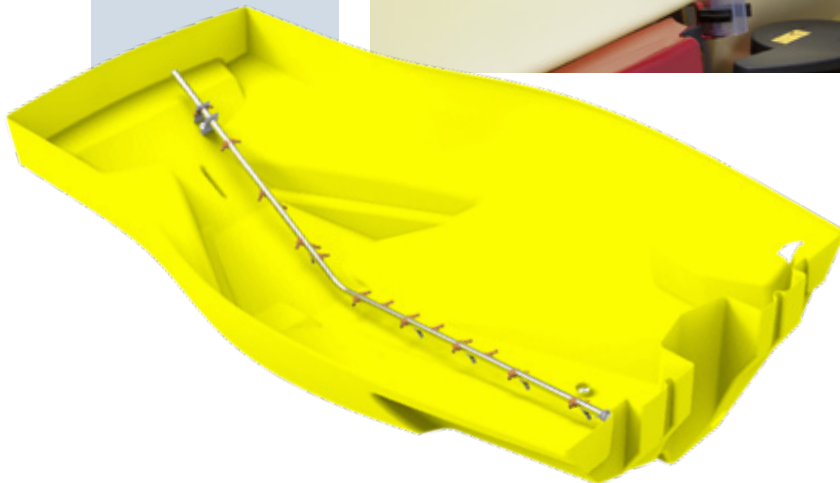
UV protected polyethylene

Material thickness:
3-4000 l min. 8 mm
5-6000 l min. 10 mm

Volume

Nominal/Maximum
3000 l/3400 l
4000 l/4210 l
5000 l/ 5400 l
6000 l/ 6450 l

Low centre of gravity
Efficient agitation
Easy to clean
Uniform weight distribution
Deep forward sump



The polyethylene tanks of the NAVIGATOR are produced as one part. They have a very flat surface, no inside walls, and they rest freely in the frame.

Low centre of gravity

To make the sprayer as stable as possible the tank is wider at the bottom and completely integrated in the frame design. This ensures a low centre of gravity.

Liquid is moved forwards as the tank is emptied, thereby maintaining weight on the drawbar. This ensures that the traction on the tractor is maintained, even when going up slopes with an almost empty tank.

Tube concept
A tube concept takes care that all fittings are in a safe position. When filling chemicals and

water, the filling hose goes through the bottom of the tank and into a tube, which takes it to the top of the tank where the chemicals/water flow back down inside the tube and out into the tank at the bottom. This system reduces technical residues and minimizes foaming with maximal safety.

Efficient agitation

Because of the forward sloping of the tank, agitation towards the sump is very efficient. The agitation is made by a set of up to 27 Venturi nozzles. The nozzles are positioned so they give optimal agitation everywhere in the tank. The output of the Venturi nozzles are around 4 times the input, meaning 320 l/min. agitation with an input of only 80 l/min. Less use of pump capacity means more capacity available for spraying. The agitation is built in that way that a full open valve uses as much fluid for agitation as possible. For spraying the agitation valve needs to be only half open.

Deep central tank sump

The sprayer is completely emptied even on slopes up to 10 degrees - uphill or downhill.

Easy to clean inside and outside

The smooth surface of the tank makes the machine very easy to clean.

Easy to rinse inside with the optional tank rinsing nozzles

100 % of the tank can be "seen" by the rinsing nozzles. No sharp corners prevent sedimentation of pesticide.

RinseTank

CHASSIS



Material:
UV protected polyethylene

Capacity:
500 l

Material thickness is 8 mm



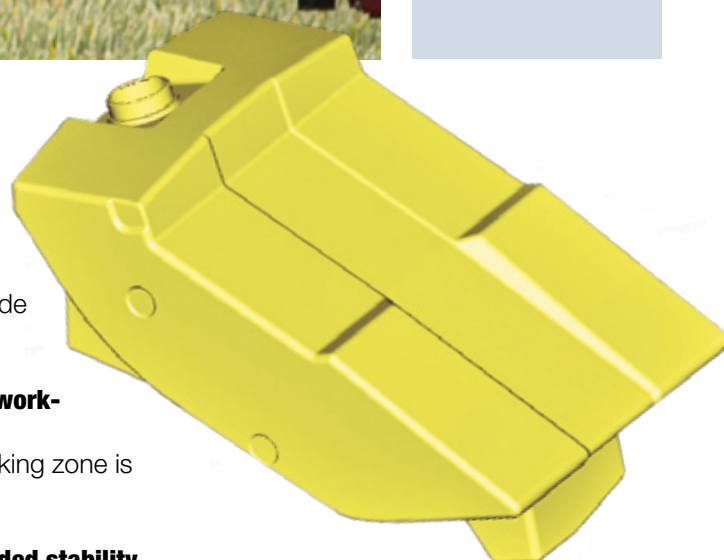
The optional 500 l RinseTank is the same model as on the COMMANDER models, providing adequate liquid for both inside and outside cleaning.

Easy filling from the working zone

1" filling from the working zone is standard.

Placed on axle for added stability

The RinseTank is typically the last tank to be emptied, and its position on the rear axle provides additional stability.



Level indicator

The level indicator is placed on the left hand side in the working zone, allowing step-by-step cleaning.

Rinsing nozzles

Together with the RinseTank, two rinsing nozzles are delivered as standard.

CleanWater tank

Material:
UV protected
polyethylene

Capacity:
20 l



CleanWater tank for hand washing

Integrated into the overall design to ensure easy cleaning at the WorkZone. The 20 l tank is built into the right front cover.

Well integrated

Easy filling operation from platform

The tank is filled from the platform through a large 60 mm filling hole.

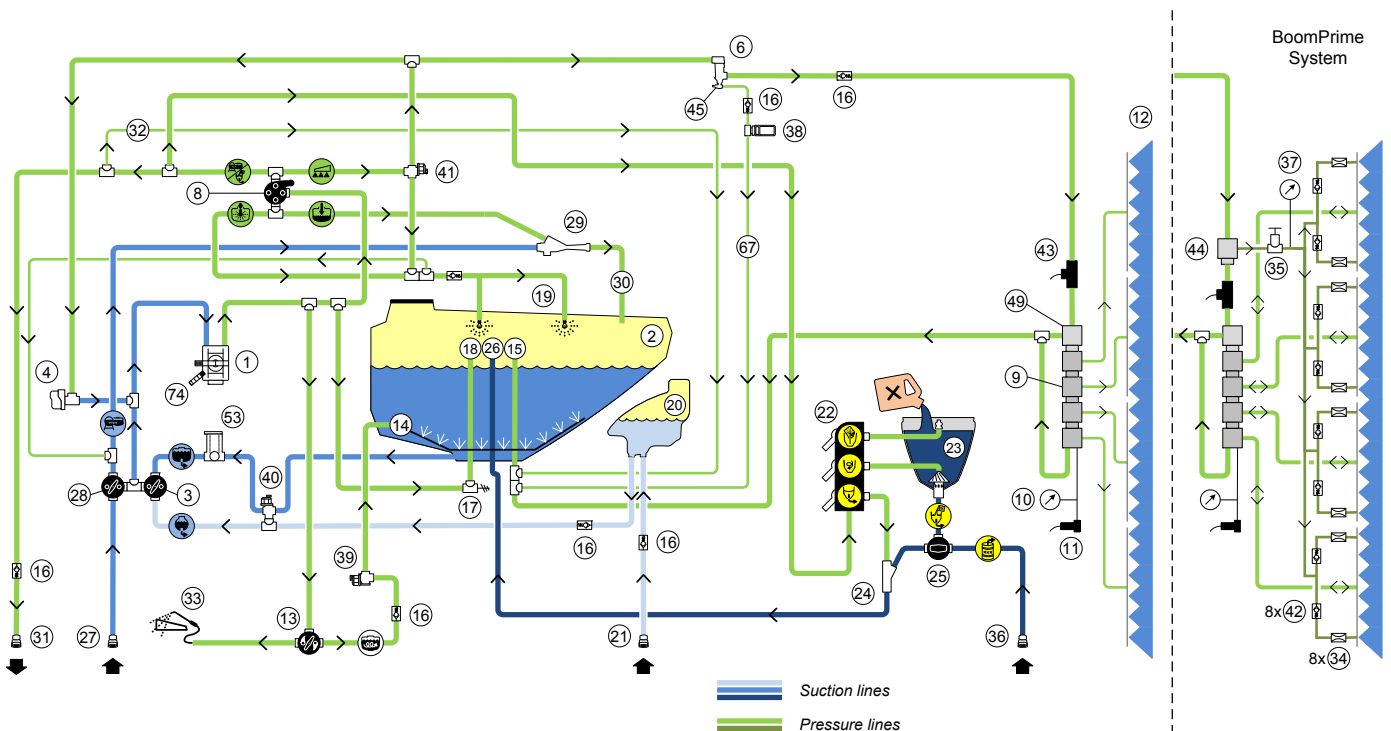


Fluid diagram

Diagram - Liquid system

1	Main Pump	21	RinseTank Coupler	40	Dilution Valve (S93 Suction Valve)
2	Main Tank	22	Valve Block for TurboFiller	41	Dilution Valve for Rinsing
3	Suction Valve for Tanks	23	TurboFiller	42	One-Way Valve
4	Pressure Control Valve	24	Ejector for TurboFiller	43	Flowmeter
6	CycloneFilter	25	EcoFill Valve	44	BoomPrime Valve
8	Pressure SmartValve	26	Tank Hose for TurboFiller	45	Boost Valve
9	Distribution Valves	27	Filling Coupler	49	Bypass Valve for Spray Boom
10	Pressure Gauge	28	Filling Valve	53	EasyClean Filter
11	Pressure Sensor	29	FastFiller Ejector	67	Return Line for Boost Function
12	Spray Boom	30	FastFiller Hose to Tank Inlet	74	Speed Sensor for Pump
13	Agitation Valve / Spray Gun	31	Pressure Empty		
14	Agitation Tube	32	Pressure Drop Line for P. Empty		
15	Return Line / Riser Pipe	33	External Cleaning / Spray Gun		
16	One-Way Valve	34	Restrictor		
17	Safety Valve	35	Pressure Control Valve		
18	Riser Pipe	36	EcoFill Coupler		
19	Rinsing Nozzles	37	Pressure Gauge		
20	RinseTank	38	Dilution Valve (On/Off Section Valve)		
		39	Dilution Valve (S67 Pressure Valve)		

The liquid system has large dimensions in all valves, tubes and filters.



SmartValve

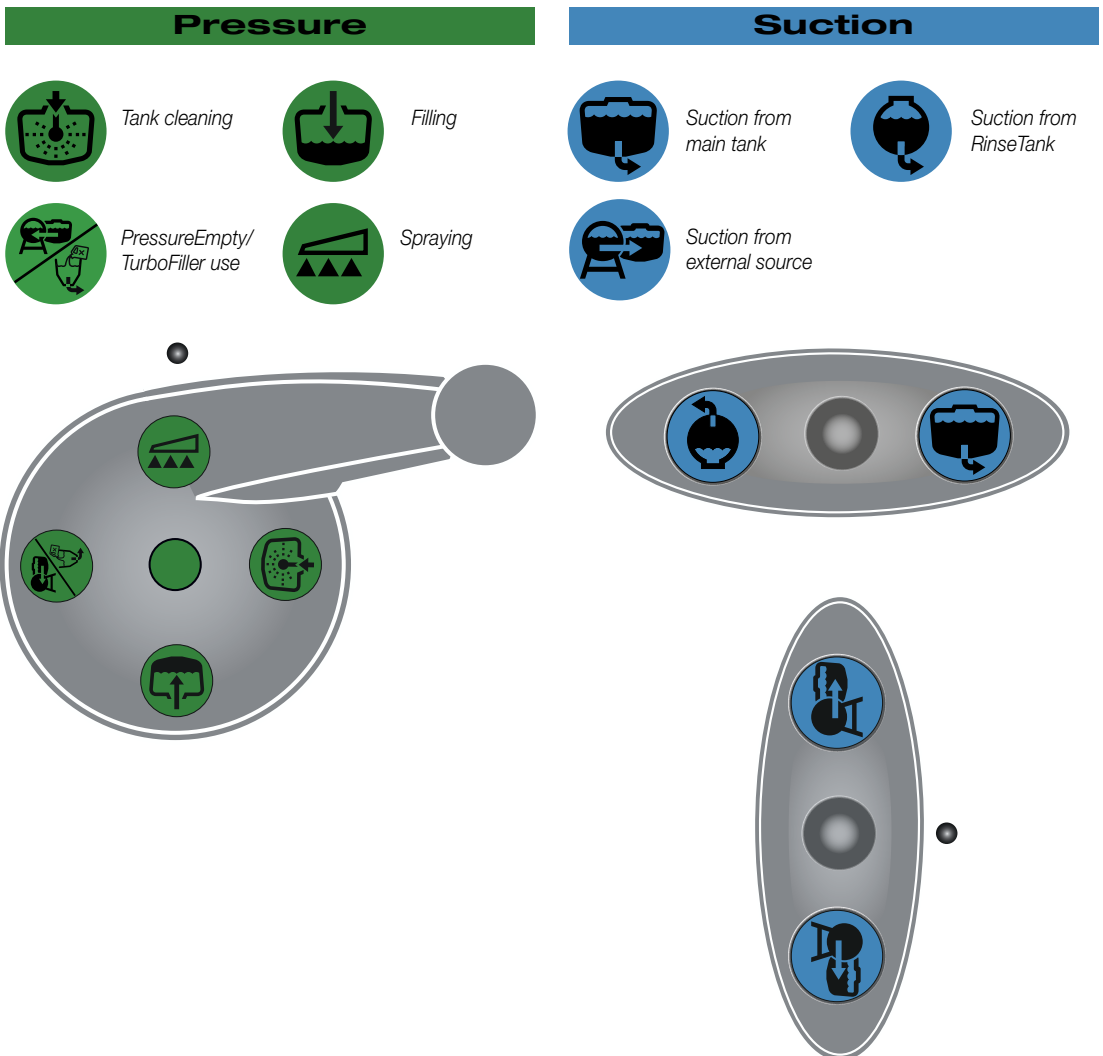
- Easy to operate
- Multifunction
- Convenient location
- User-friendly icons



All primary functions needed to operate the sprayer when filling chemicals or cleaning have been built into two main valves. These valves are located in the centre of the working zone.

The logically placed handles and the easy-to-read colour-coded icons make the system very easy to understand and operate and greatly reduce the start-up and operation time of the sprayer.

If an optional filling system, either Pump-Filler or FastFiller, is added, an extra suction valve will be used.



Pump



- Self-priming
- Can run dry
- Isolated mechanical and liquid components
- Easy to service

FLUID SYSTEM

The NAVIGATOR liquid system is driven by the robust grease-lubricated HARDI diaphragm pump.

Self-priming

The pump is self-priming and will in all start-up conditions be able to prime the filling and spraying system.

Open crankcase

The unique HARDI pump has an open crankcase. This ensures that the crankcase will not hold any chemicals, thereby avoiding fast destruction of the bearings and the crankshaft in case of an unlikely diaphragm failure.

Able to run dry without damage

The HARDI pump can run completely dry without any damage at all. No liquid for cooling is needed.

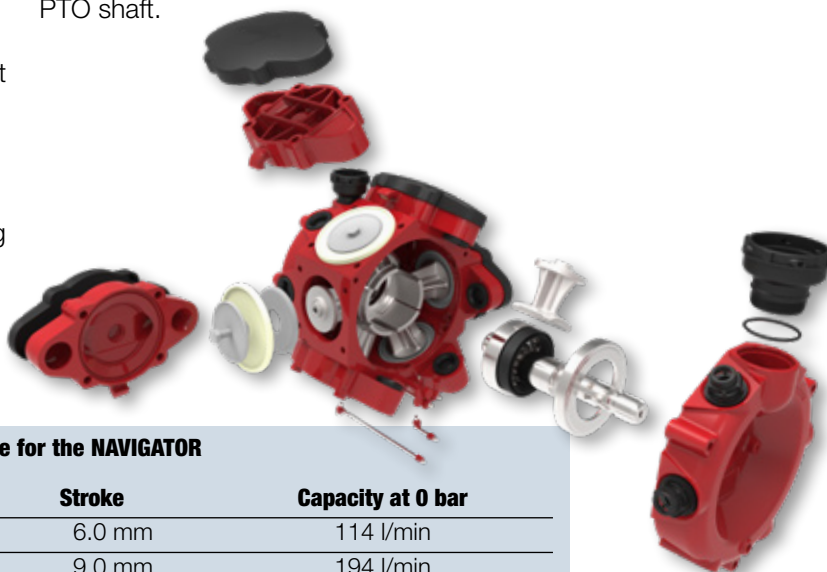
Easy service pump

The pump is mounted on the drawbar and is easily accessible for service.

No contact between chemicals and moving mechanical parts

All moving parts are completely separated from the liquid running through the pump.

The pump transmission is either done with a standard PTO or with an optional wide angle PTO shaft.



Pumps available for the NAVIGATOR

Pump	r/min	Stroke	Capacity at 0 bar
1303 (only for 3-4000)	540	6.0 mm	114 l/min
364	540	9.0 mm	194 l/min
364	1000	10.0 mm	220 l/min
464	540	10.0 mm	276 l/min
464H	540	12.0 mm	322 l/min
464	1000	5.5 mm	305 l/min
464H	1000	6.5 mm	348 l/min

EasyClean filter



Vacuum gauge monitors filter condition

Easy to clean

Dirt trap

Auto shut-off

Surface area
581 cm²

Flow capacity
450 l/min

Inlet diameter
2½"

Outlet diameter
2½"

Screen size:
30 mesh std.
50 mesh
80 mesh

The HARDI EasyClean suction filter is a high capacity filter with a very large filter surface. The condition of the filter can be constantly monitored on an external gauge. This ensures that the filter is cleaned when needed and only when needed.

When opening the lid, the main valve is automatically turned to OFF

The automatic shut-off valve ensures safe operation of the sprayer, without any risk of spill.

Condition of the filter can be monitored on vacuum gauge

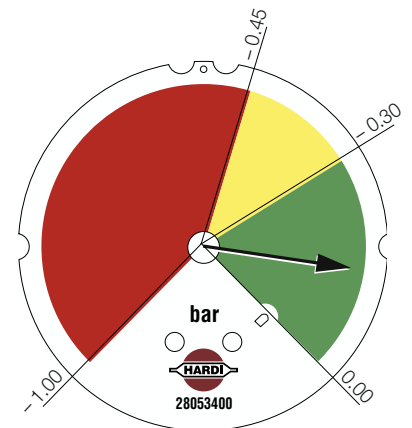
The unique vacuum gauge ensures that the filter is cleaned when needed and only when needed.

Very high capacity

The filter has large screen surface ensuring a sustained high capacity.

Filter is fitted in an upright position

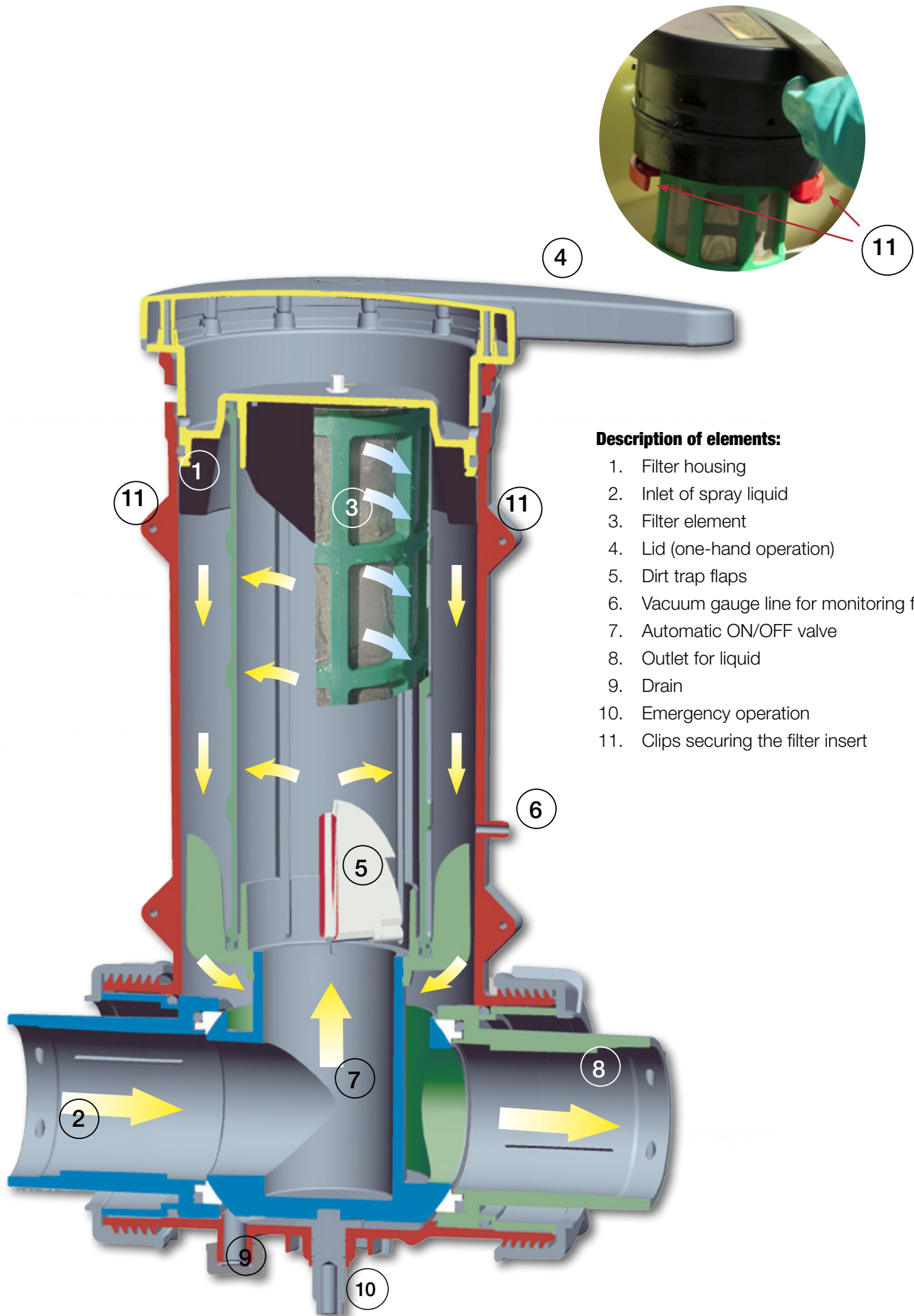
The filter is fitted in such a position that it can be serviced from the ground, without any risk of spill.



Dirt trap inside the filter screen ensures that impurities are removed from the system

Two flaps inside the filter ensure that impurities will be removed when the screen is pulled out.





Description of elements:

- 1. Filter housing
- 2. Inlet of spray liquid
- 3. Filter element
- 4. Lid (one-hand operation)
- 5. Dirt trap flaps
- 6. Vacuum gauge line for monitoring flow
- 7. Automatic ON/OFF valve
- 8. Outlet for liquid
- 9. Drain
- 10. Emergency operation
- 11. Clips securing the filter insert

CycloneFilter

Flow capacity:
400 l/min

Inlet diameter
1½"

Outlet diameter
1½"

Screen size:
80 mesh std.

Available as spare
parts:
50 mesh
100 mesh



The HARDI CycloneFilter is a unique self-cleaning pressure filter that uses a high-speed cyclone for additional cleaning action. The cyclone action increases the cleaning capacity of the filter significantly. This ensures fewer

stops and reduced pressure loss in the liquid system. The HARDI CycloneFilter furthermore has a unique boost function that allows the filter to be flushed "on-the-go" when needed.

Unique cyclone action greatly improves the self-cleaning action

The cyclone created inside the filter increases the speed of the liquid against the filter screen, thereby increasing the effectiveness of the self-cleaning action.

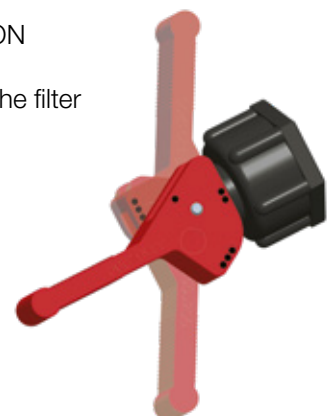
Filter is fitted in an upright position

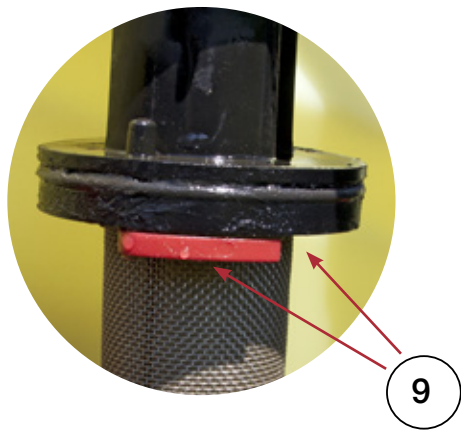
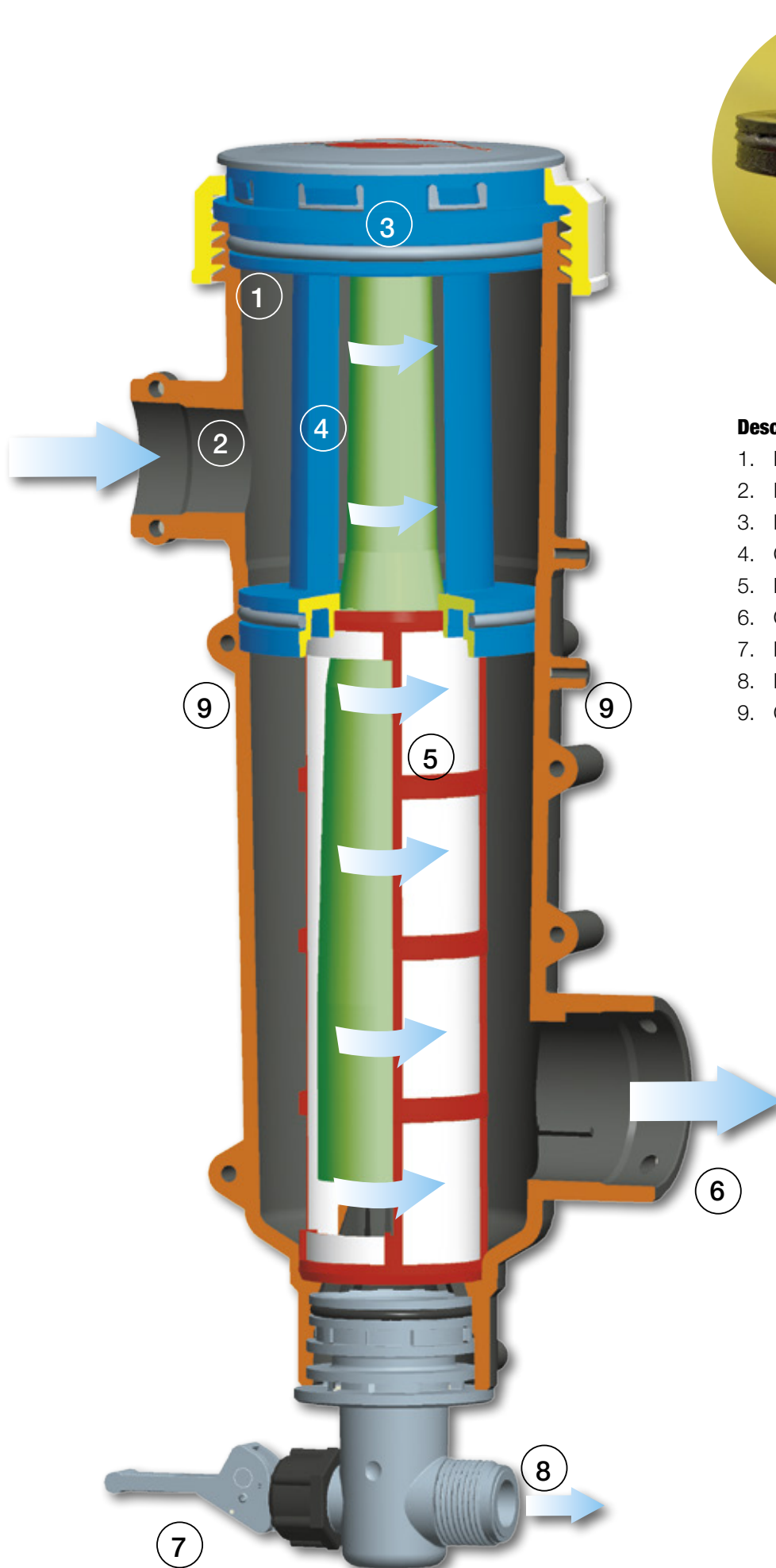
The filter is fitted in such a position that spill can be avoided when inspecting the filter.

Valve with 3 positions (OFF/ON/Boost)

The control valve in the bottom of the filter can be positioned in 3 different modes:

- Self-cleaning OFF
Used when all the flow from the pump is needed
- Self-cleaning ON
- Boost
Used to flush the filter screen





Description of elements:

1. Filter housing
2. Inlet of spray liquid
3. Lid (one-hand operation)
4. Cyclone chamber
5. Filter element
6. Outlet of spray liquid
7. Boost valve
8. Return line
9. Clips securing the filter insert

TurboFiller

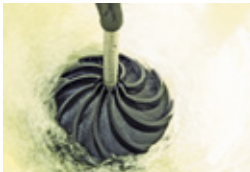
Filling capacity
liquid up to 120 l/min

Size of hopper:
25 l or 35 l

Effective
TurboDeflector

Container rinsing
nozzle with spike

Cleaning pipe



TurboDeflector operating.



Easily move from transport to operating.



Easy one hand operation.



Ejector valve in ON position.



Using attached wand to aid in cleaning.

The HARDI TurboFiller is optional on NAVIGATOR and is developed to handle large quantities of powders and liquids. Its high capacity is achieved through a combination of high vacuum and liquid rotation produced by a TurboDeflector inside the hopper.

High mixing capacity

Liquid at high pressure is being used to create a powerful rotation inside the hopper. The rotational movement effectively mixes powders and liquids as they are drawn into the sprayer. The highest capacity is achieved when the TurboFiller is more than half-filled with water.

Optimum filling height

A spring-loaded bracket with transport lock makes it easy to change from field to filling position. The filling position is approx 95 cm from the ground.

The TurboFiller is easily operated with 3 valves:

- Container rinse
- TurboDeflector with liquid in ON/OFF
- TurboFiller ON/OFF

Very high vacuum and suction capacity

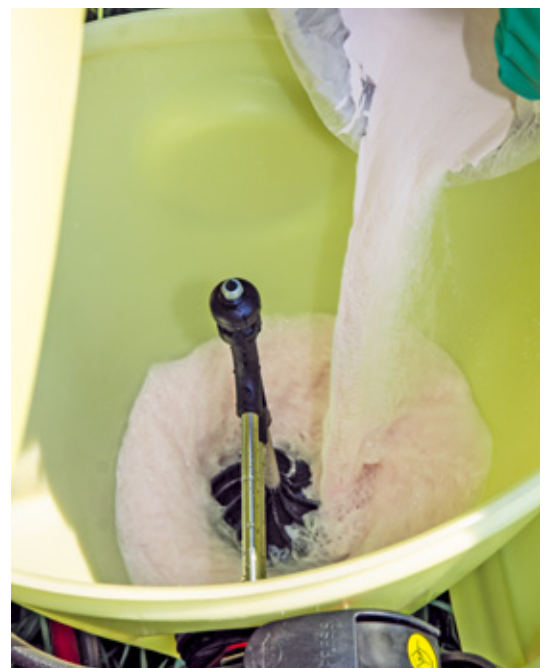
A large external ejector system creates a powerful vacuum that transfers powders and liquid directly into the tank.

Rotating nozzle used for cleaning containers and the TurboFiller

The built-in rotating nozzle will clean any chemical container. After use, the same nozzle will clean out the complete hopper. The nozzle has a spike that can penetrate the seal on most chemical containers.

Lance for cleaning

A cleaning lance is fitted as standard on the TurboFiller. This trigger valve with 1 m hose can be used for flushing the hopper or filling liquid into a container.



EFC boom section valves



Pressure drop at 120 l/min:
1.6 bar

Manifold diameter:
19 mm
Fast nozzle ON/OFF

Easy service

Fast through decontamination

Increased flow capacity

FLUID SYSTEM

The ElectricFastControl (EFC) is a modular system with a positive drive motor valve for each section and a single pressure dump valve, when all sections are switched to OFF.

The section valves incorporate a pressure dump. When the section is switched to OFF, the pressure in the line to the nozzles is relieved.

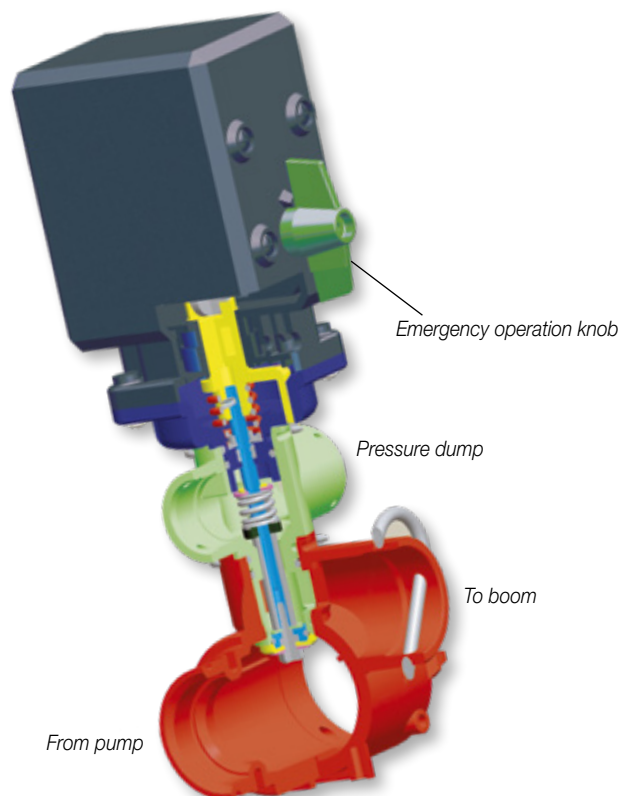
This results in instant shut-off at the nozzles. The EFC does not need any form of adjustment, e.g. pressure equalisation.

Faster nozzle OFF, even with very small capacity nozzles

Incorporated pressure dump insures instant nozzle closure.

Increased flow capacity

Larger diameter manifold to handle high application rates and larger boom widths.



DynamicFluid4



Dynamic fluid system based on 4-sensor technology.

Fast and precise regulation

With precision and capacity in mind, HARDI challenged the traditional way of regulating volume rate. Traditionally a sprayer applies and then measures

actual volume rate. When the rate applied and volume rate do not match the preset volume, the computer system will regulate until they match.

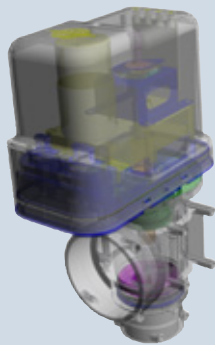
This conventional spray systems means that driving speed, boom width and pump revolutions must stay relatively stable to obtain a precise regulation.

With today's modern tractor transmissions, powerful engines, advanced boom suspensions and GPS controlled spray booms, the conventional way of spraying has changed. These

improvements in tractor and sprayer technology have now made the liquid regulation the weak part of the application system. Now that the control of the boom and tractor is optimized by technology, the operator demands more from the application system.

DynamicFluid4 is the solution for these challenges. In this chapter the technique and the benefits of the system are described.

System input overview:



Regulation valve position



Flow meter to boom sections



Pressure at EFC to nozzles



Pump RPM



Driving speed

Technique

Input to the regulation system comes from 6 different sources.

Two are outside the fluid system:

- 1. Active boom width.** The boom is set up with a number of sections and size of each section. As boom sections are turned ON/OFF, the active boom size is monitored based on each boom section.
- 2. Driving speed.** Speed input is required to know how fast the sprayer is travelling (GPS input or wheel sensor)

Four sensors are in the fluid system, 4 in DynamicFluid4, refer to these 4 sensors:

- 3. Pump rpm.** Measured by sensor on the pump. PTO speed can vary, affecting the pump output. Tractor acceleration does not necessarily mean higher revolutions on the PTO and vice versa. Reading pump RPM means that the system knows the pump flow output.
- 4. Regulation valve position.** An angle sensor (Hall sensor) is mounted internally and reads the disk in the regulation valve. The sensor is used to know the position of the valve.
- 5. Flowmeter.** Measures flow going to the boom.
- 6. Pressure sensor.** Measures the pressure in the fluid system at the EFC before going to the boom.

ISO/EN 16119 for regulation: +/- 10% from setpoint after 7 sec.
 HARDI: +/-10% from setpoint after 3.5 sec.
 After 7 sec +/-0.5%

Regulation valve updates reference setpoint 20 times per second

Limp-home - sensors back-up each other and the whole system can operate satisfactorily even in case of sensor failure.



Function

When starting a new spray job, DynamicFluid4 will respond like a conventional fluid system. Within seconds of starting, a new task data from all sensors is simultaneously collected and compared. This data allows the computer to build a matrix for all parameters and develop a pattern for the remainder of the spray job. The developed matrix can now estimate consequences of corrections to the volume rate if any of the parameters are adjusted/changed. These operations allow the system to make preventative actions before any variation in volume rate is detected. Monitoring the flow rate occurs even when sections or nozzles are turned off. Collecting this data and responding to the information upfront is called feed forward, contrary to the feedback on a conventional sprayer system.

Recalculation and updating of the matrix occurs 20 times per second. This means that if one parameter changes, the system knows what flow to adjust to.



DynamicFluid4

Capacity is 500 l/min at 1 bar

LED indicator lights for diagnostics



Examples:

Increase in speed

After completing a turn out of the headland, the sprayer can quickly accelerate from 6 to 12 km/h in the first 30 m. With a traditional system the volume rate will be held against the driving speed and corrected. When accelerating, the new setpoint will already be too low and next feedback will have same result. This will continue, too, after the acceleration has stopped, and first measure hereafter will give the right feedback for the regulation. Not until the stable speed has been obtained, the feedback will be correct, and the last correction can be made. In this example the whole area sprayed during the acceleration and until the last correction after the acceleration has been underdosed.

By use of the DynamicFluid4 (Patent Pending) and feed-forward, the system will react directly on the speed change and not wait until the speed change has developed to an underdose.

Stability and safety

More sensors often mean bigger risk of failure, and consequently more downtime. The sensors in DynamicFluid4 each have their individual task, but they will also work as back up for each other. That means that if one sensor fails, calculation will continue with signals from the remaining sensors, and the regulation will continue. This goes for pump rpm, flow and pressure sensors.

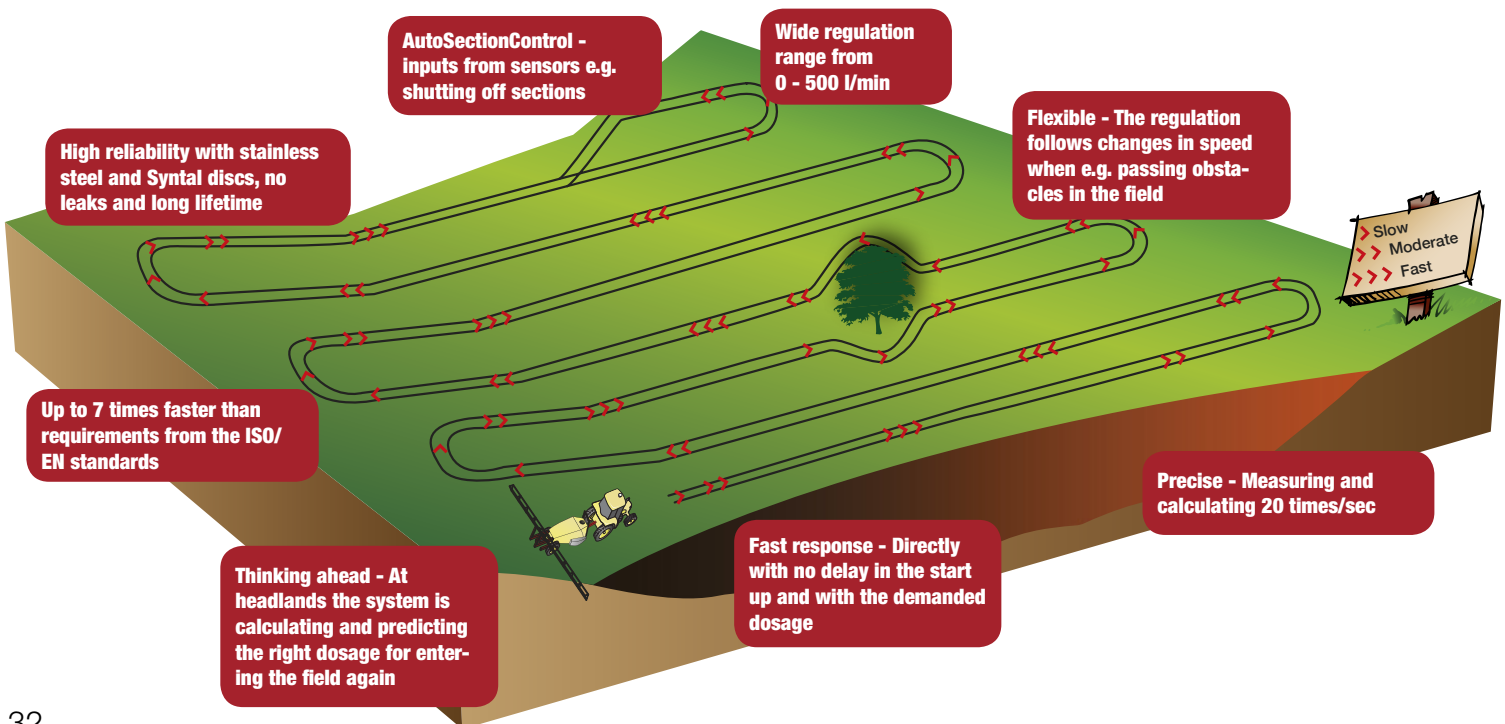
Two inputs are vital for the automatic regulation. If one of the signal's driving speed or position of regulation valve is missing, regulation has to be done manually.

If a signal is missing, the driver will get a warning on the display.

SoftStart

When the tank gets empty at the end of a spray job, the regulation will try to compensate by closing the regulation valve. If the driver forgets to turn down the pressure manually, this will be the setpoint when starting on the next full tank. The result is a pressure peak in the system, which in some cases could cause damage to the system potentially resulting in leaks. DynamicFluid4 has a (customer set) standby pressure which will be the maximum pressure when starting, thereby avoiding to have these unintended pressure peaks in the system.

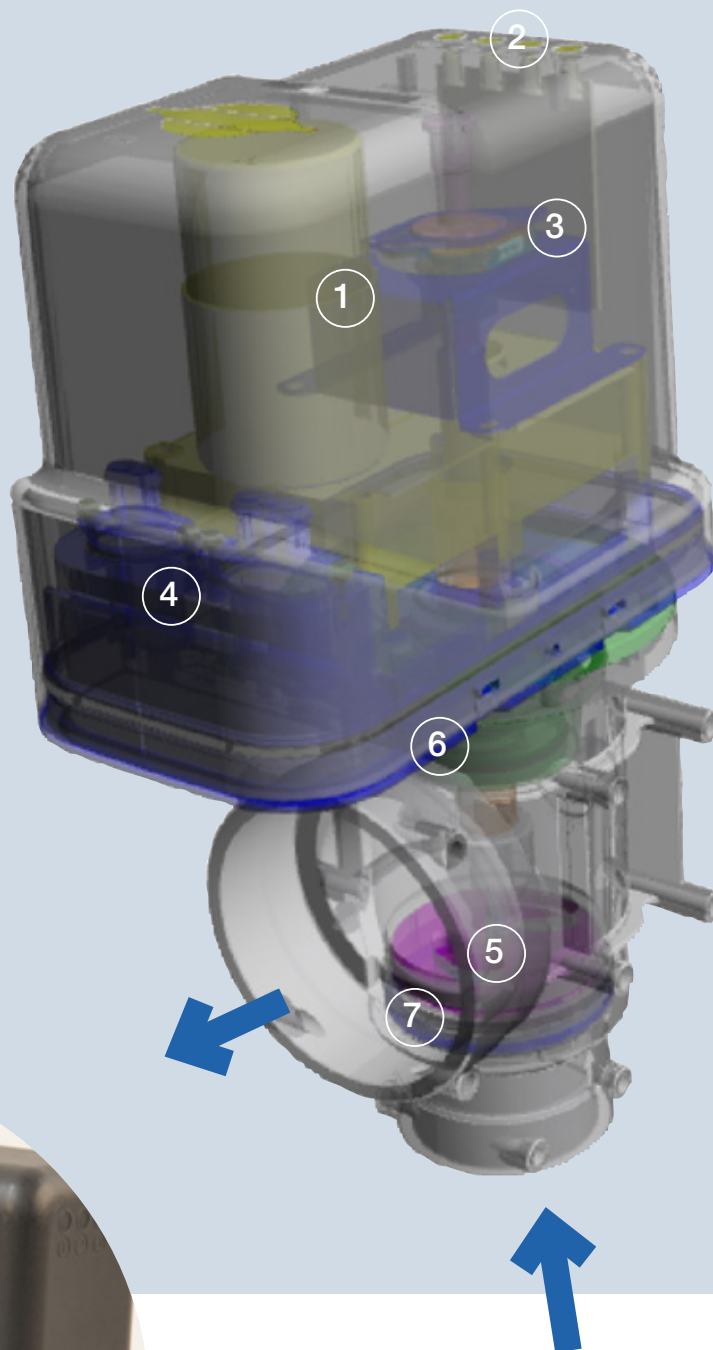
As DynamicFluid4 is working with flowmeter and pressure sensor, the high accuracy can be obtained even with output rates less than 15 l/min. In contrast to conventional flowmeter based regulation, pressure sensor and flowmeter input ensure same high accuracy in the entire flow range.



1. Motor / gear
2. LED indicator lights
3. Angle sensor for valve position
4. AMP connector
5. Stainless steel/syntal disc
6. Collar / Sealing approved for high pressure cleaning (IP69K)
7. Antisedimentation system

Four LED lights are positioned so they are visible from the cab. Two red LED lights will show that the valve is out of working range. One yellow LED light means that the valve is closed, and one green LED light is on when the valve is regulating or open.

The discs in the regulation valve are syntal which ensures low leakage and a long lifetime. The benefits of using a disc compared to piston/cylindre are that there will be no gap between the valve seat surfaces. The vertical position of the discs prevents sedimentation.



Controller features

One cable only for quick connection

No loose cables or wires through the back window

Fused power supply for equipment security

No insecurity of power supply especially from an older tractor

Easy-to-monitor operation via the in-built status diodes

High-quality water-proof connectors

No damage from cross-polarisation

Easy to disconnect and connect with only 1 metre of cable

Large colour-coded switches

The switches are easy to identify and use. Foam Marker, End Nozzles and an “A-B” switch are included for optional operator-specific functions.

Thermal fuses

No need to replace mechanical fuse if a short-circuit has occurred.

Emergency operation possible

The control boxes can operate basic sprayer functions without the computer.

Harness for tractor and cabin

A fused power harness connected directly to the tractor battery ensures good power supply.

The cabin harness is discrete with only one thin cable entering the cabin. The time required for connecting the computer on a daily basis will be minimised, and there is no messy nest of cables and wires.

Sensors

Proven sensors with excellent cable protection and high-quality connectors are used. The signal quality is very fine, ensuring trouble-free operation.

The sensors typically have a status diode to aid troubleshooting. The diode will flash, thereby indicating correct function.

Inputs are electronically protected against defective or faulty connected sensors. A cross-polarisation will not damage the sensor.

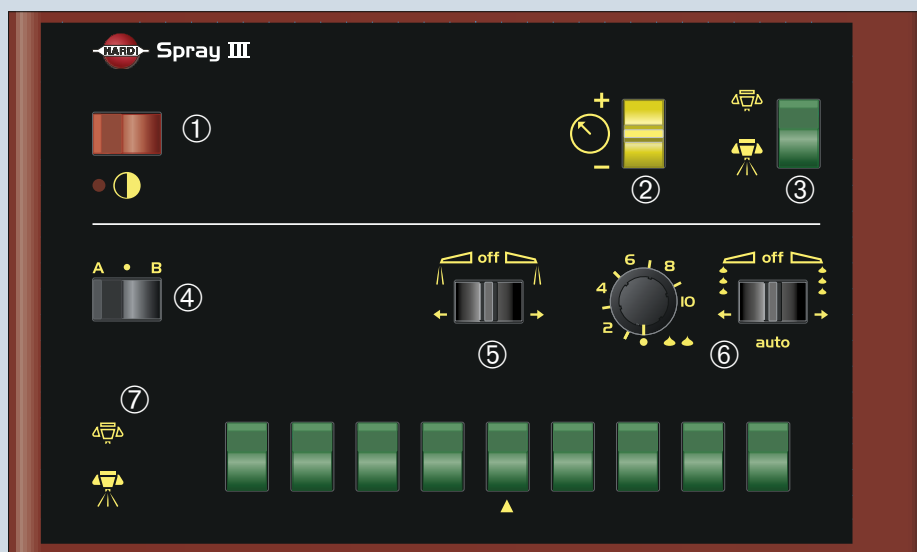


Control box unit

The control boxes are compact, ergonomically designed units that allow the operator's right hand to naturally rest around the right side of the box. The logical switch layout puts all frequently used functions at the operator's fingertips.

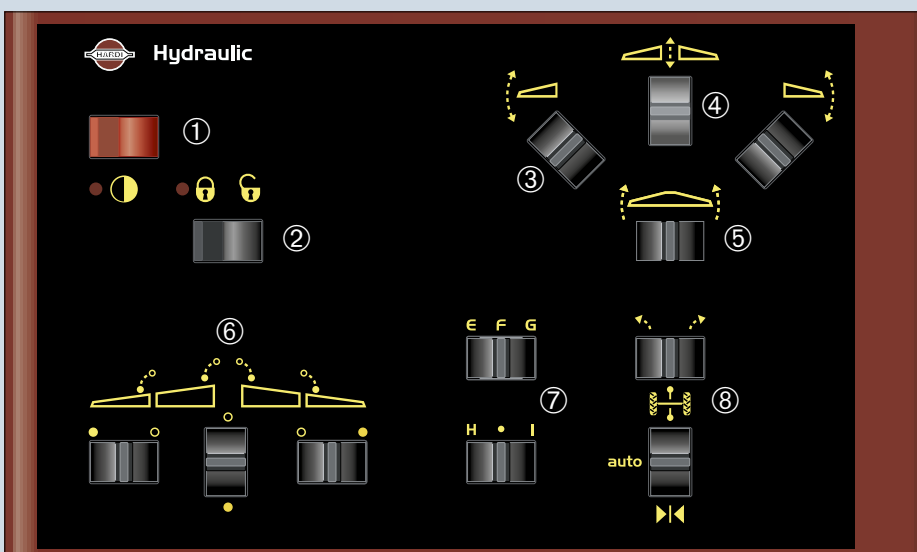
The supplied pillar bracket, designed for ISO mount points, is quickly fitted to the tractor. A wing bolt releases the boxes for quick removal. A single 39-pin plug is connected to the box. Cable diameter is only 13 mm.

Actual size:
215 x 125 x 80 mm



Spray III box

- 1. Power switch
- 2. Pressure regulation
- 3. Main ON/OFF
- 4. Options control
- 5. End nozzle control
- 6. Foam marker control
- 7. Boom section valves



Hydraulic box

- 1. Power switch
- 2. Pendulum or trapeze control
- 3. Tilt
- 4. Boom raise/lower
- 5. Slant
- 6. Boom fold
- 7. Options control
- 8. Tracking control

HC 5500 Controller

Actual size:
200 x 130 x 30 mm
User-friendly
LogicMenu
IntelliTrack control
Provides more information, controls more features
Rates changed on the go
Hot keys
AutoSectionControl ready



- Display readout**
- Activity status
 - Active sections
 - Register number
 - Volume rate
 - Speed
 - Tank contents
 - Area treated
 - Total volume sprayed
 - Distance/area left
 - Programmed and actual volume rate
 - Flow rate
 - Actual time
 - Work rate
 - Optional readout

The HARDI Controller HC 5500 is the choice where IntelliTrack steering and advanced farming tools are desired. It can also automate functions like the Foam Marker. Furthermore, the operator is instantly informed of operation status and warned when vital parameters like pressure, speed, etc are not correct.

It is advanced farming, ready with up to 98 registers and the possibility of connection to a site-specific application map or a remote sensor as well as a 12 volt printer.

LogicMenu – easy to use

The LogicMenu facilitates the daily work; with the arrow keys the operator easily finds his way.

4 lines of information displayed simultaneously

Easy-to-read display - day or night.

Freedom of placement

The HC 5500 and the Spray II box can be positioned anywhere in the cab for ease of use.

Pre-set keys

Pre-set keys offer shortcuts to display vital information.

Volume rate change on the go

Change the application rate on the go as a percentage of the prescribed rate, and hot keys are used to access vital information simply and quickly.

Untreated area displayed

The distance or area untreated is constantly calculated.

Emergency operation possible

The basic sprayer functions can be operated without the computer.

Pressure transducer

If a pressure transducer is fitted, the HC 5500 can be programmed with alarms for minimum and maximum pressure and set to not go under a minimum programmed pressure. This is important if, for example, the driving speed is too slow when starting in a corner of the field.

Options for HC 5500

12 volt printer

Can be operated from the tractor and is a quick way to hard-copy the register data. This printer only takes a few seconds to print the data.



Cable for VRA

A Variable Rate Application ('GPS') cable is used for connection to other computers.



Electronic TankGauge contents sensor

For automatic on-screen tank contents readout. A warning for low tank contents can be set up.



Foot pedal switch

For spraying at higher speeds, it is best to use both hands for steering. The foot-operated switch is a remote for main ON/OFF function.

SprayRover 570 - AutoSectionControl



Screen 5.7" (14.5 cm)
 Easy to install
 Integrated Patch receiver
 Plug and play solution
 Add-on for sprayers in use

ELECTRONICS

The HARDI SprayRover 570 is a stand-alone AutoSectionControl which can work in combination with the HC 5500 controller, with and without JobCom on the sprayer. The HARDI SprayRover is based on the well-known and tested TeeJet MATRIX 570. It brings the same advantages as the ASC.

HARDI SprayRover 570 JobCom version

If the NAVIGATOR has a JobCom, a Smart Cable will be the connection between the serial plug of the HC 5500 display and the SprayRover 570 display. If a new NAVIGATOR will be ordered this is the preferred solution. The JobCom is maybe needed for other features as well, for example IntelliTrack, AutoSlant, DilutionKit (9 section).

HARDI SprayRover 570 non JobCom version

If the NAVIGATOR has only the HC 5500 display, it will be ordered with-

out a JobCom, and a SprayerDriver-Module will be installed between the HC 5500, SprayBox II and SprayRover display. This acts as jobcomputer. It is an easy to install plug and play solution and can also be added to the sprayer later on.

Easy to install with a cost economic price level

The HARDI SprayRover 570 is equipped with a low price patch antenna, which works fine under normal field conditions. If a higher quality GPS receiver is demanded, it can be connected to the RS 232 connector on the display.

The screen is a 5.7" (14.5 cm) touch screen with a resolution of 320 x 240 pixels. It offers guidance in different driving patches and can handle up to 13 sections if a HARDI JobCom is available on the sprayer.

Boundaries have to be done in the manual mode, so the farmer drives

around the field first and can afterwards spray the centre of the field. The SprayRover has no tracking module, which means that the system does not take care if the sprayer is steered or not. The section switching reacts as it is a non-steered trailer.

HC 6500 Controller



Controller designed for comfort and easy operation

The HC 6500 is designed by HARDI and is designated only for spraying. Multi-purpose computers often compromise on details as they do not have the specifics a sprayer specialist holds.

The more complex a product is, the simpler it should be to use. A confused operator cannot take the full advantage of a complex product. All HARDI intelligent functions can be operated from the HC 6500.

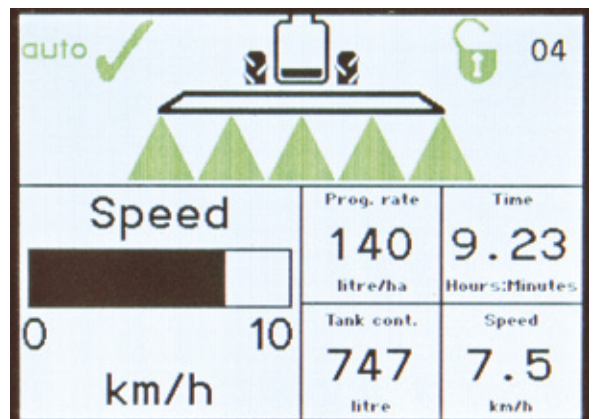
AutoSlant, AutoHeight and AutoTerrain can be mounted together with HC 6500 and operate independently through autonomous control boxes.

Intuitive controls

The operator has the best possible man-machine interface for spraying. The Grip is the primary control, and it can be placed close to the operator. It holds all the most used functions.

Excellent colour screen

The colour screen has excellent readability in sunlight. It shows six information windows. Five are operator defined.



All information at a glance

A glance is all that is needed to monitor the situation. Logical colour coding and icons are utilised. For example, the tank icon changes to indicate that a refill situation will soon have to take place.

HC 6500 Features



Safer, faster and easier with intelligent options

Sprayers equipped with the HC 6500 do not require the operator to be a technical expert in spray machinery.

Only one cable connection

All data and power are in one cable. It is quick to connect and ensures a good supply to the HC 6500 and the optional features.

Compact with location freedom

The compact terminal can be located independently from the SetBox. The units can quickly be set up in the tractor cabin. The turn of a wing bolt is all that is needed. The cabin harness is discrete with only one thin cable.

Time saving help key

A help function is always active. It can be pressed at any time for an explanation of the current process. The operator is never in doubt.

Simple with programmed readouts

A preset series of information is available with one key press. It is displayed on the largest screen window.

Menu with ID and explanations

Menu choices are shown on one screen. The page has a unique identification number and

an explanation at the bottom of the actual item. The operator can easily scroll through the menus with the arrow keys.

Direct access via the keyboard

To save time, menus can be accessed directly via the number, a useful feature with telephone support from a technician.

Upgradeable software

New features can be added like the software in personal computer. Communication follows as close as possible the International Standard Organisation CAN-BUS protocol.

As an option a 12 V printer and cable for variable rate application (VRA) can be ordered. The 12 V printer is a quick way to hard copy the registered data. With this printer it only takes a few seconds to print the data. The VRA cable allows to connect another terminal to the HC 6500 and to work with the dose rate from this.

More comfort with primary functions close to the operator

Colour screen and icons are easily monitored by the operator

Minimal operator requirements as the tasks are electronically controlled

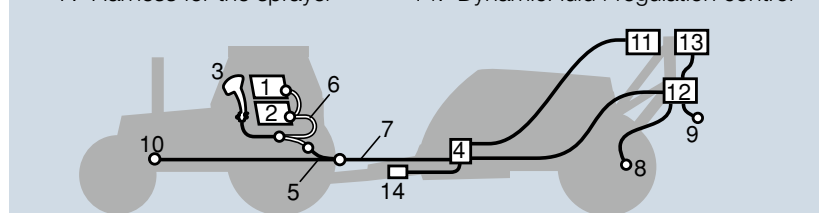
On screen help function always active

Quick to connect with single cable

ELECTRONICS

Overview HC 6500

- | | |
|----------------------------|---------------------------------------|
| 1. HC 6500 | 8. Speed sensor and pulse ring |
| 2. SetBox | 9. Flow sensor |
| 3. Grip | 10. Power supply to sprayer |
| 4. JobCom junction box | 11. Hydraulic block |
| 5. Harness for the tractor | 12. EFC junction box |
| 6. Harness for the cabin | 13. Electric Fluid Control unit (EFC) |
| 7. Harness for the sprayer | 14. DynamicFluid4 regulation control |



Terminal

Keyboard groups:

- 1 Presets
- 2 Soft keys
- 3 Navigation
- 4 Numeric
- 5 Status diode

Preset readouts:

- 6 Volume rate
- 7 Speed
- 8 Tank volume
- 9 Area treated
- 10 Total volume sprayed out
- 11 Distance or area remaining

Navigation:

- 12 Help key
- 13 Scroll, change a value or volume rate
- 14 Escape a menu
- 15 Enter menu or accept a value
- 16 Move cursor to the right or to the left
- 17 Clear a value or register

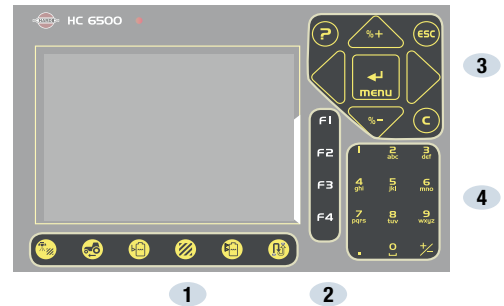
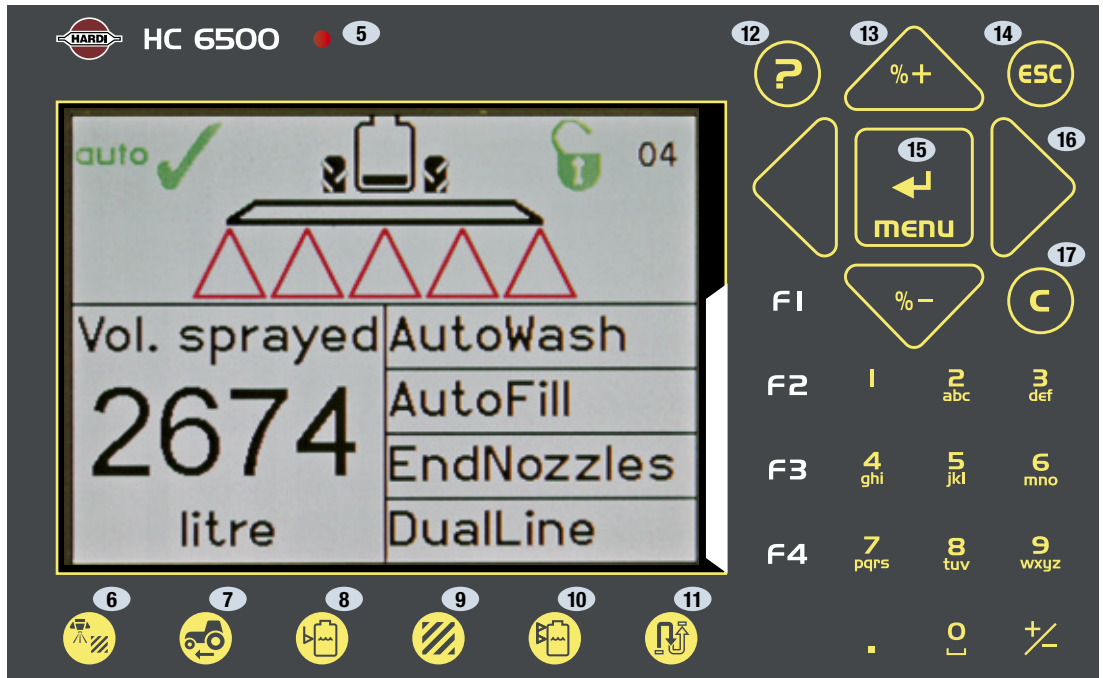
One key press only for most information

Time saving help key for clarification

Bright colour screen

Icons for status

Big screen messages, easy to read



Preset keys

Vital information whilst spraying is quick and easy to access with just one preset key press. They appear in the large format area of the screen.

Preset keys become short cut keys. Menus like programmed volume rate can be accessed through the short cut preset key.

Navigation keys

The navigation keys can change the volume rate in a set percentage or fixed volume rate. The keys are also used to code in values.

Soft keys

Soft keys control optional features. Pressing a soft key will activate it. Choices are shown like AutoFill, AutoWash and end nozzle control.

(AutoFill and AutoWash is not an option on NAVIGATOR)



Numeric keys

These are very much like a mobile phone. Toggling the key changes the item. It is very easy to enter text like a field name. They are also used to key in a value or direct access a menu.

“All green and OK”: messages, warnings and alarms

The green tick indicates all is well. It may change to a large format MESSAGE, WARNING or STOP, all with extra information in the help function.

Regarding visual and audio alarms, there are more than 27 items that can be set up.

Help key

The help key is always active. It is the operator’s built-in quick guide and instruction manual. After the help key has been activated, an explanation of any control key or switch is shown on a full screen.

Furthermore, if a message, warning or service reminder appear, more details are found by pressing the help key. This frees the operator from finding details in the instruction manual.

The keys cannot be damaged by fingernails. For the operator that finds it natural to press with the point of his nail, this will not damage the key. The clear resin convex protects the key and makes it easier to press as the surface area is enlarged.



Volume rate Automatic



Volume rate Manual



Variable rate (GPS) active



All “OK”



Stop (critical)



Warning



Information



Track Automatic



Track Manual



Track in center and Lock



Track Crab



Options A on



Options B on



Options both on



Pendulum Locked



Pendulum Unlocked



HeadlandAssist on



HeadlandAssist Mirror



HeadlandAssist Centre slant



Hand Cal DF4 reg



Auto Cal DF4 reg



Auto nozzle flow DF4 reg



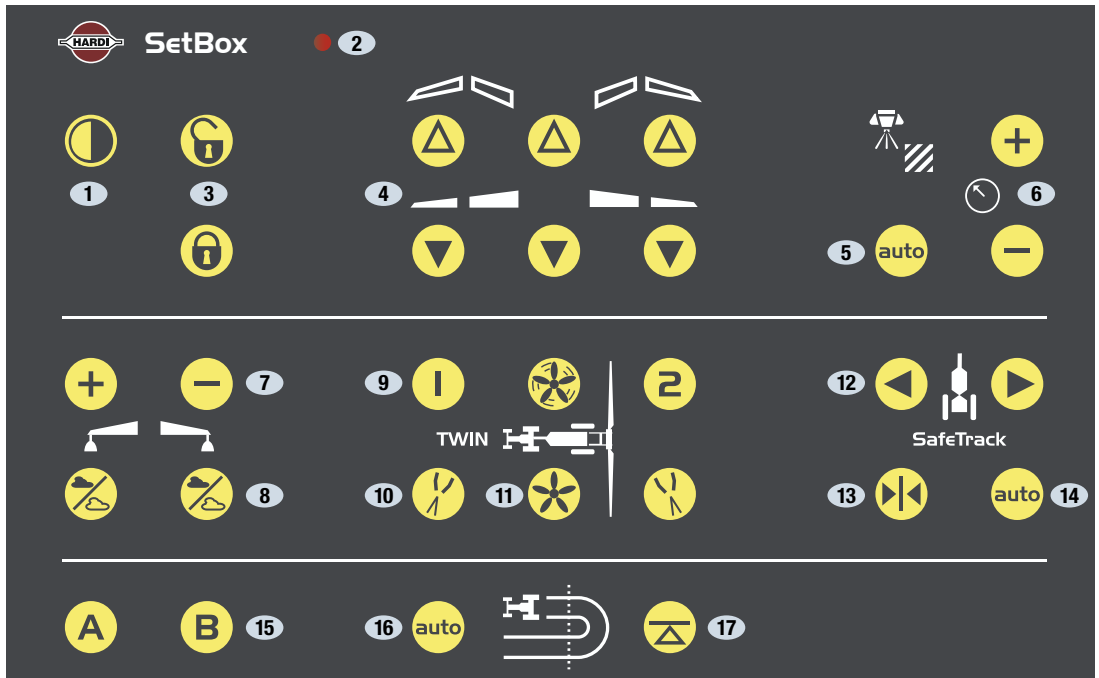
Auto UnCal DF4 reg

Grip and SetBox

HARDI ISOBUS sprayers always have a Grip and a SetBox.

We made a few changes to have the SetBox and the Grip ready for the ISOBUS. It is simple to see the difference as we changed the name from HC 6400 to SetBox. The SetBox now has a serial port that was previously located on the HC 6500 display. If a sprayer with an old HC 6500 is being updated to ISOBUS, the new SetBox will be required.

The Grip and SetBox



Can be placed out of the operator's way

Large keys so operation is easier at a distance

Logically grouped functions

Right hand hold of box eases thumb key work

Status diode for operator surveillance of system health

Keyboard groups:

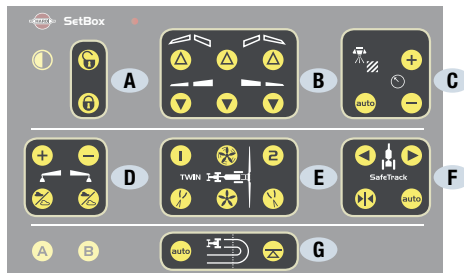
- A Pendulum
- B Boom fold
- C Liquid
- D Foam marker
- E TWIN
- F SafeTrack
- G HeadlandAssist

Located close to the operator

Logical operation without looking at Grip

Up to 13 boom sections possible - TWIN presets included

Rear light to ease night spraying



connect to the ISO CAN with one simple splitter cable. The Grip and SetBox have its own software and all components need to have a matching software. The software is updated through the D-connector "C" on the device. Software in Grip and SetBox is adapted to the ISOBUS CAN.

The SetBox controls secondary functions on the sprayer. The keys are larger so even at

1. Power ON/OFF
2. Status diode
3. Pendulum controls
4. Boom fold controls
5. Automatic volume rate
6. Manual pressure control
7. Foam marker regulation
8. Foam marker ON/OFF
9. TWIN presets
10. Air slot for TWIN
11. Air volume for TWIN
12. IntelliTrack manual control
13. IntelliTrack centering and lock
14. IntelliTrack automatic
15. Valve function A-B
16. HeadlandAssist automatic
17. HeadlandAssist boom centring

a distance, operation can be carried out.

The keys are grouped into seven control areas to simplify operator understanding.

The Grip is placed close to the operator as it has the most used functions in a logical layout. Operation is done without having to take one's eyes from the line of travel. It can be attached to most tractor seat arms.

It has internal lighting so the switches and buttons easily can be seen in poor light.



18. Boom section controls (up to 13)
19. Main ON/OFF
20. Boom tilt
21. Boom height
22. Boom slant

HARDI Controller HC 8600-9600



	HC 8600	HC 9600
Display size	30.7 cm (12.1")	21.3 cm (8.4")
ISOBUS Universal Terminal Support	x	x
AutoSectionControl	x	x
AutoSlant AutoHeight AutoTerrain unlock	x	x
USB port	2	1
WiFi mobile adapter	x	x
Task Controller	x	x
Swipe gesture	x	x
Split Screen	x	N/A
ISOXML Data Export	x	x
Data Logging	x	x
AgFiniti Mobile	0	0
Headlands	x	x
Coverage Mapping	x	x
Lightbar Guidance	x	x
Mechanically Assisted Steering	0	0
Hydraulically Automated Steering	0	0
OptRx® Crop Sensors	0	N/A
Camera Support	0	0

- Integrated touch-screen
- High brightness LCD (2 x brighter than HC 9500)
- Rugged magnesium enclosure
- Tablet-like interaction
- Connect displays with AgFiniti® Mobile
- Split-screen view (HC 9600)
- Integrated LED lightbar
- ISOBUS/Universal Terminal/Task Controller
- 4 Camera inputs
- Wireless connectivity through Wi-Fi adapter
- 2 USB ports (HC 9600) - charging mobile device
- HDMI video out
- Ethernet

“Touch the future” with integrated electronics

On the next pages the ISOBUS terminals HC 8600 and HC 9600 will be explained together, as there are more similarities than differences. The operation and installation are identical, so the descriptions given on the next pages are reflecting both terminals. Due to the different screen sizes, there could be small differences, which are not important to understand the overall functionality.

The HC 8600 screen has 8.4” (21.3 cm)

diameter, so the area is 44 % smaller than the large HC 9600.

The table gives a quick overview on how the terminals are equipped. The big differences in features are the application report function „Smart Report“, as a PDF document, which is only possible on the HC 9600, and the possibility to connect OptRxR Crop Sensors on the HC 9600.

Display structure HC 9600

The display is clearly structured, and the different areas are named. The mapping and product control toolboxes are enlarged by touching these and in the opposite way reduced in size by touching them again.

Status bar
GPS status, sprayed area. Guidance lightbar and driving speed are always on the same spot.

Product toolbox
Here the dose rate can be controlled. Flow rate and tank volume are also shown.

Mapping toolbox
Here the guidance system can be controlled and boundaries can be made.

Map screen
Map view can be in 2D or 3D format. Which sections are active, can be seen here at one glance.

Task bar
To the left of the main screen buttons are placed, and to the right are function buttons.

Sprayer specific part
The operator can see more detailed information about his sprayer. This part is only used in combination with a HARDI sprayer – here information as pressure, TWIN status, SafeTrack and tank level from TankGauge is shown. From a data list, the operator can choose the data wanted.

AutoHeight area
Here all the AutoHeight data are controlled and displayed. The AutoHeight is on a separate icon in the task bar.

The screenshot shows a central 3D map view with a yellow tractor icon and a blue guidance line. At the top, it displays '3.90 ha', '7', and '16.1 km/h' with a 'Headland: 10.1 m' indicator. A 'Water' control panel shows '110.00' for both target and current values. The bottom section contains a 'Spray Pump' control (481 rpm), 'Task Volume' (759 L), 'Mode: Soil', 'Target Height: 70 cm', 'Sensitivity: 5', 'Pressure: 1.5 bar', and 'DF4 Flow: 1.940 L/min'. The task bar at the bottom includes icons for maps, a grid, a list, a 'UT' icon, and a 'HARDI' logo. The model name 'HC 9600' is visible in the bottom right corner.

Main work screen



- All information on one view
- 3D and 2D option
- Toolboxes can be opened and closed with finger touch
- Split screen option on HC 9600

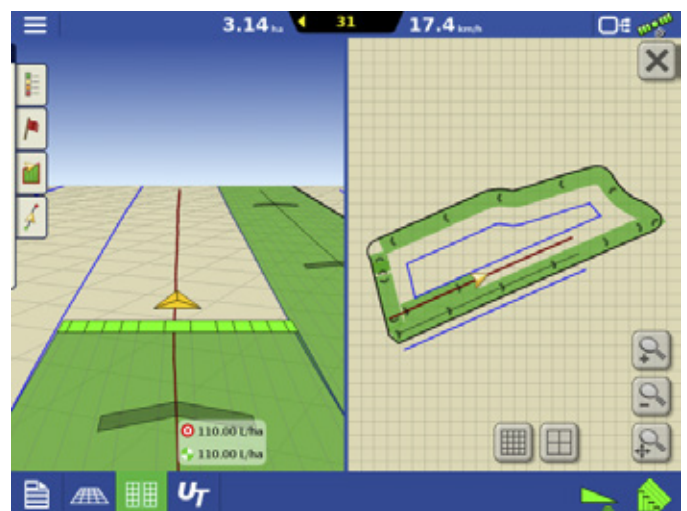
HC 8600/HC 9600 work screen

The complete integration of all important information on one work screen is an important criterion. On the HC 8600/HC 9600 work screen the driver can operate AutoHeight (UC5), AutoSectionControl as well as guidance and dosage. The view can be switched between 2D and 3D.

The operator can select his preferred view. The mapping and product toolboxes can be closed and opened by touching them.

By pressing the green grid icon on the task bar, the graphic changes between 3D and 2D. In the 2D mode the graphic can be scaled in and out as well. The 3D mode is only active if guidance is used. Driving direction indicated

By pressing the overview icon in the task bar, the operator can easily get a clear overview. Showing product and productivity data.



Display structure HC 8600

The display is clearly structured, and the different areas are named. The mapping and product control toolboxes are enlarged by touching these and in the opposite way reduced in size by touching them again.

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GPS status, sprayed area. Guidance lightbar and driving speed are always on the same spot.

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Here the guidance system can be controlled, and boundaries can be made.

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Map view can be in 2D or 3D format. Which sections are active, can be seen here at one glance.

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To the left the main screen buttons are placed, and to the right are function buttons.

Product toolbox
Here the dose rate can be controlled. Flow rate and tank volume are also shown.

AutoHeight area
Here all the AutoHeight data are controlled and displayed. The AutoHeight is on a separate icon in the task bar.

Sprayer specific part
Here the operator can see more detailed information about his sprayer. This part is only used in combination with a HARDI sprayer - information as pressure, TWIN status, SafeTrack and tank level from TankGauge is shown.

HC 9600 split screen

The HC 9600 screen can be used as split screen. To the left the work screen is displayed, but without the sprayer specific part. This part of the screen can be scaled in and out. To the right of the display either the universal terminal or the 2D work screen can be shown. The work screen can be scaled in and out. .

- All information at one view
- 3D and 2D option
- Toolboxes can be opened and closed with finger touch
- Split screen option on HC 9600



Map screen 1

Map view can be in 2D or 3D format. Which sections are active, can be seen here at one glance.

Universal terminal display

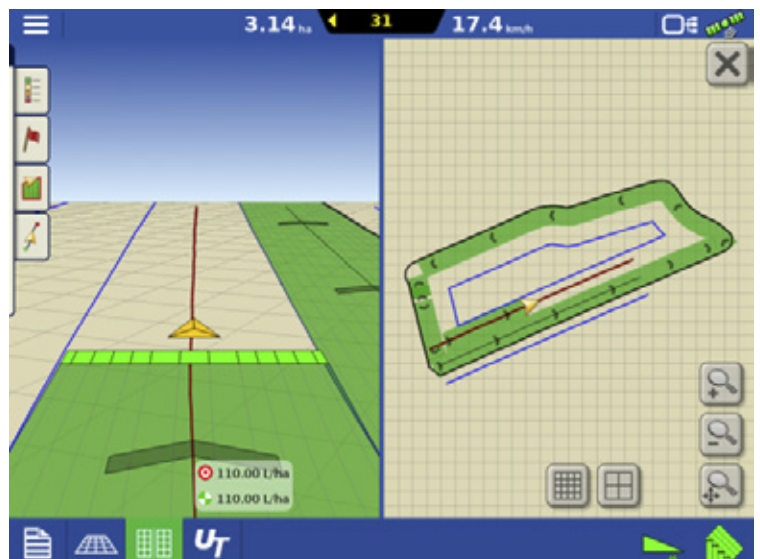
Here all ISOBUS UT screen can be displayed - the HARDI screen is visible.

AutoHeight

At the split screen view the AutoHeight data are displayed as an ISOBUS UT function, by pressing the UC5 icon the screen will be displayed to the right of the split screen.

Map screen 2

Map view is 2D but the operator can scale in and out. Also the application rate map is shown.



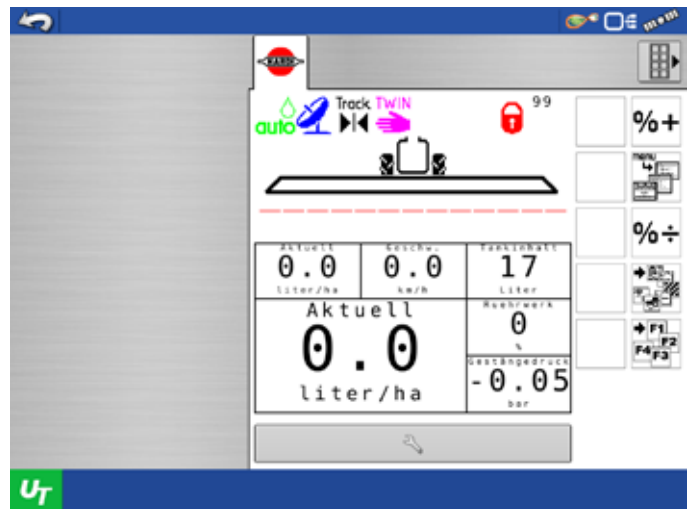
Universal terminal

The HC 8500/HC 9500 display is designed to meet the ISO 11783 ISOBUS Universal Terminal (UT) standard. The HARDI UT screen is close to the HC 6500 screen and similar to the view on other ISOBUS virtual terminals.

Via the UT page some of the HARDI specific intelligent functions are operated, for example the start of the AutoWash function. Also the calibration data must be shown here as these are the direct contact to the HARDI JobCom. Through the UT screen the JobCom receives the necessary sprayer data for editing tank size, boom width, number of sections and other critical information. The HC 8600/HC 9600 terminal has data set-up specifically required for data management and guidance (see HC 8600/HC 9600 set-up.) The HC 8600/HC 9600 work screen takes priority of the UT page. This means that when the application rate is set on the HC 8600/HC 9600, it takes priority over the rate that is in the UT.

The UT screen can also be seen in the split screen mode. Other ISOBUS functions can be chosen in this area, for example the AutoHeight UC5 is an extra ISOBUS function and displayed in the UT area.

- ISO 11783 ISOBUS UniversalTerminal standard
- View as on other ISOBUS UT
- Similar to HC 6500



Guidance

- Full guidance is a standard feature on the HC 8600/HC9600 (GPS receiver required)
- SmartPath pattern is ideal for spraying

Completely integrated guidance

Stretch working hours and view your field even in darkness with the HC 8600/HC 9600 integrated lightbar. Supports multiple guidance patterns and signals – including RTK.

The HC 8600/HC 9600 display features an advanced, integrated guidance system with on-screen lightbar, capable of multiple guidance patterns. So, even if you only want guidance, the HC 8500/HC 9500 gives you that – plus plenty of room to grow.

SmartPath™ pattern

Drive one pass through the field, then establish a custom guidance pattern based on your initial pass.

Integrated lightbar

The lightbar is integrated in the terminal housing, also includes cross-track error and pass number.

Perspective view

Choose how you prefer to see the on-screen map. Perspective view, split screen, boundary view, at the row level and more!

Headlands

Offset a headland from existing boundaries to provide both a visual reference and perform Auto Section Control.

Pattern management

Save, load, reset, pause, resume, nudge and shift patterns from the in-cab display.

Using pattern groups

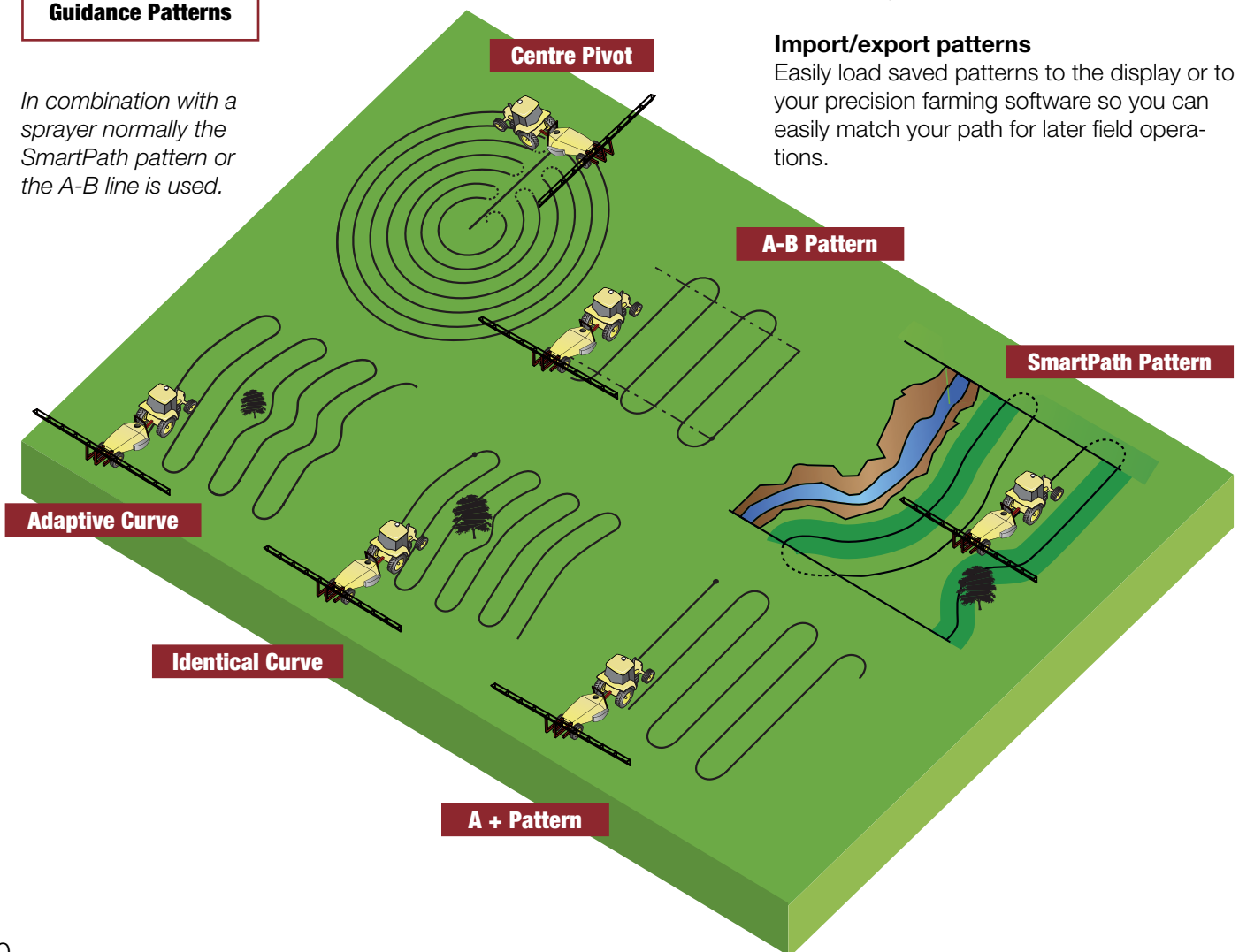
Save up to 20 pattern groups per field. The pattern group can be loaded from the pattern select wizard, then quickly and easily cycle through patterns with a single button press. This simplifies the process of selecting a different pattern for each area of the field. Pattern grouping is available with Straight AB, Identical Curve, Adaptive Curve and Pivot Patterns.

Import/export patterns

Easily load saved patterns to the display or to your precision farming software so you can easily match your path for later field operations.

Guidance Patterns

In combination with a sprayer normally the SmartPath pattern or the A-B line is used.



GPS receiver

GPS 6000 and GPS 6500

The GPS 6000 and GPS 6500 are both all in one antenna / receiver systems. These compact, low-profile units feature fixed or magnetic mounting options and offer an affordable solution for sub-meter accuracy with fast start-up and reacquisition times.

Both receivers are high performance Global Navigation Satellite System (GNSS) receiver and antenna, capable of receiving and tracking different combinations of GPS and GLONASS code. Satellite Based Augmentation System (SBAS) support, which includes WAAS (North America), EGNOS (Europe) and MSAS (Japan) is standard.

- Differential corrections include RTK, TerraStar and WAAS/EGNOS.
- GLIDE offers improved accuracy without subscription-based differential correction.
- GLONASS standard.
- Increased signal uptime provided by standard Stable-Loc™ technology.
- RTK via local base or NTRIP.
- Up to 20 Hz (6500) or 10 Hz (6000) output.
- Output simulated radar speed.
- Integrated magnets and included mounting plate with locating pins provide repeatable mounting.
- LED diagnostics for at-a-glance system monitoring.
- Sealed, compact, rugged design.

Use of existing GPS receiver

If the farmer already has a GPS receiver, it may be possible to use this for GPS input to the HC 8600/HC 9600. Technical service has a list of capable GPS receivers and what cabling is needed.

GPS Differential Correction



Plug and play solution

GPS 6000

Single frequency receiver. Designed for AutoSectionControl

Performance:

Horizontal position accuracy: SBAS: 0,9 m;
 DGPS: 0,5 m
 Maxi output rate: 10 Hz
 Velocity accuracy; 0,05 m/s (0,180 m/h)
 Size 155.3 x 66.8 x 155 mm
 Weight 495 g maximum

GPS 6500

Dual frequency receiver. Fully scalable designed to meet the need of extended RTK baselines.

Performance:

Horizontal position accuracy: SBAS: 0,6 m;
 DGPS: 0,4 m
 Maxi output rate: 20 Hz
 Velocity accuracy; 0,03 m/s (0,108 m/h)

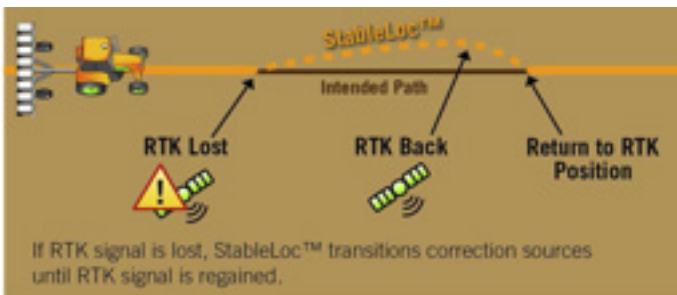


GPS receiver

GLIDE is a positioning algorithm that provides superior pass to pass accuracy (over 15 mn durations) in situations when a differential signal is not available. It provides a stable signal for customers in Eastern Europe, Australia and in areas of high ionospheric disturbance. It runs with GPS only or GPS + GLONASS.

StableLoc: it maintains accurate steering, even when your correction signal is temporarily lost, by seamless transitioning to the next available signal source. When the signal is restored, the system will then transition back to the higher accuracy source, eliminating position jumps;

Options: The GPS 6500 antenna is scalable to a better accuracy with Terrastar-C or RTK.



First set-up

The HC 8600 /HC 9600 is a high end terminal and needs input before it can be used as a data management system. Before the work with a HC8600 / HC 9600 can start, the terminal must be configured. By pressing the wrench sign, the configuration layout will be opened. On the configuration screen 4 areas in the bottom can be selected.

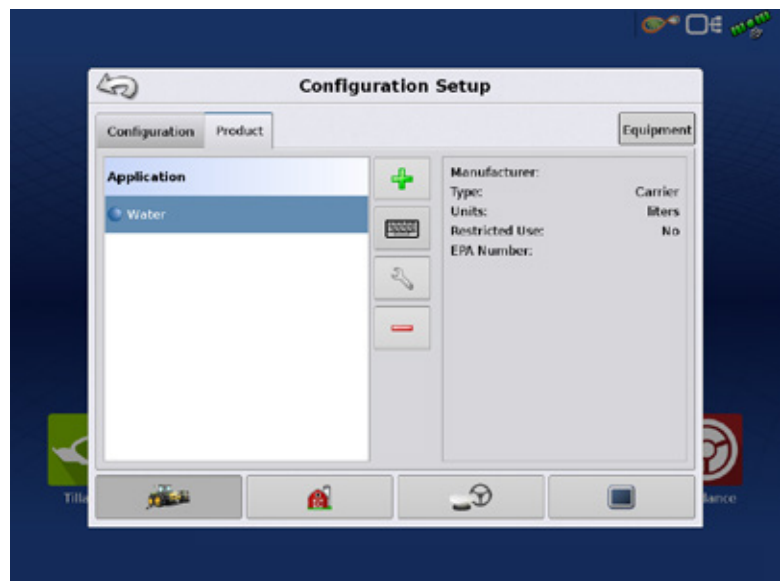
- ❶ Configuration setting
- ❷ Farm management setting
- ❸ GPS and steering data
- ❹ General display setting

❶ A: Configuration setting

In the configuration setting, all tractor and implement data are typed in. The software guides you through different pages to get all necessary data as boom width, number of sections, section width, GPS receiver position, AutoSection-Control setting etc.

If the terminal should be used on different tractors and implements, all machines must be configured separately. By clicking on the plus icon a new machine is added.

Generate different mixtures by selecting the "Product" tab and choosing which products and chemicals to apply.



Easy to follow the configuration menu

Clear instruction to setup GPS receiver

Farm management can easily import data from the internet

Existing field boundaries can be used

Preset for GeoSteer – easy calibration

Brightness can easily be changed so excellent visibility is given

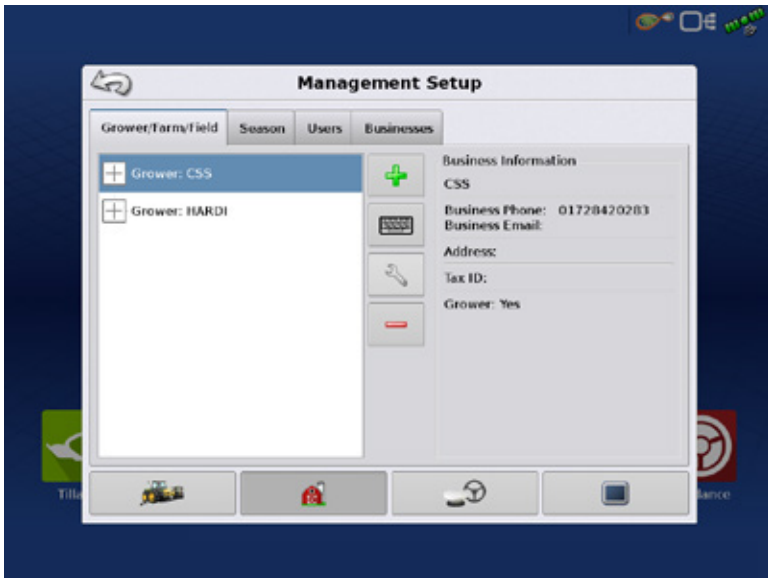
Works in more than 20 different languages

❶ B. Configuration setting

When data must be typed in, an alpha/numeric keypad pops up, and information can simply be typed in. The more accurate this job is done, the better the information in the data management system.



First set-up



2 Farm management setting

In the farm management setting area information about the grower, the farm and the field can be generated. Data for different seasons and operators are stored and maintained here also. Existing field boundaries can be transferred by a USB stick towards the terminal. Also maps from the internet can be uploaded. The terminal can work without farm management setting.



3 GPS and steering data

In the GPS/Guidance set-up, the Auto Tracking system, GeoSteer, is activated and calibrated. Information about the GPS receiver is also entered here.



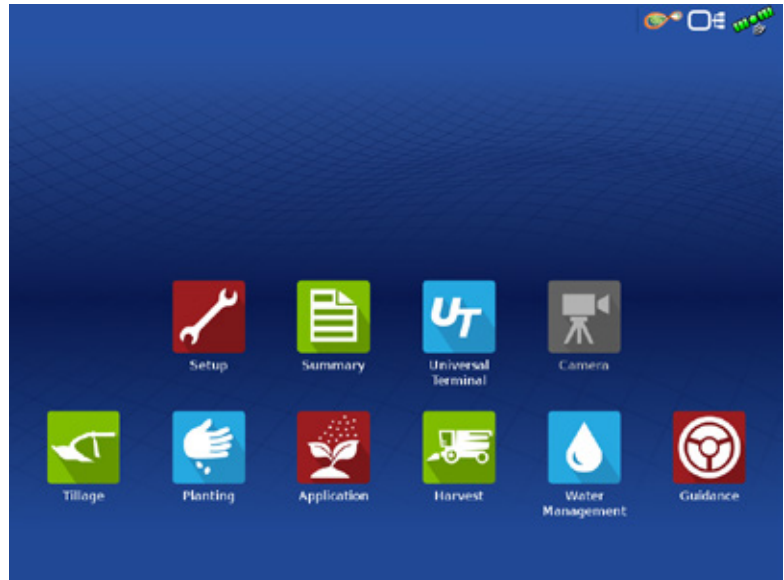
4 General display setting

In the area general display setting, the operator can choose between 20 different languages. To change to another language, the terminal has to switch OFF and ON again. Also time and data are set here as well as the screen brightness and the speaker volume level.

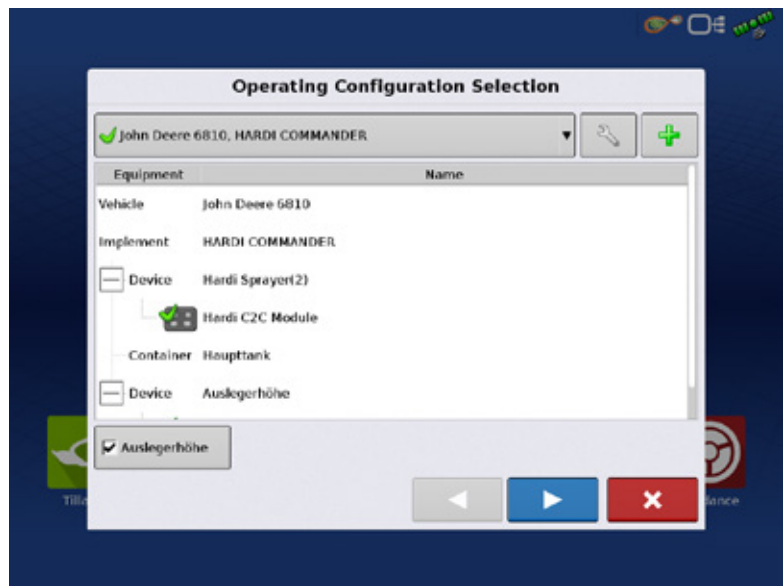
Starting a spray job

Run screen operation - Start of spray job In order to maintain accurate records the terminal requires spray job information before starting a task. If this information is not entered, the HC 8600/HC 9900 is not able to link specific information with the work associated in the specific field. Following the simple step by step procedures prior to a spray task, the operator is able to access a wide array of information after the spray job is completed.

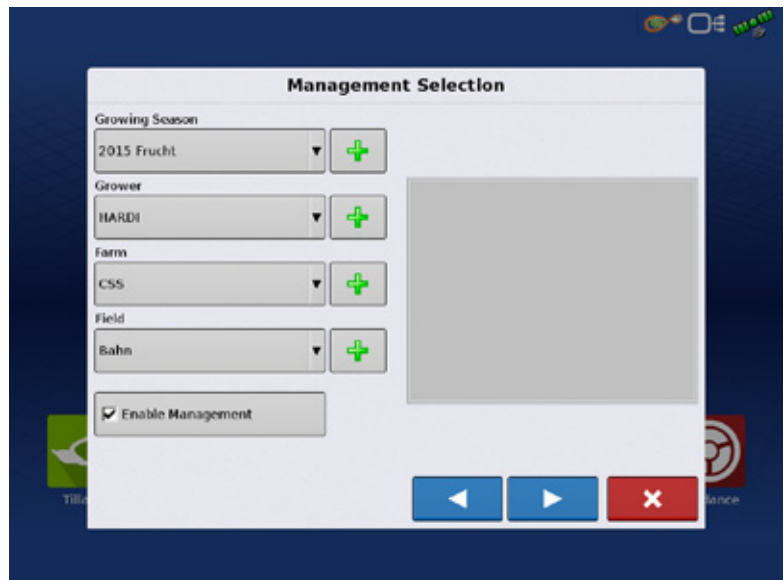
From the home screen a new spray job is started by pressing the Start Field Operation button.
Activate data management



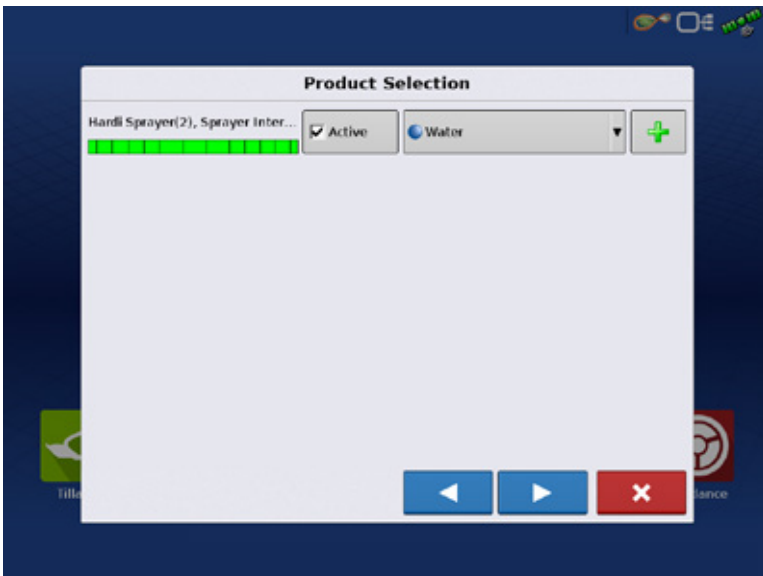
1 On the first screen a field must be chosen either from the data storage or a new one must be generated by pressing the +sign. To go further, the arrow to the right is pressed.



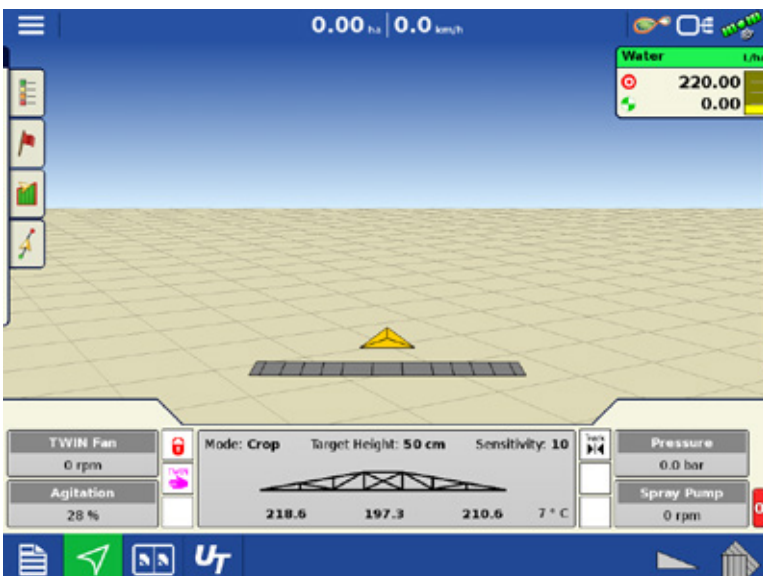
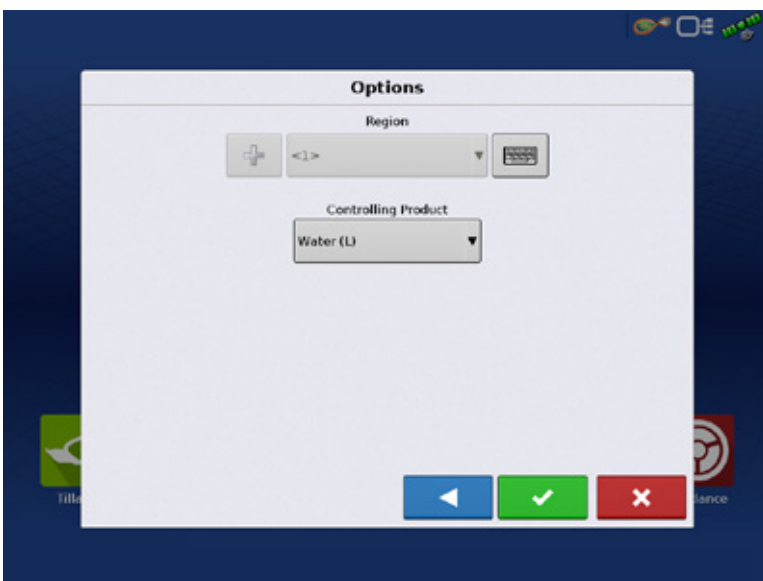
2 On the next screen the terminal asks for the implement to be used. Choose one from the list or just press further if the correct machine is shown on the display.



Starting a spray job



3 On the next two screens, information about the used chemicals or tank mixtures are asked, so you get the correct data into the reporting system.



4 Now press the green box with check mark, and the spray job is loaded into the data base, and the run screen view is now available. By pressing the icons on bottom task bar, the work screen will be active.

Starting a spray job

Turn around function

When starting in the field, the driving direction is decided by the system. For this, the last driving direction is taken into account. Meaning, if you enter a field driving forward, then start the spraying job while the GPS has not changed direction, and the boom will be behind the sprayer. But if the driver has reversed into a corner and while doing the start of a spraying job the boom will be in front. But the direction can be changed by pressing on the screen and hereafter press the turn-around symbol.

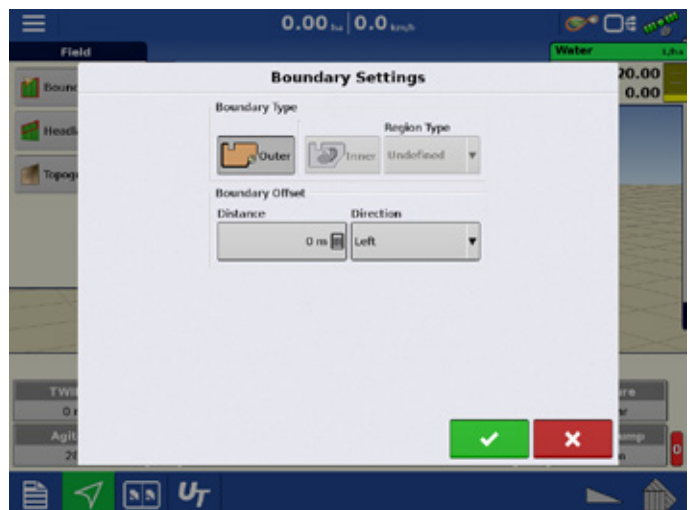
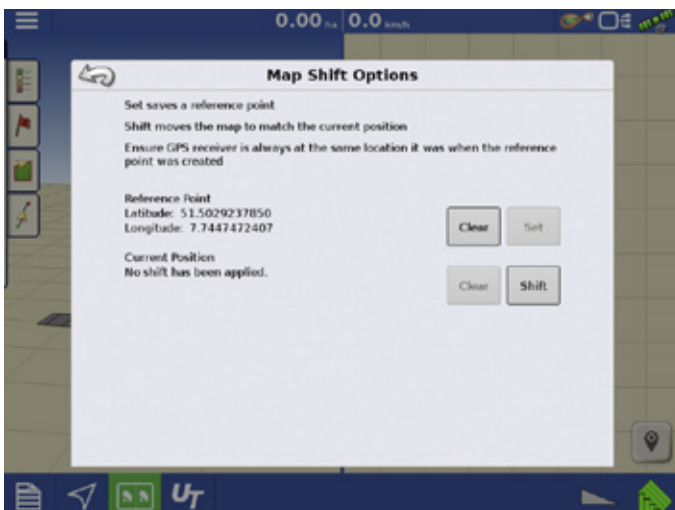
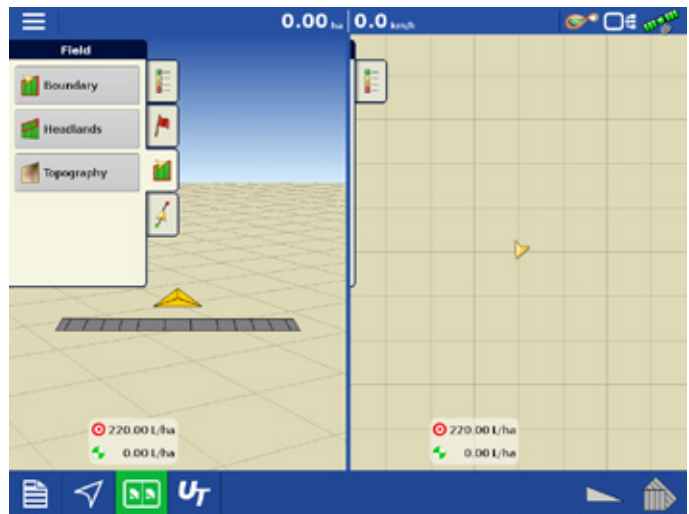
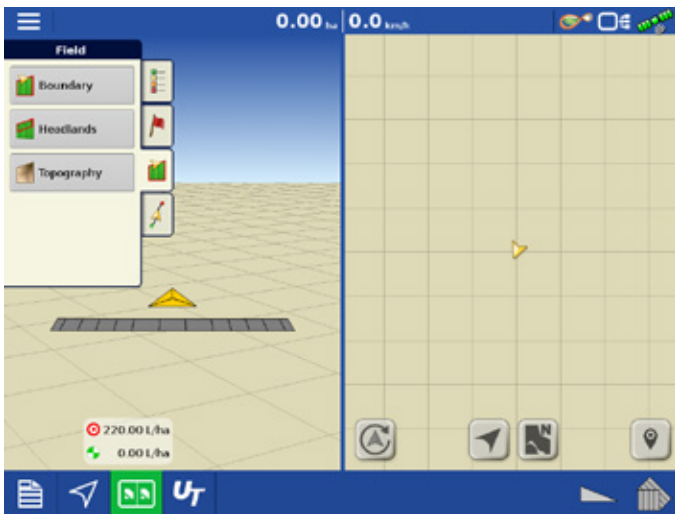
By using the mapping toolbox on the left side, boundaries, headland settings, guidance and mapping options

can be set up.

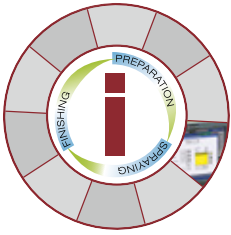
Reference point function

The reference point function can be used to shift the map position. In this case field boundaries can be used to automatically switch off the sections when spraying over the boundary - this also works with EGNOS signal.

The reference must not be exact in the sprayed field, it is more a setting regarding day time and satellite drift, so the reference point can also be on the farm. It is more to be exact at the same position.



Set dosage

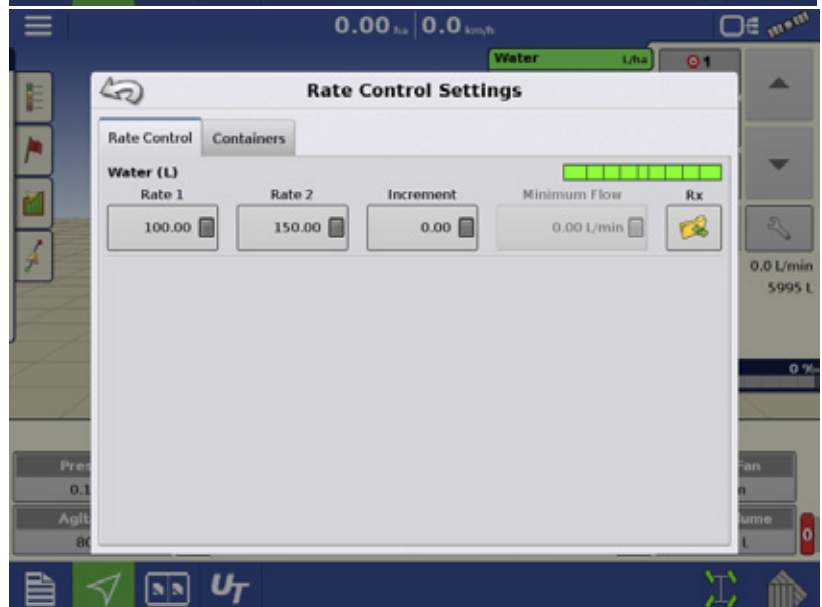
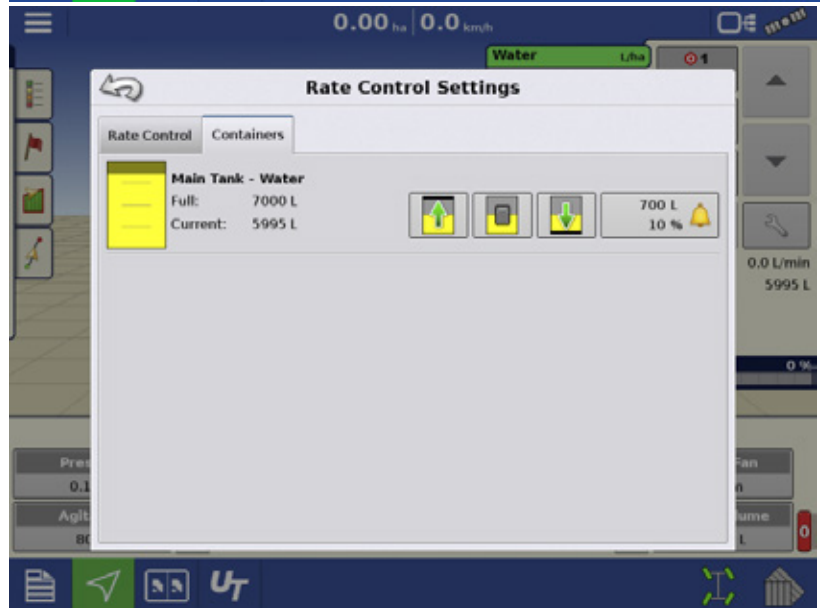
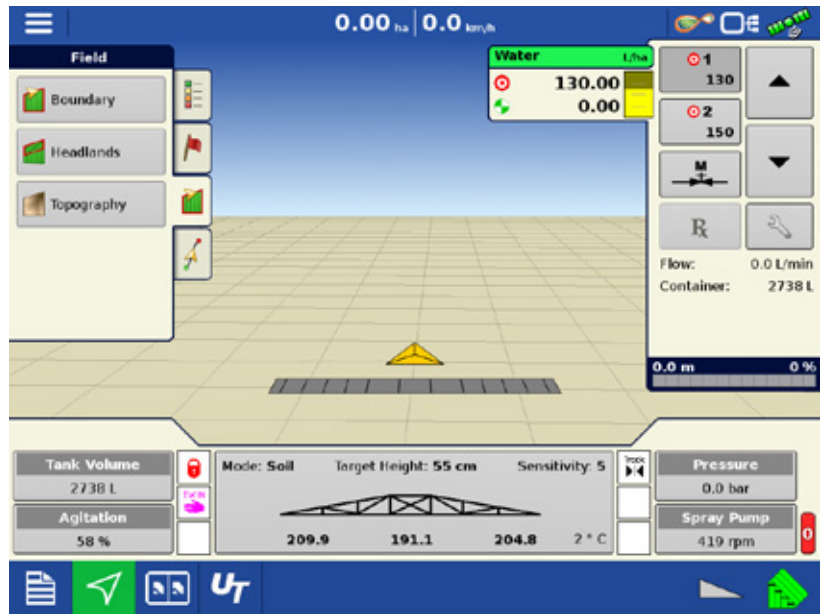


- 2 pre-set dose rates
- Dose rate steps in fixed l/ha
- Direct access to tank fill setting

The dosage is set up in the product tab on the main menu. The HC 8600/ HC 9600 works as standard with 2 pre-set dose rates. Between these the operator can easily shift by just pressing the button 1 or 2.

The dose rate can also be increased/ decreased in fixed steps l/ha – the steps can be individually selected. The product tab window also shows the actual flow, the calculated tank volume and the active boom width in metres and percentage.

If the product tab is open, and the wrench button is selected, a sub-menu will be opened. In the Control Setting area there are 2 choices - the Rate Control where dose rates and increment value step levels can be adjusted, also prescription data can be selected, and the terminal can load a variable rate map from an external USB stick. In the section Container, the tank volume and tank alarm can be adjusted. If the sprayer is equipped with a TankGauge, this data will be used on the display.



AutoSectionControl

Product savings of 3% or more are documented
 Operator fatigue is greatly reduced especially in odd shaped fields
 Precision shut-off can be individually set up
 Tracking is taken into account

AutoSectionControl (ASC) is a fully automatic system that opens and closes boom sections as necessary. ASC manages the sections when driving over sprayed area like into a headland or wedge or around obstacles like trees etc.

HC 8600/HC 9600 have ASC as a standard feature and only need to be connected to a GPS receiver. When spraying, the ASC automatically records the area sprayed. In a typical situation where the headland is sprayed first, ASC will now automatically close the sections if the operator passes over a sprayed area.

A free of charge EGNOS or WAAS GPS-signal is good enough for a spray job - as nozzles have an overlap - an accuracy of 30 cm is acceptable. Of course, more accurate GPS signals can also be used. The percentage coverage of the section can be set up between 0 and 100% as desired.

Combined with PrimeFlow, a single boom section can be as small as 0.5 m.

Depending on the number of sections, a product saving between 3 and 5% is documented, with more sections bigger savings can be reached.

SafeTrack / IntelliTrack / 4-Wheel steering noticed

The HC 8600/HC 9600 ASC takes the steering angle of the tracking system into account, so the boom position is calculated to reach the maximum accuracy.

With an ASC, the headland is sprayed first to make a field boundary, after this the rest of the field is sprayed. If ASC is activated, a minimum driving speed is required to get the sprayer to start spraying. This speed limit is

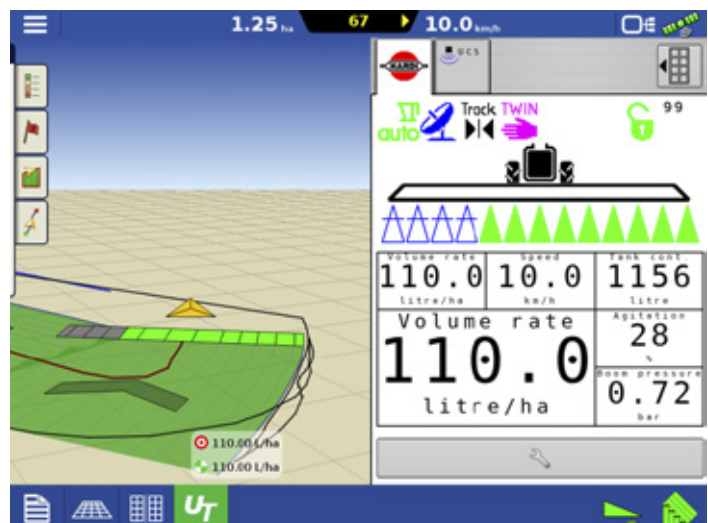
today 0.13 m/s or 0.48 km/h. So a spraying job is started in a corner, and if ASC is active the application rate is 0 l/ha. When the minimum speed is reached, the section valve / PrimeFlow valves will open, and the spraying starts. With minimum speed and EFC valves it needs approx. 50 cm.

Boom stays behind the sprayer when driving backwards

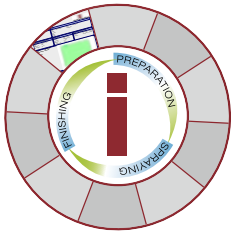
The boom stays in position and is not flipping around when the sprayer drives backwards in a field corner. The limitation of this software solution is that the ASC mapping is not working accurately when driving backwards, and the main ON/OFF switch is on.

This means spraying a headland accurately, following the rules regarding overdosing. It means that a precise cross and length distribution can only work by switching the ON/OFF manual before driving into a headland / corner part of a field.

It is not possible to spray around the corner and then reverse into the corner to spray the non-sprayed one-side rounded triangle, without operating the ON/OFF button. This behaviour without switching would give a multiple overdosage under the inner boom wing and in the braking / low speed area, as well as an under dosing under the outer boom wing. Above behaviour is not in line with any code of good farming practice, and we as manufacturer are forced by the machinery directive to give the operator clear instruction to avoid environmental application failures. HARDI cannot support this wrong spraying behaviour.



Documentation



Data logging

The HC 8600/HC 9600 automatically records application activities, including applied areas, product volume and more. The information can easily be downloaded into SMS software for analysis. Using the information can help accurately calculate input needs for the following year.

Documentation always needs a minimum of basic data and new information from the actual spray job. The terminal asks for information before the spray job can be started as this is the best time to remember what the actual task is. If no information is given before the job, data are required later to create a report!

HARDI



Ausbringungsbericht

Landwirt HARDI	Feld Feld: Tharloh Betrieb: CSS Bezirk: Beschreibung: Gemeinde: Bereich: Sektion:	
--------------------------	---	--

Gerätekonfiguration Fahrzeug: John Deere 6810 Gerät: Auslegerhöhe:	Ausbringung Timing: Platzierung: Düse-PN: Auslegerdruck:	Ausbringungsdatum/Zeit Startzeit: 29/04/2016 11:10 Endzeit: 29/04/2016 11:52
--	---	---

Produkt: Water
Bearbeitetes Gebiet: 11.31 ha

Menge (L):

- 205 +
- 185 - 205
- 165 - 185
- 145 - 165
- 0 - 145

Gesamtfeldfläche: 11.10 ha

Frucht- Frucht: Wachstumsstufe:	Einschränkungen Fruchtdrehung-Einschränk.: Beschr. Zugangszeit. (REI):	Ziel-Schädlinge
--	---	------------------------

Produktübersicht					
Name	Hersteller	EPA-Nr.	RUP	Menge	Durchschn. Menge
Water			Nein	3123.44 L	276.22 L/ha

Bediener-/Supervisor-Informationen		Unterschrift
Bediener:	Lizenz:	_____
Bediener:	Lizenz:	_____
Supervisor:	Lizenz:	

- Automatic data logging
- Transfer to farm management software

Documentation

Application report

The HC 9600 application report is a standard feature. This simple application report provides an easy way to generate detailed reports for governmental record keeping. Reports provide location, product information, applied totals, field areas, applied maps and field boundaries. Enter basic information about weather, soil conditions, products used, etc.

Basic data will be created and kept as a standard protocol for easily populating the

next report. The possibility of creating an annual report by field or entire farm also exists.

Automatic creation of PDF reports that can be saved on a USB stick and transferred to a computer for storage, e-mail or print. This feature requires no additional software as the Smart Report is fully integrated in the system

- Easy report system
- Simple possibility of data transfer
- No additional software required

Regionsübersicht	
Element	Region 1
Regionsname	<1>
Bedienername	
Ausbringungsdetails	
Fläche	11.31 ha
Water Menge	3123.44 L
Ausbringung-Startzeit	29/04/2016 11:10
Ausbringung-Endzeit	29/04/2016 11:52
Bodenzustand	
Bodentemperatur	
Bodenfeuchtegrad	
Bodenzustand	
Restfruchtgrad	
Bodenbearbeitungstyp	
Umgebung	
Lufttemperatur	
Windgeschwindigkeit	
Windrichtung	
Himmelsbedingungen	
Feuchtigkeit	
Zusätzliche Angaben	
Memo	

Data transfer

USB port

Data logging as standard

Transfer to different farm management software

Data transfer ISOBUS

The JobCom can store working data from up to 99 different fields, which is the basic possibility of the HC 6500 JobCom. The data can be transferred via an ISOBUS virtual terminal to farm management software. This software is not delivered by HARDI.

If the used ISOBUS terminal has a data management system, the basic data can be used and transferred to farm management software. The HC 6500 JobCom data is not transferred in the ISO-XML file format.

Data transfer HC 9600

The HC 9600 has different possibilities to do documentation and data transfer. The documentation part is explained on page 39 of the product guide as well as the application report which is a standard feature of the HC 9600.

The HC 9600 has an USB port with can be used for data transfer.

SMS software

AgLeader also offers a farm management software named SMS software. This is a complex farm management software with a lot of options and functions, including the option to generate A-B guidance lines on the PC or archive guidance lines from the field for

future use. This is also the case for import/export guidance lines to and from multiple brands of guidance systems.

This also allows using the collected data further in other programmes.

Free introduction to SMS

AgLeader offers free monthly online sessions to help you understand how to use the key tools provided in the SMS Basic, Advanced and mobile software. Visit sms.agleader.com to register to attend.

Data transfer from HC 9600 to other farm management software

The HC 9600 stores data in a specific AgLeader file format which than be used by different farm management software solutions, as for example Claas Agrosystems. If a specific farm management software is used and the customer needs a connection to this, the local product management has to contact HARDI to help with the communication between AgLeader and the farm management software supplier.

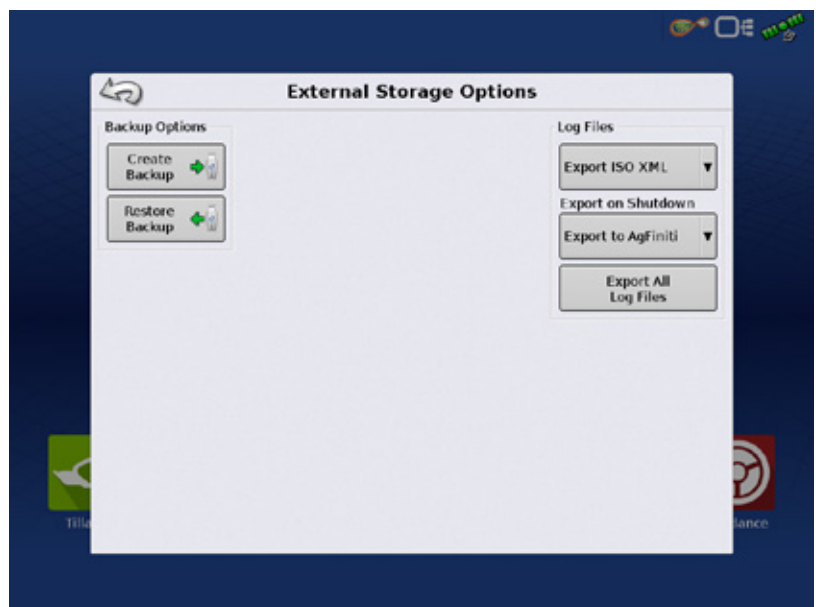
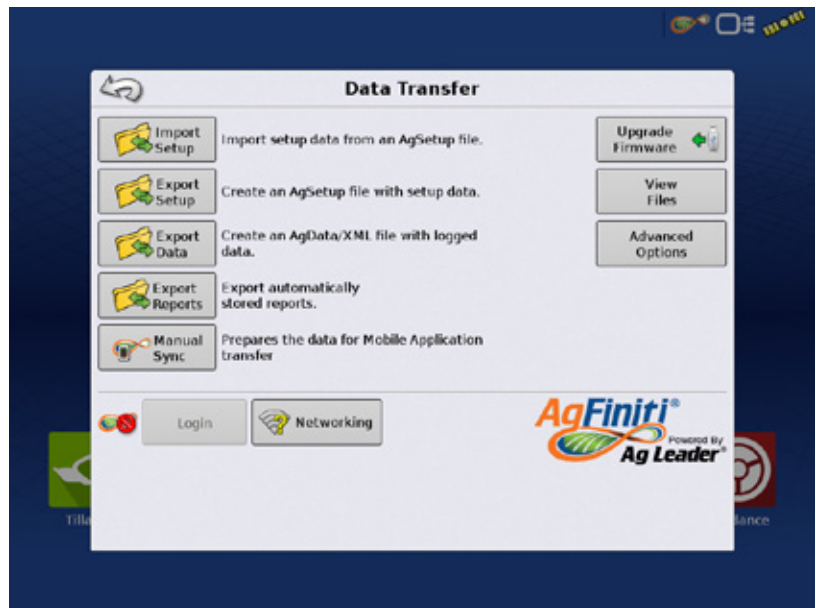
The HC 9600 will not log data in the ISOXML file format, and neither the SMS desktop software will export logged data in this format. SMS can read ISOXML log data, and we can export set-up cards in the ISOXML format.



Data transfer ISO XML

By pressing on the 3 icons in the right upper corner, a data transfer option will be opened. By choosing the option “Create an AgData/XML file with logged data” the screen 3 will be open, and data will be transferred to the USB device.

This data can then be used in farm management which can read ISO XML file format.



AgFiniti Mobile

The HC 8600 and HC 9600 terminals have a WiFi adapter. As standard with this a wireless communication can be set by using a hotspot function of a smart phone or an iPad.

The AgFiniti Mobile app can be downloaded for free. With this app the data from the HC 8600 and HC 9600 can easily be synchronized to an iPad. When the field will be left, you have data, maps and reports on your iPad.

No data plan or internet connection required. Free AgFiniti Mobile App for iPad.

Today's agriculture is increasingly data centric, your information needs to be more accessible than ever. With the AgFiniti cloud based programme, you take information about your entire operation with you wherever you go to help you making the decisions on the farm that matter most. Ag Leader believes the grower's data belongs to the grower. Growers can use AgFiniti with confidence, knowing their data are in their control.

Data can be shared with advisors. The data

can be seen anywhere on a mobile device, the terminal is used in the field.

Remote support

Increase runtime by allowing farm managers, dealers or support technicians to view on the display. Remote support helps to find setting errors and can be used without using data management options.

Accessing

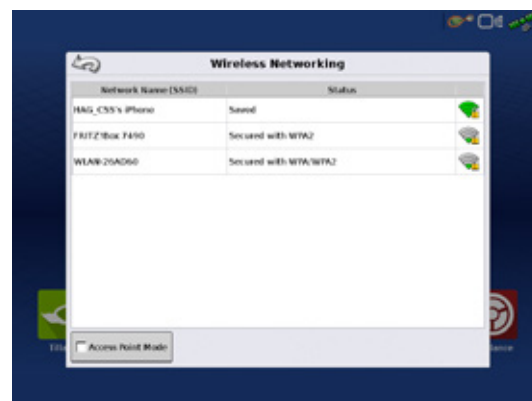
Send and receive data files wirelessly from the cab, including grower, farm and field information, prescriptions, guidance lines, boundaries, data files and more!

Connecting

With AgFiniti, maps and reports are automatically created for viewing from most Ag Leader displays. No desktop software needed.

Analyzing

See what happened at a specific location when walking through the field. View field operation data to see what happened with variety, application and equipment information for that exact spot.



Technical data

Display Hardware

Rear

A. Speaker

The built-in speaker is used for audible warnings. The volume can be adjusted through the display setup routine.

B. WiFi

802.11 communication.

C. Mounting bracket

D. HDMI OUT (HC 9600 only)

E. Ethernet Connection

4-pin connection used for communication with ParaDyme, GeoSteer, SteerCommand, OnTrac3.

F. 19-pin auxiliary connection

Used for camera input.

G. 19-pin plug

The 19-Pin round display connector contains CAN, RS-232 serial, and system power and ground connections. It is compatible with some certain other displays.

H. Power/Reset switch

The Power/Reset switch is used for turning the display on and off in installations where the system is connected to a continuous power supply.

If the display ever stops responding, the manual power switch may be held in for five seconds to restart the system. Only do this as a last resort, data loss could occur during times of improper shutdown.



Front and Side

I. Built in lightbar

For guidance.

J. Light sensitivity sensor

Used to automatically dim the display during night time or low-light situations.

K. Power light

The power light displays one of three states:

- Green = ON
- Pulses amber = Standby Mode
- Solid amber = Running on battery power

L. Side mount USB media slots

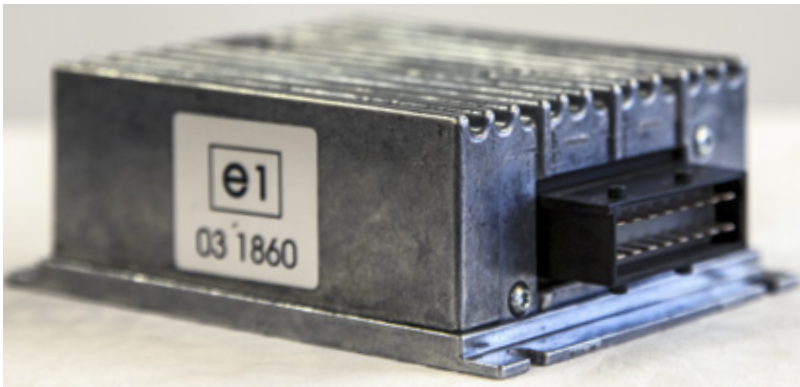
- 2 slots for HC 9600
- 1 slot for HC 8600

Used for data transfer in and out of the display.

Used to charge mobile devices up to 1.2 amps.



HARDI ISOBUS



HARDI NAVIGATOR, COMMANDER, ALPHA evo and SARITOR can be operated with a virtual ISOBUS terminal. The customer can order an intelligent HARDI sprayer and use the intelligent functions like AutoWash and PrimeFlow direct from his own ISOBUS terminal.

ISOBUS ISO 11783

The primary goal of ISOBUS data technology is to standardize the communication which takes place between tractors and implements while ensuring full compatibility of data transfer between the mobile systems and the office software used on the farm. The basis is the international ISO 11783 standard – “Tractors and machinery for agriculture and forestry – serial control and communication data network”.

Use of electronic control on tractors and implements has rapidly evolved during the last decades. An ever increasing demand for integration of the electronics has led to the development of an international standard for electronic communication network used on agricultural and forestry equipment, ISO 11783, or commonly called ISOBUS. The protocol defines communication between tractor electronics and implement electronics through a communication bus. This results in the implement and the tractor electronics truly working together. The tractor information, like speed and hitch position, can be used by the implement. The implement can be controlled by a single tractor mounted terminal. The ISOBUS system consists of an ISOBUS tractor and an ISOBUS implement, such as a sprayer.

ISOBUS provides a standard electronic interface that is similar to other standard tractor implement interfaces, such as: Three-point hitch standard – ISO 730, ISO 789, ISO 2332 Hydraulic remote connection – ISO 5676, ISO 17567 PTO standard – ISO 500

Flexibility International standard– sprayer can be operated by other ISOBUS terminals Complex standard makes the development time consuming

Names and organization

Implementation Group ISOBUS (IGI)

- Focused on Western European Market, but open to all

- Organization Type: Working Group under VDMA

- German VDMA provides administrative resources, website, and organizational oversight

- VDMA is the German Engineering Federation

and official secretariat for ISO/TC23/SC19

- North American ISOBUS Implementation Task Force (NAITF)

- Focused on North American applications, but open to all

- Organization Type: a Task Force under AEM

- AEM provides administrative resources, website, and organizational oversight

- AEM is an International Association of Equipment Manufacturers

General view of the ISO 11783 parts

Part 1: General Standard

Part 2: Physical Layer, 250 kbits/s, Quad Twisted Cable

Part 3: Data Link Layer, Harmonized with J1939/21

Part 4: Network Layer

Part 5: Network Management

Part 6: Virtual Terminal

Part 7: Implement Messages Application Layer

Part 8: Power Train Application Layer; Harmonized with J1939/71

Part 9: Tractor ECU

Part 10: Task Controller and Management; Information System Data Interchange

Part 11: Data Dictionary

Part 12: Diagnostics 2008

Part 13: File Server

Part 14: Sequence Control

ISOBUS hardware

HARDI ISOBUS

The HC 8600/HC 9600 system consists of 4 computers:

- Terminal
- Grip
- SetBox
- JobCom

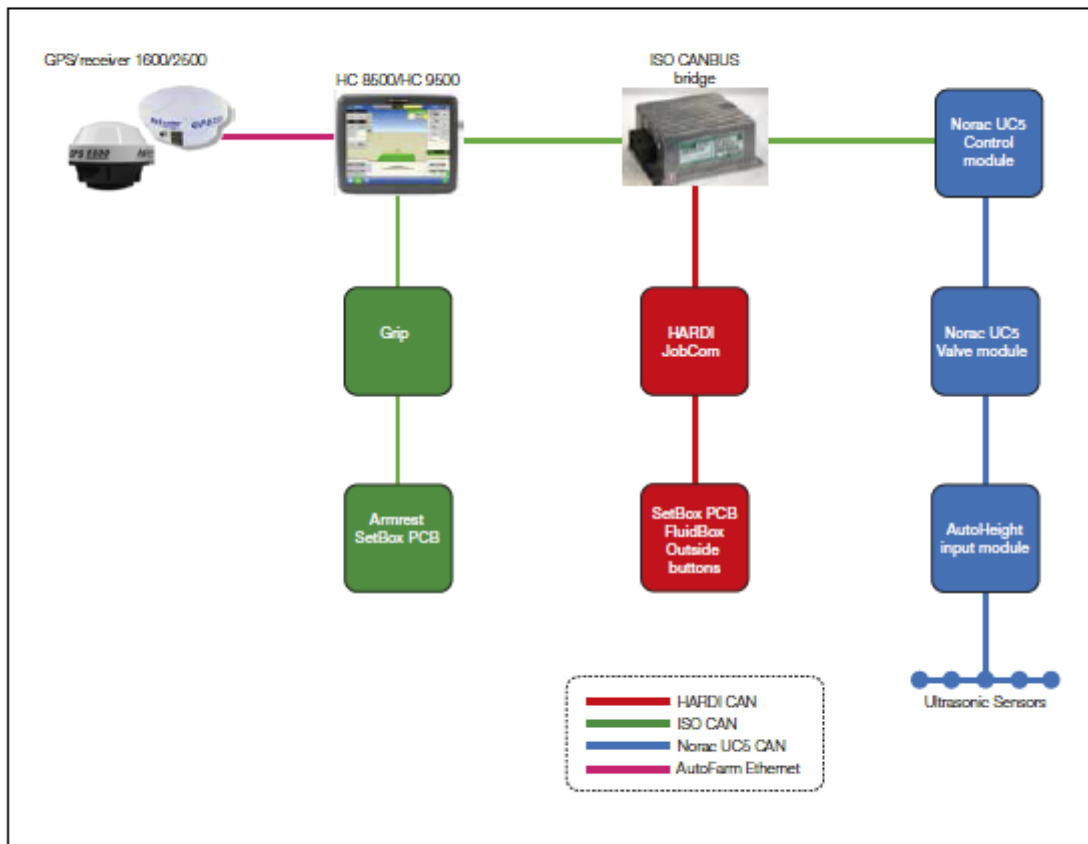
which all communicate on CANBUS according to J1939 and ISO 11783.

HARDI can work with different set-ups:

1. Tractor's ISOBUS terminal and the tractor wiring harness. HARDI Grip and SetBox will also be mounted in the tractor
2. HARDI HC 8600/HC 9600 con-

troller and the ISOBUS tractor wiring harness including Grip and SetBox
 3. HARDI HC 8600/HC 9600 controller and the ISOBUS tractor kit from HARDI - here also Grip and SetBox are used

Cabling overview



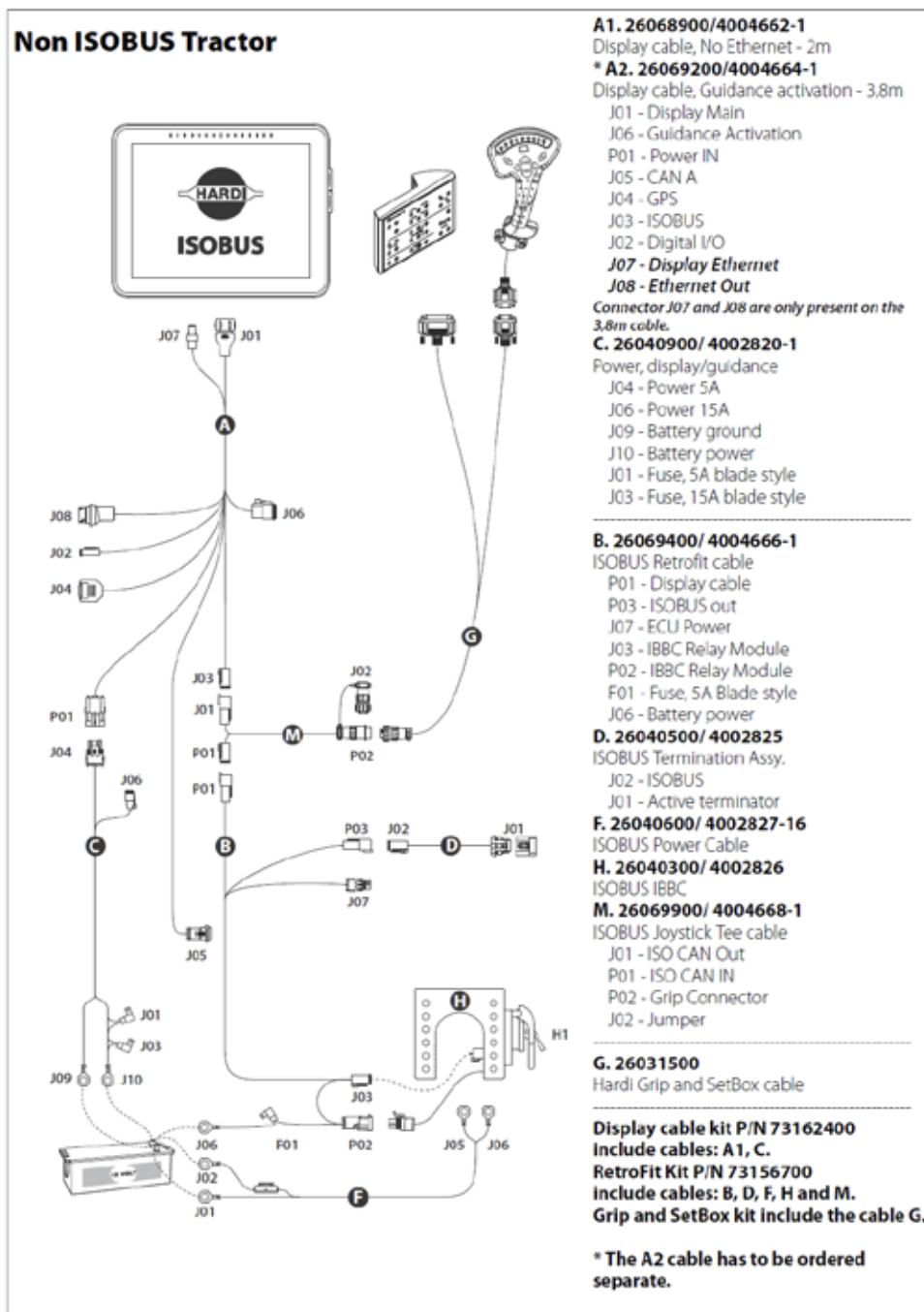
ISOBUS Retrofit Kit

If a MASTER, NAVIGATOR, COMMANDER with a HC 8600 or HC 9600 terminal should be connected to a non-ISOBUS tractor, an ISOBUS Retrofit Kit is needed. In this kit the ISOBUS coupling for the tractor and 3 different wires are. The other wires are in the

display kit, or part of the sprayer as Grip and SetBox. The below drawing is direct taken from the HC 8600 / HC 9600 manual and shows how the components will be connected. Approx. assembly time is 3 hours.

HC 8600/9600 Display Retrofit Kit Cable Connections

Part information
67215500-100



ISOBUS Bridge

ISOBUS

HARDI NAVIGATOR and COMMANDER i sprayers can be ordered with an ISOBUS Bridge. By this the sprayer can be directly operated with a virtual ISOBUS terminal. To make the complex sprayer operation easier, the proven HARDI GRIP will be delivered with the sprayer, so that all primary spray functions as ON/OFF and section switches as well as the hydraulic operation easily and safely can be done with a joystick. Also a SetBox will be used to operate sprayer specific equipment as TWIN air assistants or SafeTrack steering directly, and also other secondary functions.

The ISOBUS Bridge with 2 CAN interfaces, a HARDI CAN and an ISOBUS CAN. Seen from the JobCom, the ISOBUS Bridge is replicate the terminal. The ISOBUS Bridge should provide all data normally coming from the implement computer.

ISOBUS bridge is placed at the sprayer in order to use the ISO connector on the tractor.

The ISOBUS Bridge is mounted in the same box as the JobCom and is powered from the JobCom.

The ISOBUS Bridge is connected to the tractor. All communication between the ISOBUS Bridge and the tractor uses the ISOBUS standard.

The ISOBUS Bridge is connected to the JobCom and is translating the ISOBUS signal from the tractor to the CANBUS signal that is used in the JobCom.



Why an ISOBUS Bridge? – Knowledge and spraying know-how stay on the sprayer, high flexibility

ISOBUS bridge is ISOBUS conform



ISOBUS implement connector

Implement connector. A 9-pin connector on the tractor allows connecting the implement cable to the tractor.

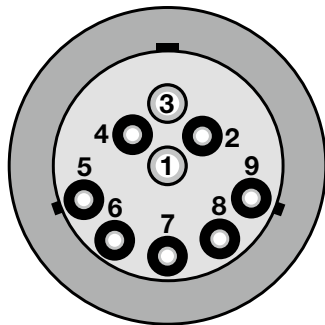
- 1 GND (Ground)
- 2 ECU GND (Electronic Control unit ground)
- 3 PWR (Power)
- 4 ECU PWR (Electronic Control unit power)
- 5 TBC DIS N.C.
- 6 PWR terminating bias circuit
- 7 RTN Return terminal. bias circuit
- 8 ISO CAN_H (ISOBUS CAN_High)
- 9 ISO CAN_L

The tractor should be equipped with power ON/OFF relays to the ISOBUS connector at the rear of the tractor, to power ON/OFF the power to the implement, with the ignition key of the tractor.

If the tractor does not have the relays, the ISO connector at the rear of the tractor should be disconnected to prevent the sprayer to drain the tractor battery.

ISOBUS tractor kit

If a HARDI ISOBUS sprayer shall be connected to a non-ISOBUS tractor, a special kit is needed. This ISOBUS tractor kit has all necessary plugs and the correct wiring harness to run a HARDI ISOBUS sprayer.



Cabin connector

ISOBUS

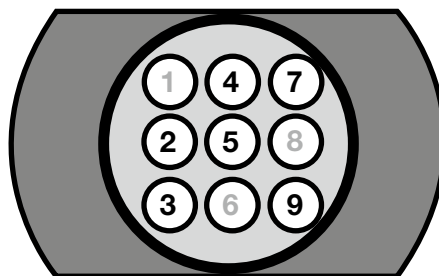


Grip and SetBox are connected to the “cabin” ISO connector in the tractor.

The ISOBUS Bridge is updated through the tractor cabin connector.

The cabin connector has the name CPC13 9W and must be in the tractor cabin, otherwise the ISOBUS system on the tractor must be updated or an extra ISOBUS tractor kit is needed.

- ② ISOBUS Low in
- ③ ISOBUS Low out
- ④ ISOBUS High in
- ⑤ ISOBUS High out
- ⑦ Power +
- ⑨ Power -



Connect the HARDI Grip and SetBox to the tractor ISOBUS cabin connector.

Software

The JobCom has its own software. The ISOBUS bridge has its own software. Grip and SetBox have their own software. All devices need to have a matching software.

Software updates

The JobCom is updated as in the past, direct through the JobCom RS232 port.

The ISOBUS bridge is updated through the tractor cabin connector. Grip and SetBox are updated through the D-connector “C” on the device.

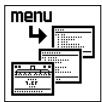
ISOBUS Icons

New HARDI ISOBUS icons

To run a complex intelligent machine via ISOBUS VT, some new icons had been needed. The HC 6500 can be operated via softkey functions and has short cut buttons on the

terminal. On a ISOBUS VT there are no short cut buttons so submenus had been developed to make this operation possible.

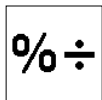
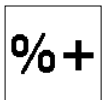
Here is an overview on the different icon.



Select menu key



EditFilled
Select this to key in the volume to fill in the tank



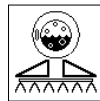
Change value or volume rate key



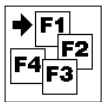
Change value or volume rate key
AutoWash



Short cut key
Same as buttons on the HC 6500 Controller



Select AutoWash programme
AutoWash programme:
BoomFlush



Short cut key
Same as the "F" buttons on the HC 6500 Controller



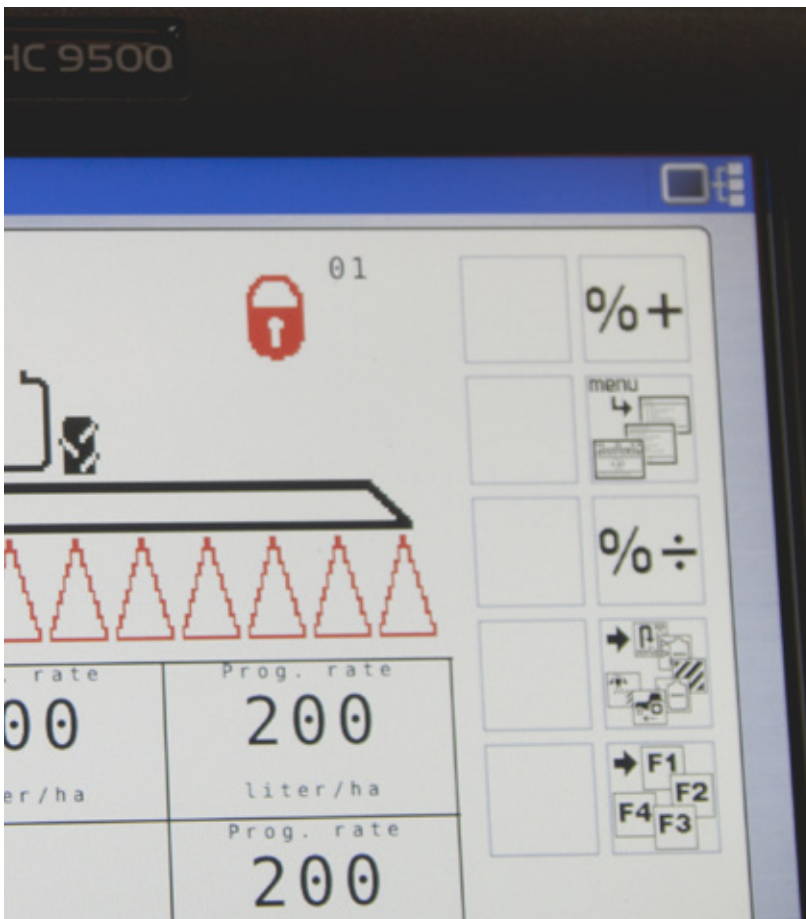
AutoWash programme:
FastFlush



AutoFill icon
Same as F1 on HC 6500
Select to activate AutoFill



AutoWash programme:
MultiRinse



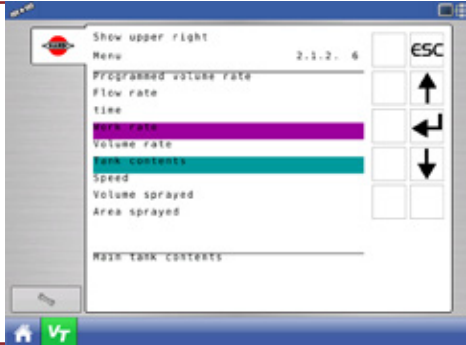
Navigation

Navigation ISOBUS terminal

ISOBUS terminals can be operated in different ways depending on their design. There are differences in the operation of touchscreen terminals and button controlled systems. Also the number of function buttons is varying between different terminals! Sometimes also a navigation wheel is used to move the cursor. Nevertheless all functions can be operated, and the operator will quickly be familiar with his system.

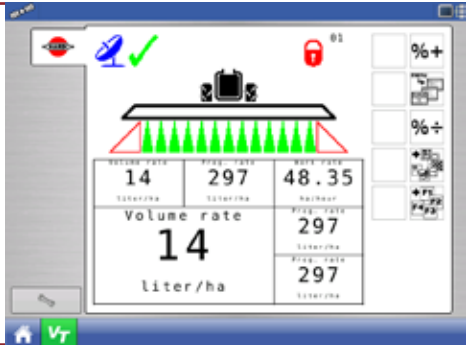
Selected menu points are shown with a turquoise linemark.

The line, where the pointer is, is shown with a purple mark.



How to change volume rate:

1. Select
2. Select 1.1. Volume rate

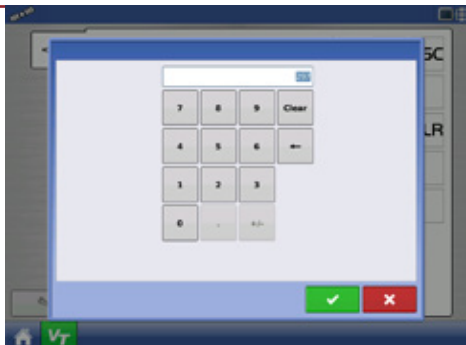


Touchscreen navigation

Press on the number



And a numeric keyboard will appear on the screen where the value can be entered.



3. Push the wheel

Turn the wheel up/down until the desired volume rate is found

Push the wheel again to confirm the value.

4. Push the ESC button to go back to the menu work screen.



ISOBUS with JobCom or ECU

JobCom or Electronic Control Unit (ECU)

The HARDI Sprayer needs a JobCom with an ISOBUS Bridge. Only the JobCom used for the HC 6500 or a newer one can be used with an ISOBUS bridge. The ISOBUS bridge is a CAN-2-CAN (C2C) box from the supplier STW and has specific software included which allows an ISOBUS system to communicate with our JobCom.

The tractor, if equipped with ISO, also has a tractor ECU. The tractor ECU sends sensor data to the terminal via ISOBUS.

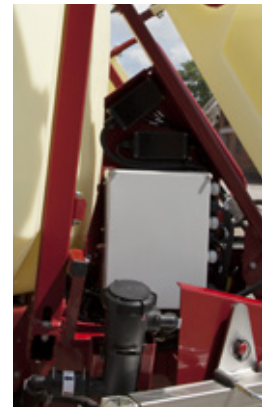


Implement ISO cable.

In the ISOBUS world a JobCom is named an Electronic Control Unit (ECU)



HARDI ECU containing ISOBUS Bridge and JobCom.



Boxes for transport

ISOBUS



Transport boxes are an easy way to store the HC 8500/HC 9500, Grip and SetBox for the winter and for safe protection when transporting these.

Boom survey

VPZ 20-28 m

The strong and well-proven three-dimensional vertical folded VPZ boom is the ideal choice for operators looking for small transport width and a boom with flexible working width. Only for NAVIGATOR 3000 and 4000.



EAGLE 18-30 m

The EAGLE boom offers unequalled performance in rough conditions and is available in boom sizes from 18 to 30 m. The perfect choice for medium to large farming operations, the two-dimensional EAGLE boom design with dynamically linked coil spring boom centre provides the smooth boom. The strong and well-proven two-dimensional EAGLE boom is the ideal choice for operators looking for durability and value.



DELTA 18-24 m

The HARDI DELTA offers excellent performance and dependability. The rugged three-dimensional structure guarantees good durability. The DELTA is available in 18-24 metres and is designed to be ultra-compact in transport and storage.



DELTA FORCE 24-39 m

DELTA FORCE is designed to be a large boom. The selection of features and the layout of the boom structure are targeted to perform at high driving speed and high performance at boom widths of 24-39 m. The result is a boom with many simple and strong solutions which together give a high-performing and reliable boom with a simple setup, low maintenance and a great design.



Note: The EN/ISO 16119 sets demands of boom sections, up to a 24 m boom width a maximum section width of 4.5 m is allowed, over 24 m maximum is 6 m. The marked models are not available in Europe.



VPZ boom:
 28 m - 9 sections
 27 m - 9 sections
 24 m - 9 sections
 24 m - 7 sections
 21 m - 7 sections
 20 m - 5 sections

only for NAVIGATOR 3-4000 I



EAGLE SPB/C boom:
 30 m - 5, 9 sections
 28 m - 5, 9 sections
 27 m - 5, 9 sections
 24 m - 6 sections
 21 m - 7 sections *
 20 m - 5 sections *
 18 m - 5 sections *

*** only for NAVIGATOR 3-4000 I**



DELTA boom:
24 m - 6, 8 sections
21 m - 7 sections
20 m - 5 sections
18 m - 5 sections

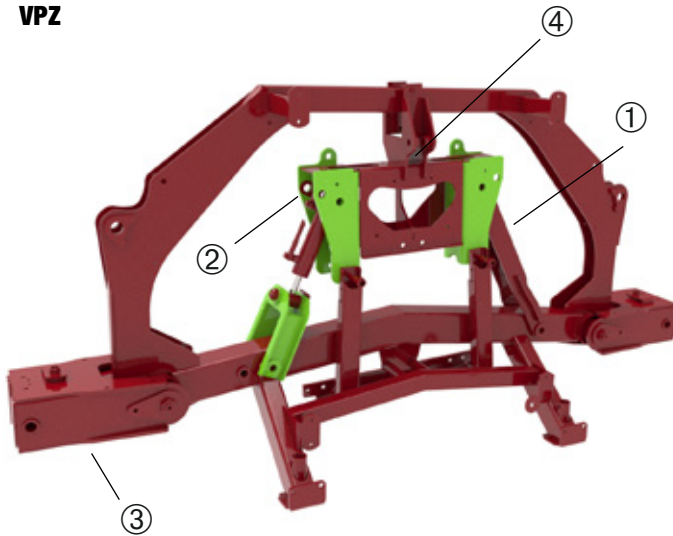
only for NAVIGATOR 3-4000 I



DELTA FORCE boom:
 39 m - 13 sections
 36/27 m - 9, 11, 13 sections
 36/24 m - 9, 11, 13 sections
 33/27 m - 9, 11, 13 sections
 33/24 m - 9, 11, 13 sections
 32/27 m - 9, 11 sections
 30/15 m - 9, 11, 13 sections
 28/14 m - 9, 11, 13 sections
 27/14 m - 9, 11, 13 sections
 24/12 m - 9 sections

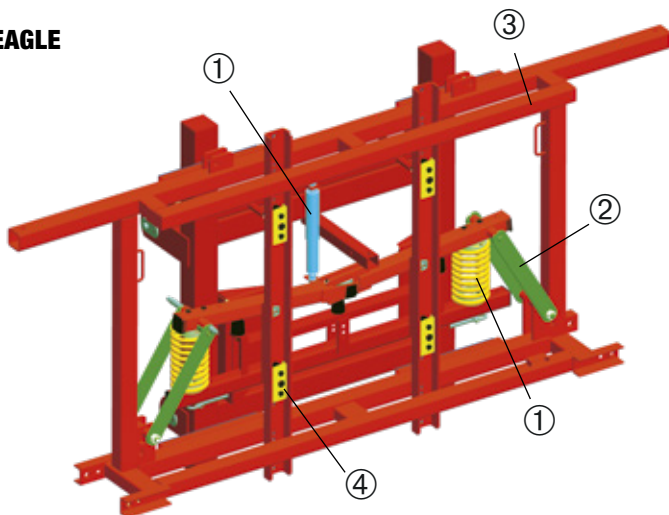
Boom suspension

VPZ



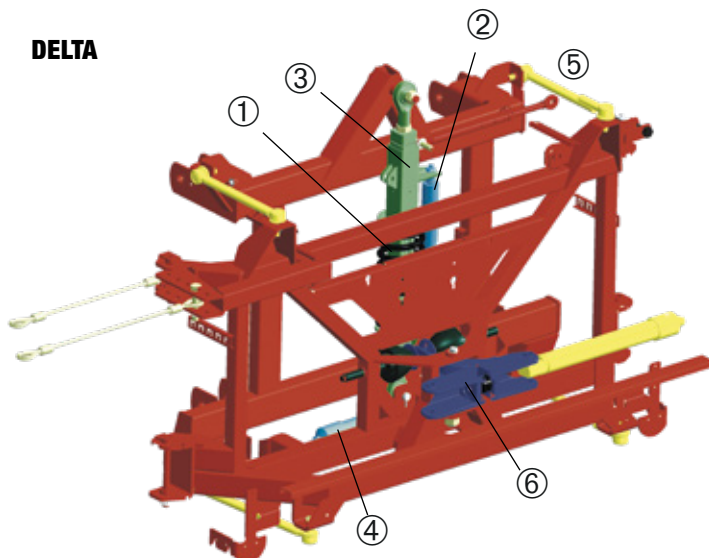
- 1. Trapeze arms** The long trapeze arms provide a good boom in flat and hilly conditions
- 2. Trapeze arms adjustment** The trapeze arms can be adjusted in 4 different positions, adapting the boom suspension to field conditions and terrain.
- 3. Anti-yaw** Yaw dampening of horizontal movements is integrated in the inner boom wings.
- 4. Trapeze lock cylinder** The cylinder is standard on all PRO VPZ booms. With this cylinder the suspension is locked so the boom can be single-side folded.

EAGLE



- 1. Coil spring** The large coil springs and damper dampen the up and down movements from the field.
- 2. Trapeze arms** Trapeze arms work together with the coil springs to provide exceptional boom ride.
- 3. Self-stabilizing trapeze** All EAGLE booms feature a self-stabilizing centre section to accommodate all terrains.
- 4. Anti-yaw** Yaw dampening of horizontal movements is integrated through 4 individual rubber buffers located on the centre section. This protects the boom in the toughest conditions.

DELTA



- 1. Coil spring** The large coil spring dampens movements directly up and down from the field.
- 2. Coil spring dampening** To ensure smooth performance of the pendulum, a shock absorber is incorporated.
- 3. Pendulum** The pendulum dampens fast side movements and keeps the boom horizontal.
- 4. Pendulum dampening** A hydraulic dampening cylinder that is fully adjustable dampens the pendulum.
- 5. Guide rods** The sensitivity of the pendulum can be adjusted by moving the guide rods, ensuring a perfect boom ride under all conditions.
- 6. Anti-yaw** A unique anti-yaw system dampens the forward and backward horizontal movements as well as any horizontal shock load.

DELTA FORCE Boom center

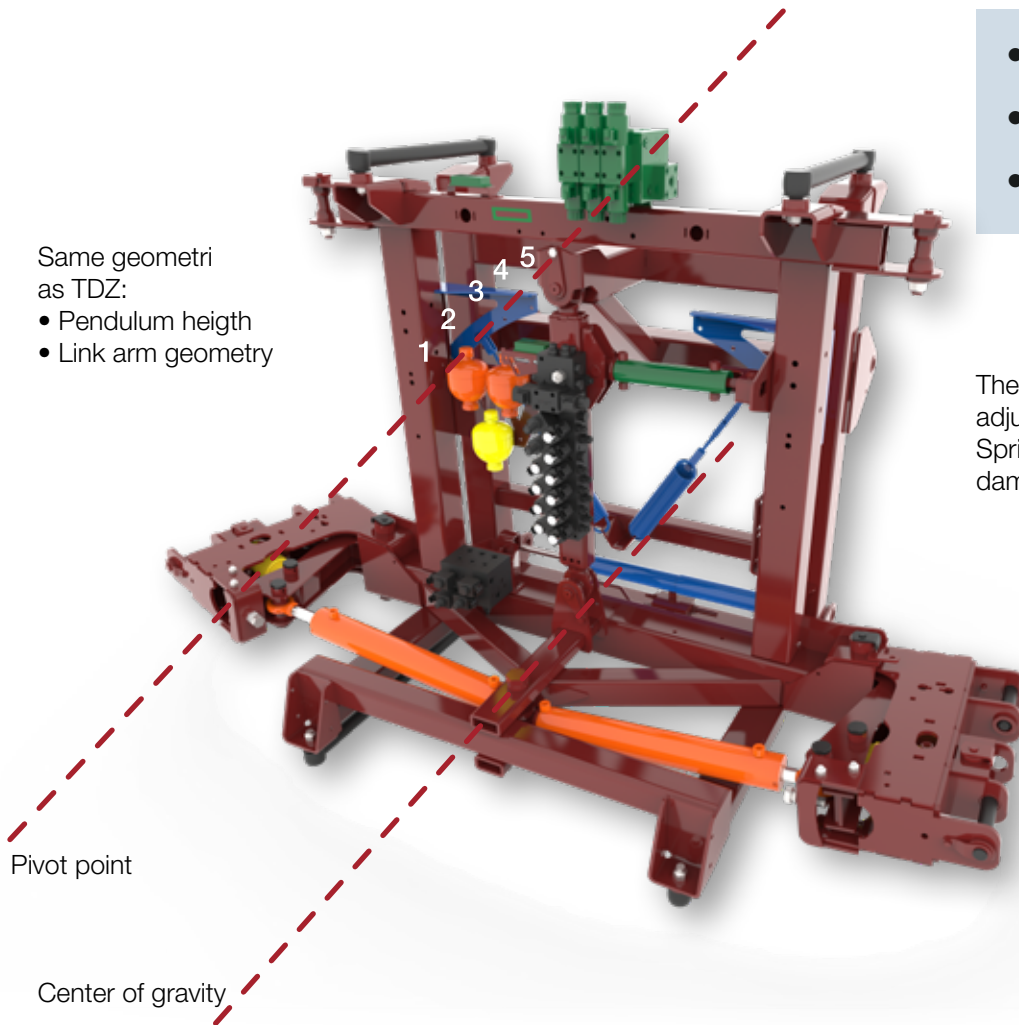
BOOMS

- High performance
- Easy setup
- Low maintenance

Same geometri as TDZ:

- Pendulum heigth
- Link arm geometri

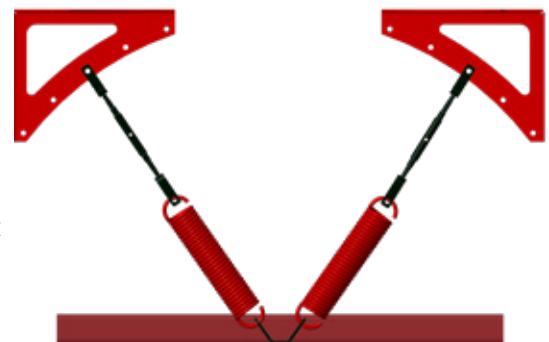
There is only two parameters to adjust when setting up the boom: Spring for boom characteristic ① and dampening of pendulum ②.



Pivot point

Center of gravity

① Five settings for boom behaviour. Top = most effect from the pendulum. Lowest = Terrain following / trapeze like.



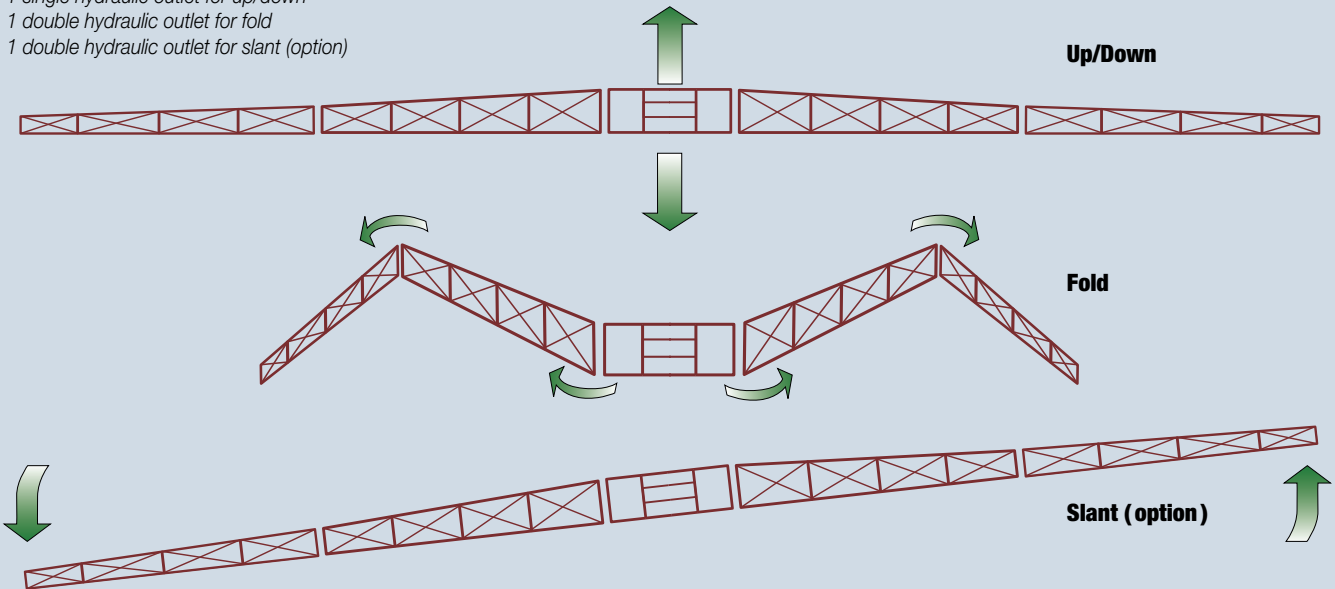
② The pendulum lock cylinder has an adjustable dampening function. This will slow down the speed of the roll movements on the boom.

Boom hydraulics

Y boom

Requires

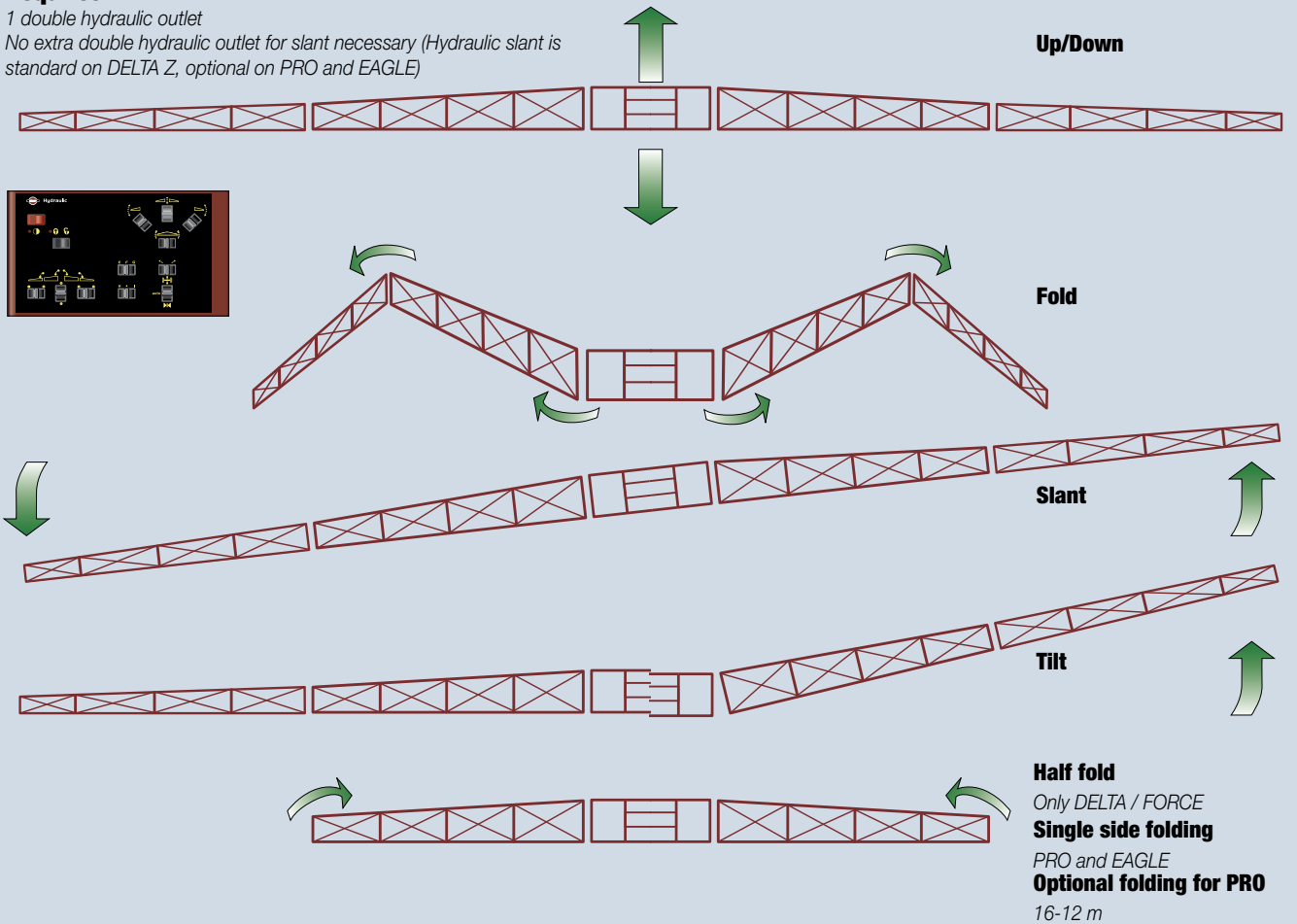
- 1 single hydraulic outlet for up/down
- 1 double hydraulic outlet for fold
- 1 double hydraulic outlet for slant (option)



Z boom

Requires

- 1 double hydraulic outlet
- No extra double hydraulic outlet for slant necessary (Hydraulic slant is standard on DELTA Z, optional on PRO and EAGLE)



Electrically activated hydraulics

Fingertip hydraulic controls
 Designed for modern tractor hydraulics
 Only two hose connections

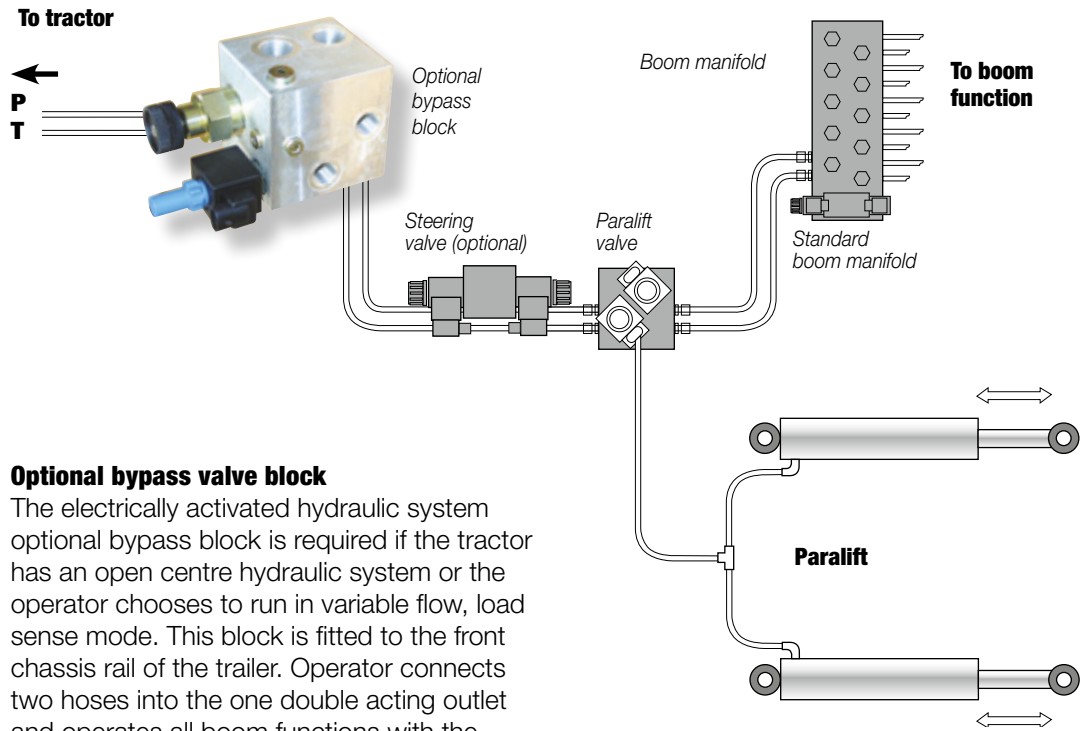
If operator chooses a DELTA-Z, EAGLE-Z, PRO VHZ or FORCE boom, the electrically activated hydraulic system is selected. This system is designed for modern, closed centre hydraulic circuits.

In this instance the operator will engage the hydraulic outlet for constant flow and hereafter control boom functions by a hydraulic switch box.

The operator connects two hoses into the one double-acting outlet and operates all boom functions with the electric controls.

Electric hydraulics required for:

- Boom tilt
- IntelliTrack steering
- Open centre hydraulic tractors
- Optional load sensing if only one double acting remote available



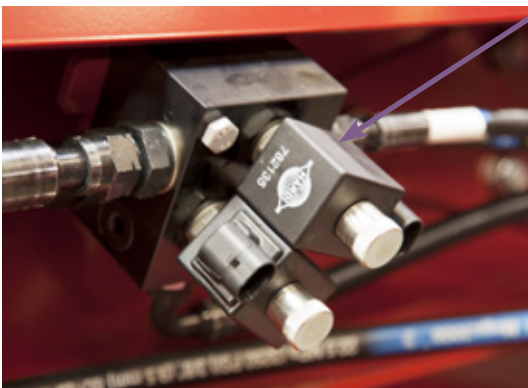
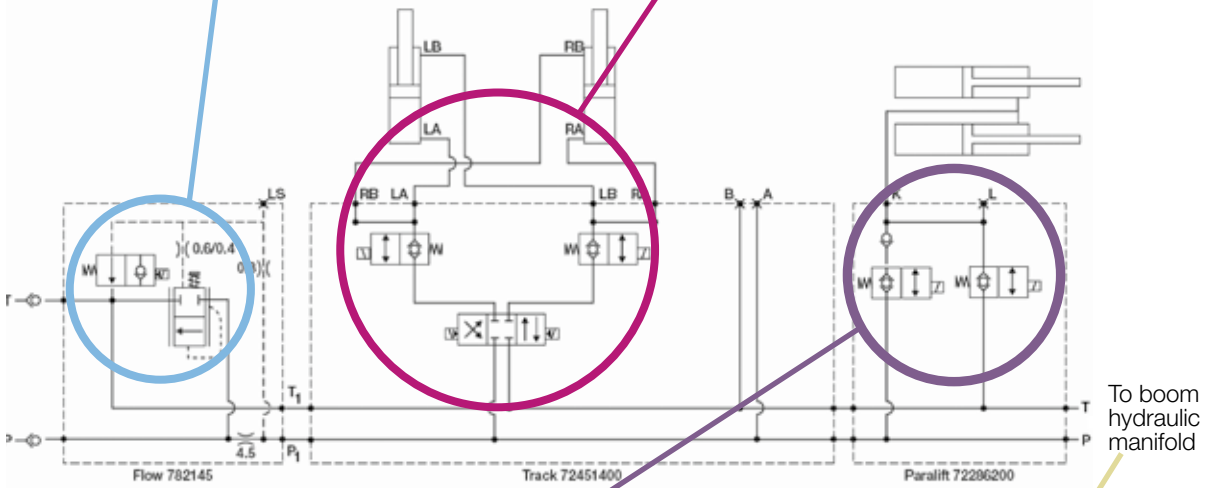
Optional bypass valve block
 The electrically activated hydraulic system optional bypass block is required if the tractor has an open centre hydraulic system or the operator chooses to run in variable flow, load sense mode. This block is fitted to the front chassis rail of the trailer. Operator connects two hoses into the one double acting outlet and operates all boom functions with the electric controls.

Optional bypass valve

Required for LS signal



Optional IntelliTrack valve
Optional IntelliTrack lock valve



Standard ParaLift valve



Boom circuit

Basic hydraulic Y version

Basic and simple

Suitable for open and closed centre hydraulics

Boom and lift control via the tractor's hydraulic levers

Steering on Y-hydraulics requires an extra double acting connection

The basic hydraulic system is for DELTA Y, PRO VHY and EAGLE-Y booms

This system requires the tractor to have one double and one single acting circuit. If a hydraulic slant control is needed, another double acting outlet is required.

This allows the boom to work with the lift function connected into a single circuit and the fold function connected into a double acting circuit.

The boom is then operated by the standard tractor levers and no hydraulic control box is required. This will operate with all types of tractor hydraulic systems. The basic Y system is not available when the HC 6500 controller is fitted.

IntelliTrack Y-version

If a NAVIGATOR is ordered with IntelliTrack Y, the sprayer has a Z hydraulic block and a Jobcom for the steering. So 2 double-acting and 1 single-acting outlets will be needed.

Requires 2 remotes (one double-acting and one single-acting remote)

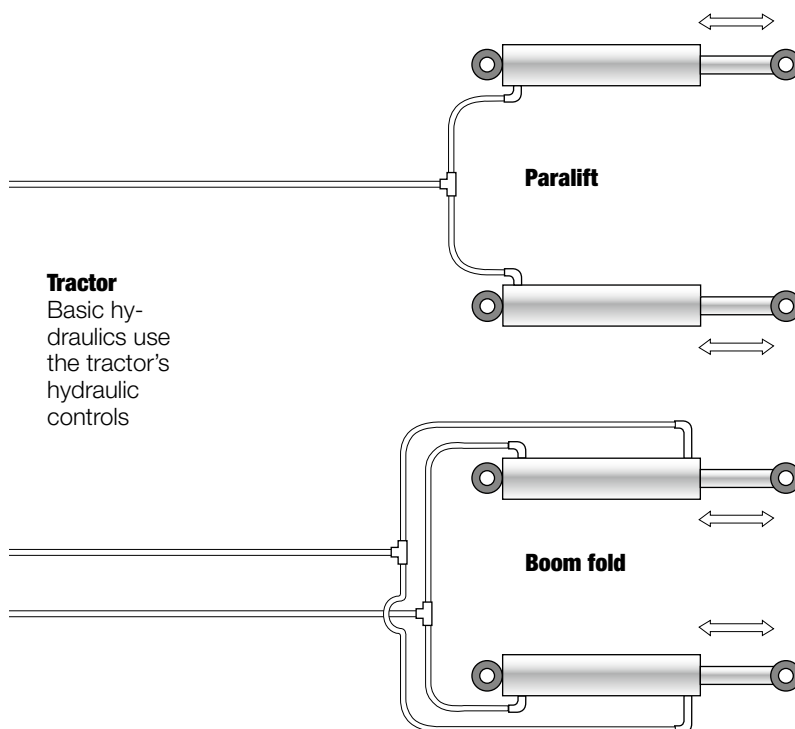
Optional hydraulic slant needs extra double-acting outlet

Optional IntelliTrack Y-version needs extra double-acting outlet

Optional ManualTrack Y-version needs extra double-acting outlet



Tractor
Basic hydraulics use the tractor's hydraulic controls

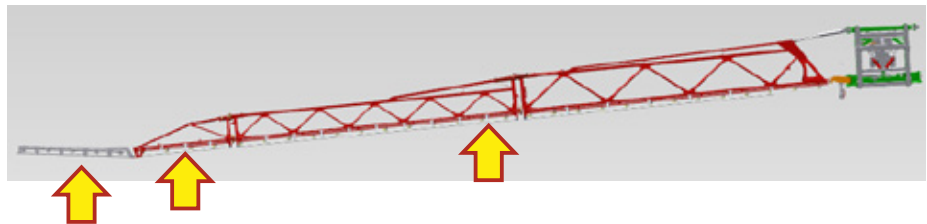
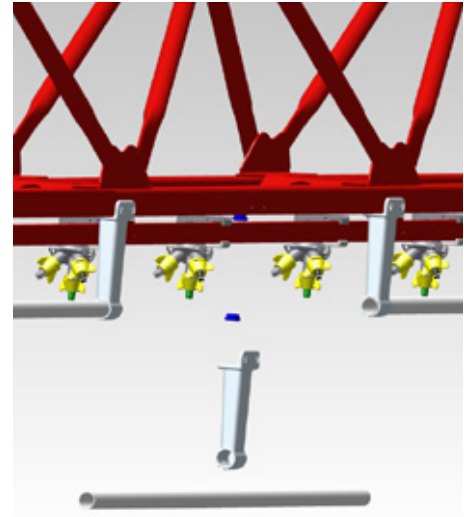


Efficient nozzle protection with minimum weight

The nozzles are protected by an aluminium tube.

An important difference compared to other similar systems is that each boom element starts and stops with a steel guard to support and protect the aluminium tube.

Nozzles at the breakaway section are fully protected in the boom structure.



Bracket for nozzle protection is a unique HARDI part. It is strong, but should it brake it will not damage the rest of the boom and it is easily replaceable. The breakaway is aluminium and have proved its reliability on other booms.

Carbon-fiber break-away

4 m long / 8 nozzle compared to 2.5 m / 5 nozzles on 36 m
 Lower weight as aluminium
 Same inner wing, 1st and second outer wing than 36 / 27 / 15 m
 Hard material - specific made for HARDI



Symmetric partial fold

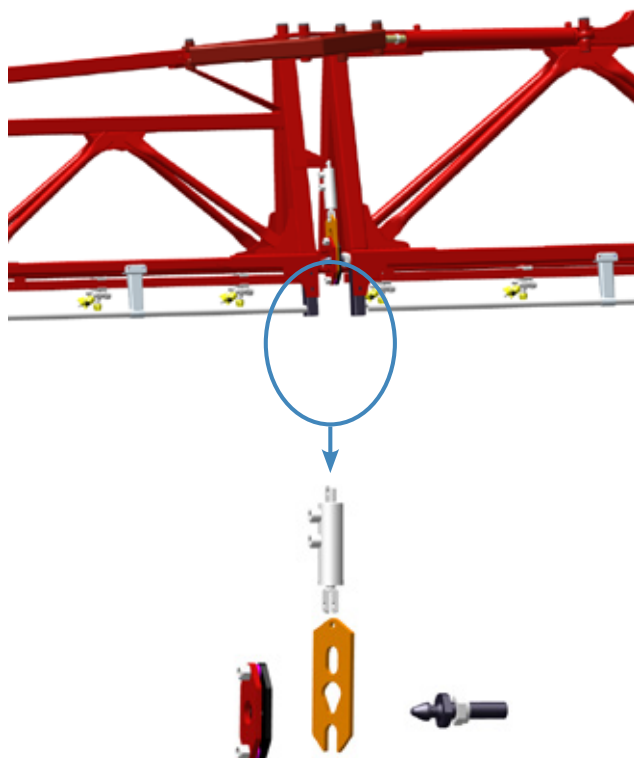
BOOMS - DELTA FORCE



Manual fold controller by the HY – operating box.

One button for each step:

Boom folding:
36/27/15 m
33/25/15 m
32/25/15 m



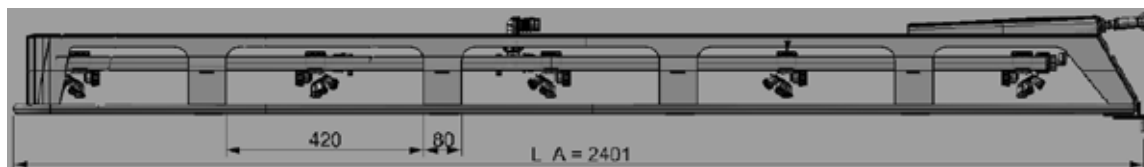
The folding lock is a “stop and lock” system.

This type will minimize the risk of play and secure a good and reliable transfer of forces from one boom element to the next.

It is easy to adjust and remove stress in the folding mechanism.

25 cm nozzle space – 27 – 36 m

On-Center solution - extra nozzle holder placed in between the 50 cm positions. Sprayer can be used with standard 50 cm nozzle space and as 25 cm. Working width reduced when working with lower boom height 36 vs 35.75 m



Changed break-away demanded

9 sections 2 fold – 27 / 28 / 30 m

13 sections 3 fold – 32 / 33 / 36 m

Only with EFC / no PrimeFlow

Stainless steel nozzle tubes

Recommended nozzles size for drift reduction setting MiniDrift or MiniDrift Duo 02 or 025

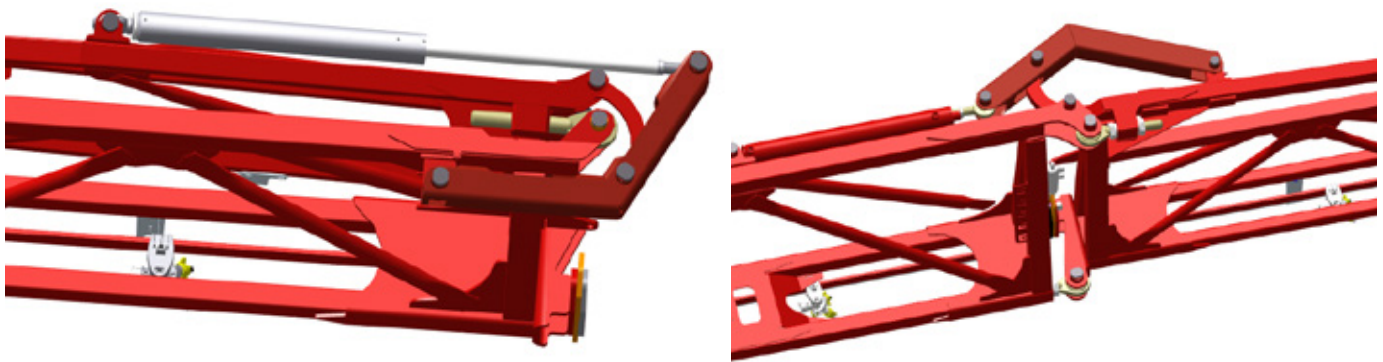
Arguments for 25 cm nozzle space?

Drift reduction due to lower boom height (30 cm height possible)

Increased coverage - smaller nozzles sizes have a smaller VMD

GradualFold - Progressive folding Soft at start and stop

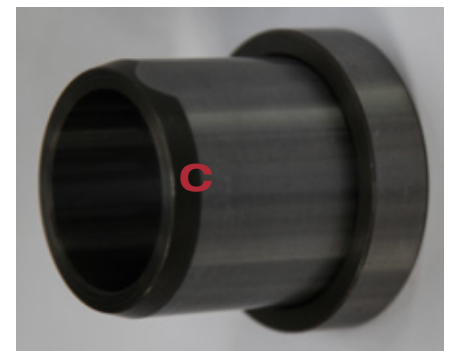
All folding are made so the folding will slow down before it reach the inner or outer end stop



On the two outer folds the geometry of the folding arms are made so that the folding speed is varied during the folding. Higher speed in the folding and slow at start and stop.

At the inner fold, the folding speed are hydraulic restricted just before the boom reaches the transport bracket.

A is a steel ring fixed inside the cylinder guide **B**. When the boom is folding in, **C** will pass trough **A** and the angled groove will make the oil passage more restricted, consequently folding speed will be redused.



Steel quality and weldings – light and strong

To optimize weight and strength DELTA FORCE is like other HARDI booms produced of quality steel.

Plates are made in DOMEX® 420 from SSAB (Swedish Steel).

Domex® 420 is characterized by high strength and excellent formability. Normal mild steel is Domex® 240. So Domex® is almost double up on strenght.

Tubes are made of Steel 52. Steel 52 is ideal for dynamically stressed constuctions. Common steel in the farmers' workshops will be steel 37.

Tubes are made of Steel 52. Common steel in the farmers' workshops will be steel 37. Plates ar made in Domex® 420. Normal mild steel is Domex® 240



The extended weldings at the end of the cross bars minimize fatigue stress.



2nd prize

- *High Tensile Steel: this high quality steel is able to resist major stress and ensures unmatched reliability even after many years.*
- *This riveting technology comes from an industrial truck company, which is a good proof of robustness and reliability.*

Boom wings and nozzle holders

EAGLE

- 2-dimensional
- SYNTAL boom tubes
- Single nozzle holders
- Spring-loaded breakaway

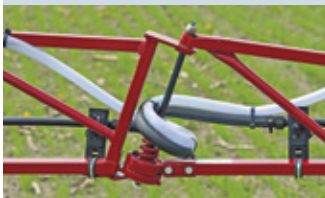
Optional

- TRIPLET nozzle holders
- BoomFlush
- Fertilizer equipment



Folding wires

The inner section is up to 1 m high. The folding cylinder is mounted near the centre section; the outer wing is pulled in and out by a strong wire. This system absorbs forward and backward movements of the outer boom wing.



Breakaway

An adjustable spring-loaded breakaway system protects the boom from damage.



Protected adjustable nozzle holders

The nozzles are well-protected by the boom structure. The nozzle holders can be adjusted up and down for different types of nozzles.

DELTA

- 3-dimensional
- SYNTAL boom tubes
- TRIPLET nozzle holders
- Spring-loaded breakaway
- Over-centre locking

Optional

- Stainless steel boom tubes
- BoomPrime
- BoomFlush
- Fertilizer equipment



Over-centre locking mechanism

The DELTA has an integrated over-centre locking mechanism, which together with the three-dimensional design provides a very rigid boom, ensuring a minimum of boom movements and very accurate application.



Breakaway

A non-directional adjustable spring-loaded breakaway system protects the boom from damage.



Protected nozzle holders

The TRIPLET nozzle holders are well-protected by the boom structure, ensuring fewer breakdowns and stops in the field.

VPZ

- 3-dimensional
- SYNTAL boom tubes
- TRIPLET nozzle holders
- Spring-loaded breakaway

Optional

- BoomFlush
- Fertilizer equipment



Integrated folding mechanism

The folding cylinders and the brackets are fully integrated in the boom design. When unfolded, the boom is totally locked, which ensures a minimum of boom movements and a very accurate application.



Breakaway

A non-directional spring-loaded breakaway system protects the boom from damage.



Protected nozzle holders

The TRIPLET nozzle holders are well-protected by the boom structure, ensuring fewer breakdowns and stops in the field.

DELTA FORCE

- 3-dimensional
- Stainless steel boom tubes
- TRIPLET nozzle holders
- Spring-loaded breakaway

Optional

- BoomFlush
- BoomPrime
- Fertilizer equipment



Over-centre locking mechanism

This combined with the three dimensional design provides a very rigid boom, ensuring a minimum of boom movements and very accurate application.



Breakaway

A multi-directional spring loaded breakaway system protects the boom from damage.



Protected nozzle holders

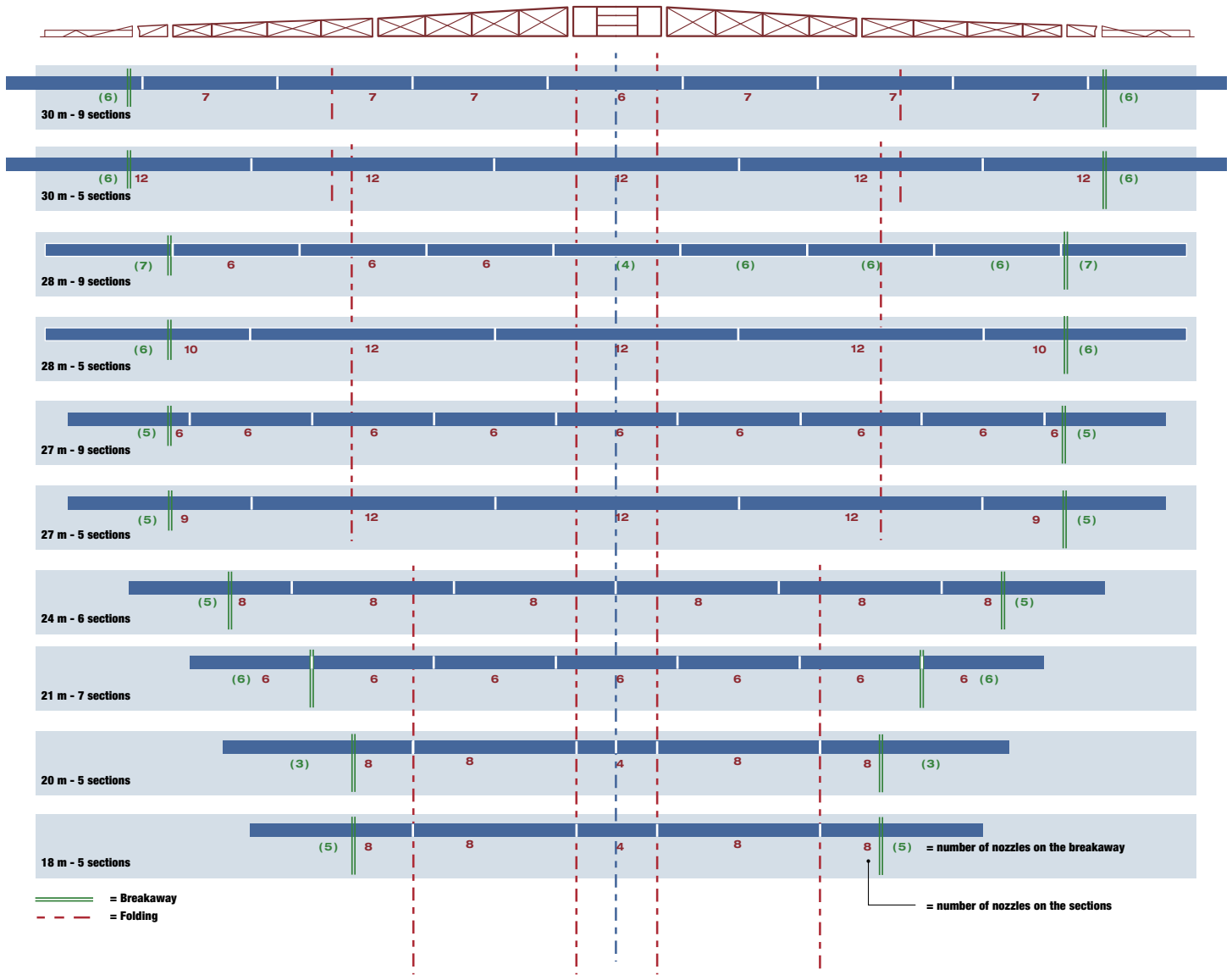
Well protected TRIPLET nozzle holders are standard.

Stainless steel boom tubing

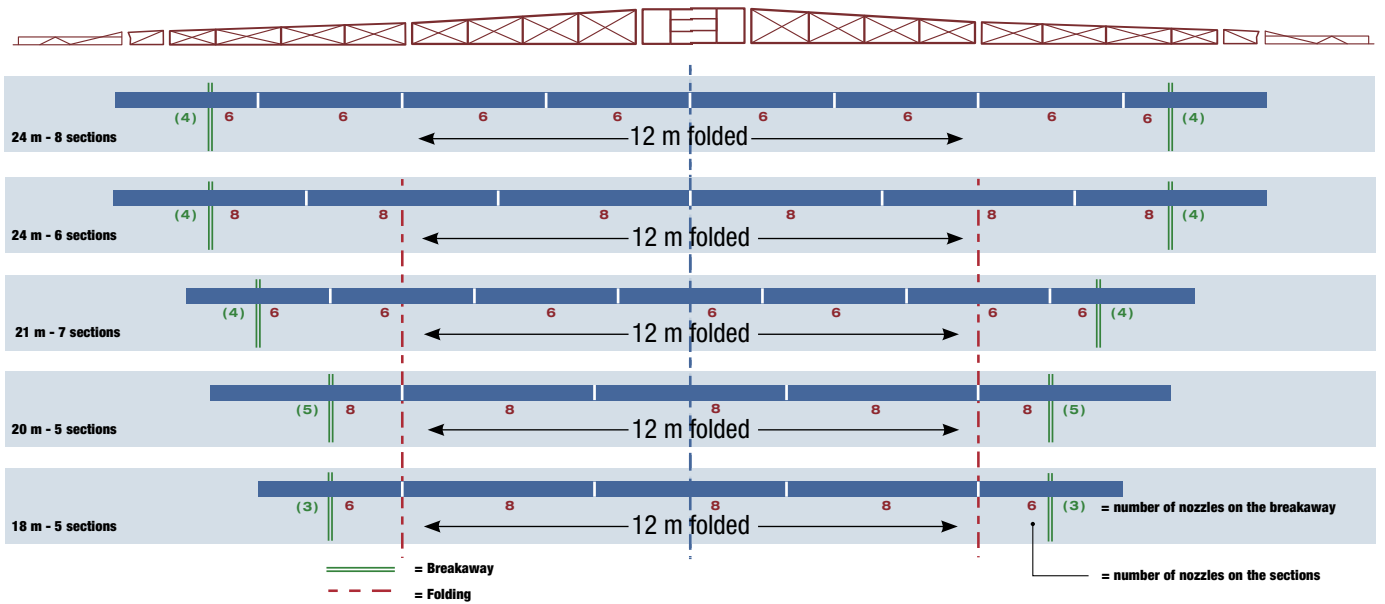
On DELTA FORCE booms, stainless steel boom tubing is standard. This ensures both durability and high flow capacity on the boom.

EAGLE boom sections

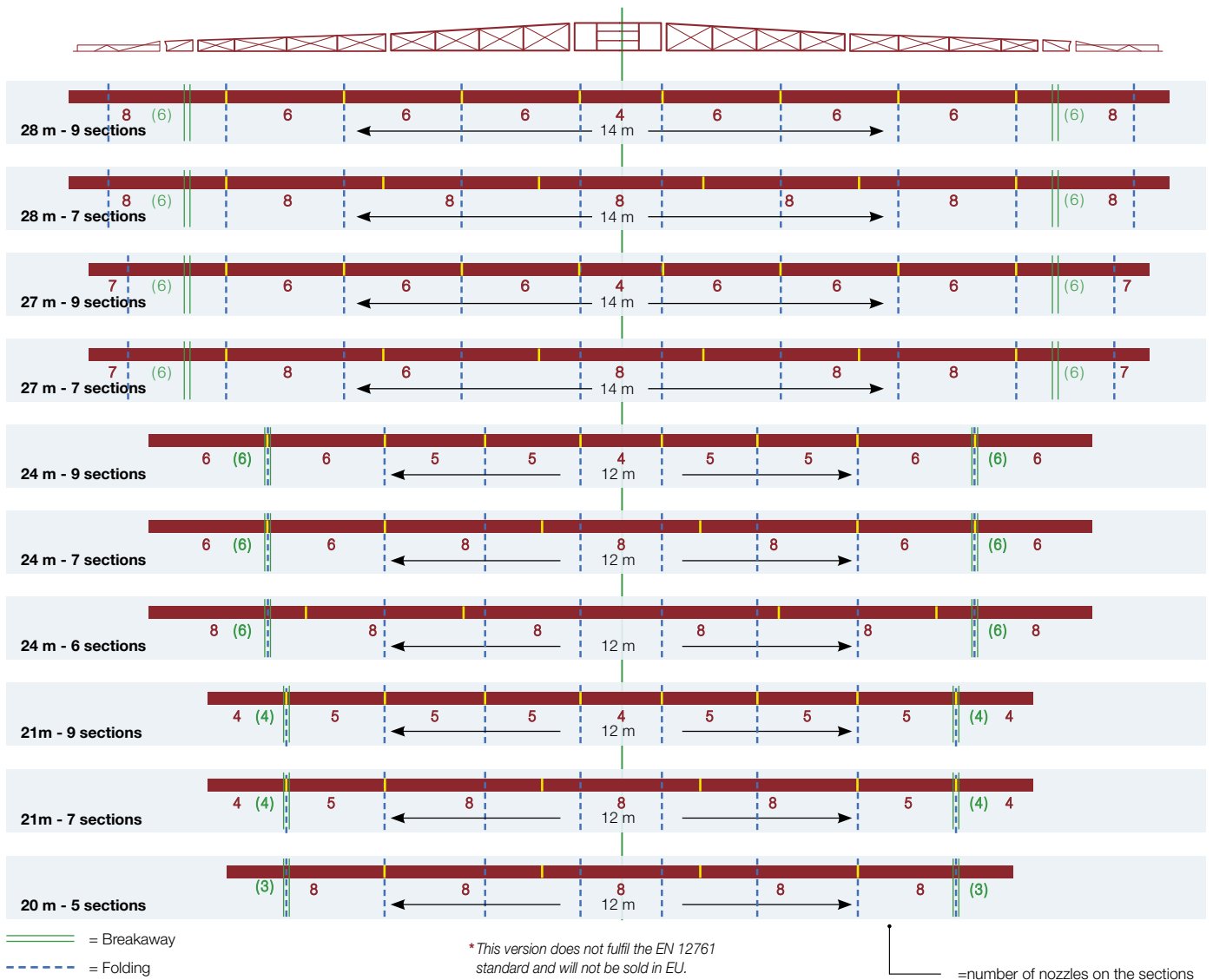
BOOMS



DELTA boom sections



VPZ boom sections



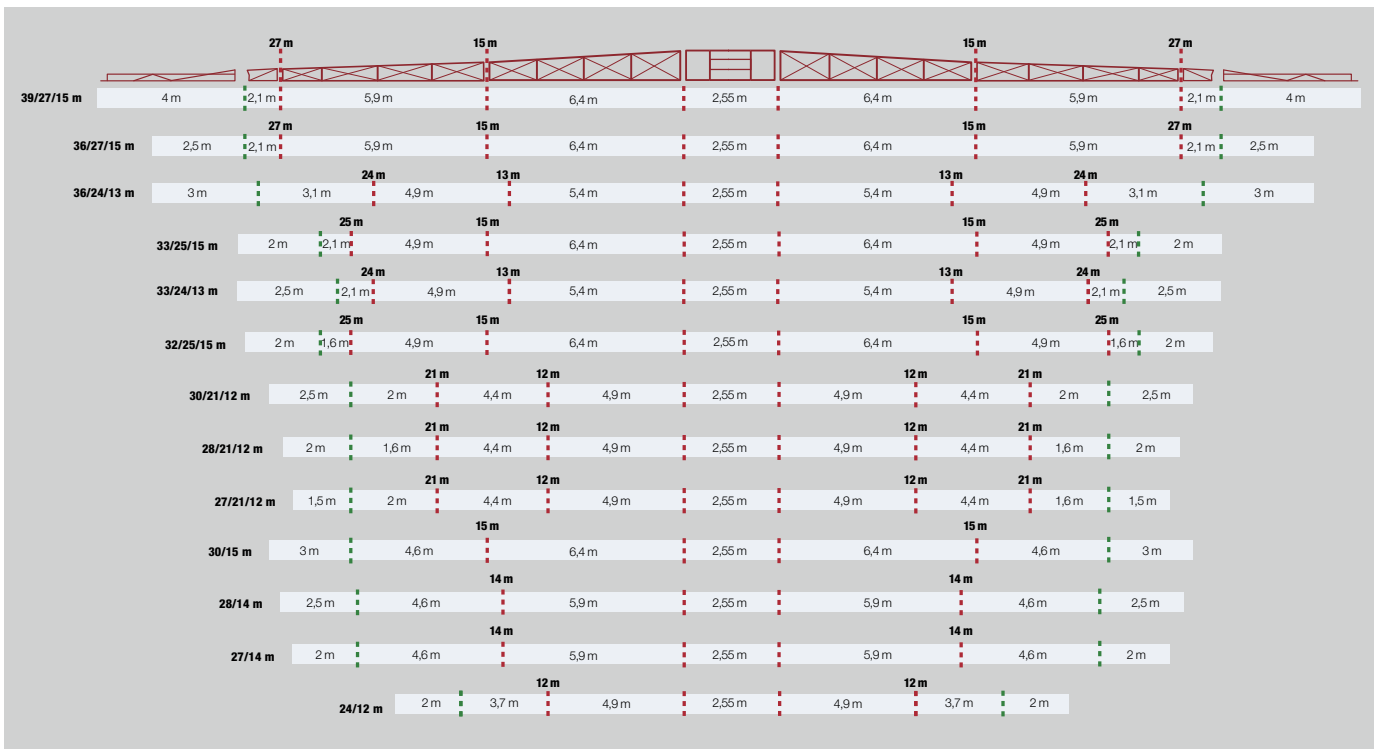
DELTA FORCE boom sections



HARDI DELTA FORCE is available in:

3-fold: 39/27/15 m, 36/27/15 m, 36/24/13 m, 33/25/15 m, 33/24/13, 32/25/15 m, 30/21/12 m, 28/21/12 m, 27/21/12 m.

2-fold: 30/15 m, 28/14 m, 27/14 m, 24/12 m



Boom management system

BOOMS



Overview table

AutoSlant	AutoHeight	AutoTerrain
Boom height	Boom height	Boom height
Hydraulic slant	Hydraulic slant	Hydraulic slant
	Individual tilt of boom wings	Individual tilt of boom wings
		Negative tilt
2 ultrasonic sensors	3 or 5 ultrasonic sensors	3 or 5 ultrasonic sensors
	2 angle sensors on the center	3 angle sensors on the center
	2 temperature controlled proportional valves	3 temperature controlled proportional valves
DELTA V, DELTA Z	DELTA Z	
EAGLE SPZ	EAGLE SPZ	
DELTA FORCE		DELTA FORCE
VPZ	VPZ	

Boom management systems

More working hours – without compromises in application quality

Boom can work in optimum height of 50 cm

Higher driving speed

Proven agricultural sensors – robust and reliable

Less operator stress – boom height is always at optimum

Proportional hydraulics for smooth operation

The HARDI AutoSlant, AutoHeight and AutoTerrain systems will automatically control the boom

This makes the job much easier for the driver, and the result will be a better spray application.

The system is known for the following features:

- ▶ Robust and precise ultrasonic sensors
- ▶ Option to choose between soil, crop or hybrid mode
- ▶ Proportional valve for smooth movements (AutoHeight, AutoTerrain)
- ▶ Slant, tilt and height correction (AutoHeight, AutoTerrain)
- ▶ Slant and height correction (AutoSlant)

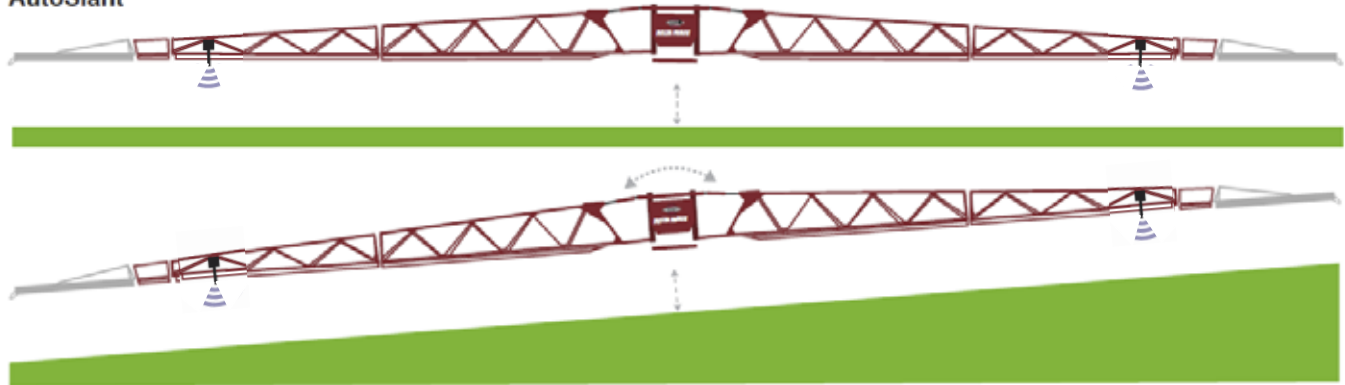
AutoTerrain works and reacts on both boom movements and twisting forces on the boom. This allows the system to be proactive and react on the cause more than on the symptom.



<p>Spray Day or Night</p>	<p>Reduce Drift</p>	<p>Fast & Reliable</p>	<p>Reduce Stress</p>	<p>Accurate Smooth Control</p>
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AutoSlant and AutoHeight

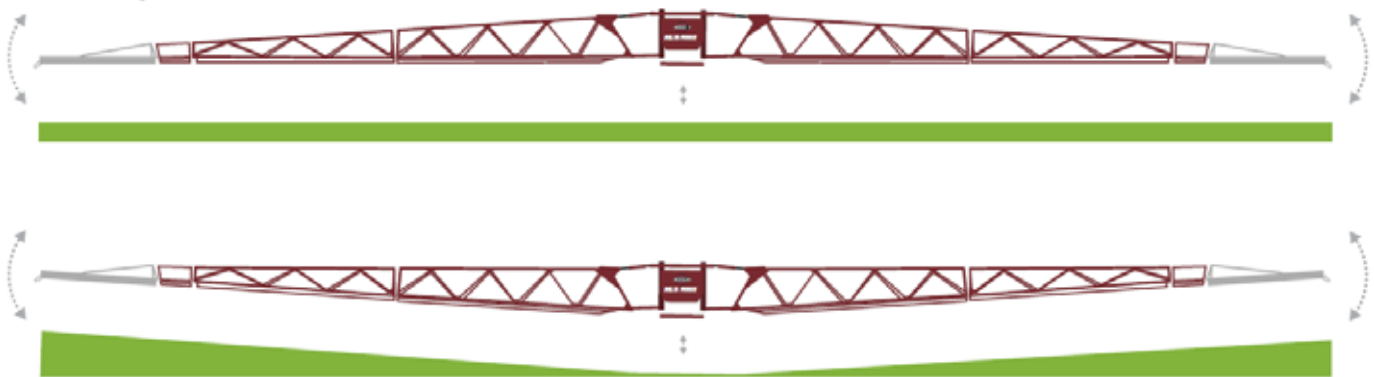
AutoSlant



AutoSlant is controlling height and slant
 2 sensors on boom wing
 Direct control on sprayer hydraulics
 Controlled by HC 8600, HC 9600, ISOBUS terminal or Pulse display (with HC6500)

DELTA V / Z booms 18 - 24 m
 VPZ 20 – 28 m

AutoHeight



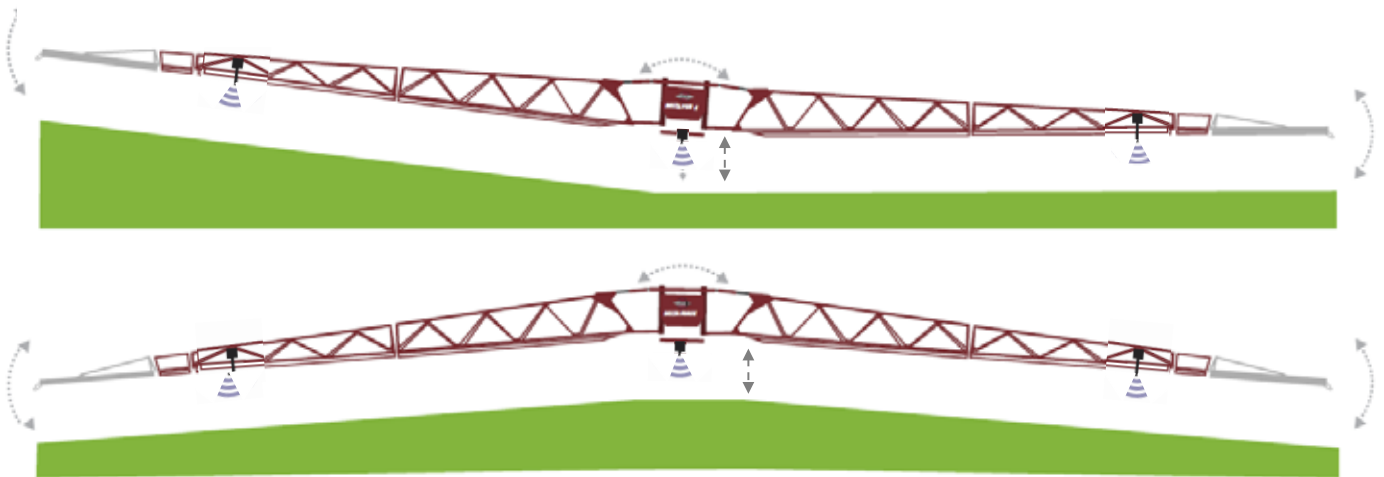
Controlling height, tilt and slant function
 3 ultrasonic sensors
 2 extra optional sensors (SevereTerrainKit)
 2 Proportional hydraulic valves
 Controlled by HC 8600, HC 9600, ISOBUS terminal or Pulse display (with HC6500)

DELTA Z booms 18 to 24 m

AutoTerrain

AutoTerrain works and reacts on both boom movements and twisting forces on the boom. This allows the system to be proactive and react on the cause more than on the symptom.

AutoTerrain



Controlling height, tilt and slant function
 3 ultrasonic sensors
 2 extra optional sensors (SevereTerrainKit)
 3 Proportional hydraulic valves
 Controlled by HC 8600, HC 9600, ISOBUS terminal or Pulse display (with HC6500)

DELTA FORCE 24 to 39 m



Negative tilt for superb boom stability

Filling devices

OPTIONS

Height filling coupling 115 cm

FastFiller

Filling capacity when lifting water approximately 3 m: 375 l/min

Filling capacity when gravity feed from external tank: 500 l/min



The NAVIGATOR can be fitted with 2 different filling devices - a PumpFiller or a FastFiller. The 6 m filling hose is available with or without filter.

The system is 100 % self-priming. The FastFiller works in combination with the TurboFiller, and simultaneous filling from the TurboFiller and the FastFiller is possible.

Filling devices

The sprayer is filled by means of the suction capacity of the pump.

Coupling is done with a heavy-duty aluminium coupling.

FastFiller

The high-capacity HARDI FastFiller is capable of filling up to 500 l/min of clean water into the main tank.

Filling capacity when gravity feed from external tank: 500 l/min, when lifting water approx. 3 m: 375 l/min

EcoFill

Micromatic coupling

As an option, an EcoFill coupling can be fitted which enables the ejector to suck chemicals directly from closed transfer containers.

This kit contains a micromatic coupling and a cleaning coupler to flush the filling hose. Hoses and dosage pumps will be delivered by chemical companies.



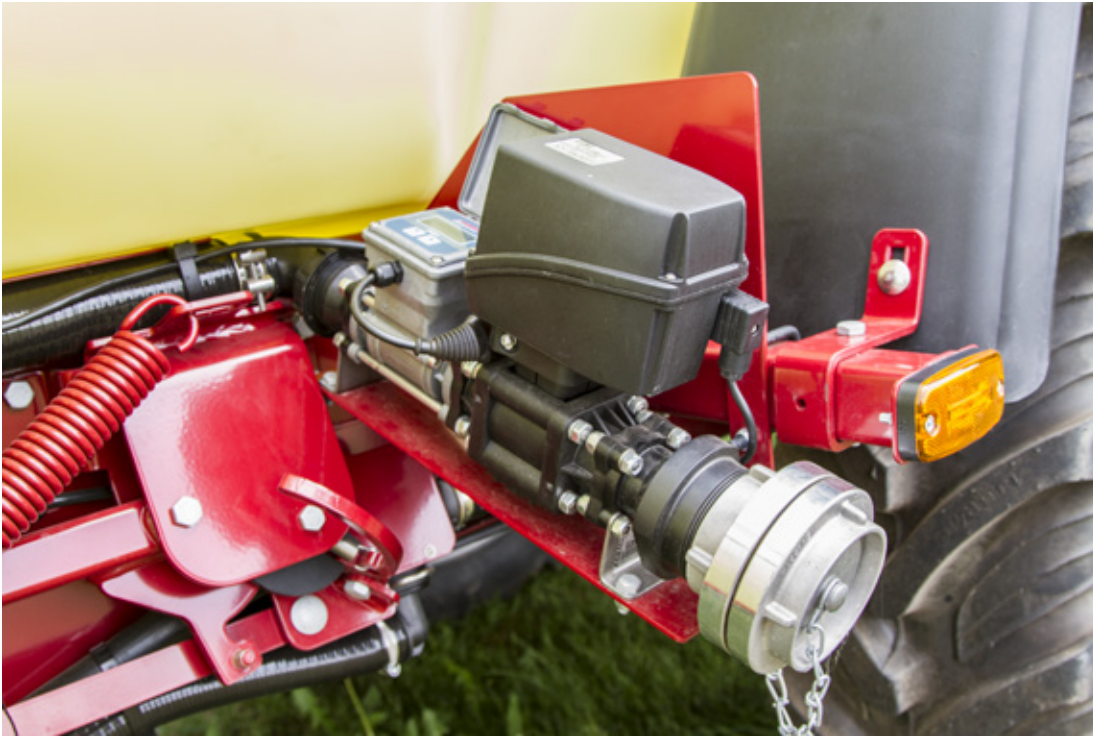
PressureEmpty

Emptying capacity: Equal to pump

With this system, liquid fertiliser or any other solution can be returned into the storage tank. Coupling is done through the same coupling as with the FastFiller, allowing you to use the same hose for filling as well as for emptying.



FillStop



Add

Add

Hydraulic transmission for fluid pump



Requires one double acting hydraulic outlet with a stable flow of minimum 40 l/min.

To achieve the correct performance of the remaining hydraulic functions on the sprayer, a minimum of additional 30 l/min must be available.

As an alternative for transmission shaft, a hydraulic pump transmission can be offered. It requires double acting hydraulic outlet from

the tractor. See price list if hydraulic pump transmission is available for all fluid pumps.

ChemLocker



Width 550 mm
Depth 530 mm
Height 250 mm

Load capacity:
100 kg

OPTIONS

A HARDI ChemLocker is a sprayer-mounted storage locker for chemical containers or bags.

It cannot be used when a foam marker is mounted.

SafetyLocker



Width 340 mm
Depth 150 mm
Height 290 mm

A SafetyLocker can be assembled under the left side front cover for storage of gloves and mask close to the working zone.

BoomPrime

No untreated areas at spray start

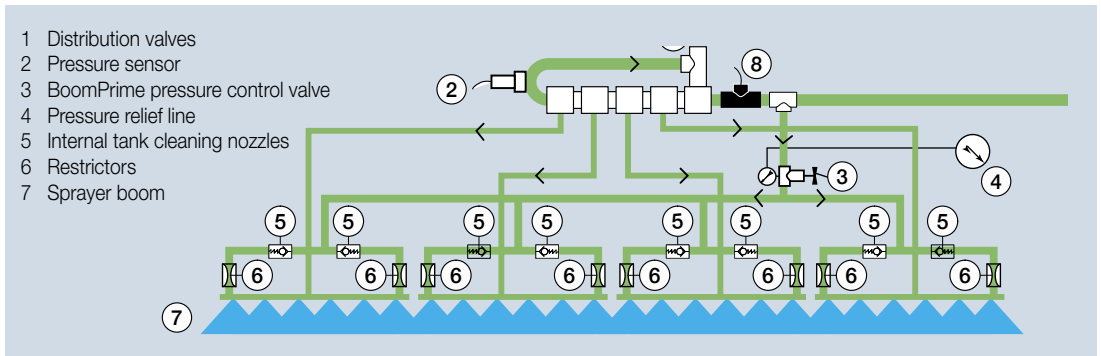
No pesticide sedimentation in the spray lines

Positive pressure-based system to ease trouble-shooting

The optional BoomPrime is a low pressure circulation system for DELTA booms. The spray liquid can circulate to the nozzles before the actual spraying starts. It prevents sedimentation and permits flushing of the boom lines without spraying onto the ground.

There will still be liquid running through the boom tubes when the distribution valves are closed. A pressure valve in front of the boom sections ensures that the pressure in the sections will be not higher than 0.7 bar, so the non-drip valves will not open.

This is a much simpler and less vulnerable system compared to a vacuum-based system. Leaks in a vacuum system are difficult to locate and even the slightest leak will cause problems.



BoomFlush

Boom can be flushed completely

No pesticide sedimentation in the dead ends



The optional BoomFlush gives the user the possibility to flush the complete boom lines in the field. If the sprayer is not cleaned so often, there could be residues at the end of the boom tubes!

With the BoomFlush valves the user can flush these dead ends also.

At every end of a distribution valve a manual valve will be mounted.

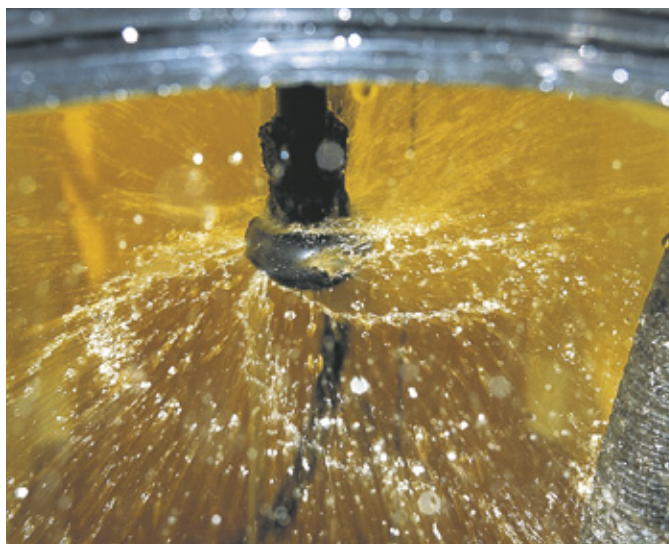
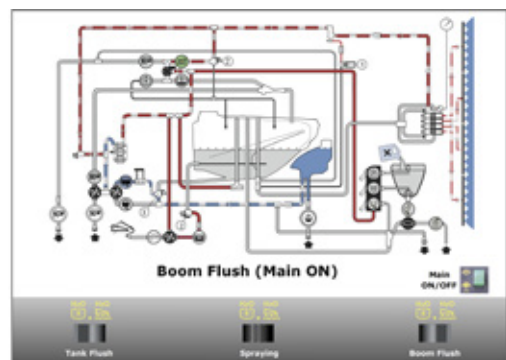
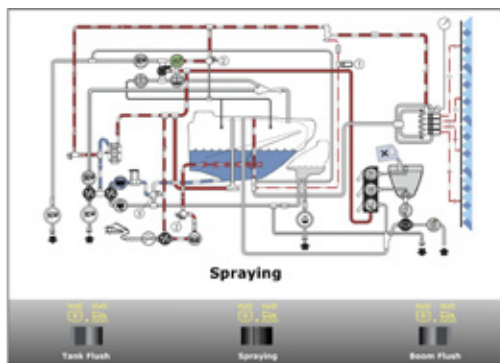
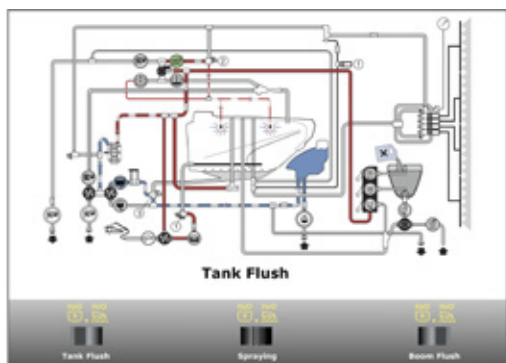
DilutionKit

The NAVIGATOR can be equipped with a DilutionKit, allowing the operator to flush the liquid system from the driver's seat. The operator can flush only the boom or rinse the tank with the flush nozzles. The need of rinse

water is reduced due to the optimized liquid system. All return lines and agitation will be flushed when spraying out the diluted liquid from the main tank.

Rinsing from the driver seat
Low residue concentration

OPTIONS



AutoSelect

Automatic and safe change of nozzles from the drivers seat to quickly overcome more field- and weather conditions



AutoSelect - For full flexibility

HARDI is introducing a air controlled nozzle concept at Agromek 2016, allowing the driver to switch between 2 nozzles or to use both at the same time.

You can for example use one drift reducing nozzle in headland or at sensitive buffer zones and a "normal" FlatFan or LowDrift nozzle in rest of the field.

The driver is also able to react on weather conditions and change nozzles on the go if wind conditions has changed since start of the spray job.

You have the possibility to change between 4 functions:

1. Spray with nozzle A
2. Spray with nozzle B
3. Spray with both nozzle A and B
4. Auto mode – here AutoSelect can work with pre-defined pressure settings or working speeds.

Excellent at speed changes

If you need to run with big changes in speed, AutoSelect can automaticly, and instantly change between two sizes of nozzles, so one nozzles work can be taken over by a larger nozzle, at higher speeds. This will result in a higher droplet quality and a better application.

Change of dose during the spray job

If you need to change dose in the field, this can be done by changing to a more suited nozzle on the go - without compromising the spray quality.

You have the possibility to use 9 to 13 sections and maximum 8 nozzles per section.

AutoSelect works with air pressure, if you have a pneumatic brake system on your tractor your air source is already provided. If not, an air compressor is available as an option.



External cleaning kit

Use of clean water at 15 bar:
25 l/min

Use of clean water at 5 bar:
15 l/min

Length of 3/8" hose:
20 m

Max pressure
15 bar



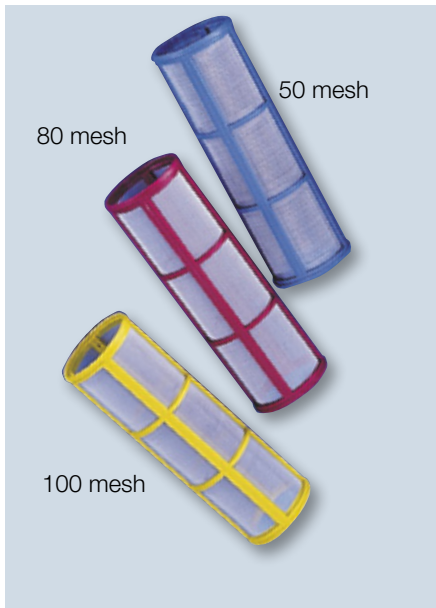
OPTIONS

A cleaning kit can be fitted for safe external cleaning of the complete sprayer in the field.

Several European markets are faced with demands of in-field cleaning of the sprayer. The HARDI system offers a pressure of up to 15 bar, ensuring quick and efficient outside cleaning.



In-Line filter



Flow capacity:
52 l/min

Inlet diameter
3/4"

Outlet diameter
3/4"

Screen size:
50 mesh std.
80 mesh
100 mesh

To avoid blocking of nozzle filters when working with low volume rates or to eliminate the need for nozzle filters, the NAVIGATOR can be equipped with the easy-to-service In-Line filters. The In-Line filters are placed on the boom.

Nozzle holder and boom tubes

The EAGLE boom can be equipped with TRIPLET nozzle holders to enable nozzle changes by simply rotating the assembly. Ensuring fast and simple changes between nozzle rates and/or patterns. TRIPLET are standard on DELTA and PRO booms.

The DELTA boom can be equipped with QUADRILET nozzle holders.

Stainless steel boom tubes

The DELTA boom can be equipped with stainless steel boom tubes.



TRIPLET



QUADRILET

Calibration kit

To ensure accurate application rates, a calibration kit is standard on a sprayer. The calibration kit includes:

- Measuring jug
- Nozzle wheel
- Cleaning brush

Minimum requirement for new sprayers in EU – ISO 16119-2:

- Appropriate calibration aids (at least a measuring jar with a capacity of 1 l and an accuracy of +/- 2,5 %
- and with a scale marked every 20 ml) shall be supplied together with the sprayer.



Night spraying lights

OPTIONS

1 working zone light
From 2-6 lamps LED lamps
Positioned under and behind the nozzles

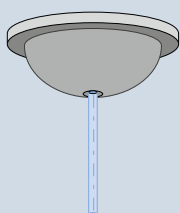


LED lamps are placed behind the spray-douche and gives a good overview of blocked nozzles. The lamps are in a design which makes it possible to place them in the boom

structure protected for damage if the boom hits the ground. The light is activated from the cabin.

Dribble hoses for liquid fertilizer

Hose length 70 cm
Standard dose plate
Solid stream nozzle 1553-14



For liquid fertilizer application the NAVIGATOR booms can be equipped with dribble hoses for liquid fertilizer. Special brackets will be mounted on the boom so that 1 distributor with 2 hoses can be assembled on each nozzle.

The dribble hoses have 25 cm spacing and are placed in 12.5 cm off-set from the nozzle holders, thus ensuring an optimum distribution of the fertilizer.

Nozzles

HARDI spray nozzle selection guide

The HARDI ISO nozzle series is the most complete nozzle series on the market. This full range ensures that nozzles of all relevant sizes are available for all spray jobs.



HARDI ISO – Standard-Flat Fan nozzle (F)
The essential, multi-purpose Flat Fan nozzle. Ensures maximum coverage and superior uniform distribution in most situations. These nozzles can be recommended for all pesticide applications.



HARDI ISO MINIDRIFT – Air Inclusion nozzle (MD)
HARDI MINIDRIFT makes it possible to change from Medium to Coarse/Very Coarse just by turning the TRIPLET - pressure and volume rate will stay the same - and the spray job can be finished even at higher wind speeds.



HARDI ISO – LowDrift-Flat Fan nozzle (LD)
LowDrift nozzles are recommended when optimal spraying conditions cannot be achieved yet spraying cannot be postponed. These nozzles have less Very Fine (driftable) droplets.



HARDI MiniDrift DUO
The HARDI MINIDRIFT DUO nozzle can be used for spraying at sub-optimal weather conditions, when spraying cannot be postponed. The MINIDRIFT DUO nozzle will at low pressures reduce drift to a minimum. This compact flat spray air injector nozzle offers droplet spectrum from medium to very coarse; safe for drift control but without risking poor coverage and deposition on leaves. The two angled fans spraying 30° forward and backward, and impacts on target deposit compared to normal air injector nozzles.



HARDI QUINTASTREAM 5-hole nozzle (Q)
For applying liquid fertilizer. This new (patent pending) HARDI designed nozzle series can uniquely ensure a uniform distribution at boom heights from 35 - 100 cm. The easy way to turn your sprayer into a high precision fertilizer applicator.



HARDI INJET – Air Inclusion nozzle (INJET)
The mix of air and water gives these nozzles a very coarse droplet spectrum, which will remarkably decrease the risk of drift. Recommended for very wind tolerant applications of soil applied and systemic pesticides.

ISO number/colour	Standard Flat Fan	LowDrift	MINIDRIFT	INJET	I/min	I/ha at km/h							
						6	7	8	10	12	15	20	25
0075-Pink	F	–	–	–	0.30	60	51	45	36	30	24	18	14
01-Orange	F	M	–	VC	0.40	80	69	60	48	40	32	24	19
015-Green	F	M	C	VC	0.60	120	103	90	72	60	48	36	29
02-Yellow	F	M	C	VC	0.80	160	137	120	96	80	64	48	38
025-Lilac	M	M	C	VC	1.00	200	171	150	120	100	80	60	48
03-Blue	M	C	C	VC	1.20	240	206	180	144	120	96	72	58
04-Red	M	C	VC	VC	1.60	320	274	240	192	160	128	96	77
05-Brown	M	C	VC	VC	2.00	400	343	300	240	200	160	120	96
06-Grey	C	–	–	VC	2.40	480	411	360	288	240	192	144	115
08-White	C	–	–	VC	3.20	640	549	480	384	320	256	192	154
10-Light blue	C	–	–	–	4.00	800	686	600	480	400	320	240	192
15-Light green	–	–	–	–	6.00	1200	1029	900	720	600	480	360	288

Spray quality: F = Fine, M = Medium, C = Coarse, VC = Very coarse, S = Solid stream

All values are at 3 bars pressure

Pressure range: For F, LD, MD and Q is 1.5 to 5 bar (1.5 to 3 bar recommended) and for INJET 3 to 8 bar (4 to 7 bar recommended).

Surface treatment

SURFACE TREATMENT

Material:

UV protected

13 steps of cleaning, degreasing and preparation

Hardening at 200 C° for one hour

Will last at least 1000 hours in salt fog test, without any corrosion

Paint colour:

Red RAL 3011

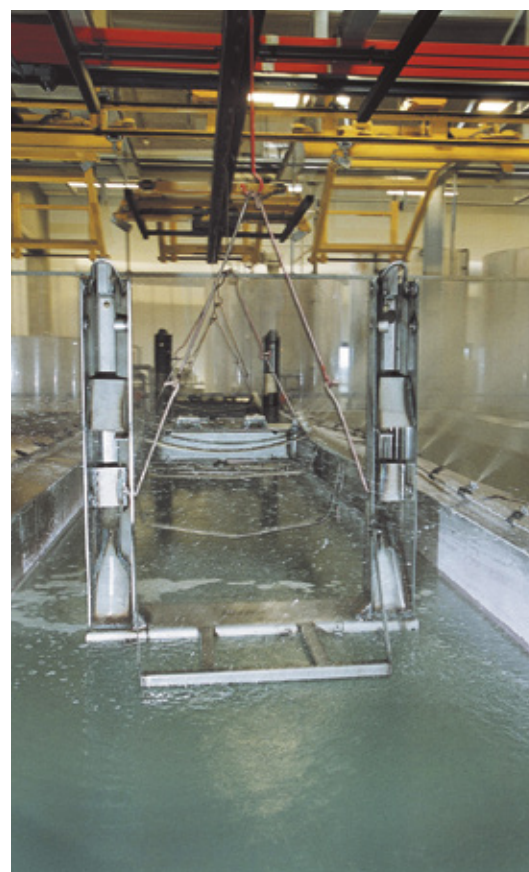


The chassis, the boom and all other steel parts have been pre-treated with Oxsilan followed by a high-quality coating of powder paint.

The high-technology surface treatment contains 13 treatments, including an Oxsilan pre-treatment and powder coat painting of all major components.

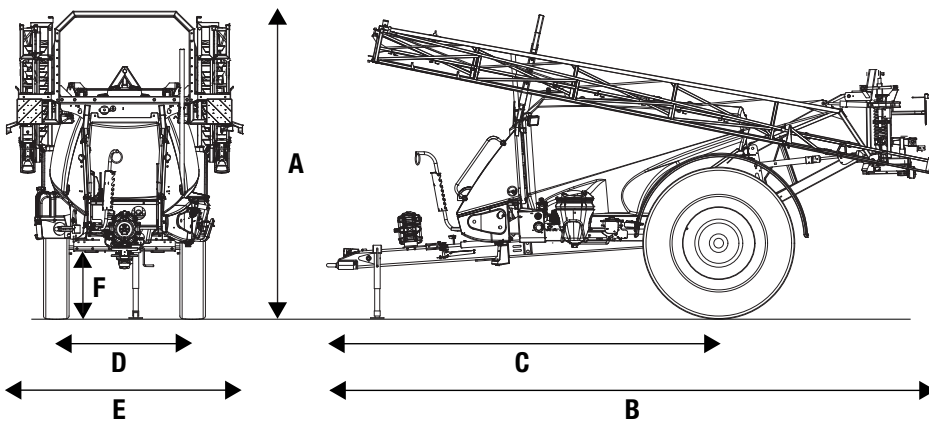
This treatment provides outstanding protection against corrosion from both chemicals and harsh weather conditions.

Together with the Delta/Magni treatment of nuts, bolts and other items, we supply high corrosion protection of our products.



Technical specifications

Tank, litres	3000	4000	5000	6000
Pumps, type – l/min	364-194 / 464-280 / 464H-334			
Booms, m	VPZ 20-28 DELTA 18-24 m EAGLE 18-30 m	VPZ 20-28 DELTA 18-24 m DELTA FORCE 24/27/28/33/36 m EAGLE 18-30 m	DELTA 24 m DELTA FORCE 24-39 m EAGLE 24-30 m	DELTA 24 m DELTA FORCE 24-39 m EAGLE 24-30 m
RinseTank	500	500	500	500
Total height, m (A)	3.80 (13.6x48)	3.80 (13.6x48)	3.80 (20.8x42)	3.80 (20.8x42)
Total length, m (B)	7.2	7.2	8.00	8.00
Length draw to axel, m (C)	4.80	5.30	6.05	6.05
Turning radius IntelliTrack, m	6.00	6.0	8.5	8.5
Track width, m (D)	1.50-2.25	1.50-2.25	1.80-2.25	1.80-2.25
Width DELTA boom, m (E)	2.55	2.55	2.55	-
Width DELTA FORCE, m (E)	-	2.55	2.55	2.55
Width EAGLE, m (E)	3.00	3.00	3.00	3.00
Width VPZ, m (E)	2.30	2.30		
Clearance, m (F)	0.8 (340/85R48)	0.8 (340/85R48)	0.81 (520/85R42)	0.81 (520/85R42)
Weight total (empty tank), kg	3300-3600	3400-4700	4950-5850	5000-5900
Suspension	Optional	Optional	Optional	Optional



VPZ 20-28

Booms from 20 to 28 m with integrated AntiYaw damper on the boom wings. The lattice boom structure ensures a strong and rigid boom; the bases for exact and uniform spray distribution. The nozzles, spray lines and hoses are all well protected within the boom design.

DELTA 18-24 m

The DELTA boom offers excellent performance and dependability. The rugged three-dimensional structure guarantees good durability. The design makes it compact in transport and storage.

EAGLE 18-30 m

The EAGLE boom offers unequalled performance in rough conditions. The strong and well-proven two-dimensional EAGLE boom is the ideal choice for operators looking for durability and value.

DELTA FORCE 24-39 m

DELTA FORCE is designed to be a large boom. The selection of features and the layout of the boom structure is targeted to perform at high driving speed and high performance at boom widths of 24-39 m.

Weight

Weight in kg

NAVIGATOR 3000

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tires
PRO boom							
12 m	2620	220	2840	5320	1020	6340	13.6xR48
15 m	2683	201	2884	5383	1001	6384	
16 m	2710	190	2900	5410	990	6400	
18 m	2810	170	2980	5510	970	6480	
EAGLE boom							
18 m	3165	140	3305	5797	1008	6805	13.6xR48
20 m	3177	143	3320	5807	1013	6820	
21 m	3195	145	3340	5820	1020	6840	
24 m	3120	280	3400	5810	1090	6900	
27 m	3152	283	3435	5863	1092	6935	
28 m	3162	288	3450	5872	1098	6950	
30 m	3210	300	3510	5900	1110	7010	
DELTA boom							
18m	2924	414	3338	5532	1306	6838	13.6xR48
20m	2942	423	3365	5549	1316	6865	
21m	2948	428	3376	5554	1322	6876	
24m	2970	440	3410	5574	1336	6910	
27m	2998	452	3450	5602	1348	6950	
28m	3001	454	3455	5605	1350	6955	

NAVIGATOR 4000

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tires
PRO boom							
12 m	2635	230	2865	6240	1125	7365	13.6xR48
15 m	2698	211	2909	6303	1106	7409	
16 m	2725	200	2925	6330	1095	7425	
18 m	2825	180	3005	6430	1075	7505	
EAGLE boom							
18 m	3180	150	3330	6669	1151	7830	13.6xR48
20 m	3192	153	3345	6680	1155	7845	
21 m	3210	155	3365	6695	1160	7865	
24 m	3135	290	3425	6725	1170	7925	
27 m	3167	293	3460	6785	1195	7960	
28 m	3177	298	3475	6795	1200	7975	
30 m	3225	310	3535	6825	1210	8035	
DELTA boom							
18m	2943	420	3363	6453	1410	7863	13.6xR48
20m	2961	429	3390	6471	1419	7890	
21m	2967	434	3401	6477	1424	7901	
24m	2989	446	3435	6499	1436	7935	
27m	3017	458	3475	6527	1448	7975	
28m	3020	460	3480	6530	1450	7980	

The data is measured with booms in transport position, main tank filled to net volume, RinseTank full and TurboFiller. The weight can be differing up to +/- 200 kg depending on sprayer specifications.

Weight in kg

NAVIGATOR 5000

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tires
EAGLE boom							
24 m	4131	408	4539	8359	1687	10046	
27 m	4141	418	4559	8369	1707	10076	
28 m	4146	423	4569	8364	1717	10081	
30 m	4236	467	4703	8454	1761	10215	20.8 x 42
DELTA boom							
24 m	3463	562	4025	7621	1880	9501	
27 m	3491	574	4065	7649	1892	9541	
28 m	3494	576	4070	7652	1894	9546	20.8 x 42
FORCE boom							
24 m	4148	570	4718	8264	1904	10168	520/85x46
27 m	4330	600	4930	8348	1934	10282	
28 m	4402	630	5032	8408	1964	10372	
30 m	4474	660	5134	8468	1994	10462	
32 m	4574	692	5266	8528	2026	10554	
33 m	4604	702	5306	8618	2032	10650	
36 m	4634	712	5346	8708	2054	10762	

NAVIGATOR 6000

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tires
EAGLE boom							
24 m	4145	401	4546	9029	2037	11066	
27 m	4155	421	4576	9039	2057	11096	
28 m	4160	431	4591	9044	2067	11111	
30 m	4250	475	4725	9134	2111	11245	20.8 x 42
DELTA boom							
24 m	3477	562	4039	8291	2230	10521	
27 m	3505	574	4079	8319	2242	10561	
28 m	3508	576	4084	8322	2244	10566	
FORCE boom							
24 m	4168	580	4748	8934	2244	11178	
27 m	4350	610	4960	9038	2274	11312	
28 m	4422	640	5062	9098	2304	11402	
30 m	4494	670	5164	9158	2334	11492	
32 m	4594	702	5296	9208	2364	11572	
33 m	4624	712	5336	9298	2374	11672	
36 m	4654	722	5376	9388	2394	11782	520/85x46

HARDI Service

Service

HARDI machinery is serviced by a grid of specially educated service technicians. HARDI is aware of the importance of supplying knowledge to the buyers along with the sprayers. This increases the value of the sprayer for the end-user. To emphasize HARDI's investment in spreading know-how about the technical and applicational aspects of the sprayers, HARDI founded the "HARDI Academy" in 2004. HARDI Academy offers a wide range of courses, from 1st level technician to high specialist level. The strategy followed is still heavy investments in educating our customers and their customers.

Extensive user manuals

With the HARDI sprayer follows an extensive user manual, instructing the user in all relevant matters regarding his new machine. The manual covers service issues and user instructions for the entire machine, including the electronic and computing devices. Also included is service manuals for technical service.

Spare parts

Availability of spare parts is a crucial issue to secure the reliability of the HARDI sprayer. Some parts are wearing parts, which need to be replaced as a consequence of using the sprayer. Other parts are suddenly needed due to collisions and other acute mishaps.

The spare parts stock carried by any HARDI distributor is backed up by central spare parts stocks, carrying all fast and most slow moving parts. This chain of supply secures a smooth and reliable service of HARDI machines worldwide. HARDI spare parts are available all over the world, and most areas are covered within 24 hours. Find the complete HARDI spare parts catalogue on: www.hardi-international.com.

Original HARDI spare parts are, of course, manufactured under the same strict tolerances and quality demands as the complete machines. This goes for wearing parts, that are mostly easily replaced, as well as the complex hydraulic and mechanical parts.

HARDI SERVICE

