FOAM MARKER
High Capacity Version
Operator's Manual

Part No. 67301903 9/03

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Dear Owner,

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

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

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

Some of the features on your HARDI® Foam Marker were suggested by growers. There is no substitute for "on farm" experience and we invite your comments and suggestions.

Please address your correspondence to the Service Manager at one of these branches:

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

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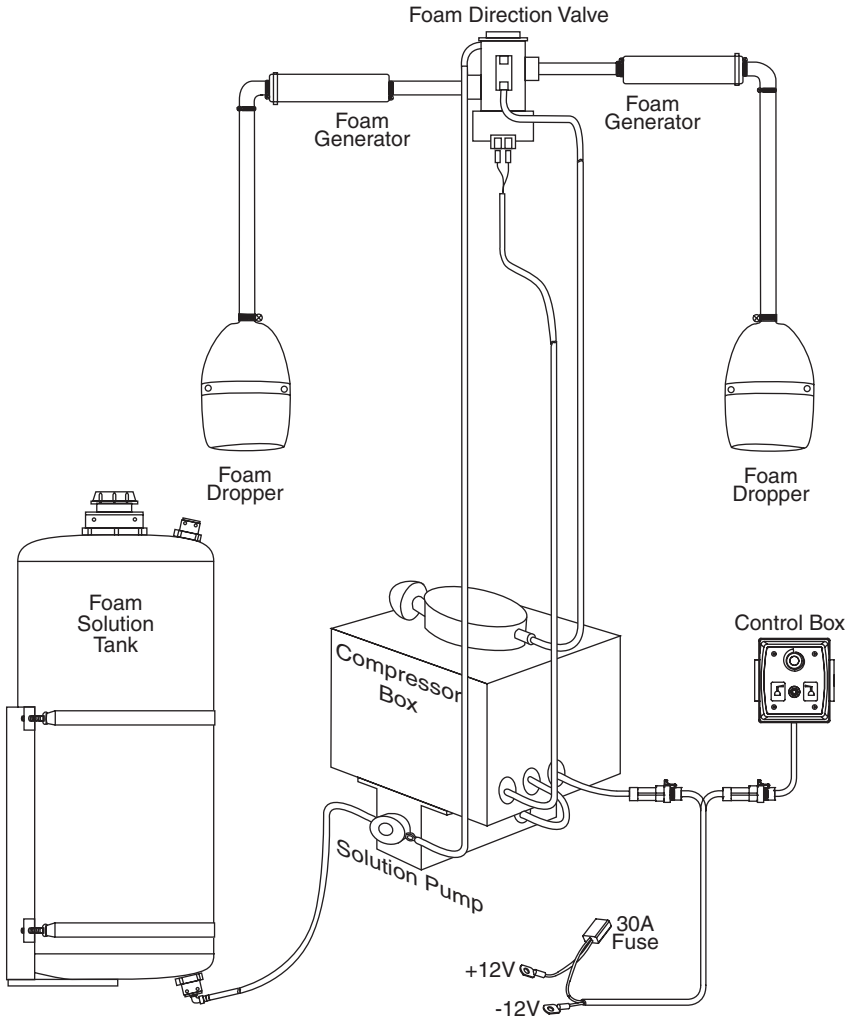
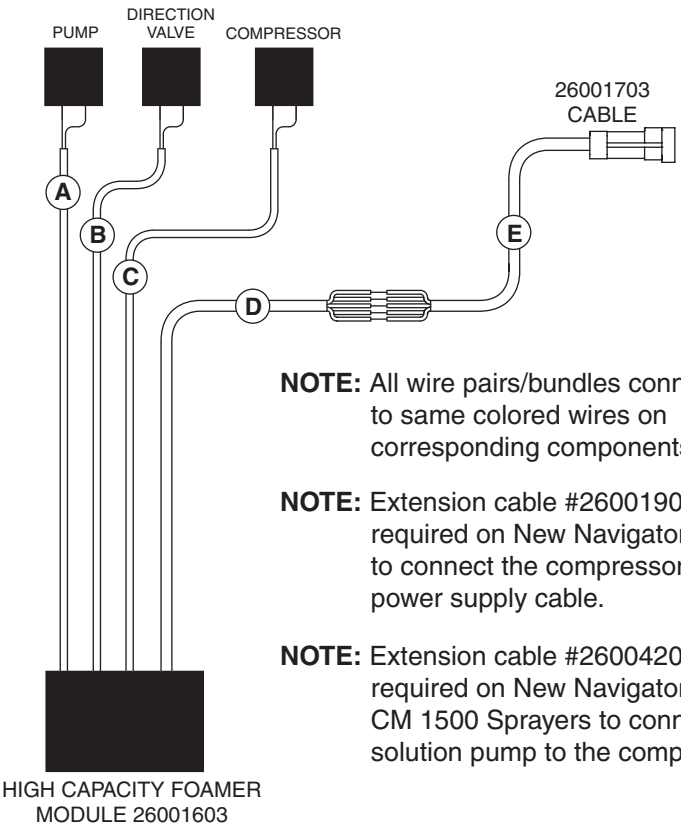
HARDI® GREAT LAKES
290 Sovereign Road
London, Ontario N6M 1B3
Phone: (519) 659-2771
Fax: (519) 659-2821

Sincerely,

Tom L. Kinzenbaw
President



Foam Marker Schematic
Fig. 1



NOTE: All wire pairs/bundles connect to same colored wires on corresponding components.

NOTE: Extension cable #26001903 is required on New Navigator Sprayers to connect the compressor box to the power supply cable.

NOTE: Extension cable #26004203 is required on New Navigator and CM 1500 Sprayers to connect the solution pump to the compressor.

A. Green & Yellow Pair (To Pump)
B. Brown & Blue Pair (To Direction Valve)
C. Red & Black Pair (To Compressor)
D. Orange, Blue, Gray, Black & Red Wire Bundle (To 26001703 Cable)
E. 26001703 Cable

Foam Marker Wiring Schematic
Fig. 2

1.0 INTRODUCTION

The use of a foam marking system in certain conditions is beneficial in the reduction of spraying operation costs. Missed or skipped areas as well as overlapping will result in either lost production or over application of product resulting in poor weed control, yield loss and/or crop damages.

The High Capacity version of the HARDI® Foam Marker is available in a 20 gallon solution tank capacity (20 or 40 gallon on New Navigator sprayers, 40 gallon on Commander 1500). It also consists of a Solution pump, a Compressor Box, an In-cab Control Box, a Solution line and an Air line: The solution and air line are plumbed to the Foam Direction Valve with a Foam Generator and Dropper at both ends of the spray boom.

The Solution pump supplies fluid and the Compressor supplies air to the Foam Direction Valve on the boom center section where the fluid and air mix.

The Control Box has one switch and one adjustable knob. The adjustable knob is for controlling the frequency of the foam drops. The switch is for on/off and alternating foam drops between left and right hand sides of the sprayer.

The High Capacity version of the HARDI® Foam Marker is designed to be added to current production trailer sprayers that can accommodate the 20 gallon solution tank (40 gallon on New Navigator and Commander 1500). It can also be added to the Delta 3-PT sprayer. The installation instructions are covered in this Foam Marker manual. Some variation from this material may be necessary if installing on older model HARDI® sprayers.

To optimize the performance of your HARDI® Foam Marker, it is suggested to use HARDI® Foam concentrate at dilutions ranging from 110:1 to 55:1. This can be purchased in 1.0 U.S. gal. containers (#10501703) or boxes of 6 x 1.0 U.S. gallons (#10501903).

2.0 SAFETY

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

PTO driven machinery can cause serious injury. Before working on or near the PTO shaft, or servicing or cleaning the driven machine, put the PTO lever in the DISENGAGE position and STOP the engine.

WARNING: MAKE SURE TO DISCONNECT THE FOAM MARKER FROM THE TRACTOR POWER SUPPLY BEFORE WELDING ON THE SPRAYER.

DO NOT USE A HIGH PRESSURE CLEANER DIRECTLY ON THE SOLUTION PUMP OR COMPRESSOR BOX

WARNING: DURING OPERATION OF THE FOAM MARKER, THE COMPRESSOR GENERATES HEAT WHEN COMPRESSING AIR.

DO NOT TOUCH THE COMPRESSOR HEAD OR THE SURROUNDING BOX DURING, OR RIGHT AFTER IT HAS BEEN RUNNING

3.0 INITIAL SETUP

3.1 Control Box Installation

1. Select the desired location for the Control Box.

2. Route wire harness from compressor box up to the double lead of the power supply cable and plug into the male plug (**Fig. 3**). On New Navigator sprayers, a 15' extension harness (HARDI® #26001903) is needed to reach the compressor box.

3. Route wire harness from Control Box down to the double lead of the power supply cable and plug into female plug (**Fig. 3**).

NOTE: Make sure that the wire harness will not interfere with any operations of the tractor or sprayer.

4. Route power cable to power supply. (Section 3.2)

FOAM MARKER SCHEMATIC

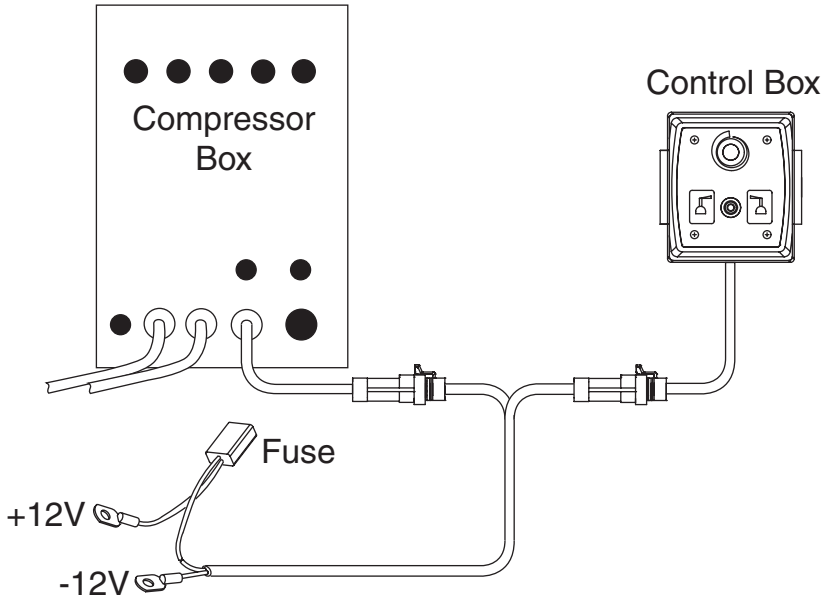


Fig. 3

3.2 Power Supply connection

For optimum performance of your HARDI® Foam Marker (High Capacity version), it must be connected directly to a fully charged 12V power source (tractor battery) that is capable of delivering at least 25 amps continuous, 40 amps peak.

Connect to the 12 volt power source as follows:

ORANGE WIRE - POSITIVE BATTERY TERMINAL
BLACK WIRE - NEGATIVE BATTERY TERMINAL

CAUTION: Reversed polarity will blow fuse and may cause damage to the internal circuitry.

NOTE: The performance of the HARDI® Foam Marker is greatly determined by the electrical power that it receives. Attention must be given to assure that the power supply connection is clean of dirt or corrosion and that the terminal connections are tight and secure for optimum Foam marker operation.

If the power supply cable needs to be lengthened, the cable size should not be any less than #10awg ($4mm^2$).

There is one 30 amp ATC fuse protecting the circuits of the HARDI® Foam Marker. It is located at the beginning of the power cable (**Fig. 3**).

4.0 OPERATION OF THE HARDI® FOAM MARKER

1. Mix foam marker concentrate in the foam tank following the mixing instructions (Section 5).

2. The In-Cab control box is used as follows: (**Fig. 4**)

Switch "A" is used to alter the frequency of foam drops. Regulation is done using an adjustable knob. Turning the knob clockwise will increase the frequency and turning the knob counterclockwise will decrease the frequency.

Switch "B" has three positions. In the center position the foam marker is switched off. Activate switch to the left or right corresponding to which side foam marking is required.

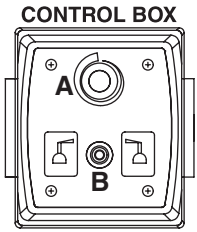


Fig. 4

3. Check the performance of the foam marker.

5.0 MIXING OF FOAM CONCENTRATE

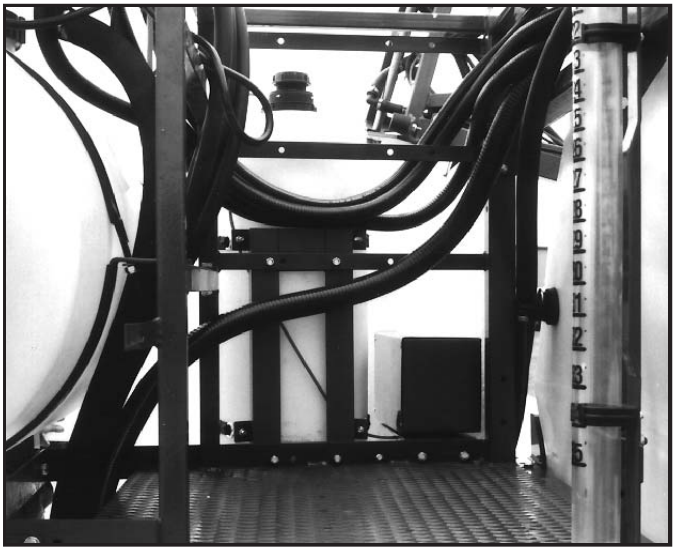
Note: Foam concentrate needs to be stored in a frost free place and shaken well before using. If frozen, raise to room temperature, thaw completely and thoroughly mix prior to use.

1. Remove fill cap on Foam Marker tank.
2. Fill tank 1/2 full of fresh clean water.
3. Add recommended rate of foam concentrate. We recommend using HARDI® foam concentrate at a 80:1 ratio (approx. 16 oz. to 10 gallons) (29 ml. to 38 liters of water). Amounts may need to be varied depending on hardness of water and weather conditions. Refer to the HARDI® foam concentrate label for further instructions.
4. Continue filling Foam Marker tank with water.

6.0 MOUNTING THE TANK BRACKET

6.1 HC 650M, 950, 950M, and Twin 650, 950

1. Locate and drill (2) 11/32” holes for tank mounting bracket by using the measurements shown in (**Fig. 5**).
2. Position tank mounting bracket with bottom edge flush with the lower edge of platform. Clamp into position and mark hole location for top bolts using previously drilled holes in bracket as a template. Drill (2) 11/32” holes.
3. Install and tighten all bolts.



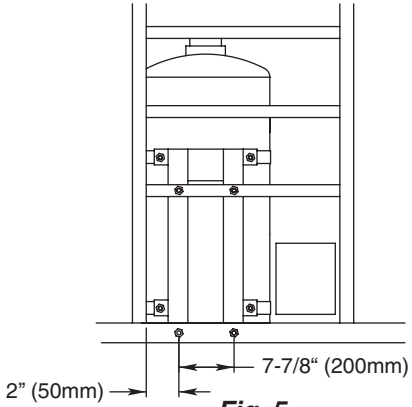
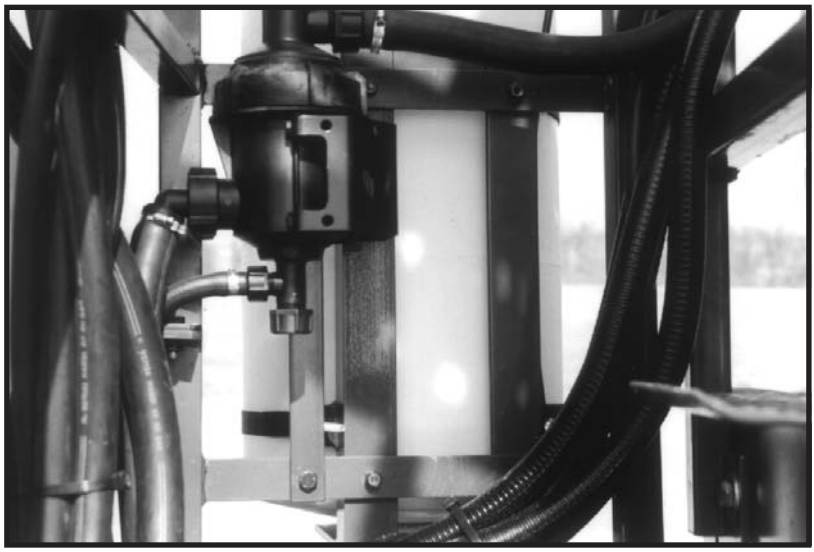


Fig. 5

6.2 Navigator 550, 800, 1000, 550M, 800M, 1000M

1. Locate 4 mounting holes on side rail (**Fig. 6**).
2. Position tank mounting bracket so that the mounting holes line up with holes in side rail.
3. Install and tighten all bolts.



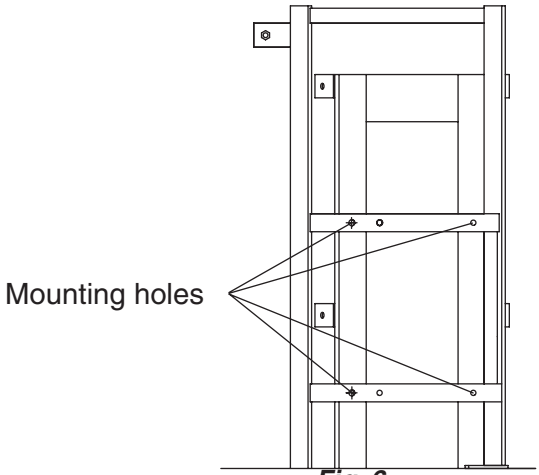


Fig. 6

6.3 Commander 750, 875, 1200 & Twin Force

1. Use the measurements drawn in (**Fig. 7**) to locate and drill (2) 11/32“ holes in the tank mounting bracket (**pos A**).
2. Position tank mounting bracket on the outside of the platform according to (**Fig. 8**). Clamp into position and mark hole location for the remaining bolts using previously drilled holes in bracket as a template. Drill (2) 11/32“ holes (**pos B**).
3. Install and tighten all bolts.

Note: Twin Force only! If the Hydraulic Flow Valve (mounted underneath the platform) needs to be moved, a bracket (#161379) is required.

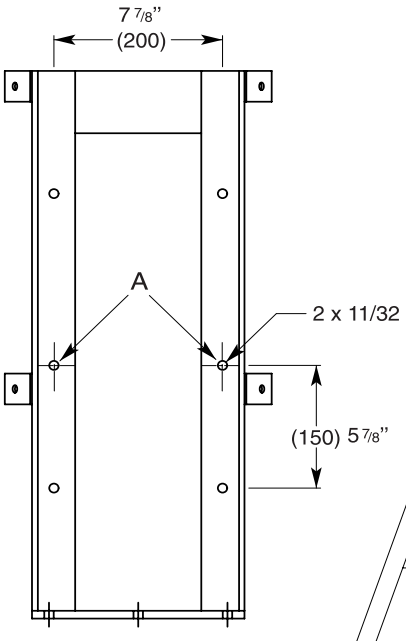


Fig. 7
20 gallon Tank Mounting Bracket

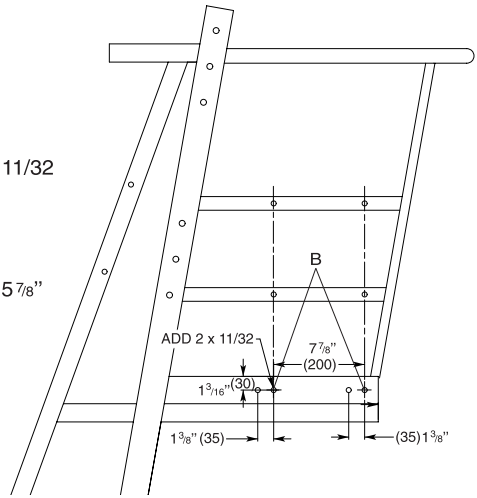


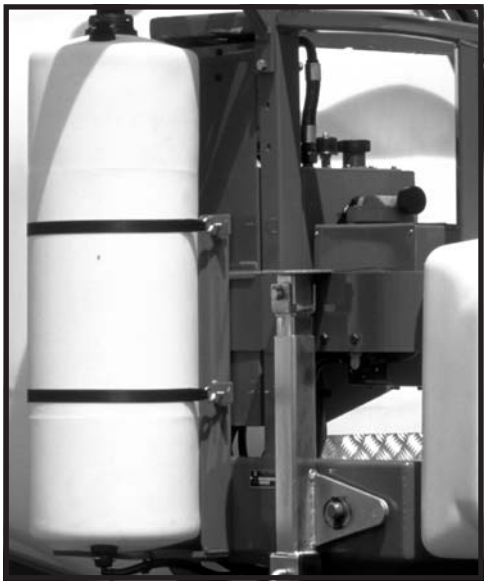
Fig. 8
20 gallon Tank Mount Bracket Installation

6.4 Commander plus 750, 1200 & Twin Force

1. Line up the left edge of the tank mounting bracket with the left edge of the platform and drill three 7/16" dia. holes as shown in (**Fig. 9**).

2. Drill middle hole first and then use the tank mounting bracket as a template for the remaining two holes.

3. Install and tighten all bolts.



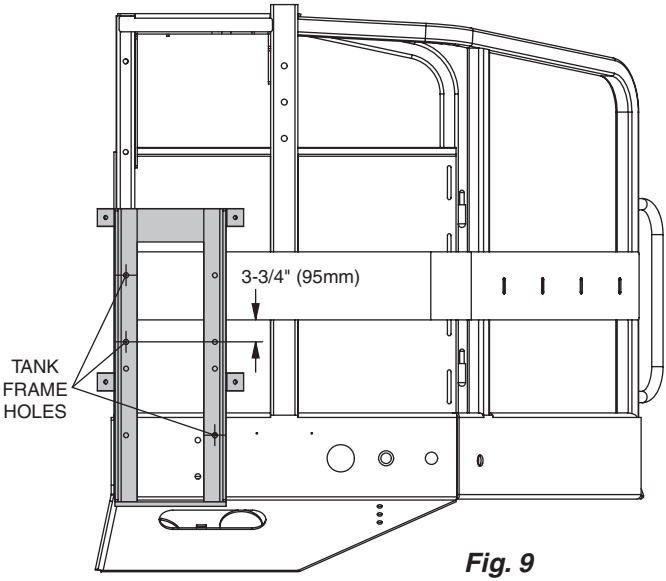


Fig. 9

6.5 Delta 3-PT

1. There are two brackets that mount to the Delta 3-PT frame for the foam marker system.
2. Mount the bottom bracket to the Delta frame using two M16x110mm bolts and locknuts (**A**) as shown in (**Fig. 10**).
3. Mount the tank bracket to the bottom bracket using three M10x35mm bolts and locknuts (**B**) as shown in (**Fig. 10**).

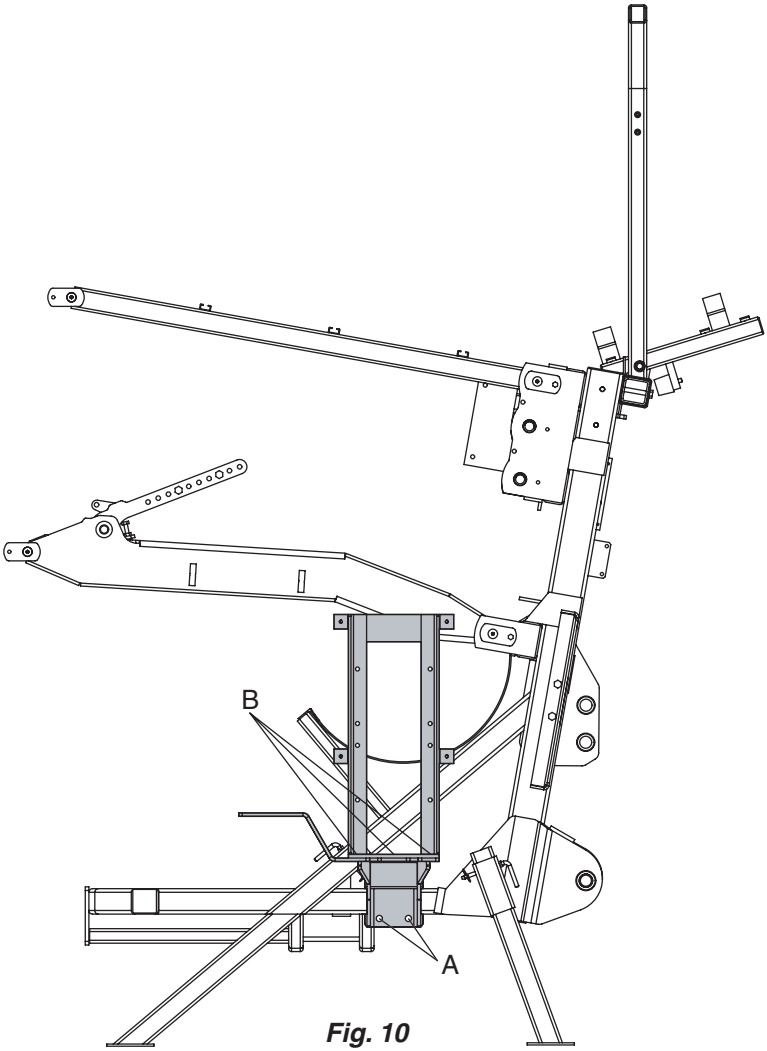


Fig. 10

6.6 New Navigator 575, 1100

1. The Foam Marker Tank on the New Navigator sprayers is mounted directly to the frame with tank straps. See Section 7.2 for detailed instructions.

6.7 Commander 1500

1. Install the tank bracket to the underside of the drawbar as shown in (**Fig. 11**) using four M10x30 bolts and locknuts.

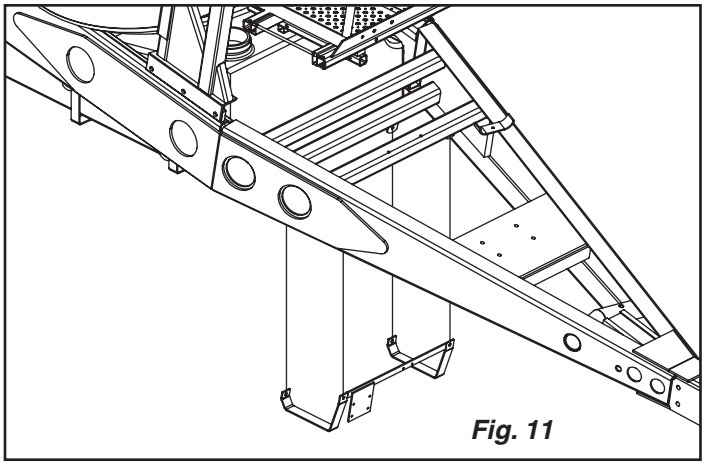


Fig. 11

7.0 MOUNTING THE TANK

7.1 All Tanks except New Navigator & Commander 1500

1. Place the solution tank in bracket with bulkheads oriented as shown in (**Fig. 12**).
2. Strap tank into bracket using black nylon straps and nuts supplied and tighten nuts at this time.
3. Clean the area where the HARDI® logo is to be placed and attach it to the tank in the location shown (**Fig. 12**).

Note: Make sure no air bubbles are present under decal.

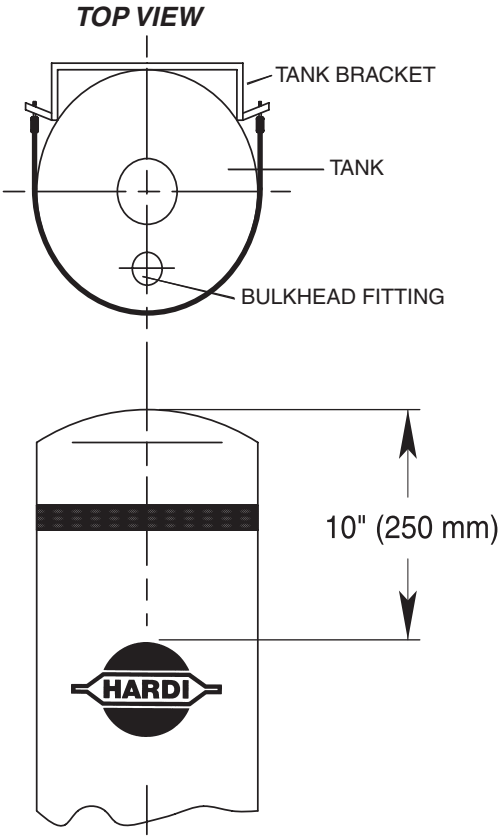


Fig. 12

7.2 New Navigator

1. Install the Filler Neck onto the Foam Marker Tank as shown in (**Fig. 13**) using the O-Ring, bolts and washers supplied in the kit.
2. Install the stainless steel vent tube **(Fig. 13**) to the inside of the filler neck. Secure to filler neck with self-tapping screw (approx. 3/4" from filler neck opening).
3. Wait to install the 1/2" hose barb and clear sight gauge hose to the Filler Neck until after the tank is secured to the frame.
4. Locate the slots for the tank straps underneath the frame (**Fig. 14**). Slide the "folded" end of the metal tank straps through the slots and secure with the bolts, washers and nuts supplied in the kit. (**Fig. 13**).

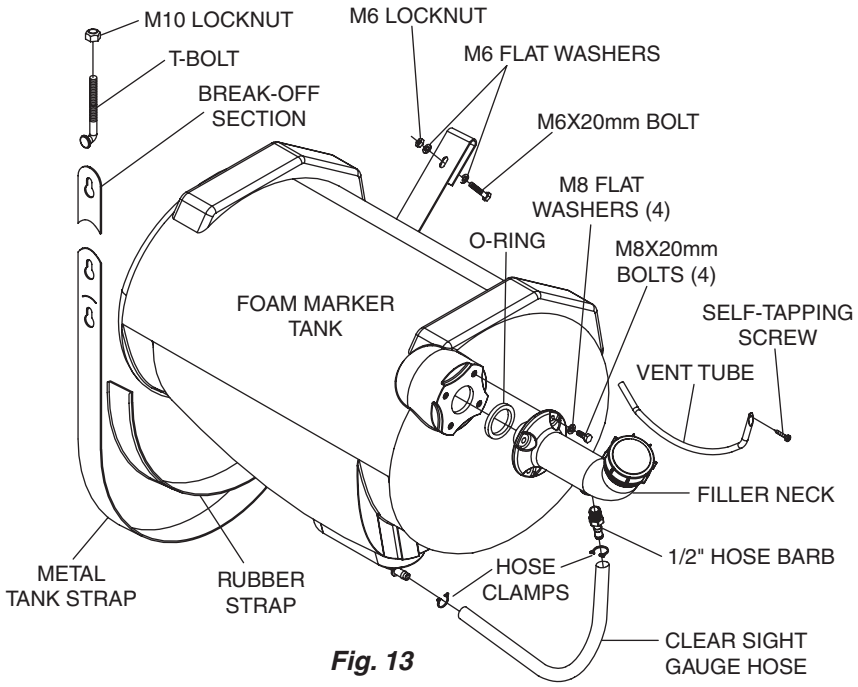


Fig. 13

7.2 New Navigator (continued)

5. Lift the Foam Marker Tank into position with the Filler Neck sticking out the left side of the frame as shown in (**Fig. 14**). Attach the free end of each tank strap to the frame using the "T-Bolts" and locknuts supplied in the kit (**Fig. 13**). Insert rubber straps between the tank and metal tank straps before tightening.

Note: The metal tank straps have "Break-Off" sections to allow for different lengths. Break off any sections not needed by bending back and forth. Grind the sharp edges smooth and apply paint to the bare metal before securing with "T-Bolts".

6. Install the 1/2" hose barb into the bottom of the Filler Neck using a thread sealant to prevent leakage (**Fig. 13**).

7. Install the clear sight gauge hose as shown in (**Fig. 13**) using the hose clamps supplied in the kit.

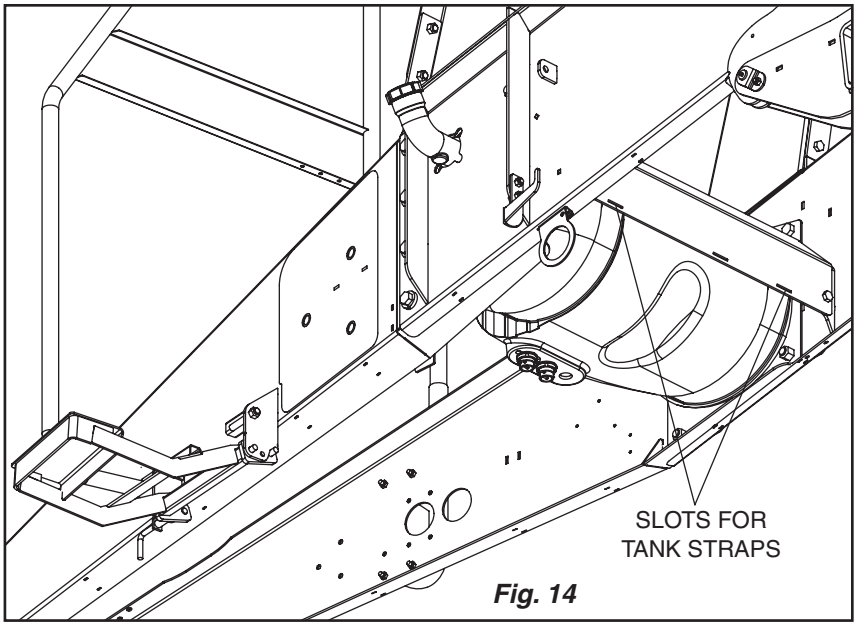


Fig. 14

7.3 Commander 1500

1. The platform on the Commander 1500 needs to be moved in order to allow enough clearance to install the Foam Marker Tank.

2. Unfold the boom to take the weight off the transport brackets. Secure the platform with straps to a lifting device and remove the three M16x50 bolts on both sides of the platform (**Fig. 15**).

3. Carefully lift the platform just enough to allow the Foam Marker Tank to be placed on top of the tank bracket (installed in Section 6.7).

IMPORTANT: Make sure that no damage occurs to any hoses or fittings. The platform only needs to move an inch or two to allow the Foam Marker Tank to be installed.

4. Lower the platform back down and reinstall the M16x50 bolts.

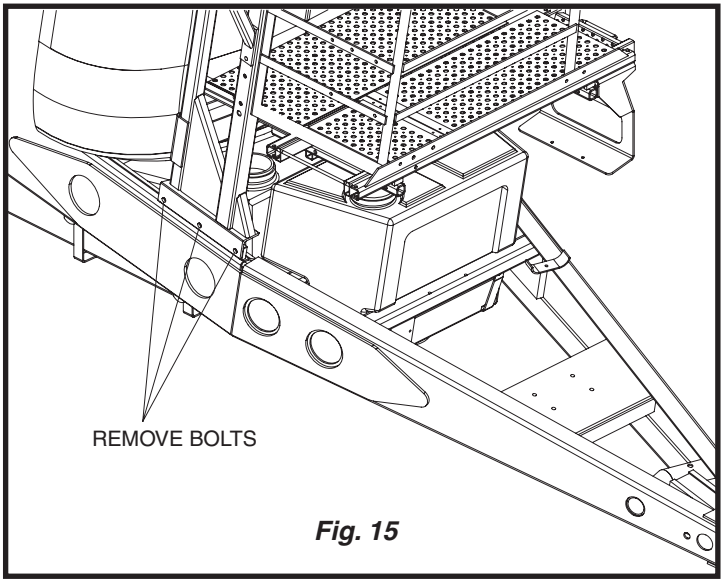
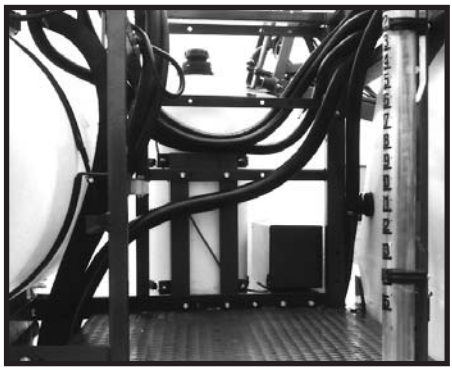


Fig. 15

8.0 MOUNTING THE COMPRESSOR AND SOLUTION PUMP

8.1 HC 650M, 950, 950M, and Twin 650, 950

1. Locate and drill (2) 7/16” holes as shown in (**Fig. 16**).
2. With supplied hardware install the compressor mounting bracket using the holes previously drilled in step 1.
3. Place the Compressor Box on the mounting bracket with hose fittings facing away from the sprayer platform.
4. Mount the Solution Pump on the pump bracket using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing away from the Foam Solution Tank.
5. Mount the Solution Pump to the Compressor Box and mounting bracket, using the 6mm nuts supplied.
6. See Wiring Schematic (p. 5) for cable hookup.



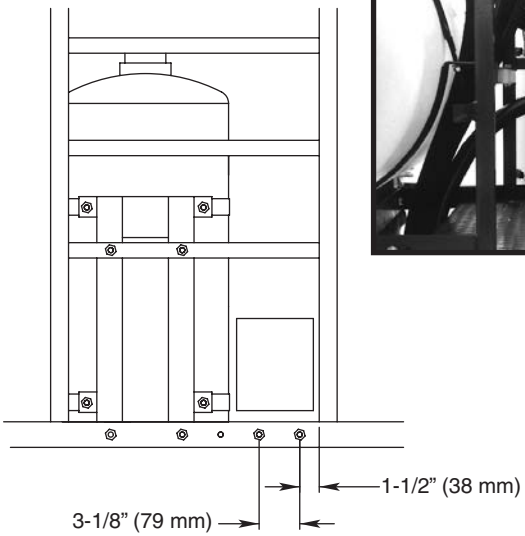


Fig. 16

8.2 Navigator 550, 800, 1000, 550M, 800M, 1000M

1. Locate the mounting holes on the right hand side of the sprayer frame. (In front of the tire). Install the mounting bracket using the supplied hardware.
2. Place the Compressor Box on the mounting bracket with hose fittings facing the front of the sprayer (**Fig. 17**).
3. Mount the Solution Pump on the pump bracket using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing away from the sprayer frame.
4. Mount the Solution Pump to the Compressor Box and mounting bracket, using the 6mm nuts supplied (**Fig. 17**).
5. See Wiring Schematic (p. 5) for cable hookup.

Fig. 17

8.3 Commander 750, 875, 1200 & Twin Force

1. Locate the compressor mounting holes on the front face of the sprayer platform (**Fig. 18**). (If necessary) drill holes as shown (**Fig. 18**)
2. Install the mounting bracket using the supplied hardware.
3. Place the Compressor Box on the mounting bracket with hose fittings facing away from the sprayer's center line (**Fig. 18**).
4. Mount the Solution Pump on the pump bracket using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing away from the sprayer platform (**Fig. 18**).
5. Mount the Solution Pump to the Compressor Box and mounting bracket, using the 6mm nuts supplied.
6. See Wiring Schematic (p. 5) for cable hookup.

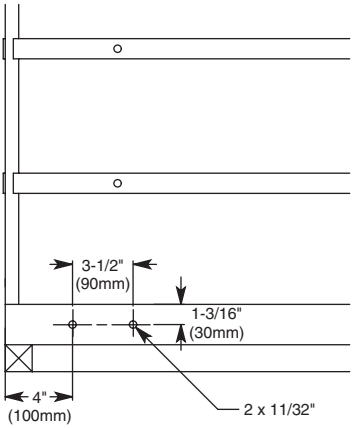


Fig. 18

Note: TWIN FORCE ONLY! To clear the Hydraulic Oil Tank, sub mounting bracket (Kit# 10512503) is required.

8.4 Commander plus 750, 1200 & Twin Force

1. Use the measurements in (**Fig. 19**) to locate and drill two 7/16" dia. holes for mounting the Compressor Box to the inside of the platform.
2. Place the Compressor Box on the mounting bracket with hose fittings facing the rear of the sprayer.
3. Mount the Solution Pump on the pump bracket using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing the outside of the sprayer frame.
4. Mount the Solution Pump to the Compressor Box and mounting bracket, using the 6mm nuts supplied.
5. See Wiring Schematic (p. 5) for cable hookup.

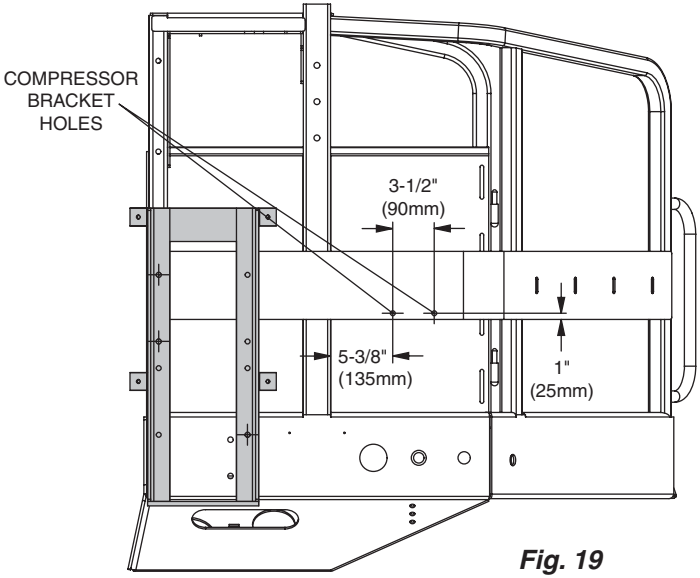


Fig. 19

8.5 New Navigator 575, 1100

1. Locate the mounting holes for the Compressor Box at the rear of the sprayer (**Fig. 20**).

2. Mount the Compressor Box to the frame using the 6mm nuts supplied.

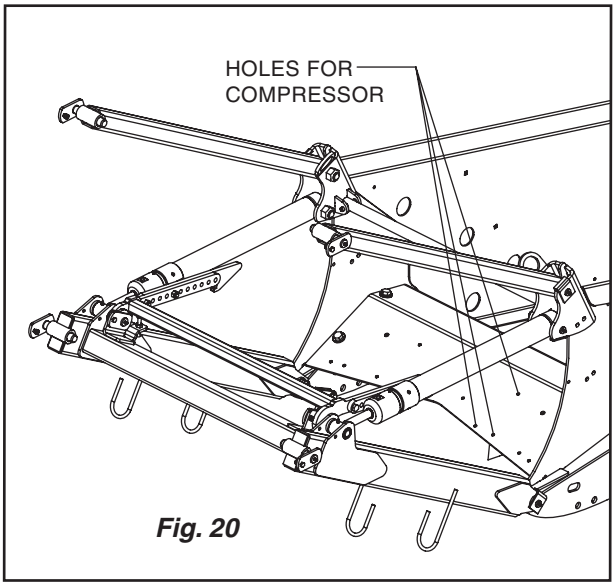
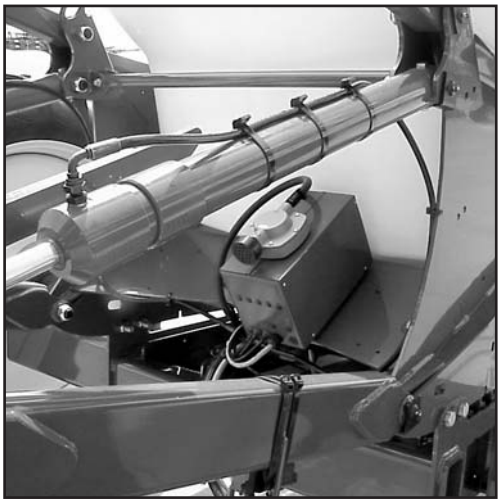


Fig. 20



8.5 New Navigator 575, 1100 (continued)

3. Locate the mounting holes for the Solution Pump inside the right hand drawbar frame (**Fig. 21**). Mount the Solution Pump to the frame using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing up.
4. See Wiring Schematic (p. 5) for cable hookup.

Note: Use power extension cable #26001903 to connect the Compressor Box to the power supply cable. Use extension cable #26004203 to connect the Solution Pump to the Compressor Box.

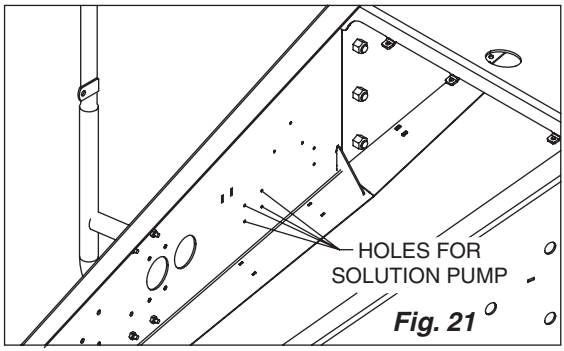


Fig. 21

8.6 Delta 3-PT

1. Locate holes **A** on the bracket added in Section 6.5. Mount the Compressor Box to the top of the bracket (**Fig. 22**).
2. Mount the Solution Pump on the pump bracket using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing the outside of the sprayer frame.
3. Mount the Solution Pump to the Compressor Box and mounting bracket, using the 6mm nuts supplied.
4. See Wiring Schematic (p. 5) for cable hookup.

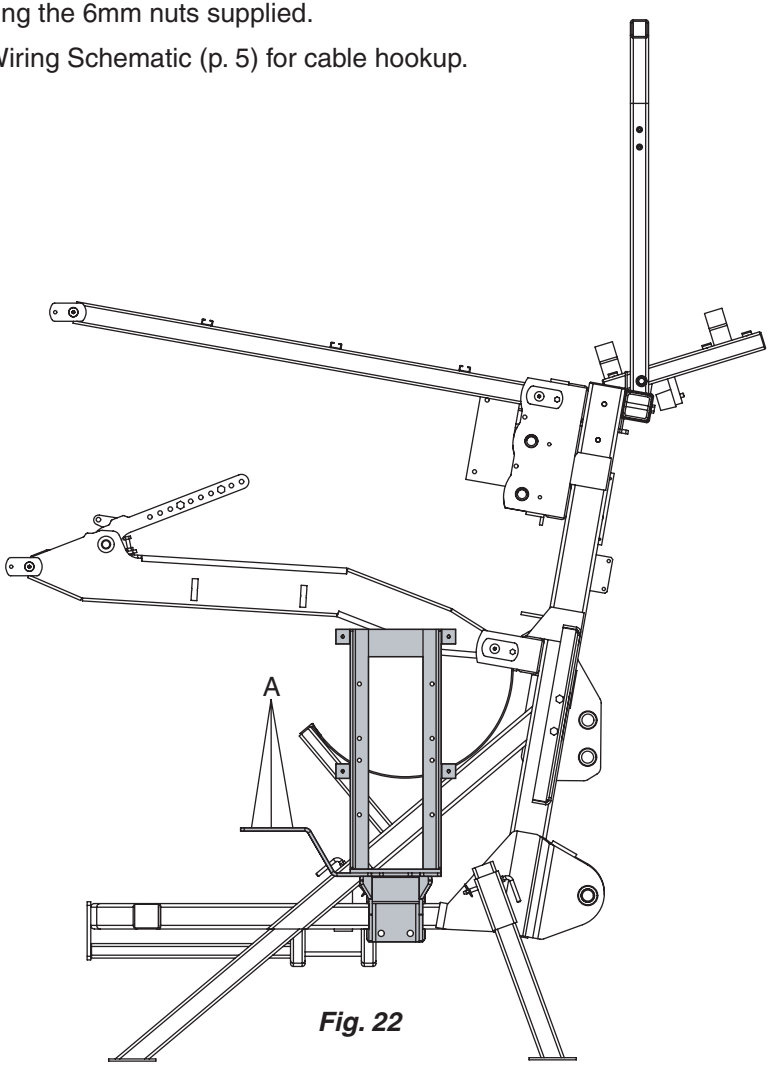


Fig. 22

8.7 Commander 1500

1. Locate the compressor mounting holes on the front face of the sprayer platform (**Fig. 23**). Remove existing bolt for outside hole. If necessary, drill inside hole as shown in (**Fig. 23**).
2. Install the mounting bracket using the supplied hardware.
3. Place the Compressor Box on the mounting bracket with hose fittings facing away from the sprayer's center line (**Fig. 23**).
4. Locate the mounting holes for the Solution Pump on the front of the Foam Tank mounting bracket. Mount the Solution Pump using (4) bolts (M6x25mm), washers and 6mm nuts. Orient the Solution Pump so the pump head is facing up.
5. See Wiring Schematic (p. 5) for cable hookup.

Note: Use extension cable #26004203 to connect the Solution Pump to the Compressor Box.

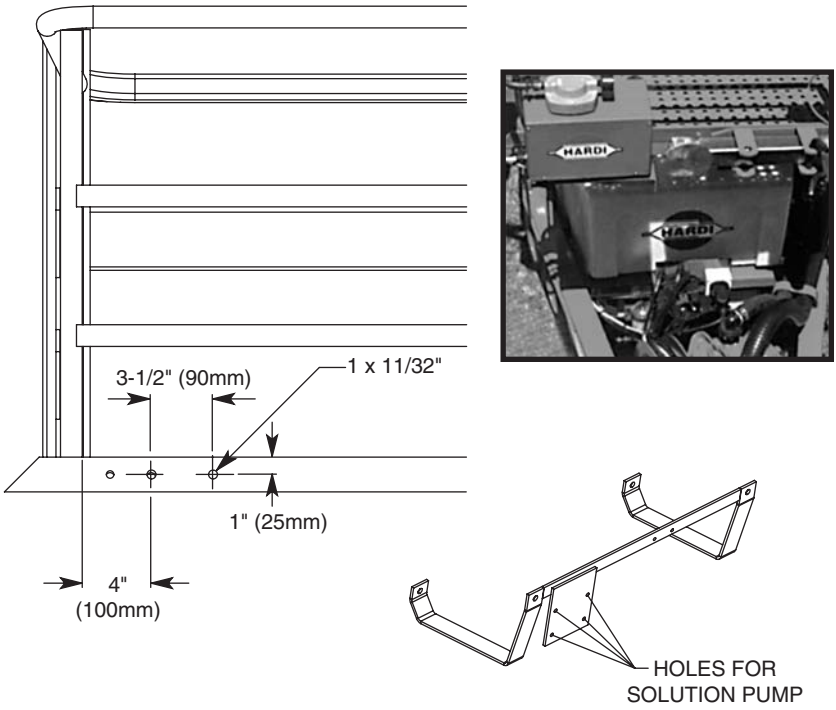


Fig. 23

9.0 MOUNTING THE FOAM DIRECTION VALVE

9.1 HC 650M, 950M

1. Remove the center feed hose underneath the center section nozzle track.

Note: For Booms with "on center nozzles" (88' Eagle), remove the center nozzle tube.

2. Locate and drill (2) 3/8" holes as shown in (**Fig. 24**).
3. Bolt the Foam Direction Valve to the nozzle track using (2) bolts (M8x70mm) turned from the inside out (**Fig. 24**). Have the valve and 1/2" tee fitting facing back, away from the main tank.
4. Make sure the 1/2" tee fitting is turned vertical and that it contains the rubber seal and white ball (**Fig. 24**).

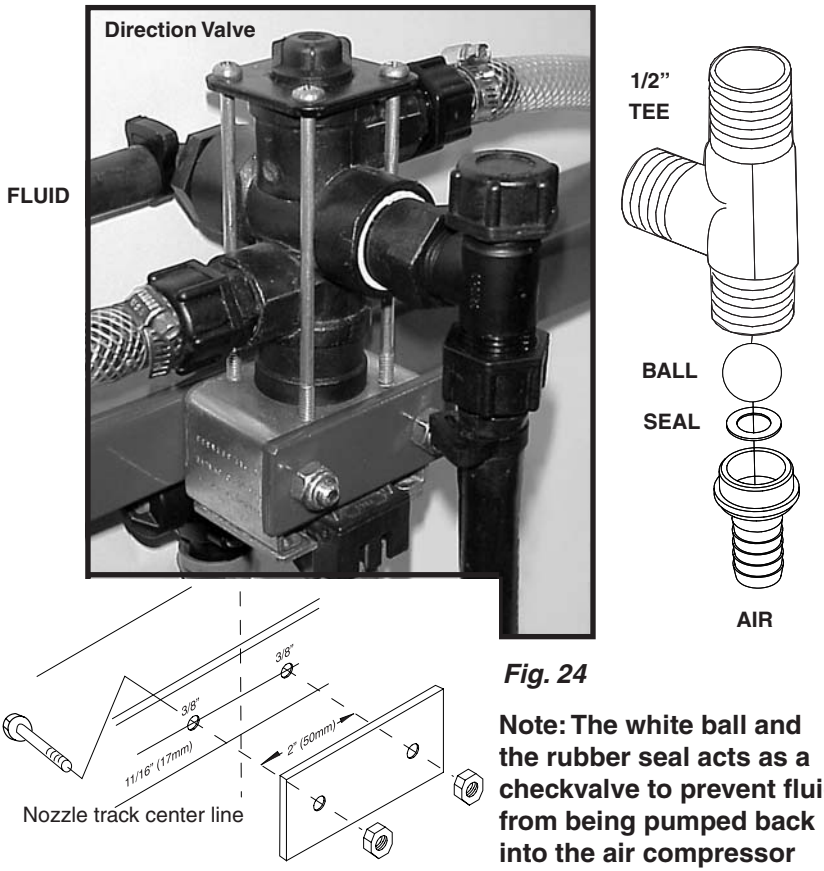


Fig. 24

Note: The white ball and the rubber seal acts as a checkvalve to prevent fluid from being pumped back into the air compressor

9.2 Twin System 650, 950

1. Locate and drill (2) 3/8” holes as shown in (**Fig. 25**).
2. Bolt the Foam Direction Valve to the weldment using (2) bolts (M8x110mm, #421232 or equivalent.) Have the valve and the 1/2” tee fitting facing back, away from the blower housing.
3. Make sure the 1/2” tee fitting is turned vertical and that it contains the rubber seal and white ball (**Fig. 24**).

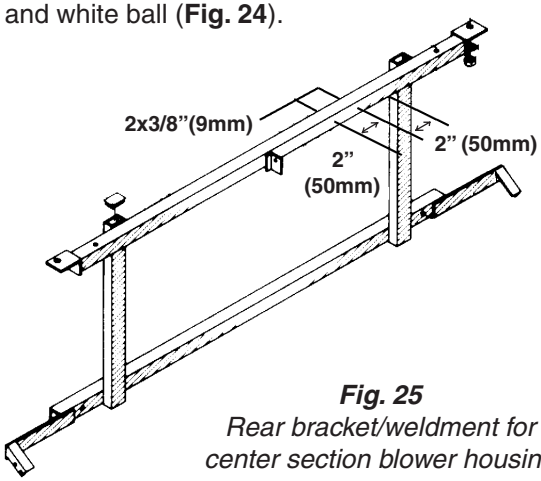


Fig. 25
Rear bracket/weldment for center section blower housing

9.3 Navigator 550, 800, 1000, 550M, 800M, 1000M

1. Remove the center feed hose underneath the center section nozzle track.

Note: For Booms with “on center nozzles” (88’ Eagle), remove the center nozzle tube.

2. Locate and drill (2) 3/8” holes as shown in (**Fig. 24**).
3. Bolt the Foam Direction Valve to the nozzle track using (2) bolts (M8x70mm) turned from the inside out (**Fig. 24**). Have the valve and 1/2” tee fitting facing back, away from the main tank.
4. Make sure the 1/2” tee fitting is turned vertical and that it contains the rubber seal and white ball (**Fig. 24**).

9.4 New Navigator, Commander, Commander plus - All Models except Twin Force

1. Bolt the Foam Direction Valve to the bracket welded on the Lift Frame/Center Frame (**Fig. 26**) using (2) bolts (M8x70mm)(**Fig. 26**). Have the valve and the 1/2" tee fitting facing the main tank.
2. Make sure the 1/2" tee fitting is turned vertical and that it contains the rubber seal and white ball (**Fig. 24**).

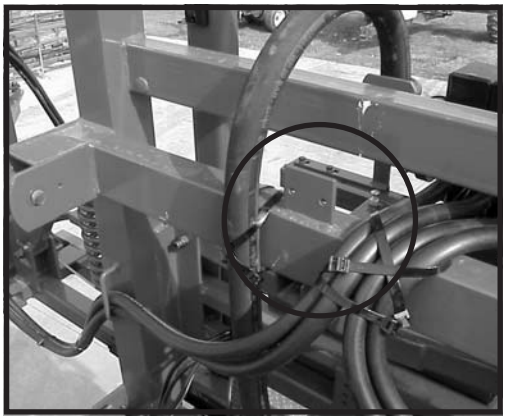
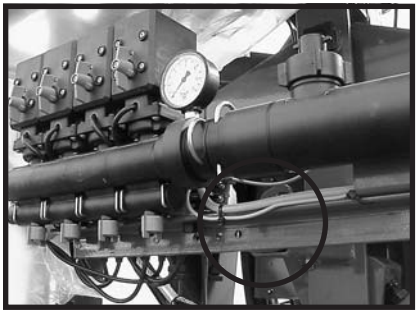


Fig. 26

9.5 Commander - Twin Force

1. Locate and drill (2) 3/8" holes as shown in (**Fig. 27**).
2. Bolt the Foam Direction Valve to the EC - Control Unit bracket on the center frame using (2) bolts (M8x70mm). Have the valve and the 1/2" tee fitting facing the main tank.
3. Make sure the 1/2" tee fitting is turned vertical and that it contains the rubber seal and white ball (**Fig. 24**).



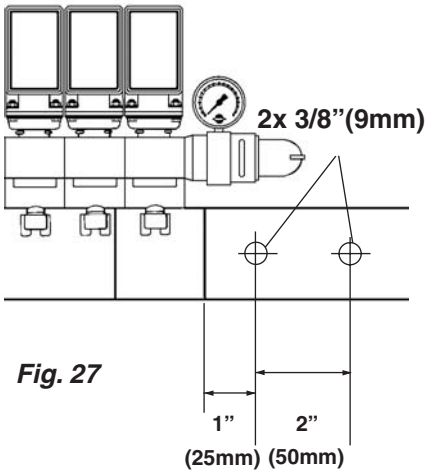


Fig. 27

10.0 INSTALLATION OF HOSES

10.1 Hoses

For installation of hoses, please refer to (**Fig. 24**) and (**Fig. 28**).

NOTE: There are two types of hoses used, a 3/8" HARDI® Rubber hose and a 1/2" Clear Braided hose.

Fluid solution lines: 3/8" HARDI® Rubber hose.
From the Solution Tank to the pump, and pump to the Foam Direction Valve.

Air Lines: 3/8" HARDI® Rubber hose.
From the Air Compressor to the Foam Direction Valve.

Boom lines: 1/2" clear Braided hose.
From the Foam Direction Valve, to the Foam Generator.

1. Use the fittings and hose clamps supplied.

NOTE: Use plastic clamps on 3/8" Rubber hoses.
Use Stainless Steel clamps on 1/2" Clear Braided hoses.

2. Route the hoses making sure that they will not get tangled or caught when operating the sprayer. For example boom lift, boom breakaway etc.

3. Fasten all hoses to the frame or boom with supplied tie straps.

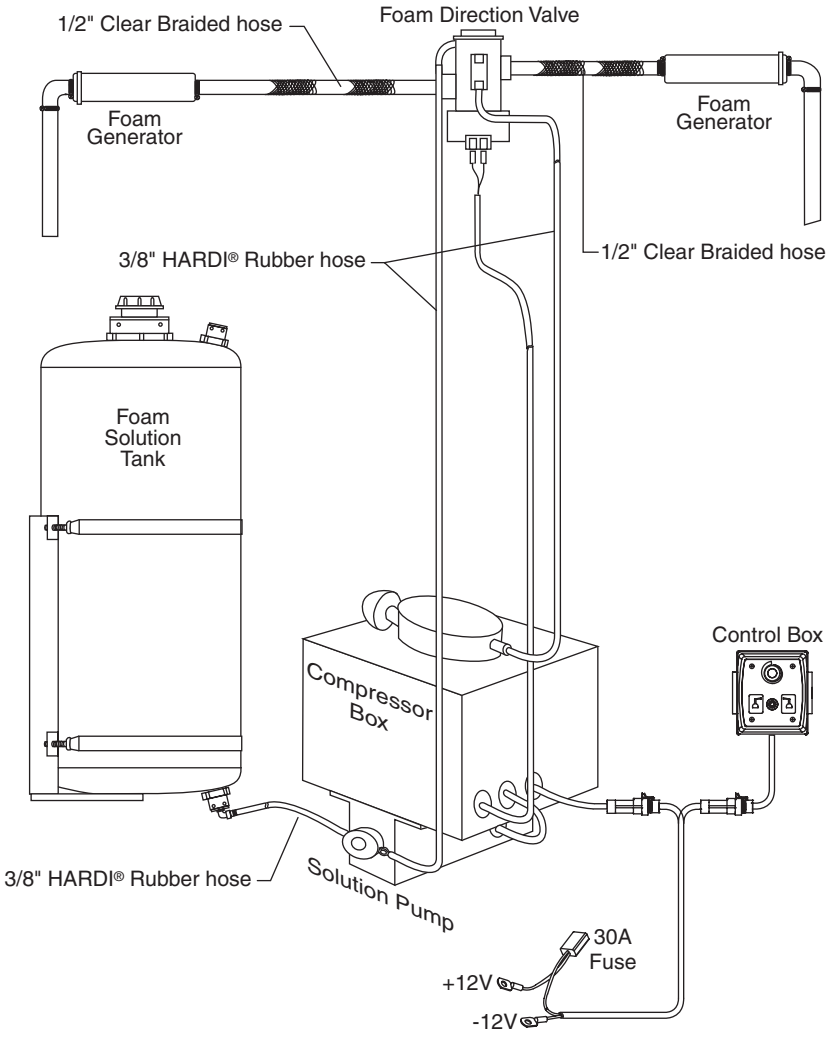

1/2" Clear Braided hose
Foam Direction Valve
Foam Generator
Foam Generator
3/8" HARDI® Rubber hose
1/2" Clear Braided hose
Foam Solution Tank
Compressor Box
Control Box
3/8" HARDI® Rubber hose
Solution Pump
30A Fuse
+12V
-12V

Fig. 28

11.0 MOUNTING THE DROPPER ASSY. AND FOAM GENERATOR

11.1 EAGLE™ and TWIN System (HAC) Booms

- Mount the Foam Dropper mount bracket as close to the outer nozzle as possible as shown in (**Fig. 29**).
- Adjust the breakaway tension by tightening or loosening the center M12 pivot bolt.
- Mount the Dropper and Foam Generator using a supplied 1" gasket at each connection (**Fig. 29**).
- Connect the 1/2" Clear Braided hose to the hose barb on the Foam Generator using a Stainless Steel hose clamp.
- Secure hose with cable ties as necessary.

Fig. 29

11.2 FORCE™ Booms

NOTE: For fitting the Foam Dropper mount bracket to the FORCE™ boom the following components are required:
- 2 pcs. 160775 - Friction plate
- 2 pcs. 471127 - M12 washer
- 2 pcs. 430367 - M12x 100 bolt

- Disassemble the Foam Dropper mount bracket be loosening the center M12 pivot bolt. Discard the lower boom mount bracket replacing it with the Friction plate (#160775).
- Mount the updated Foam Dropper mount bracket through the hole located at the tip of the breakaway (**Fig. 30**). Use the M12 washer (#471127) underneath the breakaway profile.

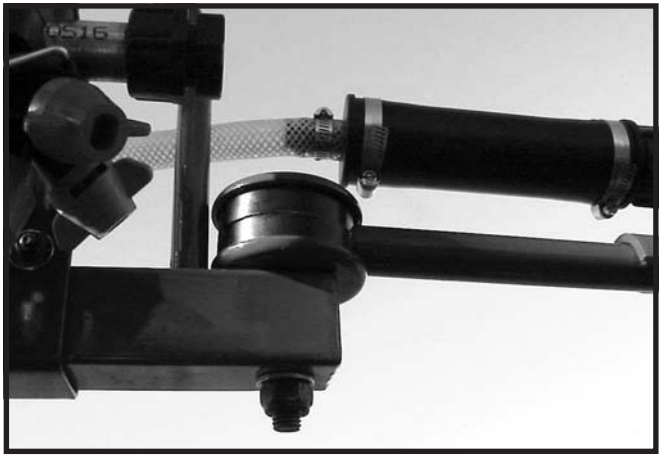


Fig. 30

- Adjust the breakaway tension by tightening or loosening the center M12 pivot bolt.
- Mount the Dropper and Foam Generator using a supplied 1” gasket at each connection (**Fig. 29**).
- Connect the 1/2” Clear Braided hose to the hose barb on the Foam Generator using a Stainless Steel hose clamp.
- Secure hose with cable ties as necessary.

11.3 TWIN Force Booms

- A mount tab (**A**) for the Foam Dropper assembly is fixed to the outer edge of the breakaway. The Dropper assembly is to be remove from the mount bracket arm and refitted to the mount tab (**Fig. 31**).

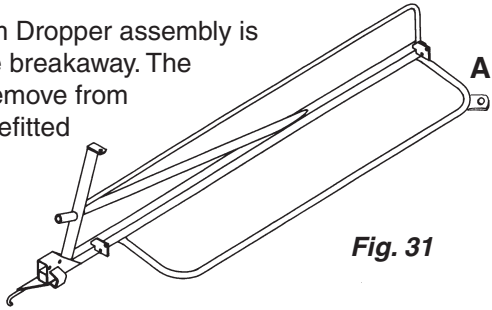


Fig. 31

- Mount the dropper and Foam Generator using a supplied 1” gasket at each connection (**Fig. 29**).
- Connect the 1/2” Clear Braided hose to the hose barb on the Foam Generator using a Stainless Steel hose clamp.
- Secure all hoses with cable ties as necessary.

12.0 MAINTENANCE & SERVICE

1. Check the tank straps periodically to make sure they stay tight so the tank does not rotate in the bracket.
2. The System should be flushed with clean water if the foam marker is not going to be used for a period of time.
3. Make sure that all electrical connections stay clean and free of corrosion.
4. Before storing unit for the winter, run a mixture of ethylene glycol based antifreeze and water through the marker system to keep components from freezing. The system will have to be flushed thoroughly with clean water to restore maximum performance to the Foam Marker.
5. Clean the tank filter every 50 hours of operation. (See instructions and diagram below **Fig. 32**)
   A. Remove the U-clip from the bottom tank fitting and pull the foam line fitting out.
   B. Using a needle nose pliers, reach into the tank fitting, grabbing a hold of the filter and remove by pulling it down.
   C. Clean the filter with clean water.
   D. Flush the tank using clean water and let it drain through the tank fitting to remove any remaining foreign material.
   E. Replace the filter using the needle nose pliers and reassemble.

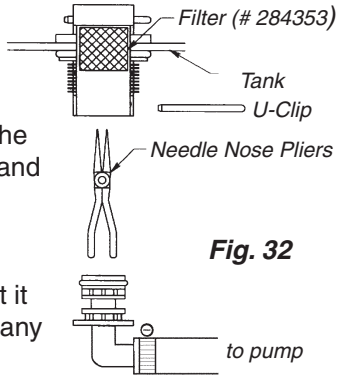
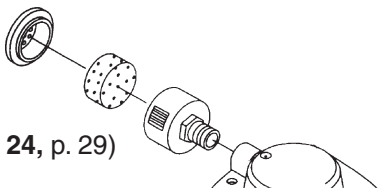


Fig. 32

6. Clean the Air filter every 50 hours of operation
   A. Remove filter cap.
   B. Clean the filter element with compressed air.



7. Make sure the check valve on the Foam Direction Valve is functional (**Fig. 24,** p. 29) - clean if necessary.

13.0 TROUBLE SHOOTING

PROBLEM	CAUSE
Compressor will not run.	a. 12 volt supply weak or not connected. b. Fuse blown. c. Inadequate power supply. d. Reversed polarity. e. Poor wiring connections. f. Faulty control module. g. Faulty compressor. h. Defective control box.
Solution pump will not run.	a. 12 volt supply not connected. b. Plug for pump not connected. c. Fuse blown. d. Poor wiring connections. e. Faulty control module. f. Faulty solution pump. g. Defective control box.
Both compressor and pump are running, but will not make foam.	a. Tank filter plugged. b. Faulty control module. c. Not enough foam concentrate. d. Solution pump not primed. Bleed the check valve on the pump. e. Solution pump defective. f. Air leak in pressure line. g. Kinked hoses. h. Foam generators plugged.
Foam to one boom tip only.	a. Foam Direction Valve cable pinched. b. Poor wiring connections. c. Faulty control module. d. Defective control box. e. Faulty or plugged Foam Direction valve. f. Foam generator plugged. g. Kinked hoses.

PROBLEM	CAUSE
Will not make enough foam.	a. Compressor filter partially plugged. b. Air leak in pressure line. c. Tank filter partially plugged. d. Not enough foam concentrate. e. Water too hard (Add water softener). f. Foam generators partially plugged. g. Kinked hoses.
Foam drops will not last.	a. Not enough foam concentrate. b. Incorrect adjustment on control box. c. Water too hard (Add water softener). d. Environmental conditions. e. Dropper screen missing.
Both compressor and pump are running but only liquid foam solution comes out.	a. Compressor filter plugged. b. Check valve (white ball) on Foam Direction Valve plugged. c. Air leak in pressure line. d. Compressor defective. e. Control box adjusted all the way down. f. Faulty control module. g. Kinked hoses.
Keeps blowing fuses.	a. Reversed polarity. b. Short in electrical wire. c. Faulty compressor. d. Faulty solution pump. e. Faulty control module. f. Faulty Foam Direction Valve. g. Poor wiring connections. h. Incorrect fuse.

14.0 WARRANTY POLICY AND CONDITIONS

HARDI® INC. , 1500 West 76th Street, Davenport, Iowa, USA; 5646 W. Barstow, Fresno, California, USA; and 290 Sovereign Road, London, Ontario, Canada hereinafter called "HARDI®", offers the following limited warranty in accordance with the provisions below to each original retail purchaser of HARDI® new equipment of its own manufacturer, from an authorized HARDI® dealer, that such equipment is at the time of delivery to such purchaser, free from defects in material and workmanship and that such equipment will be warranted for a period of one year from the date of delivery to the end user providing the machine is used and serviced in accordance with the recommendations in the Operator's Manual and is operated under normal farm conditions.

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

   a) Parts of the machine not manufactured by HARDI®, (i.e. engines, tires, tubes, electronic controls, and other components or trade accessories, etc.) are not covered by this warranty but are subject to the warranty of the original manufacturer. Any claim falling into this category will be taken up with the manufacturer concerned.

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

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

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

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

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

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

   d) Dealer traveling costs.

4. Parts defined as normal wearing items, (i.e. tires and V-belts) are not in any way covered under this warranty.

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

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

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

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

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

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

8. Subject to the following terms, conditions and contributions, HARDI® extends the warranty on polyethylene tanks (excluding fittings, lids and gaskets) to FIVE YEARS. To qualify for this extended warranty, the tank must be drained and flushed with fresh water after each day of use. HARDI®'s liability is limited to replacement of the tank, FOB our plant at no cost to the purchaser during the first twelve months; at 20% of the then current price during the second year ; at 40% during the third year ; at 60% during the fourth year ; and at 80% during the fifth year. This five year extended warranty is subject, in each instance, to the tank being inspected and approved for replacement or repair by HARDI® personnel before HARDI® will accept any liability hereunder.

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

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

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

12. Any warranty work performed which will exceed $400.00 MUST be approved IN ADVANCE by the Service Manager.

13. Claims under this policy must be filled with HARDI® within thirty (30) days of work performed or warranty shall be void.

14. Parts requested must be returned prepaid within thirty (30) days for warranty settlement.

15. Warranty claims must be COMPLETELY filled out properly or will be returned.

DISCLAIMER OF FURTHER WARRANTY

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