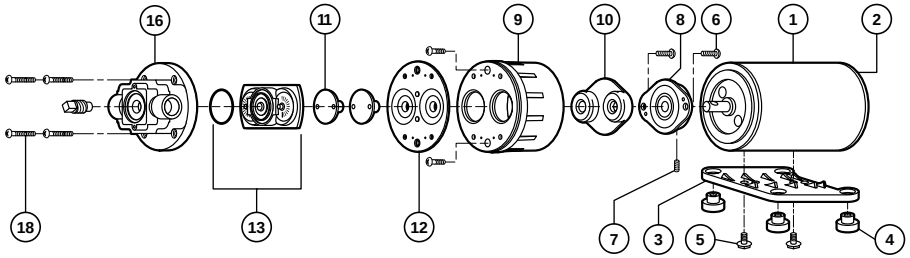
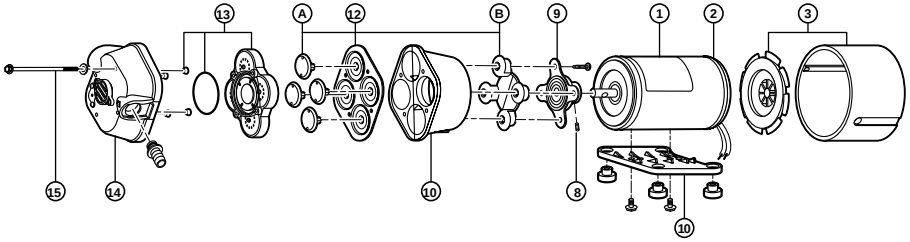
Flojet Pump Assemblies.

2100 Series Demand Pump



4100 Series Demand Pump



OPERATION 1. Allow pump to prime with discharge line (or spray valve) open to avoid an airlock. 2. A built-in pressure switch will automatically turn the pump off when the discharge valve is closed / pressure reaches the set cutoff point and will turn on when the pressure dropsbelow the cut-in point. In the bypass model fluid recirculates.3 If the supply tank is empty the pump will continue to run. Running the pump dry will not damage the pump. Turn off manually.

NOTE: The pressure generated by the pump is dependent upon the flow of the spray nozzle.
An undersized spray nozzle, or a lance / spray gun adjusted to produce too fine a spray will cause the pump pressure switch to cycle on and off and create a pulsating flow from the pump. To obtain a smooth flow and constant operating pressure adjust the nozzle setting on the lance /spray gun, or select a larger size spray nozzle.

SERVICE GUIDELINE - Disconnect power first 1. To disassemble, remove six pump head screws (18), rotate bearing cover (9) so drain notch is aligned with cam/bearing assembly set screw (7).
2 Loosen set screw (use 1/8" size Allen Wrench). Slide pump head off shaft. 3. Pistons (10) should always be replaced when new diaphragm is installed. 4. Replace worn parts and reassemble. Be sure raised side of diaphragm faces the motor and radiused corner of pistons face diaphragm.
5 Hex stem of inner piston (10) must be aligned (free to enter) into Hex hole in outer piston set (10). Press pistons together by hand until they snap tight. 6. Install flat head screws (6) through outer piston set and tighten screws partially, center pistons in diaphragm than tighten screws securely. 7. Place cam bearing assembly over outer piston set, align locating pins in the holes in cam bearing assembly. Install round head screws and tighten securely. (Torque to 18 inch pounds, coat motor shaft with grease prior to assembly.) 8. Reassemble bearing and cam bearing assembly to motor and retighten the set screw securely. Set screw must be positioned in shaft indentation. Position of the screw is critical to avoid misalignment and subsequent diaphragm damage.
9. Reassemble remaining pump head parts, using care to properly seat O-ring (13) in cheek valve assembly. 10 Bypass Pumps: With lower housing held vertically, place bypass poppet/s (14) and spring/s (15) on locating post/s moulded on diaphragm. Place pump head with check valve and O-ring installed over bypass poppet/s ensuring poppet/s are aligned into bypass ports in check valve housing (13) 11. Tighten pump head screws (18) evenly.

Service Kits: Flojet Cam Bearing / Diaphragm Kit includes: Nos 6,7,8,10 and 12 in diagrams above. Flojet Pump Service Kit includes: Nos 13,14 and 15 in diagrams above.

MP/SP

Operators Manual

MP/SP Operators manual October 2004 edition
Published by Hardi Australia Pty Ltd Cavan S.A.

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Product description:

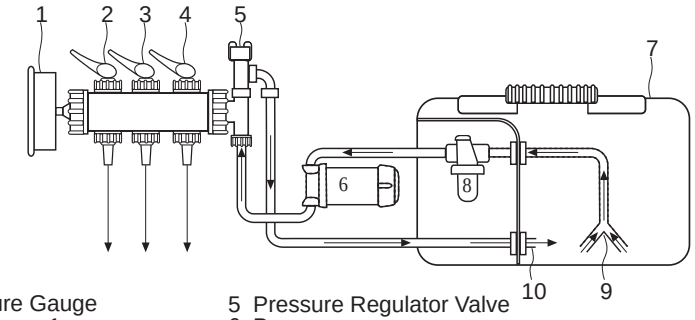
The Hardi SP (Saddle Pack) sprayers have been specifically designed for use on four wheeled ATV motor cycles. The 75 Litre high density polyethylene tank is designed to wrap around the seat, distributing the weight of the sprayer more evenly for better balance.

Three models of Flojet 12 volt diaphragm pumps are used in the SP range. The 2100-559 model is controlled by a pressure switch, and runs when the spray gun trigger is operated. When the trigger is released the pump is turned of.

The 2100-848 model pump is a fan cooled twin diaphragm unit designed for continuous running through an adjustable pressure control valve and return line system. The 2100-848 is suitable for hand gun and small boom operation and outputs 5.8 litres p/minute at 2.5 bar.

The 4100-505 model pump is a fan cooled quad diaphragm unit as above but outputs 9.6 litres p/minute at 2.5 bar. Also connected to an adjustable pressure control valve, it is used on 3 point distribution manifolds for spray gun and larger boom configurations.

Schematic Diagram of Plumbing System



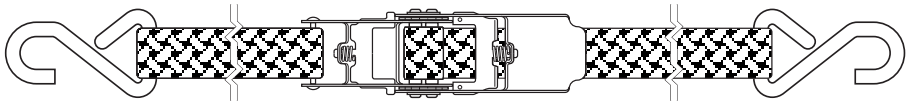
1 Pressure Gauge
2 To Sprayer 1
3 To Sprayer 2
4 To Hand Gun
5 Pressure Regulator Valve
6 Pump
7 Tank
8 Filter Unit
9 Induction Hose
10 Return / Agitator Outlet

Connecting to power.

Your Hardi SP Sprayer requires a 12 volt DC power source and comes supplied with a wiring harness and terminal clips. Be sure to connect red to positive and black to the negative terminal of the vehicles battery.

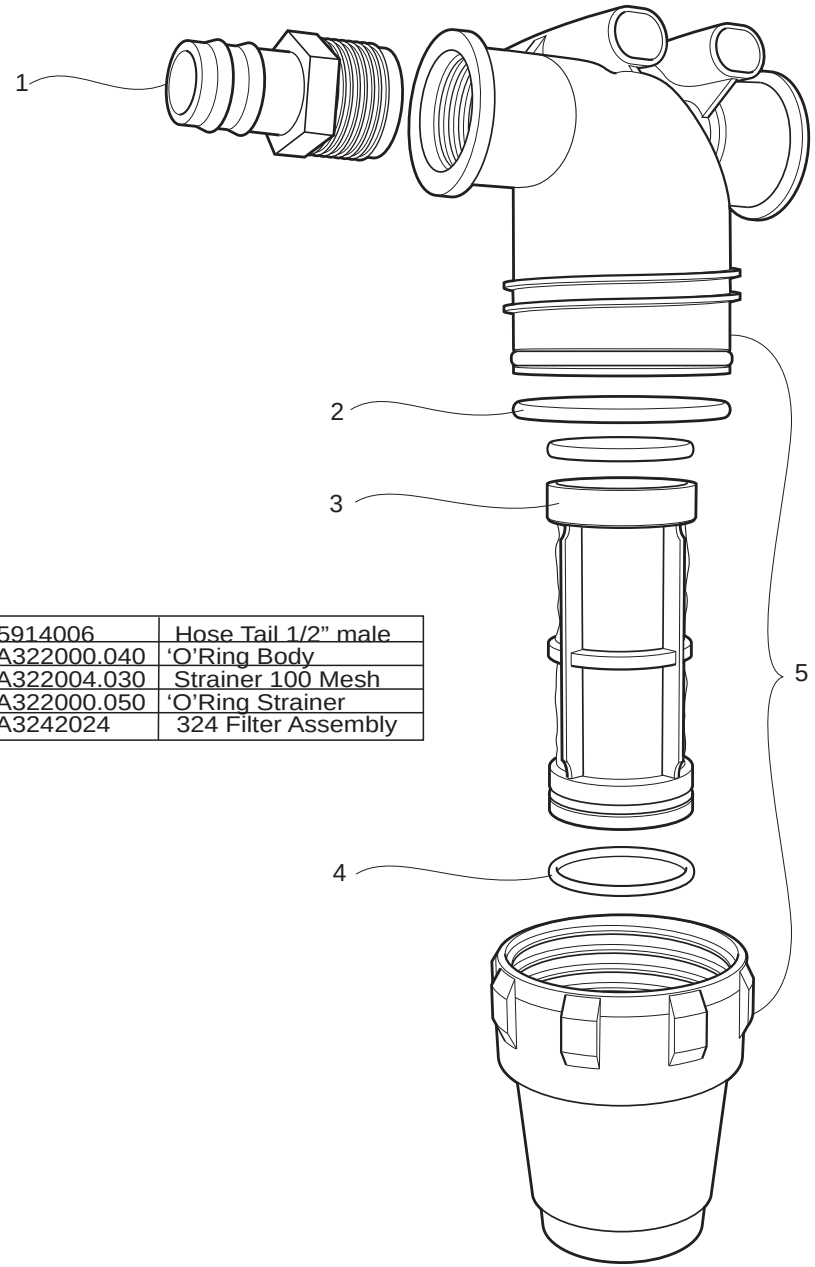
Securing the sprayer to the vehicle.

Your SP Sprayer is designed to sit on the rear carrier of an ATV motor cycle. It is secured in position by two ratchet operated tie down straps (supplied) which fit around the tank and rear carrier on either side of the tank lid.



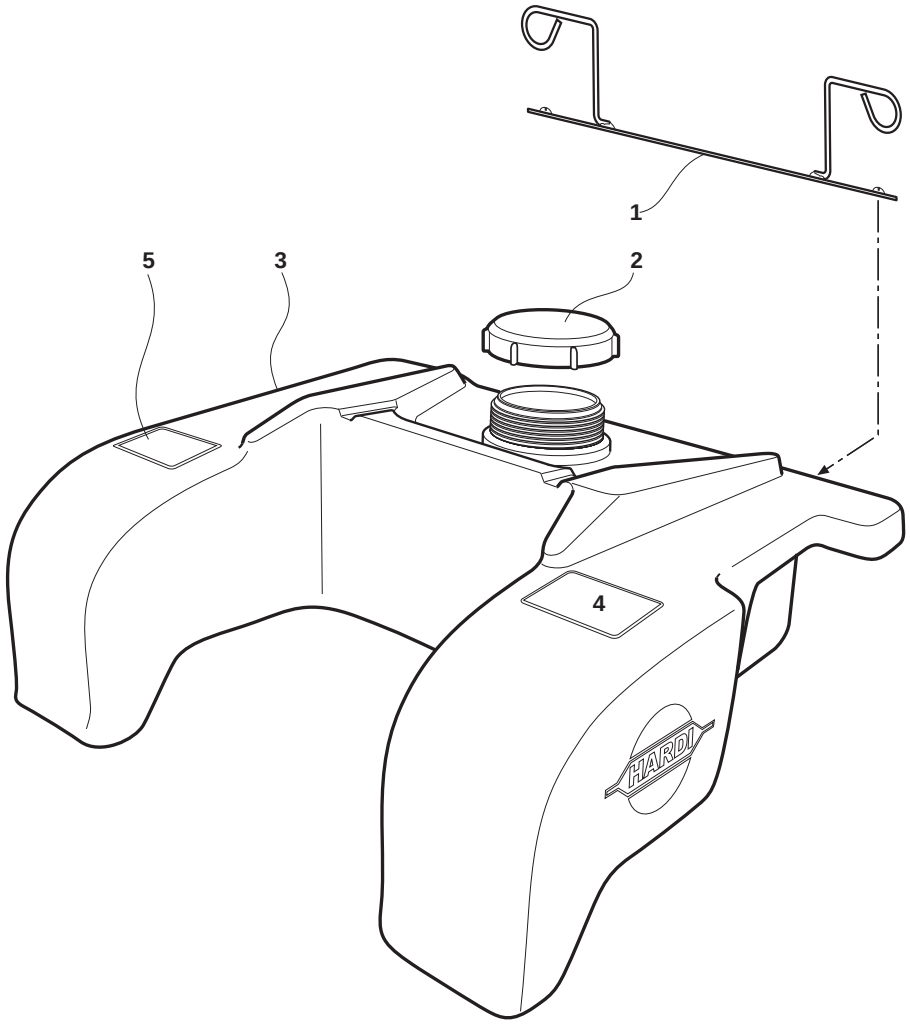
Ratchet operated tie down strap with two hooks.
(please see packaging for manufacturers operating instructions)

Filter Assembly...324 Series



1	5914006	Hose Tail 1/2" male
2	A322000.040	'O'Ring Body
3	A322004.030	Strainer 100 Mesh
4	A322000.050	'O'Ring Strainer
5	A3242024	324 Filter Assembly

1	508950	Hose Retainer Assm.
2	712806	Tank Lid
3	509116	Tank
4	89100804	Decal: Warning Chem.
5	89104304	Decal: Caution ATV...



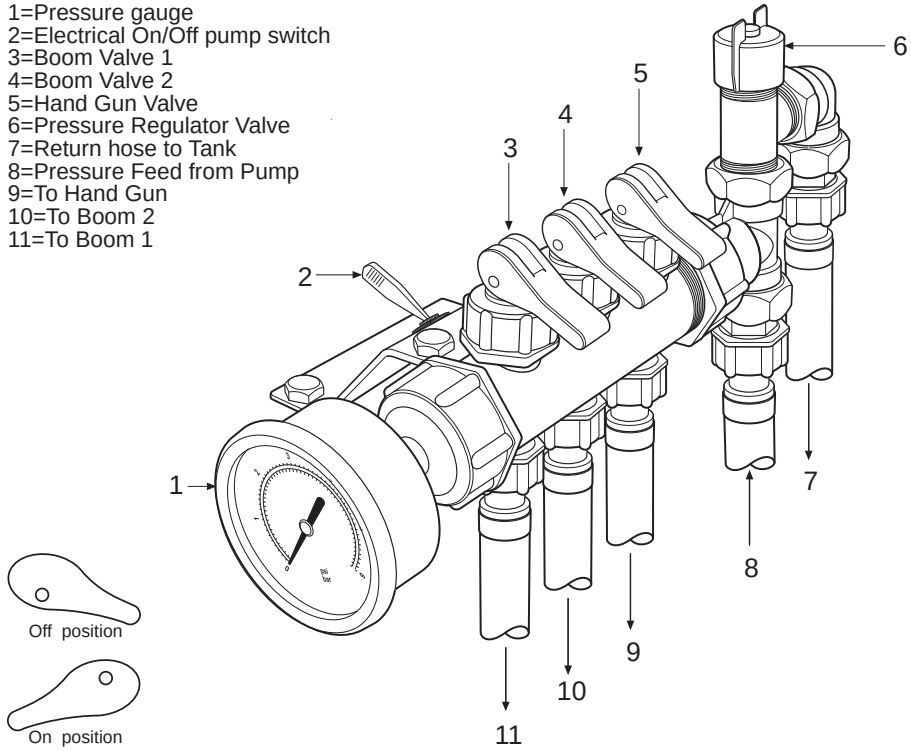
The MP/SP Tank Assembly

Getting Started.

Please be sure to start your sprayer with clean water only and exercise extreme caution when adding chemicals. Remember, agricultural chemicals can be dangerous! Always read the manufacturers labels and follow instructions carefully.

Distribution manifold and controls.

1=Pressure gauge
2=Electrical On/Off pump switch
3=Boom Valve 1
4=Boom Valve 2
5=Hand Gun Valve
6=Pressure Regulator Valve
7=Return hose to Tank
8=Pressure Feed from Pump
9=To Hand Gun
10=To Boom 2
11=To Boom 1



Off position

On position

Start Up Continued...

First, place your sprayer in a suitable location to spray water from the boom and hand gun. Before proceeding, check to ensure your boom and hand gun hoses are connected to the correct valve and outlet as shown in the illustration above.

Next, remove the lid and fill the tank with water. Once full, turn the pressure regulator valve (item 6) clock wise all the way down until it is gently seated, then out again counter clock wise approximately 4 full turns. This achieves maximum fluid by-pass back to the tank and therefore minimum system pressure at the nozzle.

Next, open the boom valves (items 3 and 4) whilst leaving the hand gun valve (item 5) closed.

Next, turn on the electrical switch (item 2). Water should now be expelled from the boom.

Start Up Continued...(Adjusting System Pressure)

Now, test the pressure regulator valve (item 6) by turning the control clockwise. You should observe a corresponding rise in pressure displayed on the pressure gauge (item 1). Now turn the pressure regulator valve control (item 6) counter clockwise. Note this time that the pressure gauge should display a drop in pressure.

Hand Gun Operation.

To operate the Hand gun, first return the boom control valves (items 3 and 4) to the Off position and swing the Hand gun control valve (item 5) over to it's On position. Now depress the red trigger on the Hand gun (item 'F' on the illustration below). With the Hand gun in operation, take note of the pressure indicated by the gauge and adjust as necessary, using the method mentioned in the last paragraph.

To adjust the Hand gun spray pattern, turn the black handle at the nozzle end of the gun (item 'G') out for a narrow spray and longer distance and in for a wider spray pattern and greater coverage at closer distances.

Boom Operation.

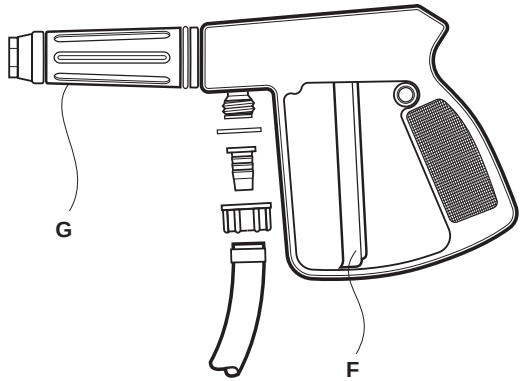
When working with the boom in operation, it is recommended that you use the electrical pump switch to turn the boom on and off.

Nozzles.

Nozzles are supplied as standard equipment for both the Hand gun and optional boom. The following is a guide to discharge rates for your Hand gun, measured in Litres p/minute at the given pressures. Please note that turning the nozzle over changes the flow rate.

Nozzle type	bar	Litres p/m	Litres p/m
1099-20	2	3.35	2.37
	3	4.67	2.87

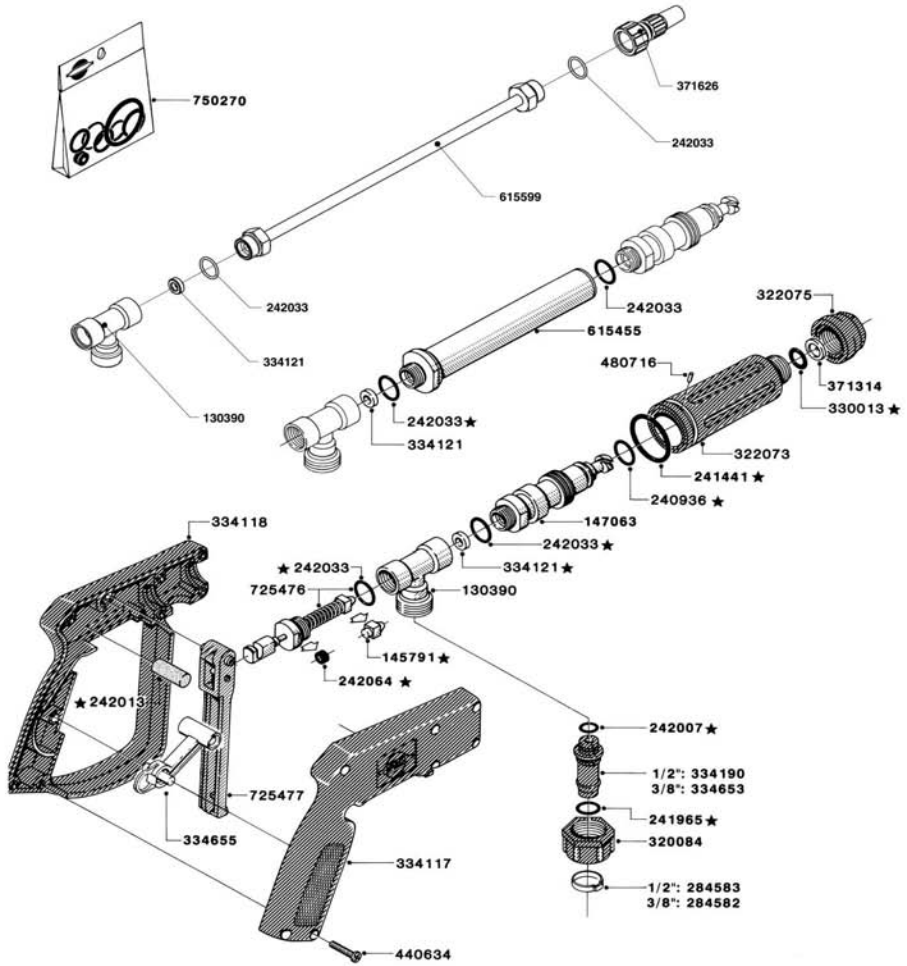
Other nozzle sizes are available for your hand gun. Contact your Hardi dealer for more information.



Hand Gun Assembly (Model 60S)

Hand Gun Model 60S

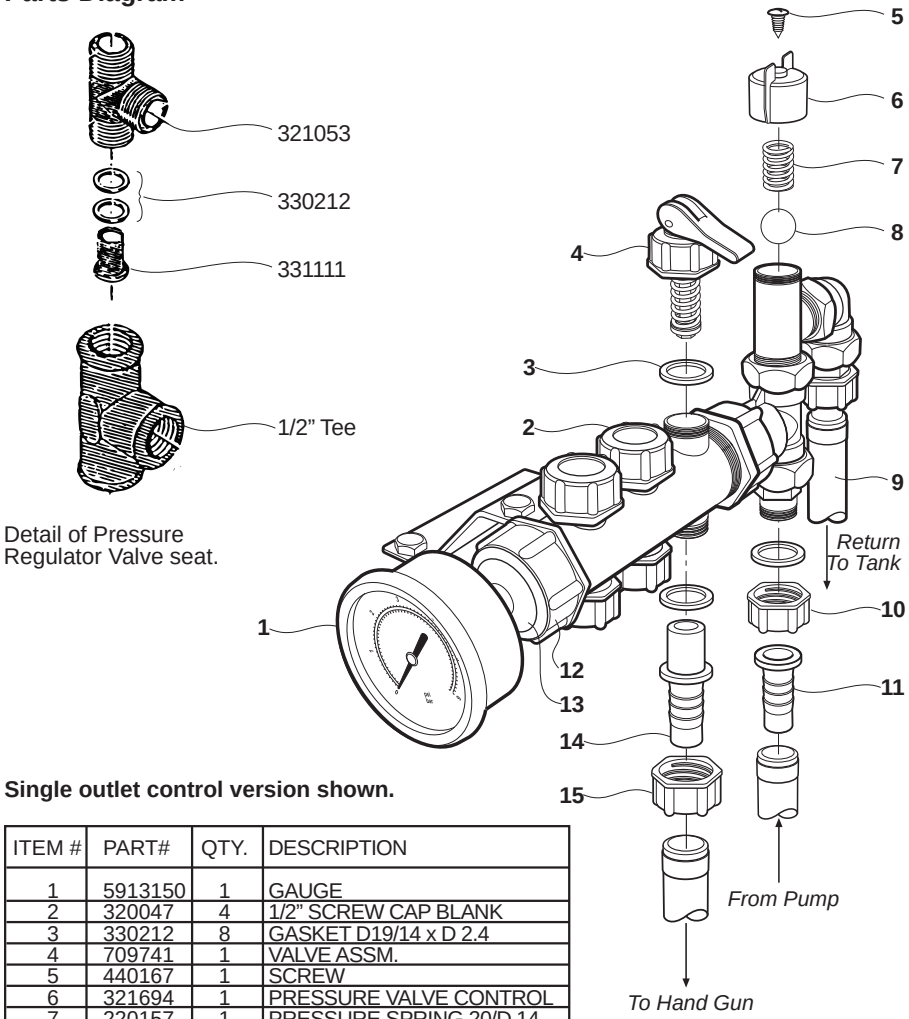
Parts Diagram



Hand Gun model 60S

Distribution Manifold Assembly.

Parts Diagram



Single outlet control version shown.

ITEM #	PART#	QTY.	DESCRIPTION
1	5913150	1	GAUGE
2	320047	4	1/2" SCREW CAP BLANK
3	330212	8	GASKET D19/14 x D 2.4
4	709741	1	VALVE ASSM.
5	440167	1	SCREW
6	321694	1	PRESSURE VALVE CONTROL
7	220157	1	PRESSURE SPRING 20/D 14
8	519022	1	BALL / PRESSURE VALVE
9	927021		HOSE 1/2" DIA. x mtr.
10	320084	5	1/2" RG CAP
11	330687	4	1/2" HOSE TAIL
12	320095	2	1" RG CAP
13	390282	1	STOPPER 1/4" PIPE THREAD
14	331111	1	VALVE SEAT 1/2" DISTRIBUTOR
15	320084		1/2 " RG CAP
16	927021		HOSE 1/2" DIA. x mtr.
17	843196	1	HAND GUN MODEL 60s

Boom Nozzles.

Nozzle size plays a large part in calibrating your equipment to discharge the correct amount of chemical for each Hectare of land. The optional boom attachment is fitted with 4110-12 nozzles as standard equipment. Please follow the steps below to ensure that these suit your requirements. Your Hardi Dealer stocks a range of nozzles to suit most applications.

The calibration chart.

Agricultural chemical application is measured in Litres per Hectare (L/Ha). This is called 'The Application Rate'. Application rates vary from one product to another, therefore it is vitally important to read your chemical manufacturers literature. In order to apply the spray correctly certain other variables must be considered. These include nozzle size, discharge pressure and vehicle speed. In order to assist with safe and accurate use of your equipment, the following information and reference chart is provided.

Before using the chart you will need to know:

-The correct Application Rate in 'L/Ha' in accordance with your chemical manufacturers instructions.

-Your desired vehicle speed in 'Kph'.

-The pressure range of your sprayer in 'bar'.

Now proceed as follows:

-Run your finger across the top row of figures in the chart until you find the one that matches your desired vehicle speed.

-Now run down the column below your vehicle speed until you find the number that is closest to your recommended chemical application rate in L/Ha.

-Next run back across the chart and note the pressure in 'bar' and nozzle size recommended to achieve the correct coverage.

You will notice for example that at a speed of 6 Kph, an application rate of 121 L/Ha can be achieved with a 4110-12 nozzle at a pressure of 2.0 bar. Note also that if we increase the vehicle speed to 8 Kph we must either **increase the sprayer pressure** or select a **larger nozzle size** to achieve the same coverage.

Nozzle	Pressure (bar)	4 Kph	6 Kph	8 Kph	10 Kph	12 Kph
Lilac 4110-08	2.0	74	49	37	29	25
	2.5	83	56	43	34	28
	3.0	92	61	46	37	31
	3.5	99	66	49	39	33
Brown 4110-10	2.0	114	77	57	46	38
	2.5	128	86	63	50	42
	3.0	140	93	69	55	46
	3.5	151	101	77	61	51
Yellow 4110-12	2.0	181	121	90	72	60
	2.5	202	135	101	80	67
	3.0	220	148	110	88	73
	3.5	240	160	120	96	80
Orange 4110-14	2.0	225	150	111	89	74
	2.5	250	168	125	100	83
	3.0	275	184	137	109	91
	3.5	300	200	150	120	100

Application Rate in Litres per Hectare (L/Ha)

Checking Vehicle Speed.

One of the variable factors mentioned earlier and worthy of particular note is vehicle speed. In order to maintain the correct application rate it is important to know the exact speed of your vehicle. Be aware that non standard wheels and even badly worn tyres can affect the accuracy of your vehicles speedometer.

In order to check your vehicles speed, travel an accurately measured distance of 100 meters in the field. This can be done between two fixed points. Next, time yourself with a stop watch or similar device as you travel between the two points using your vehicle speedometer to maintain your desired speed as closely as possible.

Now use the following formula to calculate your actual speed:

$$\frac{\textbf{Distance traveled in meters x 3.6}}{\textbf{Time elapsed in seconds}} = \textbf{Vehicle speed in Kph.}$$

For example, if it takes 46 seconds to travel 100 meters your formula would look like this:

$$\frac{\textbf{100 x 3.6}}{\textbf{46}} = \textbf{7.8 Kph}$$

It is now possible to check the accuracy of your speedo and make an allowance for any variation between the indicated and actual speed.

Amount of Chemical per Tank

Once the nozzle capacity, system pressure and vehicle speed have been established, the correct amount of chemical per tank must be calculated. The following formula will be useful in determining this amount and therefore achieve the correct dilution ratio.

$$\frac{\textbf{Tank Volume x Dose per Hectare}}{\textbf{Calibrated application rate of sprayer in L/Ha}} = \textbf{Chemical per tank in Litres.}$$

For example if the chemical must be applied at a dose of 2 Litres per Hectare, your tank volume is 100 Litres and your sprayer is calibrated for 220 Litres per Hectare, then 0.9 Litres of chemical must be added to the tank to obtain the correct dilution.

The formula will therefore look like this:

$$\frac{\textbf{100 x 2.0}}{\textbf{220}} = \textbf{0.9 Litres of concentrate per tank.}$$

Similarly if the chemical must be applied at a dose of 2 Litres per Hectare, your tank volume is 100 Litres and your sprayer is calibrated for 200 Litres per Hectare, then 1.0 Litres of chemical must be added to the tank to obtain the correct dilution.

The formula will now look like this:

$$\frac{\textbf{100 x 2.0}}{\textbf{200}} = \textbf{1.0 Litres of concentrate per tank.}$$

Cleaning.

Flushing and cleaning your equipment is an important part of your sprayers maintenance plan and also helps reduce the possibility of contamination when changing chemicals. The sprayer tank should be drained and flushed at the end of every day of spraying.

Changing Chemicals.

When changing from one chemical to another, it is important to thoroughly clean the sprayer's tank and hoses to minimise the risk of contamination. After rinsing the sprayer with clean water, fill the tank to around 1/3 full with a 1% solution of house hold ammonia and water. Re-circulate the ammonia solution throughout the system and spray some through the hand gun and boom. Let stand overnight if possible. Finally drain the sprayer and rinse thoroughly with clean water again including the hand gun and boom as before.

It is difficult to completely remove all traces of chemical especially from inside hoses. Occasionally a chemical solution can pick up traces of a previous material when first sprayed through the boom lines. Consult your chemical supplier for any special washing instructions.

Caution: Agricultural Chemicals Can Be Dangerous.

-Always read manufacturers Warnings and Safety information.

-Always exercise safe work practices.

-Be sure that all chemical residue is drained where it cannot create a health or environmental hazard.

Trouble Shooting.

Pressure drop:

-Check to see if the filter is blocked.

-Check suction hose from the tank for splits and leaks.

-Check the pressure regulator ball and seat for damage or foreign material and check the spring for damage and loss of tension.

-Check the pressure gauge is showing a correct reading.

Pressure gauge shows fluctuating pressure:

-Check to see if the filter is partially blocked.

-Check the pressure regulator for correct operation.

-Check the pressure gauge is functioning correctly.

-Check the non drip nozzle diaphragms are functioning correctly (should open at 0.5 bar).

Chemical application seems ineffective:

If after spraying your results are not what you expected, re-check your sprayer calibration and revise your chemical manufacturers instructions to make sure you followed them correctly. Other factors for consideration could be weather conditions (spray drift) and avoiding overlapping and missing areas whilst driving.