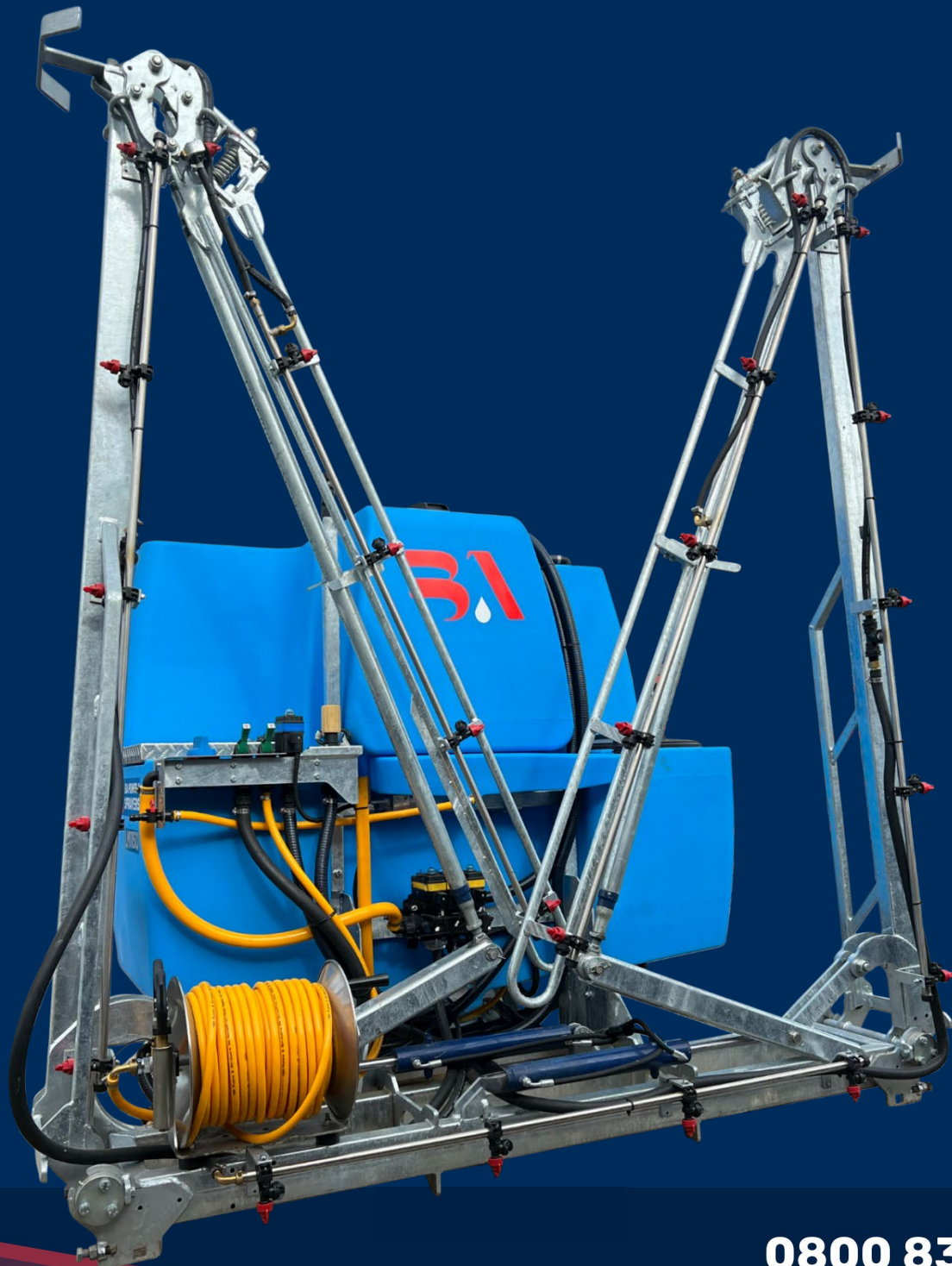


# **SAFE OPERATING PROCEDURES**

## ***LM900X & LM1150X***



**0800 833 538**

**[www.bapumpsandsprayers.co.nz](http://www.bapumpsandsprayers.co.nz)**

# SAFE OPERATING PROCEDURES

## LM900X & LK1150X Linkage Sprayers

### AN IMPORTANT MESSAGE FOR OWNERS & OPERATORS OF LM SPRAYERS

Safety is our primary concern in the design, manufacture, sale, and use of BA Sprayers. BA Pumps & Sprayers would like to remind you of the safety rules when operating one of our sprayers or it's accessories.

Failure to follow these rules can result in severe injury or death. It is essential that everyone involved in the assembly, operation, transport, maintenance, and storage of this equipment be properly trained in safety.

- Read this entire instruction manual together with the installation procedures before attempting to install or operate the sprayer.
- Prior to sprayer usage, all users and operators must have read and fully understood the contents of this operator's manual.
- Never allow inadequately trained personnel to attach or operate the sprayer.
- Be warned of the dangers of loading your tractor in excess of it's carrying capacity.
- It is important to understand that any loads or attachments whether fastened to or placed on a tractor will alter the stability or handling characteristics of that tractor.
- Spray tanks or other equipment must be filled only to a level where the gross weight is within the load limit of the tractor.
- Never exceed the load limit capacity of the tractor.
- All tractor tyres should be inflated to manufacturers recommended operating pressures.
- Please note that fitting the spray tank and fitting sprayer accessories (e.g. Spray booms) to the tractor may exceed the tractor's maximum load capacity. Do not exceed the manufacturer's guidelines.

### Please note that 1 litre of water is 1 kilogram

- LM three-point linkage sprayers should be properly distributed and securely attached.
- Reduce speed when carrying implements and allow greater distance for braking.
- Never allow anyone to ride on your sprayer or other equipment.
- Always follow the instructions in the owner's vehicle manual for carrying implements or pulling a trailer.
- Proper maintenance of your tractor in line with manufacturer's recommended maintenance procedures is essential. (e.g. Brakes and Suspension)
- All users of the tractor must be trained and competent in not only operating the vehicle, but also operating the vehicle when the sprayer is being used.
- Before applying chemicals, read the SDS (safety data sheet) and label of the chemical manufacturer or supplier for personal protective equipment and operate as recommended.

- The safety of all chemicals used in agriculture is under the jurisdiction of a government agency, i.e. NZ Ministry for the Environment. Further local government laws may apply.
- BA recommend that LM sprayers are used on a suitable tractor providing tractor manufacturers guidelines are fully observed.
- This sprayer is designed and manufactured solely for the purpose of applying agricultural chemicals to crops and pasture. Under no circumstances may it be used for any other purpose.
- Before carrying out any maintenance work, wash the sprayer thoroughly. Remove all chemicals that may contaminate the machine.
- Do not point the spray gun at a human's body as high-pressure spray may cause serious bodily harm.
- After completing spraying task in the field, turn the pump off and discharge the residual pressure in the hose by activating the boom and/or gun/lance trigger handle. This will prevent accidental discharge by a 3rd party at any later stage.

NOTE – **DO NOT** loan your sprayer to anyone without providing full operator safety and operating training.

**Throughout this manual, there are safety warnings and operational tips. Please thoroughly read this entire manual for your safety.**

**Please note that you will not be able to travel the same speed/slopes/hills on your tractor once your sprayer is filled.**

# BA Pumps & Sprayers Warranty Policy

## All products

|                                    |           |
|------------------------------------|-----------|
| Private Domestic Use               | 12 months |
| Private and Commercial Agriculture | 12 months |
| Agricultural Contractors           | 6 months  |
| All Non-Agricultural Applications  | 3 months  |

The warranty period begins on the date the product is delivered to the first retail purchaser.

BA Pumps & Sprayers warrants the owner that it will repair or replace without charge parts found defective or malfunctioning in accordance with the warranty limitation and adjustment schedule below.

- BA Pumps & Sprayers (Company) hereby warrants to the original purchaser (Owner) of this machine against faulty material and workmanship for a period as described above after delivery according to the conditions outlined.
- This Warranty does not extend to any part or parts of the machine not manufactured by the said Company. These parts being covered by the Warranty of the makers.
- This Warranty does not extend to defects due to parts damaged by the neglect, misuse or negligence of the purchaser or any damage caused as a result of incorrect installation of the machine or to normal wear.
- This Warranty does not extend to any damage to tanks due to the chemicals being used or left in tanks when not in use.
- In the event of a defect occurring within the said period as stated above, the purchaser must not attempt to correct or remedy such defect either by modification of, adjustment or alteration to any part or parts of the machine.
- This Warranty will stop by right if the product is used in a manner not up to the manufacturer's directions or for bad maintenance.
- In the event of any defect being disclosed to BA Pumps & Sprayers within the specified period, BA Pumps & Sprayers, after due examination and on being satisfied that such defect is due to faulty material or workmanship undertakes to repair or replace such defective part or parts free of charge.
- Freight and labour costs in relation to any replacement under this warranty are the responsibility of the purchaser.
- In no event shall BA Pumps & Sprayers be liable for downtime expenses, loss of chemicals, loss of machine use or other incidental, consequential, or special damages.
- This warranty is subject to the following conditions, which must be conformed to by the purchaser.

## CONDITIONS OF WARRANTY

1. The warranty is NOT transferable.
2. The purchaser must complete the Warranty Registration Form on our website upon completion of starting the machine. The form must be completed within 14 days of delivery of the unit. Only when this is completed and returned, can BA Pumps & Sprayers fulfil all obligations. The form can be found at:  
[https://go.bapumpsandsprayers.com/warranty\\_nz#RegistrationForm](https://go.bapumpsandsprayers.com/warranty_nz#RegistrationForm)
3. Abuse: Failure resulting from neglect, such as improper operation, lack of required maintenance or continued use of a sprayer after the discovery of a defect which results in greater damage to the unit.
4. Environmental Conditions and Application: Deteriorated or failed components such as



diaphragms, O-rings, hoses, seals, electrical wiring and connections damaged by corrosive chemicals dirt and sand, excessive heat or moisture. Owners should ensure the type and strength of chemicals used in the sprayer are compatible with the design of the unit. Warranty determination for these types of failures will be made by BA Pumps & Sprayers only after inspection of failed components. In most instances, these will incur inspection charges and cost of replacement parts.

5. Normal Wear: Normal wear and consumable items such as oils and lubricants, diaphragms, filter elements, pivot pins, paint, and nozzles are considered to be normal wear items and are not warranted.
6. Maintenance: Component failure caused by not performing scheduled maintenance service such as oils, grease, failure to clean tanks, pumps, filters, spray lines, nozzles, fans or any other blocked components. Not tightening or replacing loose or missing bolts, nuts, fittings, shields and covers.
7. Damage: Damages or machine failure, caused by carelessness or accidental damage, improper operation, inappropriate transportation or storage of the sprayer or attachment. Power Source: Failures due to faulty or inadequate electrical sources of power. Owners who use their own 12-volt power source must make sure that it is suitable for operating the spraying equipment.
8. Alterations: Any unauthorised alteration, modification, attachments or unauthorised repairs to the sprayer or attachments. Written approval must be obtained from BA Pumps & Sprayers for any such items to maintain the warranty.
9. Removal and Installation: Only parts and labour directly attributable to the repair of the sprayer is covered.
10. Clean-up Time: BA Pumps & Sprayers does not pay for cleaning the sprayer, parts, accessories, or work area before or after the warranty repair. Clean-up time is affected primarily by the application or conditions in which the sprayer is operated and maintained. Since clean-up time can be so variable, cleaning time is considered a customer expense.
11. Transportation Costs: Warranty does not cover transportation or insurance costs for sprayers or other equipment needing repair or replacement of warranted components. Nor does it cover any freight or insurance costs in obtaining new parts or returning old parts to BA Pumps & Sprayers for inspection purposes.
12. Travel Time: Travel time required for warranty repairs is the responsibility of the Owner.
13. Diagnostic Time: Warranty does not cover the time required to diagnose a warranty problem. Diagnostic time is affected greatly by the training and expertise of the technician employed to do the job. With proper training of service personnel, diagnostic time should be at a minimum. BA Pumps & Sprayers expects that their Agents are well trained and proficient to handle any warranty repairs. Since BA Pumps & Sprayers is not in control of these responsibilities, we elect not to cover diagnostic time.
14. Non-Genuine Repairs: Use of parts other than genuine parts for repair of warranted parts will automatically negate any guarantee. Warranted components must be replaced with genuine BA Pumps & Sprayers repair parts.
15. Unauthorised Repairs: Repairs by an unauthorised agent will automatically forfeit any warranty. Warranty repairs must be carried out by an authorised BA Pumps & Sprayers dealer only.
16. Disclaimer: The contents of this manual are published and given in good faith. However, neither BA Pumps & Sprayers nor any of its associates or directors or employees give any warranty of accuracy nor accept any responsibility in law. No reader should act on the basis of any matter contained in this manual without considering and taking appropriate advice based upon their particular circumstance. BA Pumps & Sprayers.

**Due to continuous product development, BA Pumps & Sprayers reserves the right to change specifications and design without notice.**

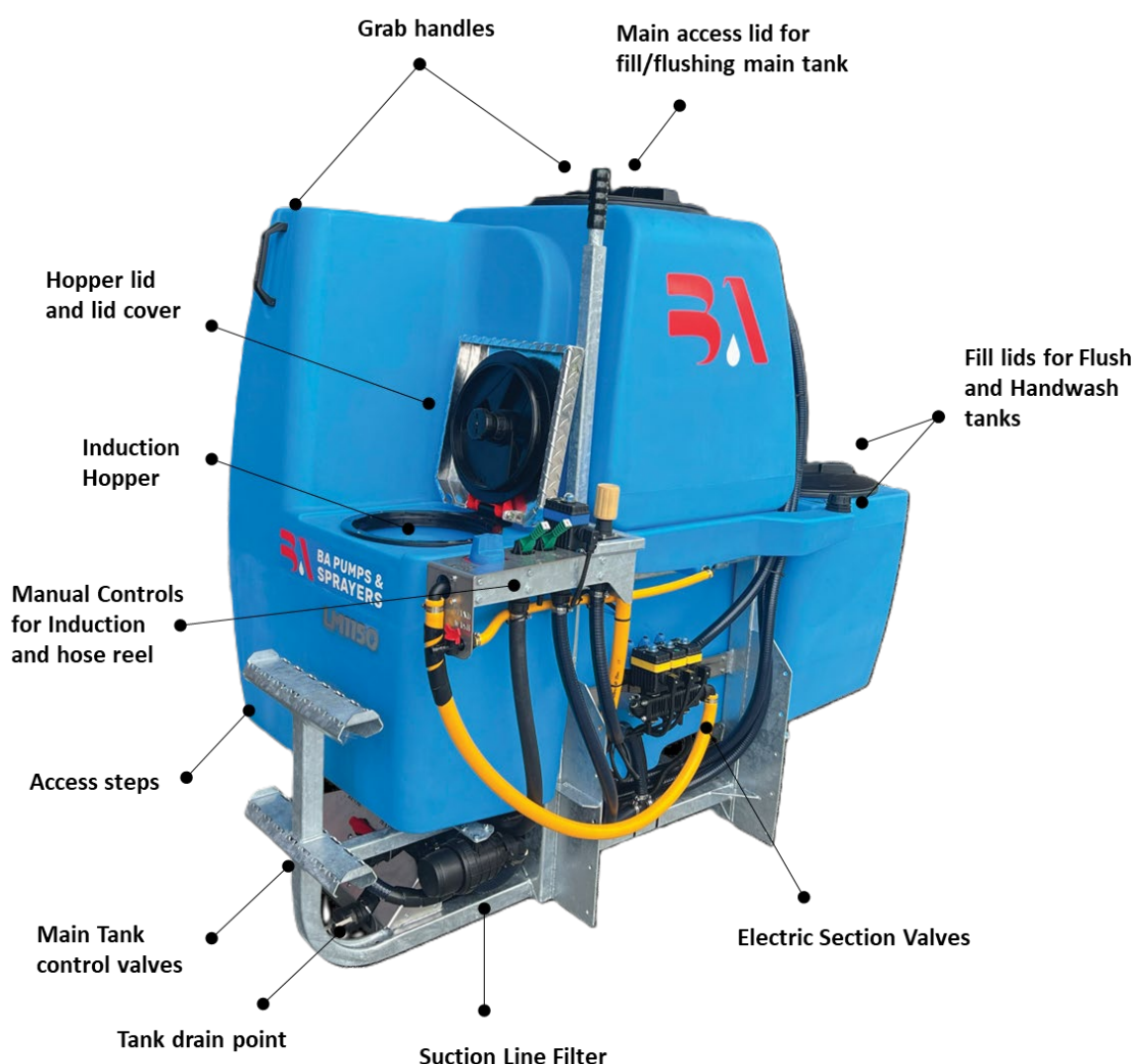
# Welcome to the BA

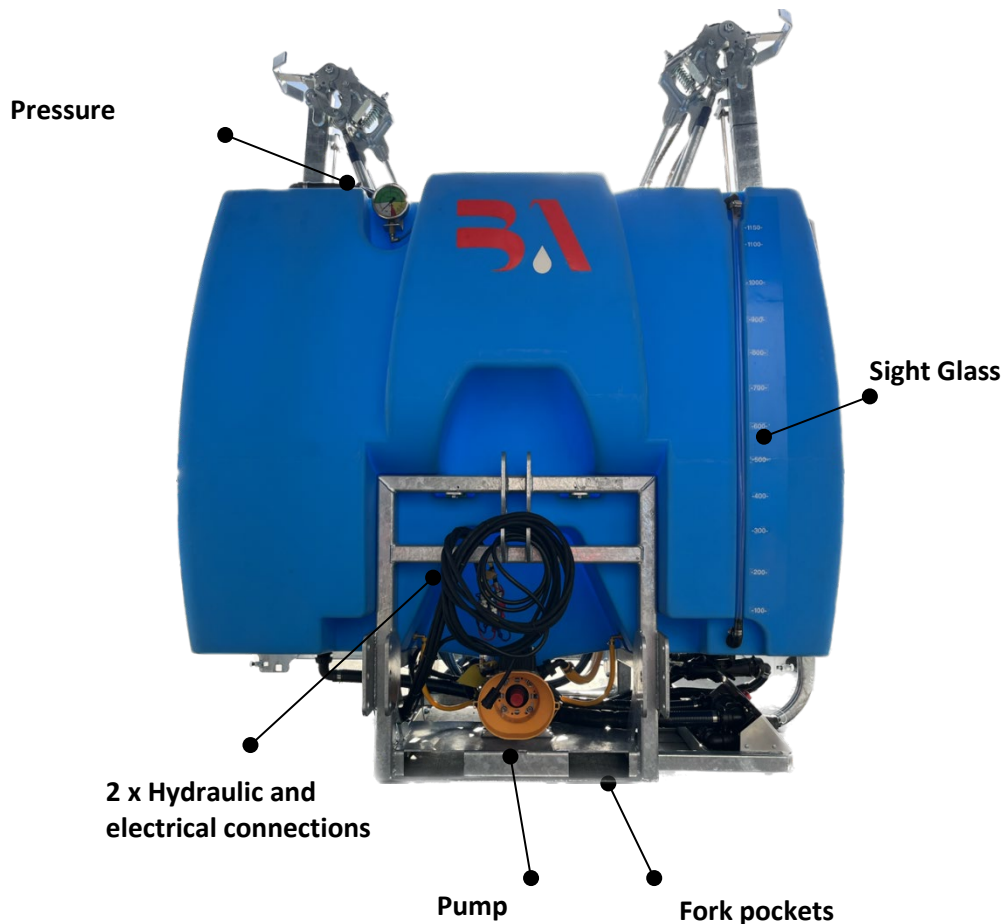
Congratulations on the purchase of your new BA sprayer. BA Pumps and sprayers has been in business since 1989 and is committed to the design and construction of high quality spraying solutions for Agriculture, Viticulture, Horticulture and Industrial applications for the NZ and Australian markets. BA uses top quality components in its product line up and is committed to local NZ and Australian manufacturing from its purpose-built sites in Hautapu and Geelong. We trust that your new sprayer will meet your expectations and enable you to achieve the outcomes you are looking for. BA has a full range of parts available, so you can maintain your sprayer in top operating condition through your BA dealer for many years to come. Thank you for your purchase.

## LM SPRAYERS

Whether you own a dairy, dry stock or cropping farm, you will find many uses for our LM spray units. The tank, pump and boom fittings are corrosion resistant and are suitable for applying weedicides, herbicides, insecticides, fungicides, miticides and green formulations. The unit is designed for boom spraying, and may also be used in conjunction with a optional 50m hose reel for spot-spraying.

### 1. Understanding Your LM Sprayer





## 2. IMPORTANT: Setting Up Your Sprayer Before Use

### Tractor 3 Point Linkage

It is important that you thoroughly read your tractor safety guidelines for instructions on how to use your tractor's three-point linkage connection. The size tractor the sprayer is fitted to must be suitable for carrying the full weight of the loaded sprayer. On rolling terrain, a larger tractor with wide track should be used.

### Weights

| Model                    | Description                                    | Dry    | Full    |
|--------------------------|------------------------------------------------|--------|---------|
| <b>LM900X-2073-8M</b>    | 900L Tank, Frame, Plumbing, Pump & Spray Boom  | 425 kg | 1395 kg |
| <b>LM900X-2073-12HM</b>  | 900L Tank, Frame, Plumbing, Pump & Spray Boom  | 564 kg | 1534 kg |
| <b>LM1150X-2073-12HM</b> | 1150L Tank, Frame, Plumbing, Pump & Spray Boom | 584 kg | 1804 kg |

Adding optional upgrades to your LM Sprayer will increase its weight. See your tractor safety guidelines for the maximum weight your tractor can handle.

### PTO Shaft Connection

A PTO shaft is supplied with your LM Sprayer. **Please ensure the shaft is the correct length to operate freely throughout the three-point linkage lift movement.**

For further instructions, please thoroughly read the PTO Booklet supplied with your new PTO Shaft. Failure to follow these instructions may result in damage to your pump and/or tractor.

## Electrical and Hydraulic connections

Your LM900X or LM1150X Sprayer is also supplied with a wiring loom for connection to your electric control unit. Please ensure the wiring loom is secured to eliminate the possibility of wiring dragging on the ground.

The electrical control unit requires 12V power. The sprayer wiring loom should be fed into the cab and be attached to the connector block on the underside of the console. Power is supplied to the console and sprayer from the 12V lead and 3pin connected attached to the tractor 12V supply outlet.

Where fitted with a hydraulic fold M Boom, two sets of remote connections are required. Take care which remotes are used for the left and right side to align with the lever layout of the tractor.

## 3. Operating Instructions

### 3.1 Water Fill

Fill the main tank with clean water through the top lid with a supply hose. Alternatively the tank can be bottom filled if fitted with the optional tank fill kit. The water volume loaded should not exceed the rated sprayer volume (900 or 1150 litres depending on model). Also fill the flush and handwash tanks with clean water. Note the flush tank should be filled no higher than 75 mm below the top of the flush tank.



### 3.2 Product Loading



use a suitable eye protection



use if necessary a suitable protection against fumes and toxic vapors



use a special coverall to protect the body



comply with all the safety precautions recommended by the manufacturer of the used chemicals



use suitable protective gloves



use shoes or boots to protect the feet



do not smoke during preparation and use of chemical products



do not eat and drink during preparation and use of chemical products

### Chemical Application **CAUTION**

As no control can be exercised over the use of the equipment or over weather, plant or soil conditions, or over the storage, handling, mixing, use or application of sprays or chemicals, BA Pumps & Sprayers will not accept any liability for loss or damage (consequential or otherwise) arising directly or indirectly from the use of this equipment.

### Chemical Advice

BA Pumps & Sprayers or their agents cannot make recommendations or give advice as to the use of chemicals and cannot accept responsibility for any damage, injury, or other consequence for disregarding this warning notice. Refer to the SDS (safety data sheet) that came with your chemical. This sheet holds all the information users need for their protection and should be read carefully before application. Contact your chemical supplier for further advice.

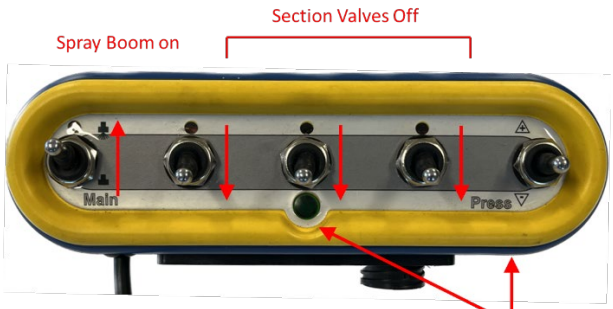


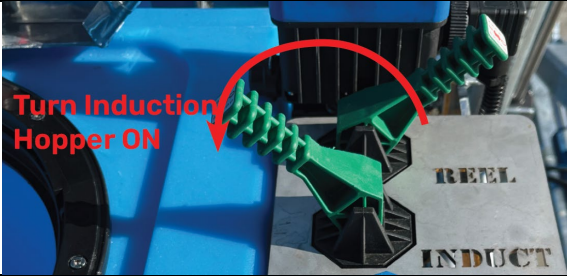
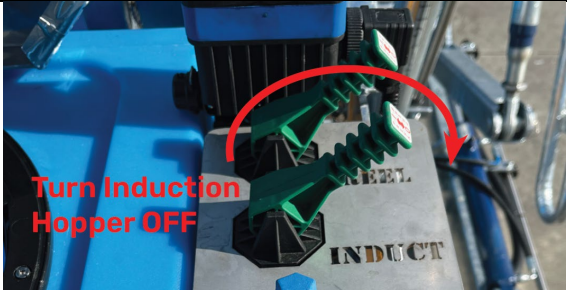
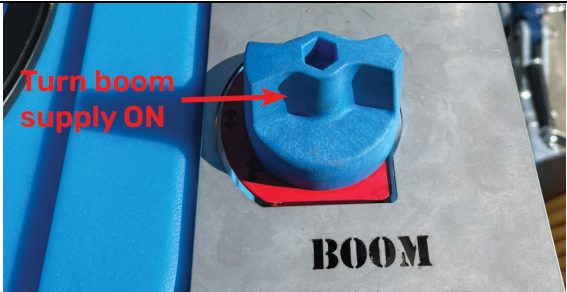
## WARNING

Mixing chemicals is a most dangerous activity as it involves handling the concentrated material. For toxic compounds, use protective clothing such as overalls, hat, gloves, safety glasses, boots, and a respirator. Note: People with beards do not get full protection from normal masks and respirators.

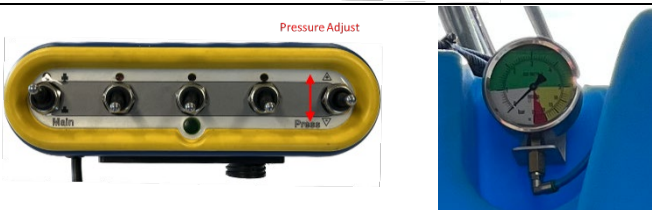
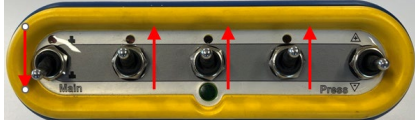
When using diluted sprays always wear at least a hat, long-sleeved cotton overalls, safety glasses, respirator, and boots. If you use pesticides regularly, it is a good idea to always wear a respirator to avoid accumulation of toxins in the body. Other protection may be required. Check the SDS and labels for specific directions for the particular chemical. Purchasers must ensure that operators of these machines are fully trained, competent, and aware of the dangers of spraying chemicals and the application of each spray used.

## Product Loading Instructions

|                                                                                                                                                                                                                                                |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Check boom tap is in the ON position as shown.                                                                                                                                                                                                 |    |
| Turn Main switch ON and turn section switches OFF                                                                                                                                                                                              |   |
| Turn on tractor PTO. Do NOT exceed 540 RPM. Wait for pump to run smoothly.<br><br>This process is to make sure the pump is primed properly before starting to induct product. If the pump is not primed the induction will not work correctly. |                                                                                      |
| Turn off flow to boom.                                                                                                                                                                                                                         |  |
| The pressure on the gauge should read 8-10 BAR. If required adjust the pressure up using the electric control.                                                                                                                                 |  |

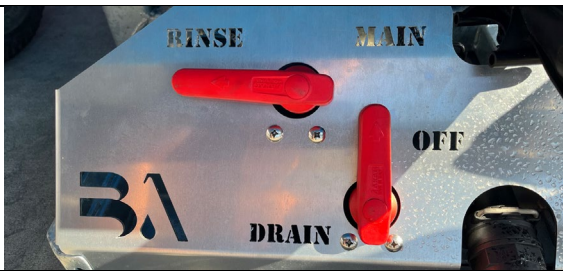
|                                                                                                                                                                                                                                                           |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>Turn induction system on using the green lever on the main control manifold.</p>                                                                                                                                                                       |    |
| <p>Add product to hopper and allow induction system to transfer into tank.</p> <p>While the induction system is still running, carefully rinse the hopper with clean water. Use at least 2 litres and allow the water to transfer into the main tank.</p> |    |
| <p>Turn induction system off.</p>                                                                                                                                                                                                                         |   |
| <p>Turn the boom tap back to the ON position.</p>                                                                                                                                                                                                         |  |

### 3.3 Spraying Instructions

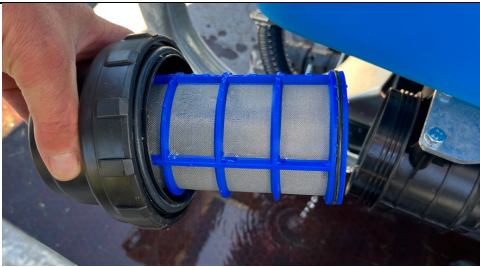
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>Check the Spraying chart in Section 4 to determine what speed and pressure you intend operating at to achieve the desired application rate. Note the spraying chart is also located on the sprayer under the induction hopper lid. Note the nozzles supplied as standard are red 04's</p> <p>Travel to the job with the pump running to mix the tank contents. Do not exceed 540 rpm at the PTO.</p> |    |
| <p>Once in the paddock, unfold the boom using the hydraulic remotes on the tractor. Be sure that the machine is well clear of objects during this process.</p>                                                                                                                                                                                                                                          |    |
| <p>Switch on the sprayer using the electric console. There is a master on/off switch under the controller, and the Main on switch on the front left hand side of the console. Leave the section valves off.</p>                                                                                                                                                                                         |   |
| <p>Adjust the pressure to the desired setting using the electric console.</p>                                                                                                                                                                                                                                                                                                                           |  |
| <p>Turn off the Main switch, and then turn on the section valves.</p>                                                                                                                                                                                                                                                                                                                                   |  |
| <p>Drive at the designated speed and to apply spray to the desired area. Start spraying by turning on the Main switch.</p>                                                                                                                                                                                                                                                                              |  |



### 3.4 Clean Down after Use

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Turn off the Main Boom and PTO                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                      |
| Switch the main control valve to the rinse position                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |
| Turn on the PTO and turn on the sprayer using the electric console.<br>Run the sprayer with the tractor at low rpm until the flush tank is completely drained in order to clean the pump, lines and boom.                                                                                                                                                                                                                                                                                     |                                                                                      |
| Turn off the Sprayer on the electric console and the PTO                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
| Return the main control valve to the MAIN position                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                      |
| Return to water fill point. Open the drain and then flush the tank using supply hose through the top lid.                                                                                                                                                                                                                                                                                                                                                                                     |   |
| Clean the outside of the sprayer with a soft brush and low pressure hose. Be sure not to spray high pressure water near the Section Valves or Main Control Station                                                                                                                                                                                                                                                                                                                            |                                                                                      |
| Clean the Suction Filter: <ul style="list-style-type: none"> <li>By hand (wearing gloves) undo the large ring that secures the filter bowl</li> <li>Remove the filter element.</li> <li>Hose out any debris trapped in the filter element</li> <li>Check for any damage to the filter element</li> <li>Be sure the Orings on each end of the filter element and the large Oring between the filter body &amp; bowl are fitted and in good condition</li> <li>Reassemble the Filter</li> </ul> |  |



|                                                                                                                                               |                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                               |   |
| <p>Check the pump oil level.</p> <p>Grease the boom main pivot points.</p>                                                                    |                                                                                                                                                                       |
| <p>Store the sprayer in a shed</p> <p>Make sure all the water in the sprayer is drained including the boom where there is a risk of frost</p> |                                                                                                                                                                       |

## 4. Spraying Chart

|    | PRESSURE<br>(BAR) | CAPACITY 1 NOZZLE<br>(L/MIN) | LITRES/HA      |     |     |     |     |     |     |     |
|----|-------------------|------------------------------|----------------|-----|-----|-----|-----|-----|-----|-----|
|    |                   |                              | SPEED IN KM/HR |     |     |     |     |     |     |     |
|    |                   |                              | 4              | 5   | 8   | 10  | 12  | 14  | 16  | 18  |
| 03 | 1                 | 0.68                         | 204            | 163 | 102 | 81  | 68  | 58  | 51  | 45  |
|    | 1.5               | 0.83                         | 249            | 199 | 124 | 99  | 83  | 71  | 62  | 55  |
|    | 2                 | 0.96                         | 288            | 230 | 144 | 115 | 96  | 82  | 72  | 64  |
|    | 3                 | 1.18                         | 354            | 283 | 177 | 141 | 118 | 101 | 88  | 78  |
|    | 4                 | 1.36                         | 408            | 326 | 204 | 163 | 136 | 116 | 102 | 90  |
|    | 5                 | 1.52                         | 456            | 364 | 228 | 182 | 152 | 130 | 114 | 101 |
|    | 6                 | 1.67c                        | 501            | 400 | 250 | 200 | 167 | 143 | 125 | 111 |
| 04 | 7                 | 1.8                          | 540            | 432 | 270 | 216 | 180 | 154 | 135 | 120 |
|    | 1                 | 0.91                         | 273            | 218 | 136 | 109 | 91  | 78  | 68  | 60  |
|    | 1.5               | 1.12                         | 336            | 268 | 168 | 134 | 112 | 96  | 84  | 74  |
|    | 2                 | 1.29                         | 387            | 309 | 193 | 154 | 129 | 110 | 96  | 86  |
|    | 3                 | 1.58                         | 474            | 379 | 237 | 189 | 158 | 135 | 118 | 105 |
|    | 4                 | 1.82                         | 546            | 436 | 273 | 218 | 182 | 156 | 136 | 121 |
|    | 5                 | 2.04                         | 612            | 489 | 306 | 244 | 204 | 174 | 153 | 136 |
| 05 | 6                 | 2.23                         | 669            | 535 | 334 | 267 | 223 | 191 | 167 | 148 |
|    | 7                 | 2.41                         | 723            | 578 | 361 | 289 | 241 | 206 | 180 | 160 |
|    | 1                 | 1.14                         | 342            | 273 | 171 | 136 | 114 | 97  | 85  | 76  |
|    | 1.5               | 1.39                         | 417            | 333 | 208 | 166 | 139 | 119 | 104 | 92  |
|    | 2                 | 1.61                         | 483            | 386 | 241 | 193 | 161 | 138 | 120 | 107 |
|    | 3                 | 1.97                         | 591            | 472 | 295 | 236 | 197 | 168 | 147 | 131 |
|    | 4                 | 2.27                         | 681            | 544 | 340 | 272 | 227 | 194 | 170 | 151 |
|    | 5                 | 2.54                         | 762            | 609 | 381 | 304 | 254 | 217 | 190 | 169 |
|    | 6                 | 2.79                         | 837            | 669 | 418 | 334 | 279 | 239 | 209 | 186 |
|    | 7                 | 3.01                         | 903            | 722 | 451 | 361 | 301 | 258 | 225 | 200 |

## 5. Further Information/Trouble Shooting

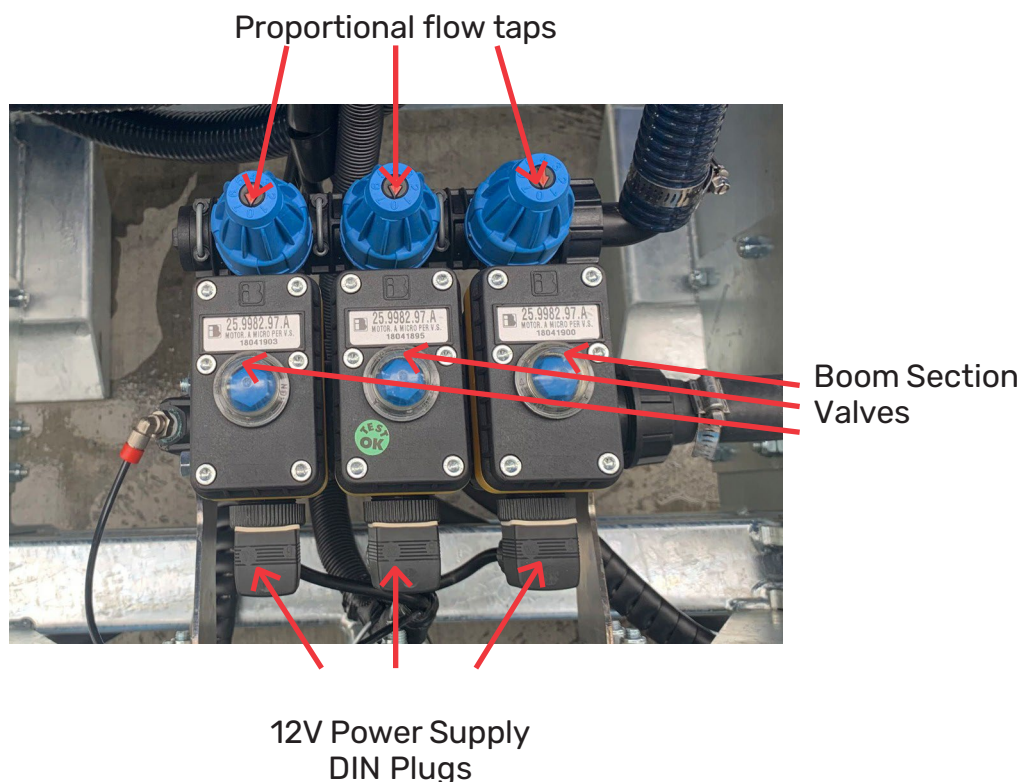
### 5.1 Setup of Proportional Flow Taps on Section Valves

The Proportional Flow control on your sprayer is designed to ensure accurate spraying pressure and consistent application rates when turning individual boom sections on/off. Without proportional valves, you would experience an increase or decrease in spray pressures when turning on/off individual section valves.

1. To set up firstly have an adequate amount of clean fresh water in the Main Sprayer Tank. (approx 400 litres).
2. Unfold the spray boom and have at a height that allows easy access to the Proportional flow taps.
3. Engage PTO and set tractor RPM as if you were going spraying **Ensure you stay a safe distance away from the PTO shaft and do not wear any loose clothing.**
4. On the Sprayer Console turn on the master On/Off switch and boom section switches, 1-3.
5. Using the Pressure Toggle Switch, adjust the spray pressure to 3 bar.
6. Turn off Section One – you will note if not setup correctly an increase or decrease in pressure. Adjust the Proportional Flow Tap on Section One (down for more pressure & up for less pressure) until the pressure is showing 3 bar on the Console Gauge again. Once 3 bar is achieved turn on Section One again.
7. Repeat step 6 for the remaining Section Valves

3 bar is an optimum pressure for Air Inducted Spray Nozzles to operate. However, if running non-Air Inducted Nozzles, we would recommend the above process be repeated at 2 bar.

### Boom Section Valves



## 5.2 Bertolini Pump - Before Operation Checks

**It is essential you read the Bertolini Manual before operating of your sprayer for the first time. Improper use can result in serious injury or death.**

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the pump to check its condition. Be sure to take care of any problem you find, or have your servicing dealer correct it before you operate the pump.

**Warning! Improperly maintaining this pump, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.**

### Checks to make before using the pump:

1. Check, with the pump not running, to make sure that the oil level is correct. Take care not to exceed the indicated level on the oil sight tube. Make sure that when the pump is operating, the oil level reaches the reference mark depending on the type of pump. **ATTENTION:** too much oil creates pressure inside the crankcase, so this can result in some leakages or diaphragm failures. Top up if required with SAE30 oil.
2. Be sure that the inlet and discharge hoses are not crimped, and the filter is clean. Ensure connections are tight to prevent any hose restrictions or air entering, since these conditions will compromise pump performance.
3. When starting, the master switch must be turned to the "off" position and the boom supply tap is in the "ON" position, to assist with self-priming of the pump. Once the pump is primed, the sprayer is ready to operate.

### After use:

After use, in order to prevent damage, flush pump and let operate for a few minutes at working pressure with clean water. Afterwards empty it, so that pressure drops to "0", then let the pump run without liquids for two minutes.

For winter storage, if a freezing condition will be encountered:

1. Empty the pump completely with a mixture of water and antifreeze.
2. Drain the suction and pressure filters.
3. Drain the spray lines on the boom and drain the hose in hose reels (if fitted).

### Oil Change:

#### Change oil after the first 500 hours as follows:

- Rotate the shaft to remove excess oil
- Wash inside the parts with Diesel oil
- Refill pump with oil through the sight glass and rotate the shaft to distribute oil and fill to the proper level
- Start pump and let run for a few minutes at zero pressure to facilitate the correct lubrication of inside parts
- **USE ONLY "SAE 30" GRADE OIL**

For all pumps without a drain plug, oil is normally changed whenever the wear parts (like diaphragms, O-rings, valves assembly) are changed. Always perform this routine maintenance on the pump at the end of the season. Drain the oil from the pump by removing the pump heads one by one and the relevant piston sleeves.

Routine maintenance on the pump includes changing the diaphragms, oil, valves assembly, O-rings, all of which are normal wear parts.

## Pump Accumulator Reference Chart (2136 pump equipped models only)

\*Not applicable on 2073 pump fitted to many LM models

| Operating Pressure | Accumulator Pressure |
|--------------------|----------------------|
| 20 to 50 Psi       | 6 to 8 Psi           |
| 10 to 20 Psi       | 5 to 7 Psi           |
| 5 to 10 Psi        | 2 to 5 Psi           |
| 2 to 5 Psi         | 2 Psi                |

### 5.3 Trouble Shooting Diaphragm Pumps

| TROUBLES                                     | CAUSES                                                                                                                                                                                 | REMEDY                                                                                                                                                |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| The pump doesn't reach the required pressure | <ul style="list-style-type: none"><li>- Valves have worn seats</li><li>- Suction hose has air pockets</li><li>- Worn nozzles or with wrong diameter</li><li>- Clogged filter</li></ul> | <ul style="list-style-type: none"><li>- Check valves</li><li>- Check hose</li><li>- Check nozzles</li><li>- Clean strainer</li></ul>                  |
| The pressure fluctuates on the gauge         | <ul style="list-style-type: none"><li>- Pump is sucking air, or air hasn't been evacuated completely</li><li>- Valves blocked</li></ul>                                                | <ul style="list-style-type: none"><li>- Start pump with the boom or gun open to evacuate the air</li><li>- Clean or change valves</li></ul>           |
| The liquid flow is irregular                 | <ul style="list-style-type: none"><li>- The air pressure in the pulsation damper is incorrectly set (2136 pump only)</li></ul>                                                         | <ul style="list-style-type: none"><li>- Check pressure in pulsation damper</li></ul>                                                                  |
| Output drops and the pump is noisy           | <ul style="list-style-type: none"><li>- Oil level is too low</li></ul>                                                                                                                 | <ul style="list-style-type: none"><li>- Top up with oil to correct level when pump is operating</li></ul>                                             |
| Oil comes out the discharge pipe             | <ul style="list-style-type: none"><li>- One or more diaphragms are broken</li></ul>                                                                                                    | <ul style="list-style-type: none"><li>- Drain the pump of oil. Dismantle the heads and change the diaphragms. Fill to the correct oil level</li></ul> |
| Oil is changing colour to white              | <ul style="list-style-type: none"><li>- Diaphragm failures. Stop pump immediately</li></ul>                                                                                            | <ul style="list-style-type: none"><li>- Drain the pump of oil. Dismantle the heads and change the diaphragms. Fill to the correct oil level</li></ul> |



## 5.4 Care of Protective Clothing

Protective clothing should be properly cared for. Rinse heavily contaminated clothes in the open before washing in the laundry. Wash and dry these clothes every day and keep them separate from other washing.

Respirators need special care. Follow the instructions provided by the Respirator manufacturer.

**The minimum requirements for personal safety are that the operator avoids spray inhalation and does not allow chemicals or spray mixture to contaminate the eyes or skin.**

## 5.5 General Guidance

### Do Spray:

- Only after reading this instruction manual carefully and following the advice given.
- With pump pressures as low as possible consistent with chemical container label conditions and nozzle type.
- With nozzles that reduce spray drift to a minimum.
- With booms as close to the ground as practicable. (Target 500mm) With less than a 5km wind.
- Using the correct personal protective equipment specified on the label of the chemical container.

### Don't Spray:

- With booms higher than is necessary, and no more than about one metre above the ground.
- Unless you have been trained to spray using a tractor operated sprayer.
- In winds higher than 5km/hr.

### CAUTION

To prevent damage to the sprayer, boom and spray gun, drain the water from the sprayer, boom and spray gun when there is a risk of frost.

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