Orchard and Vineyard Sprayer Operators Manual

Slimline
MANUFACTURING

Our Turbo-Mist Sprayers are engineered to reduce cost, reduce footprint, and increase yield.
Whether your clients are corporate farms or standalone operators, we have the models to meet their needs.

SAVES TIME. SAVES MONEY. INCREASES YIELD.

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Eliminate Drift + Improve Coverage • No More Renozzling + Recalibrating

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THROTTLE DOWN

Over 60 Years of Innovation
Adapted for 100% Organic Growers
Models from 50 US Gallons to 1000 US Gallons
Industry Leading Warranty
Over 10 Industry-Specific Attachments
Precision Spray from 40 gallons/acre to 300 gallons/acre

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We offer factory- backed OEM Turbo Mist Genuine Parts to support your needs and your customers. We stand behind our product, and offer our expertise and knowledge to help you get the right parts in a timely manner.

2-Day Delivery Guarantee*

Engineered for the Future

Slimline MANUFACTURING

1-800-495-6145
agsales@slimlinemfg.com

559 Okanagan Ave E
Penticton, BC V2A 3K4
Canada

www.slimlinemfg.com

* Delivery guarantee is 2 standard business days for delivery services within North America, provided by FEDEX and UPS. The cost of shipping will depend on your location, the carrier chosen, and the size and weight of the product purchased.

INTRODUCTION

Dear Owner,

Thank you for choosing a high quality Orchard or Vineyard sprayer manufactured by Slimline Manufacturing Ltd. By choosing to buy Turbo-mist you have not only chosen one of the best quality and most durable sprayers in the industry today, but you have also chosen to support the local economy.

Your sprayer is constructed of the finest materials available. With proper installation, operation, and maintenance, it will provide you with years of reliable service.

We recommend that you carefully review this manual and observe the recommended installation and operating instructions noted within.

Finally and equally important, we invite you to give us your comments and suggestions. There is no substitute for customer feedback. Please address your correspondence to our factory:

Slimline Manufacturing Ltd
559 Okanagan Ave. E
Penticton, BC V2A 3K4
Phone: (250) 493-6145
Toll Free: (800) 495-6145
Fax: (250) 492-7756

WWW.SLIMLINEMFG.COM

URGENT PROTECT YOUR SPRAYER

Growers using Calcium Chloride for spraying applications. If your sprayer is not protected from the chemical it will affect the paint as well as the stainless surfaces.

The following is a recommendation to protect your sprayer from calcium chloride corrosion. This procedure should be applied as per your state OSHA regulations.

First, coat your sprayer & tractor with a light coat of EP2 chassis grease or used motor oil. This will reduce corrosion of the exterior components of the sprayer & tractor. When you are through with the calcium chloride applications the sprayer & tractor will then be easy to clean with solvent, varsol or pressure washer. We recommend after each spray program of calcium chloride is finished, the inside & outside of the tank be washed with a 50% solution of water & vinegar.

Open the boom controls to allow the mixture to flush the booms & nozzles. Then using the hand gun, wash the outside of the sprayer & tractor. To drain the sprayer tank, remove the drain cap at the bottom of the tank, then remove the suction strainers, open the gun taps, petcocks on the booms & run the machine with all the valves & taps open. It is recommended you drive the tractor around during this operation as it will shake out any trapped pockets of residual fluids in the plumbing.

SECOND METHOD:

If you have an air compressor available, connect it to the gun tap & open all valves. This will blow the residual fluid out of the system. You will still have to run the machine to drain the pump. Remove the pressure filter & drain the system.

Buyer assumes all responsibility for the safe and proper handling of all hazardous chemicals. All procedures should be performed in such a manner as not to violate any State, Provincial, Federal, WCB or OSHA requirements designed to protect persons, wildlife and soil or water contamination. Read and comply with all label instructions when handling chemicals. Wear appropriate clothing, eye and respiratory protection. Do not contaminate soil or water when disposing of equipment wash fluids.

Sincerely,

John McMillan

John McMillan
President

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2.0 SAFETY INSTRUCTIONS

⚠ WARNING ⚠ READ THE OPERATORS MANUAL COMPLETELY PRIOR TO USING EQUIPMENT FOR THE FIRST TIME

The owner's manual should be read thoroughly prior to using your sprayer for the first time. You should also read your owners manual at the start of each spraying season as a reminder of safe practices. A protective tube has been located on the sprayer to keep your manual close at hand for reference. Please ensure that all operators of this sprayer take the time to read through the manual. It is the owner's responsibility to ensure that all operators of this sprayer have read this manual and are safely following correct spraying procedures.

The sprayer owner assumes all responsibility for the safe and proper handling of hazardous chemicals. All State, Federal, Provincial, OSHA, WCB and Regional regulations regarding the handling and application of pesticides take precedence over this manual. Before spraying it is the owner's responsibility to insure that operators of the sprayer are in compliance with all regulations pertaining to pesticide application.

The owner and or operator of the sprayer is responsible for ensuring that the correct chemicals have been selected, manufacturers instructions have been followed, the sprayer has been set up and calibrated properly, and proper safety procedures are being followed. Improper chemical selection or use can cause serious injury to persons, animals, plants, soil and the sprayer.

The owner is responsible to dispose of all chemical containers as per instructions on label. Failure to do so could result in contaminating the environment and charges being laid under local law.

Always fully disconnect the sprayer from the tractor when performing any maintenance and closely follow the manufacturer's maintenance schedule. Failure to do so could result in personal injury or death.

Inspect hose and hose connections daily. Check the entire sprayer, prior to each use, for any loose bolts or mechanical connections. Always wear rubber gloves when tightening connections. Damaged, loose or worn hoses could result in operator being exposed to toxic chemicals, which could result in serious illness or faulty sprayer operation.

Never wear loose fitting clothing or anything that may become entangled in the sprayers moving parts. Failure to follow proper safety procedures could result in personal injury or death.

Always block the sprayer and properly support it before crawling underneath for any type of maintenance.

Wear gloves and wash the machine before doing any disassembly repair work. Chemical residues on the machine parts could contaminate operator or service personnel causing serious illness.

Always relieve system pressure before doing any work on the machine. Failure to do so could cause operator to be exposed to high-pressure spray of chemical resulting in serious injury or machine damage.

Never disconnect any hoses nozzles or filters while sprayer is operating. Disconnecting components while under pressure will result in uncontrolled spray discharge, which may be hazardous to humans.

Entanglement in agricultural equipment is a leading cause of serious accidents & death on farms. Always be sure all guards are properly installed and in place prior to operating sprayer.

Do not allow any extra passengers on farm equipment. This can lead to serious injury should the rider fall from the sprayer or tractor.

Replace any damaged or missing warning decals and ensure that all operators clearly understand the meaning of each.

Ensure that everyone stands clear of a sprayer when working. Drifting chemicals and moving equipment can be dangerous to bystanders.

2.1 PRE SPRAY SAFETY CHECK

Before You Start

- ❑ Check all fasteners and fittings and tighten if necessary. Inspect oil levels in both pump and gearbox. Lubricate all grease points including PTO shaft.
- ❑ Check that the sprayer is securely attached to the tractor, that the drive shaft is set up according to section 3, (CONNECTING THE SPRAYER), and that the safety chain is attached to the tractor.
- ❑ Manually inspect all moving parts that they can move freely and remove any entangled debris.
- ❑ Insure that the agitation system moves freely and is operating properly.
- ❑ To avoid pressure spiking, check that the pressure regulator is fully in the released position and that the adjusting knob has been undone.
- ❑ Check that all guards, hoods, and covers are in place.
- ❑ Check that all protective gear, respirators, and face shields are clean and in good working condition. Wear chemical proof clothing, boots, and gloves and always wear face protection or hood and respirator when working with hazardous chemicals. Refer to the labels and instructions that come with chemicals for complete handling and application procedures.

2.2 SAFETY WITH CHEMICALS

Most agricultural chemicals are hazardous and can cause personal disability or death. It is extremely important to handle and use them correctly, and also, to store and dispose of safely. The effects of chronic exposure to chemicals, such as pesticides, are not always immediately obvious and sometimes do not appear for many years. Sometimes the effects of exposure are subtle, such as personality changes or memory loss. Always wear protective clothing and follow the supplier's instructions on the labels to reduce the risk of personal injury.

Reducing the Risks

Chemicals commonly used on rural properties include fertilizers, pesticides, herbicides, animal medications, acids, cleaning agents and solvents.

Suppliers of hazardous substances are required to make available safety information in the form of a material safety data sheet (MSDS) for each product. A register containing a list of all hazardous substances and their MSDS must be maintained at the property.

For each chemical hazard identified, assess the likelihood and severity of an injury, harmful reaction or a hazardous incident occurring. This might include assessing procedures for decanting and using the chemicals and the effectiveness of protective equipment and checking how toxic the chemical is.

Consider the best way to minimize or control these hazards, put control strategies in place and review the effectiveness of these strategies regularly.

General Safety Tips

- ❑ Ensure the register of hazardous substances is maintained and up to date.
- ❑ Read and follow the labels and MSDS for information on hazards, personal protective equipment, safe handling, transport, storage and disposal for each hazardous chemical.
- ❑ Wear appropriate personal protective clothing and equipment when handling and using chemicals.
- ❑ Use the least hazardous chemical available and use it at the recommended rate.
- ❑ Prepare enough of the chemical for immediate use only.
- ❑ Make sure equipment for applying chemicals works properly and does not leak.
- ❑ Don't eat, drink or smoke while pouring, mixing or spraying chemicals.

- ❑ Avoid working alone if you are using highly toxic chemicals, or have some form of mobile communication close by.
- ❑ Advise someone where you will be working and how long you intend to be gone.
- ❑ Clean all equipment thoroughly in an area where run-off will not create a hazard or contaminate the environment.
- ❑ Wash work clothing separately from domestic clothing or use disposable clothing.
- ❑ After handling hazardous chemicals wash your hands thoroughly with soap and water before eating, drinking, smoking or going to the toilet.

Take Precautions

- ❑ Provide a first aid kit.
- ❑ Provide an eye wash station or disposable eye wash bottle.
- ❑ Keep fresh water close by for washing.
- ❑ Have a family member or another person at the property attend a first aid course.
- ❑ Check the labels, MSDS and other safe-handling guides for hazardous chemicals to make sure you have the correct antidotes, emergency equipment and facilities available.
- ❑ Stop work immediately and seek medical attention if there is any sign of muscular spasm, blurred vision, excessive saliva or difficulty breathing during or after using hazardous farm chemicals.

Methods of Pesticide Entry

- ❑ **Oral** - Direct by drinking, splashing into mouth, eating and smoking with contaminated hands, eating sprayed produce, cleaning nozzles with mouth.
- ❑ **Inhalation** - Nose, mouth, but predominately the lungs.
- ❑ **Dermal** - Absorption through the skin. Increased risk when skin is broken or perspiring.

While pesticides are absorbed more completely orally and by inhalation, greater exposure and more poisonings occur through skin (dermal) contact.

2.3 SAFETY MIXING CHEMICALS

General Precautions

- ❑ Read all litterateur and labels of all chemicals and pesticides. Do not trust your memory as the label instructions may have changed since the last use.
- ❑ Reduce or eliminate operator contact by using closed loading systems, auto fillers, wettable powder mixtures or wettable dispersible granules.
- ❑ Use the right protective clothing when handling the concentrate. The user is at greatest risk when handling chemical in concentrate form.
- ❑ Open bags carefully. Cut to open, do not tear.
- ❑ Do not stir chemicals with hands or arms.
- ❑ Do not mix more spray solution than is needed and avoid needless disposal of unwanted chemicals.

Choosing a Mixing Site

Choose the mixing site carefully. The site should be located outside, away from people, livestock, and pets.

Choose an area or build a containment pad where a spill or an overflow could not get away into the fresh water supply and can be cleaned up easily.

Keep soap, first aid kit, and emergency fresh water for cleanup.

Post emergency plan and numbers for quick response.

- ❑ Ambulance
- ❑ Physician
- ❑ Fire Department
- ❑ Police
- ❑ Poison Control Center

Filling the Sprayer Tank with Water

- ❑ Prevent overflow and do not leave the tank unattended while filling.
- ❑ Prevent the fresh water line from coming in contact with the sprayer chemical.
- ❑ Use an air gap fill system with a back flow prevention valve to prevent cross contamination.
- ❑ Always use clean water. Sand, dirt, and algae causes severe pump damage, nozzle wear and can reduce the effectiveness of pesticides.

Adding Chemicals to Tank

- ❑ Before proceeding check all fittings and hoses for leaks.
- ❑ Wear appropriate protective equipment and clothing while filling sprayer with chemical.
- ❑ Fill sprayer tank half full with chemical.
- ❑ Turn on agitation system.
- ❑ Slowly add water to chemicals. Be sure to hold the container below eye level when pouring to reduce the chance of splashing chemicals.
- ❑ Finish filling the tank while chemical agitation is mixing.
- ❑ Wash your hands thoroughly to prevent contamination to the tractor controls and cab.

READ CHEMICAL LABELS - KNOW YOUR PESTICIDES

STOP

- ❑ Read the label
- ❑ Is it the right pesticide?
- ❑ What is its poisons schedule or toxicity?
- ❑ What safety precautions are required?
- ❑ What is its persistence and withholding period?
- ❑ What is its mode of action?
- ❑ Prevent overflow

Disposal of Unwanted Pesticides and Containers

- ❑ Rinse empty containers and pour residue into the spray tank.
- ❑ Punch a hole in the containers to prevent any other use.
- ❑ Cleaning and disposal of containers should be done in accordance with Provincial, State, and Federal laws.

2.4 OPERATING SAFETY

- ❑ Read and understand completely the owner's manual and all safety decals before using the sprayer.
- ❑ Before servicing, adjusting, or maintaining the sprayer; stop the tractor engine, place all controls in neutral, set parking brake, connect all electrical connections, remove ignition key and wait for all moving parts to stop.
- ❑ Keep hands, feet, hair, and loose clothing away from all moving and rotating parts.
- ❑ Do not allow riders on sprayer or tractor during operation.
- ❑ All covers, guards, and hood must be in place during operation.
- ❑ Be sure that sprayer is safely connected to the tractor and a safety chain is in place.
- ❑ Make sure area to be sprayed is clear of all bystanders, animals, and small children before starting.

TRANSPORT

- ❑ Always travel at a safe speed. Do not exceed 20 mph (30km/h) during transport.
- ❑ Be sure that the sprayer is securely attached to the tractor, complete with safety chain.
- ❑ Use hazard-warning flashers when traveling along road way unless prohibited by local law.
- ❑ Clean light, reflectors, and SMV before transporting.
- ❑ Do not allow riders on the sprayer or tractor.
- ❑ Always follow all regional laws as to the transportation of your sprayer.

SPRAYING

- ❑ Clean and inspect all equipment prior to filling sprayer.
- ❑ Make sure that the area to be sprayed is clear of people and animals.
- ❑ Post warning signs to keep people out of treated areas.
- ❑ Observe weather conditions, especially wind direction & speed. Do not spray in winds stronger than 2 mph (3.5 km/h). As wind increases so does drift. Strong winds will also cause uneven chemical application.
- ❑ Plan your route so that you avoid passing through airborne spray and double coverage in treated areas.

2.5 SAFETY SYMBOLS AND DECALS

SYMBOLS

- ❑ Recognize and understand your safety symbols.

SAFETY ALERT SYMBOL

The safety alert symbol means:

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

SAFETY SYMBOL SIGNAL WORDS

Safety signal words appear on all safety decals. The appropriate signal word has been selected using the following as a guide.

DANGER – An immediate and specific hazard which will result in severe injury or death if the proper precautions are not taken.

WARNING – A specific hazard or unsafe practice which could result in severe personal injury or death if proper precautions are not taken.

CAUTION – Unsafe practices which could result in personal injury if proper practices are not taken, or as a reminder of good safety practices.

IMPORTANT – Specific requirements as to the care of the machine or the set up of its components. If the information is not followed the warranty will be void.

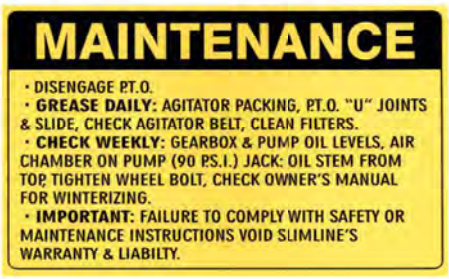
MAINTENANCE – Specific maintenance information for the care of the machine and its mechanical assemblies. If the information is not followed the warranty will be void and failure could occur.

SAFETY DECALS

- ❑ Keep safety decals clean and legible at all times.
- ❑ Replace decals that are damaged, illegible, or missing.
- ❑ Order new decals when replacing guards and other parts that display safety decals on your sprayer.
- ❑ New decals can be ordered from your dealer or direct from Slimline Manufacturing Ltd by calling 1-800-495-6145, extension 203.

SAFETY DECAL REFERENCE GUIDE

19054 – Warning Pressure



25082 – Maintenance Information

19129 – Warning Do Not Plug Vent Hole

25046 – Bypass Agitation Volume

25071 – Grease PTO Daily

25044 – Do Not Run Pump Dry

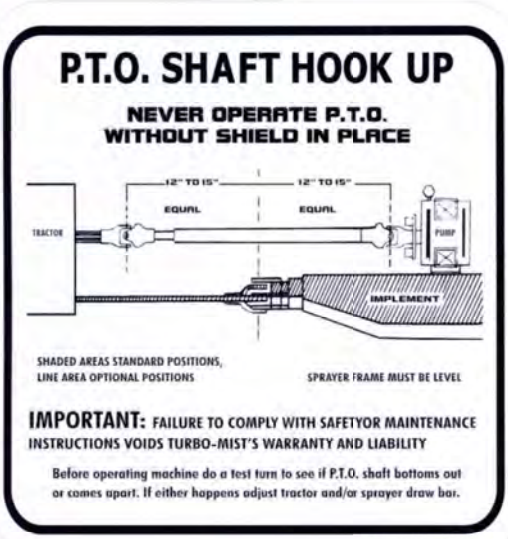
19117 – Moister Hazard Monitor

25051 – Grease Location

19057 – Read Owners Manual

19056 – Toxic Hazard

19053 – Toxic Hazard



25081 – PTO Hook UP Information

25084 – PTO Hook Up Information

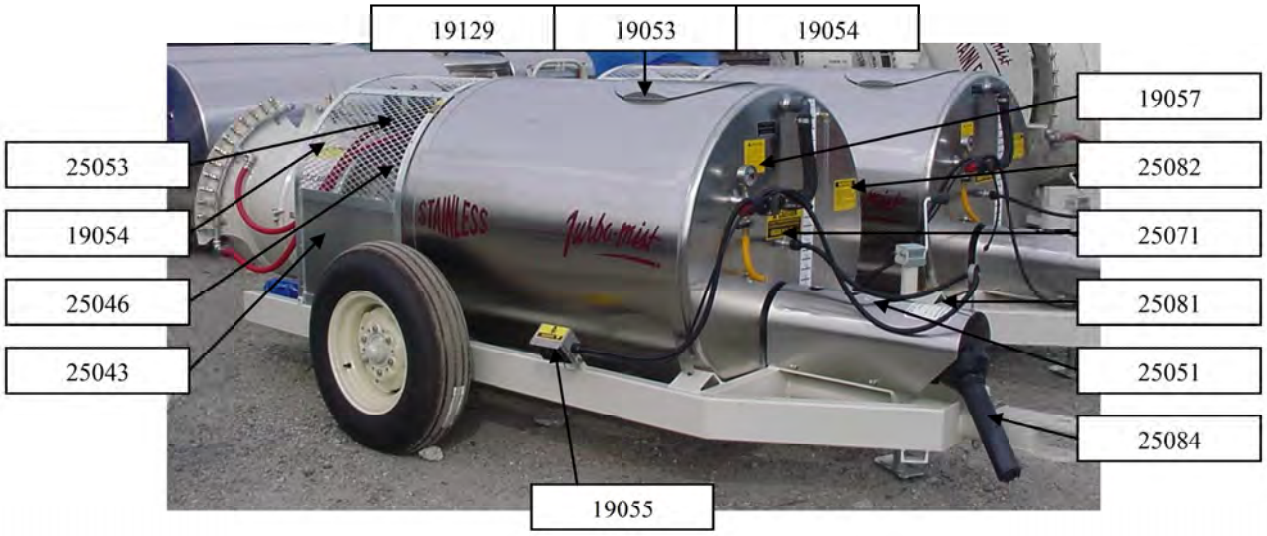
25053 – Keep Clear

25085 – CV Alignment in Phase

25043 – Pump Maintenance

19055 – Electrical Hazard

Typical Decal Locations



* Decal locations may vary from unit to unit. Only consider those that apply to your sprayer.

3.0

Connecting & Setting the Sprayers driveline

3.0 CONNECTING AND SETTING YOUR SPRAYERS DRIVELINE

⚠ **WARNING** ⚠ You can be badly injured working on or around agricultural equipment. Do only service work for which you have the knowledge and the right equipment. If you have any doubt about your ability to perform a service job, take your sprayer to a competent service technician. For a complete list of Turbo-mist certified service centers in your area log onto www.slimlinemfg.com or call us at 1-800-495-6145.

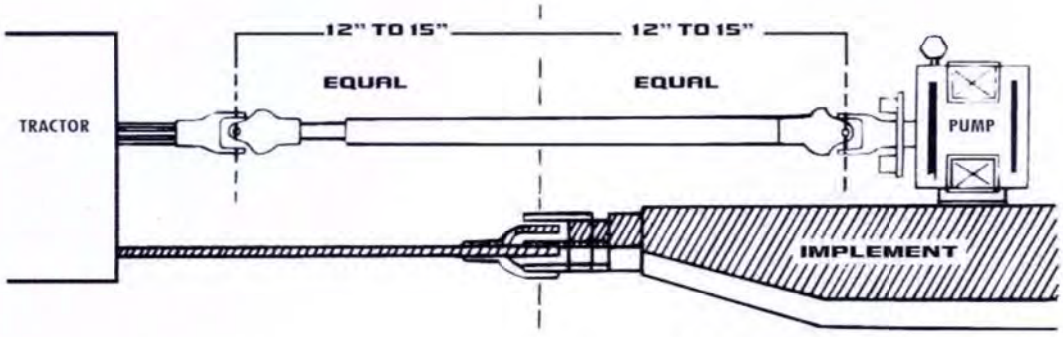
3.1 PTO. Shaft: Hook Up and Length Adjustment for Clevis Hitch Units

When setting up the driveline on your new Turbo-mist sprayer it is important to check the following steps to ensure proper set up.

- ❑ Before proceeding; stop the tractor engine, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.
- ❑ Grease PTO shafts and all other grease points before hooking the sprayer to the tractor.
- ❑ Connect the sprayer to the tractor by either a bolt or a link pin that loosely fits through clevis hitch of the sprayer and is bolted to the tractor. Your sprayer is equipped with a safety chain holder so the sprayer can be chained to the tractor for added safety.
- ❑ With the tractor hooked to the sprayer, connect the PTO shaft to the tractor and measure from the u-joint cross to the draw pin bar [figure 1]. It is important to assure that the distance is equal to avoid possible driveline damage during operation.
- ❑ If the distance is not equal and the area at fault is the sprayer, the hitch may be extended as shown on illustration [figure 2] on the following page.
- ❑ In order to assure smooth operation during the turning, it is important to have the drive shaft level, as shown in the illustration marked PTO shaft hook up [figure 1].
- ❑ Often the sprayer hitch can simply be repositioned to gain a little adjustment as illustrated [figure 3] on the following page.
- ❑ If the above adjustment is not enough you may have to adjust the axles on the unit. To do so, jack up the unit and remove the tires. After doing this inspect the backing plate that holds the axle to the sprayer frame. You will find that you have several choices available [figure 4].
- ❑ After you have made all of the required adjustments it is a good idea to drive the unit without the PTO engaged and test to see if there is enough movement in the shaft during operation.
- ❑ Following these few simple steps will help insure many years of trouble free operation.

P.T.O. SHAFT HOOK UP

NEVER OPERATE P.T.O. WITHOUT SHIELD IN PLACE



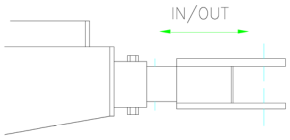
SHADED AREAS STANDARD POSITIONS,
LINE AREA OPTIONAL POSITIONS

SPRAYER FRAME MUST BE LEVEL

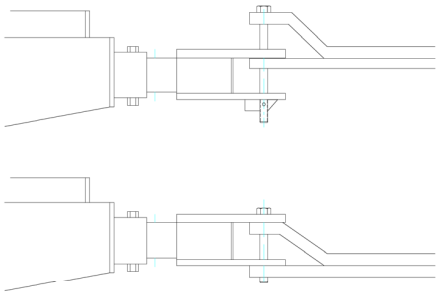
IMPORTANT: FAILURE TO COMPLY WITH SAFETYOR MAINTENANCE INSTRUCTIONS VOIDS TURBO-MIST'S WARRANTY AND LIABILITY

Before operating machine do a test turn to see if P.T.O. shaft bottoms out or comes apart. If either happens adjust tractor and/or sprayer draw bar.

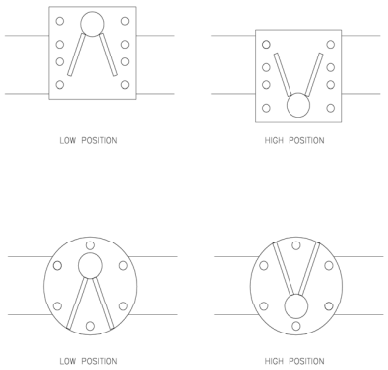
(FIGURE 1)



(FIGURE 2)



(FIGURE 3)

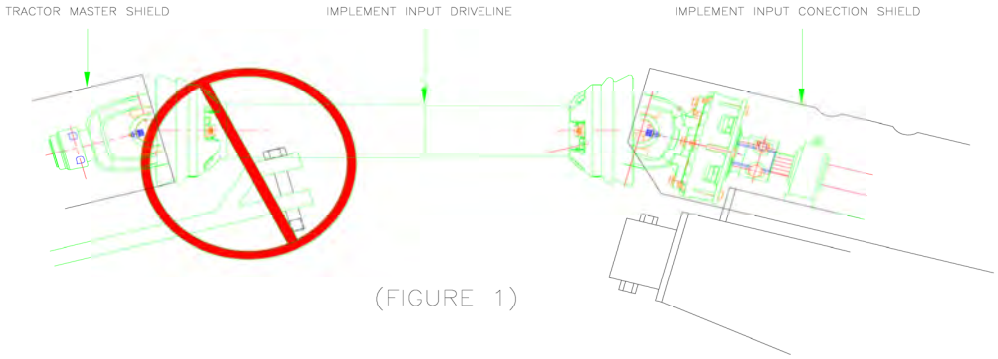


(FIGURE 4)

Tractor Drawbar Clevis on PTO Driven Implements

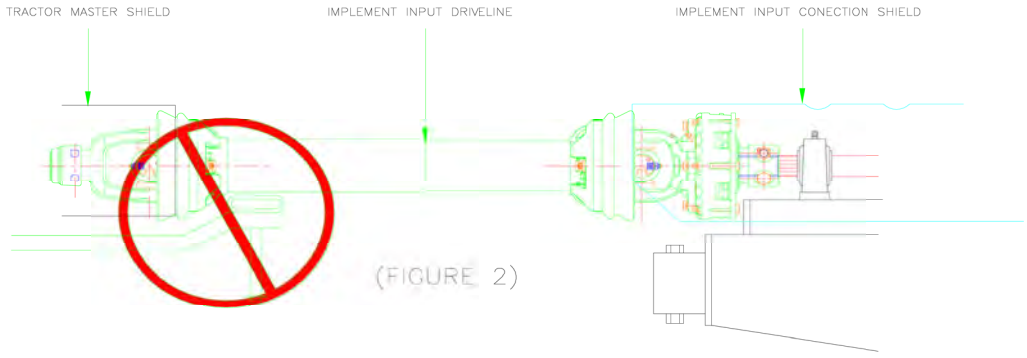
Clevis Hitches—A tractor drawbar equipped with a clevis hitch (hammer-strap) can cause interference with the PTO driveline IID [Implement Input Driveline]. This interference can cause serious damage to the IID guarding and the IID telescoping members. The clevis hitch on the tractor must be removed.

If this implement is attached to a tractor with a clevis hitch (hammer-strap) style drawbar, the clevis hitch must be removed to prevent damage to the IID guarding and the IID telescoping members. [See Figure 1]



(FIGURE 1)

If this implement is attached to the tractor with an offset in the drawbar, be certain it is in the down position to prevent damage to the IID guarding and the IID telescoping member. [See Figure 2]



(FIGURE 2)

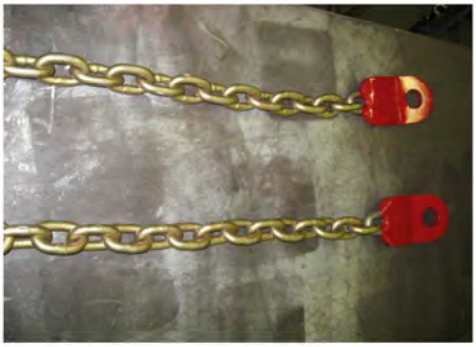
3.2 Turbosteer Hitch System

Turbosteer Hitch

NOTE: IT IS VERY IMPORTANT TO MAINTAIN A LEVEL DRIVE LINE AT ALL TIMES.

Check Chains Setup- Check chains maintain a consistent 3PT height and a level drive line. Comprised of two top brackets, two lower brackets and chains.

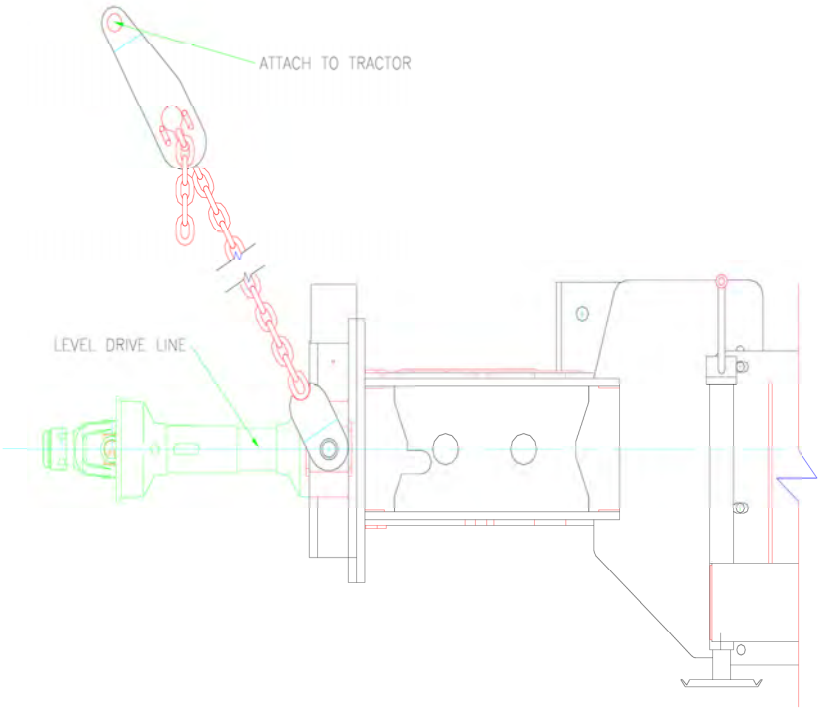
Top Tractor Links



Bottom 3PT Links

Install top links on tractor at the upper link pin above the 3PT arms. Install lower link plates on implement 3PT pins. Raise 3PT arms till the sprayer driveline is level. Pull chains through upper link plates till they slip into the receiver slot with no slack. Raise 3PT arms so that you can pull through one more link and bring arms back to level. Driveline should now be level and chain should stabilize 3PT arms. (Note: this is only required on 3PT tractor arms without 3PT lock-out to prevent them from lowering while in use.)

4.0
Operating Instructions



4.0 OPERATING INSTRUCTIONS

The Turbo-mist sprayer you have purchased has been engineered and built for maximum efficiency for pest control on your farm. This manual has been compiled to give you instructions on the proper operation and maintenance of your machine. As this instruction book covers several Turbo-mist sprayers, please pay particular attention to those sections that pertain to your unit.

4.1 Components of the Sprayer

Tank and Agitator

The tank of the sprayer is made of TYPE 304 stainless steel. The tank should be cleaned each time the machine is used. To clean, put 20 gallons of water in the tank and connect a short spray hose to the gun outlet. With the tractor running at idle, engage the PTO and turn booms on and off to flush out any remaining material in the system. Wash the outside and inside of the unit with clean water including the turbine and outlets to prevent a build up of material. If a build up does occur inside the tank, put in 20 gallons of water, mix in 2 gallons of vinegar and using the spray gun, clean the inside of the tank.

The mechanical agitator shaft is located inside of the tank. This shaft is driven from the rear of the machine by a gear belt or chain off of the gearbox or center shaft. The tension of the belt is kept constant by the use of a belt tensioner. Daily inspection of the belt should be made. The agitation shaft is supported at the front by a nylon bearing and at the rear by the packing gland assembly. The packing gland should be greased daily when in use. If a leak occurs at the packing gland on the rear of the tank, repair by tightening the bolts on the packing gland by ½ a turn each until leak stops. If leak persists the packing may require replacing.

Frames, Axles and Hubs

As the frame is a welded unit it should last for several years. Axle plates and spindles are bolted to the frame and these bolts should be checked for tightness periodically. The normal ground clearance on the machine can be changed up or down by rotating or sliding of the axle plates. The axle bearings should be packed once a year.

Power Takeoff Shaft (PTO)

The universal joints and the male/female shafts should be greased DAILY. When the machine is connected to the tractor with the PTO hooked up, the draw bar should an EQUAL DISTANCE from the front and back yoke of the PTO. A level PTO shaft will reduce vibration when turning.

Main Drive Shaft

This is the shaft that runs through the tank to the back of the machine and is coupled to the idler shaft on the front and the gearbox on the rear by a bolt on the u-joint yoke. These bolts should be checked for tightness, the u-joints and bearings should be greased once a month. This shaft can be removed from the machine by taking the yoke bolts out and removing the two bearings on the front of the machine. The shaft can then be pulled through the tank.

Fan

Turbo-mist sprayers use a 1 pc balanced cast aluminum fan. The fan is attached to the shaft with a tapered lock bushing and is supported by one fixed bearing inside turbine housing.

Air Outlets & Spray Booms

Air outlets control the air speed and air patterns on the sprayer. The shape of these openings is designed to give uniformity of air speed and volume of air. The only maintenance required is to keep them clean. If for some reason the outlets become bent, take them to your authorized dealer to be straightened. If the machine is operated with the air outlets dirty or bent, non-uniform air volume is developed resulting in poor chemical distribution.

The spray booms are made of stainless steel with brass nozzles and caps. After EVERY SPRAY the booms should be cleaned with water. This will ensure a uniform flow of liquid to the nozzles. The stainless steel nozzles and swirl plates should be checked for proper size EACH SPRING before starting up, as the spray material may wear the openings. During operation any increase in size will cause an increase in output.

NOTE: Included in this manual are the complete charts for nozzle output and calibrations for the tractor and tree width. Make sure your sprayer is properly calibrated by periodically checking its output. Use only clean water in the sprayer to ensure maximum life from the pump, relief valves and nozzles.

Turbo-mist Pumps

⚠ WARNING ⚠ ENGAGE PTO CLUTCH SLOWLY AND SMOOTHLY. AVOID SUDDEN STARTS AND FAST CLUTCHING THAT CAN DAMAGE THE DRIVE LINE AND DRIVE SECTION OF THE PUMPS.

Udor and Comet Pumps – General Operation and Pump Maintenance

The Udor or Comet pumps are semi-hydraulic diaphragm pumps with all moving parts immersed in oil. The spray liquid is kept separate from the crankcase by a diaphragm, this allows abrasive materials and running of the pump dry, without damage to the internal parts. All parts in contact with the liquids being pumped are corrosion resistant materials.

Pump Operation and Maintenance

The pump is the heart of the sprayer. It demands DAILY INSPECTION and MAINTENANCE. Oil levels should be checked daily. The correct oil level is when oil is just showing in the oil bowl. Before starting up, check the oil level. If oil is required SAE 10/30 or SAE 10/40 GOOD QUALITY motor oil can be added. Leave an air space in the filler chamber as the oil will expand during operation and without this air space there will be a build up of pressure thus resulting in a loss of oil.

NEVER operate the pump without a suction filter as large objects may be sucked into the pump which will cause major damage to the pump casing, this will void any warranty.

Always use the pump with a pressure regulator. DO NOT run the pump any higher than the recommended maximum pressure for the pump on your sprayer. The recommended pressures for the pumps used on Turbo-mist sprayers are as follows:

- **Udor-RO/160 300 PSI**
- **Comet-IDS1400 700 PSI**
- **Comet-IDS2000 700 PSI**

Storing the pump when not in use – ALWAYS run clear water through the pump when you are finished using it. In freezing weather the pump must be dry and filled with good quality automotive antifreeze.

The Suction System

The suction system starts in the tank at the sump. From the sump a line runs to a ball valve and suction strainer, which should be checked and cleaned DAILY. The ball valve should be opened all the way to ensure maximum fluid flow to the pump.

24 & 30-inch fan unit:

From the intake side chemical is drawn across the diaphragm, through the pump, to the pressure side. Chemical is then pushed up through a high-pressure hose to the relief valve. From the pressure side of the relief valve the liquid goes to the valve manifold and distributed to the spray booms or the gun tap.

Myers and Hypro Pumps - Pump Operation and General Maintenance

Priming

All centrifugal pumps must be primed before starting. If the pump is run dry the mechanical seal will be damaged. To ensure the pump primes properly there are two bypass lines off the high and low-pressure stages of the Myers pump and one bleeder line returning to the tank from the Hypro pump. There is also a drain cock on the top of the suction chamber which should be opened to remove trapped air if pumps do not self-prime. Close this drain cock as soon as water begins to flow out of it. The Myers pump will fill as the tank is filled as long as the suction line gate valve is open. The gate valve should only be used when cleaning the suction filter. The hypro pump is designed to self-prime and should also fill as the tank is filled. If the pump does not build pressure quickly it has not been primed and should be stopped immediately to avoid seal damage.

Mechanical Seal Lubrication

On the Myers pump, the mechanical seal chamber is lubricated through the clear oil filler tube. The oil tube should be full during operation as it protects the seal from heat build up and from running dry. Use SAE 30 oil to fill the tube and check the level daily.

Flush Pump After Use

One of the most common causes for faulty pump performance is "gumming" or corrosion inside the pump. Flush the pump and entire system with a solution that will chemically neutralize the liquid pumped. Mix according to manufacturer's directions. This will dissolve most residues remaining in the pump, leaving the inside of the pump clean for the next use.

To Prevent Corrosion

After cleaning the pump as directed above, flush with a permanent-type automobile antifreeze (Prestone, Zerex, etc.) containing a rust inhibitor. Use a 50% solution - that is, half antifreeze and half water. Plug the ports to keep out air during storage. For short periods of idleness, non-corrosive liquids may be left in the pump, BUT AIR MUST BE KEPT OUT. Plug ports or seal port connections.

Pump Overhaul

Contact your local dealer, our Parts Department or download the manufactures overhaul instructions from their website.

Filters

Suction Filters

Turbo-mist sprayers come with two types of inline suction filters to protect the pump from damage. Clean the suction filters by closing the valve to the tank. Unscrew the large plastic nut or aluminum face plate and remove the lid. Remove the filter for cleaning, being very careful not to damage the O-ring of the filter lid. If the ring is damaged it will allow air to enter and result in variations of pressure while spraying. Clean and replace filter. Lubricate the O-ring with vegetable oil, (EP 2 Grease) and reinstall the lid. Open the tank valve to allow chemical to flow through the filter.

Pressure Filters

In-line pressure filters are used to provide a clean flow of liquid to the spray nozzles. Pressure filters should be cleaned daily. Unscrew the filter bowl to inspect and clean the filter. Remove the filter for cleaning, being very careful not to damage the O-ring. Clean and replace filter. Lubricate the O-ring with vegetable oil (EP2) and reinstall the bowl.

4.2 Operation and Calibration

Air-blast sprayers use a high-speed fan driven air-stream to disperse spray from nozzle through the foliage. The introduction of varying sizes of fruit trees has caused some growers to be faced with multiple calibrations in a single orchard or vineyard. The procedures described in the following pages have long been the standard method of calibration to ensure pesticide or organic chemicals are applied at the recommended amounts per acre or hectare. Whether you use traditional spray methods or adopt TRV techniques, these calibration procedures will continue to ensure that you are actually applying the amount of pesticide intended.

If you need further advice about set-up, nozzle selection or calibration, or for further information on tree row volume spraying, contact your District Horticulturist or local field representative.

SET-UP

Follow these steps when setting up an air-blast sprayer for proper calibration and sprayer operation;

1. Inspecting the equipment
2. Adjusting the air-stream
3. Adjusting spray pressure
4. Selecting spray volume
5. Measure forward speed
6. Calculating required output per side
7. Selecting a set of nozzles
8. Measure delivery rates
9. Adjusting output

We recommend that you follow all of the above procedures each time you set up a new sprayer or adapt to a different size or type of planting. Each step is described in detail below.

Inspecting the Equipment

Pre Spraying – check that:

- ❑ Tire pressure of both the tractor and sprayer are correct.
- ❑ All hoses are in good condition and of the proper rating.
- ❑ All filters, strainers, and screens are clean and in place.
- ❑ Nozzles are clean and are the intended type and size.

Sprayer Running -tank about half full of clean water.

- ❑ Start the pump and set the tractor engine speed to obtain the rpm recommended for the pump (usually 540 rpm).
- ❑ Open the valve to the manifold to fill the lines and begin spraying.
- ❑ Once all the nozzles are spraying, adjust the pressure regulator to the operating pressure recommended for your pump and spraying operation (using the lowest pressure recommended will extend pump life and reduce the amount of small droplets that may drift).

Spraying – check that:

- ❑ Check that each ON/OFF valve is working.
- ❑ Test pressure gauges for accuracy by installing a second gauge at the boom and comparing the pressure.
- ❑ Check that the agitation system is working properly.
- ❑ Make sure there are no leaks in the spray system.

Adjusting the Air-stream

The air-stream created by the turbine and sprayer fan carries the spray mixture into the planting and distributes it throughout the foliage. To reach all leaf surfaces and obtain complete pesticide coverage, all of the air around the foliage must be displaced by the spray-laden air-stream. Both the speed of the air and the volume of the air from the outlet are important to achieve good coverage. The speed of the air-stream, for a sprayer with cone nozzles, must achieve a minimum air speed at the fan outlet of at least 100 mph (160 km/h).

Air Volume Measurement in Cubic Feet Per Minute

Slimline Manufacturing Ltd has taken air volume measurements of their Airblast sprayers and following are the results, tested at a 540 PTO. speed.

The following air volume measurements were recorded on Turbo-mist air blast sprayers in spray trials at the factory:

Air Volume Measurement in Cubic Feet Per Minute					
Turbine size:	**19"**	**24"**	**30"**	**30"**	**38"**
Gearbox:	M47	M47	M55	M60	M55
Cubic feet per minute (CFM)					
Standard outlets Low gear	6553	11,468	19,593		
Standard outlets High gear	7244	13,558	22,572		
Wide mouth outlets Low			21,944	31,497	34,050
Wide mouth outlets High gear			25,551	36,265	40,059
Engine drive (Cummins diesel)					50,384
Air speed in miles per hour					
Standard outlets Low gear	95	10	130	n/a	120
Standard outlets High gear	105	130	150	n/a	135
Wide mouth outlets Low gear	n/a	n/a	n/a	160	n/a
Wide mouth outlets High gear	n/a	n/a	130	185	n/a
Engine drive (Cummins diesel)	n/a	n/a	n/a	n/a	170

Volume of Air-stream – Large trees require a greater volume of air than small ones. Air-stream volume is determined by both: the size of the fan-housing opening, and air speed. Air volume can be varied by simply increasing or decreasing the PTO rpm, but remember the air-speed rule mentioned above.

Air-stream Direction – More important than air speed and volume to coverage, is air direction or angle of attack to the foliage. The foliage must be hit by air at an angle to cause the leaf to rotate and allow the spray-laden air to enter the center of the spray target. Your Turbo-mist has adjustable outlets on both the orchard head and low drift towers to maximize this benefit of angle of air attack.

Adjusting Spray Pressure

The spray pressure affects both the volume of spray output and the size of spray droplets. As pressure increases, spray output increases but droplet size gets smaller. Excessive pressure can result in too many small droplets, which are prone to drift far away from the target. Excessive pressure also increases wear on the pump, hoses, and nozzles.

As pressure decreases, spray output decreases but droplet size gets larger. Too low a pressure causes spray so coarse that it does not penetrate foliage properly. For low volume spraying with hollow cone nozzles, adequate spray breakup can be obtained at a pressure of 100 PSI (690 KPA). For medium and high volume spraying, lower pressure can be used because spray breakup is not as critical. Droplet size charts for varying pressures through nozzle equipment are included in this manual.

One of the most common problems with piston diaphragm or plunger pump equipped sprayers is accuracy of application rates when dealing with single sided spraying. Most units will experience a pressure increase, therefore increasing the rate of application during this process. Your Turbo-mist (piston diaphragm pump models only) is equipped with a unique feature to maintain constant pressure called the "bypass valve". The bypass valve works in the following manner: when any of the boom control switches are turned off, this automatically activates the electric bypass valve, thereby dumping the extra water and pressure back to the tank. Just before the entrance of the tank is a throttling valve. This is so the water returning to the tank can be adjusted to copy the amount of water that would be spraying out the closed boom. By doing this, the pressure should remain the same when a boom is shut off. This feature also helps extend pump life by reducing the pressure during start up and reducing pressure spikes.

Setting the bypass valve:

Step #1: Set the desired pressure at the regulator with both booms running.

Step #2: Turn either boom off (one boom only).

Step #3: Note the pressure change; if the pressure increases then go to the back of the tank and open the throttling valve until the pressure is the same as if you had both booms running, if the pressure decreases do the reverse. This procedure will have to be repeated every time the calibration is changed.

Units equipped with a piston diaphragm pump have an additional water relief circuit located near the regulator at the front of the tank. This is used when extremely low rates of application are required, it is important to note that this must be used in conjunction with the existing regulator. Simply open or close this valve to achieve the desired lower pressure.

Selecting Spray Volume

Spray volume is the amount of diluents (usually water) in which a pesticide is mixed and sprayed for a specific area. The choice of spray volume depends on the pesticide, the pest being controlled and the application equipment.

Most insects and diseases of fruit trees and vineyards can be controlled with low volume sprays (60 to 90 GPA or 225 to 340 litres/acre). Some pests may require volume spraying (120 to 250 GPA or 440 to 880 litres/acre) or high volume spraying (300 to 600 GPA or 1,120 to 2,240 litres/acre). High-volume spraying is characterized by considerable runoff and may be required for control of fruit tree scale insects.

Measuring Forward Speed

Forward speed of the sprayer must be slow enough to allow the air-stream to completely replace the air in the foliage, but not so slow that excessive blow-through results. The choice of forward speed for orchards depends on the tree size, spacing, and density of foliage, air-stream speed and volume. The recommended range of forward speeds is from 1 to 3 mph (1.6 to 4.8 km/h). The sprayer speed selected for use during application must be accurately measured in order to select correct nozzles and to calculate chemical delivery rate.

Measure forward speed for various gears as follows:

Step #1: Mark off a test strip which is reasonably long, 200 ft or (60 metres), which represents typical field driving conditions. Make sure tire pressures are correct. Fill your tank about half full; you won't be spraying now, but this gives an average weight load.

Step #2: Select a gear and a tachometer to give you 540 PTO. Be sure that the blower is going without discharging water. Reach and hold your forward speed before entering the test strip.

Step #3: Use a stopwatch or watch with a second hand to measure the exact time required to travel the test trip and record.

Step #4: Repeat steps 2 and 3 at least 3 times for each gear selection.

Step #5: Calculate exact forward speed by using the following desired formula:

$$\text{FORWARD SPEED (MPH)} = \frac{\text{total distance traveled (ft)} \times .68}{\text{total time required (sec)}}$$

$$\text{FORWARD SPEED (Km/h)} = \frac{\text{total distance traveled (m)} \times 3.6}{\text{total time required (sec)}}$$

Calculating Required Output per Side

Air-blast spray nozzles are sold on the basis of their output per minute. You must be sure to select a set of nozzles whose individual outputs, added together, equal the required output per side. Choose either of the following formulas, depending on the units you are using:

$$\text{Output per side (US GPMP)} = \frac{\text{recommended spray volume (GPA)} \times \text{forward speed (MPH)} \times \text{row spacing (FT)}}{1000}$$

$$\text{Output per side (L/MIN/SIDE)} = \frac{\text{recommended spray volume (L/Acre)} \times \text{forward speed (Km/H)} \times \text{row spacing (M)}}{1200}$$

$$\text{Output per side (L/MIN/SIDE)} = \frac{\text{recommended spray volume (L/ha)} \times \text{forward speed (Km/H)} \times \text{row spacing (M)}}{990}$$

Selecting a Set of Nozzles

You can now select a set of nozzles to give you the required sprayer output (US GPM or L/MIN/SIDE) at the selected operating pressure. They are chosen not only to give a correct total output, but also to produce the desired spray pattern.

Nozzles of different outputs may be arranged on the sprayer manifold in order to achieve the desired spray pattern. Usually most of the spray volume is directed at the thickest foliage. For vineyard spraying, nozzles may be placed only in the lower half of the manifold.

If you set up your manifold for mature or nearly mature trees, a typical spray pattern is for approximately two thirds (67%) of the spray material through the upper half and about one third (33%) through the lower half. This means nozzles in the lower part will be much smaller than those in upper part. Most air-blast sprayers use seven nozzles on the manifold when applying low-volume sprays, so half the output of the middle (4th) nozzle is included in both upper and lower outputs.

Measuring Delivery Rate

In theory, the sprayer has been set up to deliver a certain output per side. In fact, the output may be different than expected. This is true both of new nozzles and of old ones, which may have worn through use. You must measure the actual output per minute in order to calculate the delivery rate. You need to know the delivery rate to determine how much pesticide to add to the spray tank and to ensure it is within the range of recommended spray volumes.

First measure actual sprayer output per minute. Then, having already tested your true forward speed, you can calculate the delivery rate.

Step #1: Position the sprayer on a level location and fill it approximately half full of water. Measure the water level in the tank (use a calibrated measuring stick). Write down the water level.

Step #2: Start the sprayer pump operating. Set the pressure to that used when selecting nozzles.

Step #3: Spray out water from the booms for a measured time, ten minutes is usually enough. You do not have to be moving to complete this test.

Step #4: Measure the amount sprayed by either measuring the amount of water left in the tank with a calibrated stick or accurate tank gauge, or by refilling the tank to the original level with an accurate measuring container.

Step #5: Calculate the sprayer output per minute for the sprayer from both booms.

$$\text{Sprayer output (GPM or LPM)} = \frac{\text{amount sprayed (Gal) or (Litres)}}{\text{time of test (Min)}}$$

Adjusting Output

Changing nozzle sizes is the only way you should make large changes in output.

Changing forward speed for PTO-driven sprayers must only be done by making a full gear change. Such as moving from second low to third low so that PTO speed and engine rpm are maintained.

Change pressure to get a small change in output. It is not practical for large changes in pressure since to double the sprayer output you would have to increase system pressure by four times.

Tips For Managing Spray Drift

Know when not to spray. Delay application if; wind speeds exceed 2.5 mph (5 km/h), if the temperature is higher that 85 degrees Fahrenheit (30 Celsius), and if relative humidity is less that 50 percent.

All nozzles produce a spectrum of droplet sizes within the same spray pattern. Spray droplets are measured in microns and categorized as follows:

Fine	0 – 200 microns	30 – 40 microns	Visibility Threshold
Medium	201 – 300 microns	100 microns	Human Hair
Coarse	301 – 400 microns	500 microns	Table Salt
Very Coarse	401 – microns and larger	1000 microns	Thickness of a Dime

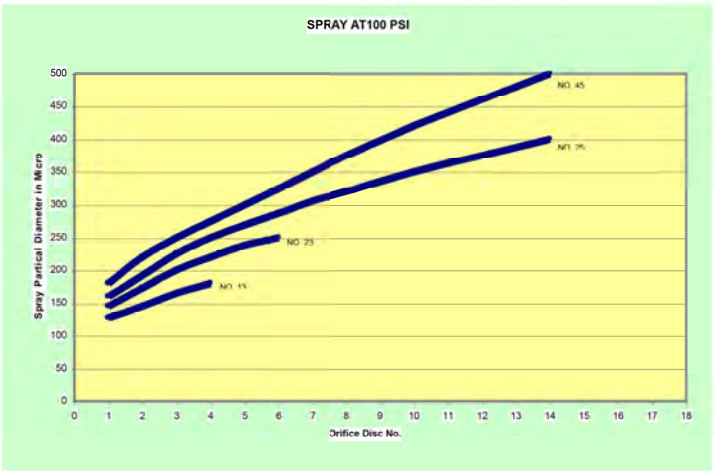
The shorter the distance a droplet has to travel, the less chance for a drift. Lower the pressure to produce larger droplets. The easiest and most economical way to control drift is to use the right tip. The goal is to get the largest droplets without sacrificing good target coverage. Today's advance tip design produces large droplets less prone to drift while maintaining a high quality spray pattern. In applications where maximum coverage is critical, higher carrier volumes may be necessary when droplet sizes are very coarse.

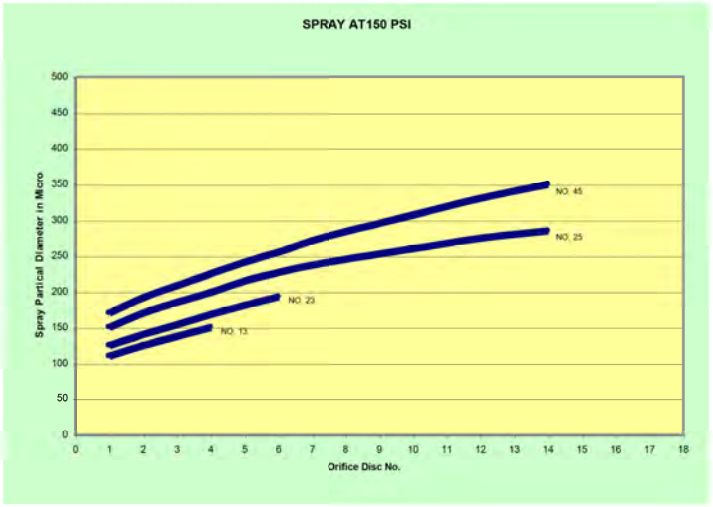
2009-2010 Turbomist standard Calibration (based on 2.5mph 12/14/16 ft rows)							
Using 7 nozzles , location 1, 3.5.7.9.11.13 output 100gpa				Towers 11,13 & 15 nozzles versions Tx nozzles 100gpa, disc& core			
Using 6 Ceramic nozzles location 2,4,6,8,10.12 output 200gpa				ceramics are 200gpa All combined 300gpa			
Using all 13 nozzles 300 gpa output							
Option #							
	Orchard Head 13	Tower 11 nozzle	Tower 21 nozzle	Tower 13 nozzle	Tower 15 nozzle	Tower 25 nozzle	Tower 29 nozzle
Loc #-top	Option # 800	Option # 801	Option # 802	Option # 803	Option # 804	Option # 805	Option # 806
1	Brown TXVK12	BlueTXVK26	BlueTXVK26	Brown TXVK12	OrangeTXVK18	Brown TXVK12	OrangeTXVK18
2	D4/45 ceramic	D8/45	Blank	D4/45 ceramic	D6/45	Blank	Blank
3	Blue TXVK26	OrangeTXVK18	D8/45	Blue TXVK26	OrangeTXVK18	D4/45 ceramic	D6/45
4	D10/45 ceramic	D8/45	Blank	D10/45 ceramic	D7/45	Blank	Blank
5	Blue TXVK26	BlueTXVK26	OrangeTXVK18	Blue TXVK26	OrangeTXVK18	Blue TXVK26	OrangeTXVK18
6	D10/45 ceramic	D10/45	Blank	D10/45 ceramic	D6/45	Blank	Blank
7	Blue TXVK26	OrangeTXVK18	D8/45	Blue TXVK26	OrangeTXVK18	D10/45 ceramic	D7/45
8	D8/45 ceramic	D8/45	Blank	D8/45 ceramic	D7/45	Blank	Blank
9	OrangeTXVK18	BlueTXVK26	BlueTXVK26	OrangeTXVK18	OrangeTXVK18	Blue TXVK26	OrangeTXVK18
10	D6/45 ceramic	D8/45	Blank	D6/45 ceramic	D6/45	Blank	Blank
11	Brown TXVK12	OrangeTXVK18	D10/45	Brown TXVK12	OrangeTXVK18	D10/45 ceramic	D6/45
12	D4/45 ceramic		Blank	D4/45 ceramic	D7/45	Blank	Blank
13	Brown TXVK12		OrangeTXVK18	Brown TXVK12	OrangeTXVK18	Blue TXVK26	OrangeTXVK18
14			Blank		D6/45	Blank	Blank
15			D8/45		BlackTXVK10	D8/45 ceramic	D7/45
16			Blank			Blank	Blank
17			BlueTXVK26			OrangeTXVK18	OrangeTXVK18
18			Blank			Blank	Blank
19			D8/45			D6/45 ceramic	D6/45
20			Blank			Blank	Blank
21			OrangeTXVK18			Brown TXVK12	OrangeTXVK18
22						Blank	Blank
23						D4/45 ceramic	D7/45
24						Blank	Blank
25						Brown TXVK12	OrangeTXVK18
26							Blank
27							D6/45
28							Blank
29	bottom						BlackTXVK10

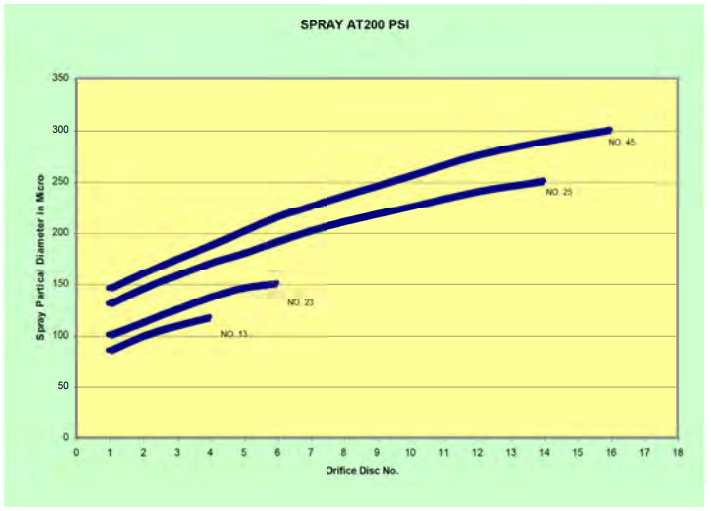
Hollow Cone Type Spray Tips

			GPM												
			10 PSI	20 PSI	30 PSI	40 PSI	60 PSI	80 PSI	100 PSI	150 PSI	200 PSI	300 PSI	20 PSI	40 PSI	80 PSI
D1	DC13	.031"	—	—	.059	.066	.078	.088	.097	.115	.128	.152	—	51°	62°
D1.5	DC13	.036"	—	.057	.067	.075	.088	.098	.110	.127	.142	.167	38°	55°	66°
D2	DC13	.041"	—	.064	.075	.08	.10	.11	.12	.14	.16	.18	49°	67°	72°
D3	DC13	.047"	—	.071	.08	.09	.11	.12	.13	.16	.18	.20	53°	70°	75°
D4	DC13	.063"	.070	.09	.11	.12	.14	.16	.17	.20	.23	.27	69°	79°	83°
D1	DC23	.031"	—	—	.064	.072	.080	.096	.107	.124	.139	.164	—	47°	58°
D1.5	DC23	.036"	—	.064	.076	.086	.103	.117	.130	.155	.175	.210	34°	51°	62°
D2	DC23	.041"	—	.078	.092	.10	.13	.14	.16	.19	.21	.25	51°	63°	70°
D3	DC23	.047"	.065	.087	.10	.12	.14	.16	.18	.21	.24	.28	58°	69°	75°
D4	DC23	.063"	.082	.113	.14	.15	.19	.21	.23	.28	.32	.38	68°	82°	87°
D5	DC23	.078"	.095	.13	.16	.18	.22	.25	.28	.34	.38	.46	79°	89°	94°
D6	DC23	.094"	.112	.15	.19	.21	.26	.29	.32	.39	.45	.54	84°	93°	98°
D1	DC25	.031"	—	—	.088	.101	.122	.138	.156	.185	.210	.255	—	27°	43°
D1.5	DC25	.036"	—	—	.118	.135	.162	.185	.205	.245	.280	.33	—	38°	49°
D2	DC25	.041"	—	.12	.14	.16	.19	.22	.25	.29	.34	.41	39°	51°	58°
D3	DC25	.047"	.10	.14	.17	.19	.23	.26	.29	.35	.40	.48	52°	61°	67°
D4	DC25	.063"	.15	.21	.25	.29	.35	.40	.45	.54	.62	.75	67°	74°	80°
D5	DC25	.078"	.18	.25	.30	.35	.42	.48	.54	.65	.75	.90	73°	79°	84°
D6	DC25	.094"	.23	.32	.39	.44	.54	.62	.70	.85	.97	1.19	79°	85°	89°
D7	DC25	.109"	.26	.37	.45	.52	.63	.73	.81	.98	1.18	1.37	85°	91°	93°
D8	DC25	.125"	.31	.43	.53	.61	.75	.89	.97	1.19	1.36	1.68	91°	96°	97°
D10	DC25	.156"	.38	.54	.65	.76	.93	1.07	1.21	1.48	1.71	2.1	97°	102°	103°
D12	DC25	.188"	.46	.61	.80	.93	1.15	1.32	1.47	1.81	2.09	2.55	103°	109°	112°
D14	DC25	.219"	.51	.72	.88	1.03	1.26	1.47	1.65	2.02	2.34	2.89	108°	113°	114°
D1	DC45	.031"	—	—	—	.125	.148	.170	.190	.225	.257	.310	—	22°	34°
D1.5	DC45	.036"	—	—	.14	.16	.20	.23	.25	.31	.35	.43	—	33°	44°
D2	DC45	.041"	—	.14	.18	.20	.25	.28	.32	.38	.44	.53	32°	46°	55°
D3	DC45	.047"	—	.17	.20	.23	.28	.33	.36	.44	.51	.62	40°	53°	60°
D4	DC45	.063"	.18	.25	.31	.36	.43	.50	.56	.68	.78	.95	62°	69°	72°
D5	DC45	.078"	.23	.32	.39	.45	.55	.64	.71	.86	.99	1.22	67°	73°	76°
D6	DC45	.094"	.29	.41	.50	.58	.72	.83	.93	1.15	1.33	1.64	73°	79°	81°
D7	DC45	.109"	.33	.48	.59	.68	.84	.97	1.11	1.35	1.57	1.94	81°	86°	87°
D8	DC45	.125"	.41	.59	.72	.84	1.04	1.21	1.35	1.68	1.94	2.40	86°	90°	90°
D10	DC45	.156"	.54	.77	.94	1.10	1.35	1.57	1.77	2.18	2.50	3.10	90°	93°	93°
D12	DC45	.188"	.67	.95	1.17	1.36	1.68	1.95	2.20	2.69	3.11	3.80	97°	100°	102°
D14	DC45	.218"	.75	1.07	1.32	1.53	1.89	2.19	2.45	3.00	3.49	4.30	101°	104°	105°
D16	DC45	.250"	.86	1.25	1.54	1.79	2.20	2.57	2.89	3.54	4.11	5.20	108°	111°	112°
D1	DC46	.031"	—	—	—	.145	.178	.205	.23	.28	.32	.39	—	13°	15°
D1.5	DC46	.036"	—	—	—	.213	.260	.300	.33	.41	.46	.56	—	15°	17°
D2	DC46	.041"	—	—	.24	.27	.33	.37	.42	.50	.57	.68	—	18°	21°
D3	DC46	.047"	—	.23	.28	.32	.39	.45	.51	.61	.70	.86	14°	20°	24°
D4	DC46	.063"	.28	.39	.48	.56	.68	.78	.88	1.07	1.23	1.52	23°	29°	33°
D5	DC46	.078"	.38	.54	.66	.77	.94	1.10	1.25	1.50	1.73	2.13	33°	39°	42°
D6	DC46	.094"	.55	.78	.95	1.10	1.35	1.58	1.73	2.16	2.50	3.06	42°	48°	50°
D7	DC46	.109"	—	.98	1.22	1.39	1.72	1.97	2.22	2.73	3.15	3.85	48°	53°	56°
D8	DC46	.125"	—	—	1.59	1.84	2.25	2.62	2.93	3.60	4.17	5.05	—	60°	62°
D10	DC46	.156"	—	—	2.15	2.48	3.05	3.53	3.96	4.83	5.59	6.80	—	66°	68°

Particulate Size vs Disc Size and Pressure







5.0

Maintenance

Slimline

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Thank you for your business

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Slimline PARTS

Turbo-mist

TURBOMIST ANNUAL SPRAYER SERVICE INCLUDES:

ALL TIME ARE OF AN HOUR

PRE INSPECTION TIME .5 (PAPER WORK, IDENTIFIY, HOOK SPRAYER TO TRACTOR

Test and verify power supplies and electrical system
- Check tractor lead and all wiring for continuity **.25 HR**

Inspect wire harness and wires for wear:
- Check wiring harness for continuity **.25 HR**
- Look for wear points

Test, clean and overhaul spray pressure regulator:
- Disassemble and clean regulator spring and slide area
- If Diaphragm is convex, replace
- Clean all surfaces and check for any burrs
- Grease all slide areas **1 HOUR**

Pressure Gauge:
- **Make sure that the pressure gauge reads zero!**
  - **Replace if necessary .25 HR**

Pump diaphragms
(Manufacturers recommend replacement every 500 hours)

Install a new set of pump diaphragms:
- Install new diaphragms and retainer bolts
  - Reinstall diaphragms and retainer bolts using blue Loctite
  - Do not use air tools on re-assembly of internal pump components
  - Inspect valve seats and springs for wear **3 HR'S**

Change pump oil
- Change Oil every 500 hours
- Use Udor 30 weight non detergent oil, "REMEMBER" continually rotate pump while filling to remove air bubbles from crank case **.75 HR**

Change gearbox oil
- Change gear box oils every 500 hours **1.0 HR**

Check belt and or Chain tension .25 HR
- Instruction in warranty book and owner's manual on how to check for wear and set up.

Clean or replace liquid filters .30 HR

Inspect and grease driveline .15 HR
- Inspect clutches for wear and broach clutches as per manufacturer recommendations
- Check for wear in U joints

Test controllers and electric valves .25 HR
- Check electric valve function with hoses disconnected from valves; this will prove that the valves are sealing and not leaking;
- Then attach hose and repeat the same test;
  - If booms fail to shut down in a reasonable amount of time
  - Check hoses for bellowing
  - Check valve connection for missing O rings

Replace worn or broken parts

Fan Gear Box
- Check to ensure that the gearbox shifts easily into high and low range **.15 HR**
  - This is a stiff shift that may require the rotation of the fan manual to engage the gears;
- If shifter is stuck or extremely stiff;
  - Remove shift gearbox cover and perform shifter maintenance procedure **1.0 HR**

Fan .25 HR
- Place fan gearbox into neutral
  - Rotate fan manually, listen to the fan bearing for potential failure

MORE >

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Slimline MANUFACTURING

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Penticton, BC V2A 3K4

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INSPECT FOR POTENTIAL FAILURES

PTO steading bearing: .25 HR
- Check that bearings are greased
- Check to make sure that seals are in place on bearings

Sight Glass: .15
- Check that sight glass is clear enough to visually see float ball

Suction Filter O Ring: .25
- Make sure that the suction filter O ring is not swollen or distorted
- If it must be replaced, coat with EP2 grease and install

Suction Intake Hose: .15
- Check both ends of suction hose, ensure all required O Rings are in place
- When reinstalling, grease O rings in these areas before reinstalling

Tank Lid: .5
- Ensure that tank lid has a seal

Tank Suction Line: .15
- Inspect to ensure that the suction line is firmly held in place!

Packing Gland .15
- Check that the packing gland has maximum adjust potential!

Agitator Bearing: .15
- Check for free rotation of bearing and pivot point (grease if necessary)

Axles: .15
- Check axles for movement
  - Simply push against the tire and check for movement
  - Jack-up sprayer and check that the axles' grease is satisfactory

Outlets .15
- Check outlets to ensure that they move easily
  - This may require the outlets to be removed and surfaces cleaned and greased to allow outlet to move easily.

Nozzle Wear .30
- Using the Tee Jet catalogue and a drill index:
  - Check each nozzle for wear!

PTO Covers and Guards .15
- Make sure that PTO safety shields slide freely and all safety guards are in place.

Run sprayer at factory specs: .25
- Test unit at 540 tractor RPM
- Test both the high range and low range

Winterize sprayer for the off-season with anti-freeze. .5

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Engineered for the Future

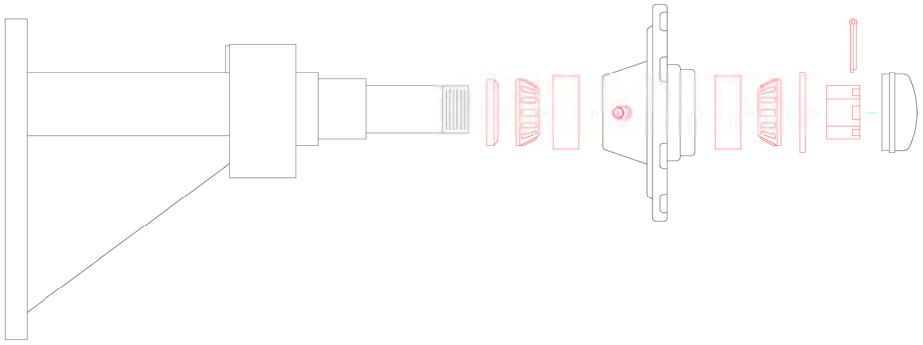
5.0 MAINTENANCE

Proper maintenance and cleaning techniques can add years to the life of spraying equipment. Maintenance of your sprayer equipment includes regular inspection of the chassis, spray tank, pump, hoses, line strainers, pressure gauge, fittings, nozzle tips and strainers.

5.1 Lubrication

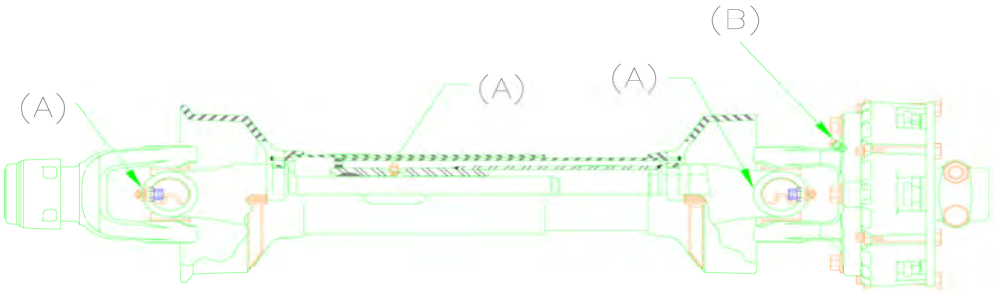
Grease Points

Axles



The hub is the part of the axle that must be greased. Remove hubcap and grease the inside of the rotating head. Certain models may be equipped with a grease fitting. Grease at least once a season.

PTO. and Center Shaft

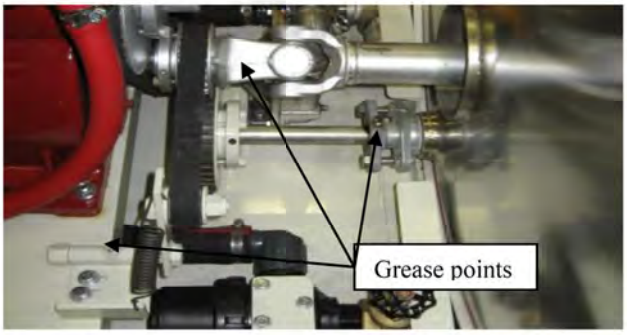


Grease points marked with (A) should be greased every 10-duty hours. Locations marked (B) should be greased seasonally or every 500-duty hours, which ever comes first. Center shaft universal joints should be greased seasonally as well.

Turbosteer Hitch

Grease universal joints, and swivel joints seasonally.

Agitation



Grease the packing gland daily and the belt tensioner and universal joint seasonally.

Gear Box Oil

Your gearbox and pump are constantly under a lot of strain. Check oil levels daily during the spraying season and change at recommended intervals using **SAE-85W/140** gear oil.

⚠ **WARNING** ⚠ **DO NOT RELY ON THE SIGHT GLASS TO CHECK OIL LEVELS. REMOVE PLUG AND BREATHER TUBES TO VERIFY OIL LEVEL. AFTER REMOVING TUBE OR PLUG, OIL SHOULD BE LEVEL WITH THE BOTTOM OF THE THREADS.**

5.2 Belts

MYERS CENTRIFUGAL DRIVE – ALIGNMENT INSTRUCTIONS

⚠ WARNING ⚠ COMPLETELY DISCONNECT THE SPRAYER FROM THE TRACTOR BEFORE STARTING!

1) Check run-out on the large pulley with a magnetic dial gauge. The maximum run out on the pulley is (±0.002"). The alignment of the large pulley is important because it is used to line up the driver pulley and the back idler tensioner.

To true up the pulley, take readings from the dial gauge at the three positions in line with the bushing bolts on the outer rim. See Fig. (2). Torque the bolt in line with the highest point at a slightly higher torque setting, 35 ft-lbs maximum. Repeat this until the pulley is within allowable specifications (± 0.002" run out) in the three positions.

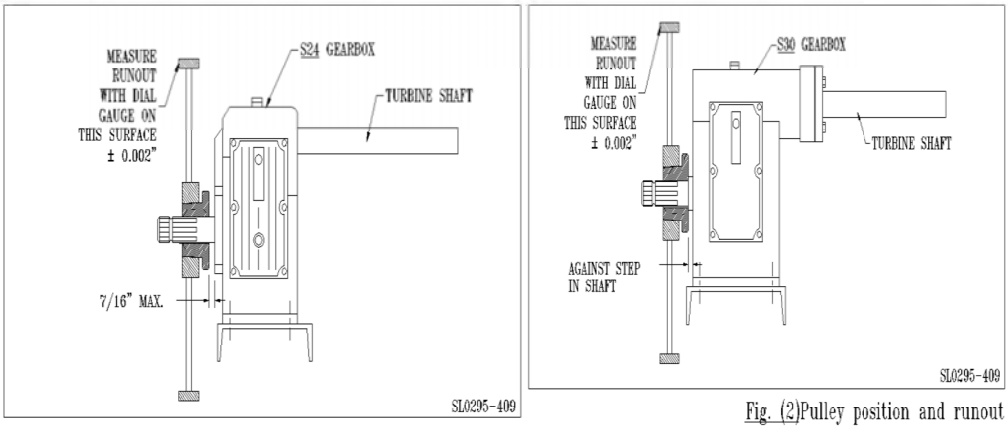


Fig. (2)Pulley position and runout

2) Install the pump using the 1/2" x 2" carriage bolts. If the pump was previously assembled with spacers reuse them in the same positions. To align the pump with the large pulley use a solid straight edge (eg. 1" x 3/8") to check the following:

A) Check that the pulleys are in line. Place the straight edge on the machined surface on the large pulley on the gearbox side. Position the small pulley on the Myers pump shaft with the bushing assembly. When the pulley and bushing are tightened up the pulleys should line up flush. See Fig (3).

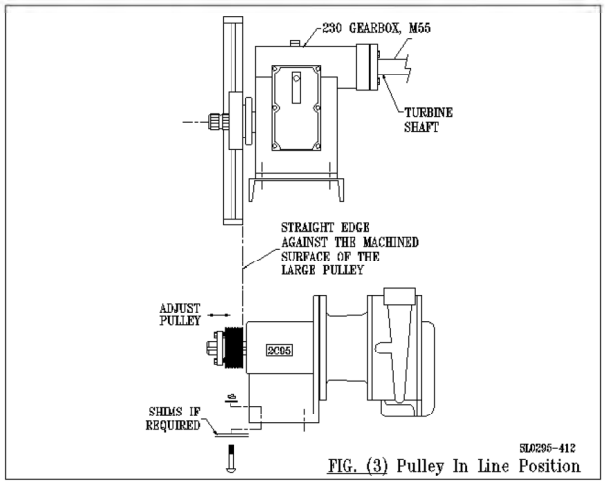
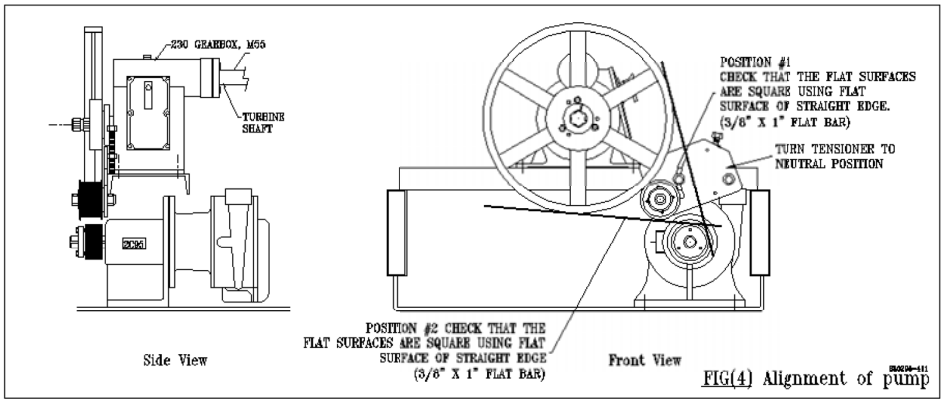


FIG. (3) Pulley In Line Position

B) Check that the two pulleys are correctly aligned on the flat belt surfaces. Check that alignment with the Poly-Rib pulley removed. Lay the flat side of a straight edge across the flat V-groove surfaces of both pulleys in two different positions. See Fig (4) Position #1. See Fig (4) Position #2. The flat surface of the straight edge should sit perfectly flat on the two pulleys, in both Position #1 and #2. If the straight edge can be rocked back and forth in any of the two positions the pump alignment must be corrected.



FIG(4) Alignment of pump

* To correct Position #1 the pump must be turned to be parallel with the gearbox shaft. See Fig (5)

* To correct Position #2 the pump may require shims to be repositioned, removed or added. See Fig(5)

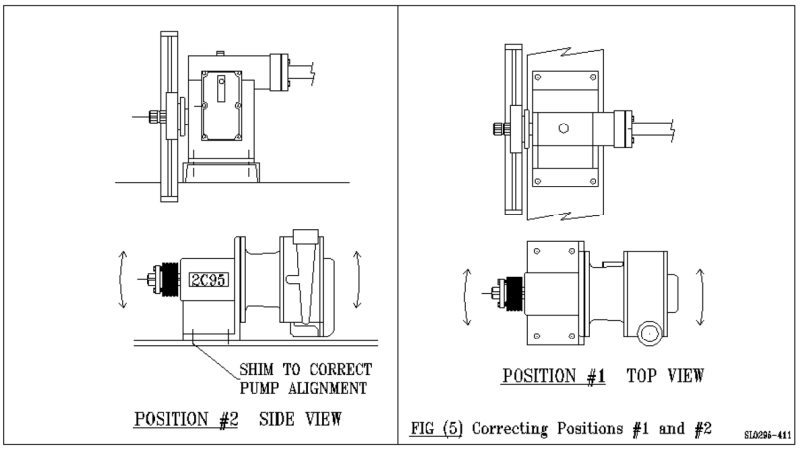


FIG (5) Correcting Positions #1 and #2

C) Repeat steps (A-B) until the alignment is correct.

Note: Do not unbolt all 4 pump mounting bolts to shim the pump after Position #1 is set correctly. Only unbolt one side at a time to correct Position #2. Place the shims under the front or rear carriage bolt one side at a time as required. This will allow you to keep the shaft parallel in Position #1.

3) Install the belt tensioner assembly and the Poly-Rib belt. See Fig (1). Increase the tension on the belt using the adjustment bolt. Set the tension at the center of the longest span to 1/4" deflection at 9 lbs force. Tighten the tensioner mounting bolts.

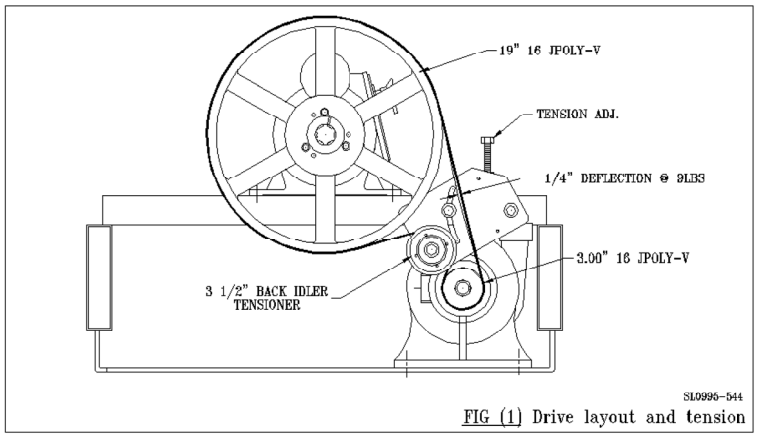


FIG (1) Drive layout and tension

4) With the gear box in neutral, turn the drive system over several times by hand in the standard PTO. direction. Next, turn the drive system over in the opposite direction by hand and pay close attention to the tensioner back idler. Watch for any sideways movement in the belt as the drive direction changes. If there is sideways movement in the belt, greater than 1/32", the tensioner back idler is out of alignment. See Fig (6). To correct this problem it is necessary to shim the tensioner plate. Shims have been provided in 8" x 1" strips. 0.030" = aluminum, and 0.005" = brass.

* If the belt moves towards the front of the machine when the drive is reversed from the correct PTO. direction, shim below the bolts.

* If the belt moves towards the back of the machine when the drive is reversed from the correct PTO. direction, shim above the bolts.

When the bolt is set so that there is no movement from side to side reset the tension. The correct tension is; 1/4" deflection at 9 lbs force at the center of the longest span. Torque the tensioner plate mounting bolts to 35ft-lbs.

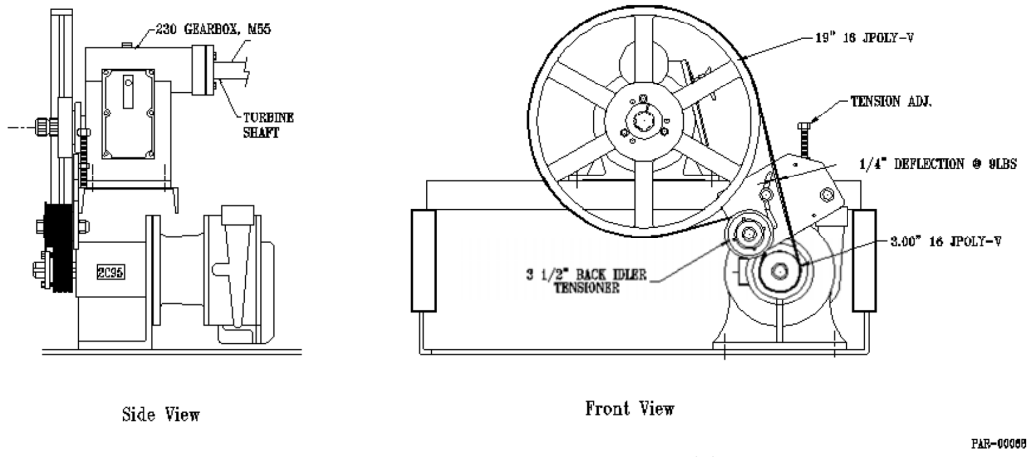


FIG. (6) Tensioner Alignment

5) Assemble the drive shaft onto the gearbox input shaft if it has been removed. Install the 3 set screws in the agitator pulley. Use a drop of silicon sealant on the set screw threads to prevent rusting.

6) Remount the front PTO. cover over the idler shaft. Remount the turbine hood onto the machine.

7) Check that the turbine is still in neutral. Hook up the machine to a 540-RPM tractor PTO. and run the drive for 5 minutes at about 80 PSI. Watch the drive during this time. If the drive is not aligned correctly there is a chance that the belt will walk itself off the pulleys.

Note: If the belt skips any grooves or walks off the pulleys, stop the drive immediately. Reset the drive alignment correctly as described in the above steps.

8) Disconnect the sprayer from the tractor and PTO. before resetting tension on the drive belt. Reset the tension to 1/4" deflection at 9 lbs force in the center of the longest span.

9) Install the stainless steel belt cover supplied with the 5/16" x 1/2" bolts.

IMPORTANT: The belt tension must be checked and reset after 8 hours service.

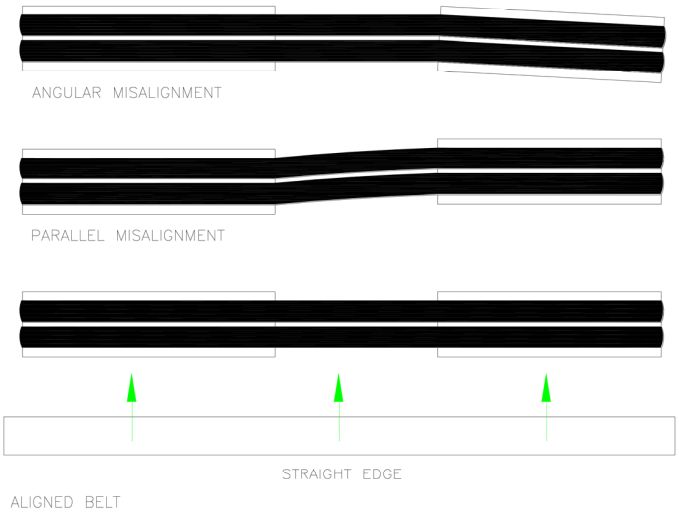
Belt Alignment and Tension

- ❑ To check alignment, use a straight edge, or laser alignment tool.

V Belt – ALIGNMENT INSTRUCTIONS

Straight Edge Method

If using a straight edge, line the straight edge along the outside face of both sheaves and sprockets as shown in the following diagram. If the drive is properly aligned, the straight edge will contact each sheave or sprocket evenly. The straight edge should touch the two outer edges of each sheave or pulley for a total of four points of contact. Misalignment of sprockets and shafts will show up as a gap between the outside face of the sheave or sprocket and the straight edge. Check for tilting or shaft misalignment by using a bubble level. For proper alignment, the bubble should be in the same position as measured on each shaft.



Laser Alignment Tool

A laser alignment tool makes it very quick and easy to check alignment of shafts, sheaves and sprockets. Follow manufacturer's instructions for laser alignment tool.

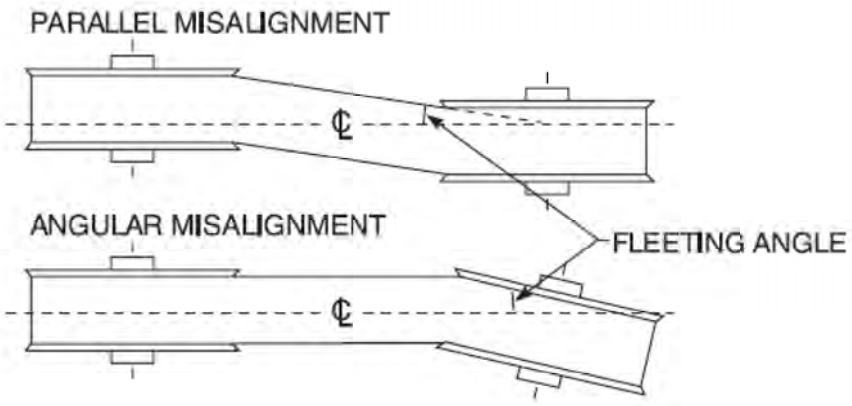
Possible Misalignment Causes and Solutions

There are three possible causes and solutions of sheave or sprocket misalignment:

1. Angular Misalignment: The motor shafts and driven shafts are not parallel.
Correct alignment by adjusting the motor shaft into alignment with the driven shaft.

2. Parallel Misalignment: Sheaves or sprockets are not properly located on the shafts.
Loosen and reposition one or both sheaves or sprockets until properly aligned.

3. Sheaves or sprockets are tilted on the shaft due to incorrect bushing installation.
Rotate drive by hand and look for excessive wobble. If wobble is observed, remove and reinstall sheave or sprocket.



Misalignment on V-belt drives should be less than 1/2° or 1/10" per foot of center distance.

Synchronous Belt

Misalignment for synchronous, Polyflex-, belts should be less than 1/4° or 1/16" per foot of center distance.

When a synchronous belt drive has been aligned do not continue to adjust alignment in an attempt to make the synchronous belt ride in the center of the sprocket's face width. Synchronous belts, while neutral tracking, will tend to ride in contact with a flange on one side of the sprockets. Synchronous belts on drives that are properly aligned will lightly contact the flanges. Synchronous belts on misaligned drives will ride hard against the flanges and generate additional noise. Attempting to adjust a synchronous belt drive's alignment to force the belt to ride in the center of the sprocket's face width will typically result in misalignment.

Check Other Drive Components

It is always a good idea to examine bearings for proper lubrication. Check the motor base bolts and adjustment screws to make sure they are not loose. If loose, tighten to the recommended torque value. Make sure that adjustment screws are free of debris, dirt, or rust.

Check Belt Tension

Following the drive component inspection, the final step is to check belt tension. Rotate the drive two or three revolutions by hand and check the belt tension. If necessary, retention the belt and make a final alignment check. If V-belts are under tensioned, they can slip. Slippage generates heat and will result in cracking and belt failure. If synchronous belts are under tensioned, they can jump teeth or ratchet. Ratcheting will damage the belt and result in premature belt failure. If belts are over tensioned, belt and bearing life can be reduced. The proper way to check belt tension is to use a tension tester.

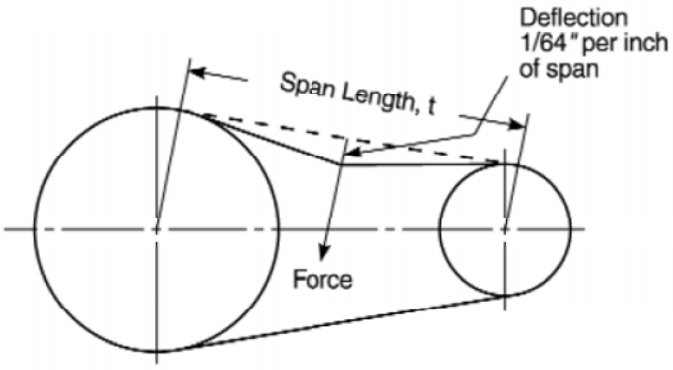
Measuring Belt Tension

The spring scale type tester measures how much force is required to deflect the belt a specified distance at the center of its span. This is the force deflection method of tensioning belts. The Sonic Tension Meter measures the vibration of the belt span and instantly converts the vibration frequency into belt static tension. This is the span vibration method of tensioning belts.

Force Deflection Tension Method

The force deflection tension method does not directly measure belt span tension or static tension. The deflection force is a calculated value that is based on the amount of static tension required in the belt. Static tension is the tension force that is actually in the belt, while deflection force is simply a measurement to check how much static tension is on the belt. The tension testers used for the force deflection tension method are available in one, two, or five-barrel configurations. The one barrel tension tester can measure up to 30 lbs. of force; the two barrel tension tester can measure up to 66 lbs. of force; and the five barrel tension tester can measure up to 165 lbs. of force. Add the force readings off each barrel to determine the total force being measured.

1. Measure span length (t). Span length is the distance from where the belt exits one pulley to where it enters the next pulley.



2. Position the lower of the two O-Rings using either of these methods:

a. On the scale reading "Deflection Inches", set the O-Ring to show a deflection equal to 1/64" per inch of span length (t).
b. On the scale reading "Inches of Span Length", set O-Ring to show a deflection equal to the inches of measured span length (t).

3. At the center of the span (t), apply force using the appropriately sized tension testers. Apply the force perpendicular to the span. If the belt is a wide synchronous belt, place a piece of steel or angle iron across the belt width and deflect the entire width of the belt evenly. Deflect the belt until the bottom edge of the lower O-Ring is at the correct deflection distance. If multiple individual V-belts are used on the drive, the deflection distance can be measured against an adjacent belt. For drives with only one belt, use a straightedge or string pulled tight across the sheaves, sprockets, or top of the belt to establish a reference line. When the belt is deflected to measure tension, measure the deflection distance by measuring from the belt to the straight edge or string reference line.

4. Find the amount of deflection force on the upper scale of the tension tester. The sliding rubber O-Ring slides up the scale as the tool compresses and stays up for a reading of the deflection force. Read at the bottom edge of the ring. Remember to slide the O-Ring down before using again.

Installation tension forces should ideally be calculated for each specific drive.

Recommended Deflection Force Per Belt For Super HC® V-Belts, Super HC PowerBand® Belts, Super HC Molded Notch V-Belts or Super HC Molded Notch PowerBand Belts

V-Belt Cross Section	Small Sheave Diameter Range (In.)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (Lbs.) Minimum	Maximum
3V	2.65 - 2.80	1200-3600	2.00 to 4.00	3.0	4.3
	3.00 - 3.15	1200-3600		3.3	4.8
	3.35 - 3.65	1200-3600		3.7	5.4
	4.12 - 5.00	900-3600		4.4	6.4
	5.30 - 6.90	900-3600		4.8	7.1
3VX	2.20	1200-3600	2.00 to 4.00	2.8	4.1
	2.35 - 2.50	1200-3600		3.2	4.7
	2.65 - 2.80	1200-3600		3.5	5.1
	3.00 - 3.15	1200-3600		3.8	5.5
	3.35 - 3.65	1200-3600		4.1	6.0
	4.12 - 5.00	900-3600		4.8	7.1
	5.30 - 6.90	900-3600		5.8	8.6
5VX	4.40 - 4.65	1200-3600	2.00 to 4.00	9.0	13.0
	4.90 - 5.50	1200-3600		10.0	15.0
	5.90 - 6.70	1200-3600		11.0	17.0
	7.10 - 8.00	600-1800		13.0	19.0
	8.50 - 10.90	600-1800		14.0	20.0
	11.80 - 16.00	400-1200		15.0	23.0
5V	7.10 - 8.00	600-1800	2.00 to 4.00	11.0	16.0
	8.50 - 10.90	600-1800		13.0	18.0
	11.80 - 16.00	400-1200		14.0	21.0
8V	12.50 - 17.00	600-1200	2.00 to 4.00	28.0	41.0
	18.00 - 24.00	400- 900		32.0	48.0

Recommended Deflection Force Per Belt For Hi-Power II™ V-Belts, Hi Power II PowerBand Belts or Tri-Power® Molded Notch V-Belts

V-Belt Cross Section	Small Sheave Diameter Range (In.)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (Lbs.) Hi-Power II Minimum	Hi-Power II Maximum	Tri-Power Molded Notch Minimum	Tri-Power Molded Notch Maximum
A AX	3.0	1750 to 3600	2.00 to 4.00	2.7	3.8	3.8	5.4
	3.2			2.9	4.2	3.9	5.6
	3.4 - 3.6			3.3	4.8	4.1	6.0
	3.8 - 4.2			3.8	5.5	4.3	6.3
	4.6 - 7.0			4.9	7.1	4.9	7.1
B BX	4.6	1160 to 1800	2.00 to 4.00	5.1	7.4	7.1	10.0
	5.0 - 5.2			5.8	8.5	7.3	11.0
	5.4 - 5.6			6.2	9.1	7.4	11.0
	6.0 - 6.8			7.1	10.0	7.7	11.0
	7.4 - 9.4			8.1	12.0	7.9	12.0
C CX	7.0	870 to 1800	2.00 to 4.00	9.1	13.0	12.0	18.0
	7.5			9.7	14.0	12.0	16.0
	8.0 - 8.5			11.0	16.0	13.0	18.0
	9.0 - 10.5			12.0	18.0	13.0	19.0
	11.0 - 16.0			14.0	21.0	13.0	19.0
D	12.0 - 13.0	690 to 1200	2.00 to 4.00	19.0	27.0		
	13.5 - 15.5			21.0	30.0		
	16.0 - 22.0			24.0	36.0		

Span Vibration Method

A Sonic Tension Meter can be used with all belts. The Sonic Tension Meter measures the vibration in the belt span, and converts that measurement into a reading of the actual static tension in the belt. To use the Sonic Tension Meter, you will need to enter the belt unit weight, belt width for synchronous belts or number of ribs or strands for V-belts, and the span length. To measure the span vibration, press the "Measure" key on the meter, tap the belt span to vibrate the belt, and hold the microphone approximately 3/8" to 1/2" away from the back of the belt. The Sonic Tension Meter will display the static tension, and can also display the vibration frequency. Since the span vibration method is intended to be a very accurate method of measuring actual tension in a belt, it is important that the proper recommended tension is calculated for the specific belt drive.

PULLEY AND V-BELT INSTALLATION AND TENSIONING INSTRUCTIONS
Rear Mounted Piston Pumps

1) Degrease and score the gearbox and pump shafts with emery cloth before installing bushings and pulleys. This will prevent them from moving during normal operation. Used pulleys should also be cleaned and scored.

2) On 24" turbine machines position the bushing on the gearbox input shaft so that 2 ½" of splined shaft is left in front. On the 30" turbine machines the position must be measured as well. A measurement can be made from the back edge of the bushing to the gearbox housing (do not measure to the rubber seal). On machines made before 06/1994 this measurement is 5/8". Units purchased after this date use ½". Install bushing with 5/16" x 5/16" x ¾" key stock.

3) Install the pulley on the bushing. Torque the ¼" x 1 3/8" bolts to 9ft-lbs.

4) Check the run-out on the gearbox pulley. Measure the run-out with a dial gauge against the inner v-groove surfaces. The outer edges of the pulley are not always machined and this makes it difficult to get a true reading. The maximum allowable run-out is 0.005". Use the bushing bolts to adjust the run-out. The closer this pulley is to zero run-out the easier the alignment of both pulleys will be.

5) Install the pulley on the pump shaft. Ensure that the brass 0.005" shim stock is in place around the busing before installing the pulley. Position the pulley with a straight edge so that it is 3/8" offset from the other pulley before tightening the bolts. As the bushing bolts are tightened the pulley on the pump shaft will move and line up. On 30" turbine machines if the bushing is positioned so that it is past the end of the shaft by 1/8", this is normal.

6) Check the run out on the pump pulley with a dial gauge. It should be set with maximum run out of 0.005" as well. Measure on the machined v-belt surfaces. The pump pulley has only two adjustment bolts and it may be necessary to adjust the run out using ¼" bolts in the removal bolt holes.

7) Install the correct v-belts on the machine. B37 for 24" turbine machines and B40 for 30" turbine machines. Check that the belts are not touching the plastic pump manifold.

8) The belts are tensioned using the two ½" tensioning bolts attached to the pump feet. These bolts must be turned equally to prevent twisting of the pump. If the pump is twisted, it is possible to break the pump feet or pump housing. The bolts, which mount the pump, should be snug when tensioning. Snug enough to allow the pump to slide but limit excess movement.

9) Tension the belts. Check that the pulleys are in line and the shafts are parallel using a straight edge. Rotate the belts and pulleys to allow belts to seat properly. This gives a more accurate reading of tension.

10) The tension should be set as follows:

Belt tension – 1/8" deflection at 7 ½ lbs force

11) Repeat the tensioning steps 7-10 until the correct tension is set and the pulleys are correctly lined up.

12) Tighten the four 3/8" pump mounting bolts to secure the pump. Also tighten the locking nuts on the two ½" tensioning bolts.

QD® Type Sprocket Installation and Removal

Install: QD® Type Bushings:

1. Clean the shaft, bore of bushing, outside of bushing and the sprocket hub bore of all oil, paint and dirt. File away any burrs.

Note: The use of lubricants can cause sprocket breakage. **DO NOT USE LUBRICANTS IN THIS INSTALLATION**.

2. For "Position 1" or "Position 2" (whichever applies), line up the unthreaded bushing holes "C" with the threaded sprocket hub holes "T". Lightly oil the bolts and thread them (with lock washers) into the sprocket hub engaging only 2 or 3 threads. Bolt heads should be mounted outside to allow for disassembly. When mounting sprockets on 'M' through 'W' bushing sizes, position the threaded jack screw hole (J) as far from the bushing saw slot as possible to reduce the possibility of bushing breakage during disassembly.

Position 1

Position 2

Note: Do not lubricate the bushing taper, hub taper, bushing bore, or the shaft. Doing so could result in sprocket breakage.

3. With the key in the shaft keyway, position the assembly onto the shaft allowing for small axial movement of the sprocket which will occur during the tightening process. When installing large or heavy parts in "Position 1" (see figure above), it may be easier to mount the key and bushing onto the shaft first, then place the sprocket on the bushing and align the holes.

Note: When mounting sprockets on a vertical shaft, precautions must be taken to positively prevent the sprocket and/or bushing from falling during installation.

4. Alternately tighten the bolts until the sprocket and bushing tapers are completely seated together (at approximately half the recommended torque).

5. Check the alignment and sprocket run out (wobble), and correct as necessary.

6. Continue alternate tightening of the bolts to the recommended torque values specified in the table below.

Note: Excessive bolt torque can cause sprocket and/or bushing breakage. When properly mounted, there must be a gap between bushing flange and sprocket after the bolts are tightened.

Bushing Style	Bolts		Torque Wrench	
	Qty.	Size	lb-ft	lb-in
H	2	1/4 x 3/4	7.9	95
JA	3	10-24 x 1	4.5	54
SH & SDS	3	1/4-20 x 1 3/8	9	108
SD	3	1/4-20 x 1 7/8	9	108
SK	3	5/16-18 x 2	15	180
SF	3	3/8-16 x 2	30	360
E	3	1/2-13 x 2 3/4	60	720
F	3	9/16-12 x 3 5/8	75	900
JA	3	5/8-11 x 4 1/2	135	1620
M	4	3/4-10 x 6 3/4	225	2700
N	4	7/8-9 x 8	300	3600
W	4	1 1/8-7 x 11 1/2	600	7200
S	5	1 1/4-7 x 15 1/2	750	9000
P	4	1-8 x 9 1/2	450	5400

QD Bushings

Caution: Excessive bolt torque can cause sprocket and/or bushing breakage.

Note: To insure proper bushing/sprocket performance, full bushing contact on the shaft is recommended.

7. Tighten the setscrew, when available, to hold the key securely during operation.

To Remove QD® Type Bushings:

1. Loosen and remove all mounting bolts.
2. Insert bolts into all threaded jackscrew holes.
3. Loosen the bushing by first tightening the bolt furthest from the bushing saw slot, then alternately tighten remaining bolts. Keep tightening the bolts in small but equal increments until the tapered sprocket and bushing surfaces disengage.

Note: Excessive or unequal pressure on the bolts can break the bushing flange, making removal nearly impossible without destroying the sprocket.

5.3 Cleaning

We recommend the following five steps when cleaning your sprayer:

1. **Read** - Before you begin cleaning your sprayer, be sure to review the label of the pesticides you've applied. The label will:
    - Tell you how to properly dispose of residual product.
    - Provide any special cleaning instructions that might be necessary.
    - Recommend decontaminating products.
    - Outline the personal protective equipment you need to safely clean your sprayer.

⚠ **WARNING** ⚠ **REMEMBER TO ALWAYS WEAR PROPER PERSONAL PROTECTIVE CLOTHING WHEN HANDLING SPRAY EQUIPMENT.**

2. **Rinse** - The goal of rinsing is to remove any concentrations or remnants of the product that might still be in or on the sprayer. Cleaning spray equipment involves circulating water through the whole system and then applying it to a site that is listed on the label of the pesticides you have used. Several rinses using a small volume (up to 10 percent of the

spray tank capacity) are better than merely filling the spray tank once with clean water. Select a location where the rinse slurry will not contaminate water supplies, streams, crops or other plants and where large puddles won't accumulate, creating a hazard to humans, animals and the environment. The rinse area should be impervious to water and have a wash rack or cement apron with a sump to catch contaminated wash water and pesticides. Make sure that you drain the spray tank in a manner consistent with the pesticide label. Do not open the valves and let chemical pour on the ground.

The outside of the sprayer should also be washed. When rinsing the sprayer, do not create standing puddles that might be accessible to children, pets, livestock or wildlife.

3. Drain - Dispose of the pesticide laden rinse water in accordance with label directions, apply the rinsate to a site where the products are to be used originally. In other words, the site must be listed on the label. Repeat the draining process after decontaminating and re-rinsing the sprayer.

4. Clean - After your sprayer has been rinsed and drained, it's time to clean or decontaminate it. Be sure to decontaminate both the interior and exterior of the machine, running liquid through the boom structure and out the nozzles. You don't need to fill the sprayer. Use only enough cleaning solution to completely fill the lines and provide enough agitation. You may need to scrub or power wash the inside of the tank.

Cleaning agents should penetrate and dissolve pesticide residues and allow them to be removed when the rinse water is removed from the sprayer. Use commercial tank cleaning agents and detergents that help remove both water and oil-soluble herbicides and that are recommended on many pesticide labels. Some tank cleaning agents and ammonia solutions raise the pH of the rinse slurry, making some products such as sulfonylurea (SU) herbicides more water soluble and thus easier to remove from internal sprayer parts. Chlorine bleach solutions hasten the breakdown of SU's and some other herbicides into inactive compounds. However, chlorine is less effective at dissolving and removing SU herbicide residues from spray tanks than ammonia solutions.

⚠ WARNING ⚠ Never add chlorine bleach to ammonia or liquid fertilizers containing ammonia, because the two materials react to form toxic chlorine gas.

Fuel oil or kerosene is effective for removing oil-soluble herbicides such as esters and emulsifiable concentrates. The fuel oil or kerosene should be followed by a detergent rinse to remove the oily residue. Also run cleaning solution throughout the sprayer, including the agitation system and the return lines. Then rinse the system with clean water. Open all nozzles until they are spraying pure water.

5. Inspect - After the final rinse you can inspect your sprayer and make the necessary repairs and modifications. Even though the sprayer has been "cleaned," always wear personal protective equipment. Some residue may remain on and in the sprayer.

General checklist of what to look for both during and after cleaning:

- Mismatched and worn nozzles
- Damaged nozzle screens
- Damaged strainer screens
- Cracks, leaks and overall performance in the pump
- Hose condition, especially brittleness or cracks
- Valve condition, identifying any possible leaks or areas where seals may have loosened
- Boom structure, identifying any cracks that must be fixed
- Drive belt and chain condition

5.4 Wheels

Turbo-mist sprayers are equipped with several different sizes of wheels dependant on the application and terrain. The sprayer's tires should always be at the correct pressure which is located on the sidewall of each tire. Inflation and checking of the tire must be done when the tire is cold. The sprayer's wheels are IMPLEMENT type and should not exceed 25 mph (40 km/h) when fully loaded. Maintain correct pressure at all times and visually inspect tires for cuts and wear each time you clean the unit.

5.5 Maintenance Intervals

Every 10 working hours:

1. Clean the suction filter.
2. Clean the pressure filters.
3. Check the nozzles.
4. Check for leaks in the fluid circuit.
5. Check for air intake into the suction.
6. Check the nuts and tighten if necessary.
7. Grease CV Tracking Hitch components.

Every 50 working hours:

1. Carry out the aforementioned tasks.
2. Check the wheel nuts and tighten if necessary.
3. Check the PTO shaft.
4. Check the tire pressure.
5. Grease the diaphragm pump. (if fitted)

Every 100 working hours:

1. Carry out the aforementioned tasks.
2. Check and grease the drawbar.

Every 250 working hours:

1. Carry out the aforementioned tasks.
2. Check the wheel hubs.
3. Check all the hoses.
4. Change the gearbox oil.
5. Grease hydraulic section valves.

Every 1000 working hours:

1. Carry out the aforementioned tasks.
2. Service all the hubs.
3. Service the pump.
4. Service the gearbox.
5. Check the pressure gauge.
6. Service the clutch and fan.

6.0

Seasonal Storage

6.0 SEASONAL STORAGE

Proper maintenance and storage techniques not only streamline next year's preseason preparations, but also enhance sprayer performance while adding years to its productive life. The following list should be followed at the end of each spraying season.

1. Clean the sprayer completely - inside and outside. Make sure that all valves, hoses and auxiliary equipment have been cleaned with detergent and flushed with clean water afterwards, so no chemical residues are left in the sprayer.
2. Renew any damaged seals and repair any leaks.
3. Empty the sprayer completely and let the pump work for a few minutes. Operate all valves and handles to drain as much water out of the spraying circuit as possible. Let the pump run until air is coming out of all nozzles.
4. Remove strainers (filters) and wash them by hand with soapy water (remember to wear chemical-resistant gloves), rinse them and either store them or place them back in the sprayer.
5. Clean nozzles, nozzle bodies and check valves. Chemical residue can build up in these areas and harden over winter, dramatically reducing the sprayer's performance next season. Remove nozzle tips, screens, and check valves, from the nozzle body assemblies. Clean and rinse out the nozzle tips, nozzle bodies and check valves. Store in a marked container. Store check valves at room temperature over the winter to avoid damage that can be caused by freezing temperatures.
6. Pour approximately 13 gal (50 liters) anti-freeze mixture consisting of 1/3 automotive anti-freeze and 2/3 water into the tank.
7. Circulate antifreeze through the sprayer and all plumbing, including booms, valves, manifolds, flow meters and agitation/return lines. Allow the antifreeze to circulate through the boom's hoses. This will coat the hose linings to prevent drying out and cracking. Closing all boom nozzles will help retain the antifreeze in the system, but you may need to open one or two nozzles to allow the antifreeze to circulate through the boom. Close those nozzles when antifreeze has completely filled the system.
8. When the sprayer is dry, remove any rust from any scratches or damages in the paint and touch-up the paint.
9. Lubricate all lubricating points according to the lubricating scheme - regardless of intervals stated.
10. Apply a thin layer of anti-corrosive oil (e.g. SHELL ENSIS FLUID, CASTROL RUSTILLO or similar) on all metal parts. Avoid oil on rubber parts, hoses and tires.
11. Wipe hydraulic snap-couplers clean and fit the dust caps.
12. Apply grease on all hydraulic ram piston rods not fully retracted in the barrel to protect against corrosion.
13. Jack up the axle and place wooden blocks under the wheels to prevent moisture damage and deformation of the tires. Cover with tarp to protect against dust and the elements. Ensure proper ventilation to prevent condensation.
14. When cleaning and winterizing your sprayer, don't overlook any flow meters. Clean the flow meter by following procedures outlined in the manufacturer's instructions. If unable to find instructions, use the following procedure where applicable but be sure to determine if any warranties are affected.
    - Disconnect the wiring harness from the electrical connector on the sensor.
    - Unscrew the flow meter insert and remove.
    - Clean insert with clean, soapy water. Make sure the turbine turns easily. If it doesn't, clean again.
    - Reinstall insert in flow meter.
    - Attach electrical connector to sensor.

7.0

Troubleshooting

7.0 TROUBLE SHOOTING

FAULT	CAUSE	SOLUTION
Piston Diaphragm Pumps		
Water in the oil	Diaphragm failure	Replace & clean, review examples of diaphragm failures enclosed in this booklet
Irregular pressure pulsations	Worn or dirty suction delivery valves or valve seats	Clean or replace complete component
Excessive delivery vibrations	Air pressure to low in accumulator	Inflate to 90 PSI (do not check with tire gauge
Noisy and low oil level	Restricted suction	Check suction side of plumbing to make sure nothing is plugging filter or intake line
Pump will not prime or is loosing pressure	Sucking air	Check suction system (if pressure is not lost during pressure test then problem is related to foaming of chemicals
Will not maintain or reach max. pressure	Worn regulator valve	Replace or clean valve
	Worn or dirty suction/delivery valves or valve seats	Repair, replace or clean valve
	Belt has come loose	Adjust to correct belt tension of 7.2 lbs @ 1/8 deflection
	Insufficient RPM	Check tractor tack or increase RPM to max 540
	Delivery GPM is higher than pump capacity	Replace worn nozzles or recalibrate sprayer
Low oil level	Check for leaks	Add to the oil level with good quality 10W30 motor oil
Pump heads cracked	Excessive tension on belts	Set belts to specifications in owners manual
	Improper torque on head bolts	Replace parts re-torque to the correct torque
Drive pulley is moved	Pulley was not installed with shims	Increase shim thickness between bushing & pulley
Myers Centrifugal		
Water coming out of oil tube	Seal failure	Replace pump
Irregular pressure (pulsations)	Belt slippage	Re-tension belt 9 lbs at 1/4" deflection
Belt will not stay on the pulleys	Pulleys are misaligned	Realign pulleys as per owner manual
Pump losing pressure during spray operation	Restricted suction	Check suction system (check to make sure that the suction line in tank is secure)
Pump will not prime or losing pressure	Sucking air	Check suction system (if pressure is not lost during water test then problem in foaming of chemicals)
	No water	No water or intake valve closed
	Filter is plugged	Clean filter

Maintaining or reaching max. pressure	Belt slippage	re-tension belt to 9 lbs at 1/4" deflection
	Plugged filters or Impellor blockage	Clean
	Insufficient RPM	Check tractor tack or increase RPM
	Delivery GPM higher than pump capacity	Replace worn nozzles or recalibrate
	Nozzle worn check Calibration	Recalibrate the unit (note max. pressure is 150 PSI)
Not enough pressure	Excessive volume being returned to tank	Close bypass
Low oil level	Inspect for leaks	Add to the oil level with good quality 10w - 30w motor oil
Hypro 9203 S		
Low discharge	Pump not primed	Remove topmost vent plug from face of pump and run pump to expel trapped air
	Air leaks in suction line	Check and reseal inlet fittings
	Blocked or clogged line strainer or impeller	Inspect strainer and impeller to clear any debris or obstruction
	Undersize suction line or collapsed hose	Suction line should be the same diameter as inlet port of pump or larger
	Eye of impeller rubbing on volute	Remove volute (front cover) and inspect the impeller. If wear detected, sand the impeller eye O.D. with emery cloth.
Liquid leaking out weep port	Worn seal.	Replace seal.
Fan Gear Boxes		
Fan is coming out of gear	Internal or external detent is not tight enough	Adjust increase spring load on detent
Unable to shift gear box	The shaft connecting the gear shift lever to shifter fork is frozen	Remove shift plate cover & disassemble the shifting mechanism, clean and lubricate
Leaking seal between fan and turbine	Check to see if the vent is operational	If the vent is not operating
	Seal has failed	Replace the complete gearbox assembly
Leaking seal between pump drive and gearbox	Seal failure	Replace seal
Gearbox is make a scrapping sound or rubbing	Shift fork is rubbing against gear	Remove cover and free up the shift finger
Gearbox bearing has failed	Lack of lubrication or premature bearing failure caused by improper fan bearing installation	Replace gearbox
Gearbox is noisy	Chipped tooth on gearbox	Replace gearbox
Gearbox does not change gear	Internal shift finger is broken	Replace complete gearbox shift cover
Turbo Steer Gear Box		
Oil leaking out of vent	Too much oil	Remove excess oil/oil level to top of side port. Each gear has its own individual oil reservoir

Oil leaking from seal of PTO shaft	Seal torn, or vent not working	Inspect vents and replace seal
Top bearing in top gearbox extremely hot	Lack of lubrication in top gearbox	Grease top bearing, When the bearing assembly dry 60 pump with a standard grease gun
Oil leaking between gearboxes	Vent plugged	Clean and inspect vents
	Seal failure	Replace complete assembly order part number A1726
Front stainless cover cracking	Procedural welding error	Replace complete assembly
Fans and Drive Shafts		
Outlets and boom mount cracking	Fan is not square to the shaft	Check alignment of fan with a dial gauge measuring the on the outside ring under the nose cone. Allowable run out 10,000 thousandths of an inch.
	Fan has lost its balance weight	Remove fan and send back to the factory for rebalancing.
	Fan has been damaged by a foreign object entering the turbine	Remove fan and send back to the factory for rebalancing.
Cracks appearing in tank or PTO covers	U joint has excess wear	Replace U joint
	Yoke clamp bolt has become loose	Tighten bolt and check fit
	Worn spline in yoke or shaft	Replace worn component
Knocking at low speed in clutch	The clutch is designed with movement to allow the turning of the PTO shaft when attaching the unit to the tractor	Increase PTO rpm until noise stops this is normal and acceptable
During operation clutch began to smoke	Over greasing of the internal bearing this has contaminated the clutch	Replace clutch pads and spring lubrication of the joint once/year
	If grease contamination is not apparent then spring tension is below manufacture recommendation	Replace clutch pack
Yoke or cross is broken	Tractor to sprayer hook up is not equal distance	Refer to PTO hook up decal on sprayer or in owners manual
Pillow block is crack or side is broken out	Tractor to sprayer hook up is not equal distance	Refer to PTO hook up decal on sprayer or in owners manual
	Operator is turning too sharp and fully collapsing the PTO shaft	Refer to PTO hook up decal on sprayer or in the owners manual to remove the PTO from tractor and manually collapse the shaft. Note where it stops on the cover so the operator will understand that the shaft is totally collapsed
IP Regulator		
Regulator will not maintain pressure	Diaphragm broken in valve	Replace diaphragm
Irregular pressure	Dirt has contaminated internal components	Clean and lubricant components
Pressure will not reduce low enough	Regulator unable to bypass enough Water	Change the regulator seat to allow bypass more water.
	Nozzle to small	Recalibrate unit

	Diaphragm badly deformed	Clean components and replace diaphragm
Unable to achieve high enough Pressure	Regulator bypass too much water	Internal components are badly worn replace
	Nozzles are too big or worn	Recalibrate unit to match pump output
	No water	No Water or intake valve closed
	Filter is plugged	Clean filter
Maintaining or reaching max. pressure	Belt slippage	Re-tension belts
	Plugged filters or Impellor blockage	Clean
	Insufficient RPM	Check tractor tack or increase RPM
	Delivery GPM higher than pump capacity	Replace worn nozzles or recalibrate.
	Nozzle Worn check Calibration	Recalibrate the unit (note Max. Pressure is 150 PSI)
Not enough pressure	Excessive volume being bypassed	Close bypass
Electric Valves		
Electric valves will not shut off	Exceeding maximum pressure rating	Test by reducing tractor RPM while failure is occurring, if valve suddenly closes then recalibrate at a reduced pressure
Large volume of water continuously coming out of valve	Broken diaphragm	Replace diaphragm
Small amount of water continuously deep inside valve	Regulator is sticking	Test by reducing tractor RPM while failure is occurring, if valve suddenly closes then disassemble & clean and lubricate components
	Internal spring has lost its strength, it is unable to overcome internal pressures	Clean internal part # 31112
	Diaphragm guide forks are broken or damaged	Replace diaphragm guide part # 31131
Fine mist or small amount of water coming out of valve approx. 1" inside	Plunger sticking	Disassemble solenoid and plunger clean components, lubricate spring area with WD40 & lubricate plunger shaft with electrical grease
Electric valves will not shut off	Dirt has contaminated internal components	Clean and lubricate components
Electric valves will not turn on	Battery dead or poor connection	Start at battery & test for power from battery through the switch box back to electric valves
	Plunger is contaminated	Remove solenoid and clean plunger, lubricate
	Electric valve is installed backwards	Solenoid should be on the same side as spray booms
	Broken switch/wiring harness	Replace switch, remember this is a on/on switch

Hydraulic Valves		
Valves will not shut off	Ball valve is not closing/stroke too short	Disconnect clevis from ball valve handle, move handle until water flow is stopped. Adjust clevis to match.
	Plugged hydraulic hose	Replace faulty hose
	Plugged port in hydraulic cylinder	Replace faulty cylinder
Valve will not open or close	Hydraulic lines have become disconnected	Check quick connectors to insure that they are connected
Valve open once but now it will not open or close	Hydraulic supply lines are crossed	Reverse hydraulic lines
Valve is leaking from stem	Cylinder stroke is too long	Disconnect clevis and shorten stroke so the cylinder does over extended pushing on valve handle "then" tighten packing nut

8.0

Warranty Policy & Conditions

Turbo-mist™

BASIC WARRANTY COVERAGE

Airblast Sprayer	12 Months
3-Point Hitch Trailer or Skid Sprayers	12 Months
Piston Diaphragm Pumps	12 Months
Centrifugal Pumps	12 Months
Diaphragms Only in Piston Diaphragm Pumps	90 Days
Diaphragms Only in Electronic Control Valves	90 Days
PTO Clutch	90 Days

We offer factory-backed OEM Turbo-Mist™ Genuine Parts to support your needs and your customers. We stand behind our product, and offer our expertise and knowledge to help you get the right parts in a timely manner.

2-Day Delivery Guarantee*

Slimline PARTS

* Delivery guarantee is 2 standard business days for delivery services within North America, provided by FEDEX and UPS. The cost of shipping will depend on your location, the carrier chosen, and the size and weight of the product purchased.

8.0 WARRANTY

Information in this Limited Warranty Manual is subject to change without notice.

This Limited Warranty Manual is for Dealer Use Only.

This Limited Warranty Manual is for Dealer Use Only.

Warranty and Limitation of Liability

This chapter describes the basic warranty coverage for the Slimline Manufacturing Ltd. products listed in the table below and provides information on the replacement of a complete assembly.

What Does this Limited Warranty Cover?
The obligation of Slimline Manufacturing Ltd. to the purchaser under this warranty is limited to the repair or replacement by an authorized Slimline Manufacturing Ltd. dealer of any part found to be defective in material or workmanship within the time period set out for each new product in the *Basic Warranty* period table below. Replacement is done free of charge for both parts and labor using genuine Slimline Manufacturing Ltd. replacement parts.

Repair or replacement in accordance with this limited warranty shall constitute fulfillment of all liabilities of Slimline Manufacturing Ltd. and the dealer in respect to such products.

Warranty Period and Start Date

Slimline Manufacturing Ltd. warrants that the products listed in the table below will be free of defects in material or workmanship for the specific warranty periods shown in the table when used in accordance with the Slimline Manufacturing Ltd. *Owners Manual*. There are two separate warranty periods depending on the product, for 12 months or 90 days that begin after the date of delivery by the dealer to the initial retail purchaser. Note that the date of delivery is the date the dealer inserted on the Warranty Registration Card that they forwarded to Slimline Manufacturing Ltd. following the sale of the product. Evidence of defective material or workmanship is a prerequisite for the approval of any Slimline Manufacturing Ltd. warranty claim and takes precedence over any other stated or assumed charges.

BASIC WARRANTY COVERAGE	
PRODUCT	WARRANTY PERIOD
Airblast Sprayers	12 months
3-Point Hitch, Trailer or Skid Sprayers	12 months
Piston Diaphragm Pumps	12 months
Centrifugal Pumps	12 months
Diaphragms Only in Piston Diaphragm Pumps	90 days
Diaphragms Only in Electronic Control Valves	90 days
PTO Clutch	90 days

Note:

- diaphragm failure is only covered for a 90-day warranty period
- mechanical failure is covered for a 12-month warranty period

Replacement of a Complete Assembly

To ensure the highest possible product quality and purchaser satisfaction, Slimline Manufacturing Ltd. will replace specific products with a new assembly if there is a failure due to defective material or workmanship.

Transferring the Limited Warranty
This limited warranty is for the benefit of the first or subsequent purchaser when the product is purchased from an authorized Slimline Manufacturing Ltd. dealer. The dealer may transfer the balance of the limited warranty on a pre-owned product to a subsequent purchaser.

Notification to Transfer Limited Warranty

For the balance of the limited warranty to be effective to a subsequent purchaser, the dealer must record the transfer on a new Warranty Registration Card, indicating on the card that the sale was for a pre-owned product. The card must be signed by the dealer and the purchaser and forwarded to Slimline Manufacturing Ltd., within thirty (30) days of delivery of the product.

Calculating the Remaining Limited Warranty on a Pre-Owned Product

The Limited Warranty available to a purchaser of a pre-owned product is reduced to the remainder of the original limited warranty period. For example, if a product warranted for 12 months is resold three months after the original date of sale, the Limited Warranty to the subsequent purchaser is for a 9-month period.

Exclusions or Limitations to the Warranty Coverage

This following provides information on what is not covered by this Limited Warranty.

What is Not Covered by this Limited Warranty?

This limited warranty does not cover:

- Any Slimline Manufacturing Ltd. product that is sold by anyone other than an authorized Slimline Manufacturing Ltd. dealer.
- Labor that is a part of the pre-delivery or scheduled inspection service.
- Labor charges performed by anyone except an authorized Slimline Manufacturing Ltd. dealer.
- Expenses covering service calls, towing, or transporting a product to and from any place where the warranty service is to be performed.
- Refilling of oils, fluids, lubricants, or replacement of filters, except when received low or without these items from Slimline Manufacturing Ltd. or where loss or contamination is caused by the failure of parts that are acknowledged by Slimline Manufacturing Ltd. to be defective in material or workmanship.
- Inspection of reconditioned products sold to second purchasers or products classified as display products used for demonstration purposes.
- Duplicate, repeat or shop comeback repairs resulting from improper diagnosis, testing or poor service work.
- Parts or items such as tires, tubes, engines and attachments and other parts that are warranted by their respective manufacturers.
- Any required repairs, if parts other than those made or supplied by Slimline Manufacturing Ltd. have been used in connection with the product, if in the sole judgment of Slimline Manufacturing Ltd., such use of parts adversely affects the product's performance, stability or reliability.
- Any required repairs, if the product has been altered or repaired by someone other than an authorized Slimline Manufacturing Ltd. dealer, if in the sole judgment of Slimline Manufacturing Ltd., such alteration or repair adversely affects the product's performance, stability or reliability.
- Dealer travel time to the product.
- Damage caused by environmental factors.
- Rental equipment used to replace the equipment being repaired.
- Any required repairs, if the product has been altered or repaired by a Slimline Manufacturing Ltd. dealer without written pre-approval, if in the sole judgment of Slimline Manufacturing Ltd., such alteration or repair adversely affects the product's performance, stability or reliability.
- Regular maintenance services such as filter cleaning and lubrication; normal replacement of service parts such as diaphragms, filters or clutch linings; normal deterioration due to use or exposure on parts such as belts, hoses, decals and the exterior finish; normal replacement on parts such as chains, belts, clutches, filters, oil or other parts that are worn out.
- Repairs that are necessary due to operating negligence, conditions, misapplication, fire, accidents, neglect, abuse, damage, misuse, accidents, weathering and failing to follow the recommended adjustments and maintenance as described in the Owners Manual.
- Any damage caused by the dealer or purchaser performing routine maintenance.
- Expenses covering bodily or personal injury of any kind (including physical or mental pain and suffering and emotional distress), medical, hospital, rehabilitation or other incidental or consequential expenses, damage to personal property, or damage to any property of others resulting from the use of any Slimline Manufacturing Ltd. product.
- An act of God (such as frost or a flood).

Limitations, Including Disclaimers of Implied Warranties and Consequential Damages

This Warranty does not preclude the operation of any applicable official statutes, which may, in certain circumstances, extend the express warranty herein. Slimline Manufacturing Ltd. does not authorize any person or dealer to create for it any other obligation or liability in connection with its products. To the extent allowed by law, any implied warranty or condition of merchantable or fitness applicable to the products is limited to the duration stated in this written Limited Warranty.

Neither Slimline Manufacturing Ltd., nor the dealer, shall be liable for the loss of the use of the products, loss of crops or time, inconvenience, commercial loss, special or consequential damages.

The remedy of repair or replacement of a defective part during the warranty period specified shall be the purchaser's exclusive remedy.

Federal, Provincial, and State Laws—How They Relate to this Warranty

This limited warranty gives specific legal rights and there may also be other federal, provincial and state law rights that apply.

The Slimline Manufacturing Ltd. Limited Warranty is limited to the repair or replacement of any part acknowledged by Slimline Manufacturing Ltd. to be defective in material or workmanship within the time periods specified in this Limited Warranty Manual. See Chapter 3 Warranty and Limitation of Liability for additional information.

Except for the express warranties contained in this Limited Warranty Manual, Slimline Manufacturing Ltd. disclaims all other warranties and conditions, express or implied, including without limitation implied warranties and conditions of merchantability and fitness for a particular purpose, statutory or otherwise. Some provinces and states do not allow the exclusion of certain implied warranties or conditions, or limitations on how long an implied warranty or condition lasts. Therefore, the foregoing exclusions and limitations may not apply.

9.0

Turbo-mist Accessories

OUR ATTACHMENTS WILL FIT ANY TURBO-MIST™ SPRAYER BUILT SINCE 1960. EQUIP YOUR SPRAYER WITH OUR QUALITY ATTACHMENTS AND ACHIEVE MORE, FOR LESS.

LOW DRIFT TOWER FAMILY

Scorpion Tower
High Density Towers

BLUEBERRY TOWER

MULTI ROW SPRAY TOWERS

Grape Tower
Citrus Tower

HOPKIT 3RD OUTLET

Hops Tower

UNDER VINE BLOWER

CANNONS

Fixed - 24"
Hydraulic Rotating - 30"

LEAF BLOWER

TURBO-MIST™ VERSATILITY

SCORPION TOWER

Designed narrow and tall to spray in tight growing conditions, the Scorpion tower is designed for maximum versatility. Whether you're spraying a 12 or 8-foot drive, this height-adjustable attachment offers even airspeed through the opening and hits your target where you need it. Additional openings available to maximize air volume.

HIGH DENSITY TOWER FAMILY

Our high-density towers are designed to reduce drift and accommodate tight planting conditions. These stainless steel towers are adjustable for air direction and angle to ensure effective tree coverage. Tower configurations are available for both standard trees and grapes.

CANNONS

We offer fixed (24") and hydraulic rotating (30") cannons. Requiring only 35hp, these units are a fixed style designed to give coverage tight to the machine. Available in either short or tall configurations to suit a variety of crop applications with a reach of 60 to 90 feet.

CITRUS TOWER

Designed for flexibility. With adjustable top outlets and additional individually controlled side outlets, this tower can be unbolted from its frame or folded over the tank for easy storage, maneuvering or transportation with an optional hydraulic fold kit. With rear attachable jacks for storage, this tower is accommodating to your needs on and off the field.

HOPS TOWER

Designed with an additional set of spray outlets high in the top trellis to allow for full canopy penetration. This tower directs air up and into difficult spots while utilizing either traditional round outlets or our low drift tower as the bottom outlets. Achieve amazing coverage from top to bottom with less horsepower.

HOP OUTLET

This attachment allows the operator to push more air vertically, increasing the functional spraying height of the sprayer while retaining the left and right traditional pattern and optimizing coverage.

TURBO-MIST™ VERSATILITY

LEAF BLOWER

Built to clear debris in the weed spray area. Maximize your sprayer investment. Multi-task by blowing both sides of the drive row at the same time.

UNDER VINE BLOWER

Designed with the grape grower in mind, this unit complements the Grape Tower to provide complete coverage. Units come with adjustable wings, air vanes, and adjustable nozzles in the air stream.

GRAPE TOWER

Designed to ensure exceptional grape quality. Accommodates single drive row or multi row through controlling the direction of sprayer outlets. Optional spray outlet adjustable arms, combined with Under Vine Blower to spray from above and below for complete coverage.

BLUEBERRY TOWER

Designed for mature blueberry plantations to direct spray laden air to the top of the plant. Used in conjunction with our traditional air outlets, this system improves coverage both on the inside and the outside of the blueberry bush by pushing down through canes into hard-to-reach areas deep within the bush.

10.0

Setting Pressure Adjust System
&
Bypass system

Setting up a new Turbomist sprayer with Electric Pressure Adjust at the tractor seat
12 steps to preform

For purpose of safety we advise that this should be performed by 2 persons

1. **One party in control of the tractor functions**
2. **Second monitoring the sprayer operations throughout this process**
3. **Establish a set of hand signals to communicate when sprayer and tractor are operational.**

Step 1

Connect sprayer to tractor and PTO, put the gearbox for the fan in neutral. This will allow the sprayer technician and the tractor operator to communicate later in the set up process.

Step 2

Fill the sprayer with water (½ full). This will allow enough water for speed trials for correct calibration practices.

Step 3

Connect electric control box to a 12-volt supply as detailed in your manual.
Note: the electric controls are polarity sensitivity see manual or control box for details

Step 4

Unscrew the **red knob** on the relief valve at the front of the sprayer so there is no measurable spring tension on the knob. On the end of the red knob the is indicators that state + to increase pressure and – to decrease pressure (out as far as it can go- it will not fall off due to screw in the end.)

State of – (decreased pressure)

State of + (Increase pressure)

Note: each valve is equipped with a dump or full relief setting; ***inside of the black handle you will find a "0" or a "1".*** If the handle is rotated in the direction of the "0" then the valve is in full relief mode and no pressure can be achieved. For this operation to function the valve must be in position number "1"

Position 0

Position 1

Step 5

Proceed to the rear of the sprayer and remove the hood if necessary. Locate the brass bypass valve in the rear of the machine. It will be located close to the tank where the bypass hoses out of the valves tee together and return into the tank.

"Open this valve completely" (means the handle will be pointing in the direction of water flow and perpendicular to flow is closed after completing this task reinstalls the protective hood before operating.

Step 6

If required turn ignition key on, but do not start the tractor which will give power to electric controls, have the operator of the tractor push the pressure adjust switch (toggle) on the tractor control box in the direction of increase pressure, as if he is adjusting the pressure to maximum pressure (pressure up) see decal on box indicating pressure up and down.

Step 7

Proceed to the rear of the machine and look for the pressure adjust valve. To ensure that the pressure adjust valve is full closed (shown below left photo) this is the one that has the red indicator in the clear plastic bubble.

Please note you will have two additional valves that have yellow indicators, these are the actual left and right valves which control the booms. Ignore them in this set up.

Photo of Pressure adjust valve in closed position achieving Maximum pressure

Photo of Pressure adjust valve <u>in open position achieving minimum pressure.</u> This is to show you what the minimum pressure setting will look like for comparison purposes. At this point of the set up process you want the regulator valve closed showing max pressure, as below.

Red Indicator on valve body valve is off when max pressure achieved

(closed position shown)

Step 8
Proceed to the rear of the machine and open or close the nozzles you will use to achieve your desired calibration. (On both sides)

Step 9
Now return to the regulator at front of the machine and ensure that black handle into 0 positions – this will push water to the mixing basket. Have the operator of the tractor now engage the PTO. With the gearbox in neutral as suggested above, set throttle to the desired settings to achieve the PTO speed you desire. Make sure that the sprayer operator is always in site line of the tractor operator!

Step 10
Have the tractor operator Turn on left and right booms.

With a clear visual site line from you to the tractor operator (stand clear of the PTO)

Have sprayer operator slowly turn the black handle into the number "1" position.

Now turning the red knob adjust the pressure relief to the desired maximum pressure required for you to meet the calibration is achieved.

Please not the sprayer is spraying water out of the preset nozzle calibration at this time. This means you need to spray water out the nozzles because pressure can only be set when the unit is spraying.

We recommend that the maximum pressure setting at the relief be 25 psi higher than the actual operating spraying pressure. Setting of the pressure higher than required at this point is allowing for maximum spray pressure variation.

Step 11
Now using the electric pressure adjust valve switch on the control box on the tractor, reduce the pressure to your desired spray pressure. Again this will be while the tractor PTO is running and spraying water out the back.

Now at this point electronic pressure adjust is now set!

Steps 12 thru 13 are for balancing of spray booms for maximum calibration accuracy during the single sided spraying or spraying of outside row panels

Step 12

Turn off one spray valve (using the control box on the tractor) and watch if there is any pressure fluctuation. If there is a pressure variations then you must adjust the ¼ bypass ball valve (shown in step #5) which is located at the rear of the tank.

- Should pressure increase from the desired setting this will required the bypass valve at the back of the machine to be opened
- Should the pressure decrease from than the desired setting this will require the bypass valve to be close until the desired pressure is reached.
- If the pressure increases open this same ball valve until the desired pressure is reached. What you are doing by adjusting the bypass return, ball valve is matching the amount of water flowing out one side of the sprayer to the amount bypassing back into the tank.
- Once you have one side equal both sides will be equal assuming of course you have the same number and size of nozzles, which you should have, on both sides of your outlet.

Step 13

Now shut down the sprayer and tractor. You are done adjusting the pressure adjust from the electric control box on the tractor and as well you have adjusted the by-pass valve in the rear to equalize both sides when one is turned off, when you are doing the outside row instance, this means your calibration remains the same whether one or both sides are turned on, so you do not have to make adjustments to speed or pressure to spray the outside row.

Note: if you change your calibration, you will necessary need to readjust the bypass valve at the rear to compensate for the change in volume going out the one side. This is just a matter of tweaking the system to make your machine function to your best benefit.

It is important to be aware to have the unit setup properly in this way, so the machine functions as it is intended to. If this setup is not done, the operator will not only become frustrated but in all likely hood he/she will blow the hoses off the pump, or worse.

Slimline Manufacturing Ltd

If the customer still has problems, we are open on our 1 800 495 6145 toll free number from 8am to 4pm pacific time, Monday thru Friday to offer assistance.

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Turbo-mist

Raven System Spray Monitors Warranty

Please be advised that Raven Monitoring systems are not covered by Slimline Manufacturing Ltd. If you have purchased a Turbomist Sprayer from Slimline and added the Raven Monitor option the warranty for that monitor will come directly from Raven Industries. You must contact Raven, get an RMA authorization and proceed from there.

If you have any technical questions on the Raven Monitoring System please feel free to contact Slimline Manufacturing Ltd, as we would be happy to assist you.
We are a certified dealer for Raven and are here to help whenever possible.

Should you need warranty information please contact the following:

Raven Industries
RMA Request to Jacqui Bell
E-mail: Jacqui.bell@ravenind.com
Phone: 800-793-2155 Fax: 306-793-2156

Thank You
Slimline Manufacturing Ltd.

Slimline

MANUFACTURING

Turbo-Mist™ Agricultural Sprayers are manufactured by Slimline Manufacturing (2016) Ltd.

Our mission is to provide high quality engineered products to customers seeking innovative and solution-based wind and water machinery for a wide range of operating conditions.

Engineered for the Future

1-800-495-6145

www.slimlinemfg.com