SUCKER REMOVERS

for

HD and Terracing Vineyard Frames

OWNER'S & OPERATORS MANUAL

Phone: (209) 662-5063

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TO OUR CUSTOMERS:

Thank you for choosing AGRISHIELD. We are proud to deliver to you equipment of the highest quality. Regularly performed preventative maintenance will keep your equipment in the best working order possible. Please take the time to review this manual and understand the maintenance and operation before using your equipment.

WARRANTY

AGRISHIELD warrants each new piece of equipment and parts manufactured by it to be free of defects in material and workmanship under normal use and service. The obligation of AGRISHIELD shall be limited to replacing any part which shall, within 1 year (1 season) after delivery to the original purchaser, be returned to AGRISHIELD with transportation charges prepaid and which an examination by AGRISHIELD discloses defective. This warranty does not obligate AGRISHIELD to bear the cost of labor, travel time or hauling in connection with the replacement or repair of the defective parts and in no event will be liable for consequential damages including but not limited to loss of crop, rental or substitute equipment or other commercial loss.

No warranties or representations made by persons other than representatives of AGRISHIELD expressly authorized in writing to do so shall be valid and binding upon AGRISHIELD. No dealer shall be authorized to bind AGRISHIELD in this respect.

AGRISHIELD makes no warranty with respect to component parts not manufactured by AGRISHIELD. This warranty shall not apply to any equipment which has been altered in any way outside of manufacturer's factory, or which has been subject to misuse, neglect or accident.

This warranty is expressly in lieu of all other warranties and representations, expressed, implied, or statutory, including warranties of merchantability and fitness for a particular use, and all other liabilities or obligations on the part of AGRISHIELD, foreseeable or not.

USERS'S RESPONSIBILITY

It is the responsibility of the user to read the Operator's Manual and understand the safe and correct operating procedures as pertains to the operation of the product and to lubricate and maintain the product according to the maintenance schedule in the Operator's Manual.

WARRANTY SERVICE

Warranty service may be obtained through and authorized dealer or AGRISHIELD service facility. Write or call: AGRISHIELD, 7507 N Podesta Ln, Linden, CA 95236, telephone (209) 662-5063.

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A. SAFETY INSTRUCTIONS

IMPORTANT SAFETY NOTICE

Improper practices or carelessness can cause bodily injury or death.

Always instruct the operator in proper operating procedures. The operator must read and understand all safety instructions in the Owner's and Operator's Manual and those placed on the equipment.

SAFETY INSTRUCTIONS

1. **Warning: Use of the sucker removers can result in projectiles in the direction of the operator. For this reason, it is recommended to install the frame on tractors with an enclosed cabin. In the absence of an enclosed cabin, proper eye protection is required for safe operation.**
2. **Warning: Make sure all personnel are clear of the frame prior to starting the tractor engine or motors.**
3. **Warning: Stop tractor engine prior to making any manual adjustments or performing any service work on the frame.**
4. **Warning: Stop tractor engine prior to clearing material from moving components on the implements.**
5. **Warning: Always wear protective eye goggles when checking for hydraulic leaks. Do not check hydraulic lines for leaks with your hands. High pressure oil leaking through a small hole will penetrate the skin. This will cause serious bodily injury or death.**
6. **Caution: Always replace safety labels and signs if they become illegible.**

B. SPECIFICATIONS

Hydraulic Oil	**Hydraulic oil used in tractor or power pack**

C. INSTALLATION & REMOVAL

The sucker remover arms can be installed on our HD or Terracing vineyard frames. Refer to the arm change procedure section of your frame's manual for instructions on connecting the arms to the frame.

Light-Duty Suckering Shaft Installation

The light-duty suckering shafts are connected to the motors using a one-piece, rigid clamping shaft coupling. Ensure that all 4 screws on the coupling are fully tightened before use.

Suckering Drum Installation

The segments of the suckering drums must be installed in the correct order and orientation to maximize performance and minimize wear on motor components.

There are two styles of drums:

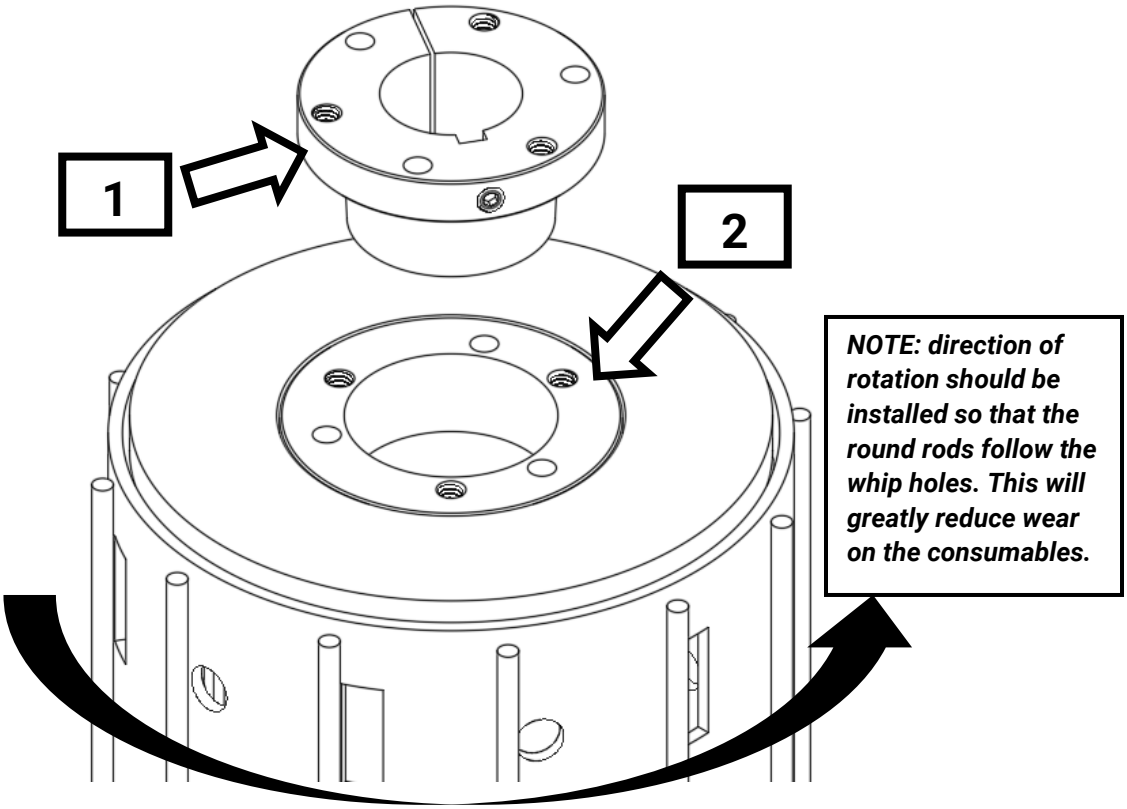
High-wire drums consist of (3) 16” segments, for a total overall height of 48”.

Standard drums consist of (4) 8” segments, for a total overall height of 32”.

Both types of drums are constructed in the same way and should follow the same assembly instructions.

Step 1: Connect the QD bushing (1) to the motor shaft and the top drum section (2) to the bushing, following the “Standard Mounting Assembly” detailed on the following page.

NOTE: There are both left-hand and right-hand drums that must be installed accordingly to maximize performance and consumable life. See note on diagram below.

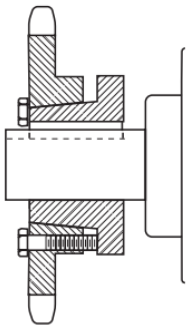


Stock QD Bushings

Martin MOUNTING PROCEDURE – QD BUSHINGS

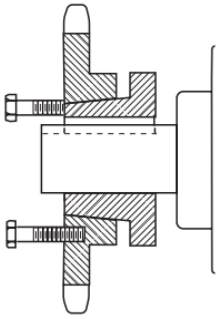
IMPORTANT – BE SURE TAPERED CONE SURFACES OF QD BUSHING AND INSIDE OF SHEAVE OR SPROCKET HUB ARE DRY AND FREE OF ALL FOREIGN SUBSTANCES SUCH AS PAINT, GREASE, OR DIRT.

STANDARD MOUNTING ASSEMBLY FOR QD SHEAVES AND SPROCKETS



MOUNTING

1. Be sure the tapered cone surfaces of the bushing and the inside of the driven product are clean and free of anti-seize lubricants.
2. Slide QD bushing on shaft, flange end first. Assemble key.
3. Position QD bushing on shaft. Tighten set screw over key "hand tight" with standard Allen wrench only. Do not use excessive force.
4. Slide large end of sheave or sprocket taper bore into position over cone aligning drilled bolt holes in sheave or sprocket with tapped holes in flange of bushing. Assemble pull-up bolts and lock washers.
   NOTE: Install M thru S bushings in the hub so that the two extra holes in the hub are located as far as possible from the bushing's saw cut.
5. Tighten pull-up bolts alternately and evenly to tightness indicated in torque table on back. Do not use extensions on wrench handles. There should be a gap between the face of the sheave or sprocket hub and the flange of the QD bushing to insure a satisfactory cone grip and press fit.
   CAUTION: THIS GAP MUST NOT BE CLOSED.



DISMOUNTING

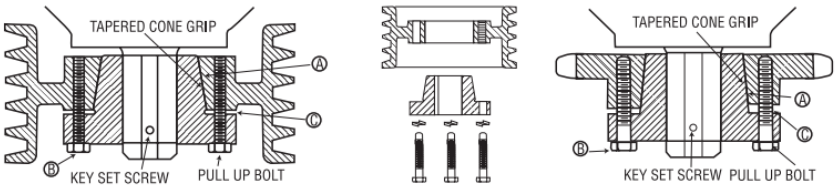
1. Remove pull-up bolts and screw them into TAPPED holes in sheave or sprocket and against flange of QD bushing to break cone grip.
1. Loosen set screw and slide QD bushing from shaft.

WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions given above must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. All rotating power transmission products when used in a drive are potentially dangerous and must be guarded by the user as required by applicable laws, regulations, standards, and good safety practice. (Refer to ANSI Standard B15.1.)

REVERSE Mounting Assembly

FOR QD SHEAVES AND SPROCKETS USING JA, SH, SD, SDS, SK, SF, E, F, AND J BUSHINGS

These bushings, as well as the sprockets and sheaves for them, are each drilled with six holes (three drilled and three tapped) to allow pull-up bolts to be inserted from either side. This enables variations of mounting characteristics to suit a particular installation.



1. Be sure the tapered cone surfaces of the bushing and the inside of the driven product are clean and free of anti-seize lubricants.
2. Assemble sheave or sprocket with bolts inserted (But not tightened) through DRILLED holes in bushing flange into TAPPED holes in sheave, sprocket, or other Martin QD part.
3. With key in shaft keyseat, slide assembly into approximate position on shaft with flange end of bushing away from bearing.
4. Position QD bushing on shaft by tightening set screw over key "hand tight" with standard Allen wrench only. Do not use excessive force.
5. Tighten pull-up bolts alternately and evenly to tightness indicated in torque table below. Do not use extensions on wrench handles. There should be a gap between the face of the sheave or sprocket hub and the flange of the QD bushing to insure a satisfactory cone grip and press fit. CAUTION: THIS GAP MUST NOT BE CLOSED.

1. Remove pull-up bolts and screw them into TAPPED holes in bushing flange and against hub of sheave or sprocket to break cone grip.
2. Loosen set screw in bushing flange and slide QD bushing from shaft.

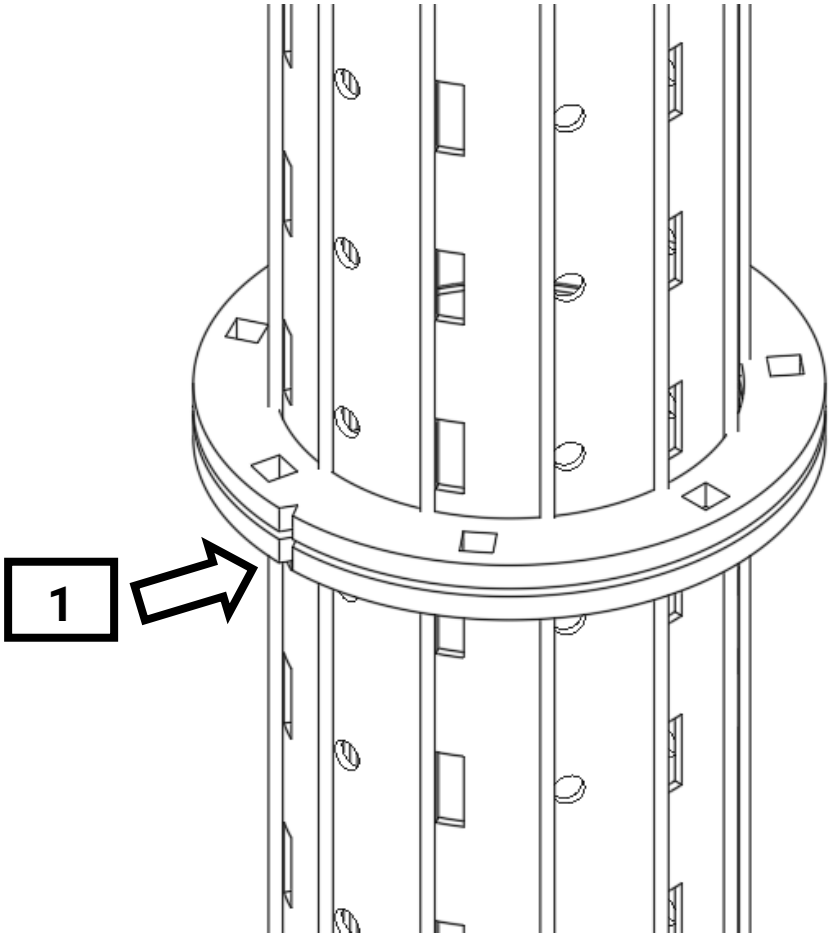
CAUTION

WARNING: USE OF ANTI-SEIZE LUBRICANT ON TAPERED CONE SURFACES OR ON BOLT THREADS WHEN MOUNTING MAY RESULT IN DAMAGE TO SHEAVES AND SPROCKETS. THIS VOIDS ALL MANUFACTURER'S WARRANTIES.

BOLT TORQUE TABLE

QD Bushing Size	Size of Cap Screw	Wrench Torque in./lbs.
JA	10 – 24	60
SH, SDS, SD	.25 – 20	108
SK	.3125 – 18	180
SF	.375 – 16	360
E	.5 – 13	720
F	.5625 – 12	900
J	.625 – 11	1620
M	.75 – 10	2700
N	.875 – 9	3600
P	1 – 8	5400
W	1.125 – 7	7200
S	1.125 – 7	9000

Step 2: Connect the drum sections together using the included carriage bolts, ensuring that the section stamps on the connecting flanges (A·, A··, B·, B·· etc.) match between the sections being connected, and the notches in the connecting rings are aligned with each other (1).



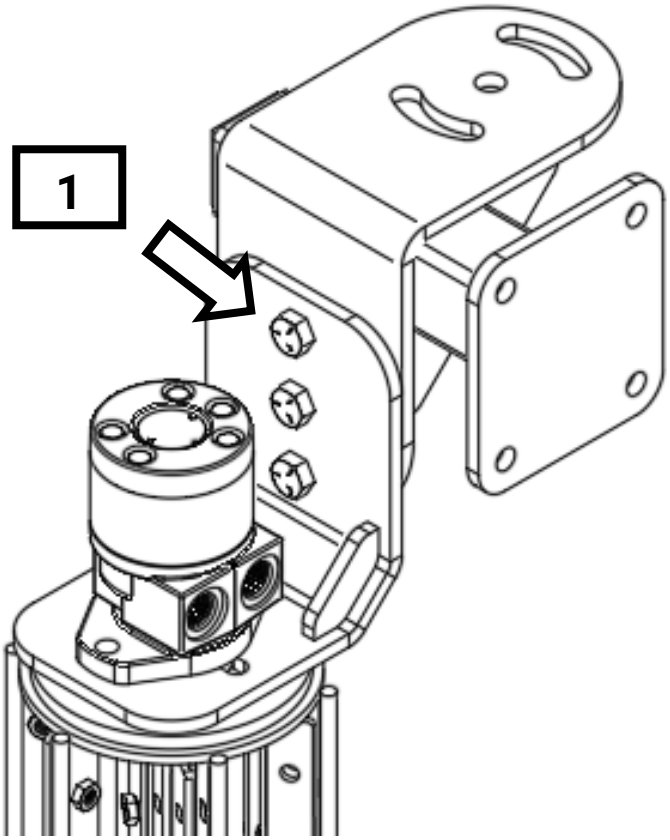
D. CONFIGURATIONS & ADJUSTMENTS

The suckering arms and heads can be adjusted in a number of ways to optimize effectiveness. The following section describes and illustrates the adjustment points and possible configurations.

After making any adjustment, always check that the hydraulic hoses are clear of any potential snag points and have enough slack to allow for proper breakaway rotation or cylinder operation (if installed on frame). Where needed, use cable ties to secure hoses.

Head Angle Adjustments

Suckering heads can be tilted side to side to allow whips to engage with the vines closer to the ground. To adjust the head angle, loosen the 3 bolts on the motor mount (1), rotate the head to the desired angle, and re-tighten the bolts, ensuring that the head is securely held in place.



Whip Adjustments

Suckering whips can be adjusted within their heads/shafts to different lengths and densities to accommodate different vines and trellis systems.

> **On both the standard and high-wire suckering drums, pass the whips through the holes in the drum and zip-tie the inside end of the whips to prevent them from sliding all the way out.**
>
> **For light-duty suckering shafts, pass the whip through the shaft until there is an equal length on either side, and secure in place using the set screws.**

For mature vines that are each supported by trellis stakes, we recommend starting the machine with roughly 8 inches of engagement by the whips and adjusting as appropriate.

For younger, smaller diameter, or un-supported vines, we recommend starting with less engagement and/or reducing motor speed to reduce the risk of damage.

Increased whip engagement will allow the whips to wrap further around the vines and remove suckers from all sides. On sturdy vines, this can potentially be used to sucker two full rows at once.

Cordon Shoot Removal

The suckering arms have a secondary mounting point that allows the heads to be installed horizontally for cordon cleaning and/or shoot removal. These can also be used to install a second set of heads for high-wire or other tall trellis systems.

For cleaning undergrowth from the cordon, similar ground and motor speeds to those used for suckering are recommended as a starting point. Care should be taken to maintain proper distance from the vines if top shoot removal is not desired.

Adjusting the heads to move the shafts closer to the cordon will allow the whips to wrap around the cordon and remove top shoots. Achieving the required number of top shoots can be done by adjusting motor speeds, ground speeds, or the number/length of whips installed in the shafts. Some trial and error will be needed to achieve the desired results.

E. CONTROLS AND VALVES

All implement controls and valves are integral to the frame. Refer to the controls and valves section of your frame's manual.

F. OPERATING PROCEDURES

Do not allow anyone to operate the berm sweeper who has not been properly trained in its safe operation. Ensure that all personnel are at least 10 feet clear of the implement and tractor before starting the engine and during operation.

WARNING: Stop the tractor engine before making any adjustments to the trimmers.

Prior to operation the following items must be checked and/or adjusted to obtain maximum performance and avoid necessary wear and stoppages:

1. **Check that all moving components are free of debris that could block operation.**
2. **Check hydraulic system for leaks and proper connections.**

RUNNING THE SUCKER REMOVER

1. **While not in a row, vertical cylinder should be raised to avoid damage.**
2. **When entering a row, start the motors and lower the heads using the vertical cylinder.**
3. **Extend the horizontal cylinders until the desired engagement with the vines is reached.**
4. **When in operation, be aware of loose irrigation lines and irrigation risers as these can get caught and be damaged by the whips. It is recommended to have a hand on the lever controlling the motors in such situations to mitigate damage should the whips become entangled.**
5. **To turn around at the end of rows, stop the motors and raise the shafts.**
6. **For optimal performance, monitor the suckering shafts to ensure that no debris/obstructions are tangled in the whips. Remove when necessary.**

Notes

Your conditions will vary from others and will change throughout the suckering period. As a general rule, higher shaft speeds will allow higher ground speeds while achieving similar results. However, fine adjustment of motor and tractor speeds, whip lengths, and vine engagement will be needed to achieve optimal results.

G. MAINTENANCE PROCEDURES AND SCHEDULES

DAILY MAINTENANCE:

1. **Check the general condition of the frame for hydraulic leaks, loose bolts, worn or damaged parts.**
2. **Check the wear status of the suckering whips/sweeper paddles. Replace as needed**
3. **Replace all worn, damaged or illegible labels.**

YEARLY MAINTENANCE:

1. **Check and repair worn or damaged parts.**
2. **Replace all worn, damaged or illegible labels.**

STORAGE OFF SEASON:

1. **Wash and clean.**

H. TROUBLESHOOTING

The following is a list of problems that may occur, and some possible causes and remedies. If the solution to a problem is not apparent, contact your AGRISHIELD dealer or AGRISHIELD directly.

Warning: Do not check for hydraulic leaks with your hands. The high pressure in these lines will penetrate the skin and cause serious personal injury.

Problem	*Cause*	*Action*
Suckering head is not spinning.	**Motor is jammed from debris.**	**Shut off the tractor and de-pressurize hoses. Inspect the heads for debris, particularly between the motor mount and suckering heads.**