



OPERATOR'S AND PARTS MANUAL

VP10 VIBRATORY PLOW



PALADIN™
LIGHT CONSTRUCTION GROUP

 **BRADCO**

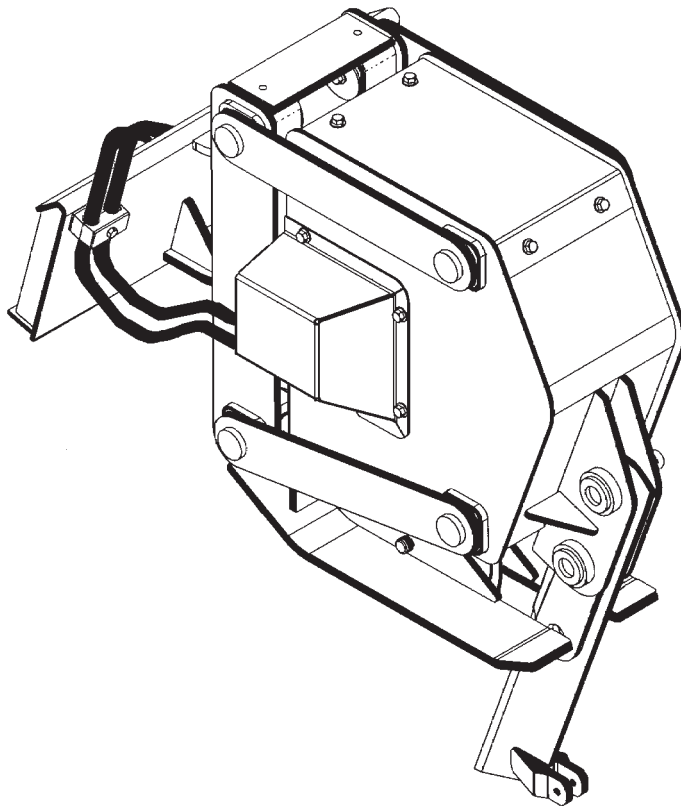
 **FFC**

 **HARLEY**

 **McMILLEN**

 **SWEEPSTER**

The Power of Combined Excellence



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM654
Part Number: 75554
Rev. 2

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TO THE OWNER

GENERAL COMMENTS

Congratulations on the purchase of your new BRADCO product! This product was carefully designed and manufactured to give you years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all safety precautions and maintenance procedures, as described in this manual.

ABOUT THIS MANUAL

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents. **Remember, never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual. (See Sections B and G respectively.)**

Unless noted otherwise, right and left sides are determined from the position of the operator when behind the product facing forward.

SAFETY ALERT SYMBOL



This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

SERVICE

When servicing your product, remember to use only manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering, record the model and serial number of your unit in the space provided on this page. This information may be obtained from the identification plate located on the product.

MODEL _____
SERIAL NUMBER _____
DATE PURCHASED _____

The parts department needs this information to insure that you receive the correct parts for your specific model.

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SAFETY PRECAUTIONS

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



THIS SYMBOL MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

SIGNAL WORDS: Note the use of signal words DANGER, WARNING, and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

DANGER: Indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, **typically for machine components which, for functional purposes, cannot be guarded.**

WARNING: Indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury, and **includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.**

CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

SAFETY PRECAUTIONS

GENERAL INFORMATION

This section is composed of various warnings and safety tips. **Read and learn all the information in this section before you attempt to use your attachment.**

Also read your vehicle owner's manual before using your equipment. This knowledge will help you operate your unit safely. **Do not take this information lightly, it is presented for your benefit and for the benefit of others working around you.**

The "Safety Alert Symbol", as previously described, will be used throughout this manual. It will appear with the word **DANGER**, **WARNING**, or **CAUTION** above it, and a safety message pertaining to the specific topic being covered. Take the time to read these messages as you come across them.

TO THE OPERATOR

The primary responsibility for safety with the equipment falls to the operator. Make sure that the equipment is operated only by responsible individuals with the proper instruction. It is the skill, care, common sense, and good judgment of the operator that will determine how efficiently and safely the job is performed. Know your equipment before you start. Know its capabilities and how to operate all the controls. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order.

BEFORE YOU START

1. **Read the entire loader and attachment operator's manuals** before ever attempting to use the loader. This knowledge is necessary for safe operation.
2. **Follow all safety decals.** Keep them clean, and replace them if they become worn, damaged, or illegible.
3. **Do not paint over,** remove, or deface any safety signs or warning decals on your equipment.
4. **Know your equipment inside and out.** Know how to operate all controls, and know emergency shut down procedures.
5. **Keep all stepping surfaces, pedals, and controls free from dirt, grease, and oil.** Keep equipment clean to help avoid injury from a fall when getting on or off equipment.
6. **Use handholds and step plates when getting on/off .** Failure to do so could cause a fall.
7. **Be alert to others in the work area.** Be sure others know when and where you will be working. Make sure no one is behind equipment.
8. **Never take passengers on your equipment.** There is no safe place for a passenger.

SAFETY PRECAUTIONS

9. **Never try to board equipment while it is moving.**
10. **Turn off engine before performing maintenance.** If lift arms must be left raised for maintenance or any other reason, use a positive lift arm lock to secure the arms in place. Serious damage or personal injury could result from lift arms accidentally lowering.
11. **Reduce speed when driving over rough terrain,** on a slope, or turning, to avoid overturning the loader.
12. **Test all controls before you begin.**
13. **Do not smoke when refueling.** Allow room in the gas tank for expansion. Wipe up any spilt fuel. Secure cap tightly when done.

WORKING WITH THE ATTACHMENT

1. **Never operate the unit without first reading and understanding the operator's manual.**
2. **Operate the attachment only in daylight or sufficient artificial light.**
3. **Do not carry load with arms in the raised position.** Always carry loads close to the ground. Do not step off platform with load raised.
4. **Check your work area, and know where all utility lines are.** Avoid hitting underground electrical wires, cables, pipes, fence posts, gas lines, uneven sidewalk edges, large rocks, etc.
5. **Never operate equipment while under the influence** of alcohol or prescription drugs, which could inhibit physical and/or mental capacity.
6. **Do not exceed rated operating capacity, as machine may become unstable, which may result in loss of control.**
7. **Slow down before turning.** Sharp turns on any terrain may cause loss of control.
8. **Always lower the loader arms to the ground,** shut off the engine, and remove the key before getting off the unit.

TRANSPORTING THE ATTACHMENT

1. **Follow all federal, state, and local regulations when transporting the unit on public roads.**
2. **Use extra care when loading or unloading the machine onto a trailer or truck.**

MAINTENANCE

1. **Never work on equipment while it is running.**
2. **Never make hydraulic repairs while the system is under pressure.** Injury or death could result.

SAFETY PRECAUTIONS

3. **Observe proper maintenance schedules** and repairs to keep the unit in safe working order.
4. **Always wear safety goggles or glasses when working on equipment.**
5. **Use a drift and hammer when pressing out pins,** to prevent the pin from shattering.
6. **Use only manufacturer recommended replacement parts.** Other parts may be substandard in fit and quality.

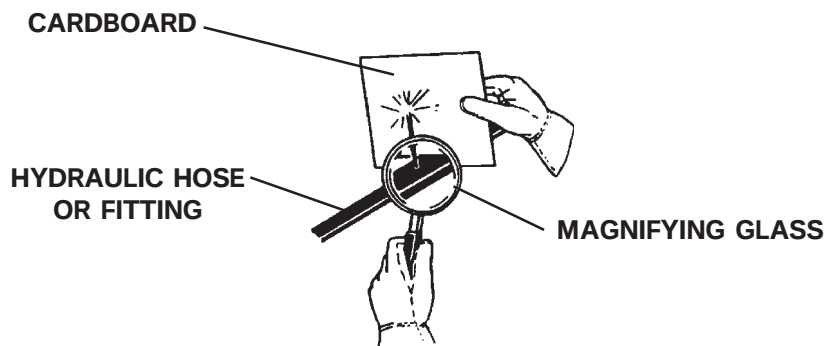
WARNING!



Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.

If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.



INTERNATIONAL SYMBOLS

As a guide to the operation of your equipment, various international symbols have been utilized on the instruments and controls. The symbols are shown below with an indication of their meaning.



Engine speed



Hours recorded



Engine water temperature



Lights



Horn



Engine oil pressure



Hazard warning



Axle connect



Axle disconnect



Continuously variable



Increase



Decrease



Diesel fuel



Creeper range



High range



Low range



Alternator charge



Power take-off (on)



Power take-off (off)



"Tortoise," slow or minimum setting



"Hare," fast or maximum setting



Caution



Control lever operating direction



Rock shaft (raised)



Rock shaft (lowered)



Remote cylinder (extended)



Remote cylinder (retracted)



Remote cylinder (FLOAT)



Differential lock



Read operators manual



Neutral



Forward



Reverse

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PRE-OPERATION

GENERAL INFORMATION

The purpose of this manual is to assist in setting up, operating and maintaining your vibratory plow. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

Right and left when referred to in this manual are determined from the position of the skid-steer operator sitting in the operator's seat facing forward. The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the vibratory plows as may be necessary without notification.

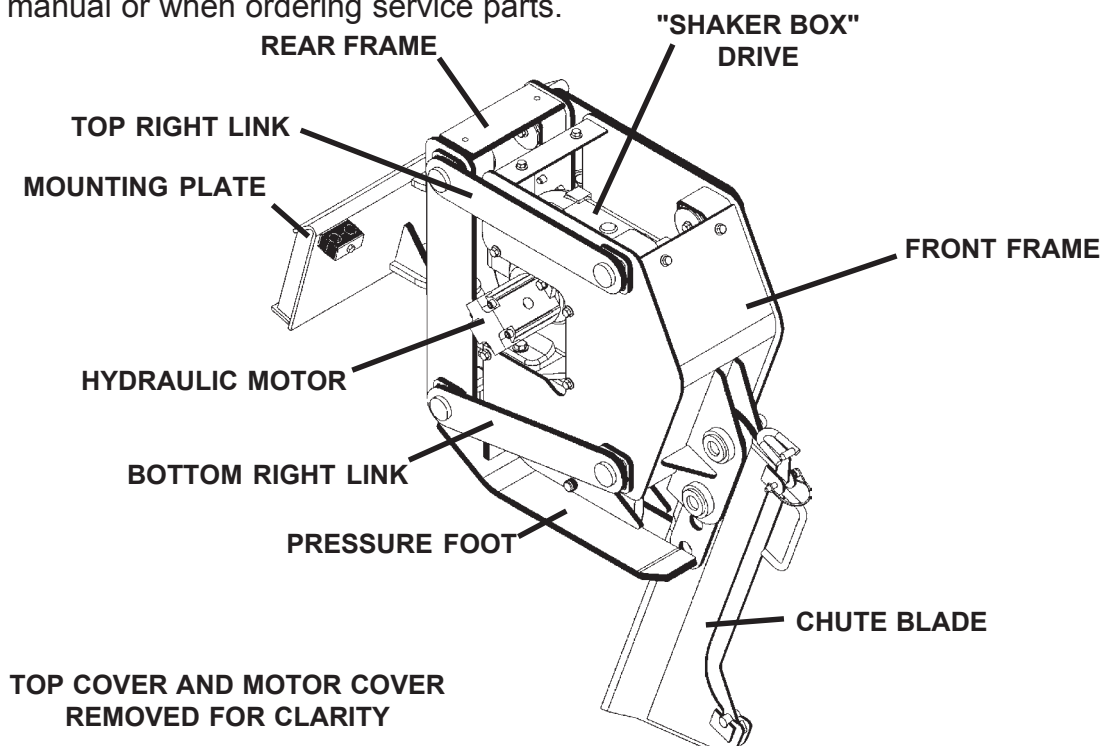
PREPARING THE VEHICLE

WARNING! Never let anyone operate this attachment without understanding all of the "Safety Precautions" and "Operating Instructions" sections of this manual. (See Section B and G respectively.) Always choose hard, level ground to park the attachment on and set the brake so the vehicle cannot roll.



MAJOR NOMENCLATURE

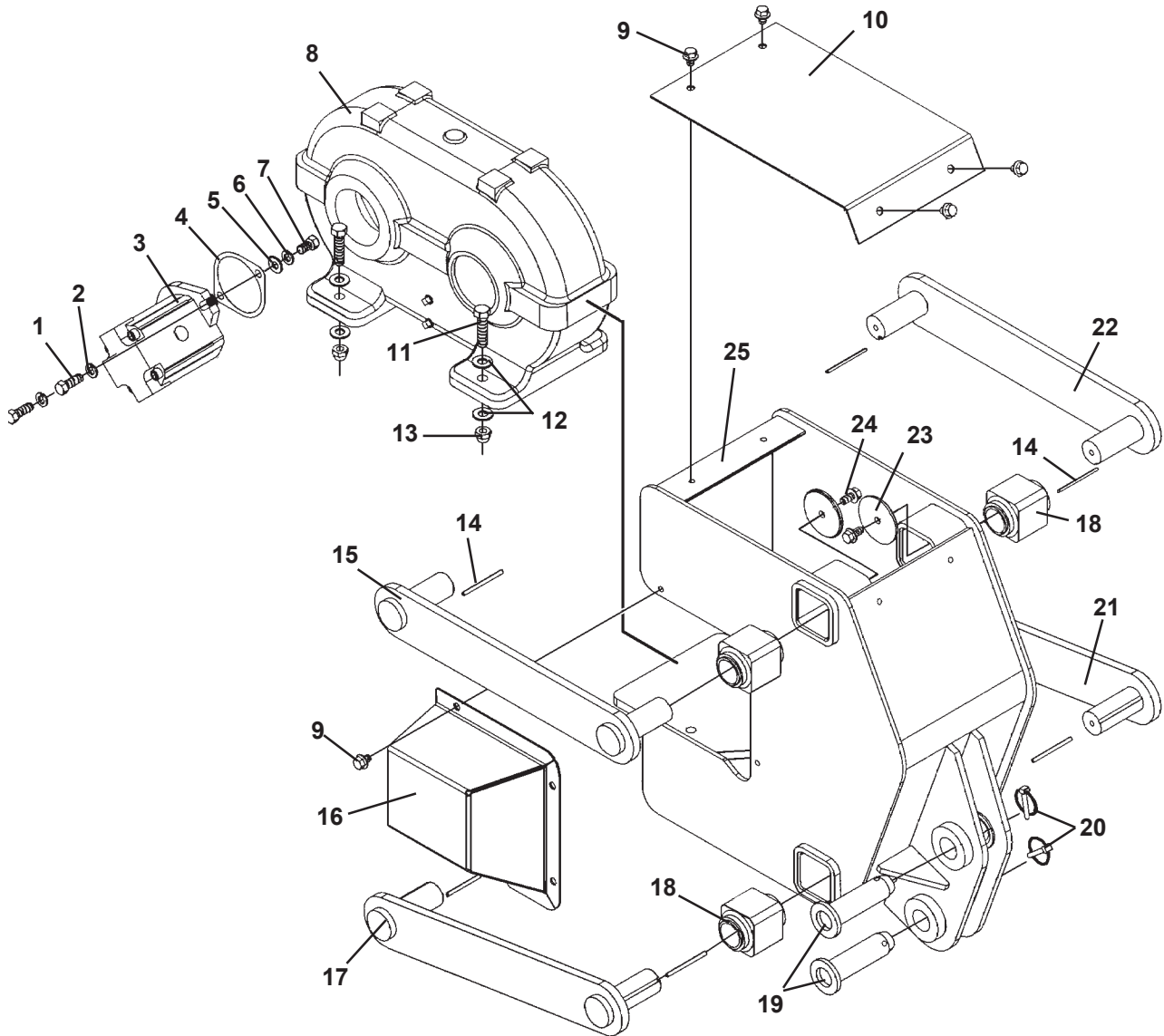
Throughout this manual, reference is made to various attachment components. The purpose of this section is to acquaint you with the various names of these components. This knowledge will be helpful when reading through the manual or when ordering service parts.



VIBRATORY PLOW ASSEMBLY

ASSEMBLIES #19000 & #19693

DIAGRAM 1 OF 2



VIBRATORY PLOW ASSEMBLY

ASSEMBLIES #19000 & #19693

LIST 1 OF 2

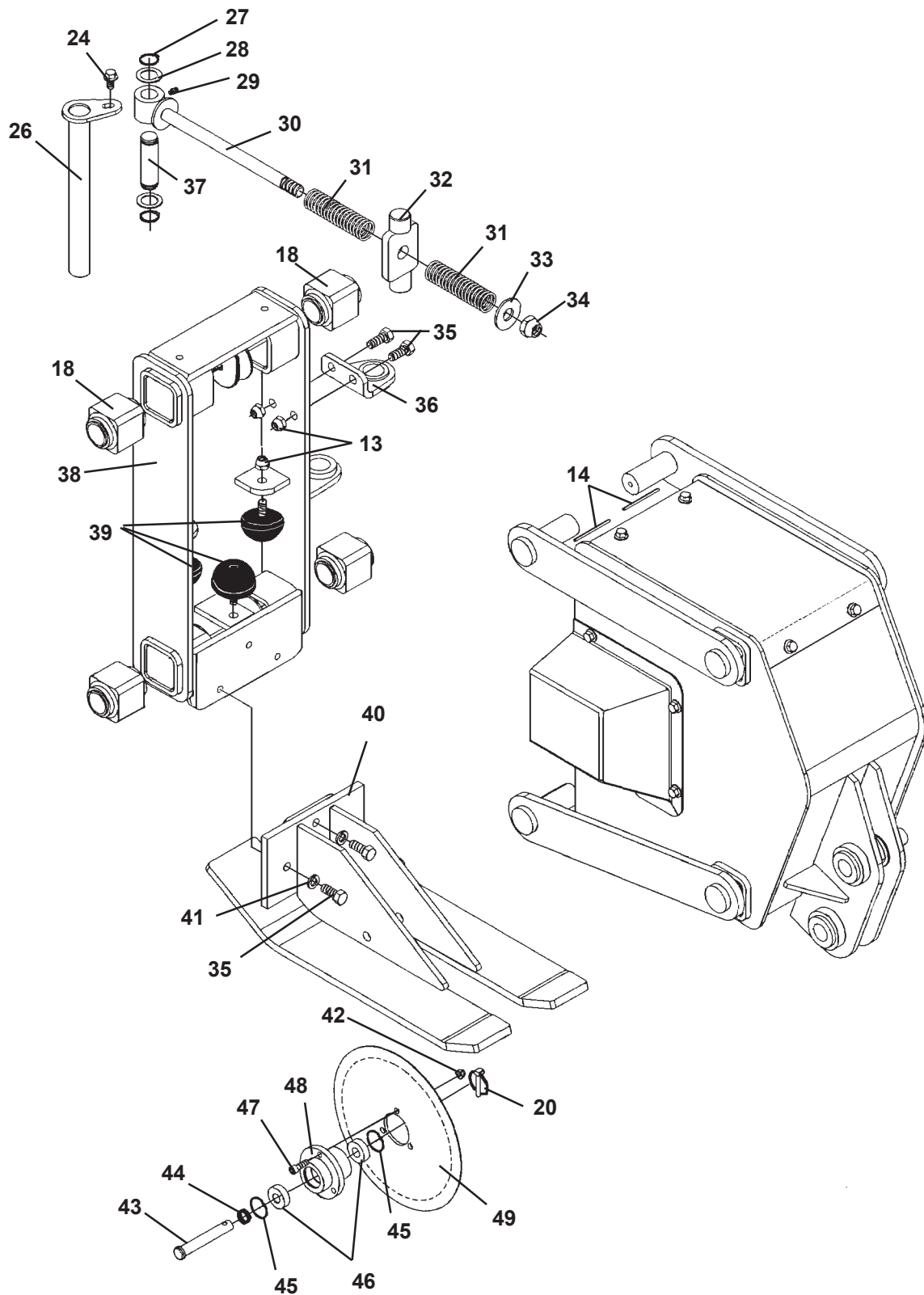
<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	10085	.44" UNC X 1.25" Sockethead Capscrew
2	2	1504	.44" Lock Washer
3	1	19645	Hydraulic Motor 7.5 - 11 GPM (Assembly #19693)
	1	19314	Hydraulic Motor 9.5 - 14 GPM (Assembly #19000)
	**	19814	Replacement Motor Seal Kit
	-	19815	Replacement Motor Shaft Key
4	1	22532	Motor Gasket
5	1	1512	Flat Washer
6	1	1502	Lock Washer
7	1	1020	.31" UNC X .50" Hex Capscrew
8	1	2000515	Drive
9	8	1961	.38" UNC X .50" Flange Head Capscrew
10	1	17864	Top Cover
11	4	10086	.50" UNC X 2.25" Hex Capscrew Grade 8
12	8	1646	.50" Hard Flat Washer
13	9	1841	.50" UNC Deformed Oval Lock Nut
14	8	18695	Key
15	1	18692	Top Right Link
16	1	19285	Motor Cover
17	1	17857	Bottom Right Link
18	8	18805	Square Bonded Bushing
19	2	17866	Blade Pin
20	3	6626	Klik Pin
21	1	17859	Bottom Left Link
22	1	17856	Top Left Link
23	8	17862	Keeper
24	9	1953	.38" UNC X .75" Tapping Screw
25	1	2006901	Front Frame

**** Field replacement of the internal motor seals voids warranty.**

VIBRATORY PLOW ASSEMBLY

ASSEMBLIES #19000 & #19693

DIAGRAM 2 OF 2



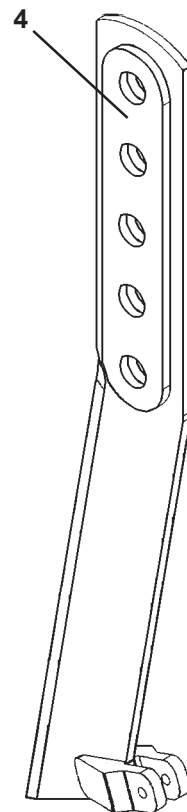
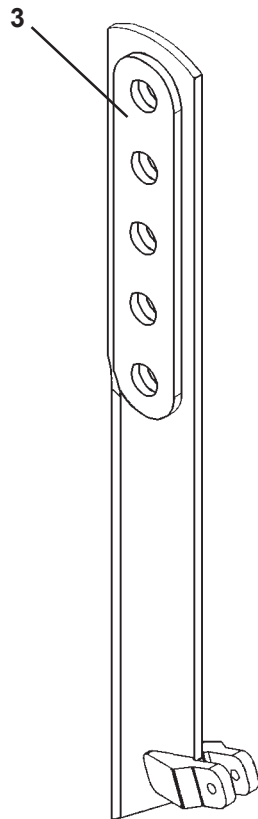
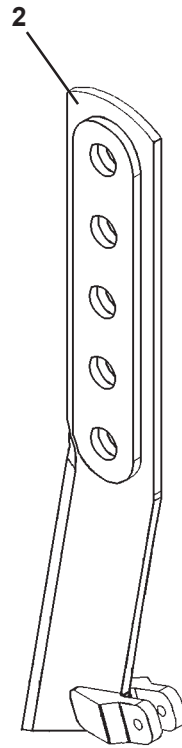
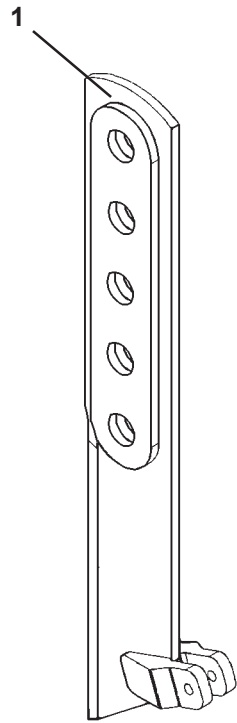
VIBRATORY PLOW ASSEMBLY

ASSEMBLIES #19000 & #19693

LIST 2 OF 2

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
13	9	1841	.50" UNC Deformed Oval Lock Nut
14	8	18695	Key
18	8	18805	Square Bonded Bushing
20	3	6626	Klik Pin
24	9	1953	.38" UNC X .75" Tapping Screw
26	1	18875	Main Pivot Pin
27	2	6612	Snap Ring
28	2	57462	Thrust Washer
29	1	6616	Grease Fitting
30	1	18821	Spring Rod
31	2	100212	Spring
32	1	18818	Pivot Plate
33	1	1518	.75" Flat Washer
34	1	1534	.75" UNC Nylock Nut
35	5	1780	.50" UNC X 1.25" Hex Capscrew - Grade 8
36	1	18748	Pivot Mount
37	1	18747	Pivot Pin
38	1	17852	Rear Frame
39	3	6886	Rubber Bumper
40	1	2007430	Pressure Foot
41	3	1505	.50" Lock Washer
42	3	1753	.31" UNC Nylock Nut
43	1	22261	Coulter Pin
44	1	18467	Coulter Pin Spring
45	2	1596	Spiral Ring
46	2	2002332	Ball Bearing
47	3	10066	.31" x 1.00" Socket Head Shoulder Screw
48	1	2000804	Coulter Hub
49	1	17949	Coulter Wheel

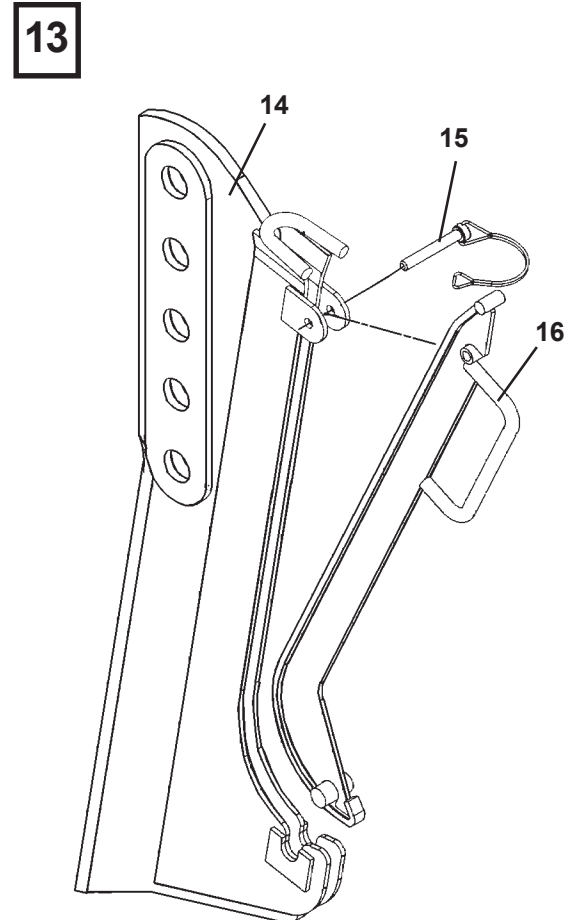
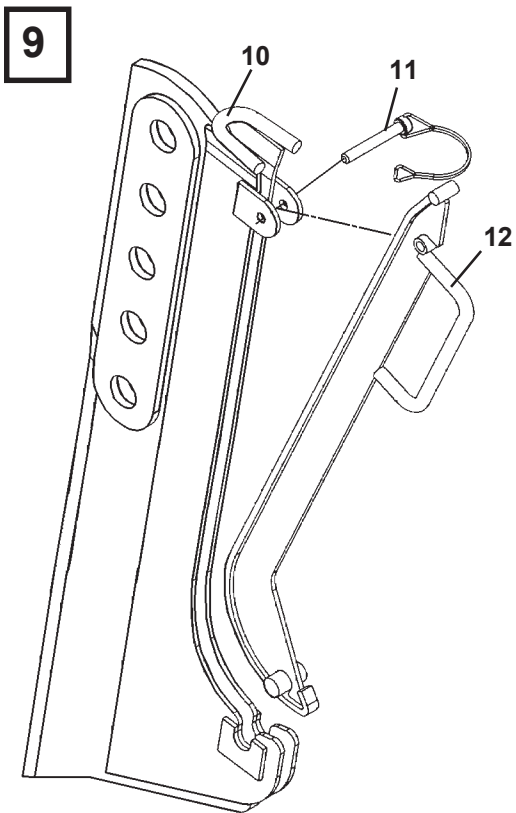
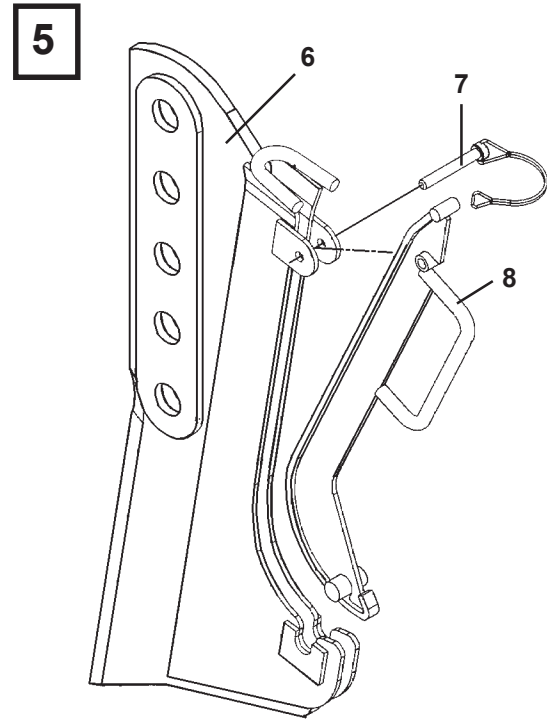
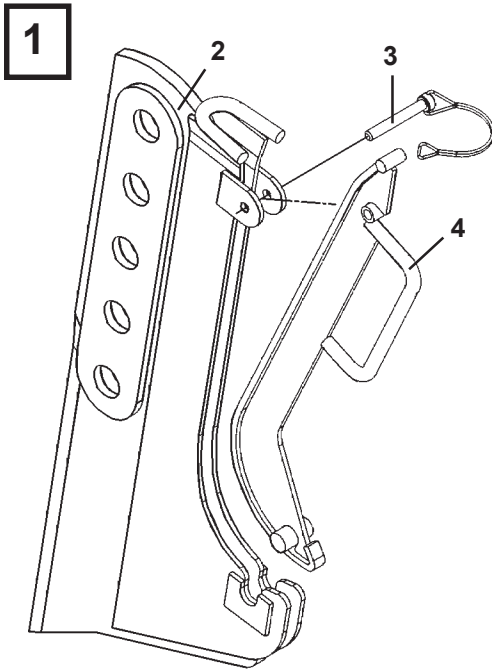
BLADE ASSEMBLIES



BLADE ASSEMBLIES

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	--	19325	20° .38" Blade (6"-12" Depth with 1" Clevis)
2	--	19441	30° .38" Blade (6"-12" Depth with 1" Clevis)
3	--	18690	20° .38" Blade (12"-18" Depth with 1" Clevis)
4	--	2007030	30° .38" Blade (12"-18" Depth with 1" Clevis)

CHUTE BLADE ASSEMBLIES

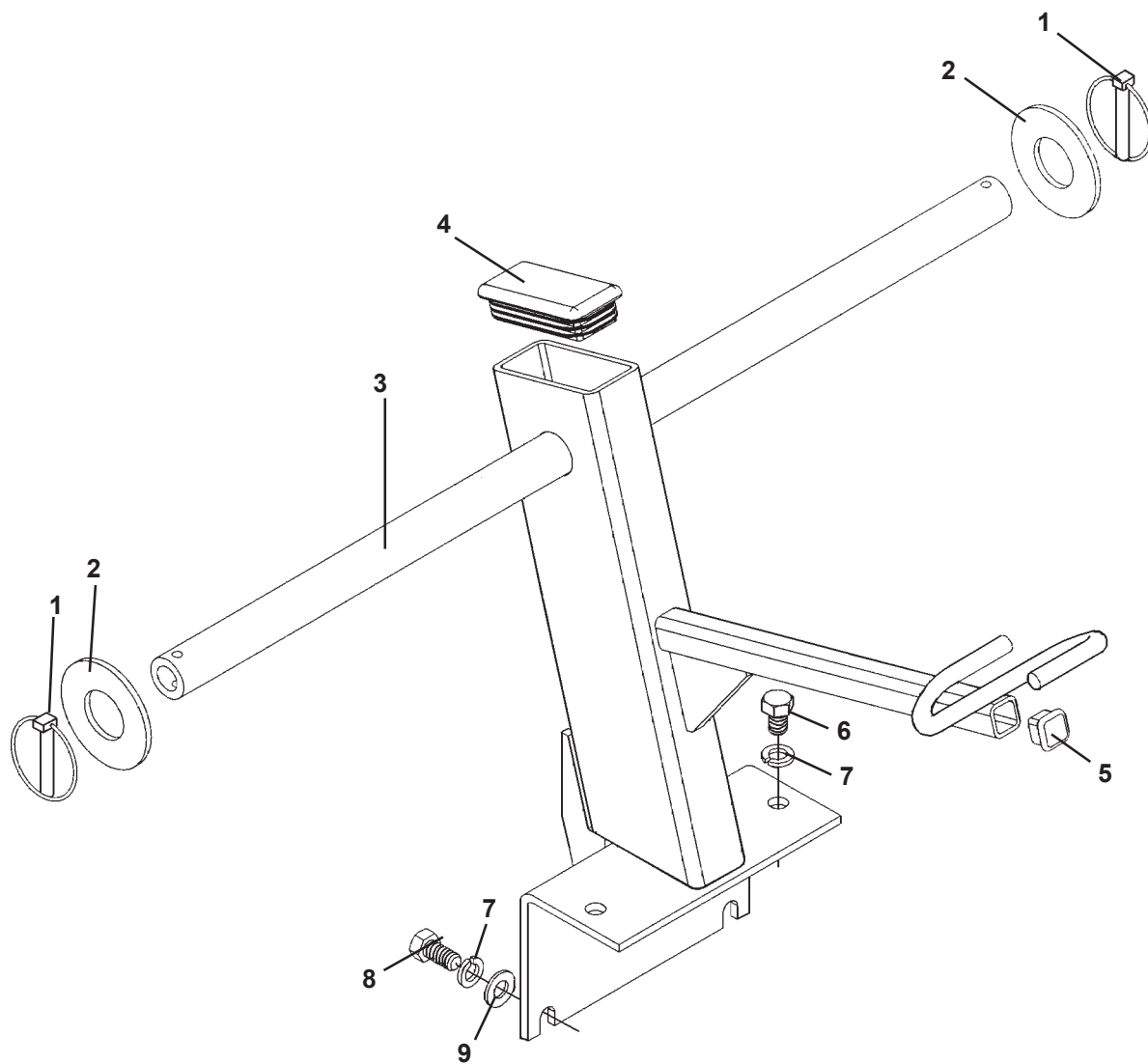


CHUTE BLADE ASSEMBLIES

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	--	19442	20° .50" Chute Blade Assembly (6"-12" Depth) (Includes Items 2 thru 4)
2	1	19447	Blade
3	1	10041	Safety Snap Pin
4	1	19464	Chute
5	--	19443	30° .50" Chute Blade Assembly (6"-12" Depth) (Includes Items 6 thru 8)
6	1	19448	Blade
7	1	10041	Safety Snap Pin
8	1	19464	Chute
9	--	19444	20° .50" Chute Blade Assembly (12"-18" Depth) (Includes Items 10 thru 12)
10	1	19449	Blade
11	1	10041	Safety Snap Pin
12	1	19465	Chute
13	--	19445	30° .50" Chute Blade Assembly (12"-18" Depth) (Includes Items 14 thru 16)
14	1	19450	Blade
15	1	10041	Safety Snap Pin
16	1	19465	Chute

CABLE REEL MOUNTING KIT

ASSEMBLY #19085



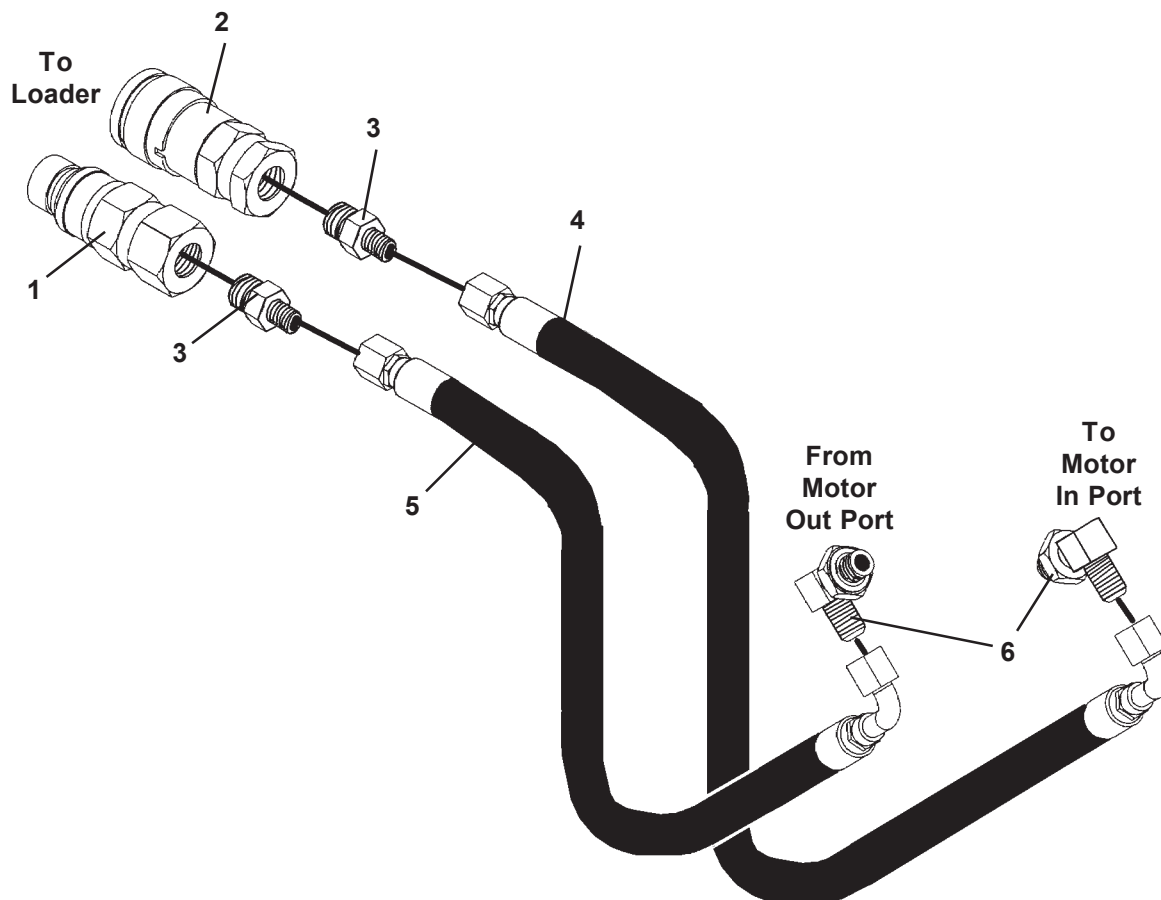
CABLE REEL MOUNTING KIT

ASSEMBLY #19085

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	6626	Klik Pin
2	2	1521	Washer
3	1	19086	Cable Reel Mount
4	1	88798	Rectangular Plastic Plug
5	1	19093	1.00" Square Plastic Plug
6	2	1087	.50" UNC X .75" Hex Capscrew
7	4	1505	.50" Lock Washer
8	2	1088	.50" UNC X 1.00" Hex Capscrew
9	2	1516	.50 " Flat Washer

HYDRAULIC ASSEMBLY

HYDRAULIC ASSEMBLY



HYDRAULIC ASSEMBLY

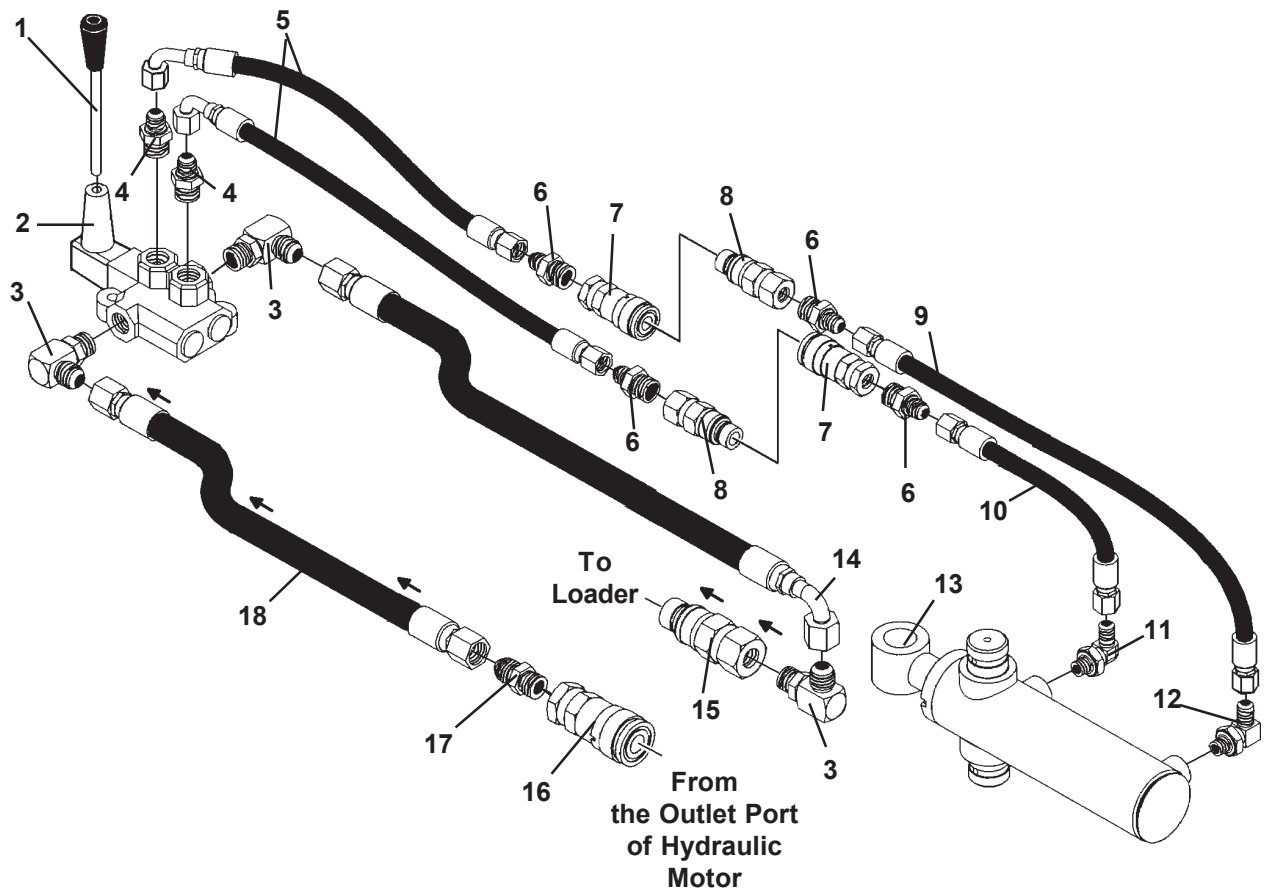
HYDRAULIC ASSEMBLY

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	**	Quick Coupler - Male
2	1	**	Quick Coupler - Female
3	2	3103	Straight Connector 8MBo-8MJ
4	1	38117	Hose Assembly .50" x 91" 8FJX-8FJX 90°
5	1	37844	Hose Assembly .50" x 84" 8FJX-8FJX 90°
6	2	3283	90° Elbow 10MBo-8MJ

**** Hydraulic couplers are specific to your loader application. Contact Factory or your local BRADCO dealer to order these items.**

HYDRAULIC ASSEMBLY

HYDRAULIC STEERING ASSEMBLY



HYDRAULIC ASSEMBLY

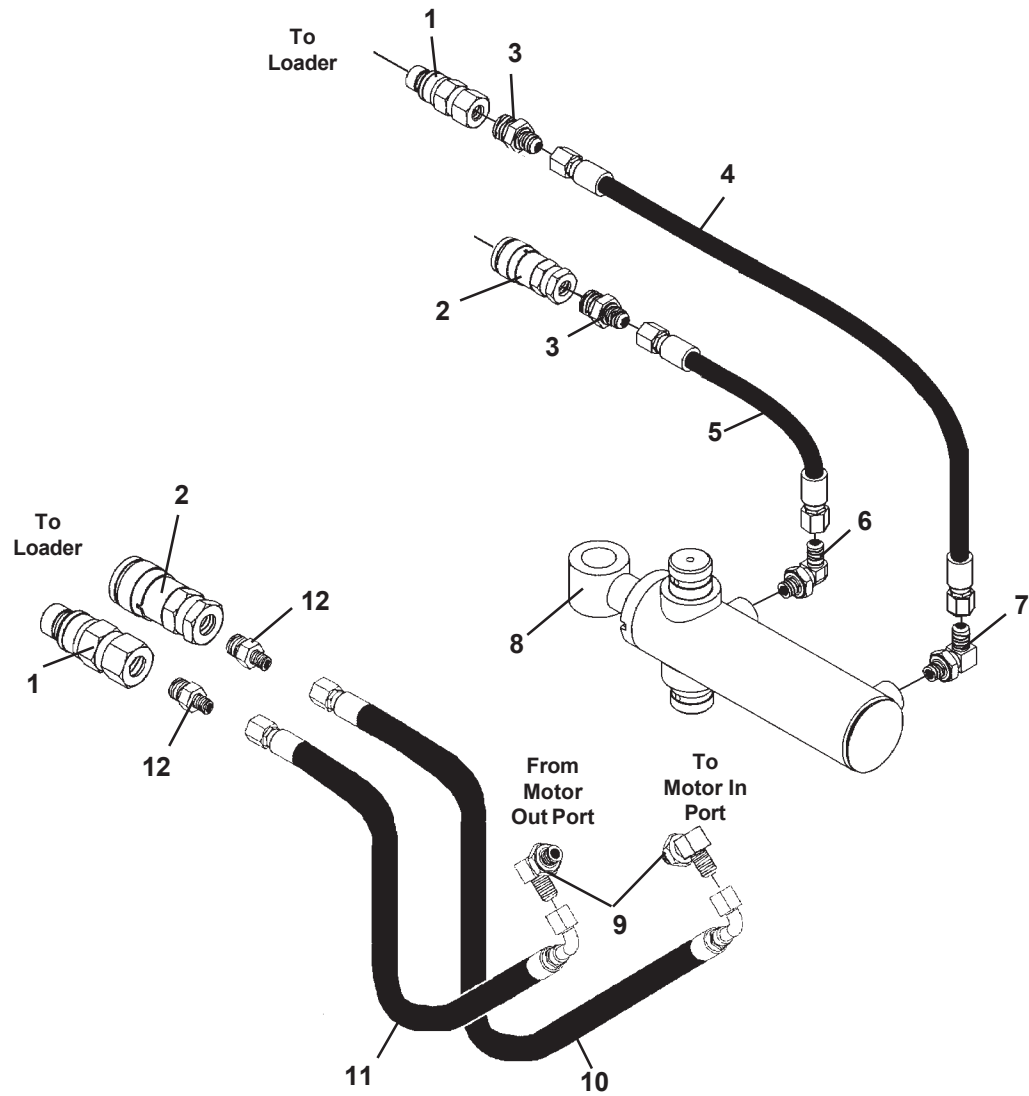
HYDRAULIC STEERING ASSEMBLY

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	19316	Valve Handle
2	1	19315	3-Position Valve
3	3	3104	90° Elbow 8MBo-6MJ
4	2	3457	Straight Connector 6MBo-6MJ
5	2	38116	Hose Assembly .25" x 57" 6FJX-6FJX 90°
6	4	3269	Straight Connector 8MBo-6MJ
7	2	84928	Quick Coupler - Female
8	2	84923	Quick Coupler - Male
9	1	38114	Hose Assembly .25" x 50" 6FJX-6FJX
10	1	38115	Hose Assembly .25" x 44" 6FJX-6FJX
11	1	30259	90° Elbow with Orifice 6MBo-6MJ
12	1	3434	90° Elbow 6MBo-6MJ
13	1	18727	Cylinder Assembly
14	1	38113	Hose Assembly .50" x 63" 8FJX-8FJX 90°
15	2	**	Quick Coupler - Male
16	2	**	Quick Coupler - Female
17	1	3103	Straight Connector 8MBo-8MJ
18	1	38112	Hose Assembly .50" x 58" 8FJX-8FJX

**** Hydraulic couplers are specific to your loader application. Contact Factory or your local BRADCO dealer to order these items.**

HYDRAULIC ASSEMBLY

HYDRAULIC ASSEMBLY WITH STEERING
(REQUIRES DUAL AUXILIARY HYDRAULICS)



HYDRAULIC ASSEMBLY

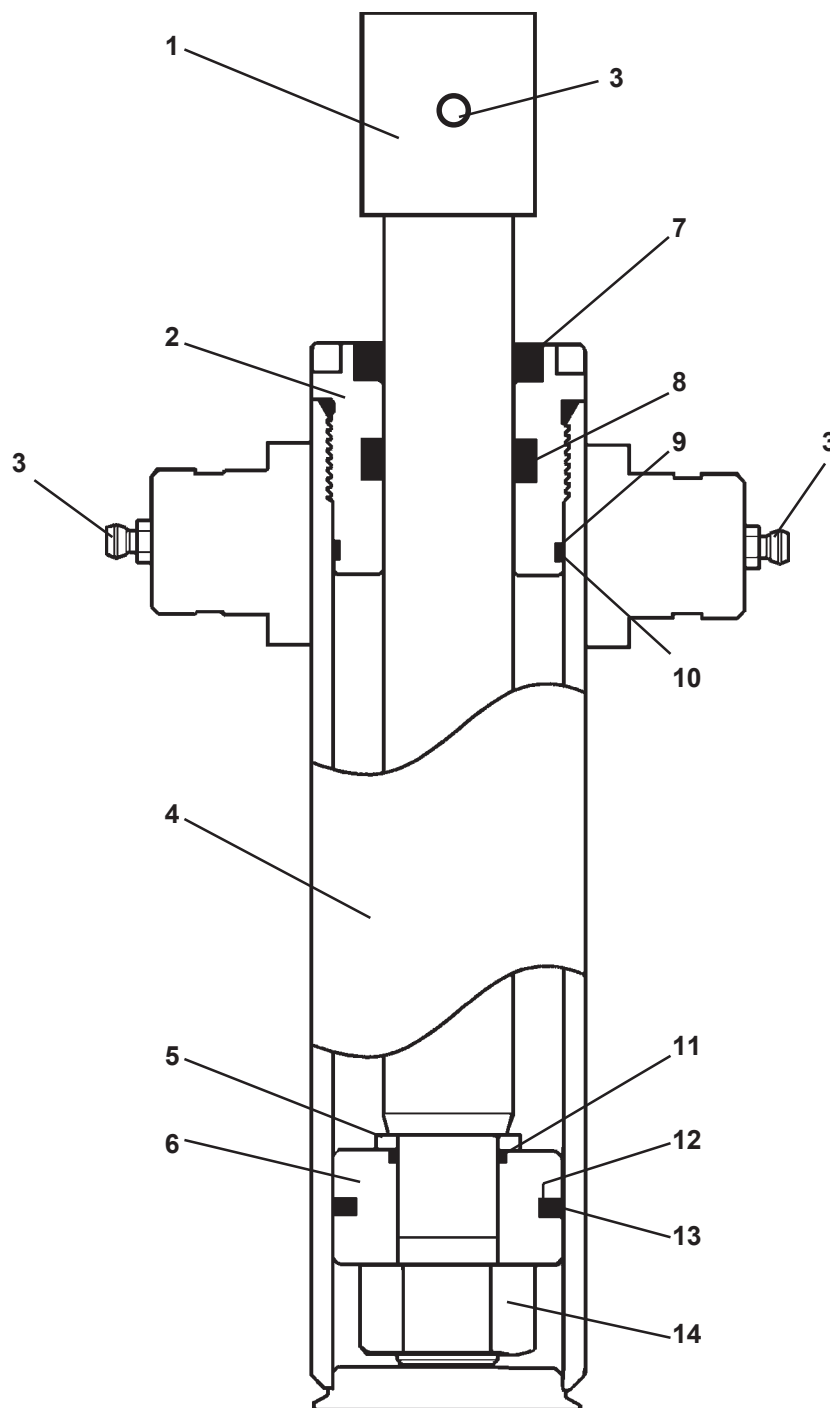
HYDRAULIC ASSEMBLY WITH STEERING
(REQUIRES DUAL AUXILIARY HYDRAULICS)

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	**	Quick Coupler - Male
2	2	**	Quick Coupler - Female
3	2	3269	Straight Connector 8MBo-6MJ
4	1	38114	Hose Assembly .25" x 50" 6FJX-6FJX
5	1	38115	Hose Assembly .25" x 44" 6FJX-6FJX
6	1	30259	90° Elbow with Orifice 6MBo-6MJ
7	1	3434	90° Elbow 6MBo-6MJ
8	1	18727	Cylinder Assembly
9	2	3283	90° Elbow 10MBo-8MJ
10	1	38117	Hose Assembly .50" x 91" 8FJX-8FJX 90°
11	1	37844	Hose Assembly .50" x 84" 8FJX-8FJX 90°
12	2	3103	Straight Connector 8MBo-8MJ

**** Hydraulic couplers are specific to your loader application. Contact Factory or your local BRADCO dealer to order these items.**

CYLINDER ASSEMBLY

ASSEMBLY #18727



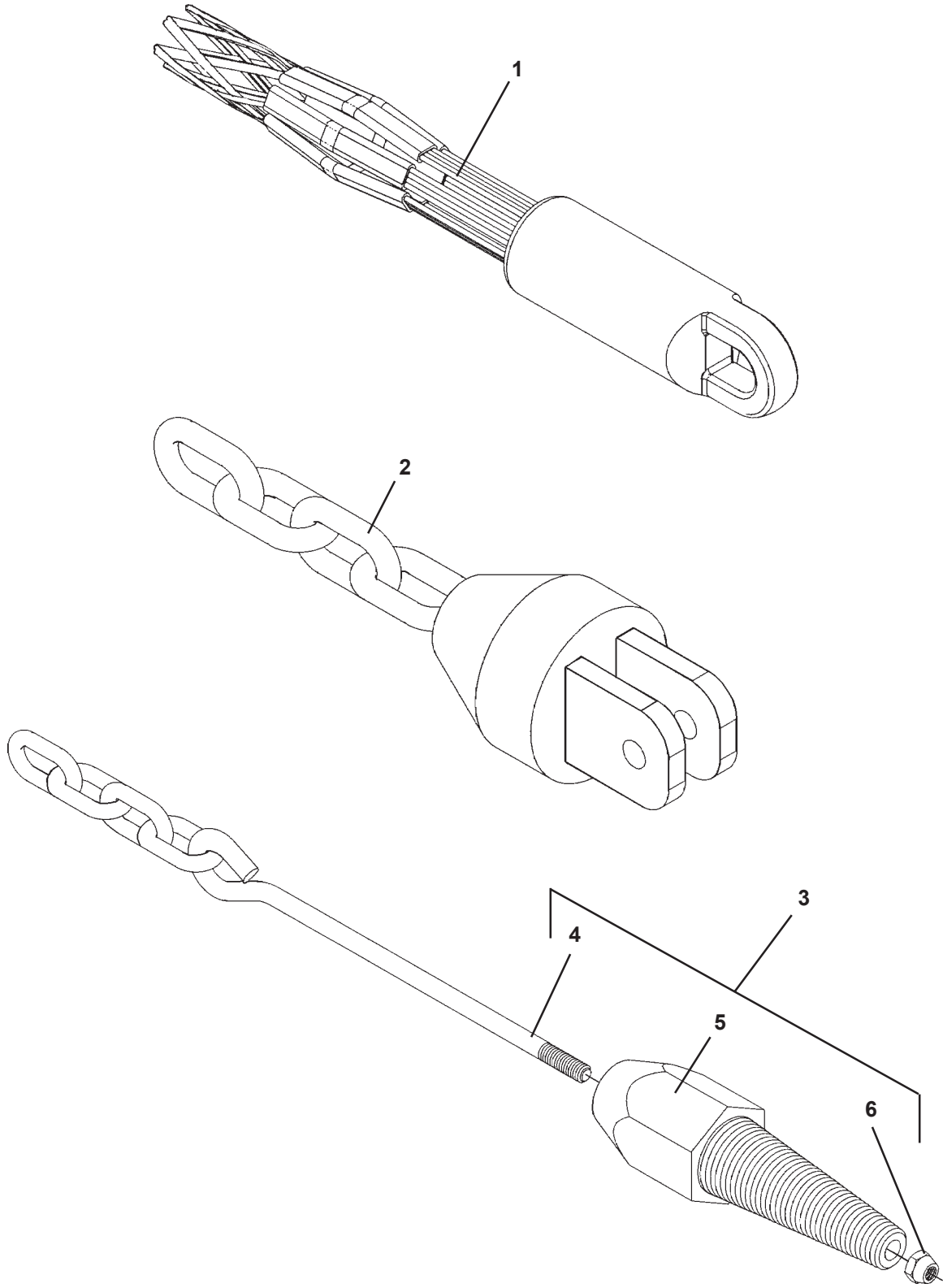
CYLINDER ASSEMBLY

ASSEMBLY #18727

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	18729	Cylinder Rod
2	1	89527	Cylinder Gland
3	3	6616	Grease Fitting
4	1	18728	Cylinder Tube
5	1	52644	Special Washer
6	1	6992	Piston
7	1	4981*	Rod Wiper
8	1	45262*	PolyPak Seal
9	1	4634*	Back-Up Washer
10	1	4633*	O'Ring
11	1	4635*	O'Ring
12	1	4637*	O'Ring
13	1	4636*	Piston Ring
14	1	1482	Deformed Lock Nut

NOTE: Seal kit #45581 includes all parts marked with an asterisk (*). Parts are not sold separately.

OPTIONS



OPTIONS

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	2001171	Cable Pull Grip
2	1	17754	2.5" Pull Bullet
3	--	18740	Pipe Puller Assembly (Includes Items 4 thru 6)
4	1	17861	Chain Assembly
5	1	18746	Pipe Bullet
6	1	1837	.38" UNC Deformed Oval Lock Nut

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INSTALLATION AND STORAGE

INSTALLATION

Your Vibratory Plow was shipped complete with the appropriate mounting for your specific unit, and with the hydraulic hoses and couplers installed.

Install the Vibratory Plow by following your power unit operator's manual for installing an attachment.

WARNING!  **To Avoid Serious Personal Injury, make sure the vibratory plow is securely latched to the attachment mechanism of your unit. Failure to do so could result in separation of the attachment from the unit.**

Connect the hydraulic quick couplers to the auxiliary hydraulics, and route the hoses in such a fashion as to prevent chafing and pinching.

If equipped with the hydraulic steering option: Start engine and slowly cycle the cylinder several times to purge system of air, and check for proper hydraulic connection, hose routing, and hose length.

Check the attachment for proper assembly, installation and hydraulic leaks.

DETACHING

On firm level ground, remove the coulter wheel and then remove the blade and reinstall it in the transport position. Lower the boom arms completely down on the frame until the attachment is level and approximately 2" off the ground.

Turn off the engine. Move the control levers back and forth to relieve pressure in line. Disconnect couplers.

NOTE: Connect couplers together or install caps to prevent contaminants from entering the hydraulic system.

Follow your power unit operator's manual for detaching (removing) an attachment.

NOTE: Frequent lubrication of grease fittings on the cylinder and pivot tube on the mount with a multi-purpose grease will greatly increase life of the product.

STORAGE

1. Clean the unit thoroughly, removing all mud, dirt, and grease.
2. Inspect for visible signs of wear, breakage, or damage. Order any parts required, and make the necessary repairs to avoid delays when starting next season.
3. Tighten loose nuts, capscrews, and hydraulic connections.
4. Cap hydraulic couplers to protect against contaminants.
5. Touch up all unpainted surfaces with paint to prevent rust.
6. Coat the exposed portions of the cylinder rod with grease. (If equipped.)
7. Store the unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

OPERATING INSTRUCTIONS

VIBRATORY PLOW

GENERAL INFORMATION

Simplicity of operation is one of the key features of the BRADCO Vibratory Plow. The basic vibratory plow itself has no controls, and only one grease fitting. Since the vibratory plow mounts to the toolbar / attachment plate of the loader, it is important to be familiar with, and know the controls on the loader. Such knowledge is crucial for safe, efficient operation of equipment. Read your loader owner's manual for information regarding operation before attempting to use the attachment. Take the time to learn how they operate now.

The BRADCO Vibratory Plow is relatively simple to use, and with the help of the information in this section and a little practice you should become proficient in its operation in no time. Observe the following points to obtain the best results with the least amount of wear on the machine. Read the "Safety Precautions" section of this manual before you begin. See Section "B".

CAUTION! Operate the vibratory plow only from the operator's station.



Pay attention to the job at hand. Be alert to the possibility of others in the work area.

Always CALL BEFORE YOU DIG. Locate all underground utilities before you begin.

Never let anyone perform maintenance on the machine while it is running.

The BRADCO Vibratory Plow minimizes turf damage during installation and greatly reduces the time spent on installing pipe for irrigation and lawn sprinkler systems, water and natural gas pipe, telephone and television cable, and wire for "invisible" dog fences.

There are various options available for the vibratory plow. There are four different knife blades which utilize the pull bullet assembly, the cable pull assembly, and/or the pipe bullet assembly. These attach to the clevis on the knife blade with a 3/8" grade 8 bolt (not included). Also available for the BRADCO vibratory plow is a cable reel mount that mounts two 24" maximum diameter cable spools and utilizes the four optional chute blades that accommodate cable up to 1/2" in diameter.

There are two methods of installation: Direct Vibratory Plowing with the standard knife blade, and Vibratory Plowing with the optional chute blade and cable reel mounting.

DIRECT VIBRATORY PLOWING (KNIFE BLADE)

Using the direct vibratory plowing method is convenient, fast, and requires a minimum of restoration work after the installation has been completed. This method is usually limited to short runs, where tension on the cable is low enough to prevent damage to the cable. With this method, the cable being pulled is actually pulled through the earth along the entire route. Therefore, this method is best used only for conduit, pipe, or cable-in-conduit unless a bullet assembly (at least twice the size of the cable or pipe) is used in the installation process, which will open up the ground sufficiently to pull the cable through with a minimum of pulling tension.

OPERATING INSTRUCTIONS

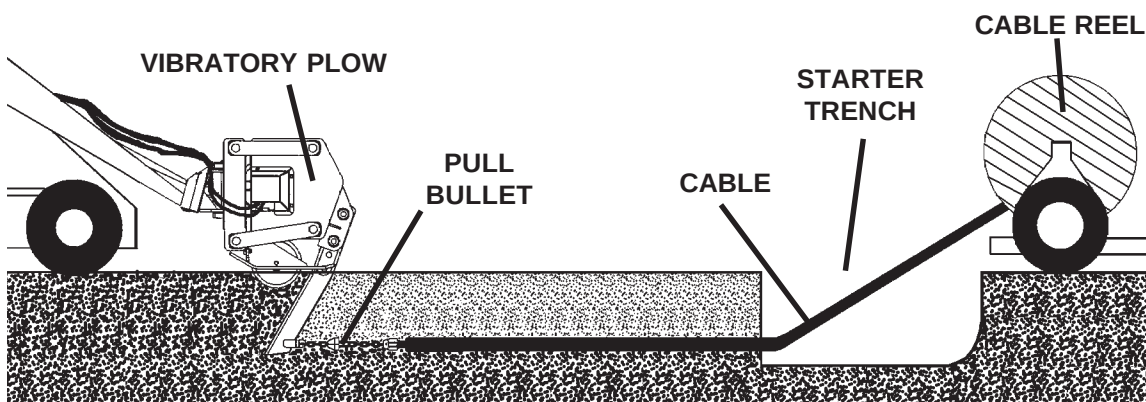
VIBRATORY PLOW

DIRECT VIBRATORY PLOWING (Continued)

WARNING! Always **CALL BEFORE YOU DIG**. Locate all underground utilities before you begin.



To begin, dig a starter trench and lower the blade/bullet combination into the trench to the desired depth with the cable attached to the bullet or cable pull. Continue to plow for several feet past the destination pedestal location to allow excess cable for connecting and splicing. At this point, stop the vibratory plow, lift the blade carefully from the ground, and disconnect the cable from the blade. Inspect the cable for any damage that may have occurred during the installation process.



Cable Protection

When the plowing section has been completed, remove any damage from the end of the cable and make sure approximately 40 inches of undamaged cable remain to facilitate connecting and splicing. Install plastic end caps to protect from moisture. A hose clamp should be installed on flooded cable to prevent jacket shrinkback. NOTE: Be sure to observe the minimum bending radius restrictions for the size of cable/pipe being installed.

VIBRATORY PLOWING (CABLE REEL MOUNT & CHUTE BLADE)

Using the vibratory plowing method of installation is often chosen for its efficiency and lack of required restoration work. But this method is limited in the size of cable or cable-in-conduit by the chute blade, which will accommodate a cable of up to 1/2" in diameter. Cable routes that intersect roads, driveways, or sidewalks should always be avoided. With this method, the cable is not pulled through the earth, so the amount of tension on the cable is minimal.

Unlike the direct plowing method where the payout reel is stationary, with the vibratory plowing method the payout reel is mounted onto the vibratory plow using the optional cable reel mount. The cable is played out over the unit and into the cable guide chute attached to the blade.

OPERATING INSTRUCTIONS

VIBRATORY PLOW

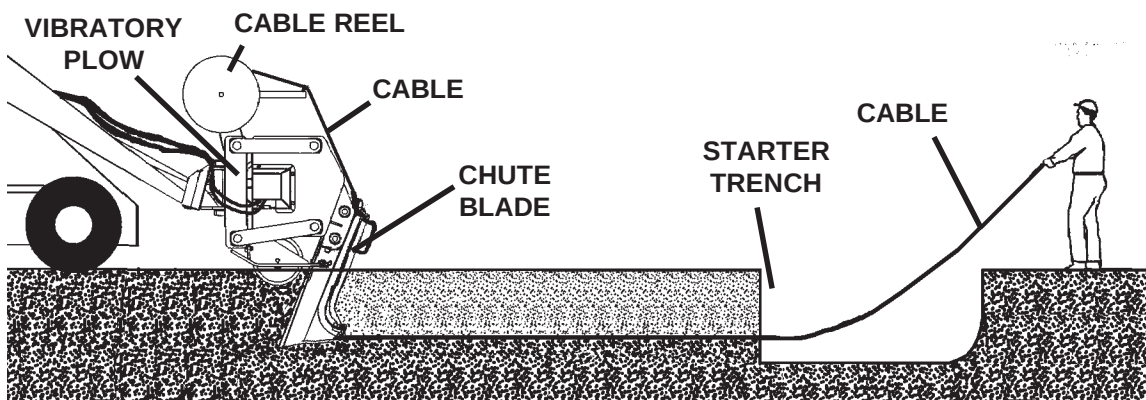
VIBRATORY PLOWING (Continued)

WARNING! Always CALL BEFORE YOU DIG. Locate all underground utilities before you begin.



To begin, dig a starter trench. The cable or cable-in-conduit should play off the top of the reel, through the cable guide and over the unit. Be sure to minimize rubbing or scraping which could cause damage to the cable. Remove the chute from the blade and form and position the cable down along the inside of the blade. Place the chute into position, and lock in place using the safety snap pin. (It is recommended that you apply a lubricant to the inside of the chute to reduce friction and tension.) Pull out a sufficient amount of cable from the reel and through the starter trench. The blade can be lowered into the starter trench while a crew member holds the cable for approximately the first 50 feet of the operation, so the loose end is not inadvertently pulled along. A layer of soil may be applied over the cable in the starter trench to help hold it in place. **NOTE: The cable should never be forcibly pushed into the blade chute.**

Continue to plow for several feet past the destination pedestal location to allow excess cable for connecting and splicing. At this point, stop the vibratory plow and remove the chute from the blade and carefully remove the cable. When the cable is free, the blade can be moved forward and lifted out of the ground. Inspect the cable for any damage that may have occurred during the installation process.



Cable Protection

When the plowing section has been completed, remove any damage from the end of the cable and make sure approximately 40 inches of undamaged cable remain to facilitate connecting and splicing. Install plastic end caps to protect from moisture. A hose clamp should be installed on flooded cable to prevent jacket shrinkback. **NOTE: Be sure to observe the minimum bending radius restrictions for the size of cable/pipe being installed.**

LUBRICATION

VIBRATORY PLOW

GENERAL INFORMATION

Economical and efficient operation of any machine is dependent upon regular and proper lubrication. All parts provided with grease fittings should be lubricated every 40 hours as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.

GEARBOX (SHAKER BOX)

The oil level in the gear box should be checked after every 40 hours of operation. Proper level of lubricant in the gear box is approximately 1.4 quarts. Fill as necessary with #90 transmission oil. The gear box is a sealed unit. If there is any sign of oil leaks please contact your nearest BRADCO dealer before carrying out any repairs.

The gear box oil should be changed after the first 100 hours of operation and then every 1000 hours thereafter.

TO CHECK OIL LEVEL:

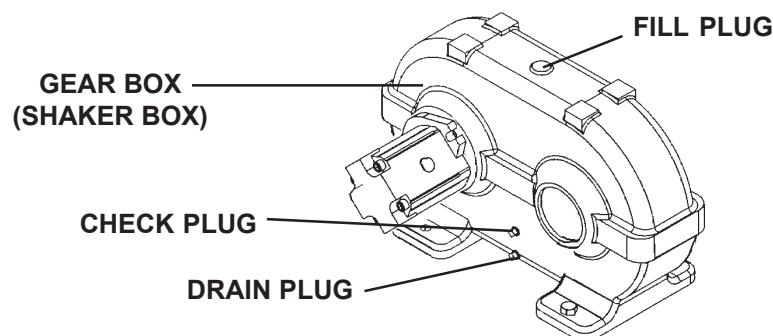
Be sure to park the unit on a level surface and remove the motor cover. Remove the check plug on the gear box (shaker box). Oil should be level with the check plug hole. Add oil as necessary.

TO ADD OIL:

Remove the top cover. Remove the filler plug on the top of the gear box and add up to the full point (check plug).

TO CHANGE OIL:

1. Park the unit on a level surface.
2. Remove the motor cover.
3. Position a drain pan under the unit and remove the drain plug.
4. Once the oil is drained reinstall the drain plug.
5. Remove the top cover to gain access to the filler plug. Add approximately 1.4 quarts of #90 weight transmission oil.
6. Check oil level and add as necessary.



MAINTENANCE & SERVICE

GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to the absolute minimum. However, it is very important that these maintenance functions be performed as described below.

DAILY

- Check all bolts and nuts for tightness
- Replace any missing bolts or nuts with approved replacement parts.
- Check hydraulic system for hydraulic oil leaks. See procedure below.
- Visually inspect the machine for worn parts or cracked welds and repair as necessary.

EVERY 40 HOURS

- Lubricate all grease fittings.
- Check oil level in gear box (shaker box).

100 HOURS

- Change oil in gear box after the first 100 hours.

1000 HOURS

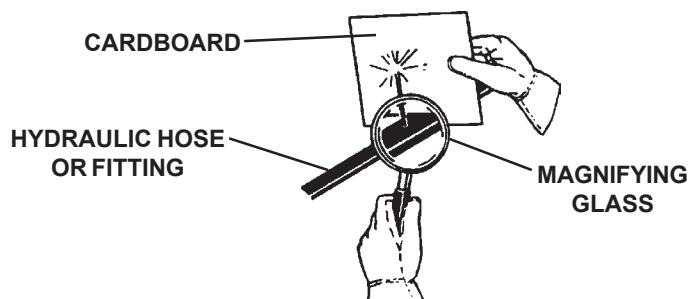
- Change oil in gear box.

WARNING! Escaping fluid under pressure can have sufficient force to penetrate the skin causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.



Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.

If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.



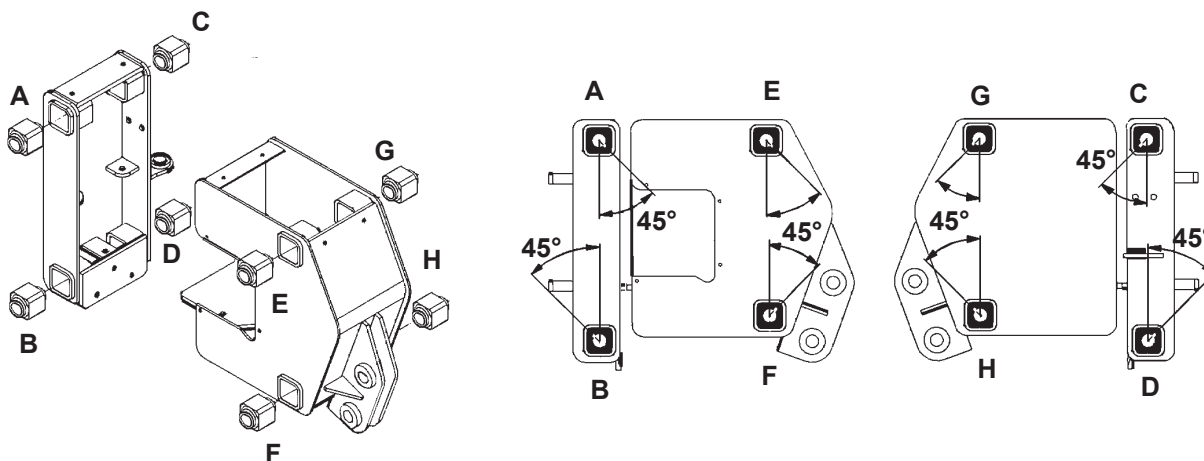
IMPORTANT: When replacing parts use only factory approved replacement parts. Manufacturer will not claim responsibility for use of unapproved parts or accessories and/or other damages as a result of their use.

REPLACING BUSHINGS

Due to the constant shaking motion of the vibratory plow the square bonded bushings will eventually become worn and require replacement. An installation kit (#19856) can be purchased from your BRADCO dealer to assist in the installation process.

1. Determine which bushing needs replaced and remove the necessary link by first removing the two .38" UNC X .75" capscrews (#1953) and keepers (#17862) that are securing it to the unit.
2. Locate the bushing (A-H) being replaced in Figure #1 and note the keyway orientation. The correct keyway orientation is critical to the final assembly.

FIGURE #1

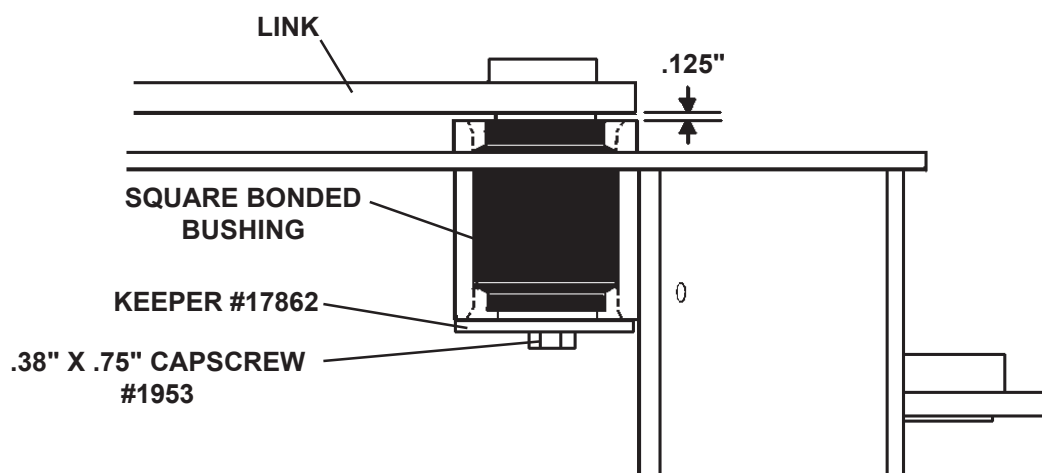


3. Remove the worn bushing.
4. Lubricate the bushing and the bushing socket lightly with P-80 rubber emulsion lubricant or water. Position the bushing on the outside of the bushing socket and press into place.

NOTE: BE SURE TO INSTALL THE BUSHING WITH THE CORRECT KEYWAY ORIENTATION. (SEE FIGURE #1)

Note: The bushing should extend out .125" (1/8") from the outside of the socket on both sides. See Figure #2

MAINTENANCE & SERVICE

FIGURE #2

NOTE: BE SURE KEYWAY IS IN THE CORRECT ORIENTATION.

5. Once the bushing is centered in the socket position the key and re-install the link using an anti-seize lubricant. (Replace the key #18695 if worn or damaged.)
6. Secure the link in place by reinstalling the keepers and capscREWs removed in Step #1.

MAINTENANCE

CYLINDER SEAL REPLACEMENT

CYLINDER SEAL REPLACEMENT

GENERAL INFORMATION

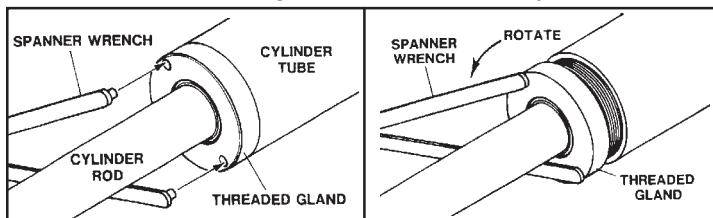
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

DISASSEMBLY PROCEDURE

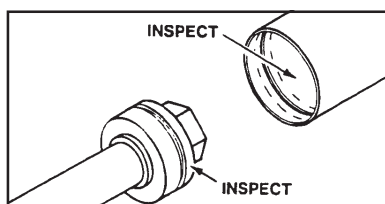
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

THREADED TYPE GLAND

1. Rotate the gland with a spanner wrench counter-clockwise until the gland is free of the cylinder tube.

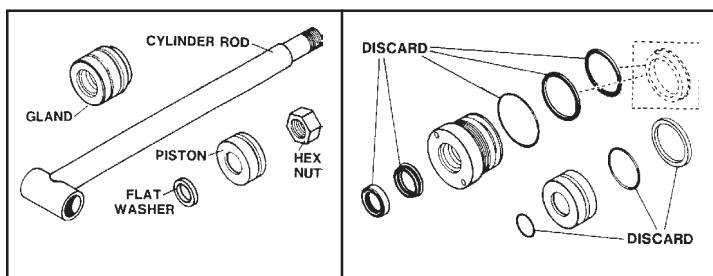


2. Pull the cylinder rod from the cylinder tube.
3. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.



4. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.

5. Remove and discard all the old seals.

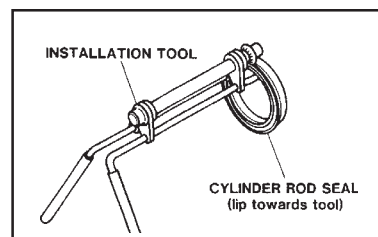


ASSEMBLY PROCEDURE

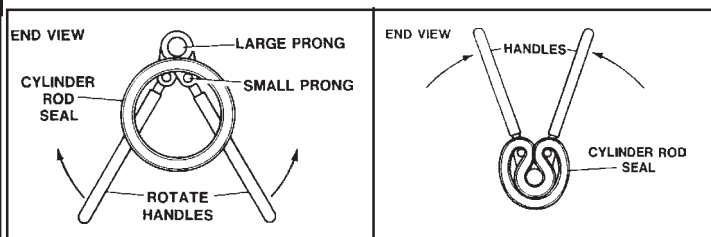
IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure.

1. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process as it is somewhat difficult to install.

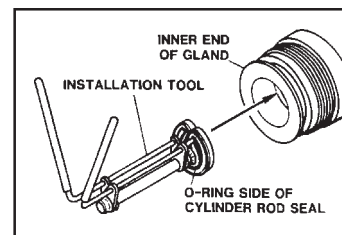
A special installation tool (Part #65349) is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool.



Rotate the handles on the tool around to wrap the seal around the end of the tool.



Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.

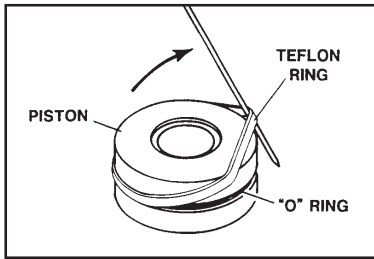


2. Install the new piston ring, rod wiper, O-rings and backup washers if applicable on the piston.

Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.

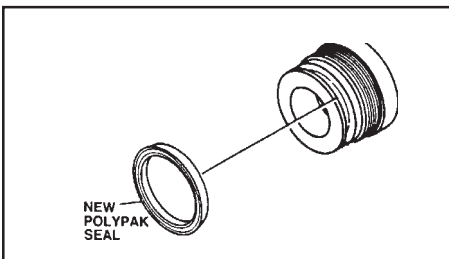
MAINTENANCE

CYLINDER SEAL REPLACEMENT

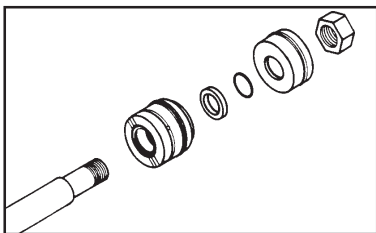


3. After installing the rod seal inside the gland as shown in step #1, install the external seal.

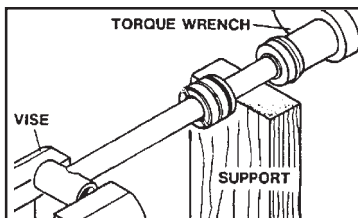
NOTE: Threaded glands may have been equipped with a separate O-ring and backup washer system or a polypak (all in one) type seal. Current seal kits contain a polypak (all in one) type seal to replace the discarded seal types on ALL THREADED GLANDS.



4. Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small o-ring, piston, and hex nut onto the end of the cylinder rod.



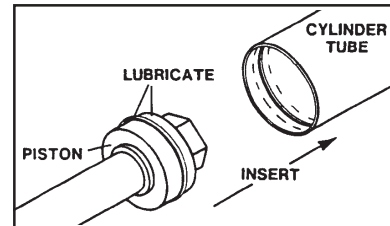
5. Secure the cylinder rod (mounting end) in a vise with a support at it's center. Torque the nut to the amount shown for the thread diameter of the cylinder rod (see chart).



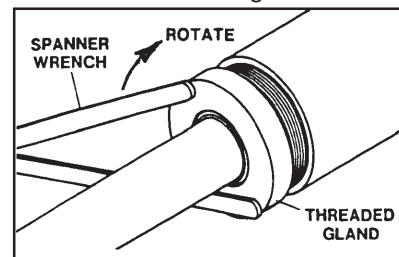
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

6. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.

IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.



7. Use a spanner wrench to rotate the gland clockwise into the cylinder. Continue to rotate the gland with the spanner wrench until it is tight.



NOTE: Seal kits will service most cylinders of similar bore size and rod diameter.

WARNING!



Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, cause severe personal injury or even death.

TORQUE SPECIFICATION CHART

Use the following torque values when tightening the nuts on the cylinder rod threads.

Thread Diameter	POUNDS - FEET	
	Minimum	Maximum
7/8"	150	200
* 1"	230	325
1-1/8"	350	480
1-1/4"	490	670
1-3/8"	670	900

* 1" Thread Diameter WITH 1.25" Rod Diameter
Min. 230 ft. lbs. Max. 250 ft. lbs.

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10-3-02

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
External leaking.	Cylinder seals damaged. (Hydraulic Steering Option)	Replace cylinder seals.
	Broken or loose hydraulic fittings or line.	Check for leaks and repair or replace.
	Motor gasket damaged.	Replace.
Vibratory Plow not vibrating.	Loader auxiliary hydraulics not engaged.	Refer to loader operator's manual.
	Inadequate hydraulic flow from loader.	Check hydraulic flow to plow.
	Low oil supply.	Add oil.
	Couplers not engaged.	Engage couplers.
	Air in hydraulic lines.	Activate system until air is purged from system.
	Broken hose.	Replace damaged hose.
	Obstructions in hydraulic lines.	Remove obstructions and replace if necessary.
	Loose or damaged hydraulic connection.	Tighten or replace fittings.
	Motor damaged or seal blown.	Call Bradco's service department for instructions.
Ground speed too fast.		Reduce ground speed.
Vibratory plow fails to maintain angle. (Hydraulic Steering Option)	Broken or leaking hydraulic lines.	Replace broken hose and check for leaks.
	Oil leaking past cylinder packings.	Replace cylinder seals.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Vibratory Plow angles too slowly. (Hydraulic Steering Option)	Cold oil.	Warm oil with engine at idle.
	Engine speed too slow.	Open Throttle.
	Oil leaking past cylinder packings.	Replace cylinder seals.

Excessive noise.	Ground speed too slow.	Adjust ground speed.
	Bushing(s) worn or damaged.	Replace as necessary.
	Turning radius too sharp for ground speed.	Adjust the hydraulic angle to increase turning radius and adjust travel speed as required.

Vibratory plow stalls	Ground speed too fast.	Adjust ground speed.

Excessive vibration transferred to loader and mounting bracket.	Ground speed too fast for ground condition.	Adjust ground speed.
	Underground obstruction.	Locate and remove obstruction or reroute cable.

BOLT TORQUE

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLE

Use the following torques when special torques are not given. These values apply to fasteners as received from suppliers, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads. Remember to always use grade five or better when replacing bolts.

SAE Grade No.		2				5				8*			
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary						  				  			
Bolt Size		TORQUE				TORQUE				TORQUE			
Inches	Millimeters	Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	5	6	6.8	8.13	9	11	12.2	14.9	12	15	16.3	30.3
5/16	7.94	10	12	13.6	16.3	17	20.5	23.1	27.8	24	29	32.5	39.3
3/8	9.53	20	23	27.1	31.2	35	42	47.5	57.0	45	54	61.0	73.2
7/16	11.11	30	25	40.7	47.4	54	64	73.2	86.8	70	84	94.9	113.9
1/2	12.70	45	52	61.0	70.5	80	96	108.5	130.2	110	132	149.2	179.0
9/16	14.29	65	75	88.1	101.6	110	132	149.2	179.0	160	192	217.0	260.4
5/8	15.88	95	105	128.7	142.3	150	180	203.4	244.1	220	264	298.3	358.0
3/4	19.05	150	185	203.3	250.7	270	324	366.1	439.3	380	456	515.3	618.3
7/8	22.23	160	200	216.8	271.0	400	480	542.4	650.9	600	720	813.6	976.3
1	25.40	250	300	338.8	406.5	580	696	786.5	943.8	900	1080	1220.4	1464.5
1-1/8	25.58	-	-	-	-	800	880	1084.8	1193.3	1280	1440	1735.7	1952.6
1-1/4	31.75	-	-	-	-	1120	1240	1518.7	1681.4	1820	2000	2467.9	2712.0
1-3/8	34.93	-	-	-	-	1460	1680	1979.8	2278.1	2380	2720	3227.3	3688.3
1-1/2	38.10	-	-	-	-	1940	2200	2630.6	2983.2	3160	3560	4285.0	4827.4

* Thick Nuts must be used with Grade 8 bolts

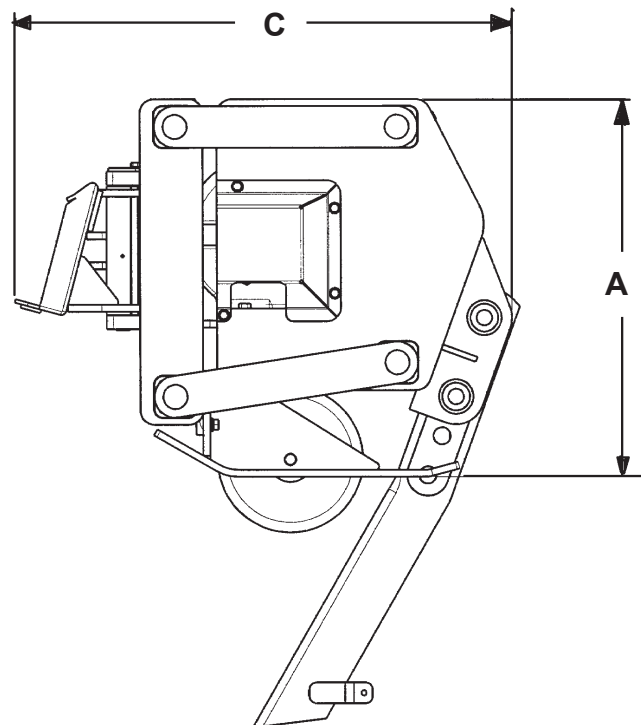
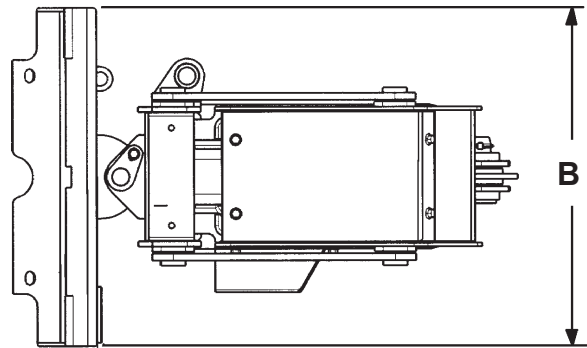
METRIC BOLT TORQUE SPECIFICATIONS

		5.6			8.8			10.9		
Size of Screw	Grade No.	Coarse Thread			Fine Thread					
		Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters			
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-			
	8.8		5.8-9.4	7.9-12.7		-	-			
	10.9		7.2-10	9.8-13.6		-	-			
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23			
	8.8		17-22	23-29.8		19-27	25.7-36.6			
	10.9		20-26	27.1-35.2		22-31	29.8-42			
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3			
	8.8		34-40	46.1-54.2		35-47	47.4-63.7			
	10.9		38-46	51.5-62.3		40-52	54.2-70.5			
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6			
	8.8		51-59	69.1-79.9		56-68	75.9-92.1			
	10.9		57-66	77.2-89.4		62-75	84-101.6			
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7			
	8.8		81-93	109.8-126		90-106	122-143.6			
	10.9		96-109	130.1-147.7		107-124	145-168			
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5			
	8.8		116-130	157.2-176.2		120-138	162.6-187			
	10.9		129-145	174.8-196.5		140-158	189.7-214.1			
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5			
	8.8		150-168	203.3-227.6		177-199	239.8-269.6			
	10.9		175-194	237.1-262.9		202-231	273.7-313			
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3			
	8.8		186-205	252-277.8		206-242	279.1-327.9			
	10.9		213-249	288.6-337.4		246-289	333.3-391.6			

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SPECIFICATIONS

VIBRATORY PLOW



SPECIFICATIONS

DESCRIPTION	SPECIFICATION
A. Overall Height	27.1"
B. Overall Width	24.5"
C. Overall Length	35.8"
Flow Requirements (GPM)	8-14
Operating Pressure (PSI)	1500-2500
Weight (LBS)	510#
NOTE: Dimensions DO NOT include blade or coulter wheel.	

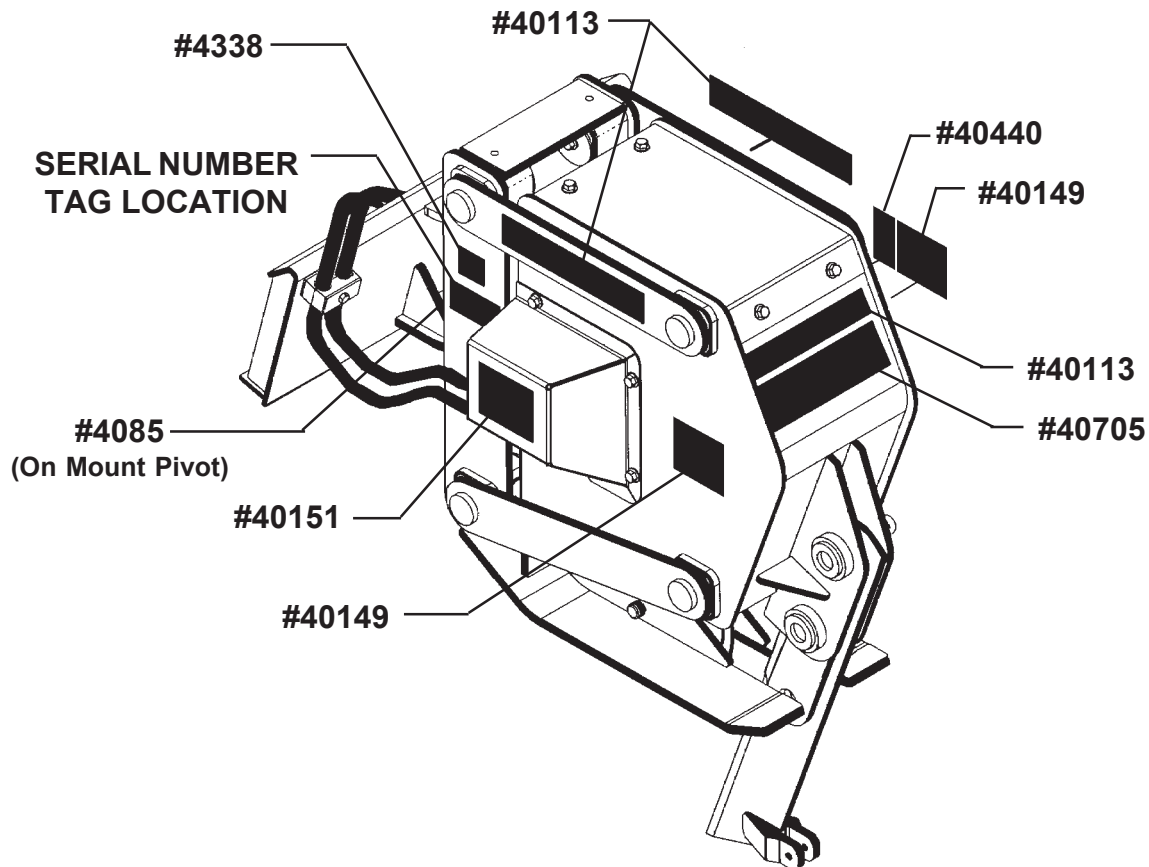
SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFOR.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagram on this page shows the location of the decals used on the BRADCO Vibratory Plow. The decals are identified by their part numbers, with reductions of the actual decals located on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and product longevity.



IMPORTANT: Keep all safety signs clean and legible. Replace all missing, illegible, or damaged safety signs. When replacing parts with safety signs attached, the safety signs must also be replaced.

REPLACING SAFETY SIGNS: Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the safety sign, exposing the adhesive surface. Apply the safety sign to the position shown in the diagram above and smooth out any bubbles.

DECALS

DECALS

BRADCO®

BRADCO LOGO
PART #40113

VP10

MODEL NUMBER
PART #40705



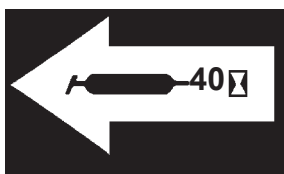
WARNING! CALL BEFORE YOU DIG
PART #40440



DANGER! PINCH POINTS
PART #40149



WARNING! HIGH PRESSURE FLUID
PART #40151



GREASE 40 HOURS
PART #4085



MADE IN USA
PART #4338

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Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction¹, has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

LIMITATIONS AND EXCLUSIONS.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.

¹Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.