



**Small Field Pivot Point
8120 Series Span
Owner's Manual**

0997977_D

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EC DECLARATION OF CONFORMITY



We: **Valmont Industries, Inc.**
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Serial Number:

Purchase Order:

declare under our sole responsibility that the product,

Crop Irrigation System

to which this documentation relates, is in conformity with the following documents:

Machinery Directive 2006/42/EC
Low Voltage Directive 2006/95/EC
Electromagnetic Compatibility Directive 2004/108/EC

The above-referenced equipment is in conformity with all safety-related clauses (Not all clauses reflecting commercial preference are met) of the following documents:

EN 60204-1:2006 Safety of Machinery – Electrical Equipment of Machines
EN 12100:2010 Safety of Machinery
EN 909:1998+A1 Irrigation Machines

Statement regarding **Pressure Equipment Directive 97/23/EC:**

The Crop Irrigation System is excluded from the scope of the Pressure Equipment Directive, by the language of Article 1, Sections 3.2, 3.6 & 3.10. This equipment is classified less than Category 1.

Statement regarding **RoHS Directive 2011/65/EC:**

The Crop Irrigation System is excluded from the scope of the RoHS Directive, by the language of Article 2, Section 4(e), being a "Large Scale Fixed Installation."

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ELECTRICAL SAFETY STATEMENT

Installation Of The Valley Electric Irrigation Machine - European Union Only

Valmont Industries Inc. does not install a differential (ground fault) circuit breaker in the control panel of the Valley electric irrigation machine because the standards of protection vary according to country of destination. The distributor must provide and install a differential (ground fault) circuit breaker that meets the standards of the country where the Valley irrigation machine is installed.

In the European Union, differential circuit breaker protection is fixed at a maximum of 24 volts.

Good grounding of the Valley irrigation machine is required.

- If resistance to ground is lower than 80 ohms, a differential (ground fault) circuit breaker of 300 mA will meet requirements.
- If resistance to ground is between 80 and 800 ohms, a differential (ground fault) circuit breaker of 30 mA will meet requirements.

The power supply installation and inspection of equipment protection components or systems are the responsibility of the installer. Valmont Industries, Inc. is not responsible for the failure of equipment protection components or systems not of their manufacture.

Valley pivot irrigation machines receiving power from a generator must have a cable connected from the irrigation machine structure to a ground rod and another cable from the irrigation machine structure to the ground terminal on generator in order for the differential (ground fault) circuit breaker to work.

The linear irrigation machines equipped with a generator are not equipped with a ground rod but must have a cable connected from the linear irrigation machine structure to the ground terminal of the generator in order for the differential (ground fault) circuit breaker to work.

- The resistance between the irrigation machine and the generator must be substantially below 80 ohms.

About This Manual

Information contained in this manual applies to Valley Small Field Pivot Point and its use with the 8120 Series of spans.

All information in this manual is based on information available at the time of printing. Valmont Industries Inc. reserves the right to make changes at any time without notice and without incurring any obligation. Specifications are applicable to equipment sold within the United States and may vary outside of the United States.

Ancillary Equipment Warranty

The owner is responsible for warranty registration of all ancillary equipment such as but not limited to engines, pumps and generators with its respective manufacturer.

Recognize Safety Information

This irrigation equipment can be powered by high voltage, which can be extremely dangerous if used improperly. For maximum safety and optimum performance of the machine, all owner/operators and maintenance personnel must read and understand the owner/operator manual(s), all safety messages in this manual and safety signs/decals on the machine before operating this equipment.

Anyone assembling, operating, servicing or maintaining this machine must read and understand all operation, maintenance, troubleshooting, testing, installation, assembly instructions and all safety messages in this manual before operating the machine or beginning any maintenance, troubleshooting, testing, installation or assembly of components.

These instructions alert you to certain things you should do carefully; if you don't, you could hurt yourself or others, hurt the next person who operates the equipment, or damage the equipment.

Safety Messages

Safety messages in this manual are preceded by the hazard symbol and one of three words: DANGER, WARNING or CAUTION. These messages alert you to potential hazards that could hurt you or others and or cause property damage.



This HAZARD SYMBOL is used to alert you to information about unsafe actions or situations, and may be followed by the word DANGER, WARNING or CAUTION.

DANGER

The HAZARD SYMBOL used with the word DANGER describes immediate hazards that can result in severe personal injury or death.

WARNING

The HAZARD SYMBOL used with the word WARNING describes unsafe actions or situations that can result in severe injury, death and/or major equipment or property damage.

CAUTION

The HAZARD SYMBOL used with the word CAUTION describes unsafe actions or situations that can result in injury, and/or minor equipment or property damage.

Information Messages

Important information messages in this manual are preceded by the word NOTE.

NOTE

The word NOTE is used to alert you to information that describes procedures or tips to help you install, operate or maintain your equipment properly.

SAFETY

Use of Personal Protective Equipment

- People working in areas where there are potential electrical hazards must use, personal protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Safeguards for personnel protection. - 1910.335, or applicable national, state or local regulations, for additional information.
- Personal protective equipment must be maintained in a safe, reliable condition and periodically inspected or tested.
- Protective shields, protective barriers, or insulating materials must be used to protect each person from shock, burns, or other electrically-related injuries while that person is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur. When normally enclosed live parts are exposed for maintenance or repair, they must be guarded to protect unqualified persons from contact with the live parts.
- Safety signs and tags. Safety signs, safety symbols, or accident prevention tags must be used where necessary to warn people about electrical hazards which may endanger them.

Conductive Materials and Equipment

Materials and equipment that can conduct electricity must be handled in a way that will prevent them from contacting energized power lines, exposed conductors or circuit parts.

- When handling long conductive objects (such as but not limited to truss rods, pipes, angles and ladders) in areas with energized power lines, exposed conductors or circuit parts, work practices (such as the use of insulation, guarding, and material handling techniques) must be used to minimize the hazard.
- Portable ladders must have non-conductive side rails.
- Do not wear conductive articles of jewelry and clothing (such as but not limited to watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) that could come in contact with energized power lines, exposed conductors or circuit parts.

Fall Protection

Identify potential fall hazards and determine if fall protection equipment is appropriate for the task, before beginning the work. Pay attention to hazards associated with routine and non-routine tasks. Inspect fall protection equipment (harnesses, lanyards) and devices (guardrails, tie-off points) before each use. Use fall protection equipment if required for the job. Be sure the fall protection equipment is right for the task, fits properly, and is in good condition. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations Standards - 29 CFR 1926.500, 1926.501 and 1926.502, or applicable national, state or local regulations for more information.

- When using scaffolds, make sure there is proper access, full planking, stable footing, and guard railing.
- When using a boom lift, keep feet firmly on the platform of a boom lift, use fall protection equipment tied-off at all times to the guardrail or tie-off point.
- When using a ladder, make sure the ladder is non-conductive and the correct size for the task. Read the ladder user instructions and be sure the ladder is in good condition. Make sure ladder is set on stable footing and at the correct angle.

SAFETY

Minimum Working Clearance

To reduce the risk of injury, all persons require adequate working clearance around the electrical panel or other electrical equipment. The table below identifies the minimum working clearance needed. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Safeguards for personnel protection. -1910.303(g)(1)(i), or any other applicable national, state or local regulations, for additional information.

| MINIMUM WORKING CLEARANCE 0-600 VOLTS | | | | |
|---|---|--|---|--|
| WIDTH OF WORKING CLEARANCE AREA | HEIGHT OF WORKING CLEARANCE AREA | ★MINIMUM WORKING CLEARANCE IN FRONT OF ELECTRICAL PANEL/EQUIPMENT | | |
| | | EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND NO LIVE GROUNDED PARTS ON THE OTHER SIDE. | EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND LIVE GROUNDED PARTS ON THE OTHER SIDE. | EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND EXPOSED LIVE PARTS ON THE OTHER SIDE. |
| 30in.(760mm) MINIMUM OR WIDTH OF ENCLOSURE, WHICH EVER IS GREATER | 78in.(1980mm) MINIMUM OR HEIGHT OF ENCLOSURE, WHICH EVER IS GREATER | 36in.(915mm) MINIMUM | 42in.(1065mm) MINIMUM | 48in.(1220mm) MINIMUM |

★Concrete, brick or tile walls shall be considered as grounded.

Qualified Person

A Qualified Person is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Only qualified persons may work on electric circuit parts or equipment that have not been de-energized.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations Standards - 29 CFR 1926.32(m) and 1910.333, or applicable national, state or local regulations for additional information.

SAFETY

Overhead Power Lines

Assembling, towing or transporting irrigation machine components such as but not limited to the pivot point, linear cart, span/drive unit assemblies, overhangs and/or corner assemblies underneath or near power lines is extremely dangerous because of the risk of electrocution.

Operating equipment that elevates irrigation machine components, such as but not limited to an aerial lift or crane, near power lines is extremely dangerous because of the risk of electrocution. Only qualified personnel should operate this type of equipment. Before operating the equipment, qualified personnel must read the equipment manufacturers' operating and safety instructions.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Cranes and derricks. - 1926.550, or any other applicable national, state or local regulations for additional information.

- Always presume that any overhead power line is an energized line unless and until the person(s) owning the line and/or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Before operating any equipment near any power line make sure the line has been de-energized and visibly grounded at the point of work.
- Electrocution can occur without touching an electrical power line. Electricity, depending on the magnitude, can jump or become induced into equipment or conductive materials that come in close proximity to, but do not touch a power line. High wind, lightning, wet ground and other environmental conditions will increase the possibility of electrocution and require additional consideration.
- Transmitter towers can induce the equipment or materials being handled with an electrical charge. Before working or operating equipment near transmitter towers, make sure the transmitter is de-energized.
- Select the location where the span/drive unit will be assembled to ensure that neither the irrigation machine, or the equipment used during the assembly process, will violate the minimum clearance guidelines.
- Never operate equipment or allow the load, ropes or tag lines within 10 ft (3.05 m) of any power line rated 50 kV or lower whether it is energized or not. For lines rated over 50 kV, the minimum clearance shall be 10 ft (3.05 m) plus 0.4 inch (1.1 cm) for each kV over 50 kVs.
- Never assemble, tow, transport or allow irrigation machine components underneath or within 10 ft (3.05 m) of any power line rated 50 kV or lower whether it is energized or not. For lines rated over 50 kV, the minimum clearance shall be 10 ft (3.05 m) plus 0.4 inch (1.1 cm) for each kV over 50 kVs. Overhang support angles, cables and spinner drive components regularly extend 10 ft to 12 ft (3.1 m to 3.7 m) above the irrigation pipeline (span).
- Use barricades to identify areas where interference with overhead power lines could occur. Keep the assembly, towing or transporting of irrigation machine components and the operation of equipment including load, ropes or tag lines away from any power line, in the distances described above, whether the line is energized or not.
- Always designate a person to observe clearance between the power line and all equipment being operated or moved in order to give timely warning for all operations to STOP if the minimum clearance is violated.

Minimal Lockout / Tagout Procedure

The following procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It is used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before personnel perform any servicing or maintenance where the unexpectedly energized or start-up of the machine or equipment or release of stored energy could cause injury. All personnel, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use that machine or equipment.

When the energy isolating devices are not lockable, tagout should be used and affected personnel must wear full personal protection.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Typical minimal lockout procedures - 1910.147 App A, or applicable national, state or local regulations, for additional information.

Sequence of Lockout

1. Notify all affected personnel that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. The authorized personnel shall identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating fly-wheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate. CAUTION: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.
8. The machine or equipment is now locked out.

DANGER

•WHEN PERSONNEL WILL BE EXPOSED TO CIRCUIT ELEMENTS AND ELECTRICAL PARTS, A QUALIFIED PERSON MUST USE TEST EQUIPMENT TO VERIFY THAT THE CIRCUIT ELEMENTS AND EQUIPMENT PARTS OF THE EQUIPMENT ARE DE-ENERGIZED.

Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

1. Check the machine or equipment and the immediate area around the machine to ensure that non-essential items are removed and that the machine or equipment components are operationally intact.
2. Check the work area to ensure that all personnel are safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout devices and re-energize the machine or equipment.
5. Notify affected personnel that the servicing or maintenance is completed and the machine or equipment is ready to be used.

SAFETY

Operate Safely

Valley Irrigation machines are designed with safety in mind. However, if this machine is operated incorrectly, it may pose a safety threat to the operator. A good safety program is much like a chain, it is only as strong as its weakest link. The manufacturer, dealer, and operator must maintain and improve all safety programs. Following is a list of safety operating tips which you and all other persons servicing or operating the machine must read and understand.

CAUTION

- DO NOT operate this machine without first reading the Owner's Manuals for the machine.
- Read all safety messages in this manual and safety signs on the machine.
- DO NOT let anyone operate this machine without proper instructions.
- Unauthorized modifications may impair the function and/or safety of the machine.
- If you do not understand any part of this manual, contact your Valley dealer.

EMPLOYEE INSTRUCTION ON SAFETY

It is very important to instruct your employees on the safe use of this equipment at the time of their initial assignment to operate it. DO NOT let anyone operate this equipment without proper instructions.

Safety training should be presented annually and the service manager should ensure employees fully understand the safety messages and what to do in case of emergencies.

EMERGENCY STOPPING

The machine can be stopped at any time at any tower by turning the disconnect switch, located underneath the tower box, to the OFF position. See Figure 12-1.

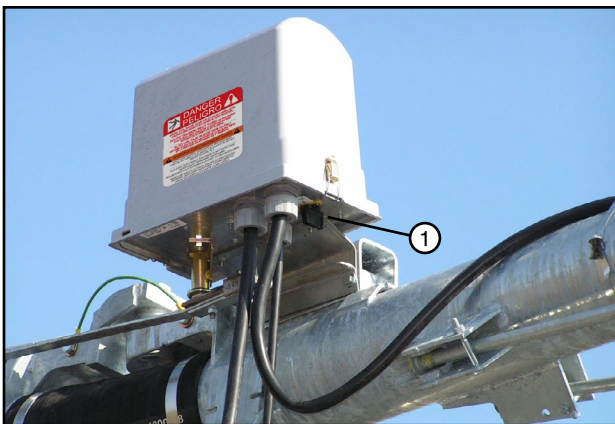


Figure 12-1 1. Disconnect Switch

WARNING

PROPER GROUNDING

DO NOT attempt to start the machine until the electrical service is properly installed and grounded by a qualified electrician as per the electrical standards.

If the power supplied to the machine is not grounded properly, severe injury or death can result should an electrical malfunction occur.

It is your responsibility to ensure that your power supplier and/or electrical contractor has grounded the irrigation machine as required by the National Electrical Code and by applicable local electrical codes. If a machine is properly grounded and fuse sizing is correct, there is extremely low probability of an individual being injured by electrical shock.

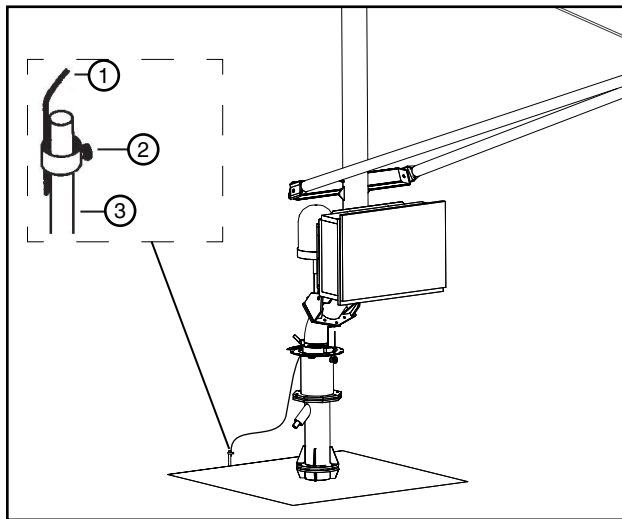


Figure 12-2 1. Copper Wire 2. Clamp 3. Copper Rod

NOTE

- All 480 VAC, 60 Hz. (380 VAC, 50 Hz.) power supply services MUST be a 4 conductor service. Three 480 VAC (380 VAC) power lines and one ground conductor which is as large as the power carrying conductors for that service.

SAFETY

Operate Safely

DANGER

DISCONNECT POWER WHEN SERVICING

ALWAYS disconnect electrical power before servicing or performing maintenance to the machine.

If you are going to perform maintenance on the machine, YOU MUST shut off and lock the main power disconnect as shown below. See figure 13-1.

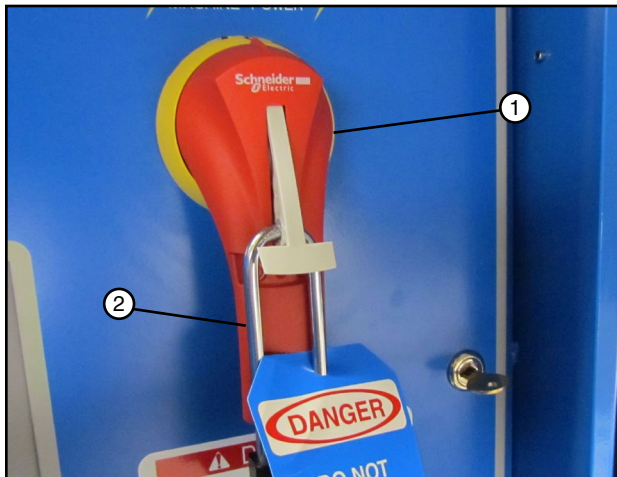


Figure 13-1 1. Main Power Disconnect
2. Lock

The blue (OSHA safety color code) tag shown below should also be filled out and attached to the disconnect after locking. See figure 13-2.

The tag should reveal the name of a person to contact before restoring power to the machine.



Figure 13-2

CAUTION

QUALIFIED SERVICE PERSONNEL

If you do not understand electricity or other parts of the machine, have qualified service personnel perform any hazardous repairs or maintenance.

CAUTION

GUARD ALL POWER TAKE-OFF DRIVES

This includes all belt and power line drives.

Replace any guards and shields removed for maintenance.

WARNING

MARK AND GUARD ALL POWER LINES

Do NOT deep rip or chisel near the buried power service wires.

Do NOT deep rip in a circle at the drive unit. The deep chisel track will cause severe stresses on the structure.

If you do deep rip your field, run the machine with the percent timer at 100% for the first revolution.

WARNING

SUSPECTED SHORT CIRCUITS

DO NOT touch the machine if you suspect a short-circuit situation. Call a qualified electrician or an authorized Valley dealer immediately.

Circumstances which may cause you to suspect hazardous voltage situations may include:

- Physical damage to the machine or span cable
- Recent electrical storms (lightning)
- Unusual operating characteristics of the machine

If you suspect a short circuit due to feeling a rippling tingle when touching the machine, DO NOT touch the machine again. Call a qualified electrician or an authorized Valley dealer immediately.

WARNING

LIGHTNING AND THE MACHINE

Stay away from the machine during an electrical storm. An irrigation machine makes a good path to earth. It is also probably the tallest object in the field, which makes it a good lightning receptor!

SAFETY

Operate Safely

CAUTION

DO NOT OVERSIZE FUSES

Fuses are sized for the protection of a specific machine.

Be certain you have the proper fuse sizes in place before initial start-up and when replacing fuses.

CAUTION

PLUG - IN CONNECTORS

Disconnect power before connecting or disconnecting any plug-in connectors.

CAUTION

DO NOT OPERATE AT FREEZING TEMPERATURES

Spraying water has a cooling effect and water will freeze even though the air temperature is slightly above freezing.

Shut the machine down at 40 degrees Fahrenheit (4.5 degrees Celsius). Do not operate machine when temperature is below 40° F (4.5° C).

- **DAMAGE TO EQUIPMENT RESULTING FROM FREEZE-UP IS NOT COVERED UNDER WARRANTY.**
- **IT IS IMPORTANT TO MAKE SURE ALL PIPE DRAINS FUNCTION PROPERLY TO PREVENT PIPELINE FREEZE-UP DURING COLD WEATHER.**

CAUTION

AVOID HIGH PRESSURE WATER STREAMS

Avoid body contact with high pressure water streams.

WARNING

AVOID CHEMICALS

Avoid exposure to sprinkler spray while chemicals are being injected into the water. Read EPA Label Improvement Program (PR Notice 87-1) and all instructions for chemical applications.

If you plan on chemigating, make certain you have complied with state or local regulations in regard to safety equipment, certification, operation and calibration of the injector pump. Make certain you have first aid and fresh water available in case of an accident. You must also be familiar with the correct cleanup procedures in case of a spill.

- **USE OF PROTECTIVE CLOTHING IS RECOMMENDED WHEN HANDLING CHEMICALS. SAFETY GLASSES, GLOVES, AND PROTECTIVE OUTERWEAR SHOULD BE WORN WHEN HANDLING CHEMICALS.**
- **CONTAMINATION OF THE WATER SUPPLY MAY OCCUR IF EFFECTIVE SAFETY DEVICES ARE NOT INSTALLED/USED IN CONNECTION WITH INJECTION EQUIPMENT FOR CHEMIGATION.**

DANGER

DRIVE SHAFTS START WITHOUT WARNING

An electric motor on each tower of the center pivot powers two or more drive shafts connected to wheel gear drives. These drive shafts start and stop without warning.

- **DO NOT touch rotating drive shaft or shield, Clothing or limbs may become entangled, resulting in severe injury.**
- **DO NOT service the machine until the main disconnect is locked in the OFF position.**
- **ALWAYS replace drive shaft shields after servicing.**
- **DRIVE SHAFT SHIELDS MUST ALWAYS BE IN PLACE WHEN OPERATING THE MACHINE.**

CAUTION

CHECK WHEEL TRACKS BEFORE STARTING

Make sure all objects, livestock or persons are clear of the machine before starting. Drive trains are powerful and can climb over vehicles, equipment, etc.

SAFETY

Operate Safely

CAUTION

KEEP CHILDREN AWAY

Irrigation Machines are NOT playground equipment. Prevent children from playing or climbing around on the machine. This can be extremely dangerous, especially if the machine is operating.

CAUTION

CHECK MACHINE DIRECTION

DO NOT operate the machine if it moves in the direction opposite to that which was chosen.

Forward should be clockwise and reverse counter-clockwise.

CAUTION

KEEP WATER OFF ROADWAYS

It is against the law in most states to allow water to spray on state and county roadways. This is a serious hazard to passing motorists.

If end guns are used, make sure you read and understand the correct procedures for setting the on and off positions to avoid watering the roadways.

If an end gun is watering a roadway, immediately discontinue use and adjust the shutoff setting or call your Valley dealer to repair the end gun shut off mechanism.

CAUTION

AUTO REVERSE OPERATION SAFETY

If the machine reverses direction at a roadway or a physical object such as a building, tree line, power pole, etc., then you MUST provide a backup device to stop the machine if the reversing mechanism were to fail. See figure 15-1.

Contact your Valley dealer for more information concerning physical barricades for machines under these circumstances.



Figure 15-1 1. Physical Barricade

CAUTION

PROPER USE OF THE SAFETY OVERRIDE

Caution MUST be taken by the operator when using the safety override function as it will bypass or disable all of the machine's automatic safety shutdown circuits.

NEVER depress and hold the START/STOP SAFETY OVERRIDE switch in the START position for more than 3 to 5 seconds.

If the machine is not in full view by the operator, do not use the Safety Override function.

The operator MUST inspect the entire machine between each safety override start attempt.

Repeated safety override start attempts can cause severe structural damage.

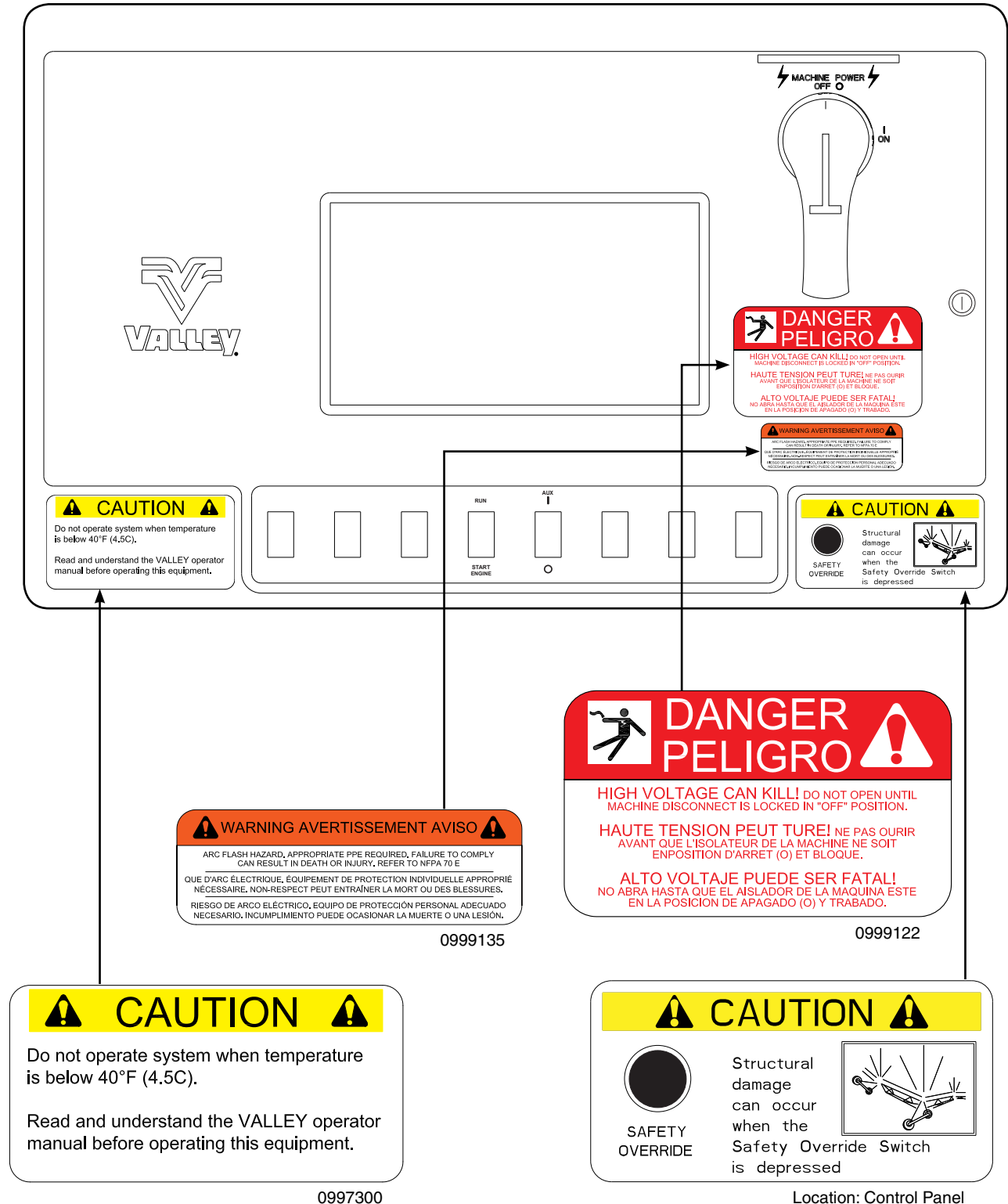
Call your Valley dealer if the machine fails to start.

SAFETY

SAFETY

Safety Decals

These Danger, Warning, and Caution decals appear in various locations on a Valley irrigation machine. You MUST familiarize yourself and other operators with these safety decals. For replacement of any decal, contact your local Valley dealer.

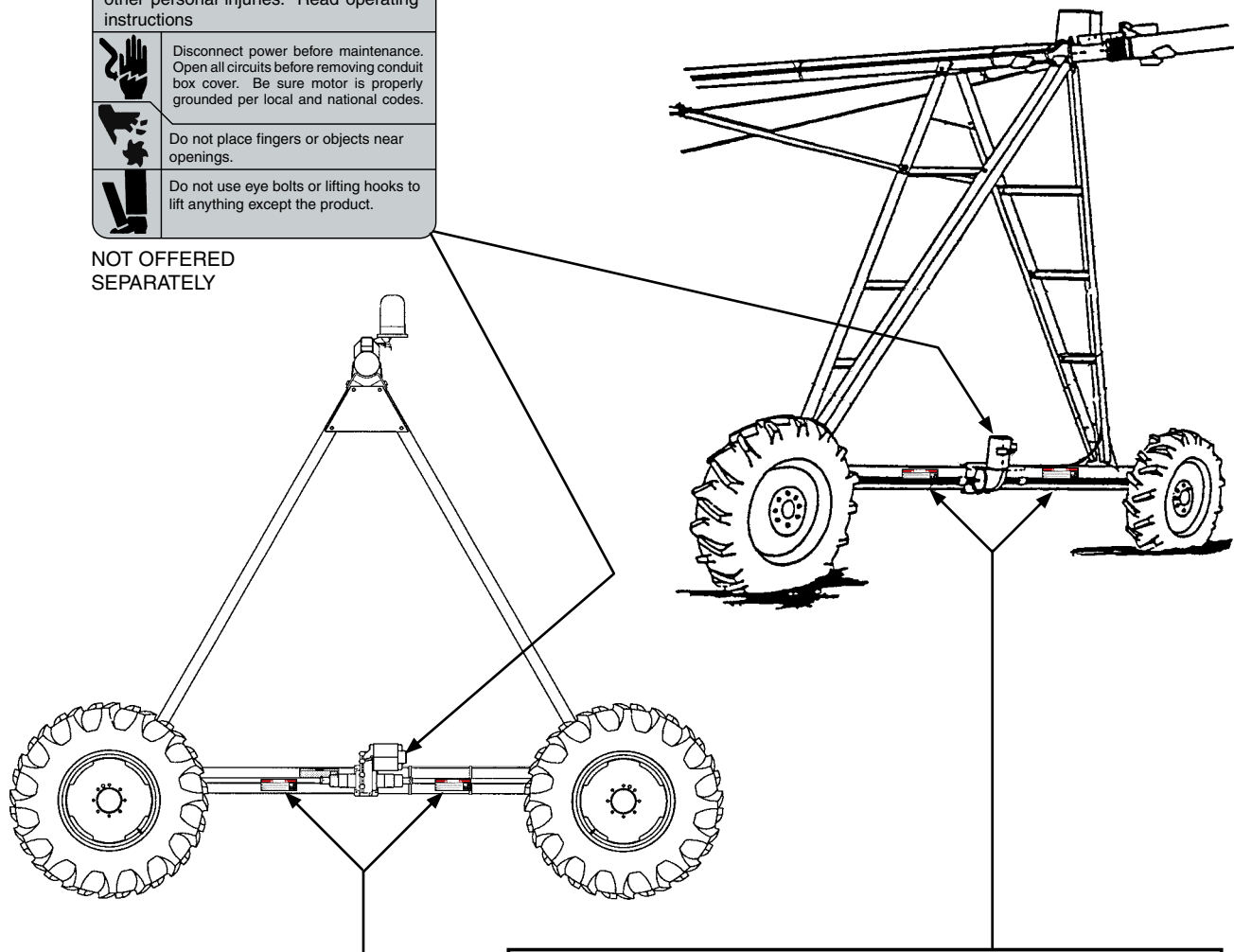


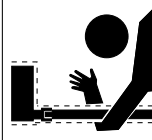
SAFETY

Safety Decals

| ⚠ WARNING | |
|---|--|
| Improper installation of this motor may result in fire, explosion, electrical shock or other personal injuries. Read operating instructions | |
|  | Disconnect power before maintenance. Open all circuits before removing conduit box cover. Be sure motor is properly grounded per local and national codes. |
|  | Do not place fingers or objects near openings. |
|  | Do not use eye bolts or lifting hooks to lift anything except the product. |

NOT OFFERED SEPARATELY



| ⚠ DANGER ⚠ | |
|---|--|
| Drive Shaft Starts Without Warning! | |
| <ul style="list-style-type: none">Do not touch rotating drive shaft or shield. Clothing or limbs may become entangled, resulting in severe injury.Do not service until machine is locked in the off position.Always replace drive shaft shield after servicing. | |
|  | |

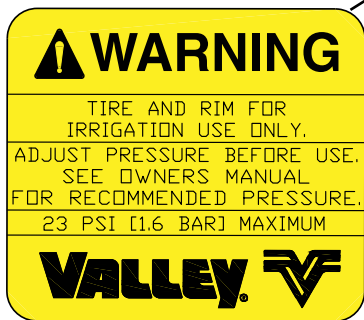
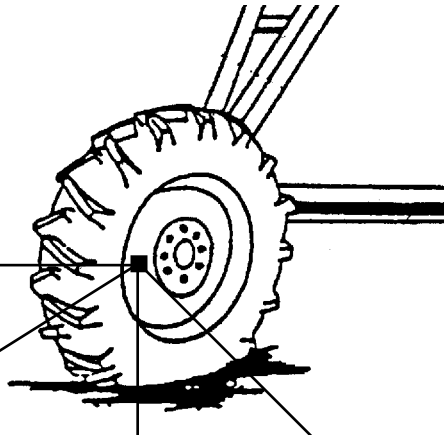
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SAFETY

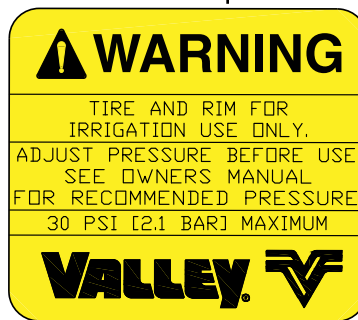
Safety Decals



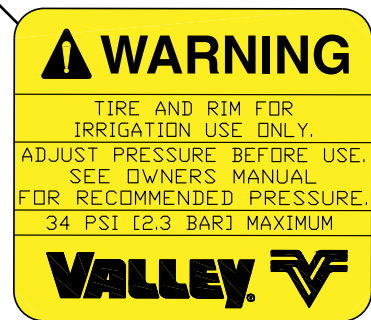
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SAFETY

OVERVIEW

Small Field Pivot Point

The Small Field Pivot Point is connected to an underground pipeline that is located in the center of the pivot pad. The Small Field Pivot Point can be either non-tow or towable.

Pivot

The pivot is the structure which the entire machine rotates around. The water entry point for the machine is at the receiver tube. See figure 21-1.

Water flows through the bearing coupler and the riser. The bearing coupler remains stationary as the pivot swivel rotates inside the bearing coupler. See figure 21-1.

Collector Ring and J-Pipe

The collector ring allows the electric cable to rotate with the pivot and is used with all public power options.

The collector ring consists of brass rings in a stack that remain stationary and are separated by insulators.

Contact brushes revolve around the brass rings providing continuous flow of current without twisting the cable as the machine makes revolutions around the field. See figure 21-1.

One electrical cable from the collector ring goes down through the J-pipe, exiting near the bottom of the riser and then is connected into the public power panel.

The other electrical cable from the collector ring goes out of the conduit and then connects into the control panel. See figure 21-1.

Pivot Flex

A pivot flex allows for flexibility between the pivot point and the first span. A pivot flex is used on all small field pivot points. See figure 21-2.

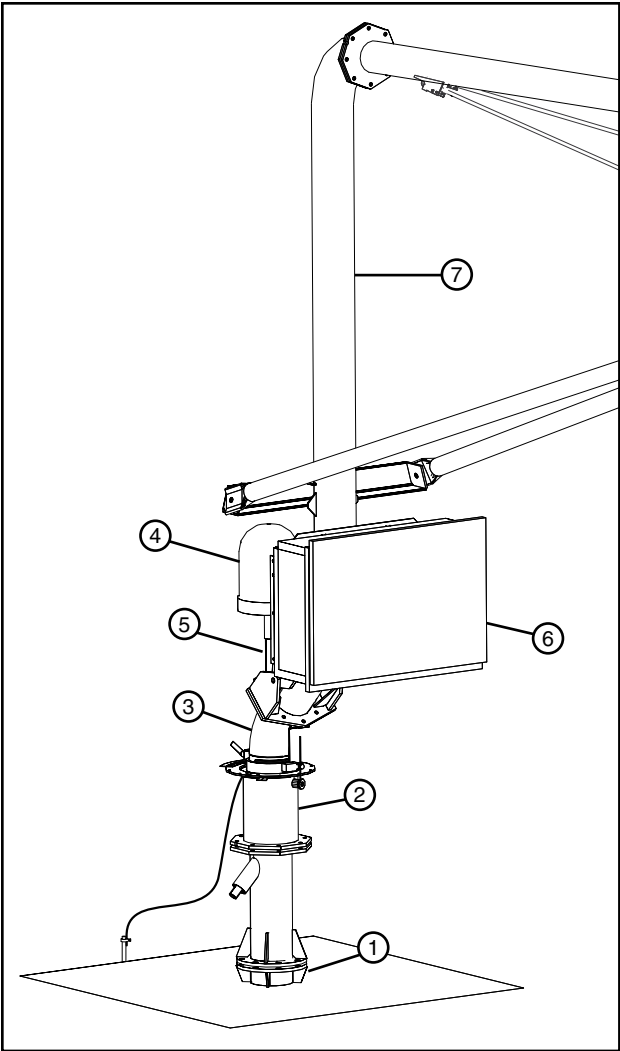


Figure 21-1 1. Receiver Tube 5. J-Pipe
2. Bearing Coupler 6. Electrical Panel
3. Pivot Swivel 7. Riser Pipe
4. Collector Ring

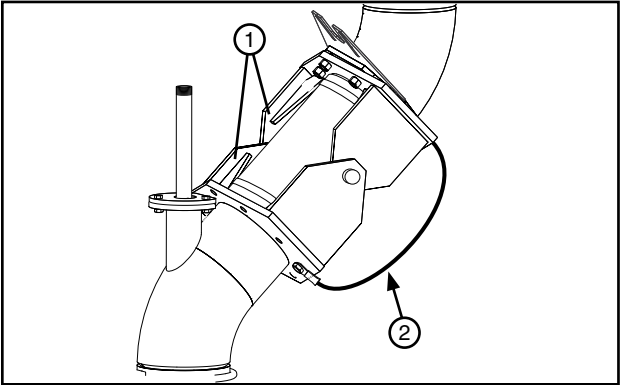


Figure 21-2 1. Pivot Flex
2. Jumper Wire

OVERVIEW

Spans

Water is transported to the irrigation machine through an underground pipe line. The water is then transported across the field through a pipeline. The pipeline is made up of a series of spans which are connected together. Each span also consists of a drive tower which moves the pipeline across the field. See figure 22-1.

A span consists of a water pipeline supported with a bowstring under truss design. Truss rods are attached to each truss assembly to support and strengthen the pipeline. See figure 22-1.

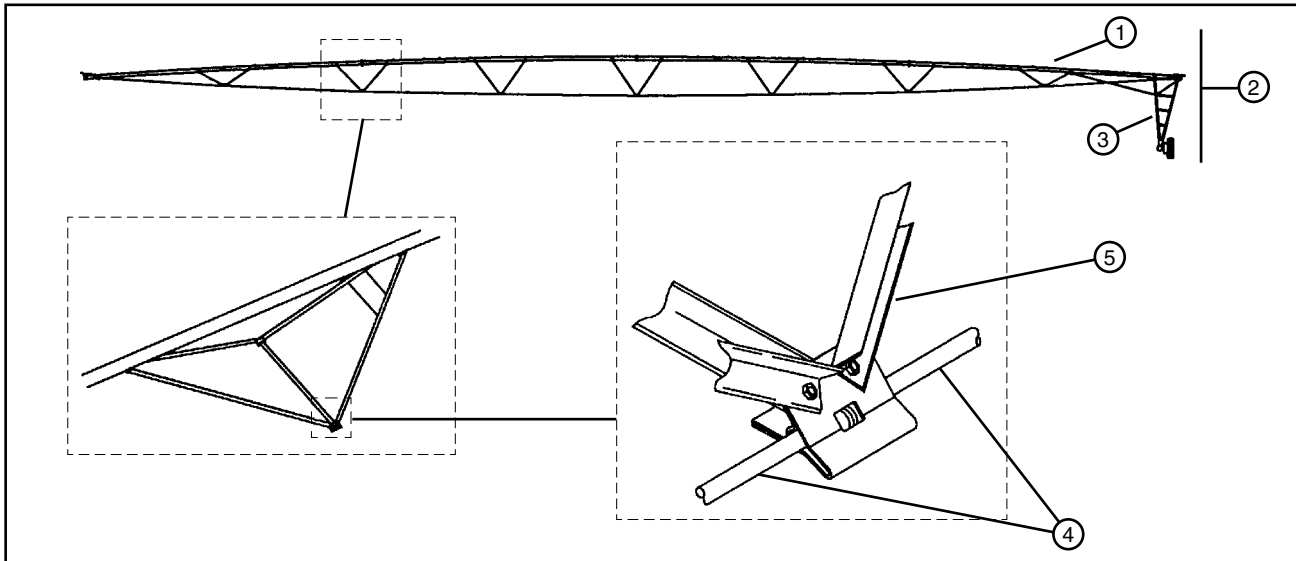


Figure 22-1 1. Pipeline
2. Span
3. Drive Tower
4. Truss Rod
5. Truss Assembly

The spans are attached to each other with a ball hitch and cup assembly which gives lateral, rotational, and vertical flexibility between the spans. See figure 22-2.

The pipelines in each span are connected together with a flexible hose that is held in place with band clamps. See figure 22-2.

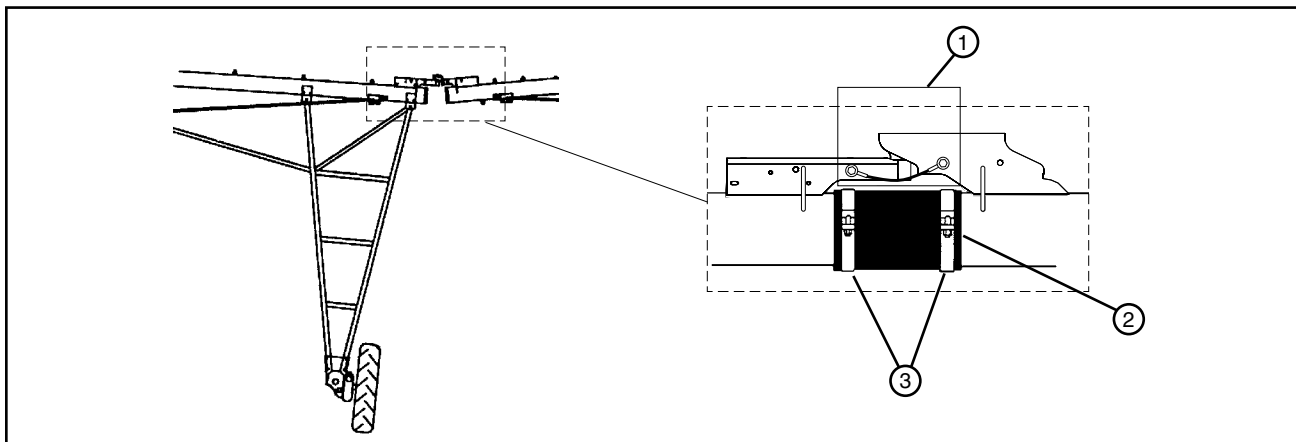


Figure 22-2 1. Hitch Ball and Cup Assembly
2. Flexible Hose
3. Band Clamp

OVERVIEW

Overhang (Option)

Typically an overhang is attached to the end of the span pipe and used for irrigation beyond the span/drive unit. Support ears and cables provide support for the overhang. See figure 23-1.

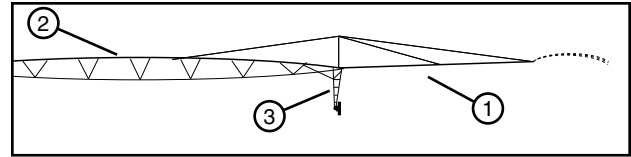


Figure 23-1 1. Overhang 3. Drive Unit
2. Span

End Gun (Option)

Typically an end gun is attached at the end of the overhang and used to increase the area irrigated beyond the end of the machine. See figure 23-2.

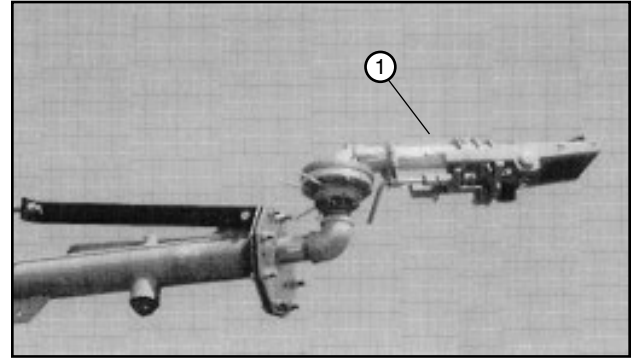


Figure 23-2 1. End Gun

The end gun is set to cover a specified area. This area is determined by the forward and backward angles, which are referred to as the end gun arc settings. See Figure 23-3.

Drive Towers

A drive tower is attached to the end of each span. The tower box acts as a junction box for the span cable and supplies power to the electric motor on the center drive gearbox. The center drive gearbox drives the wheel gearboxes. The wheel gearbox drives the tire and wheel. See figure 23-4.

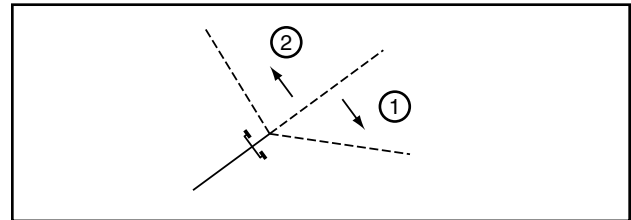


Figure 23-3 1. Forward Angle
2. Backward Angle

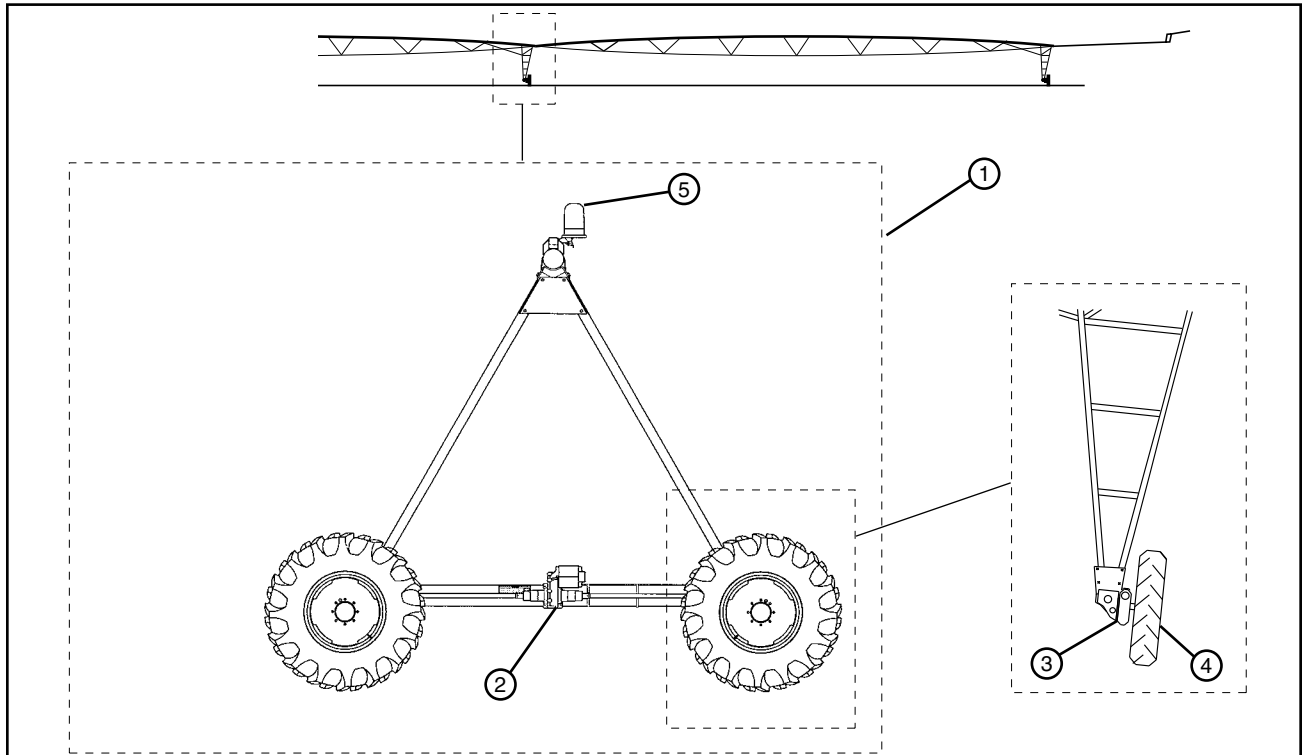


Figure 23-4 1. Drive Tower 4. Tire And Wheel Assembly
2. Center Drive Gearbox 5. Tower Box
3. Wheel Gearbox

OVERVIEW

Water Application

A sprinkler chart provides the operator with information about water application depths and pass times at different percent timer settings.

Water is applied to the field through the sprinklers. Sprinklers can be mounted on top of the pipeline or on drop tubes that hang below the pipeline. See figure 24-1.

Span Cable

A cable with color coded wires enters and leaves each tower box. The cable runs the entire length of the machine and is referred to as span cable. See figure 24-2.

The span cable can carry multiple voltages including high voltage depending on control panel and the country of use.

Intermediate Tower Boxes

The intermediate tower control boxes provide power to the center drive gear motors depending on the tower box position in relationship to the next tower in the system. See figure 24-2.

Last Tower Box

The last tower control box provides power to the center drive gear motor depending on the percent timer setting at the control panel. It also completes the safety circuit. See figure 24-2.

Alignment

The small field pivot point uses standard alignment. See figure 24-3.

The last tower is the controlling tower. As the end tower moves, all of the other towers move to maintain straight alignment.

When the last tower moves, it creates an angular deflection with the next intermediate tower, this closes the run microswitches and causes the next intermediate tower to move.

This cycle repeats itself throughout the length of the entire machine.

The result of these cycles is that any tower can be moving at any time, depending on its relationship with the next outer span.

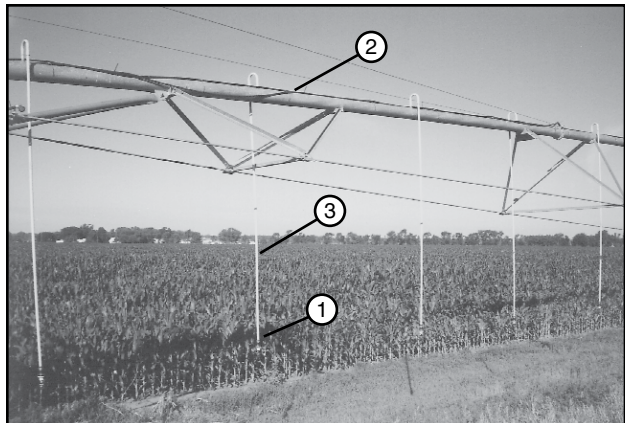


Figure 24-1 1. Sprinkler
2. Pipeline
3. Drop Tube

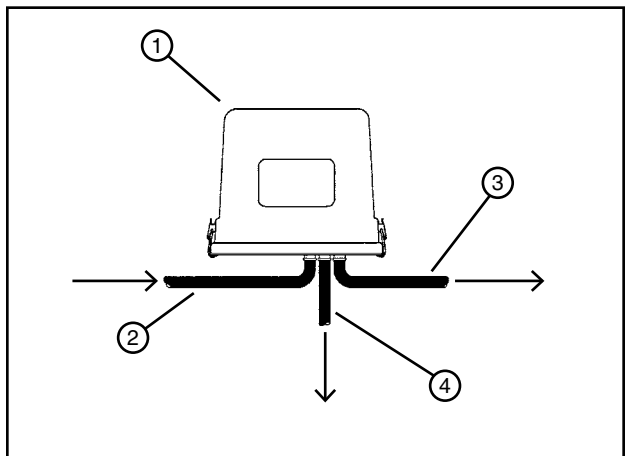


Figure 24-2 1. Tower Box
2. Span Cable Entering Tower Box
3. Span Cable Leaving Tower Box
4. Cable To Drive Motor

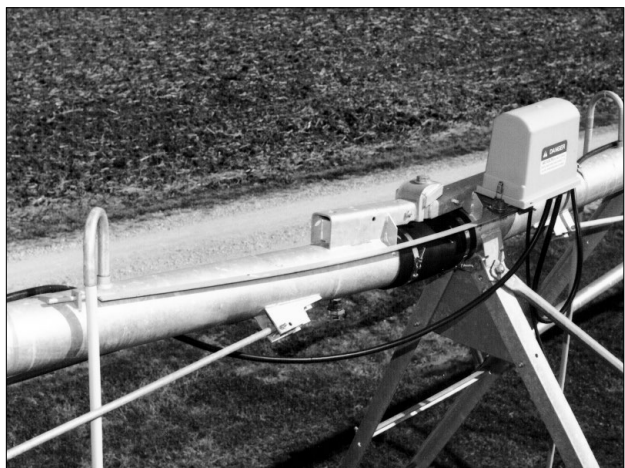


Figure 24-3 Standard Alignment

OVERVIEW

Safety Circuit

The safety circuit is a 120 volt AC control circuit that starts in the control panel and runs the entire length of the machine. See figure 25-1.

Each drive tower box contains a safety microswitch. The safety microswitches must be closed to complete the safety circuit.

When the machine is in alignment, the safety microswitches are closed. If the machine ever becomes too far out of alignment, a safety microswitch opens, breaking the safety circuit. This stops the machine to prevent structural damage.

Stop In Slot Control - Mechanical (Option)

The Stop In Slot option stops the machine at a predetermined field location. The stop in slot microswitch and stop in slot finger are located on the pivot swivel and bearing coupler. See figure 25-2.

The stop in slot finger represents the location that the machine will stop when stop in slot is on.

When the stop in slot microswitch rod contacts the stop in slot finger and rotates 2-5° in either direction the machine will shutdown.

End Gun Control - Mechanical (Option)

The end gun microswitch and end gun control ramps are located on the pivot swivel and bearing coupler. See figure 25-3.

The end gun control ramps represent the locations where the end gun will turn on and off.

When the end gun microswitch rolls up on the end gun control ramp the end gun will come on. The end gun turns off as the microswitch rolls off of the ramp.

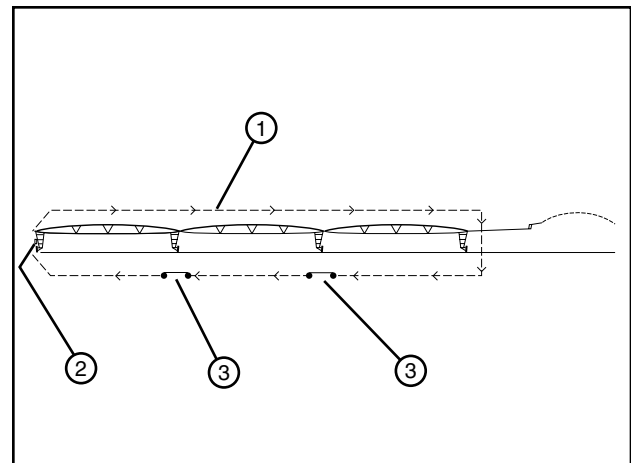


Figure 25-1 1. Safety circuit 2. Control panel 3. Safety Microswitch

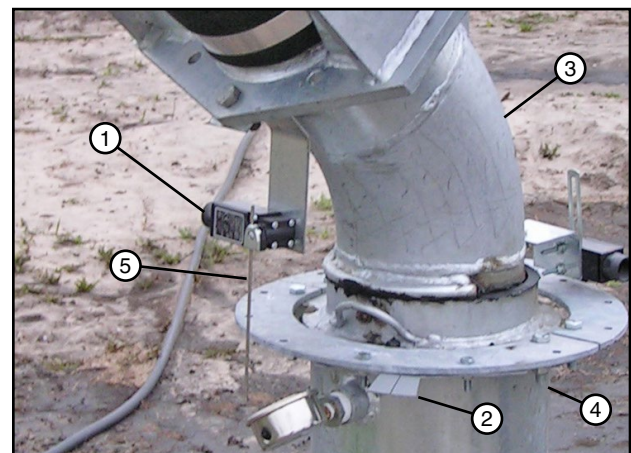


Figure 25-2 1. Stop In Slot Microswitch 2. Stop In Slot Finger 3. Pivot Swivel 4. Bearing Coupler 5. Microswitch Rod

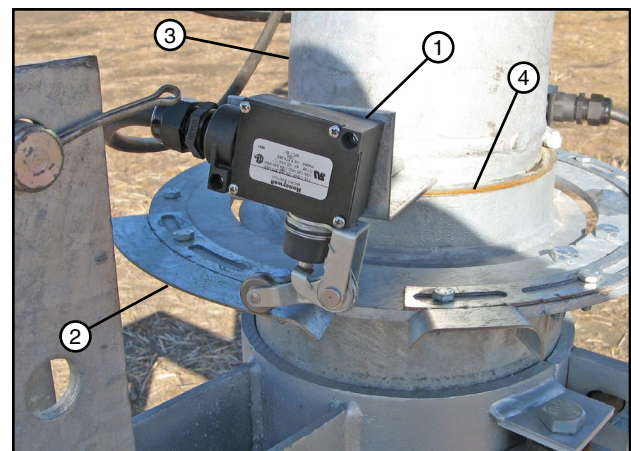


Figure 25-3 1. End Gun Microswitch 2. End gun Control Ramp 3. Pivot Swivel 4. Bearing Coupler

OVERVIEW

Public Power Non-Tow (Option)

The public power non-tow option includes an electrical box mounted on the pivot point. See figure 26-1.

Public Power Towable (Option)

The public power towable option includes electrical receptacles mounted on each pivot pad and electric cords with plugs wired into an electrical box mounted on the pivot point. See figure 26-2.

Engine Generator (Option)

The engine generator option is attached to the pivot swivel. See figure 26-3.

The collector ring is not installed when an engine generator is used.

Fuel Tank (Engine Generator Only)

One 25 gallon fuel tank with cover is provided in addition to the fuel tank included on the engine generator set. See figure 26-3.

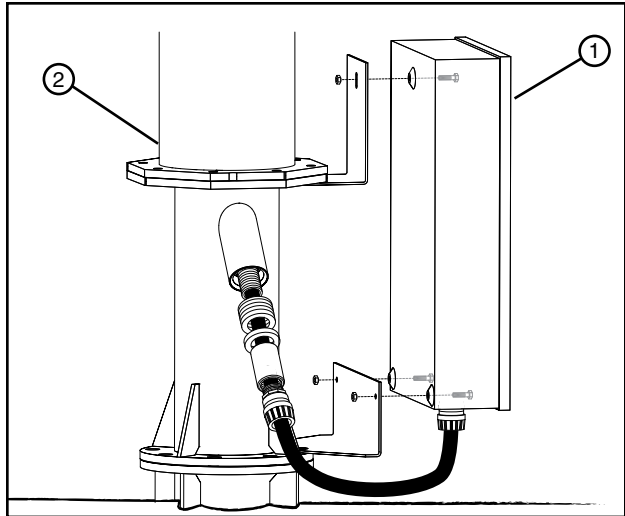


Figure 26-1 1. Electrical Box
2. Pivot Point

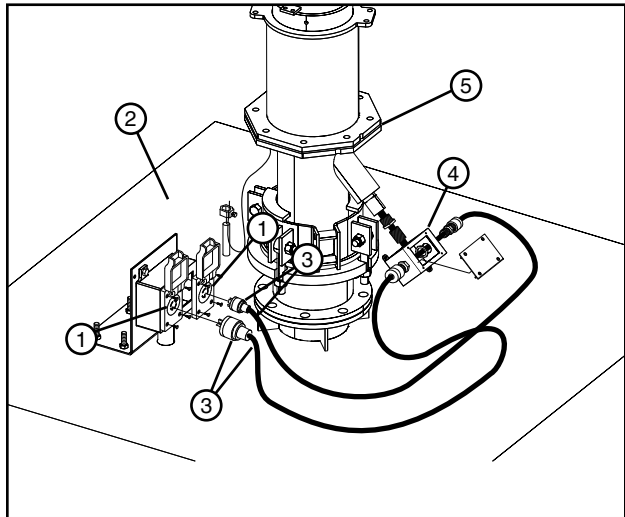


Figure 26-2 1. Electrical Receptacle 4. Electrical Box
2. Pivot Pad 5. Pivot Point
3. Electric Cord and Plug

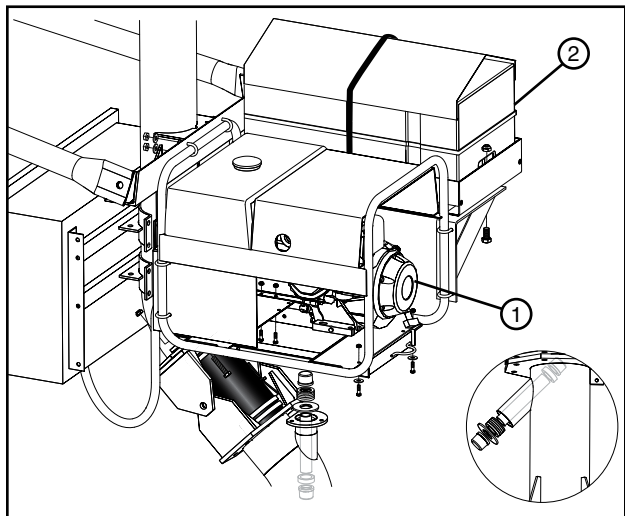


Figure 26-3 1. Engine Generator
2. Fuel Tank with Cover

OVERVIEW

Over Watering Timer

The over watering timer is located in the time delay watering box. See figure 27-1.

The time delay watering box is normally located at the next to last tower. It's function is to act as a safety device to shut the entire machine off should the end tower fail to move due to mechanical/electrical failure or wheel slippage. The timer can be set from 0-60 minutes and is factory set at 12 minutes.

At a setting of 12 minutes, the next to last tower must cycle on and off before the 12 minute setting expires. Each time the next to last tower runs, the timer is reset.

Drive Unit Field Stop/Auto Reverse (Option)

The drive unit mounted end of field stop is used with both the end of field stop and end of field auto reverse option. See figure 27-2.

This mechanism will stop the machine when the actuator arm contacts the barricade.

If the auto reverse option is installed, the operator can choose to either have the machine stop or automatically reverse its direction of travel and continue to run.

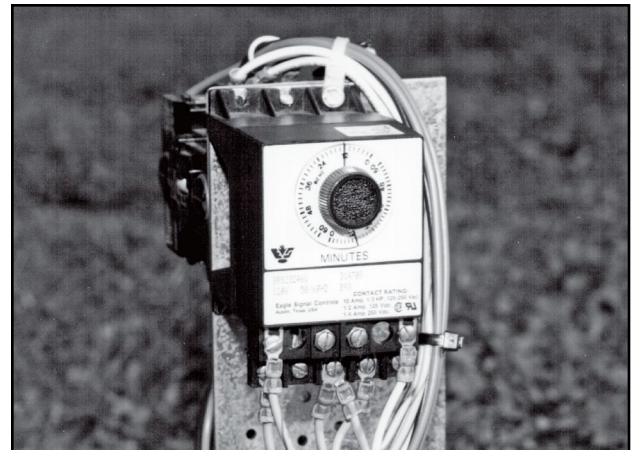


Figure 27-1 1. Over Watering Timer

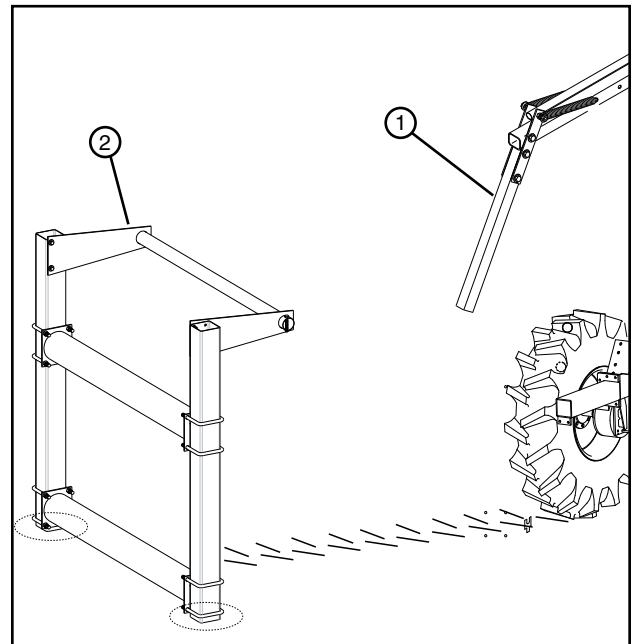


Figure 27-2 1. Actuator Arm
2. Barricade

⚠ CAUTION

- **NEVER USE THE SAFETY OVERRIDE BUTTON TO WALK THE MACHINE OFF OF THE BARRICADE. STRUCTURAL DAMAGE MAY RESULT.**
- **SOIL MAY BUILD UP IN THE WHEEL TRACK RESULTING IN A RAMP EFFECT ALLOWING THE ACTUATOR ARM TO GO OVER THE BARRICADES. REGULARLY MAINTAIN THE WHEEL TRACK TO INSURE THE ACTUATOR ARM ALWAYS CONTACTS THE BARRICADE.**

Auto Reverse/Auto Stop (Option)

The Auto Reverse/Auto Stop box provides the machine the ability to Auto Reverse and Auto Stop when the control panel also has the Auto Reverse option.

The Auto Reverse/Auto Stop Box is mounted on the drive unit mounted end of field stop and is only used with the Auto Reverse/Auto Stop option.

OVERVIEW

End Gun and Stop In Slot Control - Electronic (Option)

The Valley Select2 and Pro2 Control Panels can use a resolver to determine the position of the pivot in the field. The resolver is installed in the collector ring. See figure 28-1.

As the pivot rotates, the collector ring turns which also turns the shaft of the resolver. The resolver sends low voltage signals to the control panel. The Control Panel uses the voltage readings to determine field position in degrees. The field position readings are used to turn the end gun on and off or to stop at the stop in slot position.

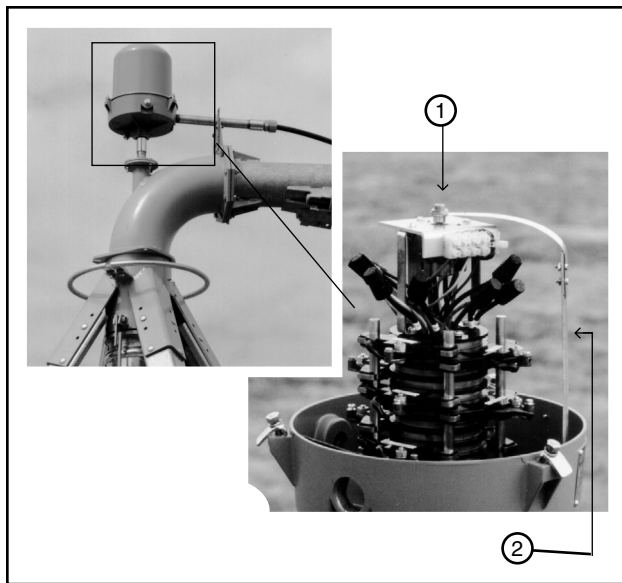


Figure 28-1 1. Resolver Shaft
2. Collector Ring

OPERATION

Machine Operation

For proper operation of the Small Field Pivot machine, the Control Panel Owner's Manual and Small Field Pivot Owner's Manual must be used together.

The Control Panel Owner's Manual includes safety guidelines and explains the basic operation of the control panel itself, including how to start/stop the machine, change running direction and change water application amounts.

The Small Field Pivot Owner's Manual includes safety guidelines and explains the operation of the Small Field Pivot machine including towing.

All Owner's, operators and maintenance personnel **MUST** read and understand the Control Panel Owner's Manual and the Small Field Pivot Owner's Manual.

CAUTION

• **PHYSICAL END OF FIELD STOP BARRICADES MUST BE INSTALLED ON ALL PART CIRCLE MACHINES. THE PHYSICAL BARRICADES SERVE AS A BACKUP IN CASE THE CIRCUITRY OR THE TRIP STRUCTURE SHOULD EVER FAIL. DELETION OF THE PHYSICAL BARRICADES CAN BE DONE BY THE CUSTOMER ONLY. SEE FIGURE 29-1.**

Part Circle Operation

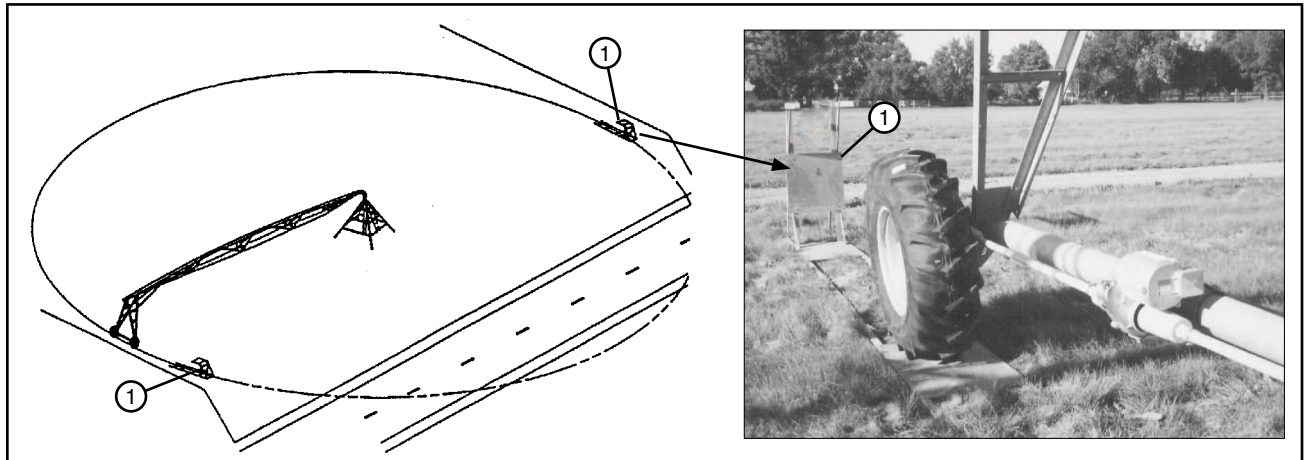


Figure 29-1 1. Physical barricad

NOTE

• **Care must be taken when the barricade option in Figure 29-2 is used. The operator **MUST** ensure the actuator arm contacts the tripping structure. Under certain conditions, soil may build up in the wheel track resulting in a ramp effect. This may allow the actuator arm to go over the top of the structure which trips the actuator arm. Should this happen, the machine will not stop but continue to move and can result in damage to the machine**

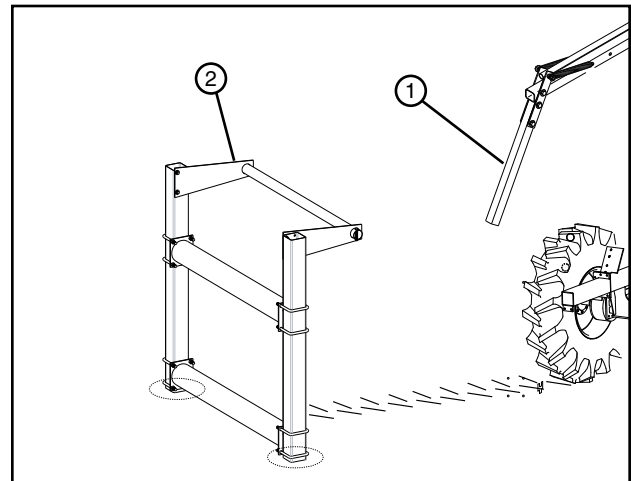


Figure 29-2 1. Actuator arm
2. Barricade

OPERATION

Towing Option

Preparing Machine for Towing

This topic provides instruction on the preparation of the drive units and pivot point for towing.

REMEMBER: SAFETY FIRST – Operate according to the following procedures when towing and read all safety precautions in this manual.

1. Position the machine in the tow lane. See figure 30-1.

NOTE

- The tow lane should be flat and void of any crop rows.
- If towing on a side slope the machine may tend to shift down the hill due to gravitational pull.
- DO NOT tow across crop rows, ditches or rough terrain.

Disconnect Power

When the public power option is used each tow location MUST have a remote power source with a service disconnect.

⚠ DANGER

- ALWAYS DISCONNECT ELECTRICAL POWER BEFORE SERVICING OR PERFORMING MAINTENANCE TO THE MACHINE.
- ALWAYS REPLACE ANY GUARDS OR SHIELDS THAT ARE REMOVED FOR PERFORMING MAINTENANCE.

2. Turn OFF and lock the electrical service disconnect at each tow location. See figure 30-2.

⚠ WARNING

- NEVER ATTEMPT TO LIFT THE ENTIRE DRIVE UNIT AT ONE TIME.
- IF THE JACK BEGINS TO SLIP OR MOVE OUT OF POSITION, STOP RAISING THE DRIVE UNIT IMMEDIATELY, LOWER THE DRIVE UNIT AND REPOSITION THE JACK.

NOTE

- Position the jack so it will not interfere with the rotation of the tire, wheel gear box, gear box mount or gear box mount hardware.

3. The wheels on each drive unit must be turned into the tow position. Use a jack to lift one side of the drive unit until the tire is off of the ground. See figure 30-3.

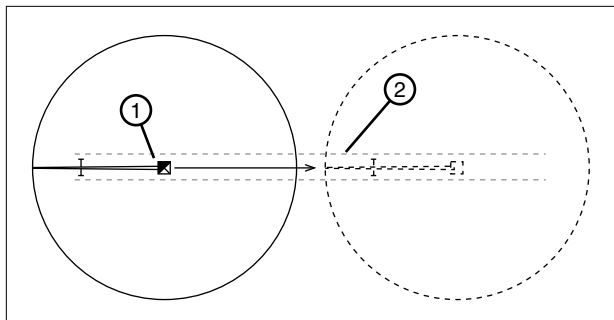


Figure 30-1 1. Machine
2. Tow lane

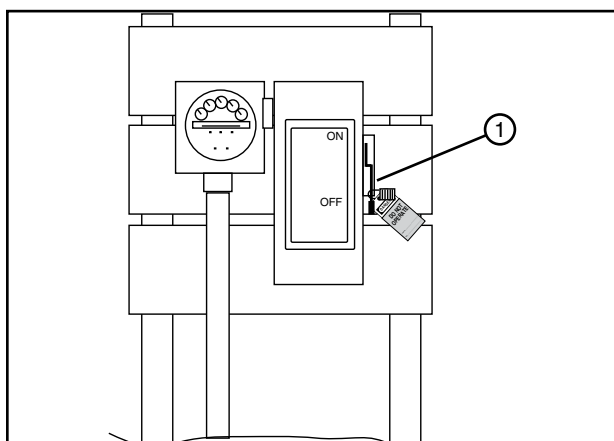


Figure 30-2 1. Power Service Disconnect

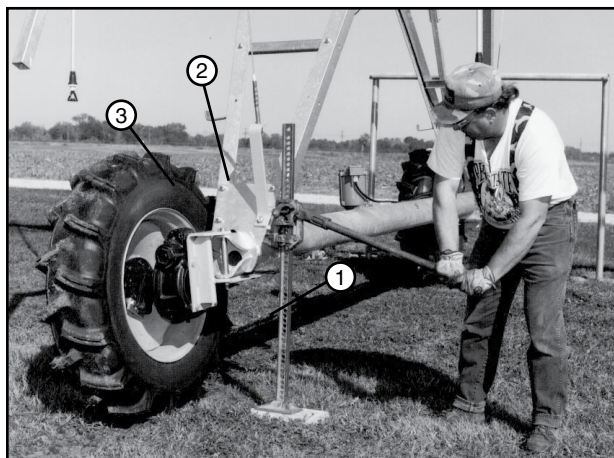


Figure 30-3 1. Jack
2. Drive Unit
3. Tire

Towing Option

Preparing Machine for Towing

4. Loosen the clamps securing u-joint shields in position. Slide all four u-joint shields away from the gearboxes.
5. Remove lynch pin from retainer clip, then open retainer clip and pull the torque pin from axle torque arm behind gearbox hub and hub torque pin receiver. See figure 31-1.
6. Using a pry bar, push down on the gearbox mount steering arm to release it from the latch plate while pushing the tire toward the tow position until steering arm is out of latch plate. See figure 31-2.
7. Push the tire toward the tow position while supporting the drive shaft and using a small pry bar to separate the drive shaft u-joint half from the flex joint and wheel gearbox u-joint half.

After separating the u-joint, place the loose end of drive shaft in the drive shaft keeper. See figure 31-3.

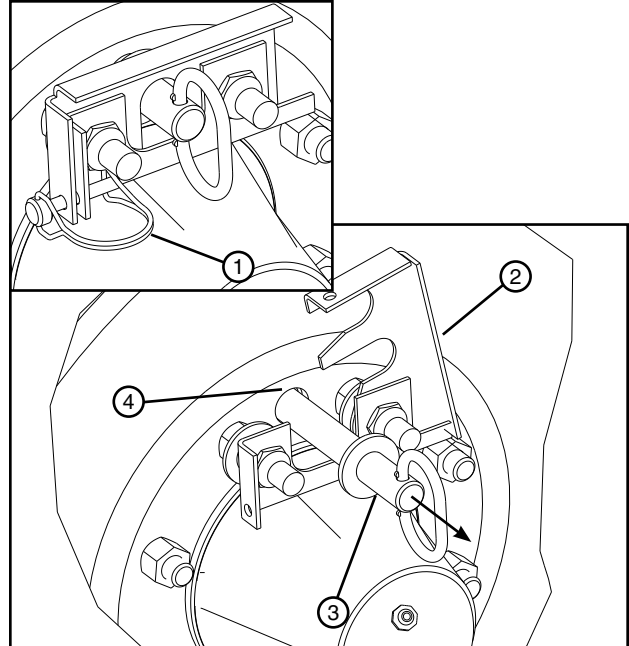


Figure 31-1 1. Lynch Pin 2. Retainer Clip 3. Torque Pin 4. Hub Torque Pin Receiver

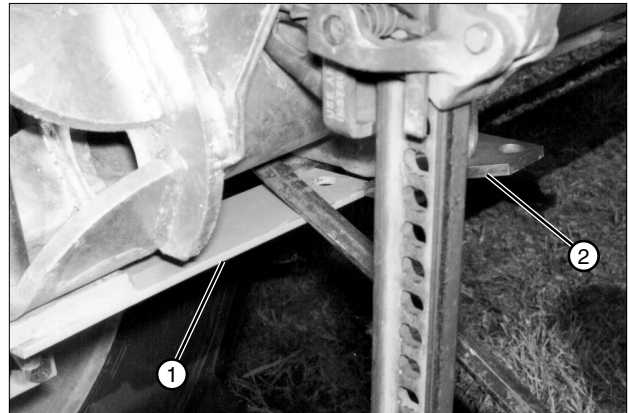


Figure 31-2 1. Steering Arm 2. Latch Plate

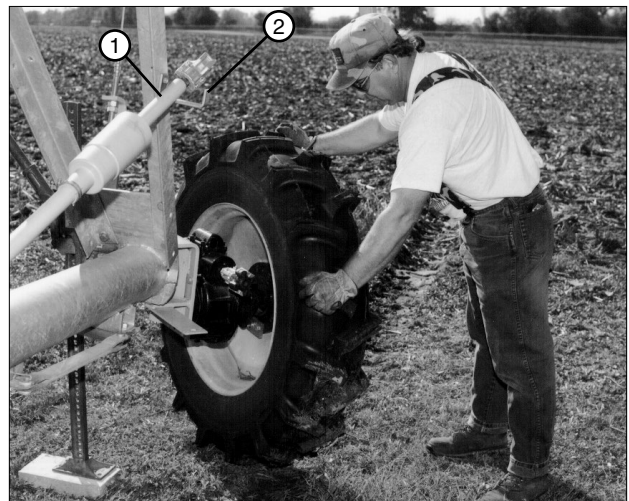


Figure 31-3 1. Drive Shaft 2. Drive Shaft Keeper

OPERATION

Towing Option

Preparing Machine for Towing

8. Lift the carrier spring and release the tow link bar from the tow link carrier. See figure 32-1.
9. Position steering arm in tow link bar yoke, align holes, then attach steering arm to tow link bar with torque pin. Secure torque pin with lynch pin. See figure 32-2.
10. Lower the drive unit and remove the jack. The tire is now in the tow position. See figure 32-3.
11. Repeat steps 3-10 for all other drive unit tires.

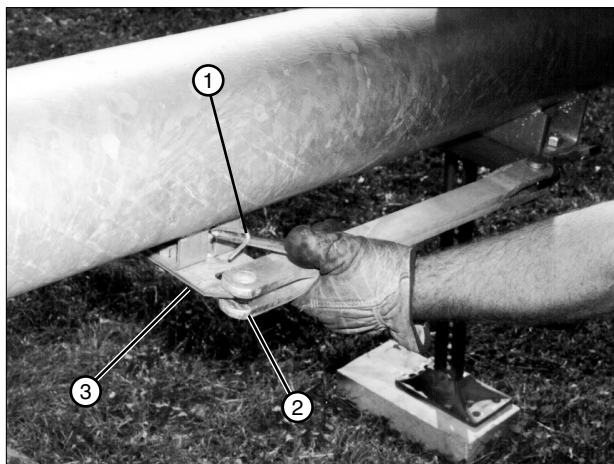


Figure 32-1 1. Carrier Spring 2. Tow Link Bar 3. Tow Link Carrier

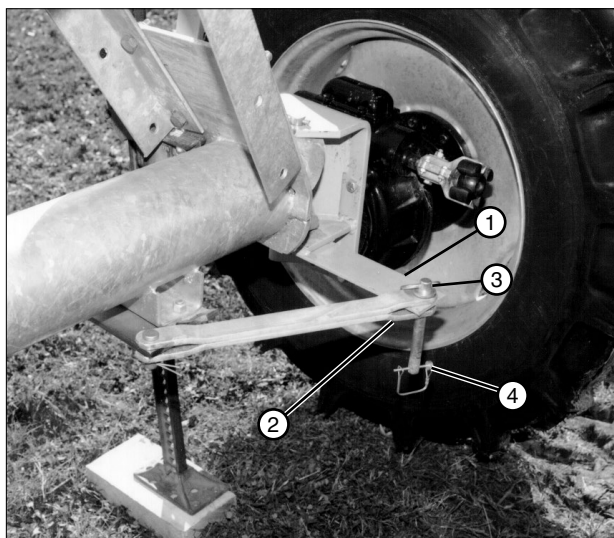


Figure 32-2 1. Steering Arm 2. Tow Link Bar Yoke 3. Torque Pin 4. Lynch Pin

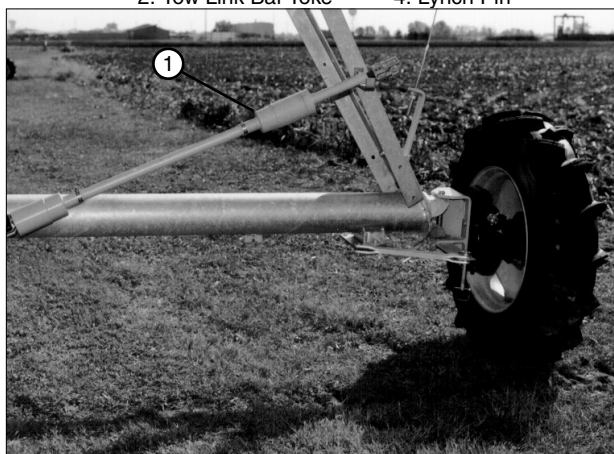


Figure 32-3 1. Towing Position Shown

Preparing Machine for Towing

⚠ DANGER

- NEVER HANDLE THE ELECTRIC CORDS WHEN THE POWER IS ON.
- THE PUBLIC POWER DISCONNECT SWITCH MUST BE IN THE "OFF" POSITION WHEN INSERTING OR REMOVING THE ELECTRIC CORD PLUGS FROM THE POWER RECEPTACLES.
- NEVER ALLOW THE ELECTRIC CORDS TO KINK.
- REGULARLY INSPECT THE ELECTRIC CORDS FOR NICKS OR CUTS. REPLACE A DAMAGED ELECTRIC CORD IMMEDIATELY. DO NOT ATTEMPT TO SPLICE A DAMAGED ELECTRIC CORD.

12. At the pivot pad, make sure the power disconnect is locked in the OFF position. Then unplug the electric cords from the power receptacles. See figure 33-1.
13. Carefully coil and hang electric cord on machine to avoid damage when towing.

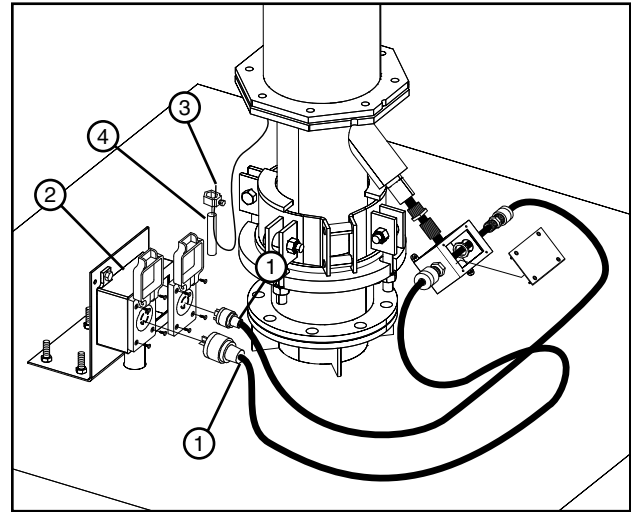


Figure 33-1 1. Electric Cord 2. Power Receptacle 3. Ground Wire 4. Ground Rod

OPERATION

Towing Option Preparing Machine for Towing

CAUTION

• THE TOOL BAR MOUNTING CLAMP MUST BE TIGHTLY CLAMPED AROUND THE BEARING COUPLER, WITH NO GAPS OR MOVEMENT BETWEEN THE TWO.

DANGER

• TO REDUCE THE POSSIBILITY OF THE PIVOT ROLLING TO ONE SIDE AS IT IS LIFTED MAKE SURE ALL THREE PINS AND BUSHINGS THAT SECURE TOOL BAR TO THE THREE POINT HITCH ARE PROPERLY ENGAGED AND SECURED BEFORE LIFTING PIVOT.

14. When attaching the tractor's three point hitch to the tool bar on the small field pivot, do the following and make sure all three pins and bushings that secure tool bar to the three point hitch are properly engaged and secured before lifting pivot. See figure 34-1.
 - a) Secure the 2 in top link bushing in the tool bar, and the tool bar to the top link of three point hitch with one top link pin and lynch pin.
 - b) Secure each 2-3/4 in bushing in the tool bar, and the tool bar to each bottom link of three point hitch with one hitch pin and hair pin.

DANGER

• BE AWARE OF HIGH WATER PRESSURE. TURN OFF THE PUMP AND ALLOW THE MACHINE TO DRAIN COMPLETELY BEFORE DISCONNECTING RECEIVER TUBE FROM UPPER ANCHOR.

15. Loosen the hex nut on each of the four rod ends on the anchor clamp. See figure 34-2.
16. Rotate each rod end out of the slot on upper anchor to disconnect the receiver tube from the upper anchor.

Machine preparation for towing is complete. Continue with Towing the Small Field Pivot on the next page.

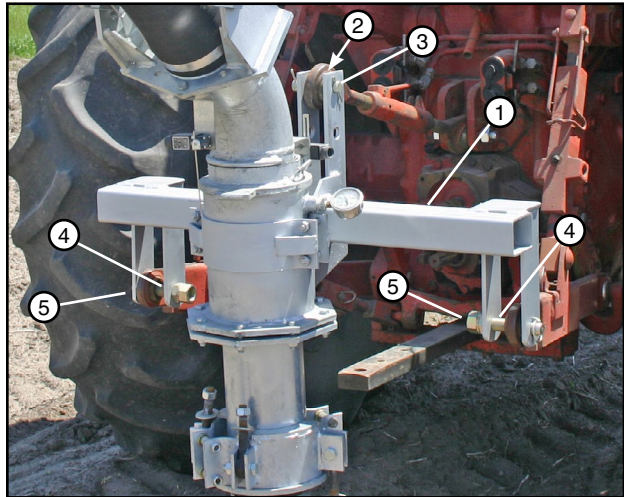


Figure 34-1 1. Tool Bar 2. Top Link Bushing 3. Top Link Pin 4. 2-3/4 in Bushing 5. Hitch Pin

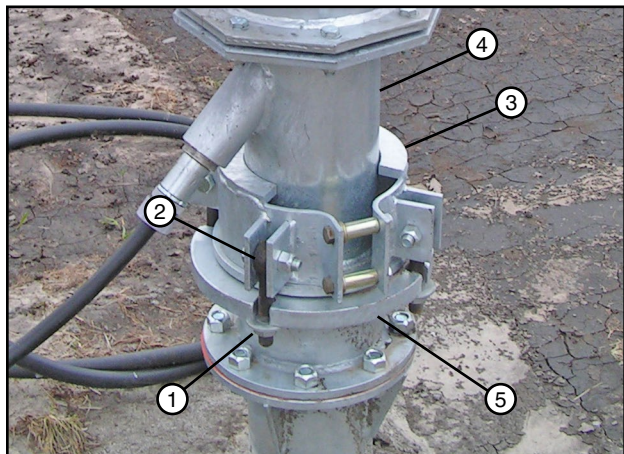


Figure 34-2 1. Hex Nut 2. Rod End 3. Anchor Clamp 4. Receiver Tube 5. Upper Anchor

Towing Option

Towing the Small Field Pivot

This topic provides instruction on towing the Small Field Pivot.

SAFETY FIRST - Operate according to the following procedures when towing and read all safety information in this manual.

1. Position the machine in the tow lane. See figure 35-1.
2. Prepare the machine for towing. See Preparing the Machine For Towing in the front of this section.
3. If using the public power option:
 - a) Make sure the public power disconnect is locked in the OFF position.
 - b) Unplug the electric cords from the power receptacles
 - c) Carefully coil and hang electric cord on machine to avoid damage when towing.
4. Make sure the anchor clamp rod ends have been rotated out of the upper anchor slots to disconnect the receiver tube from the upper anchor.
5. After the Small Field Pivot and drive units have been prepared for towing, slowly raise the pivot until the receiver tube is completely out of the upper anchor.
6. After the receiver tube is out of the upper anchor, and if applicable, plug or cap the pipe upper anchor.
7. Begin towing the machine in a slow, gradual manner to the next location. See figure 35-2.

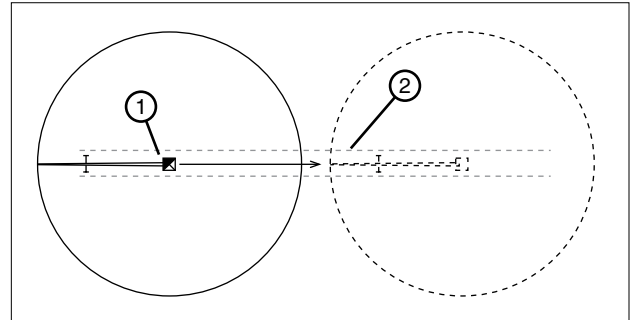


Figure 35-1 1. Machine
2. Tow lane

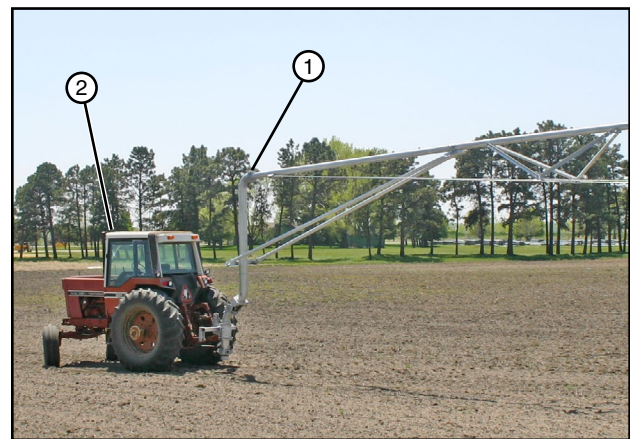


Figure 35-2 1. Small Field Pivot
2. Towing Unit

CAUTION

- TO REDUCE THE POSSIBILITY OF STRUCTURAL DAMAGE :
- IF TOWING ON A SIDE SLOPE THE MACHINE MAY TEND TO SHIFT DOWN THE HILL DUE TO GRAVITATIONAL PULL.
- DO NOT TOW ACROSS CROP ROWS, DITCHES OR ROUGH TERRAIN.
- DO NOT JERK THE MACHINE AT ANYTIME WHILE TOWING.
- DO NOT TOW THE MACHINE MORE THAN 2 MPH (3 KPH) MAXIMUM.
- ALWAYS TOW THE MACHINE IN A STRAIGHT LINE.
- NEVER ATTEMPT TO TURN THE MACHINE WHEN TOWING.
- NEVER ATTEMPT REVERSING OR BACKING THE MACHINE INTO POSITION.

OPERATION

Towing Option

Towing the Small Field Pivot

8. After reaching the next location make sure seal is on receiver tube. See figure 36-1.
9. If applicable remove the pipe plug or cap from the pipe upper anchor.
10. Position the receiver tube above the upper anchor. Lower receiver tube into upper anchor until it bottoms out in upper anchor.
11. Attach receiver tube to upper anchor with existing rod ends and hex nuts on anchor clamp. Tighten hardware completely. See figure 36-2.
12. Disconnect tractor three point hitch from tool bar.

NOTE

- THE TOOL BAR MAY BE LEFT IN PLACE DURING NORMAL OPERATION.
- REPOSITION THE TOOL BAR WHEN A DIFFERENT TOWING DIRECTION IS DESIRED.

13. Prepare the machine for operation. See Preparing Machine for Operation on the next page.

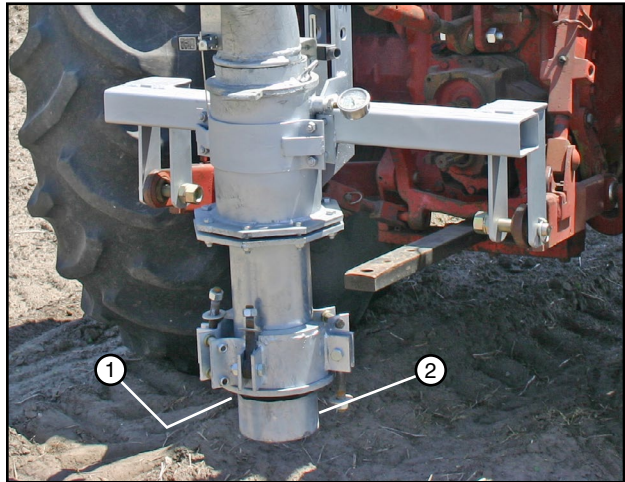


Figure 36-1 1. Seal
2. Receiver Tube

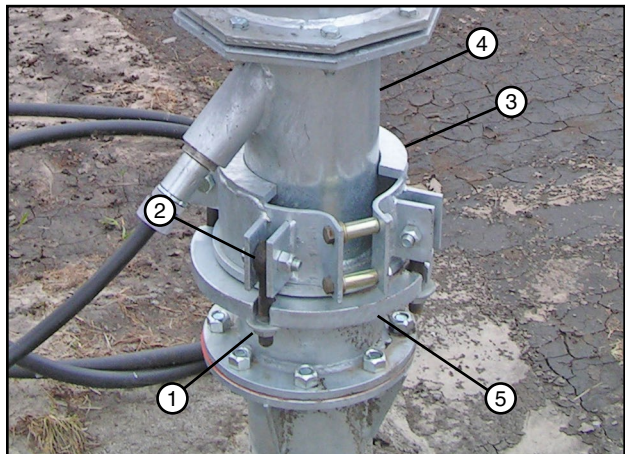


Figure 36-2 1. Hex Nut 4. Receiver Tube
2. Rod End 5. Upper Anchor
3. Anchor Clamp

OPERATION

Towing Option

Preparing Machine for Operation

This topic provides instruction on the preparation of the drive units and pivot point for operation.

REMEMBER: SAFETY FIRST – Operate according to the following procedures when towing and read all safety precautions in this manual.

Disconnect Power

When the public power option is used each tow location **MUST** have a remote power source with a service disconnect.

DANGER

- **ALWAYS DISCONNECT ELECTRICAL POWER BEFORE SERVICING OR PERFORMING MAINTENANCE TO THE MACHINE.**
- **ALWAYS REPLACE ANY GUARDS OR SHIELDS THAT ARE REMOVED FOR PERFORMING MAINTENANCE.**

1. Turn OFF and lock the electrical service disconnect at each tow location. See figure 37-1.

DANGER

- **NEVER HANDLE THE ELECTRIC CORDS WHEN THE POWER IS ON.**
- **THE PUBLIC POWER DISCONNECT SWITCH MUST BE IN THE “OFF” POSITION WHEN INSERTING OR REMOVING THE ELECTRIC CORD PLUGS FROM THE POWER RECEPTACLES.**
- **NEVER ALLOW THE ELECTRIC CORDS TO KINK.**
- **REGULARLY INSPECT THE ELECTRIC CORDS FOR NICKS OR CUTS. REPLACE A DAMAGED ELECTRIC CORD IMMEDIATELY. DO NOT ATTEMPT TO SPLICE A DAMAGED ELECTRIC CORD.**

NOTE

- **Each time a towable machine is moved, the ground wire **MUST** be reattached to the ground rod and checked for electrical integrity before restarting the machine.**

2. Connect the pivot ground wire to the pivot pad ground rod with ground clamp. See figure 37-2.
3. Plug each electric cord into the correct power receptacle. See figure 37-2.

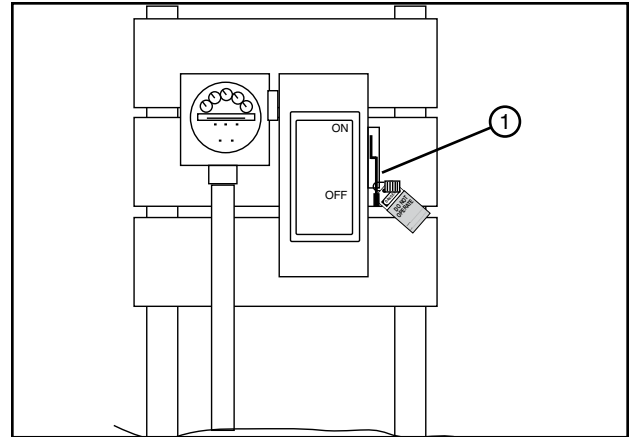


Figure 37-1 1. Public Power Service Disconnect

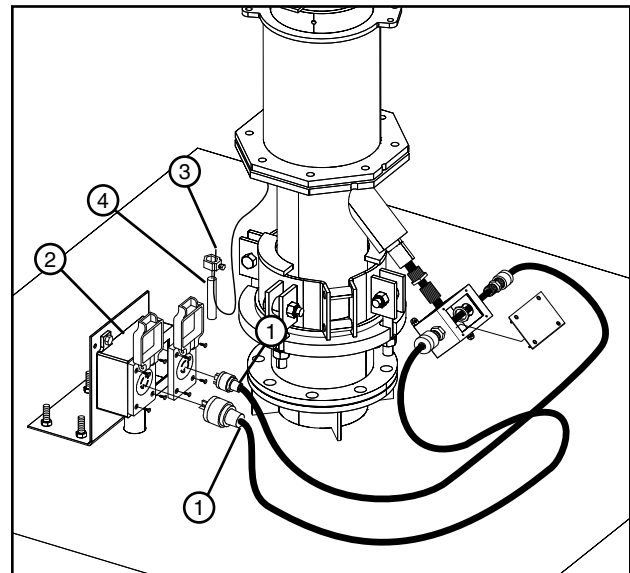


Figure 37-2 1. Electric Cord 2. Power Receptacle 3. Ground Wire 4. Ground Rod

OPERATION

Towing Option Preparing Machine for Operation

WARNING

- NEVER ATTEMPT TO LIFT THE ENTIRE DRIVE UNIT AT ONE TIME.
- IF THE JACK BEGINS TO SLIP OR MOVE OUT OF POSITION, STOP RAISING THE DRIVE UNIT IMMEDIATELY, LOWER THE DRIVE UNIT AND REPOSITION THE JACK.

NOTE

- Position the jack so it will not interfere with the rotation of the tire, wheel gearbox, swivel mount or swivel mount hardware.

4. Use a jack to lift one side of the drive unit until the tire is off of the ground. See Figure 38-1.
5. Remove lynch pin from torque pin, then remove torque pin and disconnect tow link bar from steering arm. See Figure 38-1.
6. Rotate tow link bar into the tow link carrier until the carrier spring latches into the hole in tow link bar. See Figure 38-2.
7. As tire is turned to the operating position, align the drive shaft u-joint half with puck and wheel gearbox u-joint half.

Continue pushing tire toward the operating position with enough force to push the gearbox u-joint half over the puck and latch the steering arm in the latch plate.

8. Make sure the steering arm is latched in the latch plate. See Figure 38-3.

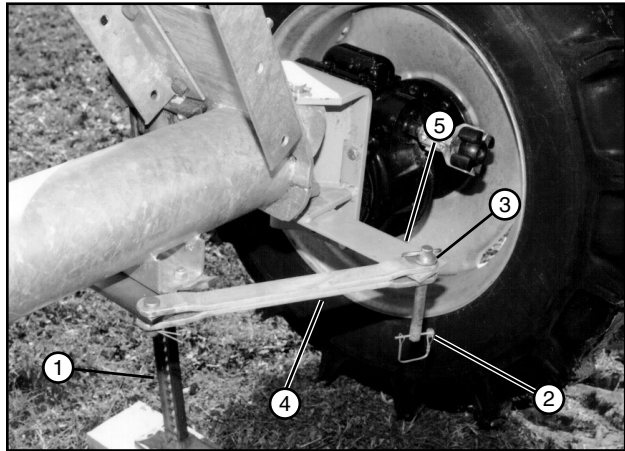


Figure 38-1 1. Jack
2. Lynch Pin
3. Torque Pin
4. Tow Link Bar
5. Steering Arm

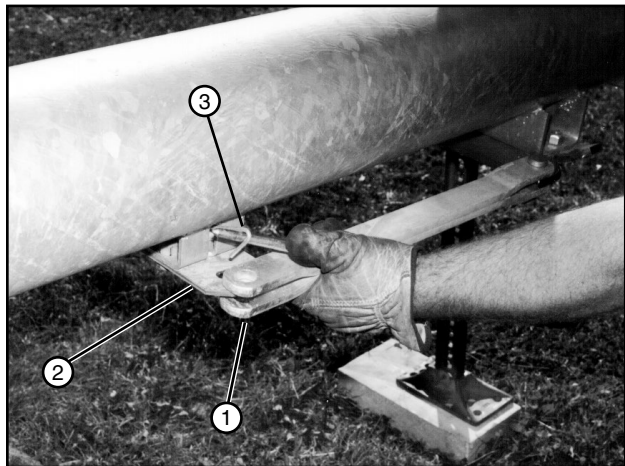


Figure 38-2 1. Tow Link Bar
2. Tow Link Carrier
3. Carrier Spring



Figure 38-3 1. Steering Arm
2. Latch Plate

Towing Option

Preparing Machine for Operation

- Slide the U-joint shield over the U-joint and position approximately 1/4 in (6.3 mm) away from touching the gearbox. Secure the U-joint shield to the drive shaft shield with a clamp. See figure 39-1.

Repeat the procedure for all U-joint shields.

- Rotate the tire until the hole in the hub torque pin receiver is aligned with the hole in the axle torque arm. Install the torque pin and close the retainer plate. Secure the retainer plate to the retainer clip with the lynch pin. See figure 39-2.
- Lower the drive unit and remove the jack. The tire is now in the OPERATING position.
- Repeat steps 4-11 for all other drive unit tires.

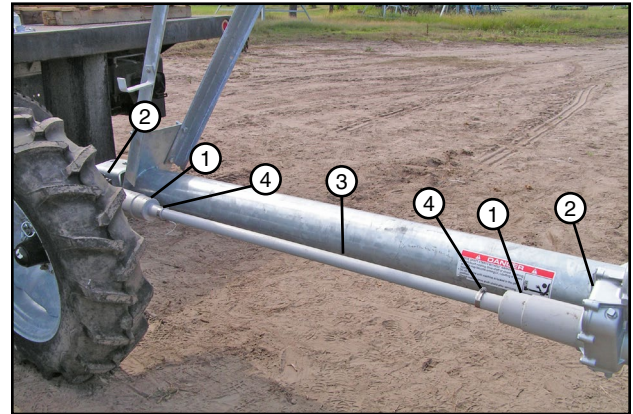


Figure 39-1 1. U-Joint Shield 2. Gearbox 3. Drive Shaft Shield 4. Clamp

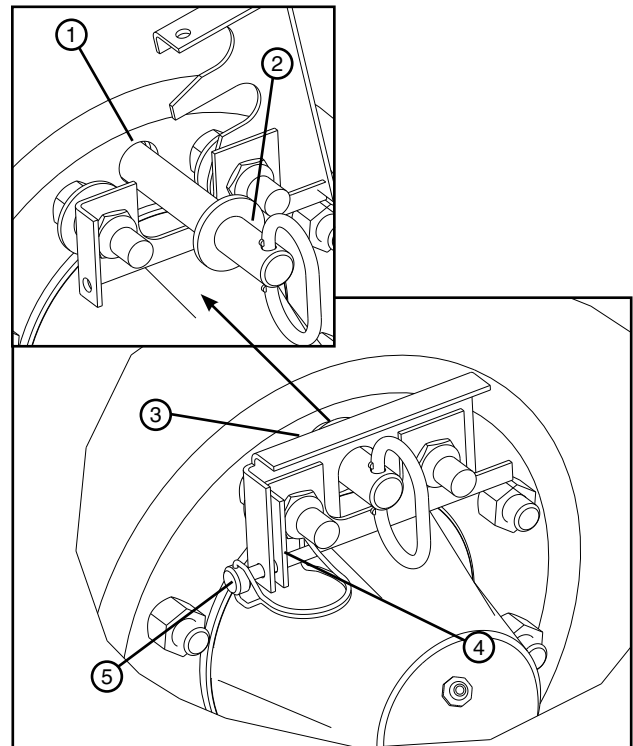


Figure 39-2 1. Hub Torque Pin Receiver 2. Torque Pin 3. Retainer Plate 4. Retainer Clip 5. Lynch Pin

OPERATION

DANGER

- THE CONTROL PANEL CONTAINS HIGH VOLTAGE! 480 VOLTS CAN KILL.
- ALWAYS DISCONNECT ELECTRICAL POWER BEFORE SERVICING OR PERFORMING MAINTENANCE TO THE MACHINE.
- TESTING AND TROUBLESHOOTING SHOULD BE PERFORMED ONLY BY AN AUTHORIZED VALLEY DEALER.
- ALWAYS REPLACE ANY GUARDS OR SHIELDS THAT ARE REMOVED FOR PERFORMING MAINTENANCE.

Disconnect All Power

Before performing service or maintenance on any part of the machine, follow the MINIMAL LOCKOUT/TAGOUT PROCEDURE located in the SAFETY section of this manual and do the following:

1. SHUT OFF and LOCK the public power service disconnect to the irrigation machine. See figure 41-1.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 41-1.

2. SHUT OFF and lock the control panel main power disconnect. See figure 41-2.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 41-2.

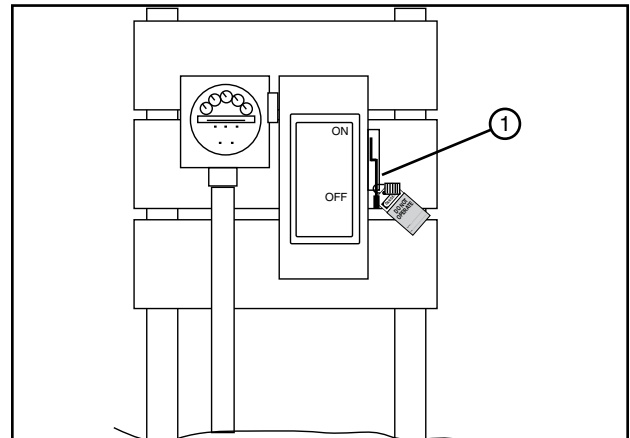


Figure 41-1 1. Public Power Service Disconnect

DANGER

- BE AWARE OF HIGH WATER PRESSURE. TURN OFF THE PUMP AND ALLOW THE MACHINE TO DRAIN COMPLETELY BEFORE REPAIRING OR PERFORMING MAINTENANCE TO THE MACHINE.

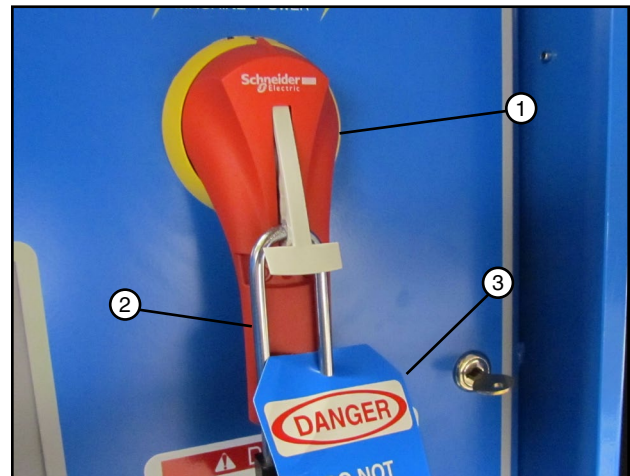


Figure 41-2 1. Main Disconnect
2. Lock
3. Blue Tag

MAINTENANCE

Wheel Gearbox

1. Remove the drain plug from the bottom of the wheel gearbox and drain the oil into a container. See figure 42-1.

NOTE

- After the first operating season, change the oil in all of the wheel gearboxes.
- After the first oil change, change the wheel gearbox oil every third year or 3000 operating hours, whichever occurs first.
- At the end of each operating season, drain the wheel gearboxes of any condensation or contaminated oil that may have accumulated in the gearbox and refill to its normal level.

2. Install the drain plug after draining oil.

NOTE

- Use only Valley Gear Lube. Other brands of lubricants may contain corrosive extreme pressure additives, which may damage bronze worm gears.

| VALLEY GEAR LUBE | |
|------------------|---------------|
| Part No. | Description |
| 0996557 | 55 Gallons |
| 0996558 | 16 Gallons |
| 0996559 | 5 Gallons |
| 0996560 | 2 1/2 Gallons |

- The oil in worm gear cases may reach temperatures up to 200° F (94° C) without alarm.

3. Clean all of the dirt away from the expansion chamber cap and remove the expansion chamber cap. Do not allow dirt to fall into the gearbox when removing the cap. See figure 42-2.
 - Make sure the vent holes on each side of the expansion chamber cap are open and unobstructed.
4. Fill the wheel gearbox with Valley Gear Lube. The capacity is approximately 3.9 quarts (3.7 liters).
 - Fill gearbox to the top of worm gear shaft or remove the check plug and fill until the oil begins to flow out of the check plug hole. See figure 42-3.
5. Install the expansion chamber cap after refilling the gearbox. Secure with original hardware and torque to 8 lb-ft (10.8 N-m).

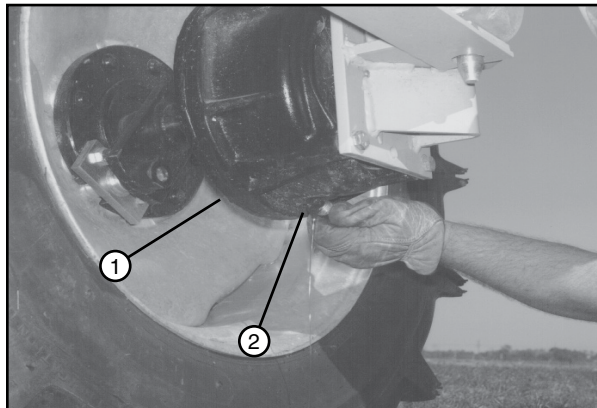


Figure 42-1 1. Wheel Gearbox
2. Drain Plug

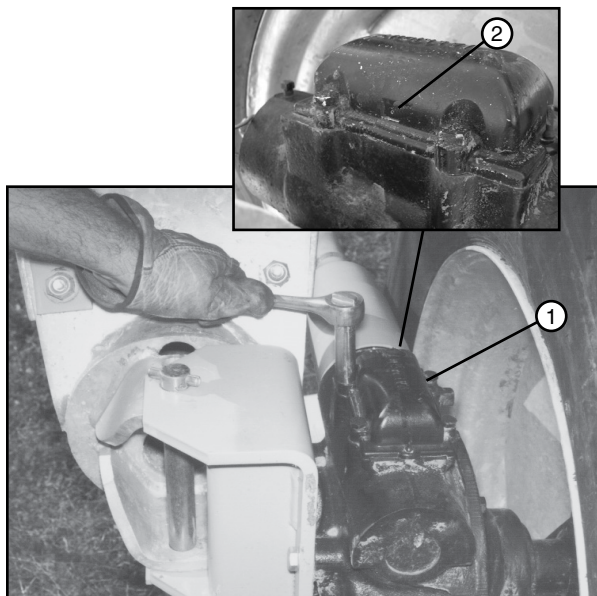


Figure 42-2 1. Expansion Chamber Cap
2. Vent Hole

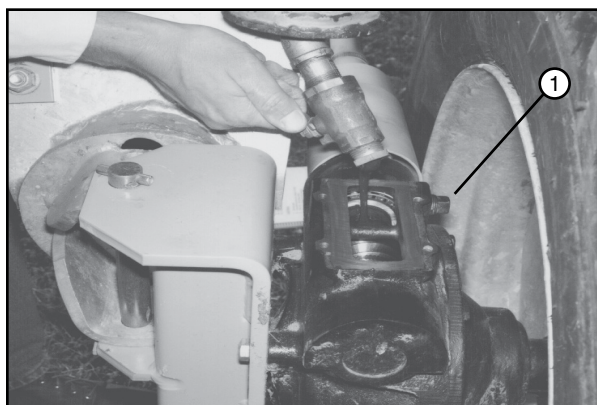


Figure 42-3 1. Check Plug

MAINTENANCE

Center Drive Gearmotors

Helical Gearmotor

After EACH season of operation, change the oil in all of the helical gearmotor gearboxes.

1. Remove the drain plug and the fill plug. Drain the oil and install the drain plug. See figure 43-1.

NOTE

•Use only Valley Gear Lube. Other brands of lubricants may contain corrosive extreme pressure additives, which may damage bronze worm gears.

| VALLEY GEAR LUBE | |
|------------------|---------------|
| Part No. | Description |
| 0996557 | 55 Gallons |
| 0996558 | 16 Gallons |
| 0996559 | 5 Gallons |
| 0996560 | 2 1/2 Gallons |

2. Fill the gearbox 1-7/8 in (48 mm) from the bottom of fill plug hole with Valley Gear Lube. The capacity of the gearbox is approximately 44 oz (1.3 liter). See figure 43-2.

NOTE

•OIL LEVEL SHOULD BE 1-7/8 IN (48 MM) BELOW FILL PLUG WHEN FULL.

⚠ WARNING

•INPUT SEAL FAILURE CAN OCCUR IF OIL CAPACITY IS EXCEEDED.

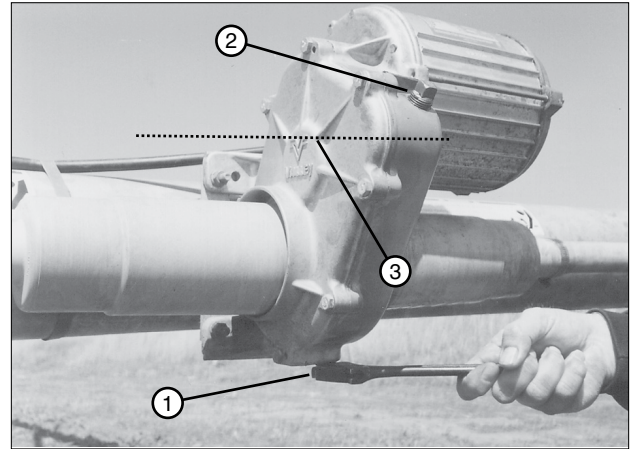


Figure 43-1 1. Drain Plug
2. Fill Plug
3. Oil Level

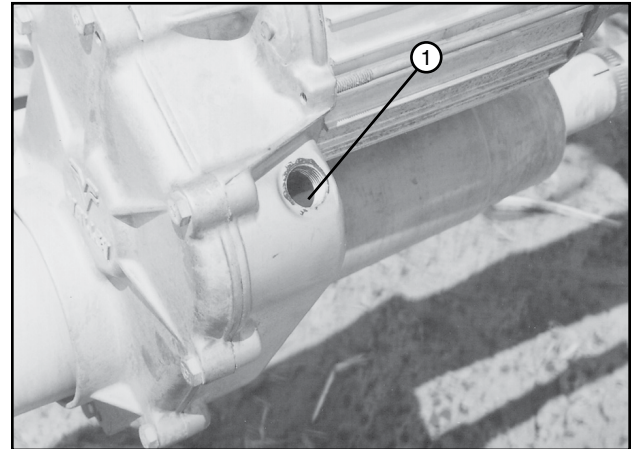


Figure 43-2 1. Bottom of Fill Plug Hole

MAINTENANCE

Tire And Wheel

Towable Hub Lubrication

The towable hubs should be greased at least once a year with water resistant lithium based grease.

This must be done whether the pivot has been towed or not during the season.

The grease fitting is located on the end of the hub. Refill the bearing cavity using a grease gun. See figure 44-1.

When the cavity is full, grease will cream around the seal area. Greasing the hub will also help push out any water which may have accumulated in the hub.

Wheel Lug Nut Torque

Wheel lug nuts should be torqued to 125 lb-ft (169.47 N·m). See figure 44-1.

Check the wheel lug nut torque annually, pre-season; at spring start-up.

Tire Pressures

Proper tire pressure is important! Operating with low tire pressure will damage the tires and the drive train.

Check tire pressure several times a year:

- Pre-season: At spring start-up.
- During-season: Check tire pressure monthly.
- Post-season: When performing fall winterization.

For the correct tire pressure refer to the decal on the rim or the tire pressure chart. See figure 44-2.

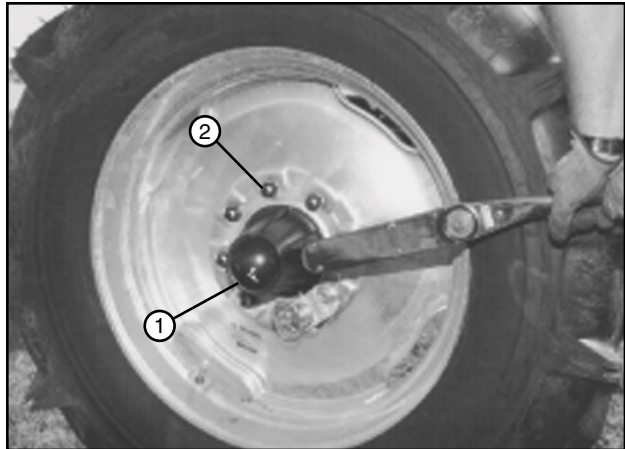


Figure 44-1 1. Grease Fitting
2. Wheel lug nut

TIRE PRESSURE CHART

| Span Drive Units | | | |
|----------------------|------------------------|-------------|---------|
| Tire Size | Pounds per Square Inch | Kilo pascal | Bar |
| (Inches) | (PSI) | (kPa) | (bar) |
| 11.2 X 24 Tire | 34 | 234 | 2.3 |
| 14.9 X 24 Float Tire | 18 | 124 | 1.2 |
| 14.9 X 24 Turf Tire | 18 | 124 | 1.2 |
| 16.9 X 24 Turf Tire | 16-18* | 110-124 | 1.1-1.2 |

Figure 44-2 *Tire pressure may be reduced to 16 psi (110 kPa) for increased flotation.

WARNING

- TIRES ARE SHIPPED AT A PRESSURE OF 30 TO 35 PSI (206 TO 241 KPA).
- BE SURE THE TIRES HAVE BEEN DEFLATED TO THE CORRECT PRESSURE (SHOWN ON DECAL) BEFORE THE TIRE IS USED.

NOTE

- When replacing tires be sure the ply rating of the new tire is equal to or greater than the ply rating of the old tire.

Barricade

Maintain the barricade structure and area.

Inspect the barricade structure for failure and tighten any loose hardware completely.

Ensure that the actuator arm contacts the tripping structure. Under certain conditions, soil may build up in the wheel track resulting in a ramp effect. This may allow the actuator arm to go over the top of the structure which trips the actuator arm. See figure 45-1.

Should this happen, the machine will not stop but continue to move and can result in damage to the machine. Remove any build up of soil in the barricade area.

Wheel Tracks

It is important to maintain wheel tracks. See figure 45-2.

- Wheel track depths must not exceed 4 in (100 mm).
- Wheel track depth can be controlled by using track fillers, tillers, discs, or flotation tires.

Engine/Generator

Refer to the Owner's Manual supplied with engine/generator for specific details on maintenance, operation, and winterizing of the engine/generator.

CAUTION

- A PARTIALLY FILLED FUEL TANK WILL PERMIT CONDENSATION WHICH WILL CONTAMINATE THE FUEL AND ACT TO DAMAGE THE INJECTION PUMP AND INJECTORS.

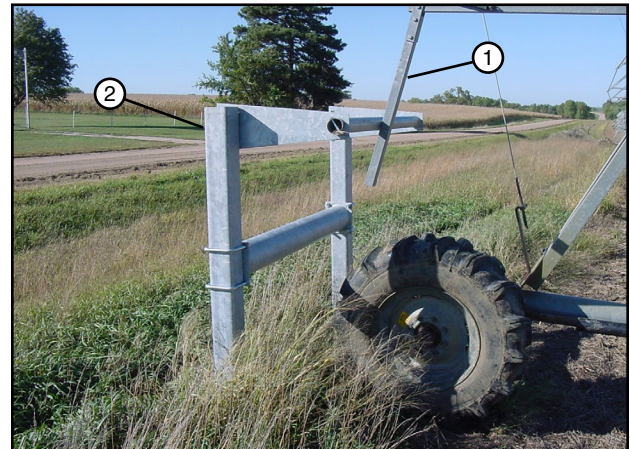


Figure 45-1 1. Actuator arm
2. Barricade

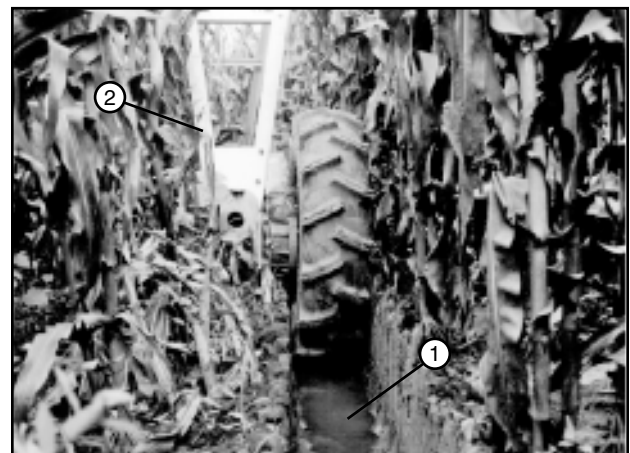


Figure 45-2 1. Wheel Track
2. Drive Unit

MAINTENANCE

Miscellaneous

Pivot Swivel Lubrication

The pivot swivel should be greased every 5 to 7 revolutions with water resistant lithium based grease. See figure 46-1.

Greasing the pivot swivel regularly reduces the possibility of binding that can cause the pivot to move erratically. When a resolver is used for position sensing the erratic movement can cause incorrect position readings.

The grease fittings are located on each side near the top of bearing coupler. Refill the bearing cavity using a grease gun. See figure 46-1.

When the cavity is full, grease will appear around the top of bearing coupler.

Flex Hose Replacement

If a flex hose must be replaced, loosen the two clamps to remove the old flex hose and insert the new one. No extra support is needed while making the changes. See figure 46-2.

When installing or tightening the hose clamps always place the bolts and fasteners on the opposite side of the control rod. Under certain terrain conditions the bolts could interfere with the machine's alignment if positioned on the same side as the control rod. See figure 46-2.

Bonding Ground Wire

Bonding ground wire **MUST** be installed for proper ground between individual spans. See figure 46-2.

Electrical and Grounding Conductors

Check the condition of all electrical and grounding conductors regularly. See figure 46-3.

Have your local Valley dealer repair or replace broken conduit and electrical wire with worn or cracked insulation.

Always be sure the ground wire is securely attached to both the ground rod and the ground lug on the bearing coupler.

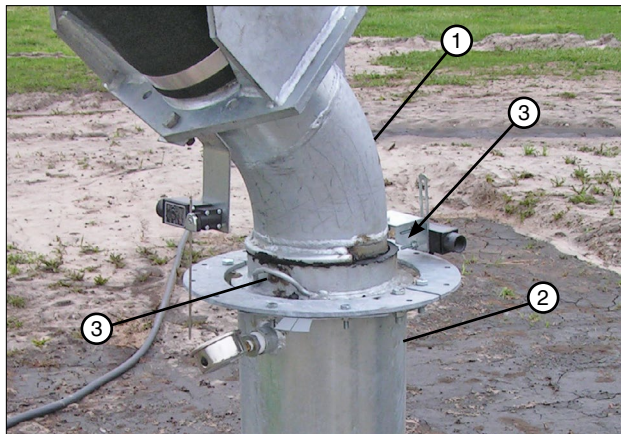


Figure 46-1 1. Pivot Swivel
2. Bearing coupler
3. Grease Fitting

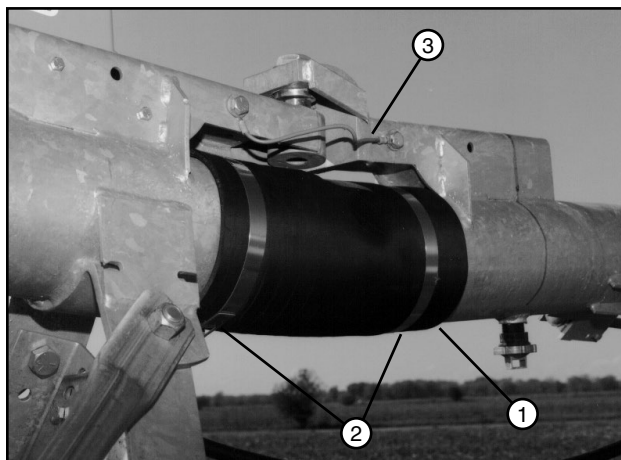


Figure 46-2 1. Flex Hose
2. Hose Clamp
3. Bonding Ground Wire

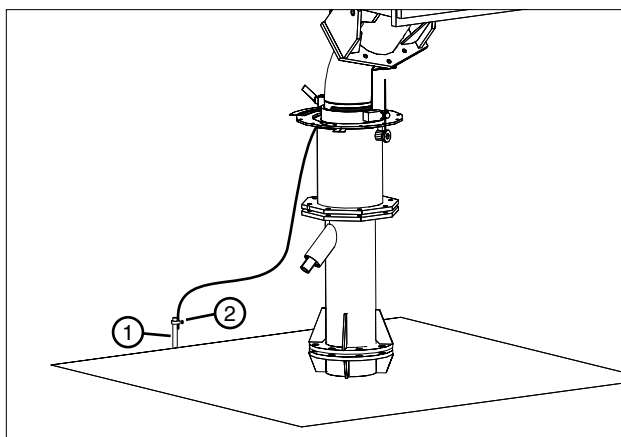


Figure 46-3 1. Ground rod
2. Ground lug

Mechanical End Gun Shut Off Adjustment

The end gun switch and end gun control ramps are located on the pivot swivel and bearing coupler. See figure 47-1.

The end gun control ramp represents the location where the end gun will turn ON.

NOTE

•Very small changes in the location of the end gun shut off ramp can result in MUCH greater distance changes at the outer end of the pivot machine.

1. Adjust end gun control ramps for range of operation. Cut the web between ramp tab and mounting tab as needed depending on the range of end gun operation desired. End gun control ramps may be positioned end to end for longer arcs. See figure 47-2.
2. After adjusting the range of operation, bend each end of ramp tab down at a 45 degree angle. See figure 47-3.
3. Position end gun control ramps on half rings as desired. Secure each end gun control ramp with two 1/4 in x 1 in cap screws and lock nuts. See figure 47-3.
4. Adjust switch and arm position while the machine is running.

Loosen the switch mounting hardware, then adjust the switch position so the arm is low enough for the wheel to contact the end gun control ramp and engage the switch. Tighten switch mounting hardware. See figure 47-3.

Loosen the end gun control ramp mounting hardware to make adjustments to the end gun ON/OFF location. See figure 47-3.

Fine tuning can be done by adjusting the switch arm height.

Make additional adjustments to the end gun control ramp range of operation as required.

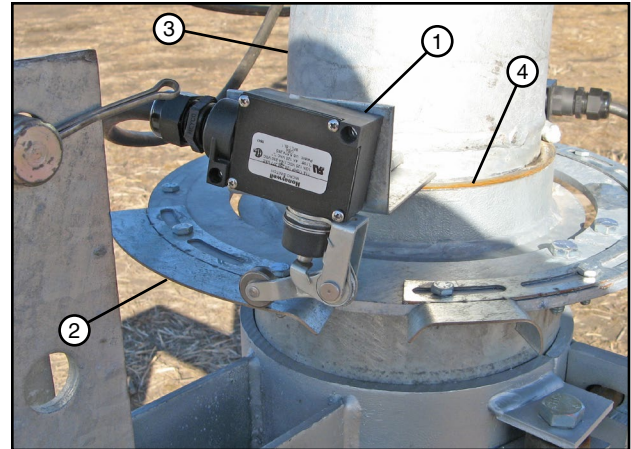


Figure 47-1 1. End Gun Microswitch 2. End gun Control Ramp 3. Pivot Swivel 4. Bearing Coupler

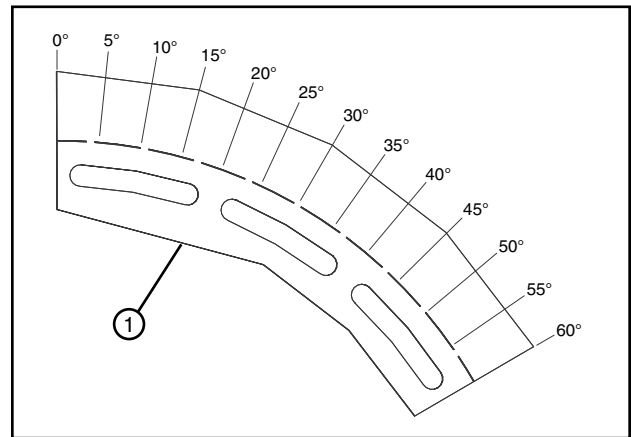


Figure 47-2 1. End Gun Control Ramp

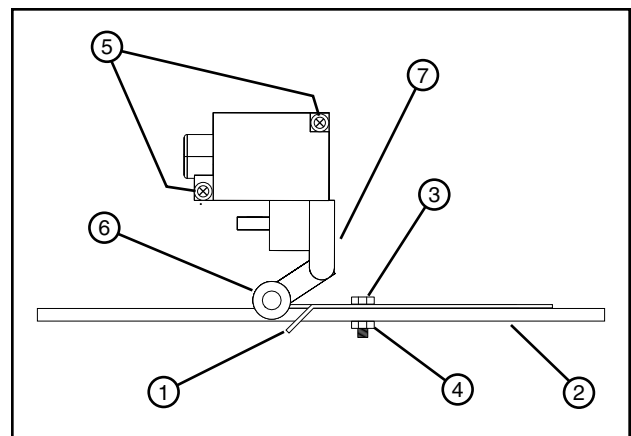


Figure 47-3 1. End Gun Control Ramp 2. Half Ring 3. 1/4 x 1 Cap Screw 4. 1/4 Lock Nut 5. Switch Mounting Hardware 6. End Gun Switch Arm w/Wheel 7. Arm Height Adjustment

MAINTENANCE

Miscellaneous

Mechanical Stop In Slot Adjustment

The stop in slot microswitch and stop in slot finger are located on the pivot swivel and bearing coupler. See figure 48-1.

The stop in slot finger represents the location that the machine will stop when stop in slot is on.

NOTE

•Very small changes in the location of the stop in slot ramp can result in MUCH greater distance changes at the outer end of the pivot machine.

5. Position Stop-In-Slot finger under half ring as desired. Secure Stop-In-Slot finger with two 1/4 in x 1 in cap screws and lock nuts. See figure 48-2.
6. Adjust switch rod while the machine is running.
 - Set the switch rod low enough to contact the Stop-In-Slot finger and engage switch. See figure 48-2.
 - Loosen the Stop-In-Slot finger mounting hardware to make adjustments to the Stop-In-Slot location. See figure 48-2.
 - Additional adjustment can be obtained by bending one of the Stop-In-Slot fingers down so that the switch rod cannot contact the finger.

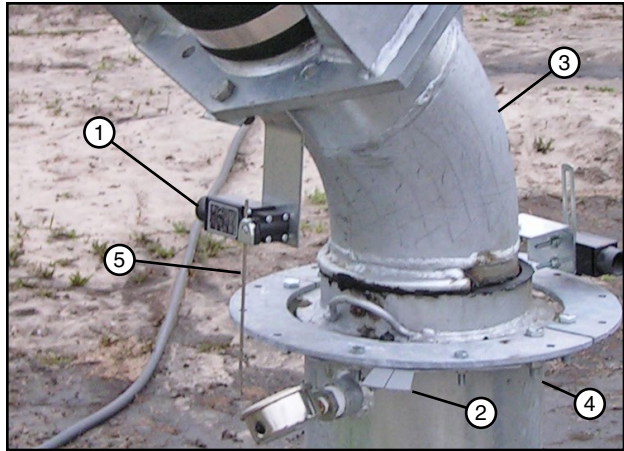


Figure 48-1 1. Stop In Slot Microswitch 4. Bearing Coupler
2. Stop In Slot Finger 5. Microswitch Rod
3. Pivot Swivel

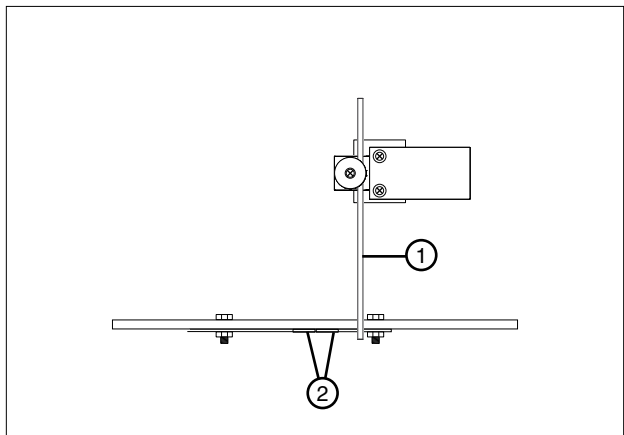


Figure 48-2 1. Stop-in-slot switch rod
2. Stop-in-slot fingers

Machine Alignment

The machine is initially aligned when it is installed. However, for various reasons it may become necessary to adjust the alignment.

⚠ WARNING

• **DO NOT ALIGN THE MACHINE WHEN THERE ARE ESTABLISHED WHEEL TRACKS. WHEEL TRACKS MUST BE REMOVED BEFORE ALIGNING THE MACHINE TO REDUCE THE POSSIBILITY OF STRUCTURAL DAMAGE.**

Alignment should be checked annually and adjusted before there are wheel tracks.

Alignment is an important factor in the operation of the machine. A misaligned machine develops very high stresses which could cause structural damage and reduce expected motor and gearbox life.

A leading bow creates extreme tension or linear pulling force over the entire machine. See figure 49-1.

A trailing bow creates extreme compressing or linear pushing force on the entire machine. When the spans are compressed, they lose their inherent strength. See figure 49-1.

⚠ WARNING

• **A TRAILING BOW IN EITHER DIRECTION IS NEVER ACCEPTABLE AND MAY RESULT IN SEVERE STRUCTURAL DAMAGE.**

NOTE

• **If the irrigation machine is operated in forward and reverse, a leading bow in one direction becomes a trailing bow in the other direction. Therefore, such a machine should be aligned to operate in as straight a line as possible.**

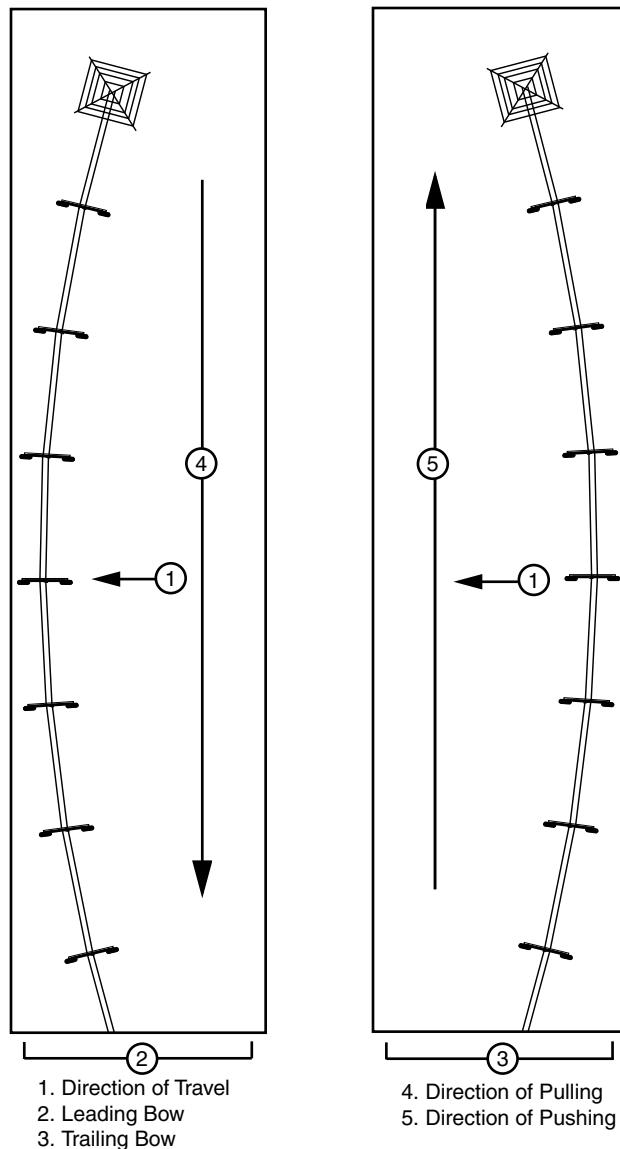


Figure 49-1

MAINTENANCE

Machine Alignment Tower Alignment - Three Tower Method

The three tower alignment method is used to identify towers that start or stop in a position that is either leading or trailing in relationship to the other two towers.

This procedure works best with two people:

- One person at tower 1 sighting the tower alignment.
 - One person at tower 2 adjusting the alignment.
1. At the control panel, set the percent timer at 50% and start the machine in either the forward or the reverse direction.
 2. Begin the alignment procedure from the end tower. Identify the first three towers as 1, 2, and 3. Use towers 1 and 3 to align tower 2. See figure 50-1.
 3. Sight an imaginary center line between the center of the tower drive motor 1 to the center of the tower drive motor 3. See figure 50-1.
 4. Observe the movement of the tower drive motor 2 it should start and stop equal distances from the imaginary center line. See figure 50-1.

If it does not, the alignment linkage at tower box 2 needs to be adjusted.

5. If adjustments are necessary, stop the machine and make adjustments Adjustment procedures, located in the Alignment Section of this manual.
6. After tower 2 is aligned, move in to the next tower and repeat steps 3, 4, and 5 of this procedure.

Continue this process to the pivot end of the machine.

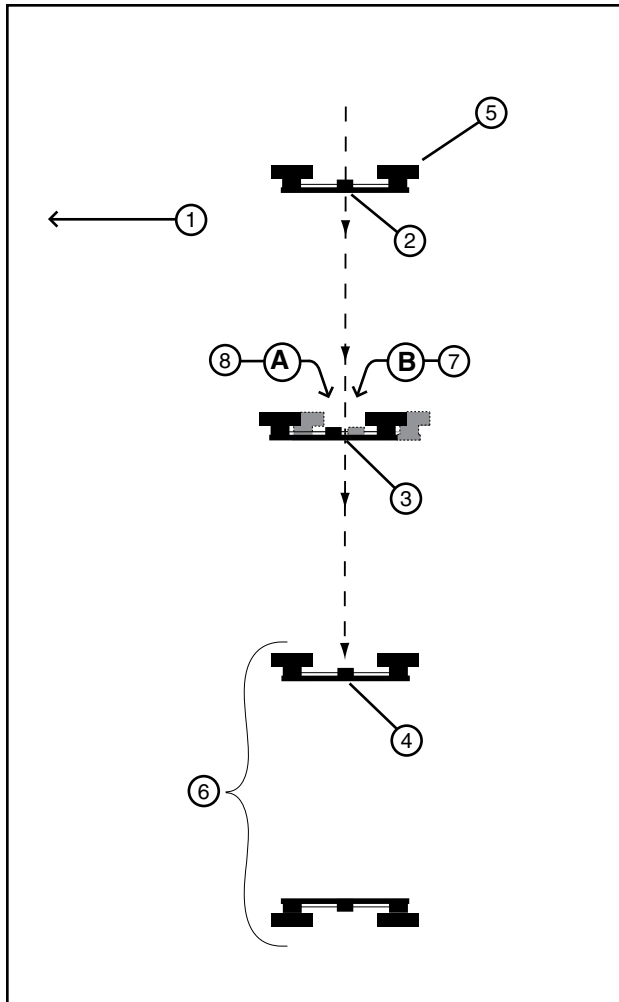


Figure 50-1 1. Direction of Travel 5. End Tower
2. Tower 1 6. Free Standing Span
3. Tower 2 7. Start
4. Tower 3 8. Stop

Machine Alignment

Standard Alignment Adjustment

1. Loosen the hardware securing control bar to the switch pivot arm. See figures 51-1 and 51-2.
2. Adjust the jam nuts clockwise or counter-clockwise no more than 1/4 of a turn at one time. See figures 51-1 and 51-2, and the adjustment chart figure 51-3.

CAUTION

- NEVER ADJUST THE JAM NUTS MORE THAN 1/4 OF A TURN AT ONE TIME.
- ALWAYS RE-TIGHTEN THE JAM NUTS AND ALLOW THE TOWER TO CYCLE TWICE (START AND STOP) TO DETERMINE IF THE TOWER IS STILL LEADING OR TRAILING.

3. Tighten Jam nuts.
4. Tighten hardware to secure control bar to switch pivot arm.

Allow tower to cycle (start and stop) twice to determine if the tower is still running ahead or behind. Adjust the jam nuts as needed until the tower is in alignment.

5. Continue the Three Tower Method of alignment down the entire length of the machine, make adjustments as necessary to individual towers.

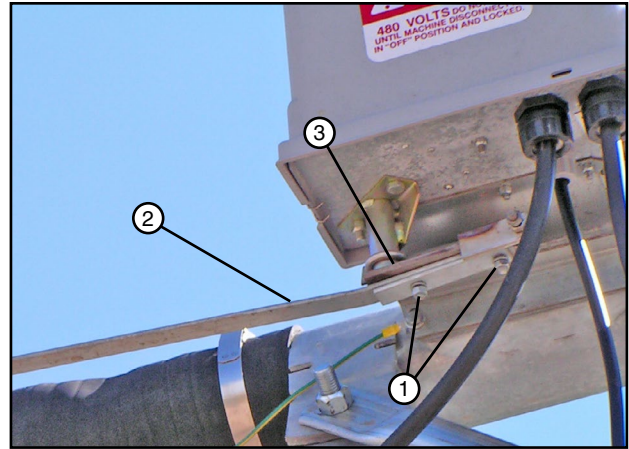


Figure 51-1 1. Hardware
2. Control Bar
3. Switch Pivot Arm

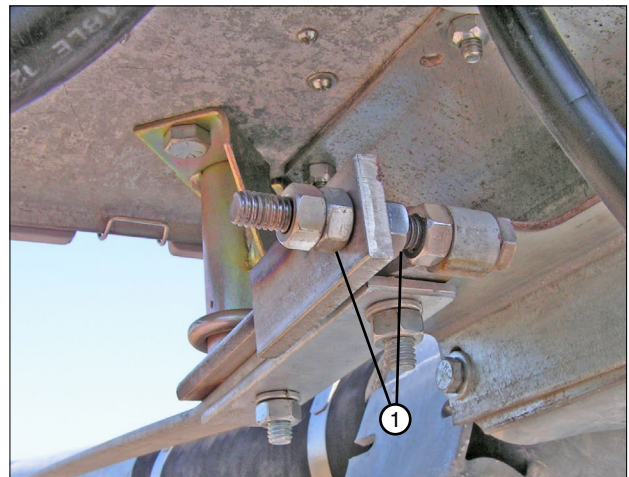


Figure 51-2 1. Jam Nut

ADJUSTMENT CHART

| Direction of travel | Condition | Adjust Nuts |
|---------------------|--------------|---------------------|
| Forward | Leading Bow | *Clockwise |
| | Trailing Bow | **Counter-clockwise |
| Reverse | Leading Bow | **Counter-clockwise |
| | Trailing Bow | *Clockwise |

Figure 51-3 * Clockwise - Adjust the nut further onto the threaded stud as if tightening it.

** Counter-clockwise - Back the nut off of the threaded stud as if loosening it.

MAINTENANCE

Span Flushing Procedure

The purpose of flushing the machine is to remove sand and debris from the pipeline. Excessive accumulation of sand in the machine also adds weight and can cause structural damage to the machine.

The Flushing Process Should Be Performed:

- After system installation.
- After pump repair.
- After structural repair.
- Seasonally - prior to operating the system and after the operating season is over.
- As often as necessary according to debris or sand content in water.

NOTE

- Excessive sprinkler problems (clogging) could be an indication of high debris or sand content.

DANGER

- DO NOT START THE FLUSHING PROCEDURE WHILE THE SYSTEM IS UNDER WATER PRESSURE. REMOVING SAND TRAP PLUGS WHILE THE SYSTEM IS UNDER PRESSURE MAY CAUSE PERSONAL INJURY OR DEATH.

1. Turn the main disconnect switch off. Only water is required for this procedure - the machine does not need to run.
2. Remove the pipe drains at each tower and clean sand and foreign particles from these drains. Turn the rubber drain seal over when reinstalling. See figure 52-1.

NOTE

- The rubber drain seals should be turned over when being reinstalled. This practice helps to increase the seal life.

3. Remove and clean the sand trap at the last regular drive unit. See figure 52-2.

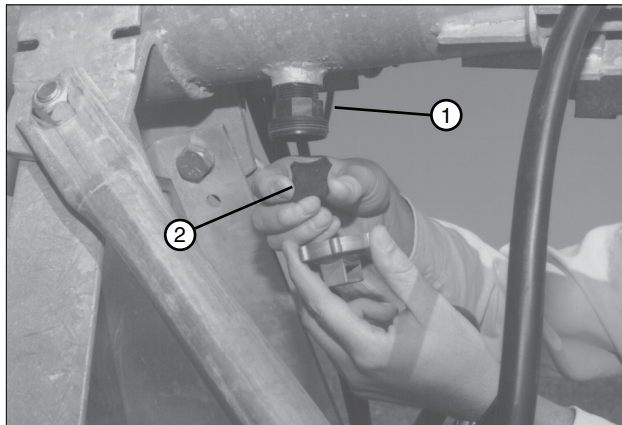


Figure 52-1 1. Pipe Drain
2. Rubber Seal

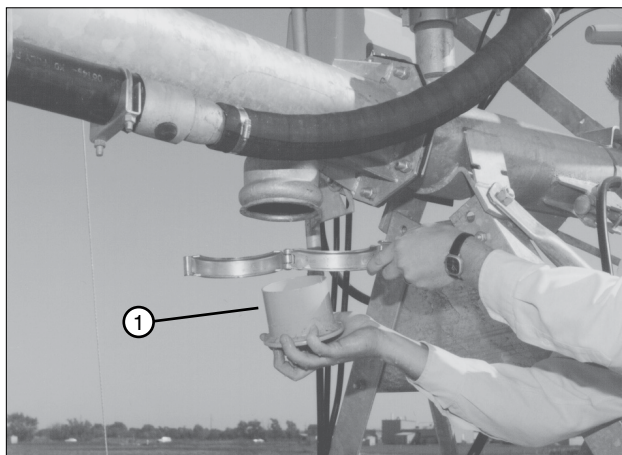


Figure 52-2 1. Sand Trap

MAINTENANCE

Span Flushing Procedure

4. Remove plugs from the overhang drain. See figure 53-1.
5. Start the pump and allow the machine to flush thoroughly.
6. Turn off the water supply and install the pipe drains, sand trap, and overhang plugs.
7. If the machine is equipped with an end gun:
 - Make sure the booster pump hose drain is not plugged with sand. See figure 53-2.
 - Clean the end gun shut off solenoid valve cross filter or optional dirty water filter. See figures 53-3 and 53-4.

NOTE

•After flushing for winterization, ensure the water has been allowed to drain completely before replacing the pipe drains and plugs to prevent freezing and splitting of the pipeline.



Figure 53-1 1. Overhang Drain

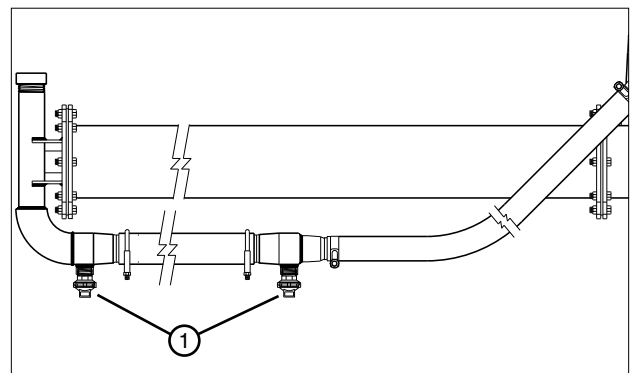


Figure 53-2 1. Booster Pump Hose Drain

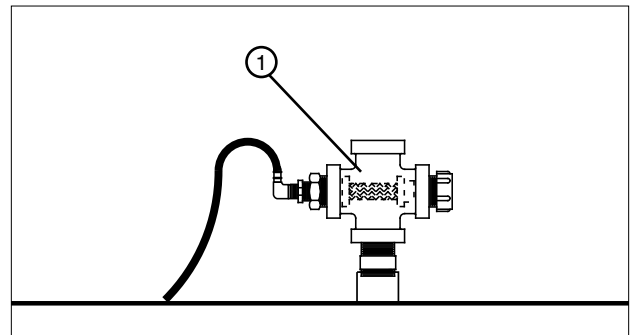


Figure 53-3 1. Cross Filter

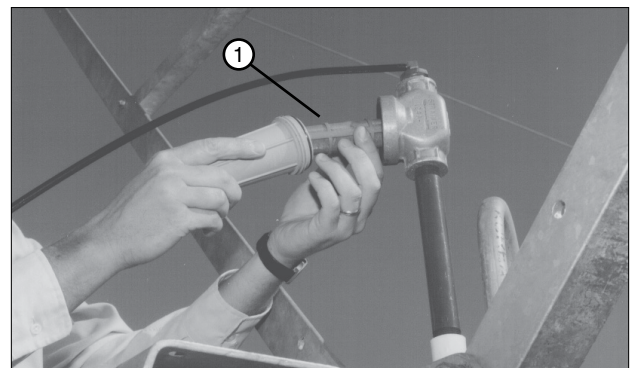


Figure 53-4 1. Optional Dirty Water Filter

MAINTENANCE

Winterization

In regions where the temperature during the winter months will drop below 40°F (4°C) and/or the growing season is 6 months or less, the irrigation machine must be winterized.

- Flush and drain the irrigation machine and all plumbing components as specified in the flushing procedure section. After flushing for winterization, ensure the water has been allowed to drain completely from all drains and plumbing components before replacing drains and plugs to prevent freezing and splitting of the pipeline.
- All underground pipe **MUST** be drained below the frost line. When drainage is complete, re-install all plugs to prevent rodent infestation.
- Perform all post-season maintenance as specified in the recommended maintenance section.
- Winterize auxiliary equipment such as pumps, power units, mainline pipes and hoses according to the auxiliary equipment manufacturers recommendations.
- Ensure the main pipeline is completely drained and replace all of the drains. Any low spot in the mainline which is buried above the frost line between the pump and the pivot should have a riser installed at the low point to provide access for pumping water from the line.

Parking the Machine

The metal in the irrigation machine will expand and contract with variances in temperature. When the machine is being operated, this poses no threat. However, if the machine is parked in the wheel tracks which were created during the year, shrinking due to the contraction of the metal could cause structural damage.

The possibility of structural damage due to metal contraction increases as the machine length increases. Long machines are more susceptible to these stresses, especially where extreme temperature variances occur (90°F (32°C) down to -0°F (-17°C)) and when wheel tracks are present.

To reduce the possibility of structural damage due to expansion and contraction of the metal, the operator should consider one of the following methods when parking the machine in the off season:

1. Park the machine in an area where the wheel tracks have been eliminated.
2. Place wooden 2 in x 12 in planks over the wheel tracks. Park the machine with the tires on the center of the planks.
3. Towable Drive Units – Place every third drive unit's wheels in the tow position.
4. Remove all wheel tracks and run the machine dry (without water) for approximately 100 yards (92 m) to 200 yards (183 m) monthly. Only run the pivot if the temperature is above 40°F (4°C).

Contact your Valley dealer for other winter storage/parking information and tips.

MAINTENANCE

Regular Maintenance

Time, humidity, vibration, temperature, sand, and machine operation all contribute to wear on your VALLEY irrigation machine. To keep the machine operating properly with a minimum amount of down time, establish a regular preventative maintenance program using the recommended maintenance charts in this section. If replacement parts are needed, use only genuine Valley Real Parts.

| Pivot | | | | | | |
|--|------------|----------|----------|------------|-------------|---|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check all nuts and bolts. Tighten as required. | X | | | X | | |
| Check equipment grounding conductors. Tighten or clean as required. | X | | | X | | If your pivot is towable, check the grounding conductor hook-ups prior to start up each time the pivot is towed. |
| Grease pivot swivel. | X | | X | X | | |
| Check condition of power and pump shutdown wires. | X | | | X | | For your safety, call your local Valley dealer for immediate replacement or repair of any broken conduit or wire with cracked insulation. |
| Check collector ring base drain for proper drainage. | X | | | X | X | |
| Visually check pivot contactors for arcing. Insure disconnect is in the OFF position. | X | | | X | | Burned or pitted contact points indicate low voltage. Check generator belts for proper tension. |
| Drain riser assembly. | X | | | | X | |
| Check placement of screens on the generator, pump panel, and electric motors (used to prevent rodent damage) | X | | | X | X | |
| Check tire pressure. | X | | | X | X | Check at least one time during the operating season. |
| Check condition of electrical conductor. | X | | | X | X | Replace if frayed, worn, or weather checked. |

| Span | | | | | | |
|--|------------|----------|----------|------------|-------------|--|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check all nuts and bolts. Tighten as required. | X | | | X | | |
| Check flanges for leaks and tighten as required. | X | | | X | | |
| Check pipe drains for proper drainage and invert the seal when applicable. Clean as required. See Winterization procedure. | X | | | X | X | |
| Check structural components for tightness. | X | | | X | | |
| Check span cable for damage. | X | | | X | | Replace or repair cable if chaffed or weather checked. |
| Check span cable for proper banding. | X | | | X | | Replace bands and adjust span cable as required. |

MAINTENANCE

Regular Maintenance

| Overhang/End Gun/Booster Pump | | | | | | |
|--|------------|----------|----------|------------|-------------|--|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check overhang cables for broken cable strands. | X | | | X | | Replace if cables are damaged. |
| Clean and ensure operation of the end gun drain. | X | | | X | X | Clean as required. |
| Check and clean the sand trap. | | | | X | X | As needed. See Winterization in the Maintenance section. |
| Check the end gun arc settings. | X | | | X | | Refer to the sprinkler chart. |
| Check the end gun bearing and brake. | X | | | X | | |
| Check the end gun nozzle for wear. | X | | | | | |
| Drain the booster pump and ensure that the booster pump is drained completely. | | | | | X | See Winterization in the Maintenance section. |

| Drive Unit | | | | | | |
|--|------------|----------|----------|------------|-------------|--|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check the flex joint hose for leaks. | X | | | X | | Tighten clamps or replace as required. |
| Check the motor lead cable for damage. | X | | | X | | Contact your local Valley dealer if the outer insulating sheath is cracked. |
| Check for proper ground connection on motor and motor lead. | X | | | X | | |
| Check the motor drain hole for proper drainage. | X | | | X | | |
| Check and change the center drive gearbox lubricant. Drain moisture. | X | | | | X | See the Center Drive Gearbox in the Maintenance section. |
| Check the center drive gearbox seals and gaskets. | X | | | | | |
| Check the wheel gearbox lubricant level and drain moisture. | X | | | | X | See the Wheel Gearboxes in the Maintenance section. |
| Change the wheel gearbox lubricant. | X | | | | | Change after the first season and then change every third season thereafter. |
| Check the drive shaft U-joints. Check the U-joint and drive shaft covers for damage. | X | | | | | Replace covers as required |
| Check the wheel lug nut torque. Tighten to 125 ft. lb. (169 N-m) torque. | X | | | | X | |
| Check the tire pressure. | X | | | X | X | See the Tire Pressure Chart in the Maintenance section. |
| Check the ARAS/EOFS arms for proper operation. | X | | | X | | |
| Clean gearbox ventilation hole in expansion chamber (3 times a year). | X | | | X | X | Ventilation holes must be kept open to extend the gearbox seal life. |
| Grease the towable hubs. | X | | | X | X | See Towable Hub Lubrication in the Maintenance section. |

MAINTENANCE

Regular Maintenance





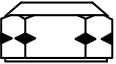
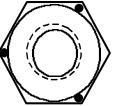
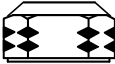
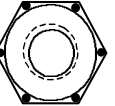
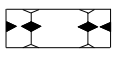
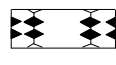
| Sprinkler | | | | | | |
|--|------------|----------|----------|------------|-------------|--|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check the water pressure to make sure it matches the sprinkler package pressure. | X | | X | X | | Notify your local Valley dealer of any changes. |
| Check sprinklers and nozzles for tightness. | X | | | X | | |
| Check sprinkler for free movement. | X | | | X | | |
| Check sprinkler nozzles for wear. | X | | X | X | | |
| Check pressure gauge or pressure transducer for proper operation. | X | | | X | | |
| Check for plugged or partially plugged nozzles. | X | X | X | X | | Clean as required. |
| Flush entire machine. | X | | | | X | See the Span Flushing Procedure and Winterization in the Maintenance section |
| Check end gun bearing and brake setting. | X | | | | X | |
| Ensure the booster pump hose is drained. | | | | | X | |

| Alignment | | | | | | |
|---|------------|----------|----------|------------|-------------|---|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Check all nuts and bolts. Tighten as required. | X | | | X | | |
| Check connection of grounding bond jumpers. | X | | | X | | |
| Visually check for contactor wear and/or pitting. Make sure the power is OFF. | | | | | | Pitted or burned contact points indicate low voltage. |
| Visually check the surge suppressor connection. | X | | | | | |
| Align the pivot and check all safety switches. | | | | | | As needed. Call your local Valley dealer. |
| Check for proper safety microswitch position. | | | | | | As needed. Call your local Valley dealer. |

| Ancillary Equipment | | | | | | |
|---|------------|----------|----------|------------|-------------|---|
| | Pre season | 1st Pass | 4th Pass | Mid season | Post season | Remarks |
| Perform all maintenance as required or recommended by the ancillary equipment manufacturer. | X | | | X | X | Refer to the ancillary equipment owner's manual or manufacturer for required or recommended maintenance and service intervals |

MAINTENANCE

Regular Maintenance

| Hardware Identification - SAE Grade - Inch Size | | | | | | | |
|---|---|---|---|---|--|---|---|
| CAP SCREW | | NUT | | LOCKNUT | | | |
| GRADE 5 | GRADE 8 | GRADE 5 | GRADE 8 | GRADE B | | GRADE C | |
|  |  |  |  |  |  |  |  |
| | | * Vendor's Mark | | Use With Grade 5 Screw | | Use With Grade 8 Screw | |
| | |  |  | | | | |

| Torque Chart - UNC Hex Head Cap Screws | | | | | | | | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| SIZE INCH | GRADE 5 | | | | GRADE 8 | | | |
| | TORQUE DRY | ACCEPTABLE RANGE | TORQUE DRY | ACCEPTABLE RANGE | TORQUE DRY | ACCEPTABLE RANGE | TORQUE DRY | ACCEPTABLE RANGE |
| | lb-ft | lb-ft | N·m | N·m | lb-ft | lb-ft | N·m | N·m |
| 1/4 | 9 | 8-9 | 12 | 11-12 | 12 | 11-13 | 16 | 15-17 |
| 5/16 | 18 | 16-19 | 24 | 22-25 | 25 | 22-27 | 34 | 30-36 |
| 3/8 | 31 | 28-33 | 42 | 38-44 | 43 | 39-47 | 58 | 53-64 |
| 7/16 | 49 | 44-53 | 66 | 60-71 | 69 | 63-75 | 94 | 85-101 |
| 1/2 | 75 | 68-81 | 102 | 92-109 | 106 | 96-115 | 144 | 130-156 |
| 9/16 | 108 | 98-117 | 146 | 133-158 | 152 | 139-166 | 206 | 188-225 |
| 5/8 | 149 | 135-162 | 202 | 183-219 | 210 | 191-229 | 285 | 259-310 |
| 3/4 | 264 | 240-297 | 358 | 325-402 | 372 | 338-406 | 504 | 458-550 |
| 7/8 | 426 | 387-464 | 577 | 525-629 | 601 | 546-655 | 815 | 740-888 |
| 1 | 637 | 579-695 | 863 | 785-942 | 900 | 818-982 | 1220 | 1109-1331 |

| Special Torque Applications | | | | |
|-----------------------------|---------|--------|---------|--------|
| SPANS & DRIVE UNITS | GRADE 5 | | GRADE 8 | |
| | lb-ft | N·m | lb-ft | N·m |
| Hitch ball bolts* | 750 | 1016.8 | 1050 | 1423.6 |
| Wheel lug nuts | 125 | 169.4 | | |
| Gear Box mounting bolts | 75 | 101.6 | | |

***DO NOT reuse this hardware after removal. Always replace hardware that has been removed with new hardware of the correct grade and size.**

MAINTENANCE

Regular Maintenance

Pivot Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|--|------|----------------------------|
| Check all nuts and bolts. Tighten as required. | | |
| | | |
| | | |
| Check equipment grounding. Tighten or clean as required. | | |
| | | |
| | | |
| Grease pivot swivel | | |
| | | |
| | | |
| Check condition of power and pump shutdown wires. | | |
| | | |
| | | |
| Check collector ring base drain for proper drainage. | | |
| | | |
| | | |
| Visually check pivot contactors for arcing. | | |
| | | |
| | | |
| Drain riser assembly. | | |
| | | |
| | | |
| Check placement of screens on generator, pump panel, and electric motors (used to prevent rodent damage). | | |
| | | |
| | | |
| Check the air pressure in the tires. | | |
| | | |
| | | |

MAINTENANCE

Regular Maintenance

Span Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|--|------|----------------------------|
| Check flanges for leaks and tighten as necessary. | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Check pipe drains for proper drainage and invert the seal when applicable (see Winterization). | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Check structural components for tightness. | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Check power cable for damage and proper banding to ensure proper attachment. | | |
| | | |
| | | |
| | | |
| | | |
| | | |

MAINTENANCE

Regular Maintenance

Sprinkler Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|--|------|----------------------------|
| Check the pivot pressure to make sure it matches the sprinkler package pressure. | | |
| | | |
| | | |
| Check sprinklers and nozzles for tightness. | | |
| | | |
| | | |
| Check sprinkler for free movement. | | |
| | | |
| | | |
| Check sprinkler nozzles for wear. | | |
| | | |
| | | |
| Check pressure gauge or pressure transducer for proper operation. | | |
| | | |
| | | |
| Check for plugged or partially plugged nozzles. | | |
| | | |
| | | |
| Flush the entire machine. | | |
| | | |
| | | |
| Check end gun bearing and brake setting. | | |
| | | |
| | | |
| Ensure the booster pump hose is drained. | | |
| | | |
| | | |

MAINTENANCE

Regular Maintenance

Alignment Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|---|------|----------------------------|
| Check all nuts and bolts. Tighten as required. | | |
| | | |
| | | |
| | | |
| Check connection of grounding. | | |
| | | |
| | | |
| | | |
| Visually check for contactor wear and/or pitting. Make sure the power is OFF. | | |
| | | |
| | | |
| | | |
| Visually check suppressor connection. | | |
| | | |
| | | |
| | | |
| Align machine and check all safety switches. | | |
| | | |
| | | |
| | | |
| Check for proper safety microswitch position. | | |
| | | |
| | | |
| | | |

MAINTENANCE

Regular Maintenance

Overhang/End Gun/Booster Pump Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|---|------|----------------------------|
| Check overhang cables for broken cable strands. | | |
| | | |
| | | |
| | | |
| Check and ensure operation of the end gun drain. | | |
| | | |
| | | |
| | | |
| Check and clean the sand trap. | | |
| | | |
| | | |
| | | |
| Check end gun arc settings. | | |
| | | |
| | | |
| | | |
| Check end gun bearing and brake. | | |
| | | |
| | | |
| | | |
| Check end gun nozzle for wear. | | |
| | | |
| | | |
| | | |
| Drain booster pump and ensure booster pump is completely drained. | | |
| | | |
| | | |
| | | |

MAINTENANCE

Regular Maintenance

Drive Unit Annual Maintenance Log

| | YEAR | Date(s) Performed/Comments |
|--|------|----------------------------|
| Check flex joint boot for leaks and tighten bands as required. | | |
| | | |
| | | |
| Check motor lead cable for damage. | | |
| | | |
| | | |
| Check for proper ground connection on motor and motor lead. | | |
| | | |
| | | |
| Check motor drain hole for proper drainage. | | |
| | | |
| | | |
| Drain and replace gear motor lubricant. | | |
| | | |
| | | |
| Check/change gearbox lubricant. | | |
| | | |
| | | |
| Check gear motor seals and gaskets. | | |
| | | |
| | | |
| Check drive shaft U-joints and U-joint covers. | | |
| | | |
| | | |
| Check gearbox seals and gaskets. | | |
| | | |
| | | |
| Check and tighten wheel lug bolts (125 lb-ft torque). | | |
| | | |
| | | |
| Check tire pressure. | | |
| | | |
| | | |
| Clean gearbox ventilation hole expansion chamber (3 times/year). | | |
| | | |
| | | |
| Grease towable hubs. | | |
| | | |
| | | |

DANGER

- THE CONTROL PANEL CONTAINS HIGH VOLTAGE! 480 VOLTS CAN KILL.
- ALWAYS DISCONNECT ELECTRICAL POWER BEFORE SERVICING OR PERFORMING MAINTENANCE TO THE MACHINE.
- TESTING AND TROUBLESHOOTING SHOULD BE PERFORMED ONLY BY AN AUTHORIZED VALLEY DEALER.
- ALWAYS REPLACE ANY GUARDS OR SHIELDS THAT ARE REMOVED FOR PERFORMING MAINTENANCE.

Disconnect All Power

Before performing service or maintenance on any part of the machine, follow the MINIMAL LOCKOUT/TAGOUT PROCEDURE located in the SAFETY section of this manual and do the following:

1. SHUT OFF and LOCK the public power service disconnect to the irrigation machine. See figure 65-1.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 65-1.

2. SHUT OFF and lock the control panel main power disconnect. See figure 65-2.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 65-2.

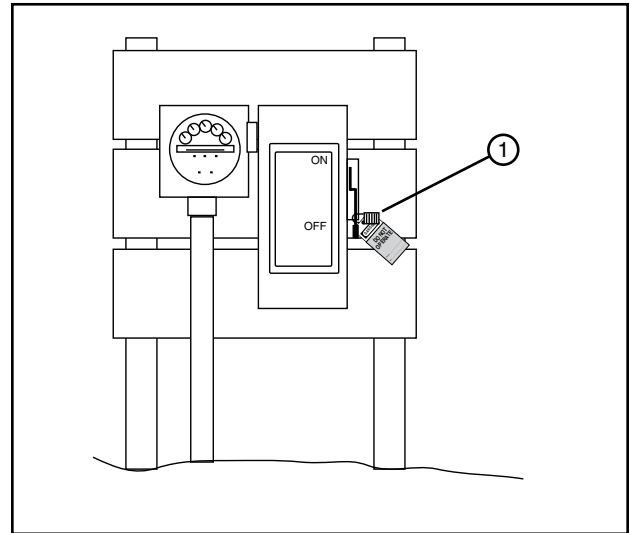


Figure 65-1 1. Public Power Service Disconnect

DANGER

- BE AWARE OF HIGH WATER PRESSURE. TURN OFF THE PUMP AND ALLOW THE MACHINE TO DRAIN COMPLETELY BEFORE REPAIRING OR PERFORMING MAINTENANCE TO THE MACHINE.

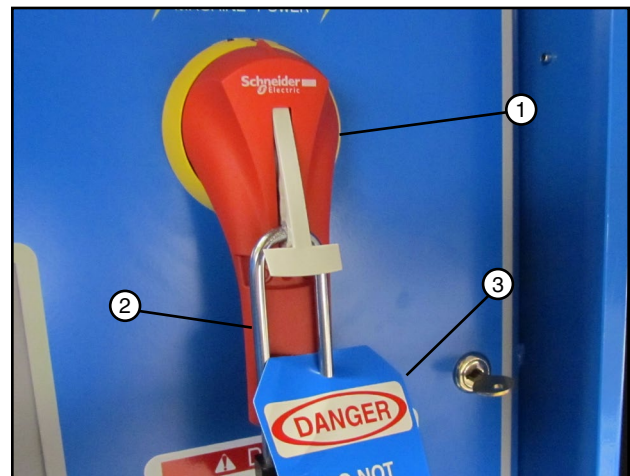
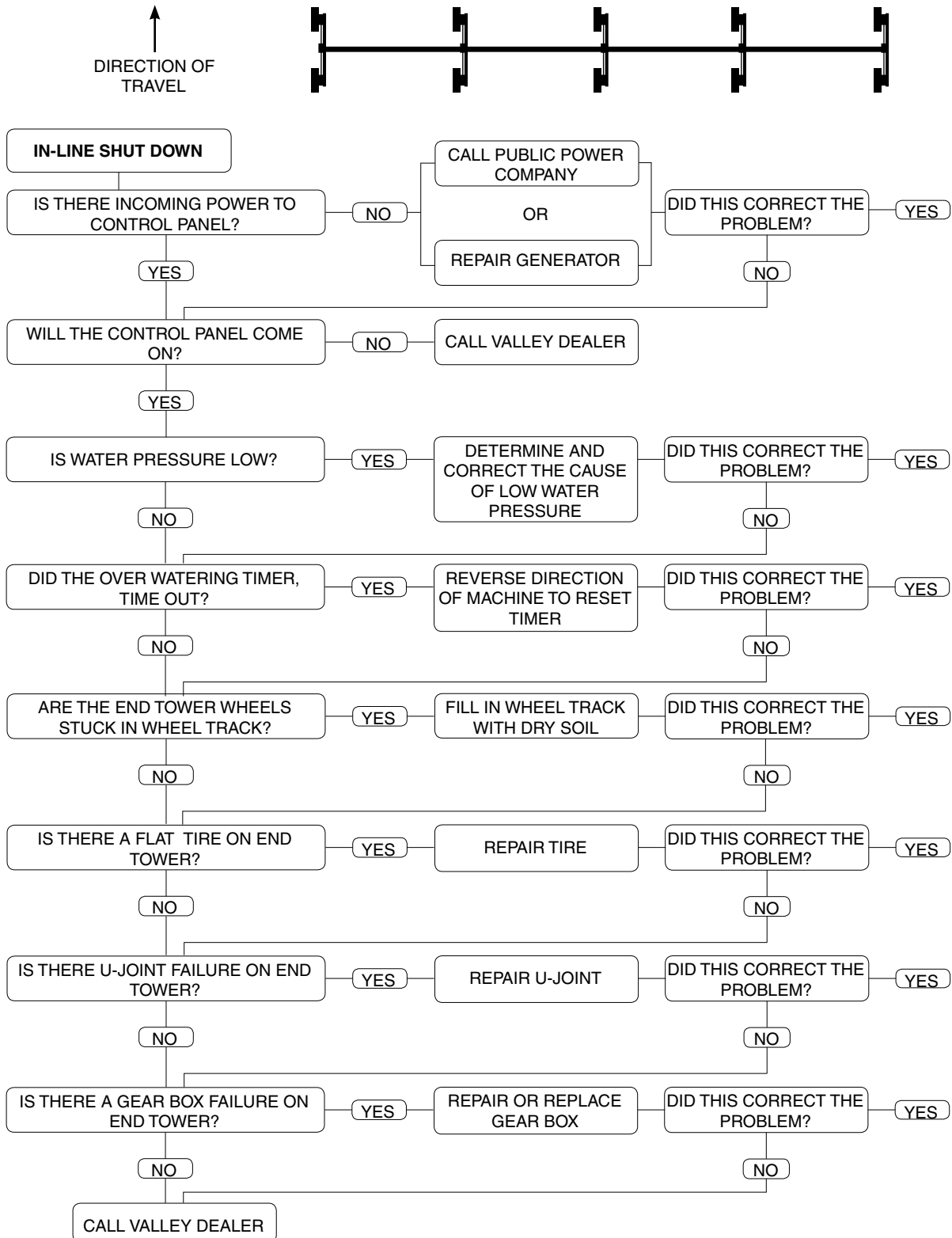


Figure 65-2 1. Main Disconnect
2. Lock
3. Blue Tag

TROUBLESHOOTING

In-Line Shut Down

In-line shut downs typically occur because of a failure in one or more of the following areas: power source, machine controls, or end tower. Use the flow chart below to determine if the in-line shut down was due to a mechanical failure. Refer to the control panel Owners Manual for other TROUBLESHOOTING information.



TROUBLESHOOTING

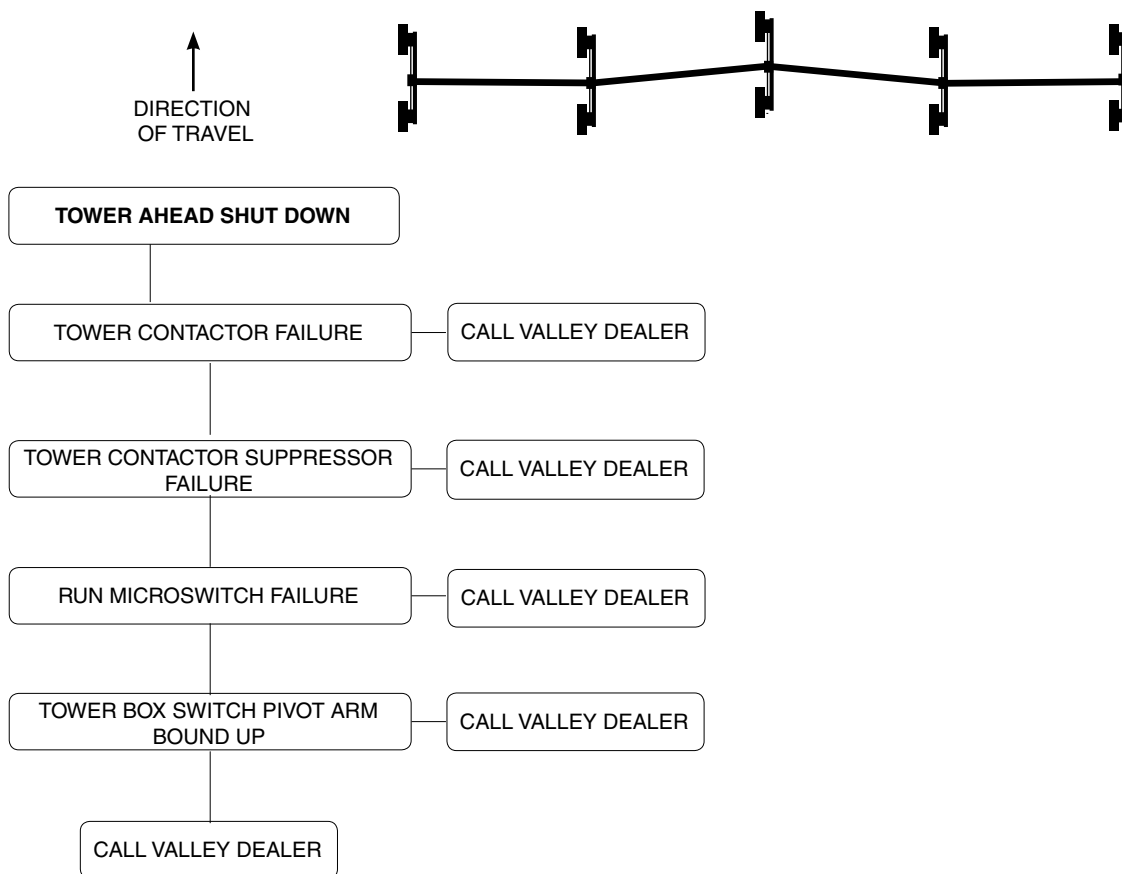
Tower Ahead Shut Down

In a tower ahead shut down, the tower which is out of line and the farthest ahead fails to shut off and breaks the safety circuit.

WARNING

- **TO REDUCE THE POSSIBILITY OF STRUCTURAL DAMAGE, NEVER REVERSE THE DIRECTION OF TRAVEL AFTER A TOWER AHEAD SHUT DOWN. AFTER MACHINE IS REPAIRED, ALWAYS OPERATE IN THE SAME DIRECTION OF TRAVEL AS BEFORE THE SHUT DOWN. WHEN THE MACHINE COMES BACK INTO ALIGNMENT THE DIRECTION CAN BE CHANGED.**

Tower ahead shut downs typically occur because of a component failure in the tower box. Some causes of tower ahead shut downs are shown below. Call your Valley Dealer to diagnose and repair a tower ahead shut down. Refer to the control panel Owners Manual for other TROUBLESHOOTING information.



TROUBLESHOOTING

Tower Behind Shut Down

In a tower behind shut down, the tower which is out of line and the farthest behind, fails to run and breaks the safety circuit.

WARNING

•TO REDUCE THE POSSIBILITY OF STRUCTURAL DAMAGE, NEVER OPERATE THE MACHINE IN THE SAME DIRECTION OF TRAVEL AS THE MACHINE WAS OPERATING WHEN THE SHUT DOWN OCCURRED. AFTER MACHINE IS REPAIRED, ALWAYS OPERATE IN THE OPPOSITE DIRECTION OF TRAVEL AS THE MACHINE WAS OPERATING BEFORE THE SHUT DOWN. WHEN THE MACHINE COMES BACK INTO ALIGNMENT THE DIRECTION CAN BE CHANGED.

Tower behind shut downs typically occur because of a failure in one or more of the following areas; tower box, drive train or machine alignment. Use the flow chart below to determine if the cause of shut down is mechanical. Refer to the control panel Owners Manual for other TROUBLESHOOTING information.

