Precision Corner
Owner's Manual

0996070_G

www.valleyirrigation.com

Table of Contents

Table of Contents

Table of Contents

Table of Contents

EC Declaration of Conformity

CE

We: **Valmont Industries, Inc.**
28800 Ida Street
Valley, NE 68064
+1 402.359.6312
+1 402.359.6143 (Facsimile)

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 2014/35/EU
Electromagnetic Compatibility Directive 2014/30/EU

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.”

Person Authorized to Compile the Technical File in Europe:
Relevant information will be transmitted via email
in response to a reasoned request by national authorities

Ruediger Claas
Valmont Industries Inc.
Nordring 4
45894 Gelsenkirchen
Germany
+49(151)16716790

Ron Pollak
Senior Electrical Engineer
Valmont Industries, Inc.

Date of Issue: December 17, 2018
Place of Issue: Valley, NE 68064

Electrical Safety Statement

About This Manual

Information contained in this manual applies to the Valley Precision Corner.

All information, specifications, descriptions and illustrative material contained in this manual were based on information available at the time this publication was approved for printing.

Valmont Industries Inc. reserves the right to change specification or design 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 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.

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.
30 in (760 mm) MINIMUM OR WIDTH OF ENCLOSURE, WHICH EVER IS GREATER	78 in (1980 mm) MINIMUM OR HEIGHT OF ENCLOSURE, WHICH EVER IS GREATER	36 in (915 mm) MINIMUM	42 in (1065 mm) MINIMUM	48 in (1220 mm) 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.

Irrigation Equipment near Airports and Crop Dusting Aircraft

- If any part of the irrigation machine comes within 3200 ft (975 m) of an airport runway, especially the approach (ends) of the runway, additional warning markers may be required. In the United States, CFR Title 14, Chapter I, Subchapter E, Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace describes when marking is needed.

  This document is available at: www.ecfr.gov

- Marking requirements vary depending on the location of the irrigation equipment relative to the runway, the type of airport (Civil, Military, or Heliport) and other factors. Contact the local airport authority for guidance and specific recommendations. In the United States, guidelines for marking structures near airports are published by the Federal Aviation Administration in Advisory Circular AC 70/7460-1L – Obstruction Marking and Lighting.

  Available here: www.faa.gov/regulations_policies/advisory_circulars

- For irrigation machines near private or unregulated airfields, including farm-based airstrips, Valley strongly recommends complying with the same standards and requirements as Civil airports as shown in Part 77.

- Regulations vary by country, contact your local aviation authority for guidance.

  Overhang cables, including overhang back cables are a particular danger. In locations where low-flying aircraft are likely, such as within 1,500 ft (457 m) of an end of an airport runway, or where crop dusting aircraft are common, Valley recommends adding obstruction markers to overhang cables to improve their visibility.

  For large overhangs (36 ft / 10.97 m Heavy Duty and longer), five 12 in (300 mm) or 20 in (500 mm), aviation orange marker balls are sufficient. One near the rabbit ears, two in the middle of the back cables and two in the middle of the highest overhang cables. Refer to Section 3.5 in AC70/7460-1 for additional details. Aviation marker balls are available online and from a variety of aviation and airport safety equipment providers.

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 flywheels, 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. Refer to Figure 15-1.

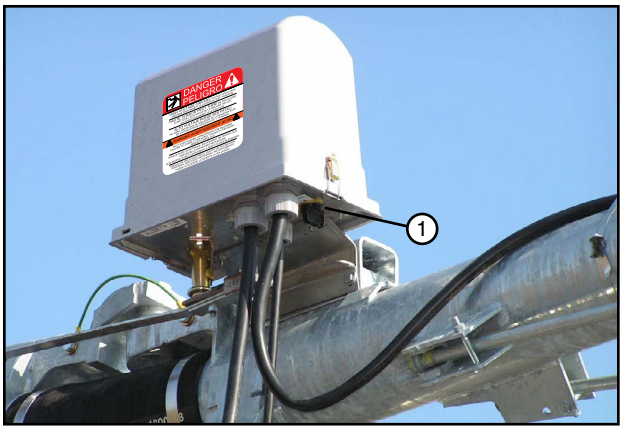


Figure 15-1 1. Disconnect Switch

⚠ 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. Refer to Figure 15-2.

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.

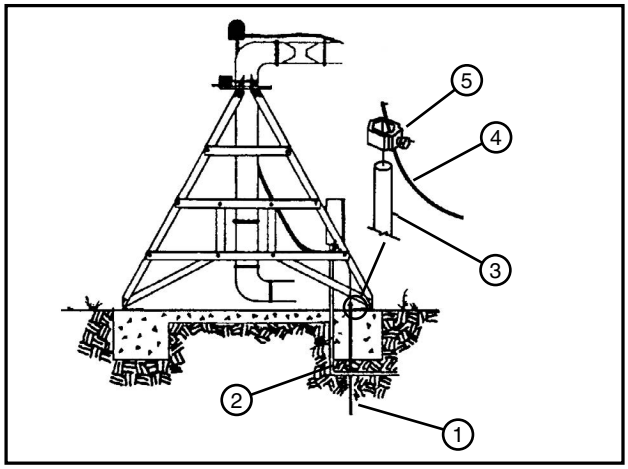


Figure 15-2 1. Ground Rod Installation 2. Service Conductor 3. Copper Ground Rod 4. Copper Ground Wire 5. Clamp

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.**
- **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.**

Operate Safely (Continued)

⚠ 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. Refer to Figure 16-1.

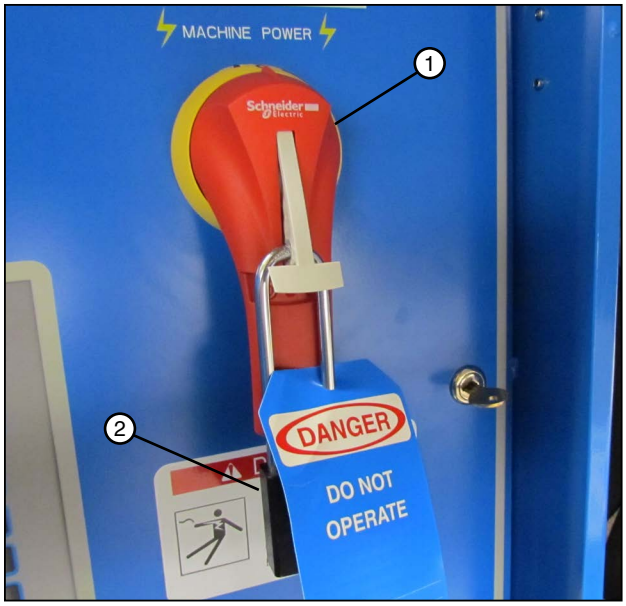


Figure 16-1 1. Main Power Disconnect
2. Lock

The blue (OSHA safety color code) tag shown below should also be filled out and attached to the disconnect after locking. Refer to Figure 16-2.

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

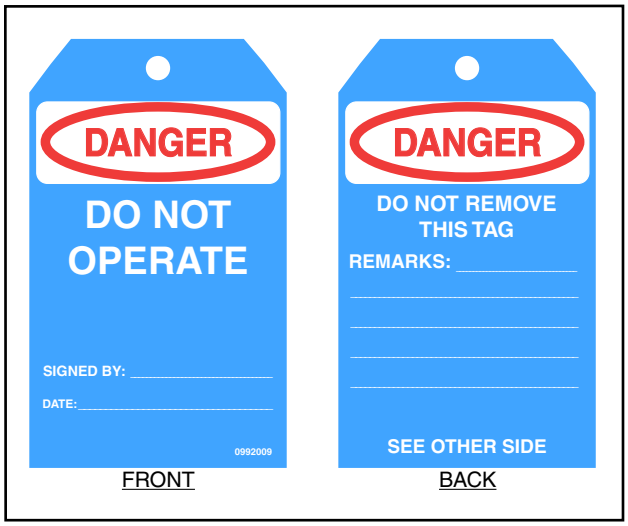


Figure 16-2

⚠ 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.

Operate Safely (Continued)

⚠ 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!

⚠ 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 SHALT 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.**

Operate Safely (Continued)

⚠ 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.

⚠ CAUTION

KEEP CHILDREN AWAY

Pivots 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 should be 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. Refer to Figure 18-1.

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

Figure 18-1 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.

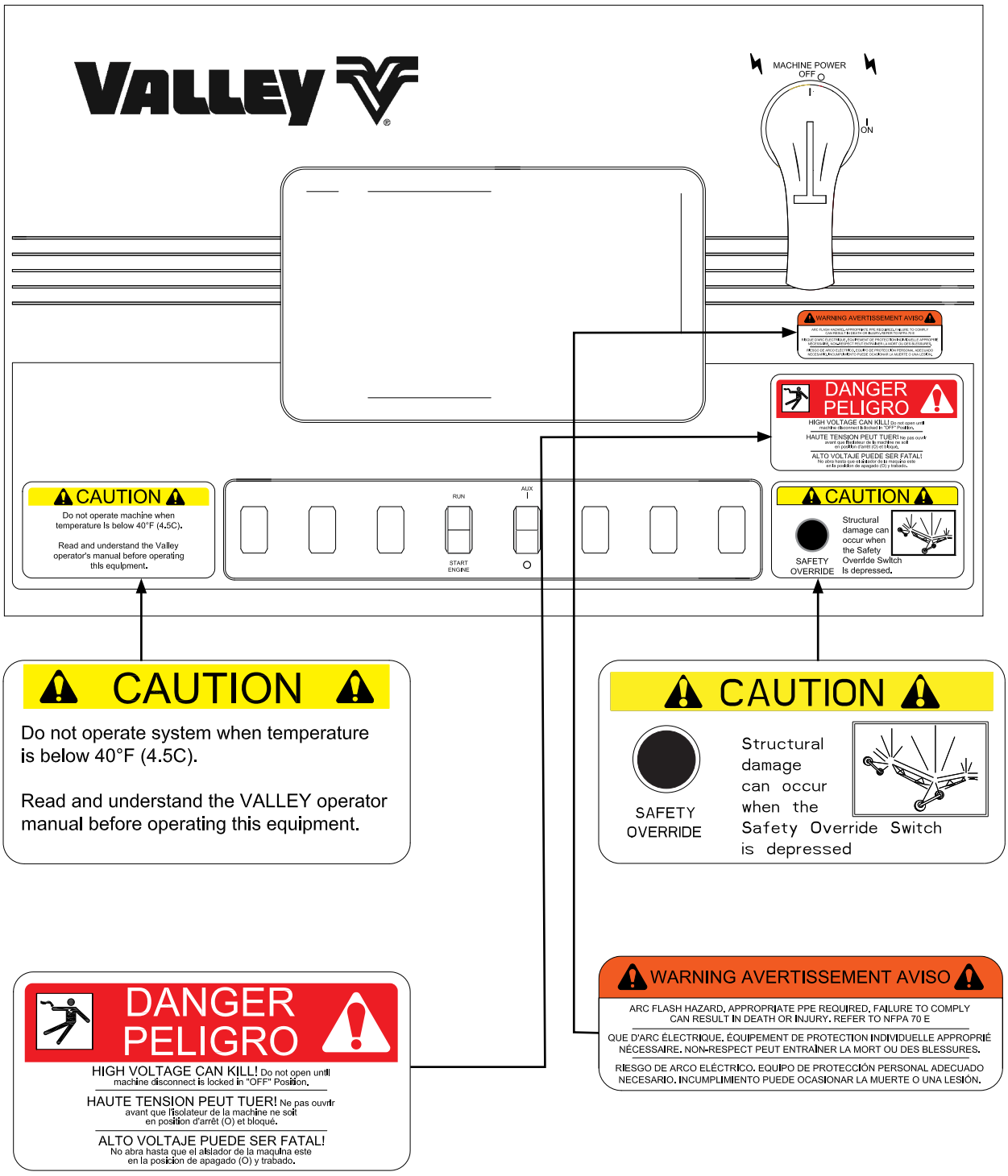
The operator MUST inspect the entire machine between each safety override start attempt.

Repeated safety override start attempts can cause severe structural damage.

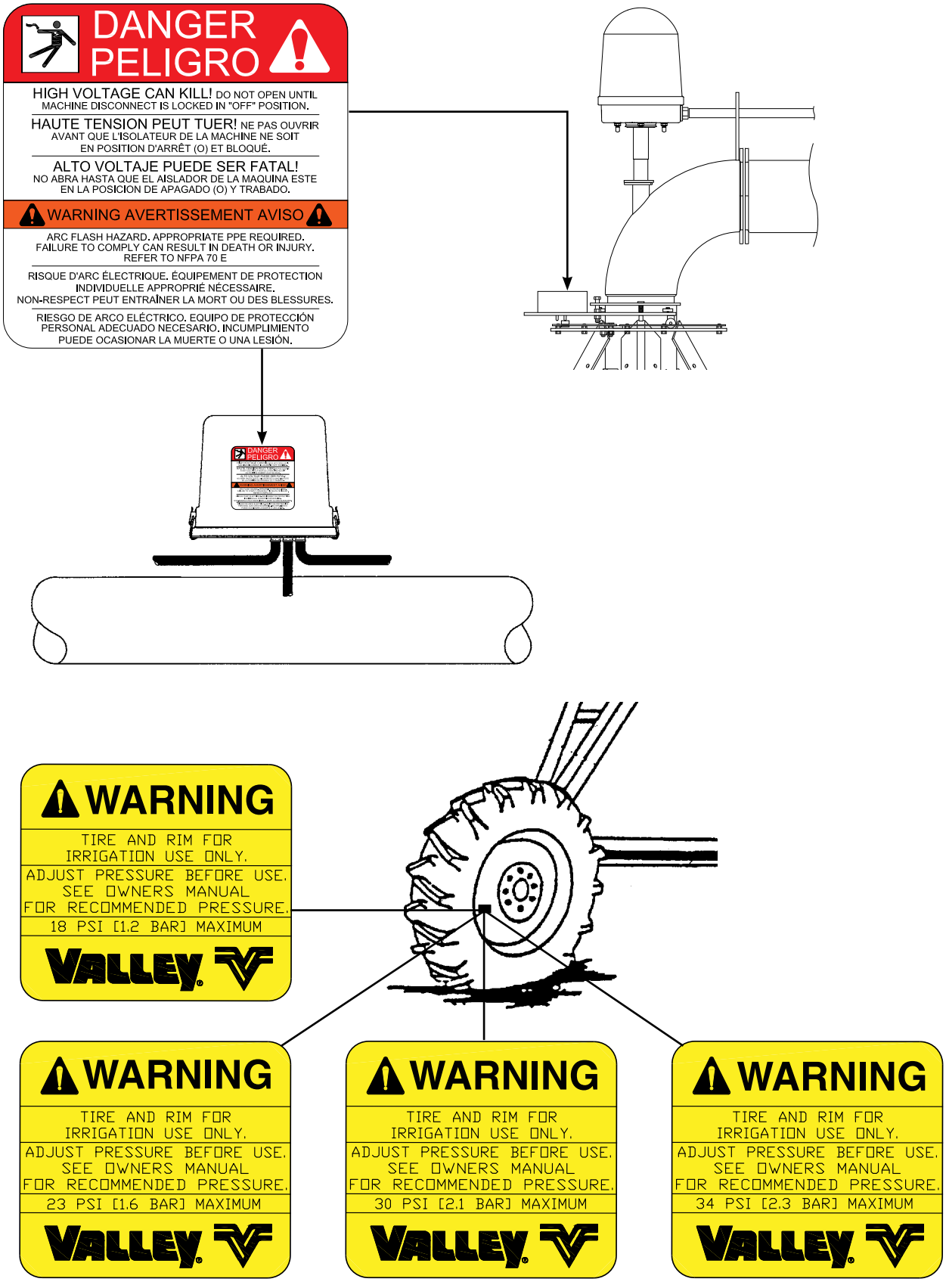
Call your Valley dealer if the machine fails to start.

Safety Decals

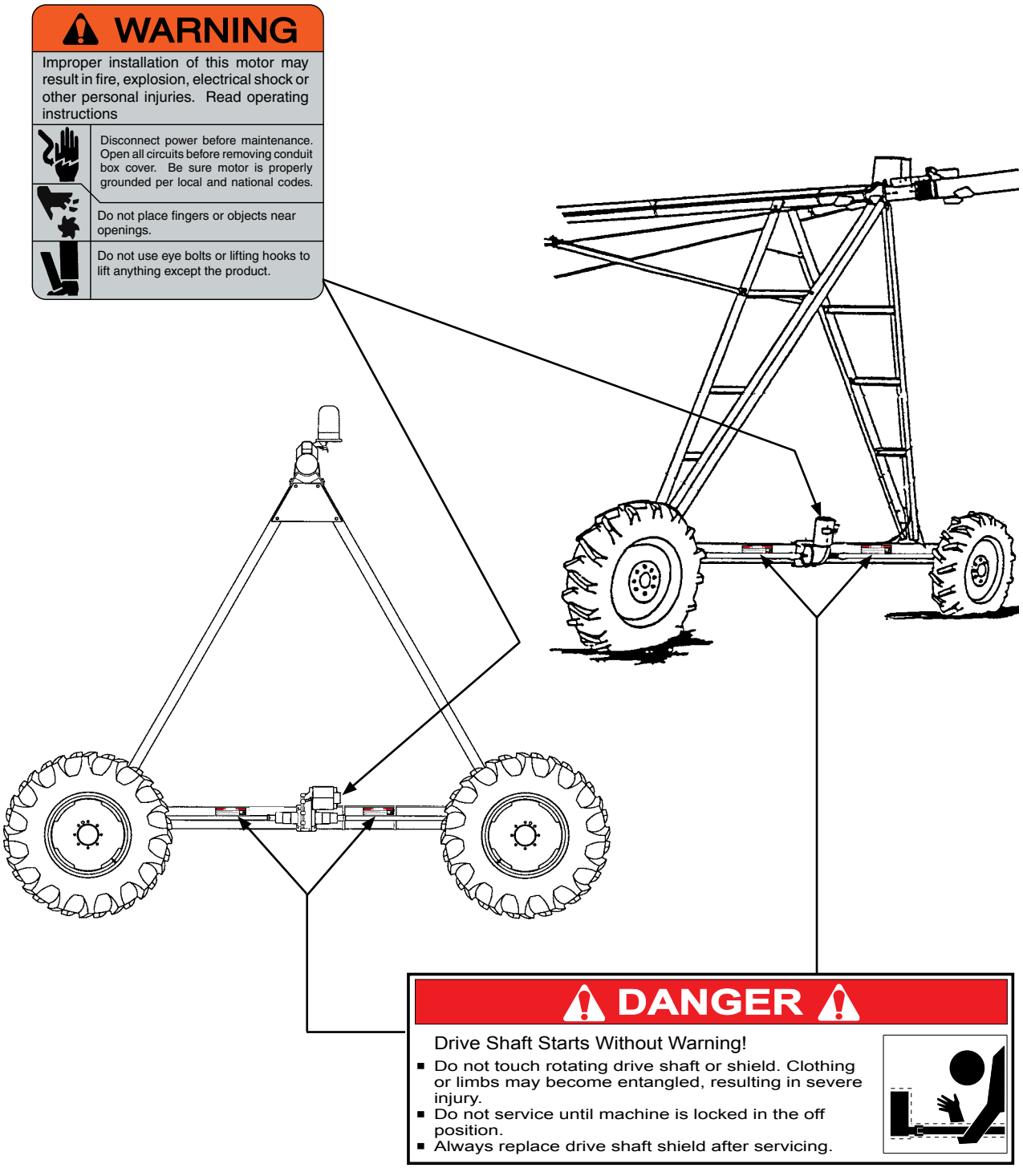
These Danger, Warning, and Caution decals appear in various locations on a Valley irrigation machine. You MUST familiarize yourself and other operator's with these safety decals. For replacement of any decal, contact your local Valley dealer.



Safety Decals (Continued)



Safety Decals (Continued)



Introduction

Understanding the operation of the corner machine requires understanding how the Center Pivot operates. Refer to the Valley 8000, 8120, 7000 Center Pivot Owner's Manual for a complete explanation of the operation of the Valley Center Pivot. Operators of Valley Precision Corner machines retrofitted to earlier models of Valley Center Pivots or other brands of Center Pivots must use the appropriate Center Pivot owners/operators manual in conjunction with this manual.

Overview

The Valley Corner is a pivoting extension (185 ft or 205 ft span, 82 ft overhang and steerable drive unit) of the Center Pivot machine. As the Center Pivot enters a corner of the field, the corner arm moves or swings outward to extend into the corner. At various points during extension, sprinklers or spray nozzles begin turning on in a specific sequence to maintain optimum uniformity. This allows the corners or areas outside the Center Pivot to be uniformly irrigated. As the corner arm reaches full extension, the end gun turns on to irrigate the area beyond the end of the overhang. When the corner approaches the boundary of the field, the end gun shuts off and the corner begins moving inward. At various positions during retraction, the sprinklers or spray nozzles begin to shut off in a specific sequence. See Figure 23-1.

Figure 23-1

Overview

Machine Components - Structural

The corner structural hardware consists of a 185 ft or 205 ft span of 6 5/8 in pipe with 30 in coupler spacing, trussing and truss rods and an 82 ft overhang. A steerable drive unit (SDU) supports the span and overhang. See Figure 24-1.

The steerable drive unit utilizes a drive motor and gearbox on each drive unit leg. A steering motor and a steering gearbox, mounted to the SDU base beam, rotate the drive unit legs.

The corner connects to the basic Center Pivot at the Last Regular Drive Unit through a ball and socket. This type of attachment allows movement in all directions for optimum flexibility as the LRDU and SDU negotiate varying terrain.

The drive for the LRDU is a 34 RPM helical motor/center drive gearbox while the SDU incorporates 56 RPM worm gear wheel-drive motor/gearboxes. Each of these drives are powered from variable speed motor controllers (Dinverters). This improves reliability and reduces maintenance, while extending the life of the drives.

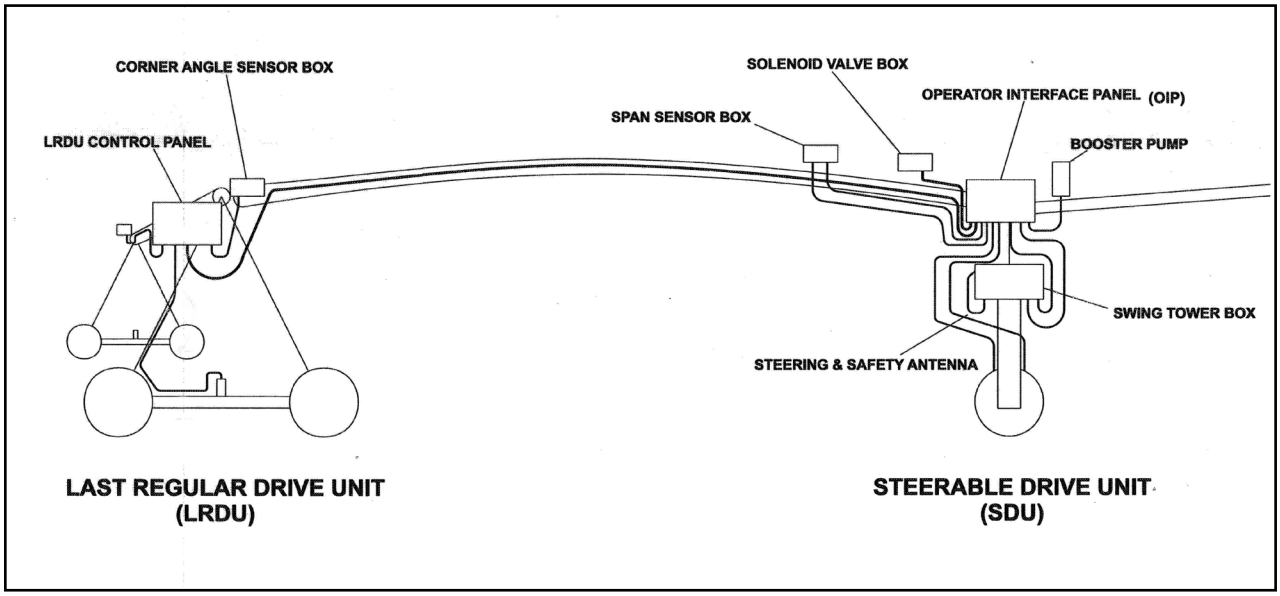


Figure 24-1

Machine Components - Operational

The Valley Precision Corner utilizes a number of control boxes and other components for movement, guidance and sprinkler package sequencing. The following is a listing of these components and their basic function. See Figure 24-1 for operational component location.

Main or Pivot Control Panel

The Valley Precision Corner machine, used in conjunction with an 8000 Valley Center Pivot, is equipped with one of three main control panels: the Standard, the Select or the Pro. Each of these provides the basic control functions for operation of the corner machine. These include controls for starting and stopping the machine, selecting the direction of operation and setting the speed for applying the desired amount of water to the field. See Figure 25-1.

A SERVICE/RUN rocker switch is included with the inner panel door controls. This switch is used for corner machine diagnostics and for use of the Operator Interface Panel.

The panel contains an oscillator which generates a low voltage, high frequency signal in the buried guidance wire.

Control panels for earlier Valley Center Pivots or pivot panels for other brands of Center Pivots are retrofitted with the appropriate components and controls for use with the Valley Precision Corner.

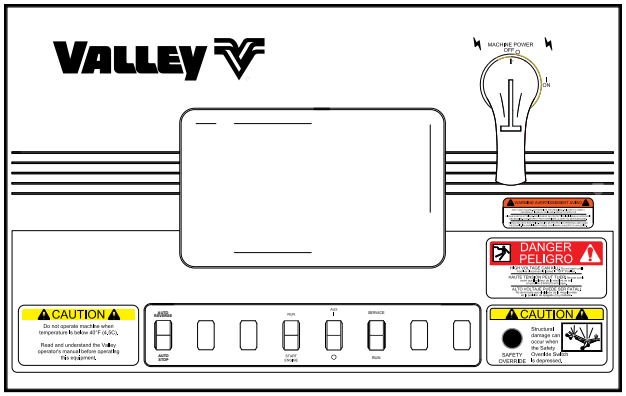


Figure 25-1 Pivot Control Panel

Last Regular Drive Unit Control Panel

The Last Regular Drive Unit (LRDU) control panel is responsible for supplying the Last Regular Drive Unit drive motor with the appropriate electrical power to achieve the desired machine operating speed. See Figure 25-2.

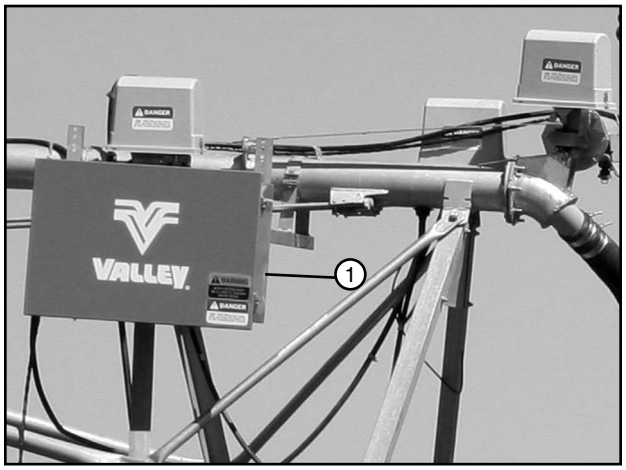


Figure 25-2 1. LRDU Control Panel

⚠ WARNING

- **THE LAST REGULAR DRIVE UNIT CONTROL PANEL CONTAINS NO OPERATOR CONTROLS. THE ELECTRICAL COMPONENTS CAN ONLY BE SERVICED BY VALLEY SERVICE TECHNICIANS. THE OPERATOR MUST NEVER ATTEMPT TO SERVICE OR TROUBLESHOOT THIS PANEL.**

Corner Angle Sensor Box

The Angle Sensor Box is located at the ball and socket joint between the LRDU and the first pipe of the corner. The Angle Sensor Box utilizes a potentiometer which monitors the angle between the Center Pivot and the corner machine. The angle between the two is used in conjunction with other information to properly sequence the sprinklers on and off as the corner extends and retracts. See Figure 25-3.

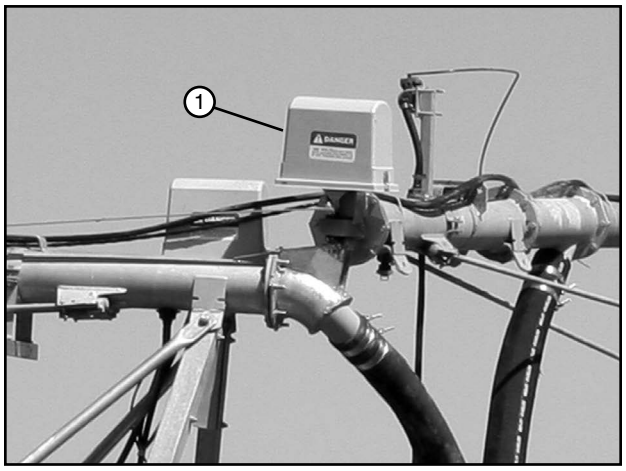


Figure 25-3 1. Corner Angle Sensor Box

Angle sensor software also monitors the extension and retraction angle to assure the corner arm does not overextend or under-retract. If the angle of the corner reaches either of these safety limits, the machine will shut off.

Overview

Operator Interface Panel (OIP)

The Operator Interface Panel (OIP) is positioned above the steerable drive unit base beam. It includes a microprocessor that receives a continuous signal from the span sensor box and monitors any movement or change in speed of the LRDU. The processor then directs, as necessary, a variable speed drive motor controller to constantly adjust the RPM of the SDU drive motors. This assures the SDU will maintain uniform movement with the LRDU. See Figure 26-1.

In addition, the microprocessor monitors the position of the corner in relation to the Center Pivot through signals from the angle sensor potentiometer. This information is used to determine the area being irrigated by the corner at any point or position in the field. Based on this information, signals are sent to the appropriate solenoid valves at the Solenoid Valve Box to turn on or turn off the appropriate sprinklers. This provides the optimum uniform water distribution at any point around the field.

The Operator Interface Panel provides a number of benefits to the operator and to the Valley service technician. The Operator Interface Panel provides information to the operator or Valley service technician on the operational status of the corner and diagnostics to aid in troubleshooting should a malfunction occur with the corner.

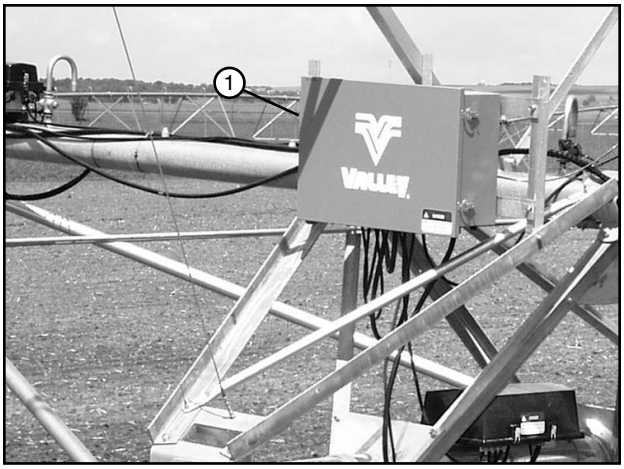


Figure 26-1 1. Operator Interface Panel (OIP)

Swing Tower Box

The Swing Tower Box includes a Corner Guidance Box. The guidance box interprets the signal from the buried guidance wire that's received through the steering and reference antenna. It then directs the steerable drive unit to turn one direction or another to maintain a position directly over the guidance wire. See Figure 26-2.

The guidance box also monitors the signal strength being received by the antenna. If the SDU moves too far away from the guidance wire, the signal strength drops below a preset level and relay contacts in the guidance box open the safety circuit causing the corner machine to shut down.

The Swing Tower Box includes a cam and steering limit switches to prevent mechanical damage to steering components should a malfunction occur. A steering safety switch backs up the steering limit switches should they not stop an oversteer.

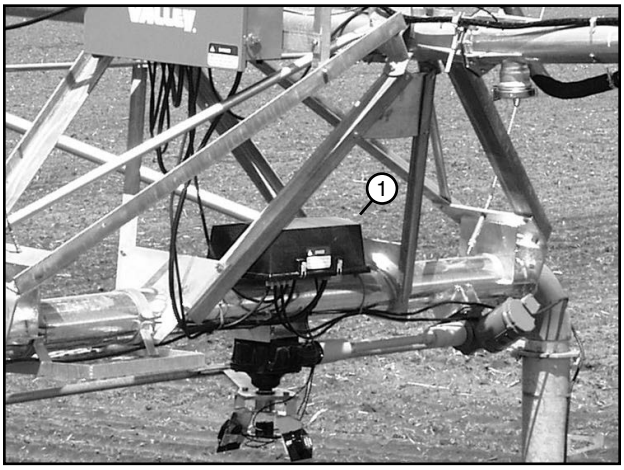


Figure 26-2 1. Swing Tower Box

Steerable Drive Unit

The Steerable Drive Unit (SDU) is located at the end of the corner span. The steering motor and steering gearbox are located on the basebeam. A single steering gearbox is standard. There are two offset legs, one on each end of the basebeam. At the bottom of each offset leg is a Corner Drive Wheel Gearbox. An optional Corner DualDrive tire configuration is available. See Figure 27-1.

Figure 27-1 1. Steerable Drive Unit

Steering and Safety/Reference Antenna

The steering and safety antenna are located on the steering arm directly below the center of the Steerable Drive Unit (SDU) base beam. The safety (reference) antenna and the forward or reverse steering antenna receive the signal from the buried guidance wire and send an electrical signal to the guidance receiver in the Swing Tower Box. The signal is monitored by the receiver which keeps the corner over the guidance wire or shuts the machine down should a malfunction occur causing the corner to move outside the guidance safety limits. See Figure 27-2.

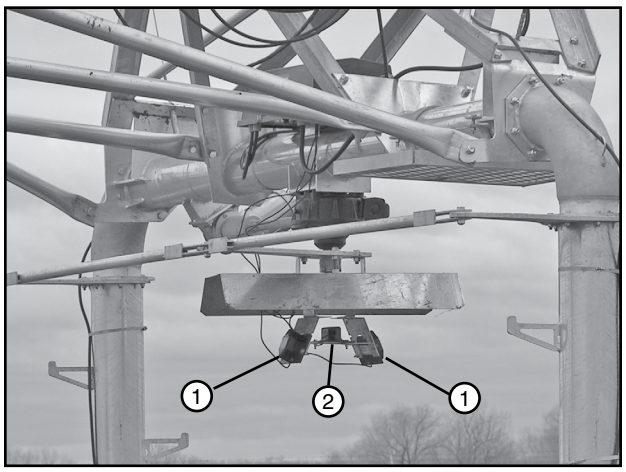


Figure 27-2 1. Steering Antenna
2. Safety/Reference Antenna

Solenoid Valve Box

The Solenoid Valve Box converts electrical signals from the SDU control panel processor into water hydraulic control for the sprinkler package pressure differential valves. This allows the appropriate sprinklers to turn on and off at the appropriate points during extension and retraction. See Figure 27-3.

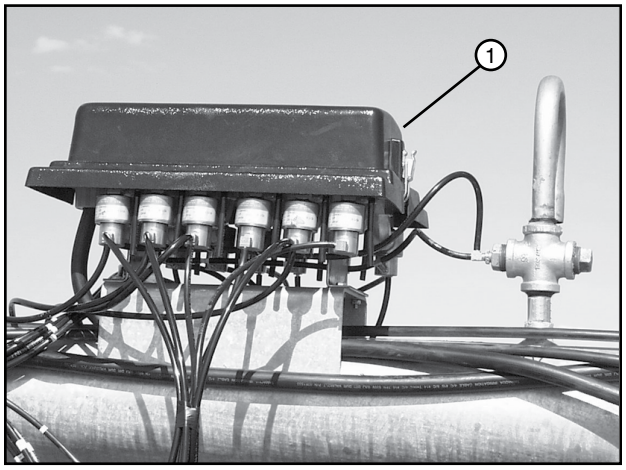


Figure 27-3 1. Solenoid Valve Box

Overview

Theory of Operation

LRDU and SDU Movement Controls

Forward or reverse movement of the corner is initiated by movement of the last regular drive unit (LRDU). Movement of the LRDU is controlled from the main control panel located at the pivot. The LRDU is sent signals from the main control panel indicating the speed and direction the LRDU is to operate. Unlike a center pivot where the last drive unit moves so many seconds out of a minute, the LRDU moves continuously above 15 Hertz. A variable speed motor controller adjusts the frequency (hertz) to the drive motor to obtain the desired operating speed or hours per revolution. On Select2 and Pro2 panels, speed may also be set by inputting the desired application amount to be distributed to the field in one revolution. To apply more water, the RPM of the LRDU motor is decreased; to apply less water, the RPM of the LRDU motor is increased. The motor controller for the LRDU is located in the large control panel (LRDU control panel) mounted on the last regular drive unit.

As the LRDU moves, an extremely sensitive electromechanical sensor (potentiometer) detects the movement of the LRDU. Through a second variable speed motor controller in the SDU control panel, the RPM of the SDU drive motors are set to match the speed of the LRDU. The span sensor is located on the corner span near the steerable drive unit (SDU). The panel is positioned above the SDU base beam. Should the rate of movement or speed of the LRDU change, the speed of the SDU will immediately change also. Again, the controls for coordinating the movement of the SDU are extremely sensitive allowing for precise, coordinated movement of the LRDU and the SDU.

Incorporated into the span sensor box are two span sensor safeties; an electrical safety limit and a mechanical safety. The electrical safety will shut the machine off should the LRDU and SDU not maintain the proper relationship within the safety band set in the software. The mechanical safety switch, which is a backup, will open and shut the machine down if tension or compression of the corner span exceeds the limits of the electrical safety. The span sensor safeties are in series with the other corner and center pivot safety devices.

Corner Guidance Systems

Guidance of the corner into and out of the corners of a field is directed or controlled by either a GPS Guidance System or a Below Ground Guidance System.

GPS Guidance System

The GPS guidance system uses a GGS Control panel and GPS Receiver mounted at the SDU. GPS coordinates are compared to a pre-determined path by the computer and converted into steering commands to guide the corner.

Below Ground Guidance

The below ground guidance system uses a signal from a wire loop buried around the outer portions, or perimeter, of the field to guide the corner. This guidance wire originates at the pivot control panel, is buried out to and around the edges of the field, then returns to the control panel.

The pivot control panel contains a device called an oscillator. The oscillator generates a low voltage, high frequency AC signal that is carried by the buried wire loop.

The steerable drive unit has three antennas; a reference or safety antenna and two steering antennas (forward and reverse). They are mounted to the steering arm located below the center of the SDU base beam.

The reference antenna “listens” for the signal from the buried wire. When the reference antenna “hears” or receives a signal of the proper strength, a relay is activated in the guidance box to complete a safety circuit path through the guidance box. Various other corner and center pivot safety switches or devices are incorporated into the series safety circuit.

The other two antennas, in conjunction with the reference antenna, are used to tell the SDU where it is in relation to the wire. One is used for steering when the corner is operating in the forward mode (clockwise) while the other is used for reverse operation (counterclockwise).

The guidance control compares the signals of the steering antenna and the reference antenna to determine if steering action is required to keep the SDU directly over the buried guidance wire. Steering can only take place when the corner is moving to prevent structural damage to the corner legs.

Theory of Operation

Below Ground Guidance (Continued)

The drive wheels on the SDU should never be allowed to turn 90 in to the direction of movement of the center pivot. Two steering limit switches in the steerable drive unit box prevent this from occurring. The limiting action of these switches does not shut the corner down.

Under certain conditions the corner may move off or away from the buried signal wire and not be able to correct itself by steering back to the wire. If the SDU gets far enough off or away from the guidance wire, the signal received by the reference antenna will weaken to a point where it ceases to receive or "hear" the signal. If this should occur, the safety relay in the guidance control box will "drop out" which opens the safety circuit and shuts the corner down before structural damage can occur.

An additional mechanical steering safety switch is used in conjunction with the steering limit switches. Should the steering switch circuitry fail to stop the steering action, the steering safety switch will shut the corner down.

Corner Water Application Sequencing

Sequencing of the sprinklers on and off as the corner extends and retracts is required for uniform water distribution. Sequencing is accomplished through the SDU control panel, the angle sensor box, the solenoid valve box and pressure differential valves mounted to water outlets on the corner span and overhang.

The angle sensor box is mounted to the first pipe flange on the corner span. It is connected to the last center pivot span by a linkage arm. As the corner span begins to extend and retract, a potentiometer in the angle sensor box rotates and sends a signal to the microprocessor in the SDU control panel.

During extension, the processor determines the area being covered and sequentially removes power from a specific solenoid(s) in the solenoid valve box. This causes the appropriate pressure differential valve(s) to open allowing water to begin flowing to sprinklers or spray nozzles on the span and/or overhang.

As extension continues, additional solenoids are deactivated allowing the pressure differential valves to open and water to flow out the appropriate sprinklers or nozzles.

During retraction, power is sent to the appropriate solenoids which closes the appropriate pressure differential valves to shut the sprinklers or spray nozzles off in the proper sequence. This process assures the optimum water distribution as the corner moves around the field.

An optional sprinkler package, called the "water utilization package", is available for increasing the rate of extension of the corner machine into the corners of the field while maintaining uniform water distribution. This package incorporates two additional sequences along with 22 additional sprinklers on a 205 ft corner and 19 additional sprinklers on a 185 ft corner.

The rate of extension is 2:1 versus 1.55:1 on the standard package. This allows for irrigating slightly more area in the corners of the field and also increases the overall uniformity of water application.

The area based sequencing used on the Precision Corner allows for accurate chemical application. If the "mode" rocker switch on the operator interface panel is set on "chemigate", the software will cause the LRDU to slow down as the corner arm extends and more area is being irrigated. As the corner retracts, the LRDU will speed up. This will provide for uniform chemical application when using a fixed rate chemical injection pump.

Overview

Overview

The Valley Precision Corner Owners Manual covers the use of the Valley Corner Operator Interface Panel along with maintenance, winterization and troubleshooting of the Valley Precision Corner.

Startup and operating procedures of the Valley Precision Corner are the same as startup and operation of the center pivot.

Control Panels

A Valley Precision Corner installed with a new Valley 8000 Center Pivot will include a Valley control module in the center pivot control panel.

A Precision Corner added to an existing Valley Center Pivot or other brand of center pivot will use the existing center pivot control panel.

If the Valley Precision Corner is used in conjunction with a New Valley Center Pivot then the Valley Center Pivot Owners Manual, along with the appropriate Valley Control Panel Owners Manual, must be used in conjunction with the Valley Precision Corner Owners Manual.

Valley Pivot with Precision Corner

The pivot control panel that is used with the Valley Precision Corner has a SERVICE/RUN rocker switch located on the lower portion of the inner panel door. This switch is utilized to power the Operator Interface Panel (OIP) and when troubleshooting the Valley Precision Corner. Its function and use is covered in-depth in other sections of this manual.

NOTE

- **The Valley Center Pivot control panel owner/operators manuals will cover the operation of the corner, including how to start/stop the machine, change the direction of operation, change the speed, etc. You must familiarize yourself not only with this manual but also the appropriate control panel manual.**

Retrofit Valley Precision Corners

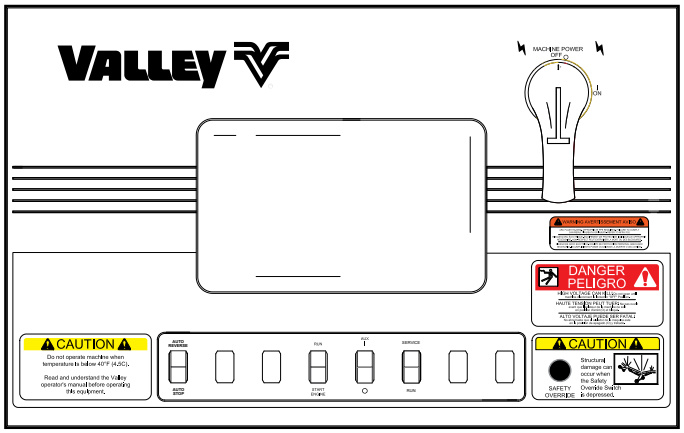
A Retrofit Valley Precision Corner added to an existing center pivot utilizes the existing center pivot control panel whether it is a Valley or other brand. The appropriate electrical Pivot Panel components for use with the Valley Precision Corner have been installed into the Pivot Panel by your Valley Dealer Service Technician. The only difference you will physically see is the addition of the SERVICE/RUN switch on the inner panel door of the Pivot Panel.

You must use the operators manual for the existing center pivot in conjunction with this manual (Valley Precision Corner Owners Manual) for complete instructions on preoperational settings and operating procedures. The operation of the center pivot with a Valley Precision Corner is virtually the same as the center pivot by itself. The major difference is determining the settings for the speed of the machine to achieve the desired water application amount.

Control Panels

Pivot Control Panel

The Pivot Panel includes standard controls for operating the machine. In addition, a SERVICE/RUN switch in the Pivot Panel is used for corner machine diagnostics and for powering the Operator Interface Panel located on the SDU (Steerable Drive Unit).



Valley ClassicPlus Control Panel Shown

Figure 32-1 Typical pivot control panel for Valley Precision Corner (actual panel will depend on brand and model of center pivot, refer to the center pivot manufacturer's operators manual for corner operating procedures).

Operator Interface Panel

The Operator Interface Panel provides an LED display for indicating the status' of the corner and controls to allow for operation and possible correction of certain corner machine malfunctions should they occur. The Interface Panel is for use by the operator and by the Valley Dealer Service Technician. See Figure 33-1.

NOTE

•Some malfunctions must only be corrected by factory trained Valley Dealer Service Personnel. The operator should never attempt to correct these malfunctions. The troubleshooting guide indicates which may be corrected by the operator and which must be corrected by the dealer. Even though most of the errors (faults) listed can only be corrected by Valley Trained Dealer Service Personnel, it is of benefit for the service person to know the error code indicated when calling for service.

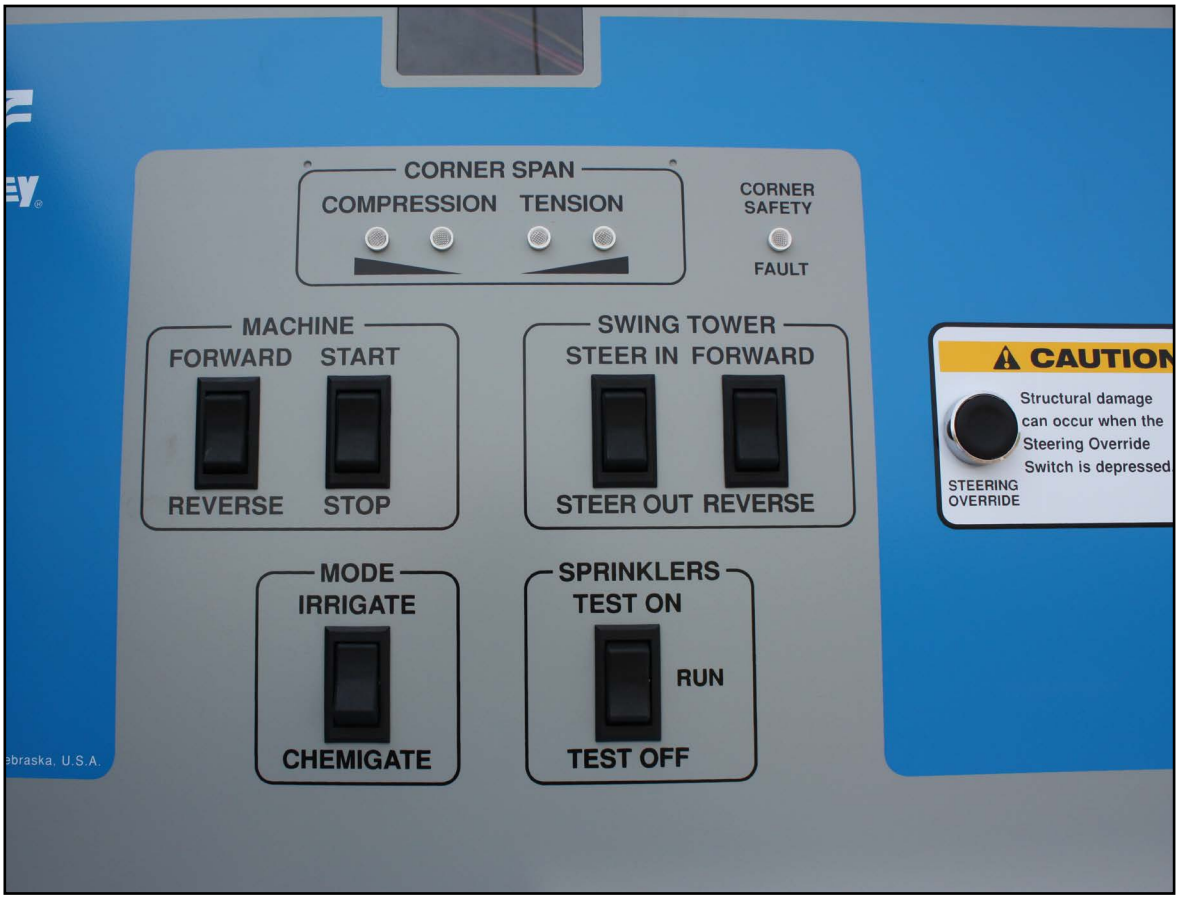


Figure 33-1 Valley Operator Interface Panel (located on the Steerable Drive Unit)

Control Panels

Operator Interface Panel (Continued)

The Operator Interface Panel is a combination diagnostics panel and a corner machine control panel. It provides a number of functions and capabilities beneficial to the Operator and the Valley Service Technician. Functions and capabilities relating to the corner include the following:

1. Diagnostics and Operational Status
2. Sprinkler Testing
3. Operational Control:
   - Machine Start/Stop - Forward/Reverse
   - Swing Tower Steer In/Steer Out - Forward/Reverse
   - Steering Override
   - Irrigate/Chemigate

The reliability of the Valley Precision Corner makes it unlikely the machine will experience faults or shutdowns. Should a malfunction occur, the diagnostics and corner controls make it possible for the operator to correct some faults. Even if a shutdown occurs that cannot be corrected by the operator, information provided by the Interface Panel will greatly aid the Valley Service Technician. It will reduce the diagnostics time allowing for easier correction of the problem and less downtime.

NOTE

•The Interface Panel only provides information (Diagnostics) on the Valley Corner, it does not provide diagnostics for the center pivot.

Use of the Operator Interface Panel requires 120 volts AC to the Interface Panel. This is achieved by placing the Main Disconnect Switch in the Main Control Panel in the ON position and SERVICE/RUN Switch in the SERVICE position.

Corner Interface Panel Capabilities

Diagnostic/Operational Status

Corner operational status and diagnostics information are shown by both an LED display and by indicator lights. Diagnostics provided include the following:

- LED display for RUN and error codes
- Corner span compression and tension indicator lights
- Corner safety fault light

LED Display

The LED display indicates the operational status of the corner and any error (error code) that may exist as a result of a shutdown. If there is not a problem with the corner, “rUn” will be shown on the display. If a shutdown or fault has occurred, a flashing Error Code number will be displayed. For example, an error code Er16 indicates a Span Sensor Fault (Tension or Compression) has occurred. See Figure 34-1.

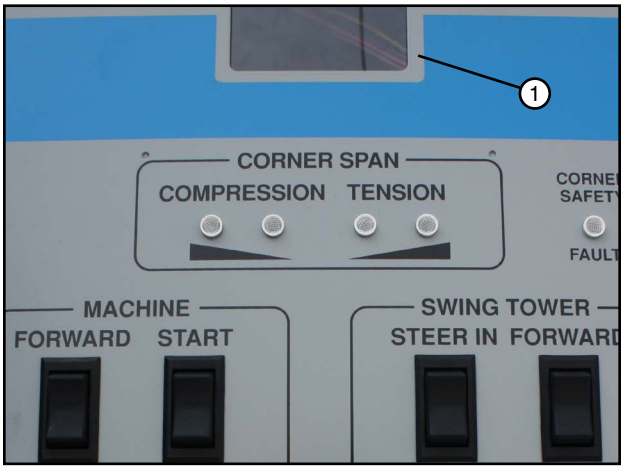


Figure 34-1 LED Display

Corner Interface Panel Capabilities (Continued)

Corner Span Indicator Lights

In addition to the Er16 Error Code, a set of Corner Span Compression/Tension Lights indicate whether the corner span is in compression or tension. If the corner span is in compression or tension then one or two of either the compression or tension lights will be lit. A corner span in tension means the LRDU (last regular drive unit) and SDU (steerable drive unit) are too far away from each other. A corner span in compression indicates the drive units are too close together. See Figure 35-1.

If the left center light is on, the span is in 50% compression, while if the right center light is on, the span is in 50% tension. If the left outside light is on, the span is in 75% compression, while if the right outside light is on, the span is in 75% tension.

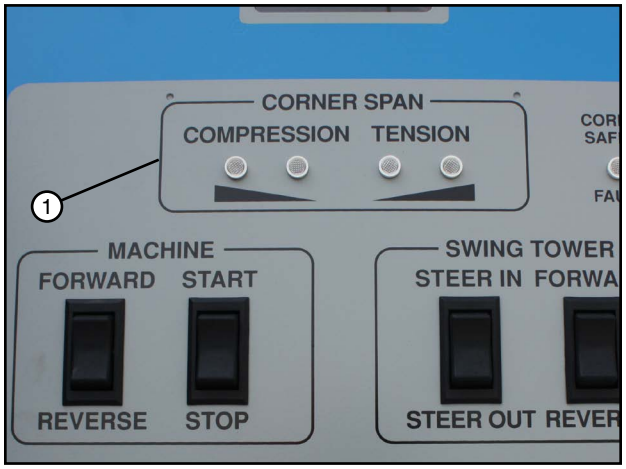


Figure 35-1 1. Span Compression/Tension Indicator Lights

NOTE

•If the corner span has not reached 100% of the allowable compression or tension, the LED will still display "rUn". If the corner span reaches 100% of the allowable compression or tension, a flashing error code "Er16" will appear in the LED status display.

The SWING TOWER FORWARD/REVERSE switch is used jog the corner drive unit in the necessary direction until error code "Er16" returns to "rUn" and all lights are off.

Corner Safety Fault Light

The Corner Safety Fault Light illuminates when any of the corner mechanical faults have been activated. Mechanical Safeties include:

- Swing Tower Box Disconnect Switch
- Swing Tower Box Steering Safety Switch
- Swing Tower Guidance Box
- Span Sensor Safety Switch

Opening of any of these safeties can be a result of mechanical or electrical malfunctions. Mechanical possibilities include: getting stuck, flat tire, corner drive or steering gearbox failure, failure of one of the guidance components (oscillator, buried wire, antenna, guidance receiver), etc. Most mechanical failures can be corrected by the operator but electrical malfunctions must be left to authorized Valley Service personnel. The operator should not attempt to correct these malfunctions or faults unless the computer board display indicates an "Er08" fault (Guidance Box Fault). If "Er08" is displayed, the STEERING OVERRIDE button should complete the safety allowing for startup and manual steering of the corner by using the Swing Tower Steering rocker switches. If "Er08" is not displayed and the Corner Safety Fault light is illuminated when the Steering Override button is depressed, then the Valley Dealer must be contacted to correct the problem. See Figure 35-2.

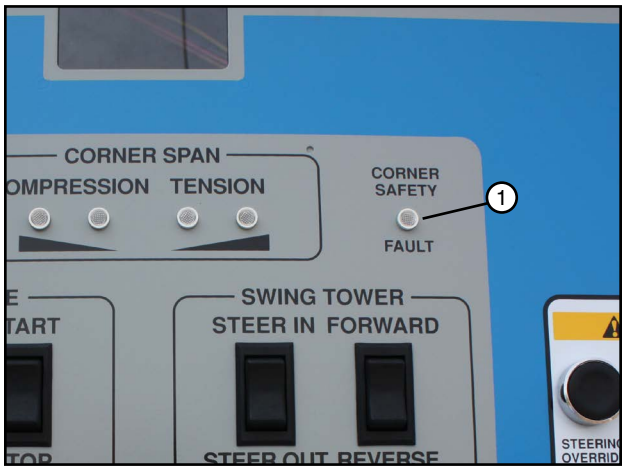


Figure 35-2 1. Corner Safety Fault Light

Corner Interface Panel Capabilities (Continued)

Corner Indicator Lights

Below are the possible combinations of Span Sensor and Corner Safety Fault lights and the status of each combination. See Figure 36-1.

NOTE

•If Corner Safety Fault light is ON when "Er16" is shown on the LED, perform an auto correct by pressing the machine start button at the same time as the jog forward button and then release. The smart board will display AUTO. The SDU and LRDU should automatically jog the correct direction until the safety fault is resolved. If doing this does not resolve the issue, contact your Valley Dealer.

Auto Correct Procedure

To perform an auto correct press the machine start button at the same time as the jog forward button and then release. The smart board will display AUTO. The SDU and LRDU should automatically jog the correct direction until the safety fault is resolved. If doing this does not resolve the issue, contact your Valley Dealer.

Corner Operating Controls

Controls on the inner door of the Operator Interface Panel allow the operator or the Valley Service Technician to start the machine in forward or reverse, steer the corner in or out, and stop the machine.

Also included is a steering override button to allow for bypassing the steering safeties on the corner. The steering override must be used with caution as structural damage can occur from oversteering when the override is depressed.

Machine Start/Stop - Forward/ Reverse Rocker Switches

Once 120 Volt AC power is available to the Operator Interface Panel through the SERVICE/RUN rocker switch in the Main Pivot Panel, the machine can be started in either direction and stopped at the Operator Interface Panel. See Figure 36-2.

The FORWARD/REVERSE toggle switch will change direction of the pivot as the machine is moving. If running in Forward (clockwise), press the REVERSE side of the switch to change directions and vice versa. This switch will work only if the pivot is equipped with Auto-Reverse/Auto-Stop and it is enabled at the main pivot control panel. Auto-Reverse must be selected rather than Auto-Stop. If all safeties on the pivot are complete, the LRDU will run at 25 hertz when the START BUTTON is pressed. It win run at this constant speed for five minutes or until STOP is pressed. After the five minutes is over, the START BUTTON can be used again for operating another five minutes.

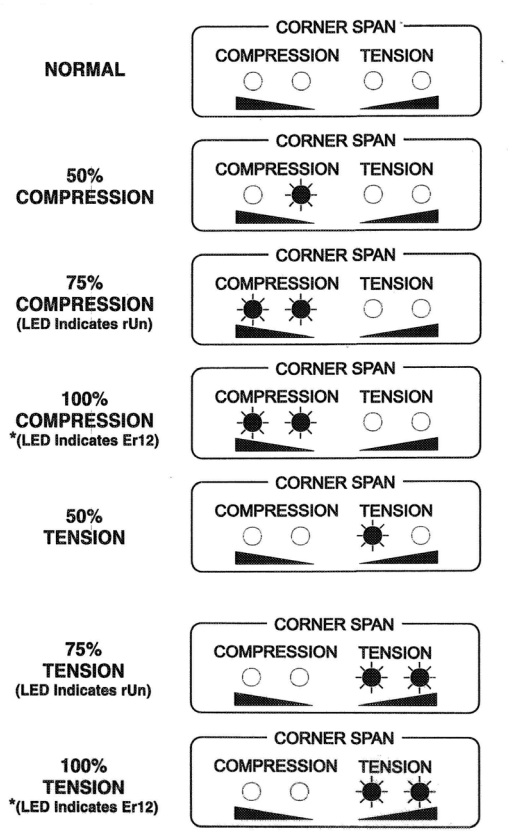


Figure 36-1 Corner Indicator Lights

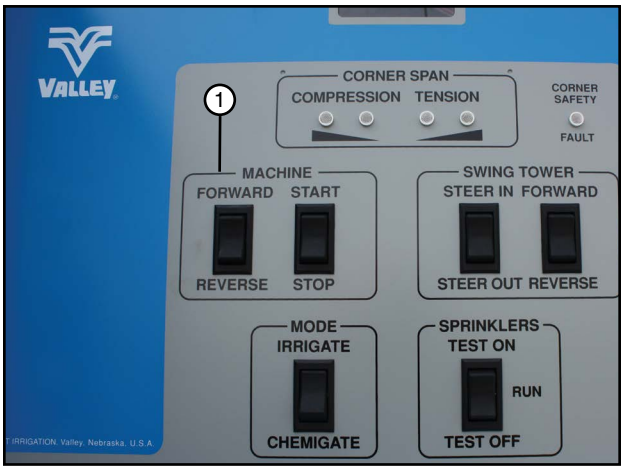


Figure 36-2 1. Start/Stop - Forward/Reverse Rocker Switches

Corner Operating Controls (Continued)

Swing Tower Steer In/Steer Out - Forward/Reverse Switches

The STEER IN/STEER OUT switch will steer the corner drive unit wheels. STEER IN will rotate the SDU legs so the corner drive unit will move towards the pivot point. This is counter clockwise (when looking down at the tires) when running in reverse and clockwise when running in forward. STEER OUT will move the SDU away from the pivot point. This switch should only be pushed when the corner is moving to prevent any structural damage to the steering components. See Figure 37-1.

The FORWARD/REVERSE rocker switch will "jog" the SDU in the forward (clockwise) and reverse (counter clockwise) directions. This FORWARD/REVERSE switch can be used at the same time as the STEER IN/STEER OUT switch, but must not be used when the START button has been depressed and the corner is running in normal operation, or at the same time as the MACHINE FORWARD/REVERSE switch.

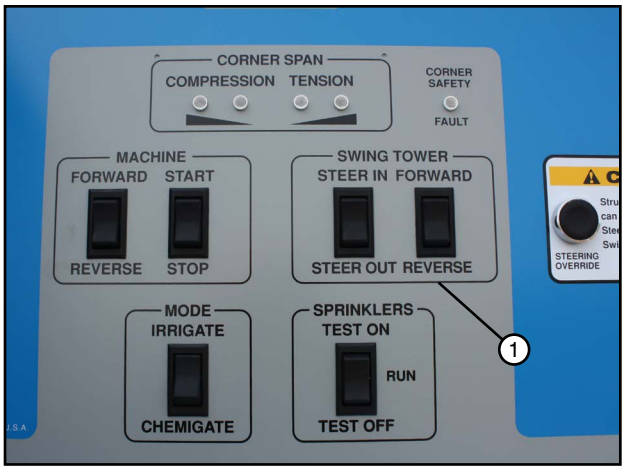


Figure 37-1 1. Steer In/Steer Out - Fwd./Rev. Rocker Switches

Steering Override Button

The Steering Override Button bypasses all mechanical safeties except span sensor mechanical safety. This button allows some inadvertent shutdowns to be corrected by the operator. The Steering Override Button must be used with care as structural damage can occur when this switch is depressed. See Figure 37-2.

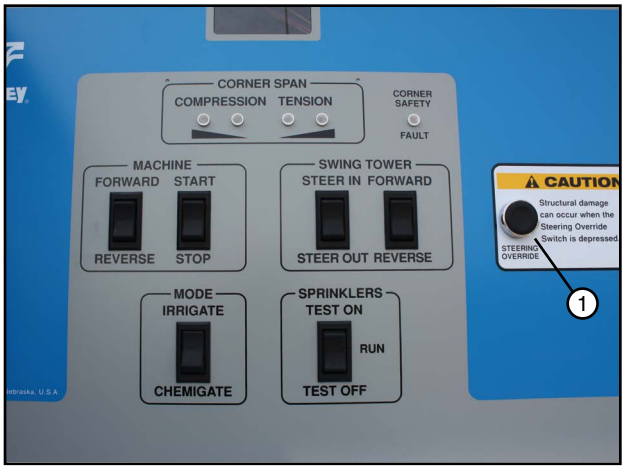


Figure 37-2 1. Steering Override Button

Irrigate/Chemigate Rocker Switch

The Irrigate/Chemigate Switch is used to access the appropriate software program to uniformly apply either irrigation water or agricultural fertilizers and chemicals. The Irrigate Mode is used when distributing irrigation water and injecting chemical when using a Variable Displacement Injection Pump. The Chemigate Mode is used when applying fertilizer or agricultural chemicals with a Fixed Rate Injection Pump. See Figure 37-3.

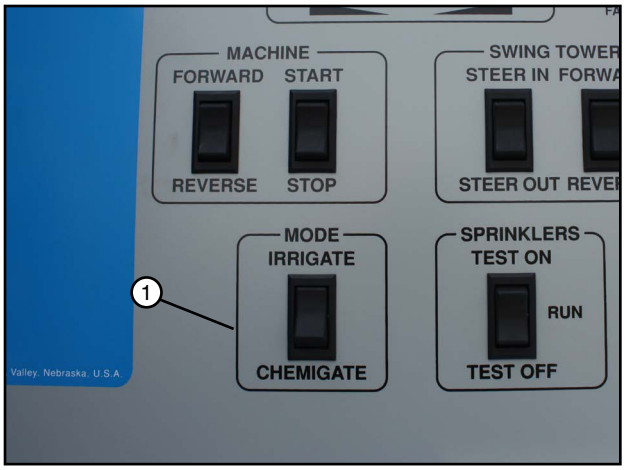


Figure 37-3 1. Irrigate/Chemigate Rocker Switch

Control Panels

Corner Operating Controls (Continued)

Sprinklers Test On/Test Off Switch

The Sprinkler Test On/Off rocker switch allows the operator to check the operation of the corner span valve controlled sprinklers and end gun. All sprinklers and the end gun can be turned ON or OFF assuring the sprinkler controls are operating properly. See Figure 38-1.

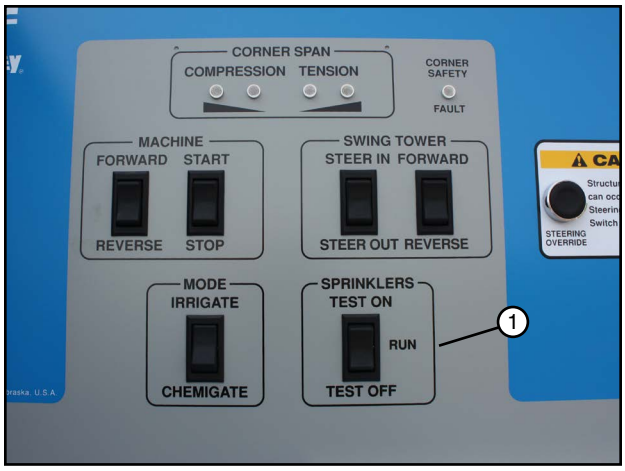


Figure 38-1 1. Sprinkler Test Rocker Switch

Variable Frequency Drive

Two Variable Frequency Drives (VFD) are used on the Valley Precision Corner: One in the LRDU Control Panel and the other in the Operator Interface Panel at the SDU. See Figure 38-2.

The VFD in the LRDU Panel controls the voltage and frequency going to the LRDU drive unit motor which in turn sets the speed of the machine.

The second VFD, located on the right side of the Operator Interface Panel, controls the speed of the two corner drive motors. This allows the corner to maintain coordinated movement/speed with the last regular drive unit (LRDU). During normal operation the VFD display will show the hertz at which the corner drive motors are operating. If the SDU is stopped and there is no problem with the VFD, it will indicate “rdy” (Ready).

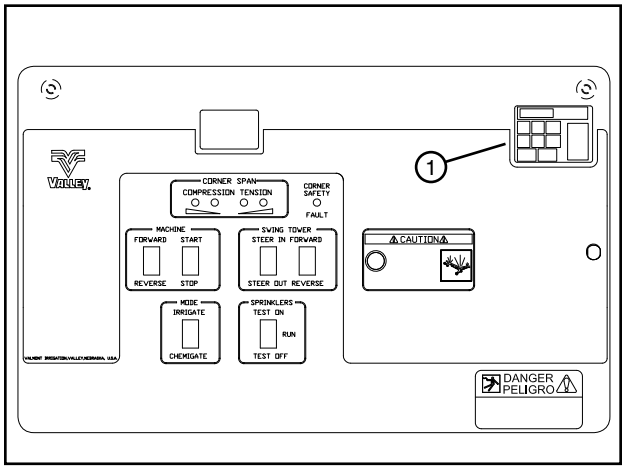


Figure 38-2 1. VFD

Water Application

An electromechanical or electronic percentage timer (depends on the type of pivot control panel) regulates the speed of the corner machine which determines the amount of water being applied per revolution of the machine. A percent timer setting of 100% means the machine is operating at its maximum speed and applying the minimum amount of water. A setting of 50% means the machine is running at one half of its maximum speed therefore, doubling the amount of water being applied.

Application of irrigation water through a corner machine requires uniform application as more area is irrigated when the corner extends and less area is irrigated when the corner retracts. Maintaining uniformity is achieved in one of two ways.

The first is to use a sprinkler package with pressure regulators at each sprinkler outlet on the machine. This will maintain a constant flow at all sprinklers which will require the machine to move at a constant speed around the entire field. As the corner extends, sprinklers on the corner win turn on increasing flow and as the corner retracts sprinklers will turn off decreasing flow.

NOTE

•Flow control nozzles perform the same function as pressure regulators.

The second means of maintaining uniformity is to use a sprinkler package without pressure regulators and is to progressively adjust the speed of the machine as it moves around the field. This is accomplished through the corner machine sprinkler package software.

Monitoring the water pressure in the machine (pressure transducer in the LRDU control panel) allows the machine speed to progressively decrease as the corner extends (irrigating more acres) and increase as the corner retracts (irrigating fewer acres).

The application amount, or depth, in inches per revolution of the Precision Corner must be calculated based on the design of the installation i.e., length of machine and the corner, speed, gallonage, field size and shape, crop(s), soil type, etc. The sprinkler chart for your machine will provide you with a speed chart, the distance from the pivot to the last regular drive unit (LENGTH), the gallonage, the operating pressure, the end gun radius, the center drive type (standard or high speed), and the tire type (standard, high float, maxi-float, etc.). Knowing the gallonage, the center pivot and corner length and the machine speed will allow you to calculate the application rate in inches per day, the hours per revolution and the percent timer settings for applying the amount of water desired.

NOTE

•It is strongly recommended the machine be run one revolution at maximum speed (100% timer setting) while irrigating to establish the actual revolution time.

This is especially true on a non-pressure regulated machine as field sizes and shapes will directly impact the revolution time of the machine. Operating one revolution at 100% percent timer setting while irrigating will allow for establishing actual operating modes that will meet the needs of your application.

Pre Operation

Sample Timer Chart
With Pressure Regulators or Flow Control Nozzles

Dealer
Customer
Field Name

VALLEY | V-CHART

Sprinkler Order No

Parent Order No

Valley Standard Corner VFlex Percent Timer Data

Setup Information - Valley Computer Control Panel Water Application Constants: Minimum Application = 0.184 (in) Hours Per Revolution = 16.1

Based on IN

IN Per 360 degrees	Pivot % Timer	Hours Per 360 degrees
0.184	100.0	16.1
0.20	92.0	17.5
0.30	61.4	26.2
0.40	46.0	35.0
0.50	36.8	43.8
0.60	30.7	52.4
0.70	26.3	61.2
0.80	23.0	70.0
0.90	20.5	78.5
1.00	18.4	87.5
1.25	14.7	109.5
1.50	12.3	130.9
1.75	10.5	153.3
2.00	9.2	175.0
2.50	7.4	217.6
3.00	6.1	263.9
3.50	5.3	303.8

Based on % Timer

Pivot % Timer	IN Per 360 degrees	Hours Per 360 degrees
100.0	0.184	16.1
90.0	0.20	17.9
80.0	0.23	20.1
70.0	0.26	23.0
60.0	0.31	26.8
50.0	0.37	32.2
45.0	0.41	35.8
40.0	0.46	40.3
35.0	0.53	46.0
30.0	0.61	53.7
25.0	0.74	64.4
20.0	0.92	80.5
17.5	1.05	92.0
15.0	1.23	107.3
12.5	1.47	128.8
10.0	1.84	161.0
7.5	2.45	214.7
5.0	3.68	322.0

Field Area

(Ac) Total
114.7 (Ac) Pivot 360°
(Ac) EG on 100%
1549.0 (ft) Machine Length
99.7 (ft) End Gun Radius

Flow

1000 (GPM)
5.10 (GPM per Acre)
0.27 (in per day) App Rate
0.184 (in) App Depth @ 100%
114.7 (GPM) End Gun

Pressure

36 (PSI) Pivot Pressure
Calculated Pressure
0.0 (ft) Highest Elevation
0.0 (ft) Lowest Elevation

LRDU Drive Train

34 RPM Center Drive @ **60** Hz freq.
14.9 x 24 High Float Tire
52:1 Wheel GB Ratio, LRDU Dist **1261.2** (ft)
16.1 Hrs/360 @ 100% (**8.25**) (Ft per Min)

Disclaimer
The information presented in the attached Percent Timer Report is based on variables which cannot be totally controlled by Valmont (including, but not limited to; pivot pressure, inside pipeline surface, end gun throw, end gun arc setting, tire slippage, tire pressure, field slopes, soil variations, sprinkler package installation, well capacity, center drive motor voltage, center drive motor frequency, climatic conditions and other elements and circumstances beyond Valmont's reasonable control). Valmont recommends monitoring the machine for at least one pass through field to obtain an accurate rotation time.

Sample Timer Chart
Without Pressure Regulators or Flow Control Nozzles

Dealer
Customer
Field Name

VALLEY | V-CHART

Sprinkler Order No

Parent Order No

Valley Standard Corner VFlex Percent Timer Data

Setup Information - Valley Computer Control Panel Water Application Constants: Minimum Application = Hours Per Revolution =

Based on IN

70% LRDU Ratio		
IN Per 360 degrees	Pivot 70% Timer	Hours Per 360 degrees
0.270	100.0	19.1
0.30	90.1	21.2
0.40	67.6	28.3
0.50	54.1	35.3
0.60	45.0	42.4
0.70	38.6	49.5
0.80	33.8	56.5
0.90	30.0	63.6
1.00	27.0	70.7
1.25	21.6	88.3
1.50	18.0	106.0
1.75	15.4	123.7
2.00	13.5	141.4
2.50	10.8	176.7
3.00	9.0	212.0
3.50	7.7	247.4
4.00	6.8	282.5
5.00	5.4	353.7

80% LRDU Ratio		
IN Per 360 degrees	Pivot 80% Timer	Hours Per 360 degrees
0.232	100.0	17.8
0.30	77.2	23.0
0.40	57.9	30.7
0.50	46.3	38.4
0.60	38.6	46.1
0.70	33.1	53.8
0.80	29.0	61.5
0.90	25.8	69.1
1.00	23.2	76.8
1.25	18.5	96.0
1.50	15.5	115.2
1.75	13.2	134.4
2.00	11.6	153.6
2.50	9.3	192.0
3.00	7.7	230.6
3.50	6.6	268.9
4.00	5.8	307.4
0.00	0.0	0.0

90% LRDU Ratio		
IN Per 360 degrees	Pivot 90% Timer	Hours Per 360 degrees
0.204	100.0	16.8
0.30	68.0	24.7
0.40	51.0	33.0
0.50	40.8	41.2
0.60	34.0	49.4
0.70	29.1	57.7
0.80	25.5	65.9
0.90	22.7	74.1
1.00	20.4	82.4
1.25	16.3	103.0
1.50	13.6	123.6
1.75	11.7	144.2
2.00	10.2	164.7
2.50	8.2	205.9
3.00	6.8	247.1
3.50	5.8	288.2
4.00	5.1	329.4
0.00	0.0	0.0

To Select Correct LRDU Ratio Refer To Valley Precision Corner Owner's Manual Section 3 Corner Transducer Calculation.

Field Area

114.7 (Ac) Pivot 360°
(Ac) EG on 100%
1549.0 (ft) Machine Length
99.7 (ft) End Gun Radius

Flow

1000 (GPM)
(GPM per Acre)
(in per day) App Rate
(in) App Depth @ 100%
114.7 (GPM) End Gun

Pressure

36 (PSI) Pivot Pressure
Calculated Pressure
0.0 (ft) Highest Elevation
0.0 (ft) Lowest Elevation

LRDU Drive Train

34 RPM Center Drive @ **60** Hz freq.
14.9 x 24 High Float Tire
52:1 Wheel GB Ratio, LRDU Dist **1261.2** (ft)
Hrs/360 @ 100% (**8.25**) (Ft per Min)

Disclaimer

The information presented in the attached Percent Timer Report is based on variables which cannot be totally controlled by Valmont (including, but not limited to; pivot pressure, inside pipeline surface, end gun throw, end gun arc setting, tire slippage, tire pressure, field slopes, soil variations, sprinkler package installation, well capacity, center drive motor voltage, center drive motor frequency, climatic conditions and other elements and circumstances beyond Valmont's reasonable control). Valmont recommends monitoring the machine for at least one pass through field to obtain an accurate rotation time.

Pre Operation

Hours Per Revolution - Actual

Prior to irrigation or applying agricultural chemicals (Chemigation) with the Valley Precision Corner, the time it takes to make one revolution (hours Per Revolution - Hrs/Rev) must be determined. A number of factors affect the revolution time. These include the speed of the machine (Standard or High Speed), the tire size, tire slippage, the length of the center pivot from the pivot point to the last regular drive unit (DLRDU), the size and shape of the field and the terrain.

In addition, the revolution time is affected by the type of sprinkler package (pressure regulated or non-pressure regulated) and whether the machine is irrigating or chemigating. Individual computer based water and chemical application programs are used to provide the optimum in uniformity of application. The IRRIGATE/CHEMIGATE rocker switch in the Operator Interface Panel provides for selecting the desired mode.

Due to the number of variables, the machine should be operated for one revolution in the Irrigate Mode and one revolution in the Chemigate Mode with the times recorded for use in water and chemical application calculations. Actual revolution times will provide the most accurate Hours Per Revolution for achieving the best uniformity of application.

Procedures and formulas are provided in this section for calculating the revolution times along with the application rate and depth settings.

Operating the machine to determine the actual revolution times should be completed with water. This will allow for tire slippage and the effect of a pressure regulated sprinkler package versus a non-regulated sprinkler package. In the case of irrigating with a non-regulated sprinkler package, it allows for decreasing and increasing speed as the corner extends and retracts. Below is a guide to determining actual revolution times.

Determining Actual Revolution Times/Hours Per Revolution (Hrs/Rev)

Pressure Regulated Sprinkler Package:

- Irrigate Mode: Operate at 100% with or without water*
- Chemigate Mode: Operate at 100% with or without water**

*Operating with water will increase the accuracy as tire slippage affects the revolution time.

**Operating with water will increase the accuracy as tire slippage affects the revolution time. Water distribution will not be uniform.

Non-Pressure Regulated Sprinkler Package:

- Irrigate Mode: Operate at 100% with water*
- Chemigate Mode: Operate at 100% with or without water**

*Changes in machine pipeline water pressure affects the speed of the machine as the corner extends and retracts.

**Operating with water will increase the accuracy as tire slippage affects the revolution time. Water distribution will not be uniform.

Hours Per Revolution - Calculated

The revolution time for a Valley Precision Corner can be calculated using the information and formulas given below. It is strongly recommended the machine be operated for one revolution at a 100% percentage timer setting while irrigating to accurately determine the hours per revolution. This must be done while in the irrigate mode.

Last Regular Drive Unit (LRDU) Speed

The LRDU sets the speed for the machine. The drive motor on the last regular drive unit motor is labeled 34 RPM. This is the RPM of the motor for a standard speed corner. The 34 RPM motor will operate at 56 RPM when the machine is equipped with the high speed option. Motor and tire data used in calculating the revolution time is shown below.

DRIVE UNIT TRAVEL SPEED (FEET/MINUTE)									
Tire Size									
	11.2 x 24	Non-Directional 14.9 x 24	14.9 x 24	16.9 x 24	18.4 x 26	11.2 x 38	Non-Directional 11.2 x 38	Recap 11R x 22.5	Recap 11R x 24.5
Motor Speed									
34	6.92	7.88	8.25	8.77	9.26	9.45	9.45	7.18	7.18
56	11.40	12.98	13.59	14.44	15.26	15.56	15.56	11.82	11.82

*****RPM and speed for 480 V, 60 Hz service.**

There are two different procedures for calculating the revolution time: one for a machine equipped with pressure regulators and another for a machine without pressure regulators.

HRS/REVOLUTION - Corner Systems

1. WITH PRESSURE REGULATORS:

Hours per revolution

Hrs per rev = $\frac{(.105)\ (DLRDU)}{Speed}$ @ 100%

DLRDU = Distance From Pivot to Last Regular Drive Unit (Feet)

Speed = Travel Speed of Last Regular Drive Unit at 100% Pivot Percentage Timer setting (Feet/Minute)

2. REVOLUTION TIME FOR CORNERS WITHOUT PRESSURE REGULATORS

Following is the equation which can be used to calculate system revolution time for corner systems without pressure regulators.

$$\text{Hours/rev with Pivot \% Timer Set at 100\%} = \left[\frac{(DLRDU)\ (.105)}{Speed}\right] \times \left[\frac{\text{Calculation Based on Field Configuration see Chart A*}}{\text{Transducer Setting}} + (1 - \text{Chart A*})\right]$$

Transducer Setting based on **Graph A** on page 45.

Chart A* - Corner Without Pressure Regulators on page 44.

EXAMPLE:

DLRU = 1408 ft (429.1 m)

185 ft (56.3 m) Corner arm irrigating four corners

Transducer Setting = .77 (see Graph A)

Field Configuration Constant = .47 (see Chart A*)

Standard Tires

Standard speed Valmont Centerdrive = 34 RPM

$$\text{Hours/rev} = \left[\frac{(1408)\ (0.105)}{6.95}\right]\left[\frac{0.47}{0.77} + (1 - 0.47)\right]$$

Hours/rev = [21.46] [0.61 + 0.53]

Hours/rev = 24.46 hours

Transducer Setting Charts

FIELD CONFIGURATION
CONSTANT
CORNER WITHOUT PRESSURE REGULATORS

205 Ft Corner

CHART A

Distance LRDU Feet	Irrigating 4 Corners	Irrigating 4 Corners +1 Side	Irrigating 4 Corners +2 Side	Irrigating 4 Corners +3 Side	Irrigating 3 Corners
700	0.25	0.44	0.63	0.81	0.19
800	0.30	0.48	0.65	0.83	0.23
900	0.34	0.51	0.67	0.84	0.26
1000	0.38	0.53	0.69	0.84	0.28
1100	0.41	0.56	0.70	0.85	0.31
1200	0.43	0.58	0.72	0.86	0.33
1300	0.46	0.59	0.73	0.86	0.34
1400	0.48	0.61	0.74	0.87	0.36
1500	0.49	0.62	0.75	0.87	0.37
1600	0.51	0.63	0.76	0.88	0.38
1700	0.52	0.64	0.76	0.88	0.39
1800	0.54	0.65	0.77	0.88	0.40
1900	0.55	0.66	0.78	0.89	0.41
2000	0.56	0.67	0.78	0.89	0.42
2100	0.57	0.68	0.79	0.89	0.43
2200	0.58	0.69	0.79	0.90	0.44

Above values are based on an ideal field with the distance from the end gun boundary to the LRDU equal to 20 ft.

CHART B

185 Ft Corner

Distance LRDU Feet	Irrigating 4 Corners	Irrigating 4 Corners +1 Side	Irrigating 4 Corners +2 Side	Irrigating 4 Corners +3 Side	Irrigating 3 Corners
700	0.25	0.44	0.63	0.81	0.19
800	0.30	0.47	0.65	0.82	0.22
900	0.34	0.50	0.67	0.83	0.25
1000	0.37	0.53	0.68	0.84	0.28
1100	0.40	0.55	0.70	0.85	0.30
1200	0.42	0.57	0.71	0.86	0.32
1300	0.45	0.58	0.72	0.86	0.33
1400	0.47	0.60	0.73	0.87	0.35
1500	0.48	0.61	0.74	0.87	0.36
1600	0.50	0.62	0.75	0.88	0.37
1700	0.51	0.64	0.76	0.88	0.39
1800	0.53	0.65	0.76	0.88	0.40
1900	0.54	0.66	0.77	0.89	0.41
2000	0.55	0.66	0.78	0.89	0.41
2100	0.56	0.67	0.78	0.89	0.42
2200	0.57	0.68	0.79	0.89	0.43

Above values are based on an ideal field with the distance from the end gun boundary to the LRDU equal to 20 ft.

Corner Transducer Calculation

P Low to P High Ratio

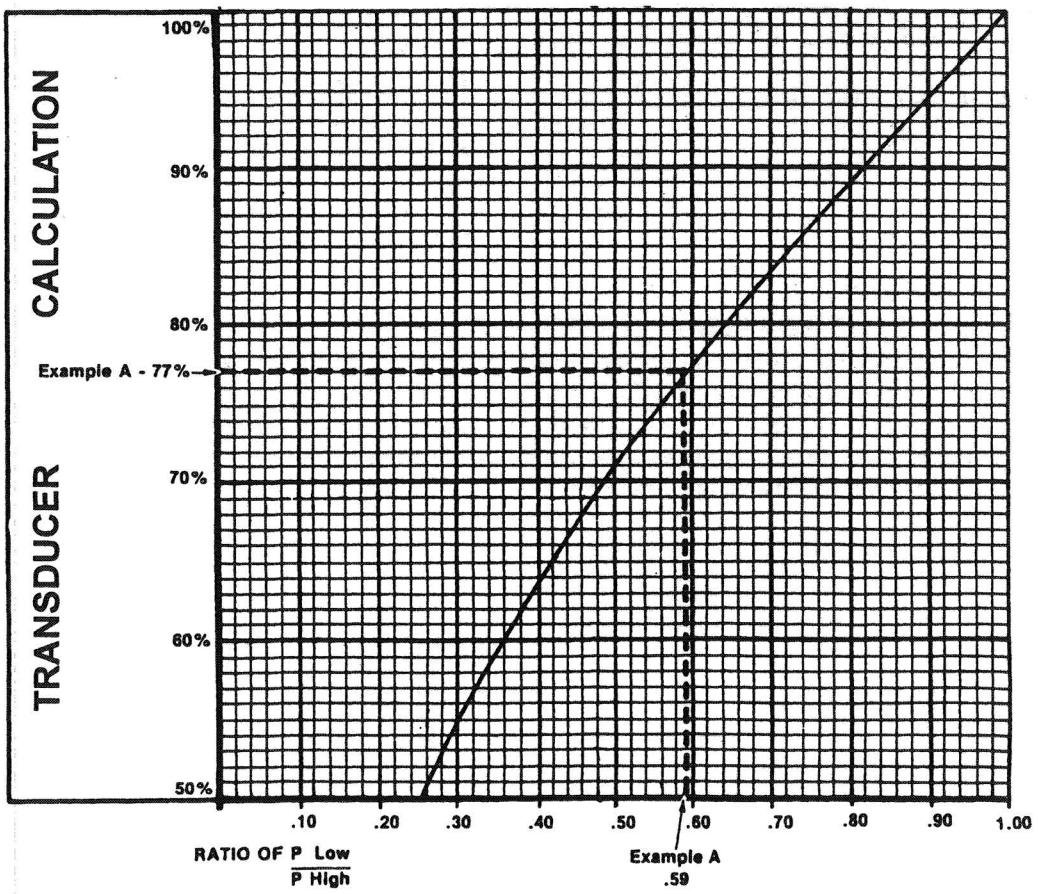
Corner machines **WITHOUT** pressure regulators slow down in the corners to achieve even water distribution. Consequently, the following data must be collected for calculation of the rotation time (your Valley Dealer should provide you this information).

1. Measure the nozzle pressure or pipeline pressure at a sprinkler location on the last regular drive unit with the corner system sprinklers all on AND the end gun ON if the end gun is to be used, make sure the end gun is off when the Water Utilization Package is ON while recording the pressure **unless** the end gun and water utilization package sprinkler are allowed to be on at the same time. In this case, all sprinklers, and the end gun, should be on. Also take a reading with all the valve controlled sprinklers off. Allow several minutes between readings to permit well drawdown to stablize.
2. Calculate the ratio of the lower pressure reading to the higher pressure reading.

   $$\frac{\text{P Low}}{\text{P High}}$$

   Find this value on the lower portion of the graph shown below. Move up from this point until you intersect the line plotted diagonally across the graph (see Example A). Then read the appropriate value at the left of the graph.
3. Corner machines with pressure regulators or flow control nozzles automatically compensate for the extra acres covered in the corners.

GRAPH A



Pre Operation

Revolution Time Calculations without Pressure Regulators

Calculation of the revolution time for a Valley Precision Corner **without** pressure regulators involves other inputs into the calculations. These include a Transducer Setting or TS (Chart A) and a Field Configuration Constant or FCC (Graph A). Again, it is recommended the actual revolution time be determined by operating the corner (not equipped with regulators) for one revolution, while irrigating, at a 100% percentage timer setting.

$$\text{Hours/rev at 100\%} = \left[\frac{(\text{DLRDU})\ (.105)}{\text{Speed}}\right] \times \left[\frac{(\text{FCC})}{\text{Transducer Setting}} + (1 - \text{FCC})\right]$$

DLRDU = Distance to Last Regular Drive Unit

.105 is a constant.

Speed = Travel speed of the Last Regular Drive Unit at 100% Percentage Timer Setting (Feet per Minute).

FCC = Field Configuration Constant from Chart A

TS = Transducer Setting from Graph A (Contact your Valley dealer for the low and high pressures to calculate the low and high pressure ratio for determining the Transduce Setting or TS)

Example:

DLRDU = 1255 Ft

185 Ft Corner Arm Irrigating 4 corners

New 11.2 x 38 In Tires

High Speed (56 RPM)

Step 1. Determine the Transducer Setting From Graph A

*In this example the low pressure is 50 PSI and the high pressure is 84 PSI for a ratio of .59.

Per Graph A the TS = .77

Step 2. Determine the Field Configuration Constant from Table 1

**The FFC for a 185 ft corner span irrigating 4 corners of the field is .44 (Chart A).

Step 3.

$$\text{Hours/rev at 100\%} = \left[\frac{.105 \times 1255\ \text{ft}}{15.56\ \text{Ft/Min}}\right] \times \left[\frac{.44}{.77} + (1 - .44)\right]$$

$$= 8.5 \times (.57 + .56)$$

$$= 8.5 \times 1.13 = \textbf{9.6 Hrs Per Rev}$$

Pressure Regulated vs. Non-Regulated Revolution

The machine revolution time for a regulated sprinkler package is less compared to a non-regulated package (both with a pivot percentage timer setting of 100%). This is because a non-regulated machine slows down through the corners to maintain a uniform water distribution while the regulators automatically compensate or adjust for the corner area. The machine revolution time to apply a desired application depth will be less for a non-pressure regulated corner compared to a pressure regulated corner.

Determining the Application Rate and Depth

The application rate in inches per day (In/Day) is the maximum amount of water the corner machine can apply in a 24 hour period. It is necessary to know this value to determine the percent timer settings for applying the desired amount of water (inches). Again, calculating these amounts differ depending on whether the machine is equipped with pressure regulators or not. The same machines as previously illustrated will be used.

Example calculations will be shown with the machines used in the previous examples. The criteria is as follows:

- Gallons Per Minute (GPM) = 900
- Distance to Last Regular Drive Unit (DLRDU) = 1255 ft
- Corner Arm Span Length = 185 ft
- Effective Corner Length (ECL) = 256 ft (185 ft corner arm w/ 82 ft overhang)

  (NOTE: 276 ft for a 205 ft corner arm with an 82 ft overhang)
- End Gun Radius (EGR) = 97 ft
- Hours per Revolution @ 100% = 8.5 Hrs (Regulated Corner)
- Hours per Revolution @ 100% = 9.6 Hrs (Non-Regulated Corner)
- Transducer Setting (TS) = .77 (Non-Regulated)
- Field Configuration Constant (FCC) = .44 (Non-Regulated)

Corner Machine with Regulators

Examples:

APPLICATION RATE IN INCHES PER DAY

$$\text{Inches/Day (Application Rate)} = \frac{(\text{GPM}) \times (735.3)}{(\text{DLRDU} + \text{Eff. Corner Length} + \text{EGR})^2}$$

$$\textbf{Inches/Day (Application Rate)} = \frac{4{,}945{,}579}{(1255\text{ Ft} + 256\text{ Ft} + 97\text{ Ft})^2} = \frac{661{,}770}{2{,}585{,}664} = \textbf{.26 Inches/Day (24 Hrs)}$$

INCHES PER REVOLUTION (IN/REV) AT 100% PERCENT TIME SETTING

$$\text{Inches/Rev} = \frac{(\text{Hrs Per Rev}) \times (\text{In Per Day})}{24}$$

$$\text{Inches/Rev} = \frac{(8.5) \times (.26)}{24} = \textbf{.09 In}$$

Corner Machine without Regulators

Examples:

APPLICATION RATE IN INCHES PER DAY

$$\text{Inches/Day (Application Rate)} = \left[\frac{(\text{GPM}) \times (735.3)}{(\text{DLRDU} + \text{Eff. Corner Length} + \text{EG Radius})^2}\right] \times \left[\frac{(\text{FCC})}{\text{TS}} + (1 - \text{FCC})\right]$$

$$\textbf{Inches/Day (Application Rate)} = \left[\frac{(900) \times (735.3)}{(1255\text{ Ft} + 256\text{ Ft} + 97\text{ Ft})^2}\right] \times \left[\frac{.44}{.77} \times (1 - .44)\right]$$

$$= \left[\frac{661{,}770}{2{,}585{,}664}\right] \times \left[.57 + .56\right] = .26 \times 1.13 = \textbf{.29 Inches/Day}$$

INCHES PER REVOLUTION (IN/REV) AT 100% PERCENT TIME SETTING

$$\text{Inches/Rev} = \frac{(\text{Hrs Per Rev}) \times (\text{In Per Day})}{24}$$

Pre Operation

Percentage Timer Calculations Worksheet

Once the Application Rate in Inches per Day and the Inches per Revolution have been determined for your corner machine, the following table can be filled out to provide a guide to the Hours per Revolution and the Inches per Revolution at various percentage timer settings. Below is an example for the corner machine equipped with pressure regulators used in the previous examples. Blank copies of this worksheet are included in the Appendix of this manual. Based on the Hours per Revolution and the Inches per Revolution for your machine, you can fill out the worksheet to use as a Revolution Time and Application Depth guide.

PERCENTAGE TIMER SETTINGS

	Hrs/Rev at 100%				Hrs/Rev	Ins/Rev at 100%				Ins/Cycle	
100%	**8.5**					**.09 in**					
90%	8.5	÷	.9	=	**9.4**	.09 in	÷	.9	=	**0.10 in**	90%
80%	8.5	÷	.8	=	**10.6**	.09 in	÷	.8	=	**0.11 in**	80%
70%	8.5	÷	.7	=	**12.1**	.09 in	÷	.7	=	**0.13 in**	70%
60%	8.5	÷	.6	=	**14.2**	.09 in	÷	.6	=	**0.15 in**	60%
50%	8.5	÷	.5	=	**17.0**	.09 in	÷	.5	=	**0.18 in**	50%
40%	8.5	÷	.4	=	**21.3**	.09 in	÷	.4	=	**0.23 in**	40%
30%	8.5	÷	.3	=	**28.3**	.09 in	÷	.3	=	**0.30 in**	30%
20%	8.5	÷	.2	=	**42.5**	.09 in	÷	.2	=	**0.45 in**	20%
10%	8.5	÷	.1	=	**85.0**	.09 in	÷	.1	=	**0.90 in**	10%
5%	8.5	÷	.05	=	**170.0**	.09 in	÷	.05	=	**1.80 in**	5%

Percentage Timer/Application Depth Worksheet

Once the Application Rate in Inches per Day and the Inches per Revolution have been determined for the corner machine, the following table can be filled out to provide a guide to the Hours per Revolution and the Inches per Revolution at various percentage timer settings. Based on the Hours per Revolution and the Inches per Revolution for your machine, fill out the worksheet and use as a Revolution Time and Application Depth guide.

PERCENTAGE TIMER/APPLICATION DEPTH SETTINGS

	Hrs/Rev at 100%			Hrs/Rev	Ins/Rev at 100%			Ins/Cycle	
100%	_____				_____				
90%	_____	÷	.9	= _____	_____	÷	.9	= _____	90%
80%	_____	÷	.8	= _____	_____	÷	.8	= _____	80%
70%	_____	÷	.7	= _____	_____	÷	.7	= _____	70%
60%	_____	÷	.6	= _____	_____	÷	.6	= _____	60%
50%	_____	÷	.5	= _____	_____	÷	.5	= _____	50%
40%	_____	÷	.4	= _____	_____	÷	.4	= _____	40%
30%	_____	÷	.3	= _____	_____	÷	.3	= _____	30%
20%	_____	÷	.2	= _____	_____	÷	.2	= _____	20%
10%	_____	÷	.1	= _____	_____	÷	.1	= _____	10%
5%	_____	÷	.05	= _____	_____	÷	.05	= _____	5%

VALLEY PRECISION CORNER

Machine # _____ LOCATION _____ FIELD #_____

DLRDU _____ FT CORNER ARM LENGTH _____ FT SPEED ❑ STD ❑ HI

TIRE SIZE _____ PRESSURE REGULATORS Y N TS _____ FCC _____

Pre Operation

Chemical Application

The Valley Precision Corner can be utilized to uniformly apply agricultural chemicals or fertilizer on a timely basis.

Chemigate/Irrigate Switch

The Operator Interface Panel located on the steerable drive unit (SDU) includes a CHEMIGATE/IRRIGATE rocker switch on the inner panel door.

Chemigate Mode

This switch must be placed in the CHEMIGATE position anytime agricultural fertilizers or chemicals are being injected using a FIXED rate chemical injection pump. Failure to place the Chemigate/Irrigate switch to the CHEMIGATE mode will result in uneven application of the material being used. The application software is designed to control the speed of the machine based on the irrigated area to achieve uniform application of the material being applied. The Chemigate mode should only be chosen when applying fertilizers or other agricultural chemicals and does not depend on the presence or absence of pressure regulators. Water application will not be uniform while the machine is operated in the Chemigate mode.

Irrigate Mode

The IRRIGATE mode must be selected for application of irrigation water only. This will allow the machine to provide uniform water distribution. The Irrigate mode must also be used if fertilizer or agricultural chemicals are being applied with a variable displacement chemical injection pump. This holds true whether pressure regulators are or are not used on the machine.

The CHEMIGATE mode should only be used when applying fertilizer or agricultural chemicals using a fixed rate chemical injection pump regardless of the use of pressure regulators. Always return the CHEMIGATE/IRRIGATE switch to the IRRIGATE mode for normal corner water application.

Chemigation Calculations Example

The following procedure can be used to determine the amount of chemical or fertilizer required when chemigating with the Valley Precision Corner.

NOTE

•These formulas are only used for chemigation calculations and not for water application calculations! The Valley Precision Corner contains a software program specifically for chemigation.

CALCULATIONS

1. Calculate the acres under the center pivot spans.

$$\textbf{Acres Under Center Pivot} = \frac{(3.14)\ (\text{Distance to LRDU})^2}{43{,}560} = \frac{(3.14) \times (1{,}255\ \text{Ft})^2}{43{,}560\ \text{Sq Ft/Acre}} =$$

$$= \frac{(3.14)\ (1{,}575{,}025)}{43{,}560} = \frac{4{,}945{,}579}{43{,}560} = \textbf{113.5 Acres}$$

2. Calculate the minimum revolution time of the center pivot without the corner.

$$\textbf{Rev Time of Center Pivot} = \frac{(.105)\ (\text{Distance to LRDU})}{\text{Ft/Min}} = \frac{(.105)\ (1255\ \text{Ft})}{15.56\ \text{Ft/Min}} = \frac{131.78}{15.56}$$

$$= \textbf{8.47 Hrs}$$

NOTE

•If the machine is actually operated to determine the revolution time in lieu of the calculation in Step 2, the pivot percentage timer must be set at 100%, the Chemigate/Irrigate switch in the corner SDU Operator Interface panel must be in the IRRIGATE mode and the machine must be run without water.

Chemical Application
Chemigation Calculations - Example (Continued)

3. Calculate the volume of chemical needed for under the center pivot spans only.

Gallons of Chemical = (Gal/Acre Req) (Acres Under Pivot) = (1 Gal/Acre) (113.5 Acres)

= **113.5 Gallons**

4. Calculate the Chemical Injection Pump Rate.

$$\textbf{Injection Rate} = \frac{\text{Gallons of Chemical}}{\text{Rev Time of Center Pivot}} = \frac{113.5\ \text{Gal}}{8.47\ \text{Hrs}} = \textbf{13.4 Gal/Hr}$$

5. Determine the Acres under the Center Pivot and the Corner Arm.***

(Your Valley Dealer should supply you with this information.)

Example = **150 Acres**

NOTE

- **If the acres under the pivot and the corner arm are known, complete steps 6 and 7.**
- **If the acres under the pivot and the corner arm are not known and cannot be determined because of irregularities in the field layout, skip steps 5-7 and use steps 5.1 and 6.1. These steps will provide you with the total quantity of chemical or chemical solution needed for the area being covered by the center pivot and the comer**

6. Calculate the Volume of Chemical Needed for the Pivot and Corner Arm.

$$\textbf{Gallons of Chemical for Center Pivot And Corner} = \frac{\text{(Gal/Acre) x (Acres under Pivot and Corner)}}{\text{(1 Gal/Acre) x (150 Acres)}} = \textbf{150 Gallons}$$

7. Calculate the Chemigation Rotation Time at 100% Pivot Percentage Timer Setting.

$$\textbf{Chemigation Rotation Time} = \frac{\text{Gallons of Chemical}}{\text{Injection Rate}} = \frac{150\ \text{Gal}}{13.4\ \text{Gal/Hr}} = \textbf{11.2 Hrs}$$

(This is the **calculated** time it will take to apply the chemical to the field at a 100% percentage time setting.)

NOTE

- **Steps 5.1 and 6.1 - use if the number of acres is not known or can not be easily determined.**

5.1 Time one complete revolution of the center pivot and corner at 100% pivot percentage timer setting. The Chemigate/Irrigate switch must be in the CHEMIGATE mode. Operation of the machine can be performed running without water. Record this time for future use in other chemical application.

Example = **11.4 Hours**

(This is the **actual** time it will take to apply the chemical to the field at a 100% percentage timer setting.

6.1 Calculate the amount of chemical needed for the pivot and corner arm.

Gallons of Chemical = (Injection Rate) x (Actual Rev Time) = (13.4 Gal/Hr) x (11.4 Hrs)

= **152.8 Gallons**

Water application will not be uniform when operating in the CHEMIGATE mode.

The above chemigation procedure is intended as a guide only. Valmont Industries, Inc. assumes no liability for its accuracy or use thereof. For specific chemical recommendations contact your chemical supplier.

Pre Operation

Chemigation Application
Chemigation Worksheet

1. Acres Under Center Pivot = $\frac{(3.14) \times (\text{Distance to LRDU})^2}{43.560}$ = _____ (Acres - CP)

2. Rev. Time of Center Pivot = $\frac{(.105)\ (\text{Distance to LRDU})}{\text{Ft/Min}}$ = _____ (Hrs/Rev - CP)

3. Volume of chemical needed (Center pivot spans only) = (Gal/Acre Req.) x (Acres Under Pivot) = _____ (Gallons under CP)

4. Calculate the Chemical Injection Pump Rate = $\frac{\text{Gallons of Chemical}}{\text{Rev. Time of Center Pivot}}$ = _____ (Gallons/Hour)

5. Determine the Acres under the Center Pivot and the Corner Arm* = _____ (Acres - CP and Corner)

(Your Valley Dealer should supply you with this information. Go to 5.1 and 6.1 if information not available.)

6. Gallons of Chemical for Center Pivot and Corner = (Gal/Acre) x (Acres under Pivot and Corner) = _____ (Gallons-CP and Corner)

7. Chemigation Rotation Time = $\frac{\text{Gallons of Chemical}}{\text{Injection Rate}}$ = _____ (Calculated Chemigation Rotation Time)

(This is the **calculated** time it will take to apply the chemical to the field at a 100% percentage timer setting.)

NOTE

•Steps 5.1 and 6.1 - use if the number of acres (step 5) is not known or can not be easily determined.

5.1 Time one complete revolution of the center pivot and corner at 100% pivot percentage timer setting. The Chemigate/Irrigate switch must be in the CHEMIGATE mode. Operation of the machine can be performed running without water. Record this time for future use in other chemical applications.

(This is the **actual** time it will take to apply the chemical to the field at a 100% percentage timer setting.)

_____ (Actual Hours Per Revolution)

6.1 Calculate the amount of chemical needed for the pivot and corner arm.

= (Injection Rate) x (Actual Rev. Time) = _____ (Gallons-CP and Corner)

Corner Chemigation

The IRRIGATE/CHEMIGATE ROCKER SWITCH in the Operator Interface Panel **must be** set in the **CHEMIGATE** mode if a fixed rate chemical injection pump is being used. This is regardless of whether the machine is equipped with or without pressure regulators. The Chemigate mode achieves optimum application of chemicals or fertilizer throughout the entire field. The Irrigate/Chemigate switch **must be** returned to the **IRRIGATE** mode once chemigation is complete.

Water application will not be uniform when the machine is operated in the CHEMIGATE mode.

Record the number of hours required for one revolution for subsequent use in calculating chemical rates.

Chemigation Safety

Proper handling of crop protection chemicals by those involved in mixing, loading, and application is essential in order to minimize the risk of injury or intoxication. Therefore, safe handling procedures and body protection to reduce potential exposure to crop protection chemicals are absolutely essential. When dealing with chemical products, a simple formula to remember is:

RISK = TOXICITY (HAZARD) X EXPOSURE

The toxicity (hazard) is inherent in the product. The operator can't change that part of the formula. But one can reduce exposure and thereby reduce risk. Reduction of exposure risk is a principle that fits with every farm operation, from handling and applying chemicals to driving a farm tractor, an automobile or handling farm animals.

Methods and procedures to reduce exposure when handling crop protection chemicals take little time and in the long run pay great dividends. Knowledge of the toxicity of a product and the potential for exposure is essential for developing risk management strategies. For example, gasoline is extremely toxic and flammable. This is well understood, and we have learned how to handle it safely. No matter how toxic a substance may be, if the exposure is low enough, the risk can be minimized to an acceptable level.

Exposure Routes

Exposure occurs via four routes: (1) oral (mouth), (2) dermal (skin), (3) eyes and (4) inhalation (lungs). Each route of exposure can occur as the result of accidents, spills, broken hoses, poor personal hygiene (transporting chemicals to the mouth, eyes and pubic areas via the hands when eating, handling tobacco products and toileting). Each route of exposure can be significantly reduced by simply following basic principles for protection.

For example, field applicator exposure studies show the primary source of exposure is dermal (the skin) with the forearms and hands receiving the overwhelming majority. Wearing rubber gloves can reduce potential dermal exposure to the mixer, loader and applicator. Thus, by simply wearing appropriate chemical resistant gloves, and washing the gloves and hands following chemical handling, potential exposure by the dermal route can be significantly reduced. At the same time, transport of chemical residues to the mouth and eyes by unwashed hands can be minimized or essentially eliminated.

⚠ WARNING

- **HAZARDS MAY EXIST. CONSULT LOCAL AND STATE GUIDELINES WHEN APPLYING AGRICULTURE CHEMICALS MIXED WITH IRRIGATION WATER VIA MECHANIZED SPRINKLER EQUIPMENT. CONTACT YOUR CHEMICAL DEALER AND CHEMICAL EQUIPMENT MANUFACTURER FOR SETUP, CALIBRATION, AND OPERATING PROCEDURES.**
- **CONTAMINATION OF THE WATER SUPPLY MAY OCCUR IF EFFECTIVE SAFETY DEVICES ARE NOT INSTALLED/USED IN CONNECTION WITH INJECTION EQUIPMENT FOR CHEMIGATION. READ EPA LABEL IMPROVEMENT PROGRAM (PR NOTICE 87-1) AND ALL INSTRUCTIONS FOR CHEMICAL APPLICATIONS.**
- **AVOID EXPOSURE TO SPRINKLER SPRAY WHILE CHEMICALS ARE BEING INJECTED INTO IRRIGATION WATER.**
- **MAKE CERTAIN YOU HAVE COMPLIED WITH STATE AND LOCAL REGULATIONS REGARDING SAFETY EQUIPMENT, CERTIFICATION, CALIBRATION, AND OPERATION OF THE INJECTOR PUMP AND ASSOCIATED EQUIPMENT.**
- **MAKE CERTAIN FIRST AID AND FRESH WATER IS AVAILABLE IN CASE OF AN ACCIDENT. YOU MUST BE FAMILIAR WITH CLEAN UP PROCEDURES IN CASE OF A SPILL.**
- **USE OF PROTECTIVE CLOTHING AND EQUIPMENT AS RECOMMENDED WHEN HANDLING CHEMICALS. SAFETY GLASSES, GLOVES, BOOTS, PROTECTIVE OUTERWEAR AND A RESPIRATOR SHOULD BE WORN WHEN HANDLING AND WORKING WITH CHEMICALS.**

Pre Operation

Pivot Control Panels

The specific center pivot control panel used in conjunction with the Valley Precision Corner depends on the brand and model of the center pivot. Regardless of the panel used, It will have a Service/Run Rocker switch installed in the inner door of the pivot panel. This switch must be set in the RUN position for normal operation of the machine.

The SERVICE position is used for troubleshooting of the Valley Precision Corner and allows for operation of the corner from the Operator Interface Panel located on the corner machine SDU (Steerable Drive Unit).

The pivot panel also includes an oscillator for providing a signal to the buried guidance wire and auto reverse which is used in conjunction with the Operator Interface Panel.

⚠ WARNING

•NEVER OPERATE THE MACHINE WITH THE SERVICE/RUN SWITCH IN THE SERVICE POSITION. NORMAL OPERATION OF THE MACHINE REQUIRES THE SERVICE/RUN SWITCH BE IN THE RUN POSITION.

Percent Timer / Pivot Panel Speed Control

The operating speed of the machine is typically controlled by a percentage timer or some timing device that sends a signal to the Last Regular Drive Unit. The duration of the signal is dependent on the speed setting selected. The signal can be set from 0% to 100%.

The Valley Precision Corner Operator Interface Panel on the Steerable Drive Unit and the Last Regular Drive Unit Control Panel incorporate variable speed motor controllers called Dinverters. The signal from the pivot panel for establishing the speed of the last regular drive unit is received by a microprocessor in the Last Regular Drive Unit control panel.

Signals sent from the pivot panel speed control device(s) will vary in their cycle time(s) (30, 60, 120 cycle times, etc.). The LRDU microprocessor must monitor the signal from the pivot panel percentage timer for up to 200 seconds to determine the desired speed before it can tell the variable speed motor controller at the LRDU at what speed to operate the LRDU motor. This processing time is necessary to allow the Valley Precision Corner to be used with all Valley and other brands of control panels using all available percentage timer cycle times. The result of this is a delay of response from when the operator changes a speed setting on the percentage timer to when the change actually takes place at the LRDU. Shown below are three situations:

- Every time the machine is started it will begin moving at 25%. It will run at 25% for one cycle time (usually 60 seconds) then change speed to the pivot percentage timer setting for any setting other than 0% or 100%.
- If the speed is changed during normal operation to anything other than 0% or 100%, the speed of the LRDU will change in one cycle time (usually 60 seconds).
- If the machine is started at 100% or changed to 100% or 0%, it will take 200 seconds (3 minutes 20 seconds) to change speed.

Again, this process allows the Precision Corner to be used with all Valley control panels using all available percentage timer cycle times.

⚠ WARNING

•IF THE OPERATOR WERE TO CHANGE FROM ANY PIVOT PANEL PERCENT TIMER SETTING (OTHER THAN 0%) TO A 0% SETTING, THE MACHINE WOULD CONTINUE TO MOVE AT THE PREVIOUS SETTING FOR 200 SECONDS BEFORE CHANGING TO 0% AND STOPPING. FAILURE TO HEED THIS WARNING CAN RESULT IN EQUIPMENT DAMAGE OR PERSONAL INJURY.

Operator Interface Panel

Startup of the machine is done at the pivot control panel. The Operator Interface Panel (OIP) is only used to provide diagnostics for the corner and to attempt correction of a problem with the corner should one occur.

The OIP does include a CHEMIGATE/IRRIGATE switch. The switch must be set in the proper mode depending on whether the machine is to strictly irrigate or chemigate. Failure to do so will adversely affect the uniformity of distribution.

Operation

Startup Procedure - Irrigation Mode

1. Check the CHEMIGATE/IRRIGATE rocker switch in the Operator Interface Panel. It must be in the IRRIGATE mode for obtaining uniformity in water application when irrigating.
2. Turn on the main power supply (service disconnect).
3. Turn on the main disconnect in the pivot panel.
4. Place the Service/Run rocker switch in the RUN position.
5. Determine the speed setting for the desired depth of water application.
6. Start the machine in the appropriate direction.
7. Refer to the appropriate center pivot Owners Manual(s).
8. Set the percentage or electronic timer to the correct speed or application setting.

NOTE

- **Some computer based panels allow for directly setting the depth of water application which automatically sets the speed of the LRDU. Refer to the appropriate center pivot manufacturer's operators manual.**

9. Start the irrigation pump.
10. Visually check the center pivot and corner for proper operation.

Shutdown Procedure - Irrigation Mode

1. Shut off the center pivot.

⚠ WARNING

- **ALWAYS SHUT OFF THE CENTER PIVOT USING THE "STOP" BUTTON OR SWITCH. NEVER SHUT OFF THE MACHINE USING THE CONTROL PANEL DISCONNECT SWITCH OR THE SERVICE DISCONNECT SWITCH. FAILURE TO HEED THIS WARNING CAN RESULT IN EQUIPMENT DAMAGE OR PERSONAL INJURY.**

NOTE

- **Shutting the machine down will typically shut down the irrigation pump. If this is not the case, it will be necessary to shut the pump off. Again, use the STOP button or switch - never the pump panel disconnect switch.**

2. Turn the pivot control panel disconnect switch to OFF.
3. Turn the service disconnect switch to OFF.

Wet to Dry Operation

There may be instances where the operator wants to change directly from wet machine operation (irrigating) to dry machine operation (running dry). It is important the machine continue to operate when the pump (irrigation water) is shut off. Failure to do so can result in the inability to restart the machine dry until all water has drained from the pipeline. This is due to changes in the crowns of the spans which, cumulatively, change the overall machine length when water is shut off. This change in overall machine length can affect the corner span sensor and allow the span sensor safety to open. By allowing the machine to operate (continue to move) while changing from wet to dry operation, the appropriate distance between the LRDU and the SDU will be maintained assuring continued operation.

Wet to Dry Operating Procedure

1. Allow the machine to continue to operate.
2. Disengage the machine low pressure shutoff (if applicable).
3. Shut off the pump.

Operating Procedure for Chemigating

1. Determine the amount of chemical to be applied.
2. Preliminary Setting - CHEMIGATE/IRRIGATE SWITCH
   - If the chemical injector pump is a fixed rate pump: at the Operator Interface Panel on the SDU, place the CHEMIGATE/IRRIGATE rocker switch in the CHEMIGATE mode for obtaining uniformity in fertilizer or chemical application when irrigating.
   - If the chemical injector pump is a variable rate pump: at the Operator Interface Panel on the SDU, place the CHEMIGATE/IRRIGATE rocker switch in the IRRIGATE mode for obtaining uniformity in fertilizer or chemical application when irrigating.
3. Turn on the main power supply (service disconnect).
4. Turn on the main disconnect in the pivot panel.
5. Place the Service/Run rocker switch in the RUN position.
6. Determine the speed setting for the desired depth of water application.
7. Start the machine in the appropriate direction. Refer to the appropriate center pivot Operators Manual(s).
8. Set the percentage or electronic timer to the correct speed or application setting.

NOTE

•Some computer based panels allow for directly setting the depth of water application which automatically sets the speed of the LRDU. Refer to the center pivot appropriate manufacturer's operators manual.

9. Start the irrigation pump.
10. Start the Injection pump.
11. Visually check the center pivot and corner for proper operation.

⚠ WARNING

•HAZARDS MAY EXIST! CONSULT LOCAL AND STATE GUIDELINES WHEN APPLYING AGRICULTURAL CHEMICALS MIXED WITH IRRIGATION WATER VIA MECHANIZED SPRINKLER EQUIPMENT. CONTACT YOUR CHEMICAL DEALER AND CHEMICAL EQUIPMENT MANUFACTURER FOR SETUP, CALIBRATION AND OPERATING PROCEDURES.

•CONTAMINATION OF THE WATER SUPPLY MAY OCCUR IF EFFECTIVE SAFETY DEVICES ARE NOT INSTALLED/USED IN CONNECTION WITH INJECTION EQUIPMENT TOR CHEMIGATION. READ EPA LABEL IMPROVEMENT PROGRAM (PR NOTICE 87-1) AND ALL INSTRUCTIONS FOR CHEMICAL APPLICATIONS.

•AVOID EXPOSURE TO SPRINKLER SPRAY WHILE CHEMICALS ARE BEING INJECTED INTO IRRIGATION WATER.

•MAKE CERTAIN YOU HAVE COMPLIED WITH STATE AND LOCAL REGULATIONS REGARDING SAFETY EQUIPMENT, CERTIFICATION, CALIBRATION AND OPERATION OF THE INJECTOR PUMP AND ASSOCIATED EQUIPMENT.

•MAKE CERTAIN FIRST AID AND FRESH WATER IS AVAILABLE IN CASE OF AN ACCIDENT. YOU MUST BE FAMILIAR WITH CLEAN UP PROCEDURES IN CASE OF A SPILL.

•USE OF PROTECTIVE CLOTHING AND EQUIPMENT AS RECOMMENDED WHEN HANDLING CHEMICALS. SAFETY GLASSES, GLOVES, BOOTS, PROTECTIVE OUTERWEAR AND A RESPIRATOR SHOULD BE WORN WHEN HANDLING AND WORKING WITH CHEMICALS.

Safety

⚠ 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 59-1.

   FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See Figure 59-1.

2. SHUT OFF and lock the control panel main power disconnect. See Figure 59-2.

   FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See Figure 59-2.

⚠ 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.**

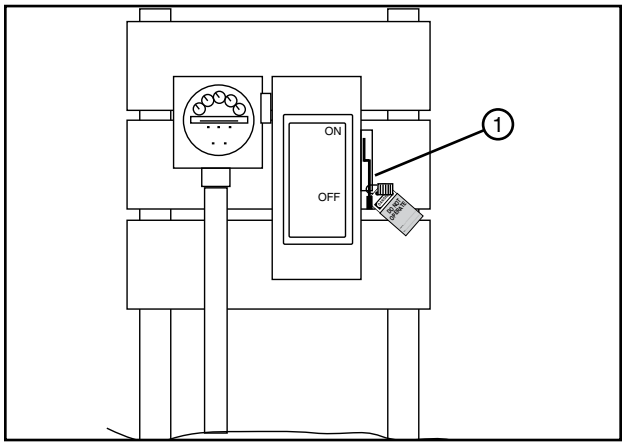


Figure 59-1 1. Public Power Service Disconnect

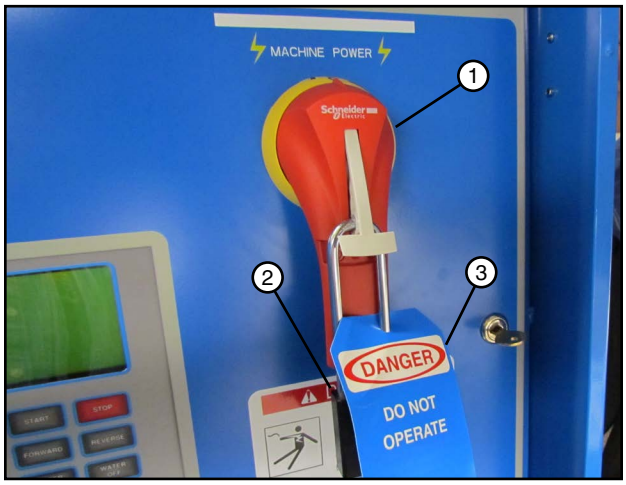


Figure 59-2 1. Main Disconnect
2. Lock
3. Blue Tag

Maintenance

Wheel Gearbox

NOTE

- **After the first operating season, change the oil in all wheel gearboxes, bell housings and gear motors.**
- **After the first oil change, change the wheel gearbox, bell housing and gear motor 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.**

1. Remove the drain plug from wheel gearbox, bell housing and gear motor. Drain oil into a container. See Figures 60-1 and 60-2.
2. Install the drain plugs after draining oil.
3. Clean all dirt away from the expansion chamber cap and remove the expansion chamber cap from the wheel gearbox. Do not allow dirt to fall into the gearbox when removing the cap. See Figure 60-3.
   - Make sure the vent holes on each side of the expansion chamber cap are open and unobstructed.
4. Remove fill plug and oil level plug from gear motor. See Figure 60-2.
5. Remove fill plug from bell housing. See Figure 60-2.
6. Fill the gear motor with Valley gear lube through fill plug hole until oil runs out of oil level hole. Install oil level and fill plug in gear motor.
7. Fill gearbox with Valley gear lube to the top of fill line on the inside of the gearbox or top of worm gear shaft. The capacity is approximately 6.5 quarts (6.2 liters). Allow time while refilling the gearbox for the oil to equalize between the bell housing and wheel gearbox. DO NOT over fill.
8. Fill bell housing with Valley gear lube to top of coupling as seen through the fill plug hole.

NOTE

- **Use only Valley Gear Lube. Other Lubricants may contain corrosive extreme pressure additives, which may damage components and void your warranty.**
- **The oil in worm gear cases may reach temperatures up to 200˚ F (94˚ C) without alarm.**

9. Install bell housing fill plug and wheel gearbox check plug. Then install the expansion chamber cap on wheel gearbox. Secure with original hardware and torque to 8 lb-ft (10.8 N·m). See Figure 60-3.

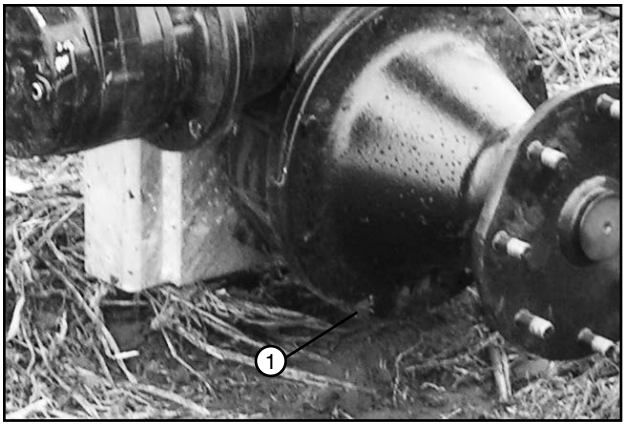


Figure 60-1 1. Wheel Gearbox Drain Plug

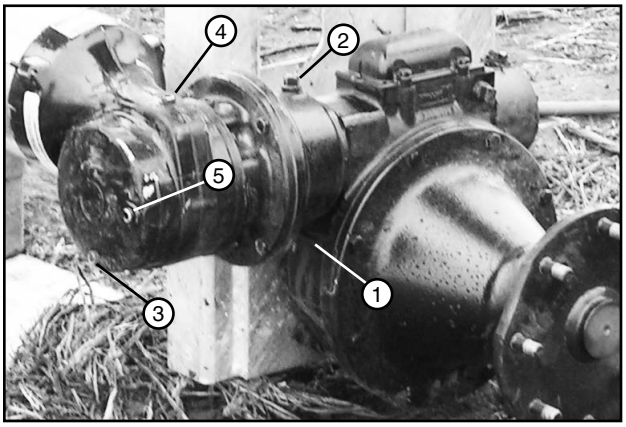


Figure 60-2 1. Drain Plug Bell Housing 4. Fill Plug Gear Motor
2. Fill Plug Bell Housing 5. Oil Level Plug Gear Motor
3. Drain Plug Gear Motor

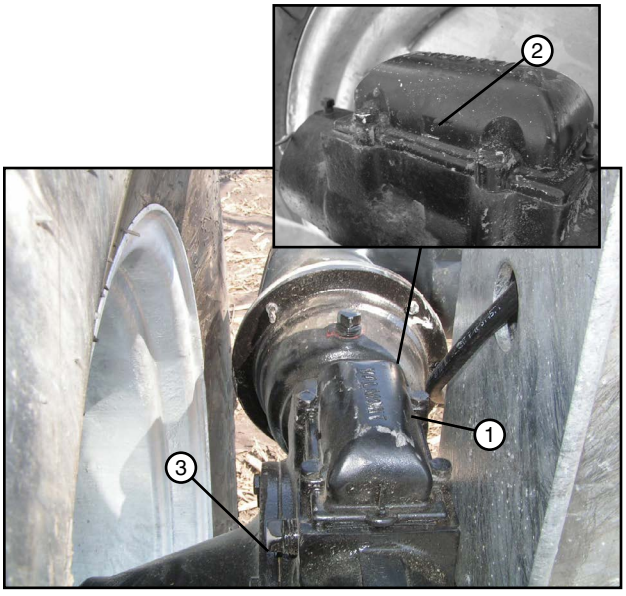


Figure 60-3 1. Expansion Chamber Cap
2. Vent Hole
3. Check Plug

Optional DualDrive Gearbox

NOTE

- **Elevation of one side tire using a block may-be required. This would allow better access to the fill plug.**

1. Loosen all lug nuts allowing one tire to tilt enough for the removal drain/fill plugs.
2. Remove the drain plug from center drive gearbox. Drain oil into a container. See Figures 61-1 and 61-2.
3. Install the drain plugs after draining oil.
4. Remove fill plug from gearbox. See Figure 61-2.
5. Fill gearbox with Valley gear lube to the fill line, approximately 2.5 gal (9.5 L), shown in Figure 61-2. Allow time while refilling the gearbox for the oil to equalize in the gearbox. DO NOT over fill.

NOTE

- **Use only Valley Gear Lube. Other Lubricants may contain corrosive extreme pressure additives, which may damage components and void your warranty.**
- **The oil in worm gear cases may reach temperatures up to 200˚ F (94˚ C) without alarm.**

6. Secure with original hardware and torque to 20 lb-ft (27 N·m).
7. Tighten lug nuts to 125 lb-ft (169.47 N·m).

Steering Gear Motor

NOTE

- **After every operating season, change the oil in the steering motor gearbox.**

1. Remove both the fill plug and drain plug from the steering motor gearbox, then drain the oil into a container. See Figure 61-1.
2. Install the drain plug after draining oil.
3. Fill the steering motor gearbox to .5 in (12.7 mm) below fill plug hole with Valley Gear Lube.
4. Install fill plug after refilling the gearbox.

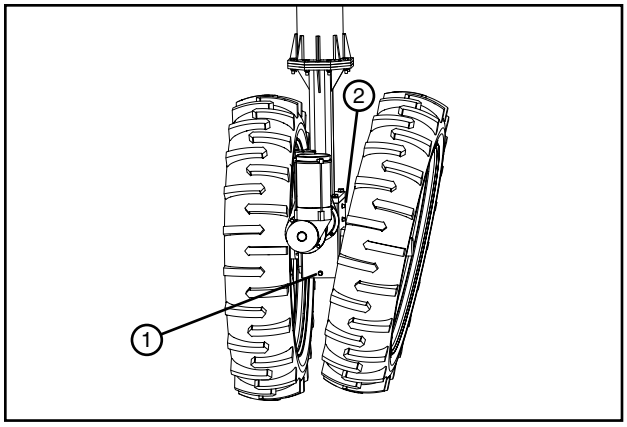


Figure 61-1 1. Drain Plug
2. Fill Plug

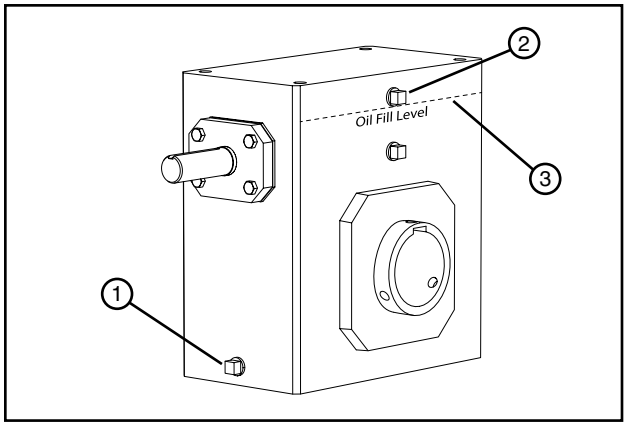


Figure 61-2 1. Drain Plug
2. Fill Plug
3. Oil Level

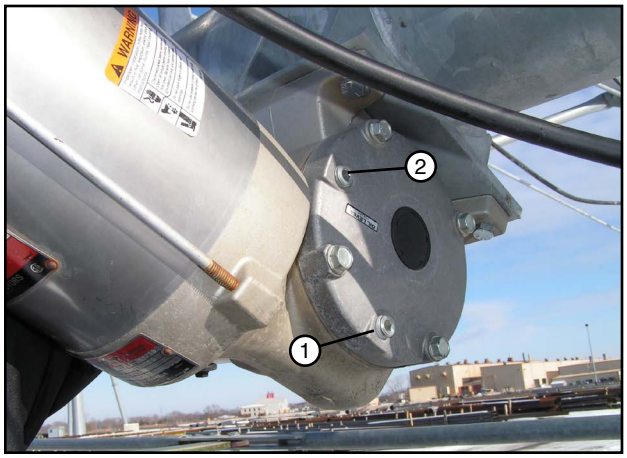


Figure 61-3 1. Drain Plug
2. Fill Plug

Steering Gearbox

NOTE

- **After every operating season, change the oil in the steering gearbox.**

Steering Gearbox will need to be removed to change gear lube. Fill steering gear box to the top of the worm with Valley Gear Lube. Capacity is approximately 1 gal (3.7 L).

NOTE

- **Use only Valley Gear Lube. Other lubricants may contain corrosive extreme pressure additives, which may damage components and void your warranty.**
- **The oil in worm gear cases may reach temperatures up to 200˚ F (94˚ C) without alarm.**

Wheel Lug Nut Torque

Check the wheel lug nut torque annually to make sure it is at 125 lb-ft (169.47 N·m). See Figure 62-2.

Tire Pressures

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

Check the tire pressure at these times during the year:

- At the start of the irrigation season
- Every month of the irrigation season
- When performing fall winterization or at the end of the irrigation season

For the correct tire pressure refer to the decal on the rim or the tire pressure chart. See Figure 62-3.

⚠ 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.**

Figure 62-1 1. Steering Gearbox

Figure 62-2 1. Tire and Wheel
2. Lug Nut

TIRE OPERATING PRESSURE

Allowed Tire Size (Inches)	Pounds per Square Inch (PSI)	Kilopascals (kPa)	Bar (bar)
14.9 x 24*	18**	124	1.2
16.9 x 24 - 6-Ply	16	110	1.1
18.4 x 26 - 6-Ply	16	110	1.1
11R x 22.5 Recap	30	206	2.1
11.2 x 24****	34	234	2.3
Dual Drive Option Allowed Tire Size Inches			
11.2 x 38 Non-Driectional - 4-Ply	23	158	1.5
11.2 x 38 - 6-Ply	34***	234	2.3

Figure 62-3 * The 14.9 x 24 Non-Directional - 6 Ply tire is not allowed on spans longer than 205 ft (62.4 m).
** Operating pressure may be reduced to 16 PSI / 110 kPa / 1.1 bar for increased floatation on all corner spans.
*** Operating pressure may be reduced to 23 PSI / 159 kPa / 1.1 bar for increased floatation on all corner spans longer than 205 ft (62.4 m).
**** Not allowed on spans longer than 205 ft (62.4 m).

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 63-1.

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.

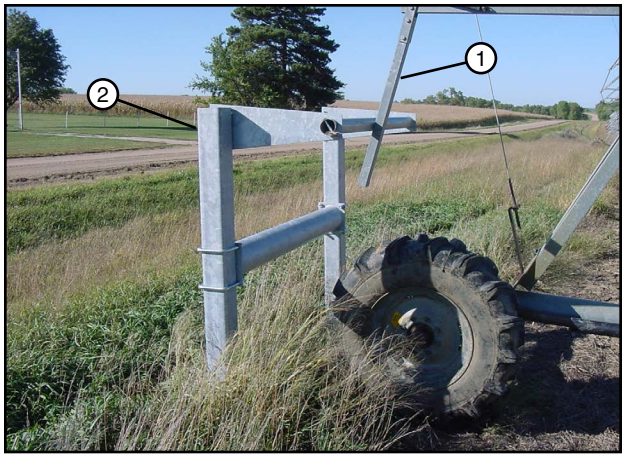


Figure 63-1 1. Actuator Arm
2. Barricade

Wheel Tracks

It is important to maintain wheel tracks. If left in a state of disrepair, wheel tracks can cause structural damage to the irrigation machine. See Figure 63-2.

- Wheel tracks should be maintained and controlled. A maximum allowable wheel track for machines is 8-10 in (20-25 cm) deep.
- Establish a wheel track with the first several revolutions of the machine at maximum speed and minimum water application depth.
- Deep ripping or chiseling in the wheel track area should be avoided.
- Wheel tracks can be controlled by various methods which include larger tires, dry wheel track sprinkler packages, boombacks, wide-flat berms, drag socks, etc. Wheel track depth can be controlled by using track fillers, tillers, discs, or flotation tires.
- If berms are built for wheel tracks it is recommended to have a width of 3 ft (1 m) to prevent slippage off the sides and compacted to prevent deep wheel tracks. Proper drainage may be required to prevent water buildup. Berms are not recommended for the steerable drive unit wheel tracks due to the potential variability of the wheel track from season to season.

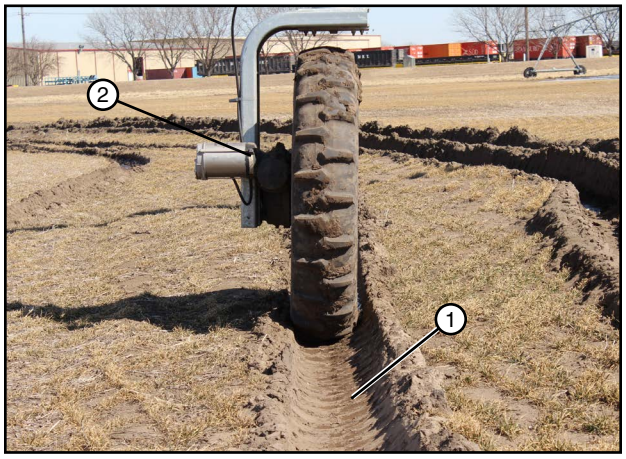


Figure 63-2 1. Wheel Track
2. Drive Unit

⚠ CAUTION

•OPERATOR INTERFACE PANEL IS LOCATED ON THE CORNER STEERABLE DRIVE UNIT (SDU). IT IS ACCESSED BY CLIMBING STEPS ON THE FORWARD SDU LEG TO OPERATOR PLATFORM. WET OR MUDDY CONDITIONS CAN RESULT IN SLIPPERY SURFACES.

•WATCH OUT FOR THE LOCATION OF THE STEERING ARM AND TIE ROD TO INSURE YOU DO NOT HIT YOUR HEAD OR SHOULDERS AS YOU MOVE UP SDU LEG AND NEVER ATTEMPT TO UTILIZE STEPS WHILE CORNER IS MOVING.

Miscellaneous

Hose Replacement

If the 4-1/2 in hose is sufficiently weather-cracked, checked, or leaking, you need to replace the hose. Follow the steps below to replace the 4-1/2 in hose. See Figure 64-1.

1. Loosen the hose clamps. See Figure 64-1.
2. Remove the old hose.
3. Slide the hose clamps over the new hose.

NOTE

- **To aid installation of the hose, a vegetable based soap or tire bead lubricant may be used to lubricate the barbed pipe. DO NOT use oil, grease, or other petroleum-based products.**

4. Slide the new hose onto each stub pipe until the hose contacts the hose stops.
5. Tighten the hose clamps. See Figure 64-1.

Contact your local Valley Dealer if you have any questions about replacing the 4-1/2 inch hose.

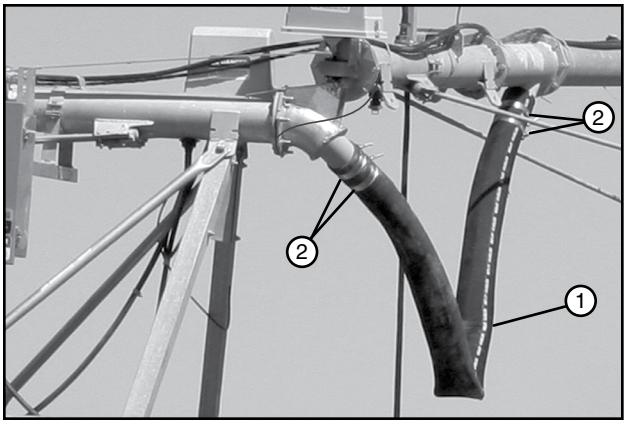


Figure 64-1 1. 4-1/2 In Hose
2. 4-1/2 In Hose Clamps

Electrical and Grounding Conductors

Check the condition of all electrical wires and grounding conductors regularly. See Figure 64-2.

Have your local Valley dealer repair or replace any broken conduit or electrical wire that has worn or cracked insulation.

Always make sure the ground wires are attached securely. See Figure 64-3.

Figure 64-2 1. Electrical Wires

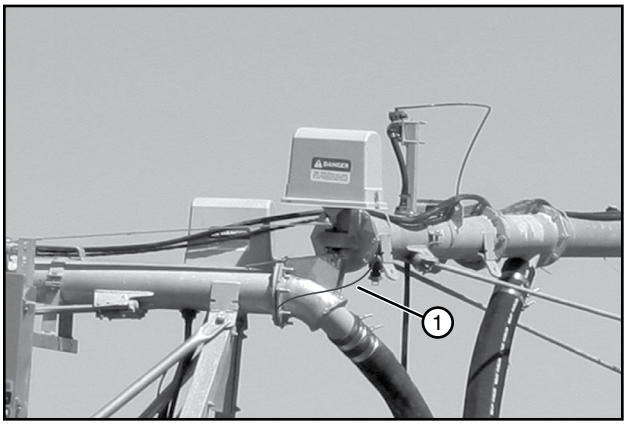


Figure 64-3 1. Ground Wire

Miscellaneous

Low Profile Offset Leg Bearing Lubrication

If the machine is a low profile machine, lubricate the low profile offset leg bearings every five to seven revolutions with a water-resistant lithium-based grease.

1. Lubricate the four grease fittings on each bearing flange. See Figure 65-1.

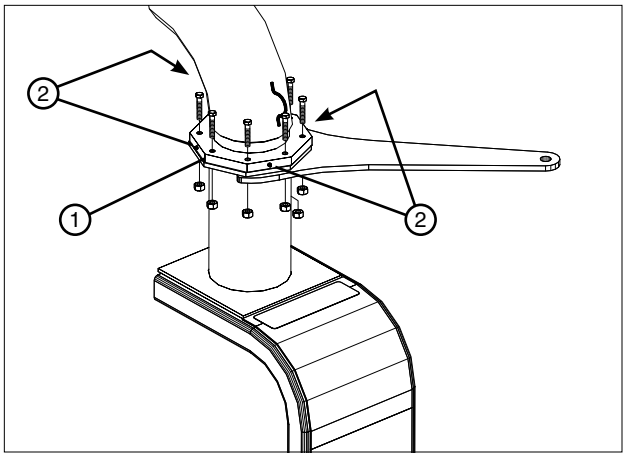


Figure 65-1 1. Low Profile Bearing Flange
2. Grease Fitting

End Gun Arc Setting Example

An end gun is installed at the end of the machine and is used to increase the area irrigated beyond the end of the machine. See Figure 65-2.

The end gun must be set to cover a specified area to ensure the best uniformity. This area is determined by two angles – the Forward and Backward end gun angles which are sometimes referred to as the end gun arc settings.

A line on the sprinkler chart for this machine specifies the correct end gun arc settings for the machine: see Figure 65-3.

END GUN ARC SETTING EXAMPLE:

FORWARD ANGLE = 45

BACKWARD ANGLE = 85

IMPORTANT: This is an example only. Refer to the sprinkler chart for this machine to determine the correct end gun arc settings.

These settings should initially be set by your Valley Dealer at time of installation and start up.

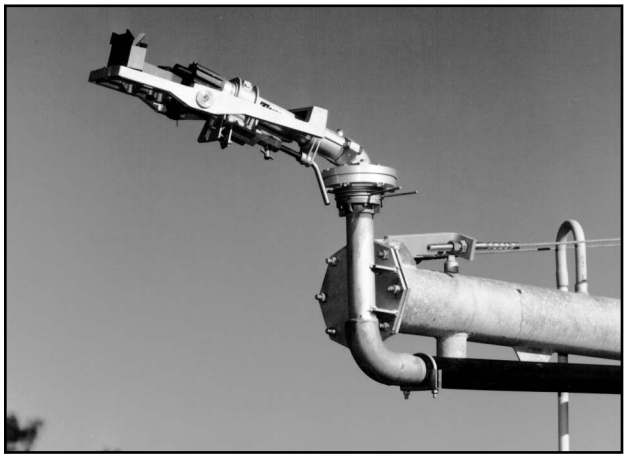


Figure 65-2 End Gun

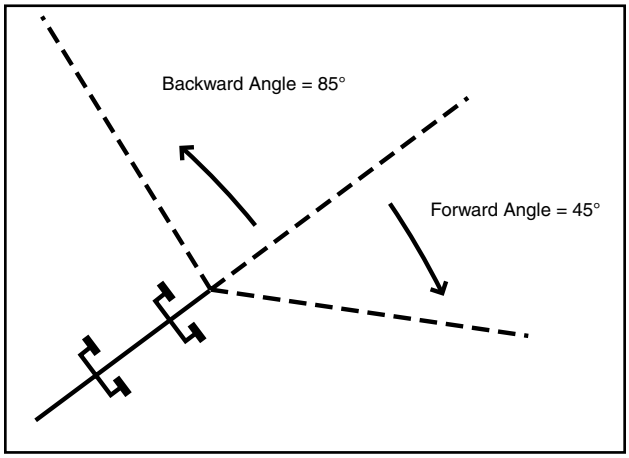


Figure 65-3

Maintenance

Annual 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 PARTS.

Span

	1st Pass	4th Pass	Pre-season	Remarks
Check flanges for leaks and tighten as required.			X	
Check pipe drains for proper drainage and invert the seal when applicable. (See Winterization procedure.)			X	These must be checked at end-of-season shutdown.
Check structural components for tightness.			X	
Check power cable for damage and proper banding to ensure proper attachment.			X	
Check equipment grounding conductors. Tighten or clean as required.			X	If your pivot is towable, check the grounding conductor hook-ups prior to start up each time the pivot is towed.
Check/clean cross filter.			X	
Check high pressure hose and poly pipe for leaks. Tighten clamps and bands as required.			X	

Sprinkler

	1st Pass	4th Pass	Pre-season	Remarks
Check the pivot pressure to make sure it matches the sprinkler package pressure.		X	X	Notify your Valley dealer of any changes.
Check sprinklers and nozzles for tightness.			X	
Check sprinkler for free movement.			X	
Check sprinkler nozzles for wear.		X	X	Increasing the engine RPM or drop in pressure indicates wear.
Check pressure gauge or pressure transducer for proper operation.			X	
Check for plugged or partially plugged nozzles.	X	X	X	
Flush entire machine.			X	See Flushing Procedure.
Check end gun bearing and brake setting.			X	
Ensure the booster pump hose is drained.				This should be done at end of season.
Check tubing harness for damage.				

Annual Maintenance

Steerable Drive Unit

	1st Pass	4th Pass	Pre-season	Remarks
Check the motor lead cable for damage.			X	Contact your Valley dealer if the outer insulating sheath is cracked.
Check for proper ground connection on motor and motor lead.			X	
Check each motor drain hole for proper drainage.			X	
Check steering gear box oil level.			→	See the Steering Gear Motor in the Maintenance section.
Drain and replace the steering gear motor lubricant.			→	See the Steering Gear Motor in the Maintenance section for frequency.
Check the gearmotor seals and gaskets.			X	
Check the steering drive shaft U-joints and U-joint covers.			X	
Check the gearbox seals and gaskets.			X	
Check and tighten the wheel lug bolts. (125 ft lbs torque).	X		X	When ever a lug nut is tightened, re-check lug nuts after the first revolution.
Check the tire pressure.			X	See Tire Pressure in the Maintenance section.
Clean gearbox ventilation hole in expansion chamber (3 times a year).			X	Ventilation holes must be kept open to extend the gearbox seal life.
Lubricate the low profile offset leg bearing if applicable.			→	See Low Profile Offset Leg Bearing Lubrication in the Maintenance section for frequency.
Check the wheel gearbox and gear motor oil levels.			X	See the Wheel Gearbox in the Maintenance section.
Drain and replace the wheel gearbox and gear motor lubricant.			→	See the Wheel Gearbox in the Maintenance section for frequency.
Grease SDU U-Joints if Dual Drive is present			X	

Overhang/Booster Pump

	1st Pass	4th Pass	Pre-season	Remarks
Check overhang cables for broken cable strands.			X	Replace if cables are damaged.
Clean and ensure operation of the end gun drain.			X	Always check at end-of-season shutdown.
Check and clean the sand trap.			X	As needed. See Winterization Procedure.
Check the end gun arc settings.			X	Refer to the sprinkler chart.
Check the end gun bearing and brake.			X	
Check the end gun nozzle for wear.			X	
Drain the booster pump and ensure that the booster pump is drained completely.				See Winterization Procedure.

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 machine 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.

⚠ 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.

NOTE

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

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 68-1.

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 steerable drive unit. See Figure 68-2.

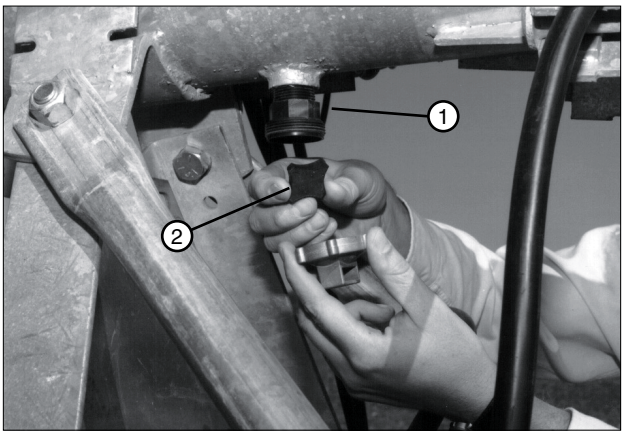


Figure 68-1 1. Pipe Drain
2. Rubber Seal

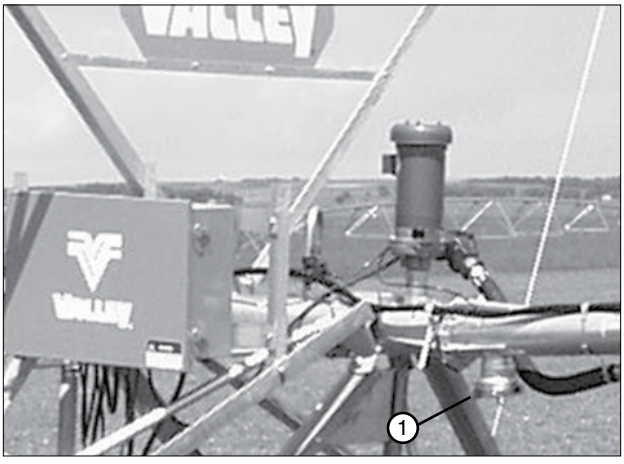


Figure 68-2 1. Sand Trap

Span Flushing Procedure

4. Remove plugs from the overhang drain. See Figure 69-1.
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.

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.**

7. Make sure the booster pump hose drain is not plugged with sand. See Figure 69-2.
8. Clean the solenoid valve cross filter or optional dirty water filter. See Figures 69-3 and 69-4.

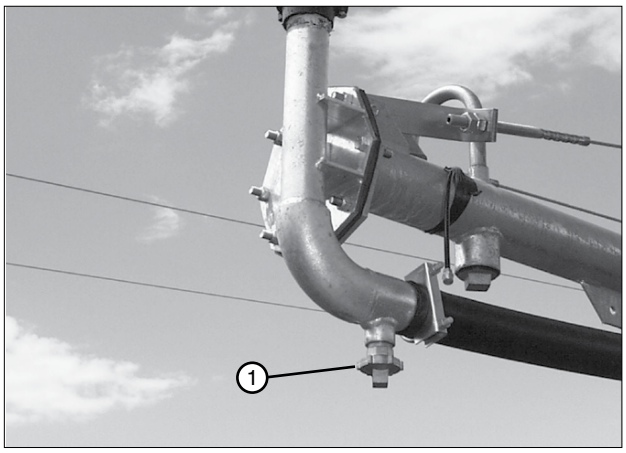


Figure 69-1 1. Overhang Drain

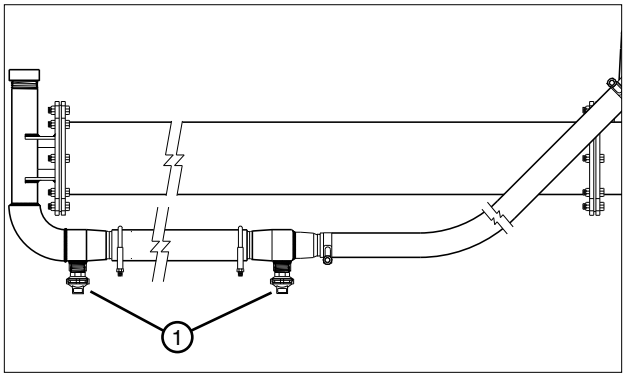


Figure 69-2 1. Booster Pump Hose Drain

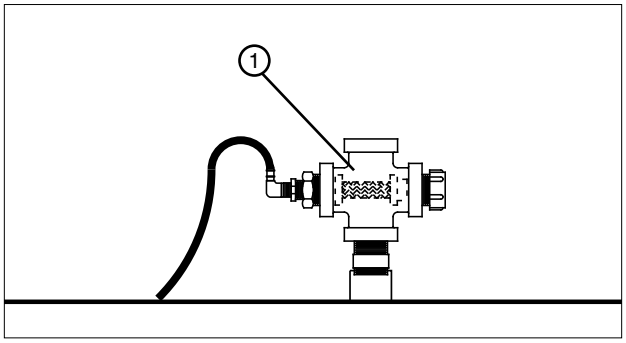


Figure 69-3 1. Cross Filter

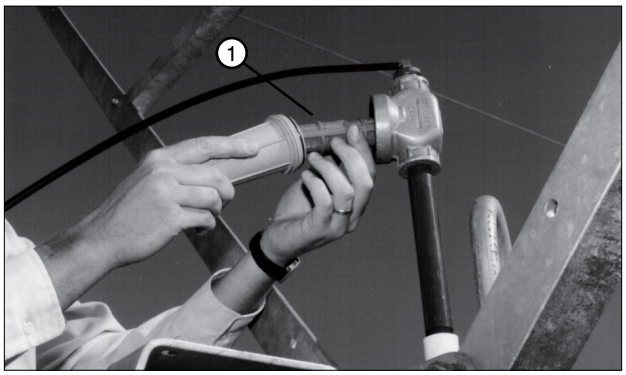


Figure 69-4 1. Optional Dirty Water Filter

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.

Important Information

A shutdown of the machine can be the result of a malfunction of the center pivot or of the corner. Refer to the appropriate center pivot and/or control panel operators manual(s) for information related to a malfunction on the center pivot portion of the machine. Correct the malfunction on the center pivot or contact your local Valley dealer for assistance.

The Valley Precision Corner includes software for corner diagnostics, automatically correcting some corner faults and automatically resetting some corner electronic component or software failures should they occur. The Operator Interface Panel provides an LED display of error codes related to corner faults. The Operator Interface Panel provides the operator the ability to correct certain faults that might occur. Use of the Operator Interface Panel requires a SERVICE/RUN switch in the pivot panel to be placed in the SERVICE position.

The operator may elect to attempt startup of the machine if he thinks the shutdown may have been caused by a power drop or some other non-machine related cause. If this is done, the operator needs to be aware the Valley Precision Corner includes software that has the ability to rectify certain corner faults. Depending on the type of fault, the pivot contactors may engage and hold in when a startup attempt is made leading the operator to conclude everything is OK. On certain faults, the correction or reset program(s) can take up to 3 minutes to complete the correction or reset process. The pivot panel contactor can remain engaged for this period of time then drop out. If the machine is restarted after a non-operator initiated shutdown (operator intentionally shutting the machine OFF), the operator must wait for 3 minutes before leaving the pivot panel to assure the automatic correction or reset program(s) have been successfully completed and the machine is operating properly. Some software auto-correcting or reset programs will take less than 3 minutes. If the pivot contactor will not hold in (stay engaged) or drops out within the 3 minute period, then there is a problem on the center pivot or corner and it must be isolated and corrected.

In a few instances it is beneficial to install the Valley Precision Corner in the leading position (corner operates ahead of the last regular drive unit when the machine is operating in the forward or clockwise direction). The troubleshooting procedures contained in this manual are for corner machines operating in the trailing position. This means the corner follows the center pivot when the pivot is operated in the forward (clockwise) direction. Use of the controls in the Operator Interface Panel for a corner installed in the leading position will differ from those of a trailing corner. Contact your Valley Dealer for specific instructions.

Troubleshooting Overview

The Valley Center Pivot and the Precision Corner include a number of electromechanical and software safeties that protect the machine from structural or other damage should a malfunction occur on the pivot or the corner. Corner safeties include the following:

- Span Compression/Tension Safeties (Software and Mechanical Safeties)
- Guidance Safety
- Over-Extension/Under-Retraction Safety
- Steering Hardware Safety

Typical center pivots include alignment and over-watering safeties (refer to the appropriate Center Pivot and/or Center Pivot Control Panel Operator Manuals for specific information regarding these safety circuits and troubleshooting of the same).

The Valley Precision Corner incorporates an Operator Interface Panel that provides an LED (Light Emitting Diode) display for showing the status of the corner and controls to allow for operation and possible correction of certain corner machine malfunctions should they occur. The Operator Interface Panel is for use by the operator and by the Valley Dealer Service Representative. Some malfunctions should only be corrected by Factory Trained Valley Dealer Service Personnel. The operator should not attempt to correct these malfunctions. The troubleshooting guide Indicates which ones may be corrected by the operator and which ones must be corrected by the dealer. Even though most of the errors (faults) listed can only be corrected by Valley Trained Dealer Service Personnel, it is of benefit for the service person to know the error code indicated when calling for service. Error codes (Er) potentially correctable by the Operator are in “BOLD” text in the chart on the next page.

Troubleshooting

Error Codes

Error Code	Error (fault)	Error Explanation	Correctable By
Er01	Software CSUM	Software download Incomplete	Dealer Only
Er02	Setup Constants	Set-up parameters are not within range	Dealer Only
Er03	Communications	Boards are not talking or both think they are LRDU or SDU	Dealer Only
Er04	Software Version	Different versions of software used on both LRDU and SDU	Dealer Only
Er05	LRDU Power Supply	Bad Power Supply	Dealer Only
Er06	SDU Power Supply	Bad Power Supply	Dealer Only
Er07	Drive Enable Bypass Rly	VSD enable relay or drive VSD relay (K4) circuit bad	Dealer Only
Er08	**Swing Tower Box Fault**	**Safety failure in Guidance box**	**Corner has over-steered, steered off the buried perimeter wire or had a failure of a guidance component** **If the corner is on the wheel track contact Dealer**
Er10	LRDU Fault	Drive Motor of VSD Fault	Dealer Only
Er11	SDU Fault	Drive Motor or VSD Fault	Dealer Only
Er12	Inclinometer Fault	Bad Tilt Sensor LRDU is at 15 degrees or greater	Dealer Only
Er13	Side Load Sensor Fault	One motor has stopped Side load present on SDU	Dealer Only
Er14	Span Sensor Micro SW	Potentiometer is adjusted incorrectly with respect to mechanical switch	Dealer Only
Er15	**Auto Correct Failed**	**Machine Stuck** **VSD Malfunction**	**Attempt auto correct at the SDU**
Er16	**Span Sensor Fault**	**Span Sensor Fault**	**Operator/Dealer attempt auto correct**
Er17	Pressure Fault	Transducer shorted out or wired wrong	Dealer Only
Er18	Corner Angle Fault	Bad angle sensor potentiometer, mislaid wire, or inverted corner	Dealer Only
Er19	LRDU Timeout Waiting	LRDU stopped for 300 seconds waiting for SDU to catch up or SDU stuck or stopped.	Dealer Only
Er20	Override Table Checksum Fault	Incomplete or corrupt override table	Dealer Only

Terms

- LRDU: Last Regular Drive Unit
- SDU: Steerable Drive Unit
- OIP: Operator Interface Panel
- LED: Light Emitting Diode
- Er: Error
- Fault: Open Safety/Safety Circuit

Tips

⚠ WARNING

•NEVER TROUBLESHOOT THE CORNER MACHINE WITH THE IRRIGATION PUMP OPERATING (MACHINE IRRIGATING).

NOTE

•All corner troubleshooting and/or operation of the corner from the Operator Interface Panel must be performed with the pivot panel Service/Run switch in the SERVICE position.

Most all center pivot control panels include a spring loaded Safety Override switch or button. This Safety Override is used in conjunction with the center pivot and must be used with caution. The pivot control panel Safety Override switch or button DOES NOT override the safeties at the LRDU or on the Valley Precision Corner.

Error Codes, should a fault occur at the LRDU or on the Corner, are displayed on the LED in the Operator Interface Panel. The Error Codes appear sequentially with the lowest code being shown first. This means if two faults should occur, the LED will display the lowest Error Code # first. If there is a second Error Code #, it will appear after the first Error Code is rectified. Once the last Error Code is rectified, the display will show “rUn”.

Span Sensor Safeties

Error 16 (Span Sensor Fault) can be a fault on one of two Span Sensor Safeties: the Span Sensor Software Safety or the Span Sensor Mechanical Safety (Span Sensor Microswitch).

The Span Sensor Software Safety shuts the machine down but allows for attempting to correct the fault or problem through the controls in the Operator Interface Panel.

- If Er16 (Span Sensor Fault) is displayed on the LED and the Corner Safety Fault light is off, the failure is a Span Sensor Software Safety.

The Span Sensor Mechanical Safety protects the corner should the corner span experience additional tension or compression than what the Span Software Safety allows. If the Mechanical Span Sensor Safety is faulted (open), the controls in the Operator Interface Panel on the SDU will not function. In this situation the Dealer must be called to correct the problem.

- If the Er16 is displayed and the Corner Safety Fault Light is ON, the Mechanical Span Sensor Safety may be broken (open). It is possible, although unlikely, to have both an Er08 and an Er16 Error Code or Fault at the same time. The Er08 fault would be shown on the LED but the Er16 would not be shown until the Er08 fault was corrected. To determine what the specific fault or faults are, press the Steering Override Button.

Press The Steering Override Button:

- If the Corner Safety Fault light goes OFF, there is a Span Sensor Software Safety Fault and a Swing Tower Box Safety Fault.
- If the Corner Safety Fault light stays ON, then there is a Span Sensor Mechanical Safety Fault and the Valley Dealer must be called to rectify the fault.

NOTE

•An Er16 Span Sensor Software Safety Fault will not result in the Corner Safety Fault light going ON. In this situation it is not necessary to press the Steering Override to move the SDU with the Swing Tower Forward/Reverse rocker switch.

Troubleshooting

Swing Tower Box Safeties

Er08 (Swing Tower Box Fault) with the Corner Fault light ON: If the Steering Override button is depressed and the Corner Fault light goes OFF, guidance/steering is the problem (Swing Tower Box Fault). The display on the LED will change to “rUn” when the Steering Override button is depressed.

⚠ WARNING

- **IF EITHER THE STEER-IN OR STEER-OUT CONTACTOR IN THE SDU BOX IS STUCK, STRUCTURAL DAMAGE WILL OCCUR IF THE STEERING OVERRIDE SWITCH IS HELD IN. THE STEERING ARMS START TO BECOME PARALLEL WITH THE STEERING TIE ROD AND THE TIE ROD BEGINS TO BOW, IMMEDIATELY RELEASE THE STEERING OVERRIDE BUTTON TO PREVENT STRUCTURAL DAMAGE. CONTACT YOUR VALLEY DEALER FOR SERVICE.**

General

Pressing and holding the start button will allow you to operate the Corner Machine from the SDU or SDU OIP. While holding the Start button the percent that it first toggles to pivot by 10% increments then 10 - 20 - 30 etc. When the button is released the machine is allowed to move at that speed.

The LRDU is allowed to move when the corner is operated from the Operator Interface Panel. The machine will continue to run at this speed for 15 minutes. After 15 minutes, the Machine Start switch can be depressed for another 15 minutes of operation.

⚠ WARNING

- **ALWAYS PRESS THE MACHINE STOP SWITCH BEFORE LEAVING THE OPERATOR PLATFORM. NEVER ATTEMPT TO CLIMB UP THE SDU OR GET OFF THE SDU WHILE THE MACHINE IS MOVING. PRESSING THE OPERATOR INTERFACE PANEL MACHINE START/STOP ROCKER SWITCH TO THE STOP POSITION WILL STOP THE LRDU AND THE SDU.**
- **ONCE THE STOP BUTTON IS PRESSED, THE BOARDS WILL READ STOP. THE POWER AT THE MAIN CONTROL PANEL WILL HAVE TO BE TURNED OFF AND THEN BACK ON TO CLEAR THE STOP BEFORE THE CORNER IS ALLOWED TO MOVE AGAIN. COULD ALSO PRESS THE START BUTTON AT THE SDU SO THAT PIVOT IS SHOWN AND IT WILL RUN OFF THE PANEL % TIMER.**
- **WHEN THE PIVOT PANEL SERVICE/RUN SWITCH IS IN THE SERVICE POSITION, THE OPERATOR INTERFACE PANEL STOP ROCKER SWITCH DOES NOT SHUT POWER OFF TO THE MACHINE. SHUTTING POWER OFF TO THE MACHINE MUST BE DONE AT THE CENTER PIVOT CONTROL PANEL.**

NOTE

- **If the corner is attached to the front side of the center pivot (leading corner), the procedures for troubleshooting and use of the operator interface panel will vary from the procedures covered In this section. Contact your Valley dealer for assistance.**

Corrective Procedures - Operator Interface Panel

Span Sensor Safety Fault Situation Table

SITUATION #	ERROR CODE	FAULT	COMPRESSION LIGHTS	TENSION LIGHTS	CORNER SAFETY FAULT LIGHT	PROBLEM	CORRECTIVE ACTION
#1*	ER16	Span Sensor (Software Safety)	**Both ON**	Both OFF	OFF	LRDU/SDU too close	Jog SDU away from LRDU*
#2**	ER16	Span Sensor (Software Safety)	Both OFF	**Both ON**	OFF	LRDU/SDU too far apart	Jog SDU Toward LRDU**
#3	ER16	Span Sensor (Software Safety)	Both OFF	**Both ON**	**ON**	LRDU/SDU too far apart	**Perform Auto Correct Procedure**
#4	ER16	Span Sensor (Software Safety)	**Both ON**	Both OFF	**ON**	LRDU/SDU too close	**Perform Auto Correct Procedure**

*The cause of fault must be determined and corrected before attempting to jog (move) the SDU away from the LRDU. An example of mechanical causes for a compression shutdown might include the SDU sliding ahead off a ridge or bed for a machine operating in the forward direction. If the machine was operating in reverse, the fault could be the SDU spinning out on a ridge or bed, a flat tire on SDU, a defective SDU gearbox, the SDU stuck, etc. If the cause of the fault can not be readily identified and/or corrected, the dealer must be contacted.

**The cause of fault must be determined and corrected before attempting to jog (move) the SDU toward the LRDU. Examples of causes for a tension shutdown include a flat tire on SDU, a defective SDU gearbox, the SDU stuck, etc. When operating the machine in the forward direction. If the machine was operating in the reverse direction, the cause could be the SDU sliding off a ridge or bed. If the cause of the fault can not be readily identified and/or corrected, the dealer must be contacted.

Auto Correct Procedure

To perform an auto correct press the machine start button at the same time as the jog forward button and then release. The smart board will say AUTO. The SDU and LRDU should automatically jog the correct direction until the safety fault is resolved. If doing this procedure does not resolve the issue, contact your Valley Dealer.

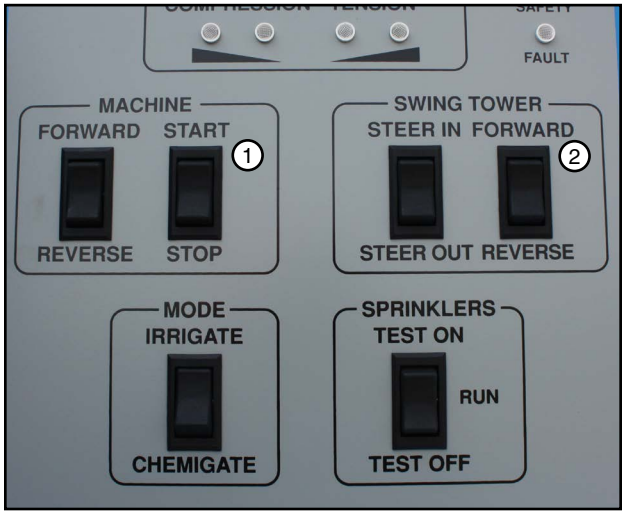


Figure 75-1 1. Start/Stop Switch
2. Forward/Reverse Switch

Troubleshooting

Situation #1, Er16 - Span Sensor Fault

- Both Compression Lights are ON.
- Corner Safety Fault Light is OFF.
- Problem: SDU is TOO CLOSE to LRDU.
- Corrective Action: Jog SDU away from LRDU.

> **⚠ WARNING**
>
> **•NEVER PERFORM THIS PROCEDURE WHILE PUMPING WATER TO THE MACHINE.**

At Pivot Panel

1. Turn the Main Disconnect Switch ON at the Pivot Panel.
2. Enable and/or set the pivot control panel in the Auto-Reverse mode.
3. Place the irrigation pump in the OFF position.
4. Place the SERVICE/RUN switch in the SERVICE position.
5. Go to the SDU.

At Operator Interface Panel on the SDU

1. Carefully access the service platform on SDU.

> **⚠ CAUTION**
>
> **•ACCESS THE SERVICE PLATFORM WITH EXTREME CARE! THE ACCESS STEPS MAY BE SLIPPERY IF MUD OR MOISTURE ARE PRESENT ON THE FEEL ALSO WATCH OUT FOR THE LOCATION OF THE STEERING ARM AND TIE ROD TO INSURE YOU DO NOT HIT YOUR HEAD OR SHOULDERS AS YOU MOVE UP THE SDU LEG.**

2. Open the outer door on the Operator Interface Panel.
3. Verify the Error Code and Indicator Lights match Situation #1, Er16.
4. Fix the cause of the shutdown.
5. Jog (move) the SDU AWAY from the LRDU by pressing the SWING TOWER FORWARD/REVERSE rocker switch to REVERSE.

> **⚠ CAUTION**
>
> **•WHEN THE CORNER SPAN IS IN COMPRESSION, ALWAYS MOVE THE CORNER AWAY FROM THE LRDU. MOVING THE SDU THE WRONG DIRECTION MAY CAUSE THE MECHANICAL SPAN SENSOR SAFETY TO TRIP WHICH WILL MAKE THE OPERATOR INTERFACE PANEL SWING TOWER CONTROLS INOPERABLE AND REQUIRE THE VALLEY DEALER TO BE CALLED.**

   - As the SDU and LRDU move apart, the Compression Lights will sequentially go out. Move the SDU until no compression or tension lights are on (lit).
   - Error 16 (Er16) on the LED will change to “rUn”. The Variable Speed Drives will display the Hertz value (speed of the SDU) while the SWING TOWER DIRECTION SWITCH is being depressed then will display “rdy” once the switch is released.

6. Press the MACHINE DIRECTION ROCKER SWITCH to the desired direction of operation (FORWARD or REVERSE operation).
7. Press the MACHINE START/STOP rocker switch to START. This will start the LRDU moving for 15 minutes.
8. Monitor the LRDU and sou movement.
9. Once the LRDU and SDU are moving smoothly and in unison, press the MACHINE START/STOP rocker switch to the STOP position.
10. Close and latch the outer door on the Operator Interface Panel.
11. Carefully climb down from the SDU and return to the pivot panel.

Situation #1, Er16 - Span Sensor Fault (Continued)

At the Pivot Panel

1. Place the SERVICE/RUN switch in the RUN Position.

NOTE

- **Failure to do so will prevent the LRDU from running. If the machine Is started from the pivot panel while the Service/Run switch Is In the SERVICE position, the pivot contactor will engage and hold in but the LRDU will not move. Once the over-watering timer on the center pivot times out, the contactor will drop out.**

2. Disable or turn off the Auto-Reverse if the function is not needed/desired for normal operation.
3. Reengage the pump/pivot tie-in for automatic control of the machine and pump.
4. Start the machine in the desired direction and at the appropriate speed.
5. Close and latch the outer pivot panel door.

At the LRDU/SDU

1. Check for proper operation of the corner.

Situation #2, Er16 - Span Sensor Fault

- Both Tension Lights are ON.
- Corner Safety Fault Light is OFF.
- Problem: SDU is TOO FAR from LRDU.
- Corrective Action: Jog SDU toward LRDU.

⚠ WARNING

•NEVER PERFORM THIS PROCEDURE WHILE PUMPING WATER TO THE MACHINE.

At Pivot Panel

1. Turn the Main Disconnect Switch ON at the Pivot Panel.
2. Enable and/or set the pivot control panel in the Auto-Reverse mode.
3. Place the irrigation pump in the OFF position.
4. Place the SERVICE/RUN switch in the SERVICE position.
5. Go to the SDU.

At Operator Interface Panel on the SDU

1. Carefully access the service platform on SDU.

⚠ CAUTION

•ACCESS THE SERVICE PLATFORM WITH EXTREME CARE! THE ACCESS STEPS MAY BE SLIPPERY IF MUD OR MOISTURE ARE PRESENT ON THE FEEL ALSO WATCH OUT FOR THE LOCATION OF THE STEERING ARM AND TIE ROD TO INSURE YOU DO NOT HIT YOUR HEAD OR SHOULDERS AS YOU MOVE UP THE SDU LEG.

2. Open the outer door on the Operator Interface Panel.
3. Verify the Error Code and Indicator Lights match Situation #2, Er16.
4. Fix the cause of the shutdown.
5. Jog (move) the SDU TOWARD from the LRDU by pressing the SWING TOWER FORWARD/REVERSE rocker switch to FORWARD.

⚠ CAUTION

•WHEN THE CORNER SPAN IS IN COMPRESSION, ALWAYS MOVE THE CORNER AWAY FROM THE LRDU. MOVING THE SDU THE WRONG DIRECTION MAY CAUSE THE MECHANICAL SPAN SENSOR SAFETY TO TRIP WHICH WILL MAKE THE OPERATOR INTERFACE PANEL SWING TOWER CONTROLS INOPERABLE AND REQUIRE THE VALLEY DEALER TO BE CALLED.

   - As the SDU moves toward LRDU, the Tension Lights will sequentially go out. Move the SDU until no compression or tension lights are on (lit).
   - Error 16 (Er16) on the LED will change to “rUn”. The Variable Speed Drive will display the Hertz value (speed of the SDU) while the SWING TOWER DIRECTION SWITCH is being depressed then will display “rdy” once the switch is released.

6. Press the MACHINE DIRECTION ROCKER SWITCH to the desired direction of operation (FORWARD or REVERSE operation).
7. Press the MACHINE START/STOP rocker switch to START. This will start the LRDU moving for 15 minutes.
8. Monitor the LRDU and sou movement.
9. Once the LRDU and SDU are moving smoothly and in unison, press the MACHINE START/STOP rocker switch to the STOP position.
10. Close and latch the outer door on the Operator Interface Panel.
11. Carefully climb down from the SDU and return to the pivot panel.

Situation #2, Er16 - Span Sensor Fault (Continued)

At the Pivot Panel

1. Place the SERVICE/RUN switch in the RUN Position.

NOTE

- **Failure to do so will prevent the LRDU from running. If the machine Is started from the pivot panel while the Service/Run switch Is In the SERVICE position, the pivot contactor will engage and hold in but the LRDU will not move. Once the over-watering timer on the center pivot times out, the contactor will drop out.**

2. Disable or turn off the Auto-Reverse if the function is not needed/desired for normal operation.
3. Reengage the pump/pivot tie-in for automatic control of the machine and pump.
4. Start the machine in the desired direction and at the appropriate speed.
5. Close and latch the outer pivot panel door.

At the LRDU/SDU

1. Check for proper operation of the corner.

Situation #3, Er16 - Span Sensor Fault

- Both Tension or Compression Lights are ON.
- Corner Safety Fault Light is ON.
- Problem: SDU is TOO far away or TOO close to LRDU.

⚠ WARNING

•NEVER PERFORM THIS PROCEDURE WHILE PUMPING WATER TO THE MACHINE.

At Pivot Panel

1. Turn the Main Disconnect Switch ON at the Pivot Panel.
2. Enable and/or set the pivot control panel in the Auto-Reverse mode.
3. Place the irrigation pump in the OFF position.
4. Place the SERVICE/RUN switch in the SERVICE position.
5. Go to the SDU.

At Operator Interface Panel on the SDU

1. Carefully access the service platform on SDU.

⚠ CAUTION

•ACCESS THE SERVICE PLATFORM WITH EXTREME CARE! THE ACCESS STEPS MAY BE SLIPPERY IF MUD OR MOISTURE ARE PRESENT ON THE FEEL ALSO WATCH OUT FOR THE LOCATION OF THE STEERING ARM AND TIE ROD TO INSURE YOU DO NOT HIT YOUR HEAD OR SHOULDERS AS YOU MOVE UP THE SDU LEG.

2. Open the outer door on the Operator Interface Panel.
3. Verify the Error Code and Indicator Lights match Situation #3, Er16. In this situation, one of two faults can exist.
   (a) The SPAN SENSOR MECHANICAL SAFETY (Er16) is OPEN which will require the dealer to be called to rectify the fault.
   (b) The SPAN SENSOR SOFTWARE SAFETY (Er16) and the SWING TOWER BOX SAFETY (Er08) are both OPEN.
4. Determine the exact fault or faults by pressing the STEERING OVERRIDE PUSH BUTTON and observing the CORNER FAULT light.
   (a) If the CORNER FAULT light stays ON, the SPAN SENSOR MECHANICAL and the SPAN SENSOR SOFTWARE SAFETIES are both OPEN. CONTACT YOUR VALLEY DEALER TO RECTIFY THE FAULT.
   (b) If the CORNER FAULT light goes OFF, the SPAN SENSOR MECHANICAL SAFETY is OK or closed but THE SPAN SENSOR SOFTWARE SAFETY and the SWING TOWER BOX SAFETY (guidance safety) are both OPEN.
5. Rectify (fix) the cause of the shutdown.

The Swing Tower Box Fault Must Be Corrected First

Refer to the “SWING TOWER BOX FAULT/CORRECTIVE ACTION” (Situation# 1 or# 2) to correct the Swing Tower Box Fault. The “Situation” used will depend on whether the SDU is Inside or Outside the normal SDU tracks. If the SDU is in wheel tracks contact your Dealer.

The Span Sensor Fault Must Be Corrected Next

Refer to the appropriate “Situation” in the “SPAN SENSOR SAFETY FAULT/CORRECTIVE ACTION” portion of this Section (Situation #1 or #2, Er16). The Situation used will depend on whether the span is in Compression or Tension.

Corrective Procedures - Swing Tower Box

Swing Tower Box Fault Situation Table

SITUATION #	ERROR CODE	FAULT	SAFETY LIGHT	STATUS OF SDU	CORRECTIVE ACTION
#1	ER08	Swing Tower Box	**ON**	SDU OUTSIDE SDU TRACKS	Steer IN to SDU Tracks
#2	ER08	Swing Tower Box	**ON**	SDU INSIDE SDU TRACKS	Steer Out to SDU Tracks
#3	ER08	Swing Tower Box	**ON**	SDU IN SDU TRACKS	Contact Dealer*

*The cause of Fault is more than likely related to the oscillator, buried wire, antenna or receiver electronics. Startup attempt at pivot can be performed. If unsuccessful, contact your Valley Dealer.

Troubleshooting

Situation #1, Er08 - Swing Tower Box Fault

- Corner Safety Fault Light is ON.
- Problem: SDU inside SDU tracks.

> **⚠ WARNING**
>
> **•NEVER PERFORM THIS PROCEDURE WHILE PUMPING WATER TO THE MACHINE.**

At Pivot Panel

1. Turn the Main Disconnect Switch ON at the Pivot Panel.
2. Enable and/or set the pivot control panel in the Auto-Reverse mode.
3. Place the irrigation pump in the OFF position.
4. Place the SERVICE/RUN switch in the SERVICE position.
5. Go to the SDU.

At Operator Interface Panel on the SDU

1. Carefully access the service platform on SDU.

> **⚠ CAUTION**
>
> **•ACCESS THE SERVICE PLATFORM WITH EXTREME CARE! THE ACCESS STEPS MAY BE SLIPPERY IF MUD OR MOISTURE ARE PRESENT ON THE FEEL ALSO WATCH OUT FOR THE LOCATION OF THE STEERING ARM AND TIE ROD TO INSURE YOU DO NOT HIT YOUR HEAD OR SHOULDERS AS YOU MOVE UP THE SDU LEG.**

2. Open the outer door on the Operator Interface Panel.
3. Verify the Error Code and Indicator Lights match Situation #1, Er08.
4. Rectify (fix) the cause{s) of the shutdown. If the cause of the fault can not be readily determined, contact your Valley dealer for service.
5. The machine should be operated in the opposite direction it was operating when moving the SDU back to the normal SDU tracks. Steer the tires so they will follow the same tracks back to the normal SDU tracks.
   - Depress and hold the STEERING OVERRIDE Button to allow for bypassing the SWING TOWER BOX FAULT (open guidance safety circuit).

> **⚠ CAUTION**
>
> **•WHEN THE STEERING OVERRIDE BUTTON IS DEPRESSED ALL STEERING SAFETIES ARE BYPASSED. IF A STEERING CONTACTOR SHOULD BE STUCK IN THE CLOSED POSITION (CONTACTS WELDED CLOSED), THE DRIVE WHEELS WILL CONTINUE TO STEER RESULTING IN DAMAGE TO THE SDU. IF THE STEERING TIE ROD BEGINS TO BECOME PARALLEL WITH THE STEERING ARMS AND THE TIE ROD BEGINS TO BOW, IMMEDIATELY RELEASE THE STEERING OVERRIDE BUTTON. CONTACT YOUR VALLEY DEALER FOR SERVICE.**

   - Press the SWING TOWER STEER IN or STEER OUT rocker switch as necessary to allow the SDU to follow the tracks back to the normal SDU tracks.

> **⚠ CAUTION**
>
> **•THE STEERING OVERRIDE BUTTON MUST BE CONTINUALLY DEPRESSED. THIS ASSURES THE SDU WILL NOT DRASTICALLY STEER TOWARD TO THE SDU WHEEL TRACKS ONCE THE GUIDANCE PICKS UP STEERING SIGNAL FROM THE BURLED WIRE. SHOULD THIS OCCUR, THE CORNER SPAN COULD GO INTO COMPRESSION OR TENSION THAT WOULD CAUSE THE MACHINE TO SHUT DOWN EITHER DUE TO OPENING OF THE SOFTWARE OR MECHANICAL SPAN SENSOR SAFETY.**

6. Press the MACHINE FORWARD/REVERSE switch to the appropriate direction of operation (opposite of the direction the machine was operating when the SDU left the normal SDU tracks).

Situation #1, Er08 - Swing Tower Box Fault (Continued)

7. Press the MACHINE START/STOP; press and hold the START button until you reach the desired percent timer setting you'd like to run at. The LRDU will begin to move and run at this percent timer setting for 15 minutes.
   - Press the SWING TOWER STEER IN or STEER OUT rocker switch as necessary to allow the SDU to follow the tracks back to the normal SDU tracks.
   - As the SDU moves toward the SDU wheel tracks, the relationship/distance between the LRDU and SDU must be maintained.

⚠ WARNING

•NEWER ALLOW THE SDU DRIVE TIRES TO BECOME PARALLEL TO THE CENTER PIVOT. THIS WILL RESULT IN A SHUTDOWN AND CAN CAUSE STRUCTURAL DAMAGE TO THE MACHINE.

   - If either the COMPRESSION or TENSION indicator lights come on, the SWING TOWER STEER IN/ STEER OUT switch must be used to alleviate COMPRESSION or TENSION in the span.
     - » If the span is going into Tension, steer the LRDU.
     - » If the span is going into Compression, steer from the LRDU.
8. Once the SDU is back in its normal tracks, the Steering Override Button can be released. The steering and guidance safety signal will be picked up and received by the guidance box. The LED will show rUn.
9. Start the machine in the desired direction of operation and Monitor the LRDU and SDU movement and SDU steering.
10. Press the MACHINE START/STOP rocker switch to the STOP position.
11. Close and latch the outer door on the Operator Interface Panel.
12. Carefully climb down from the SDU and return to the pivot panel.

At the Pivot Panel

1. Place the SERVICE/RUN switch in the RUN Position.

NOTE

•Failure to do so will prevent the LRDU from running. If the machine is started from the pivot panel while the Service/Run switch is in the SERVICE position, the pivot contactor will engage and hold in but the LRDU will not move. Once the over-watering timer on the center pivot times out, the contactor will drop out.

2. Disable or turn OFF the Auto-Reverse if the function is not needed for normal operation.
3. Reengage the pump/pivot tie-in for automatic control of the machine and pump.
4. Start the machine in the desired direction and at the appropriate speed.
5. Close and latch the outer pivot panel door.

At the SDU

1. Check for proper operation of the corner.

Situation #2, Er08 - Swing Tower Box Fault

- Corner Safety Fault Light is ON.
- Problem: SDU is OUTSIDE SDU tracks.

1. Verify Error Code and Indicator Light(s).
2. Rectify (fix) the cause of the shutdown. If the cause is unknown, contact your Valley Dealer for service.
3. Move the SDU back to the SDU tracks.
4. Press and hold STEERING OVERRIDE Button.
5. Press STEER IN/OUT switch to Steer In as required.
6. Press MACHINE Forward/Reverse rocker switch to appropriate direction. See Figure 84-1.
7. Press MACHINE Start/Stop to START. See Figure 84-1.
8. Once SDU in normal tracks, release STEERING OVERRIDE BUTTON. See Figure 84-1.
9. Operate the machine in the desired direction and monitor operation (Forward or Reverse).
10. Press MACHINE Start/Stop to STOP. See Figure 84-1.
11. Close and latch the outer door on the Operator Interface Panel.
12. Carefully climb down from the SDU and return to the pivot panel.

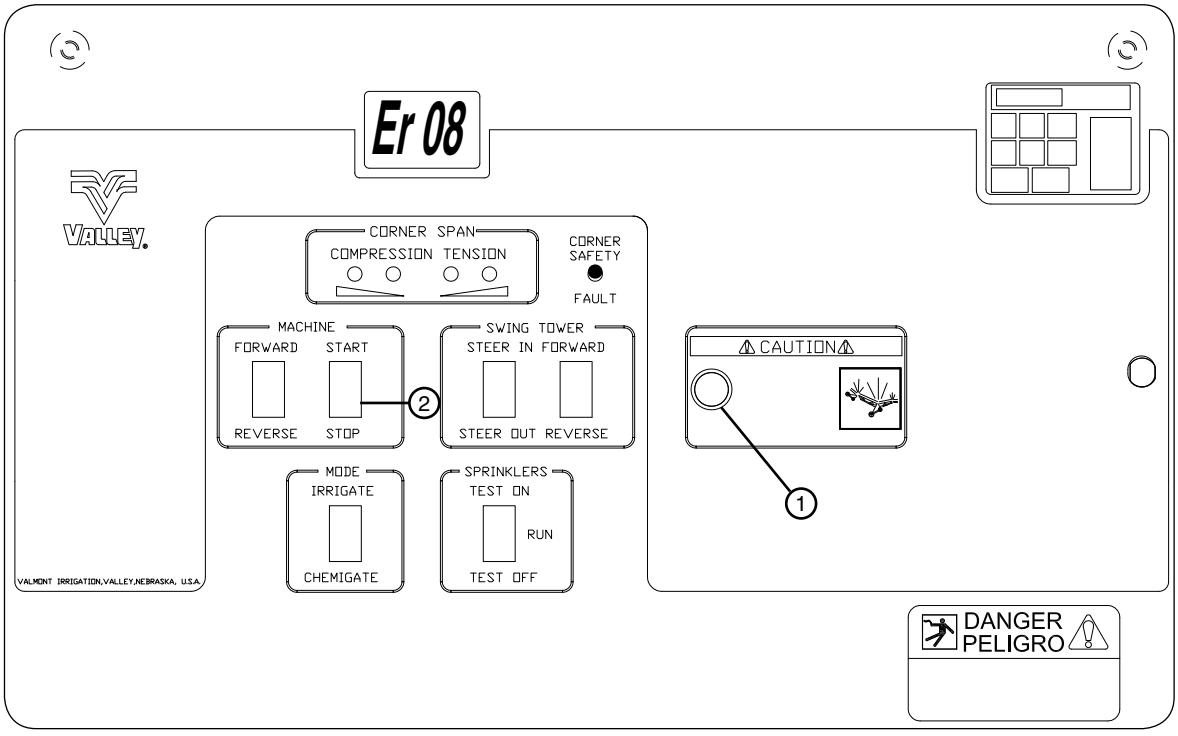


Figure 84-1 1. Steering Override Button
2. Machine Start/Stop Switch

Situation #3, Er08 - Swing Tower Box Fault

- Corner Safety Fault Light is ON.
- Problem: SDU is IN SDU tracks.

The cause of Fault is more than likely related to the oscillator, buried wire, antenna, receiver or other guidance electronics. A startup attempt at pivot can be performed. If this is unsuccessful, contact your Valley Dealer.

Corner Sprinkler Test Procedure

The Sprinkler Test On/Off rocker switch allows the operator to check the operation of the corner span and overhang valve controlled sprinklers and end gun. All sprinklers can be turned ON or all sprinklers can be turned OFF to assure the electrical and hydraulic sprinkler control components are operating properly. See Figure 85-1.

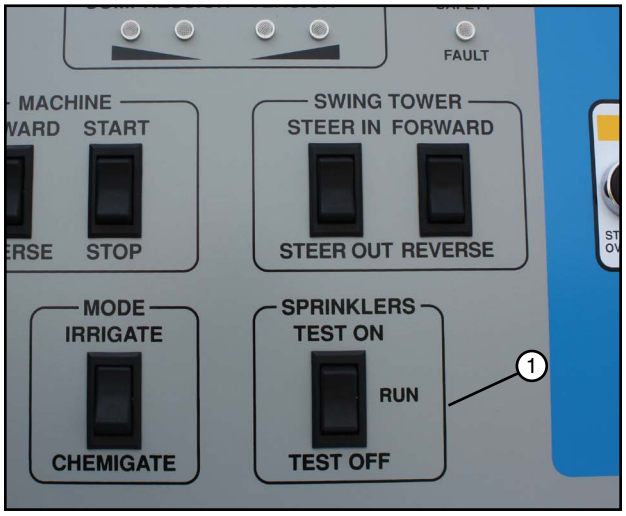


Figure 85-1 1. Sprinkler Test On/Off Switch

At the Pivot

Turn the main disconnect in the pivot panel ON.

1. Set the Service/Run switch to SERVICE (DO NOT Start the machine).
2. Start the irrigation pump.
3. Enable the Auto-Reverse/Auto-Stop.
4. Proceed to the Operator Interface Panel on the corner steerable drive unit.

⚠ CAUTION

•EXERCISE EXTREME CARE AS YOU ACCESS AND LEAVE THE OPERATOR PLATFORM ON THE STEERABLE DRIVE UNIT. MUDDY FEET CAN BE VERY SLIPPERY ON THE ACCESS STEPS TO THE OPERATOR PLATFORM.

At the Steerable Drive Unit

1. At the Operator Interface Panel open the outer operator interface panel door.
2. Press the Machine Forward or Reverse rocker switch to select a direction of operation.
3. Press the Machine Start/Stop rocker switch to the START position. This will start the machine moving. As soon as the Next-to-Last drive unit moves, the Over-watering Timer in the Next-to-Last drive unit will be reset to its preset time.

⚠ WARNING

•THE MACHINE WILL BEGIN TO MOVE. NEVER ATTEMPT TO ACCESS OR LEAVE THE OPERATOR PLATFORM ON THE SDU WHILE THE MACHINE IS MOVING. ALWAYS PRESS THE MACHINE STOP ROCKER SWITCH BEFORE LEAVING THE SDU.

4. Once the Next-to-Last Drive Unit moves, press the Machine Start/Stop switch to the STOP position.
5. Press the Sprinkler Test rocker switch to the desired mode; TEST ON or TEST OFF. Watch the LED to monitor/determine the number of minutes selected/desired.

- The sprinklers and end gun on the corner arm will remain in the mode selected for 10 minutes for each second the switch is held in the desired mode.
- To check the test time remaining, momentarily press the test switch in the same mode as originally selected.
- To increase the time in the mode selected, press and hold in the current mode.
- Remember, for each second the switch is held, the time will increase 10 minutes.
- To return to normal operation, momentarily press the test switch to the opposite test mode. The LED will show “00”. If the test switch is held in the opposite mode for too long, the opposite mode will be activated.
- To change from one mode to the other, press the test switch to the opposite test mode and hold until the desired time is shown on the LED.

To return to normal corner sprinkler operation, momentarily press the test switch to the opposite mode it is currently in.

Troubleshooting

Corner Sprinkler Test Procedure
At the Steerable Drive Unit (Continued)

Center pivots are typically equipped with an Over-Watering Timer. The purpose of the Over-Watering Timer is to monitor movement of the machine. If the machine were not to move within a preset time on the Over-Watering Timer, the Timer would open the safety circuit and shut the machine OFF. This assures the machine will not over-water should an in-line malfunction occur.

Depending on the timer setting, the machine and pump may shut down before the Sprinkler Test is complete. The machine and the pump can be kept running or restarted from the Operator Interface Panel by resetting the Over-Watering Timer.

Resetting the Over-Watering Timer
At the Operator Interface Panel

1. Press the Machine Forward or Reverse rocker switch to select a direction of operation.
2. Press the Machine Start/Stop rocker switch to the START position. This will start the machine moving. As soon as the Next-to-Last drive unit moves, the Over-Watering Timer will be reset to its preset time.

⚠ WARNING

• THE MACHINE WILL BEGIN TO MOVE. NEVER ATTEMPT TO ACCESS OR LEAVE THE OPERATOR PLATFORM ON THE SDU WHILE THE MACHINE IS MOVING. ALWAYS PRESS THE MACHINE STOP ROCKER SWITCH BEFORE LEAVING THE SDU.

3. Once the Next-to-Last Drive Unit moves, Press the Machine Start/Stop switch to the STOP position.
4. Continue the Sprinkler Test.

NOTE

• If the Sprinkler Test requires additional time to complete, It may be necessary to restart the machine. The quickest way of resetting the timer is to restart the machine in the opposite direction It was originally operated in.

5. Once the checks are complete, press the Sprinkler Test Switch to the appropriate mode until the LED shows “OO”.
6. Press the MACHINE Start/Stop rocker switch to STOP.

NOTE

• The Machine Stop switch should have already been depressed (#3).

7. Close and latch the outer door on the Operator Interface Panel.
8. Carefully climb down from the SDU and return to the pivot panel.

At the Pivot Panel

1. Place the SERVICE/RUN switch in the RUN Position.
2. Turn power OFF or STOP the machine after flipping the switch to run to clear the STOP condition on the boards before the pivot will move.

NOTE

• Failure to do so will prevent the LRDU from running. If the machine Is started from the pivot panel while the Service/Run switch is in the SERVICE position, the pivot contactor will engage and hold In but the LRDU will not move. Once the over-watering timer on the center pivot times out, the contactor will drop out.

3. Start the machine in the desired direction and at the desired speed or turn the pivot panel disconnect switch to the OFF position.
4. Close and latch the outer pivot panel door.

Additional Application Worksheets
Percentage Timer/Application Depth Worksheet

Once the Application Rate in Inches per Day and the Inches per Revolution have been determined for the corner machine, the following table can be filled out to provide a guide to the Hours per Revolution and the Inches per Revolution at various percentage timer settings. Based on the Hours per Revolution and the Inches per Revolution for your machine, fill out the worksheet and use as a Revolution Time and Application Depth guide.

PERCENTAGE TIMER/APPLICATION DEPTH SETTINGS

	Hrs/Rev at 100%			Hrs/Rev	Ins/Rev at 100%			Ins/Cycle	
100%	_____				_____				
90%	_____	÷	.9	= _____	_____	÷	.9	= _____	90%
80%	_____	÷	.8	= _____	_____	÷	.8	= _____	80%
70%	_____	÷	.7	= _____	_____	÷	.7	= _____	70%
60%	_____	÷	.6	= _____	_____	÷	.6	= _____	60%
50%	_____	÷	.5	= _____	_____	÷	.5	= _____	50%
40%	_____	÷	.4	= _____	_____	÷	.4	= _____	40%
30%	_____	÷	.3	= _____	_____	÷	.3	= _____	30%
20%	_____	÷	.2	= _____	_____	÷	.2	= _____	20%
10%	_____	÷	.1	= _____	_____	÷	.1	= _____	10%
5%	_____	÷	.05	= _____	_____	÷	.05	= _____	5%

VALLEY PRECISION CORNER

Machine # _____ LOCATION _____ FIELD #_____

DLRDU _____ FT CORNER ARM LENGTH _____ FT SPEED ❑ STD ❑ HI

TIRE SIZE _____ PRESSURE REGULATORS Y N TS _____ FCC _____

Troubleshooting

Additional Application Worksheets
Percentage Timer/Application Depth Worksheet

Once the Application Rate in Inches per Day and the Inches per Revolution have been determined for the corner machine, the following table can be filled out to provide a guide to the Hours per Revolution and the Inches per Revolution at various percentage timer settings. Based on the Hours per Revolution and the Inches per Revolution for your machine, fill out the worksheet and use as a Revolution Time and Application Depth guide.

PERCENTAGE TIMER/APPLICATION DEPTH SETTINGS

	Hrs/Rev at 100%			Hrs/Rev	Ins/Rev at 100%			Ins/Cycle	
100%	_____				_____				
90%	_____	÷	.9	= _____	_____	÷	.9	= _____	90%
80%	_____	÷	.8	= _____	_____	÷	.8	= _____	80%
70%	_____	÷	.7	= _____	_____	÷	.7	= _____	70%
60%	_____	÷	.6	= _____	_____	÷	.6	= _____	60%
50%	_____	÷	.5	= _____	_____	÷	.5	= _____	50%
40%	_____	÷	.4	= _____	_____	÷	.4	= _____	40%
30%	_____	÷	.3	= _____	_____	÷	.3	= _____	30%
20%	_____	÷	.2	= _____	_____	÷	.2	= _____	20%
10%	_____	÷	.1	= _____	_____	÷	.1	= _____	10%
5%	_____	÷	.05	= _____	_____	÷	.05	= _____	5%

VALLEY PRECISION CORNER

Machine # _____ LOCATION _____ FIELD #_____

DLRDU _____ FT CORNER ARM LENGTH _____ FT SPEED ❑ STD ❑ HI

TIRE SIZE _____ PRESSURE REGULATORS Y N TS _____ FCC _____

Additional Application Worksheets
Percentage Timer/Application Depth Worksheet

Once the Application Rate in Inches per Day and the Inches per Revolution have been determined for the corner machine, the following table can be filled out to provide a guide to the Hours per Revolution and the Inches per Revolution at various percentage timer settings. Based on the Hours per Revolution and the Inches per Revolution for your machine, fill out the worksheet and use as a Revolution Time and Application Depth guide.

PERCENTAGE TIMER/APPLICATION DEPTH SETTINGS

	Hrs/Rev at 100%				Hrs/Rev	Ins/Rev at 100%				Ins/Cycle	
100%	_____					_____					
90%	_____	÷	.9	=	_____	_____	÷	.9	=	_____	90%
80%	_____	÷	.8	=	_____	_____	÷	.8	=	_____	80%
70%	_____	÷	.7	=	_____	_____	÷	.7	=	_____	70%
60%	_____	÷	.6	=	_____	_____	÷	.6	=	_____	60%
50%	_____	÷	.5	=	_____	_____	÷	.5	=	_____	50%
40%	_____	÷	.4	=	_____	_____	÷	.4	=	_____	40%
30%	_____	÷	.3	=	_____	_____	÷	.3	=	_____	30%
20%	_____	÷	.2	=	_____	_____	÷	.2	=	_____	20%
10%	_____	÷	.1	=	_____	_____	÷	.1	=	_____	10%
5%	_____	÷	.05	=	_____	_____	÷	.05	=	_____	5%

VALLEY PRECISION CORNER

Machine # _____ LOCATION _____ FIELD #_____

DLRDU _____ FT CORNER ARM LENGTH _____ FT SPEED ❑ STD ❑ HI

TIRE SIZE _____ PRESSURE REGULATORS Y N TS _____ FCC _____

Troubleshooting

Troubleshooting List

The table below lists various problems that could occur along with their possible causes and corrective actions.

PROBLEM	POSSIBLE CAUSE OR CORRECTIVE ACTION
Machine has shut down or will not start.	The pivot is out of alignment - see the Pivot Owners Manual.
	Water deposits have caused the tower box alignment to bind up.
	A drive unit is stuck. Fill the wheel track with dry soil to allow movement.
	A flat tire at the drive unit.
	A failed drive unit U-joint.
	Check the SDU for signs of motor or gearbox problems (failure, burn out, or breakage).
	Faulty LRDU drive systems.
	Call your Valley Dealer.
SDU is out of its wheel track.	Check the wheel track to see if the SDU is having difficulty climbing over a steep soil ridge.
	Check the mechanical steering motor or gearbox.
	Faulty wheel gearbox motors.
	Faulty antenna or guidance component.
	Call your Valley dealer.
Sprinklers fail to come on or shut off.	The plastic tubing is plugged or broken.
	Plugged water filters.
	A faulty solenoid coil - call your Valley dealer.