ICON5 / ICONX
Control Panel
Owner's Manual

0999938_C

Software Versions:
ICON5 v 1.01
Smart Relay Board (SRB) v 1.01
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Quick Reference Guide

To Run The Machine: (Refer to the Overview and Operation sections of the Owner's Manual, and to the Advanced Features Manual.)

- ALWAYS make sure that vehicles, other equipment, livestock, and people are clear of the machine before operating.
- Turn the control panel main disconnect switch to the on position. If the power is supplied by an engine driven generator, set generator to proper voltage/Hz. Do not exceed system specifications.

Run The Machine Wet (With Water)
1. Push the Water button on the Main Screen to turn the water on.
2. To set the water application, select either the Depth field or Wet % Timer field.
   - In the Depth field, set the water application depth by inches or millimeters.
   or
   - In the Wet % Timer field, adjust the percent to obtain the desired water application depth.
     a) Enter either the depth or percent timer setting.
     b) Push ENTER to retain the value.
3. Do one of the following:
   - Push button to start the machine in the forward direction.
   - Push button to start the machine in the reverse direction.
   - Push to stop the machine.

Run The Machine Dry (Without Water)
1. Push the Water button on the Main Screen to turn the water off.
2. To set the speed of travel, select the Dry % Timer field.
   - In the Dry % Timer field, adjust the percent to obtain the desired speed of travel.
     a) Enter the percent timer setting.
     b) Push ENTER to retain the value.
3. Do one of the following:
   - Push button to start the machine in the forward direction.
   - Push button to start the machine in the reverse direction.
   - Push to stop the machine.

Controlling Auxiliary Relays:
1. Push Menu and Controls.
2. Push the Aux1 or Aux2 button to turn on or off.

Turning Stop-In-Slot On/Off:
1. Push the SIS (Stop In Slot) button to turn on or off.
   - Turn SIS on to stop at the stop-in-slot location.
   - Turn SIS off to bypass the stop-in-slot location.

To Set the Stop-In-Slot Position:
1. Select the SIS (Stop In Slot) field.
2. Enter the desired stop-in-slot position in degrees and push ENTER.

Turning Power and Pressure Restart On:
1. Push Menu and Controls.
2. Push the Auto Restart button to turn on or off.
   Refer to “Auto Restart Via:” in the Advanced Features Manual for more information.

Selecting Auto Reverse or Auto Stop:
1. Push Menu and Controls.
2. Push the Auto Reverse Auto Stop button to toggle between Auto Reverse on or Auto Stop on.
   AR/AS must be Enabled. Only applicable with the drive-unit-mounted auto reverse hardware. Refer to “Auto Reverse Auto Stop (AR/AS)” in the Advanced Features Manual more information.

Setting The End Gun:
Refer to Figure 5-1 below.
1. Push Menu and End Guns.
2. Check the EG (end gun) checkbox to enable it.
3. Push the Configure button for the end gun.
4. Select the Left field (end gun on angle) for a sequence Pair, and enter the degrees on the numeric keypad. Push ENTER.
5. Select the Right field (end gun off angle) for a sequence Pair, and enter the degrees on the numeric keypad. Push ENTER to confirm setting, push RETURN for previous screen.
6. Repeat steps 4 and 5 for other sequence pairs as needed. Use the arrows at the bottom of the screen to view other sequence pairs.

Software ICON5 v 1.01, Smart Relay Board (SRB) v 1.01
# System Stops and Faults

<table>
<thead>
<tr>
<th>System Stop</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>The machine was intentionally commanded to stop by pushing the Stop button.</td>
</tr>
<tr>
<td>Stop-In-Slot (SIS)</td>
<td>The current machine position matches the Stop-In-Slot position while the machine was waiting/running.</td>
</tr>
<tr>
<td>Daily Ops</td>
<td>With the Daily Ops Control enabled and Daily Ops Mode selected, the system was started outside of the start/stop range of Daily Ops.</td>
</tr>
<tr>
<td>Program</td>
<td>A stop command in a step or sector program shut down the machine.</td>
</tr>
<tr>
<td>Auto-Stop</td>
<td>The Auto Stop boundary was reached and shut down the machine.</td>
</tr>
</tbody>
</table>

## System Faults

<table>
<thead>
<tr>
<th>System Fault</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power Lost</td>
<td>Voltage dropped below half the low voltage limit for 3 seconds or more while the machine was waiting/running with water on or more than 1 second if running with water off.</td>
</tr>
<tr>
<td>System Power Low</td>
<td>Voltage fell below the low voltage limit for 15 seconds or more while the machine was waiting/running.</td>
</tr>
<tr>
<td>System Safety</td>
<td>Safety circuit was de-energized for more than 3 seconds.</td>
</tr>
<tr>
<td>Low Pressure</td>
<td>Water pressure fell below the Low Pressure Limit for more than the Operating Pressure Delay time while the machine was running with water on and after the Startup Pressure Delay has expired.</td>
</tr>
<tr>
<td>High Pressure</td>
<td>Water pressure remained above the High Pressure Limit for at least the High Pressure Shutdown Delay time.</td>
</tr>
<tr>
<td>NVMEM</td>
<td>E01 error is active, Memory Error, Backup Battery failure.</td>
</tr>
<tr>
<td>Forward/Reverse</td>
<td>Both the forward and reverse circuits were on for more than 15 seconds while the machine was waiting/running.</td>
</tr>
<tr>
<td>Operating Sector</td>
<td>With AR/AS and For/Rev Position both enabled, the machine is waiting/running or was started outside of the Forward or Reverse Position angles.</td>
</tr>
<tr>
<td>Wind</td>
<td>With Wind Shutdown enabled, the Wind Speed went above the Wind Speed Limit for more than 1 minute while the machine is running with water on.</td>
</tr>
<tr>
<td>Temperature</td>
<td>With the Temperature Shutdown enabled, the Current Temperature goes below the Low Temperature Limit while water is on.</td>
</tr>
<tr>
<td>Rain</td>
<td>With the Rain Shutdown enabled, the Total Rainfall for the Rain Window goes above the Rain Shutdown Limit while water is on.</td>
</tr>
<tr>
<td>Flow</td>
<td>While the machine is running with water on, the Flow Rate falls below the Low Flow Limit after adequate water pressure has been achieved.</td>
</tr>
<tr>
<td>Water Timer</td>
<td>With the Water Timer enabled, the time accumulated by the Overwater Timer is greater than the Overwater Shutdown time.</td>
</tr>
<tr>
<td>Tire Pressure</td>
<td>With Shutdown Pressure Control enabled, the Reported Tire Pressure of a tire is below the Nominal Tire Pressure for that tire's tower by at least the Shutdown Pressure Drop for two consecutive sensor readings.</td>
</tr>
<tr>
<td>GPS Com</td>
<td>With GPS Position and Shutdown On Position Loss enabled, while the machine is waiting/running there has been no GPS communications and the Shutdown On Position Loss Delay time has expired.</td>
</tr>
<tr>
<td>GPS Lock</td>
<td>With GPS Position and Shutdown On Position Loss enabled, while the machine is waiting/running the GPS Lock Status is None and the Shutdown On Position Loss Delay time has expired.</td>
</tr>
<tr>
<td>Cut Cable</td>
<td>A cut cable was Detected when the machine was started.</td>
</tr>
<tr>
<td>PCB Hardware</td>
<td>PCB hardware issue detected while the machine is waiting/running.</td>
</tr>
<tr>
<td>12V Power</td>
<td>With Backup Battery enabled, the battery backup supply voltage fell below 10 volts or the unit has been powered from the battery backup supply and the Battery Backup Time has expired.</td>
</tr>
<tr>
<td>Position Encoder Com</td>
<td>With the Position Encoder option and Shutdown On Position Loss enabled, and while the machine is waiting/running the position encoder has not been communicating and the Shutdown On Position Loss Delay time has expired.</td>
</tr>
<tr>
<td>License</td>
<td>The protocol license is not valid.</td>
</tr>
</tbody>
</table>

## Error Codes

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>NVMEM Corrupted</td>
</tr>
<tr>
<td>E02</td>
<td>PCB Hardware Issue</td>
</tr>
<tr>
<td>E03</td>
<td>Software Reset</td>
</tr>
<tr>
<td>E04</td>
<td>Power Dropped Below Low Voltage Limit</td>
</tr>
<tr>
<td>E05</td>
<td>System Safety Lost</td>
</tr>
<tr>
<td>E06</td>
<td>Pressure Too Low After Pressure Delay</td>
</tr>
<tr>
<td>E07</td>
<td>Pressure (mV) sensor out of range high</td>
</tr>
<tr>
<td>E08</td>
<td>Pressure (mV) Sensor Out of Range Low</td>
</tr>
<tr>
<td>E09</td>
<td>Pressure (mA) Sensor Out of Range High</td>
</tr>
<tr>
<td>E10</td>
<td>Pressure Switch Active With Pump Off</td>
</tr>
<tr>
<td>E11</td>
<td>Valve GPS Pressure Sensor Out of Range High</td>
</tr>
<tr>
<td>E12</td>
<td>Valley GPS Pressure Sensor Out of Range Low</td>
</tr>
<tr>
<td>E13</td>
<td>FWD/REV Sense Shorted</td>
</tr>
<tr>
<td>E14</td>
<td>Underwater Error</td>
</tr>
<tr>
<td>E15</td>
<td>VDC Communication Error- Primary COM Module</td>
</tr>
<tr>
<td>E16</td>
<td>VRI-iS Sprinkler Communication Error</td>
</tr>
<tr>
<td>E17</td>
<td>GPS Communications Error</td>
</tr>
<tr>
<td>E18</td>
<td>GPS Signal Loss</td>
</tr>
<tr>
<td>E19</td>
<td>DGPS Signal Loss</td>
</tr>
<tr>
<td>E20</td>
<td>Flow Rate Below Low Flow Limit</td>
</tr>
<tr>
<td>E21</td>
<td>Pressure Above High Pressure Limit</td>
</tr>
<tr>
<td>E22</td>
<td>PLC Communications Error</td>
</tr>
<tr>
<td>E23</td>
<td>Valve Duty Cycles Re-Synced Due to High Pressure</td>
</tr>
<tr>
<td>E24</td>
<td>GPS Coordinates Out of Range</td>
</tr>
<tr>
<td>E25</td>
<td>Low Tire Pressure</td>
</tr>
<tr>
<td>E26</td>
<td>TPMS Communications Error</td>
</tr>
<tr>
<td>E27</td>
<td>VDC Error Report Message Received</td>
</tr>
<tr>
<td>E28</td>
<td>Valley GPS Communication Error, Master OPMC</td>
</tr>
<tr>
<td>E29</td>
<td>Valley GPS Error Report Message Received</td>
</tr>
<tr>
<td>E30</td>
<td>Vallesso GPS Error Report Message Received</td>
</tr>
</tbody>
</table>
EC Declaration of Conformity

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

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:

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Relevant information will be transmitted via email in response to a reasoned request by national authorities.

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Senior Electrical Engineer
Valmont Industries, Inc.

Date of Issue: March 9, 2018
Place of Issue: Valley, NE 68064
Electrical Safety Statement

Installation of the Valley Electric Irrigation Machine - European Union Only

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

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

Good grounding of the Valley irrigation machine is required.

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

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

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

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

About This Manual

Information contained in this manual applies to Valley ICON5 and ICONX Control Panels with Software Versions ICON5 v 1.01 and Smart Relay Board (SRB) v 1.01. Sections related to safety, pivot hardware, maintenance, towing, troubleshooting and winterization are covered in the appropriate Valley Pivot Owners Manual.

You, as the owner/operator, should familiarize yourself with the capabilities of the system in order to obtain optimum system performance. It should be remembered that the sprinkler will perform according to your knowledge of the equipment, soil and water relationships and equipment application concepts.

Specifications, descriptions and illustrative material contained herein were as accurate as known at the time this publication was approved for printing. Valmont Industries Inc. reserves the right to change specification or design without incurring obligation. Specifications are applicable to machines sold in the United States and may vary outside the United States.

Additional information is contained within the Advanced Features Manual part number 0999984 (English) for this control panel.

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.
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.

<table>
<thead>
<tr>
<th>WIDTH OF WORKING CLEARANCE AREA</th>
<th>HEIGHT OF WORKING CLEARANCE AREA</th>
<th>★MINIMUM WORKING CLEARANCE IN FRONT OF ELECTRICAL PANEL/EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 in (760 mm) MINIMUM OR WIDTH OF ENCLOSURE, WHICH EVER IS GREATER</td>
<td>78 in (1980 mm) MINIMUM OR HEIGHT OF ENCLOSURE, WHICH EVER IS GREATER</td>
<td>EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND NO LIVE GROUNDED PARTS ON THE OTHER SIDE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND LIVE GROUNDED PARTS ON THE OTHER SIDE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND EXPOSED LIVE PARTS ON THE OTHER SIDE.</td>
</tr>
<tr>
<td>36 in (915 mm) MINIMUM</td>
<td>42 in (1065 mm) MINIMUM</td>
<td>48 in (1220 mm) MINIMUM</td>
</tr>
</tbody>
</table>

★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.
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 in (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 in (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 THE NEUTRAL OR OFF POSITION AFTER VERIFYING THE ISOLATION OF THE EQUIPMENT.

9. 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.
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. The following is a list of safety operating tips which you and all other persons servicing or operating the machine must read and understand.

⚠️ CAUTION

- DO NOT OPERATE THIS MACHINE WITHOUT FIRST READING THE OWNER’S MANUALS FOR THE MACHINE.
- READ ALL SAFETY MESSAGES IN THIS MANUAL AND SAFETY SIGNS ON THE MACHINE.
- DO NOT LET ANYONE OPERATE THIS MACHINE WITHOUT PROPER INSTRUCTIONS.
- UNAUTHORIZED MODIFICATIONS MAY IMPAIR THE FUNCTION AND/OR SAFETY OF THE MACHINE.
- IF YOU DO NOT UNDERSTAND ANY PART OF THIS MANUAL, CONTACT YOUR VALLEY DEALER.

Employee Instruction on Safety

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

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

Emergency Stopping

The machine can be stopped at any time at any tower by turning the disconnect switch, located underneath the tower box, to the Off position. See Figure 14-1.

⚠️ 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. See Figure 14-2.

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 14-1](image1.png)

![Figure 14-2](image2.png)

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. See Figure 15-1.

![Figure 15-1 1. Main Power Disconnect 2. Lock]

The blue (OSHA safety color code) tag shown below should also be filled out and attached to the disconnect after locking. See Figure 15-2.

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

![Figure 15-2]

⚠️ 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 SHAFT OR SHIELD, CLOTHING OR LIMBS MAY BECOME ENTANGLED, RESULTING IN SEVERE INJURY.
- DO NOT SERVICE THE MACHINE UNTIL THE MAIN DISCONNECT IS LOCKED IN THE OFF POSITION.
- ALWAYS REPLACE DRIVE SHAFT SHIELDS AFTER SERVICING.
- DRIVE SHAFT SHIELDS MUST ALWAYS BE IN PLACE WHEN OPERATING THE MACHINE.
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 counterclockwise.

⚠️ 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

Part Circle Operation Safety

If the machine reverses direction at a roadway or a physical object such as a building, tree line, power pole, etc., then you MUST provide a backup device to stop the machine if the reversing mechanism were to fail. See Figure 17-1.

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

![Figure 17-1 1. Physical Barricade](image)

⚠️ 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 operators with these safety decals. For replacement of any decal, contact your local Valley dealer.

**CAUTION**

Do not operate machine when temperature is below 40°F (4.5°C).

Read and understand the Valley operator's manual before operating this equipment.
Safety Decals (continued)

**WARNIMG AVERTISSEMENT AVISO**

- ARC FLASH HAZARD, APPROPRIATE PPE REQUIRED, FAILURE TO COMPLY CAN RESULT IN INJURY OR DEATH. REFER TO NFPA 70E.
- RISQUE D'ÉTROUSSAGE, ÉQUIPMENTS DE PROTECTION INDIVIDUELLE APPORTÉE, NON-RESPECT PEUT ENDOMMAGER LA MORT OU L'ÉTAT DE SANTÉ.
- PELIGRO DE ARCO ELÉCTRICO. EQUIPO DE PROTECCIÓN PERSONAL (PPE) NECESARIO, INCUMPLIMIENTO PUEDE OCASIONAR LA MUERTE O UNA LÉSION.

**CAUTION**

- Structural damage can occur when the Safety Override Switch is depressed.

**DANGER PELIGRO**

- HIGH VOLTAGE CAN KILL! Do not open until machine disconnect is locked in "OFF" Position.
- HAUTE TENSION PEUT TUEIR! Ne pas ouvrir avant que l'isolateur de la machine ne soit en position d'arrêt (O) et bloqué.
- ALTO VOLTAJE PUEDE SER FATAL! No abra hasta que el aislador de la máquina esté en la posición de apagado (O) y trabado.
Safety

Safety Decals (continued)

DANGER

HIGH VOLTAGE CAN KILL! DO NOT OPERATE MACHINE UNTIL SAFETY DECKS are INSTALLED.
HAUTE TENSION PEUT TUER! NE PAS OUVRIR LA MACHINE AVANT QUE LES SÉCURITÉS NE SOIT INSTALLEES.
HAUPTSTROM KANN TÖTEN! LIEFERBAUER KEINE MACHINE LAUSCHEN, BIS SICHERHEIT-DÄMPFER INSTALLIERT.
ALTO VOLTAJE PUEDE SER FATAL! NO ABRA HASTA QUE EL AÍSLADOR DE LA MÁQUINA ESTÉ VISITADE.

WARNING

ARC FLASH HAZARD. APPROPRIATE PPE REQUIRED. FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY. REFER TO NFPA 70E.
RISQUE D'ARC ELECTRIQUE. EQUIPEMENT DE PROTECION INDIVIDUELLE APPROPRIE NÉCESSAIRE. NON-RESPECT PEUT ENTRAINER LA MORT OU DES BLESSURES.
RISICHO DE ARCO ELECTRICO. EQUIPO DE PROTECCION PERSONAL ADECUADO NECESARIO. INCUMPLIMIENTO PUEDE OCASIONAR LA MUERTE O UNA LESION.

WARNING

TIRE AND RIM FOR IRRIGATION USE ONLY.
ADJUST PRESSURE BEFORE USE. SEE OWNERS MANUAL FOR RECOMMENDED PRESSURE.
18 PSI [1.2 BAR] MAXIMUM

WARNING

TIRE AND RIM FOR IRRIGATION USE ONLY.
ADJUST PRESSURE BEFORE USE. SEE OWNERS MANUAL FOR RECOMMENDED PRESSURE.
23 PSI [1.6 BAR] MAXIMUM

WARNING

TIRE AND RIM FOR IRRIGATION USE ONLY.
ADJUST PRESSURE BEFORE USE. SEE OWNERS MANUAL FOR RECOMMENDED PRESSURE.
30 PSI [2.1 BAR] MAXIMUM

WARNING

TIRE AND RIM FOR IRRIGATION USE ONLY.
ADJUST PRESSURE BEFORE USE. SEE OWNERS MANUAL FOR RECOMMENDED PRESSURE.
34 PSI [2.3 BAR] MAXIMUM
**WARNING**

Improper installation of this motor may result in fire, explosion, electrical shock or other personal injuries. Read operating instructions.

- Disconnect power before maintenance. Open all circuits before removing conduit box cover. Be sure motor is properly grounded per local and national codes.
- Do not place fingers or objects near openings.
- Do not use eye bolts or lifting hooks to lift anything except the product.

---

**DANGER**

Drive Shaft Starts Without Warning!

- Do not touch rotating drive shaft or shield. Clothing or limbs may become entangled, resulting in severe injury.
- Do not service until machine is locked in the off position.
- Always replace drive shaft shield after servicing.
Overview

The pages in this section provide a brief description of the control panel components and controls.

ICON5 Control Panel
This Valley ICON5 control panel uses an ICON5 module for executing operator commands. See Figure 22-1.

Main Disconnect
This switch disconnects all power to the machine except at the incoming (upper) terminals on the Main Disconnect Switch inside the control panel. The function of this switch is to turn the power on or off. See Figure 22-1.

Safety Override Switch
The machine’s safety circuit can be overridden by depressing this switch in conjunction with the start button. See Figure 22-1.

![WARNING]

• NEVER DEPRESS THE SAFETY OVERRIDE SWITCH FOR LONGER THAN THREE SECONDS AT ANY TIME. USING THE SAFETY OVERRIDE CAN CAUSE SERIOUS STRUCTURAL DAMAGE. CALL YOUR LOCAL VALLEY DEALER, SHOULD YOUR MACHINE FAIL TO START.

3-Second Delay Timer
A three-second delay timer is standard equipment built into the circuitry of the control panel.

In the event of a momentary power loss or voltage drop, the machine will remain running if power returns within three seconds.

Pump Restart Delay
When the control panel also controls an irrigation pump that is set to automatically start, the irrigation pump must be protected from damage with a pump restart delay. The pump restart delay must be in the pump circuit between the irrigation machine control panel and the pump.

![CAUTION]

• TO REDUCE THE POSSIBILITY OF DAMAGE TO AN AUTOMATICALLY CONTROLLED ELECTRIC PUMP DUE TO A MOMENTARY POWER LOSS OF 3 SECONDS OR LESS, A PUMP RESTART DELAY IS REQUIRED IN THE PUMP CIRCUIT BETWEEN THE IRRIGATION MACHINE CONTROL PANEL AND THE PUMP.

Figure 22-1 1. Control Panel  2. ICON5 Module  3. Main Disconnect Switch  4. Safety Override Switch
ICONX Control Panel
This Valley ICONX control panel contains an ICON5 module and is used with an existing control panel for executing operator commands. See Figure 23-1.

Main Disconnect
The ICONX control panel must be located within 50 ft (15.2 m) of the existing control panel Main Disconnect Switch. This switch must disconnect all power to the machine except at the incoming (upper) terminals on the Main Disconnect Switch inside the existing control panel. The function of this switch is to turn the power on or off. See Figure 23-1.

Safety Override Switch
The machine’s safety circuit can be overridden by depressing this switch in conjunction with the start button. See Figure 23-1.

⚠️ WARNING
• NEVER DEPRESS THE SAFETY OVERRIDE SWITCH FOR LONGER THAN THREE SECONDS AT ANY TIME. USING THE SAFETY OVERRIDE CAN CAUSE SERIOUS STRUCTURAL DAMAGE. CALL YOUR LOCAL VALLEY DEALER, SHOULD YOUR MACHINE FAIL TO START.

3-Second Delay Timer
A three-second delay timer is standard equipment built into the circuitry of the ICONX control panel. In the event of a momentary power loss or voltage drop, the machine will remain running if power returns within three seconds.

Pump Restart Delay
When the control panel also controls an irrigation pump that is set to automatically start, the irrigation pump must be protected from damage with a pump restart delay. The pump restart delay must be in the pump circuit between the irrigation machine control panel and the pump.

⚠️ CAUTION
• TO REDUCE THE POSSIBILITY OF DAMAGE TO AN AUTOMATICALLY CONTROLLED ELECTRIC PUMP DUE TO A MOMENTARY POWER LOSS OF 3 SECONDS OR LESS, A PUMP RESTART DELAY IS REQUIRED IN THE PUMP CIRCUIT BETWEEN THE IRRIGATION MACHINE CONTROL PANEL AND THE PUMP.

Figure 23-1 1. Classic Control Panel 2. ICONX Control Panel 3. Main Disconnect Switch 4. Safety Override Switch
Overview

Main Screen
The Main Screen is where you begin operating your irrigation machine, and where you learn its current status. Controls are located on the left side of the screen, the machine’s current status is located on the right side of the screen, Soft Keys on either side of the screen and the Menu, Home, Back, Start and Stop buttons are located below the screen. See Figure 24-1, which represents a typical main screen. The Controls and Status fields can be customized and may look different than what is shown in Figure 24-1.

Figure 24-1 ICON5 Screen Shown

|- Controls - Item 1
|---|---|
|Up to five control buttons can appear on the left side of the screen for programming and operating the machine.

|- Status - Item 2
|---|---|
|Up to six statuses can appear on the right side of the screen. Below the statuses is a graphic image depicting the machine's current position.

|- Soft Keys - Item 3
|---|---|
|Soft keys are located in line with control and menu buttons and can be used as an alternate instead of pushing the on-screen button.

|- Menu - Item 4
|---|---|
|Use the Menu button to access Controls, Status, End Guns, Setup, System, Utilities and Program related menus.

|- Home - Item 5
|---|---|
|This button will return to the Main Screen.

|- Back - Item 6
|---|---|
|Backs up one level while in Menus or Keypad. Does not back out of a screen.

|- Start Forward - Item 7
|---|---|
|Push to start the machine and move in the forward (clockwise) direction.

|- Start Reverse - Item 8
|---|---|
|Push to start the machine and move in the reverse (counter-clockwise) direction.

|- Stop - Item 9
|---|---|
|Push to halt machine movement, shut pump off, and close water valve (if wired to do so). The machine has a time delay that prevents it from restarting when you press a start button within five seconds after stopping the machine with water on.
Main Screen (continued)

Control Buttons

Up to five control buttons can be selected to appear on the left side of the screen for operating the machine. You can access all the control buttons by pushing Menu and Controls.

Below are descriptions of each available control button. It is very important to understand that, the control button indicates what the machine is currently doing.

**Water**

- **Water On** - The pump and/or close water valve are currently on (if wired to do so). Push to turn them off.
- **Water Off** - The pump and/or close water valve are currently off. Push to command pump to turn on, valve to open, or both, when machine starts (if wired to do so).

A pre-programmed pressure delay is automatically recalled to allow sufficient time for pressure to build up in the machine before it moves.

**% Timer/Depth**

- **Wet % Timer/Depth Field** - When water is on, select the right side of the field for Depth and enter the water application depth by inches or millimeters, or select the left side of the field for Wet % Timer and adjust the percent to obtain the desired application depth. The percent timer indicates the percentage of time which the end tower runs.
- **Dry % Timer Field** - When water is off, select the Dry % Timer field and adjust the percent to obtain the desired speed of travel. The percent timer indicates the percentage of time which the end tower runs.

**Cruise (Hrs)**

- **Cruise (Hrs) Off** - Cruise is off. Push to turn on.
- **Cruise (Hrs) Field** - When Cruise is on, select the Cruise (Hrs) field to set the number of hours to complete one pass.

**Stop-In-Slot**

- **Stop-In-Slot On** - Stop-In-Slot is on and will stop the machine at a preset location in the field that is user selected. Push to turn Stop-In-Slot off.
- **Stop-In-Slot Off** - Stop-In-Slot is off. Push to turn Stop-In-Slot on.
- **Stop-In-Slot Field** - When Stop-In-Slot is on, select the Stop-In-Slot field to set the angular location of the Stop-In-Slot.

**Auto Restart**

- **Auto Restart Off** - Automatic Restart is off. Push to turn on.

**Auxiliary 1 and 2**

- **Aux Off** - The Auxiliary is off. Push to turn on.

**Auto Reverse/Auto Stop**

- **Auto Reverse On** - Auto Reverse is on. Push to turn Auto Stop on.
- **Auto Stop On** - Auto Stop is on. Push to turn Auto Reverse on.

**End Gun**

- **End Gun Auto** - When end gun is set to Auto the selected end gun is enabled and ready. Push to turn off (disable).
- **End Gun Off** - The end gun is off (disabled). Push to turn auto on (enable).
Overview

Main Screen (continued)

Status

Up to four statuses can be configured below Restart and Programs which are fixed statuses. Below the statuses is a graphic image depicting the machine’s current position. A description of each field and all the statuses appear below.

The Status section illustrates the operating conditions of a typical irrigation machine example. The Status section of your machine will show different conditions.

Machine Status - Item 1 - Indicates the current known status of the machine.

Pivot Position - Item 2 - Indicates the machine location in the field. The location of the machine is expressed in degrees.

Fault Notice - Item 3 - Indicates whether any system faults have occurred. You can access the System Faults screen by pushing the icon.

Pivot Status - Item 4 - A color is displayed on the pivot graphic to represent the current known status of the machine. Refer to “Pivot Circle Colors and Shapes” on page 29.

Status Icons - Item 5

• Restart - Either No Restart or Restart. Restart indicates that the machine could restart due to Auto Restart, Cycle Repeat Restart or Daily Ops Restart.

• Programs - Either No Programs or Programs. Programs indicates that programs are currently running.

• VRI - Indicates that a VRI-S, VRI-Z, VRI-iS or Cruise program is running.

• Errors - Either No Errors or Errors. Errors indicates that an error has occurred.

• Pressure (mV) - Indicates the current water pressure at the (mV) pressure sensor. A (mV) pressure sensor is required.

• Pressure (mA) - Indicates the current water pressure at the (mA) pressure transducer. A (mA) pressure sensor is required.

• Depth and % - Displays the current application Depth and Percent.

• Voltage - Indicates current operating voltage. The machine shuts down when voltage drops below the Low Voltage Limit.

• Adjusted % and Hrs/Pass - Indicates the current Adjusted % timer wet or dry, and the time it will take for the machine to make a pass.

• Temperature - Indicates the current outdoor temperature. Requires optional hardware.

• Rain - Indicates the current rain total. Requires optional hardware.

• Wind - Indicates the speed of the wind in mph or kph. Requires optional hardware.

• Flow Meter - Indicates the amount of water, in gallons per minute, that the machine uses to irrigate. Requires optional hardware.

• Pressure Switch - Indicates OK when the pressure switch is on, and LOW when switch is off. A mechanical pressure switch is required.

• Wet Hours - Indicates the number of hours that the machine was irrigating while running.

• Total Hours - Indicates the total number of hours that the machine was running.

• AR/AS - Indicates that Auto Reverse or Auto Stop is on.

• End Pressure - Indicates the pressure at the end of the machine.
Main Screen (continued)

Menu

The Menu button is located below the screen. Use the Menu button to access other menus or screens that are used to program the panel, view data and select options not frequently used. Below are descriptions of each button.

Menu - Item 1

Use the Menu button to access Controls, Status, End Guns, Volts / PRS, Faults, Setup, System, Utilities and Program related menus.

Controls - Item 2

Displays all available controls.

Status - Item 3

Displays all current machine statuses.

End Guns - Item 4

Use to enable, disable and configure end guns.

Volts / PRS - Item 5

Displays the current voltage and water pressure.

Faults - Item 6

Displays the current system fault.

Setup - Item 7

Used to input the constant values of the irrigation machine.

System - Item 8

Used to access fault, error and history information.

Utilities - Item 9

Used to configure ARAS, Weather, Notice and TPMS.

Programs - Item 10

Use to either write or run programs that automate specific functions of the machine.

Figure 27-1
Main Screen (continued)
Keypad
The keypad is used to input values such as percentage timer setting, water application depth, SIS setting, etc. and is also used for programming the panel. The functions of these buttons are explained below.

Figure 28-1

<table>
<thead>
<tr>
<th>Numeric Keypad - Item 1</th>
<th>Used to input numeric values.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Range - Item 2</td>
<td>Displays the range of values that will be accepted.</td>
</tr>
<tr>
<td>Cancel - Item 3</td>
<td>Push to step backward from the current screen to a previous screen without performing any changes.</td>
</tr>
<tr>
<td>Enter - Item 4</td>
<td>Push at the end of a value entry to retain the value.</td>
</tr>
<tr>
<td>Keypad Selection Buttons</td>
<td>Push to toggle between the different keypads.</td>
</tr>
<tr>
<td>123 Button - Item 5</td>
<td>Push to display the Numeric keypad.</td>
</tr>
<tr>
<td>ABC Button - Item 6</td>
<td>Push to display the Alpha keypad. Also used to toggle between input types.</td>
</tr>
<tr>
<td>!@# Button - Item 7</td>
<td>Push to display the Special Character keypad.</td>
</tr>
<tr>
<td>Alpha Keypad - Item 8</td>
<td>Used to input Alpha characters A through F.</td>
</tr>
<tr>
<td>Special Character Keypad - Item 9</td>
<td>Used for input of positive or negative values or special characters.</td>
</tr>
<tr>
<td>Back - Not Shown</td>
<td>Push to back space and delete the previous character.</td>
</tr>
</tbody>
</table>
Main Screen (continued)

Pivot Circle Colors and Shapes

The table below and on the next page shows a list of all the colors and shapes the Main Screen uses to represent the current known status of the machine.

<table>
<thead>
<tr>
<th>Status</th>
<th>Color And Shape</th>
<th>Graphic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivot is stopped</td>
<td>Gray circle</td>
<td><img src="gray_circle.png" alt="Gray Circle" /></td>
</tr>
<tr>
<td>Program is running</td>
<td>Gray grid appears on the circle. The color of the circle will vary.</td>
<td><img src="gray_grid.png" alt="Gray Grid" /></td>
</tr>
<tr>
<td>Pivot is running dry</td>
<td>Green circle</td>
<td><img src="green_circle.png" alt="Green Circle" /></td>
</tr>
<tr>
<td>Pivot is running dry, with Auxiliary 1 on</td>
<td>Orange circle</td>
<td><img src="orange_circle.png" alt="Orange Circle" /></td>
</tr>
<tr>
<td>Pivot is running wet</td>
<td>Blue circle</td>
<td><img src="blue_circle.png" alt="Blue Circle" /></td>
</tr>
<tr>
<td>Pivot is running wet, with Auxiliary 1 on</td>
<td>Cyan circle</td>
<td><img src="cyan_circle.png" alt="Cyan Circle" /></td>
</tr>
<tr>
<td>Pivot representation and position in the field</td>
<td>A white line represents the pivot and its position in the field.</td>
<td><img src="white_line_field.png" alt="White Line" /></td>
</tr>
<tr>
<td>Direction indicator</td>
<td>A black arrow at the end of the pivot line indicates the direction that the pivot is moving.</td>
<td><img src="black_arrow.png" alt="Black Arrow" /></td>
</tr>
<tr>
<td>Stop-In-Slot is on</td>
<td>A red line appears in the stop-in-slot location when turned on.</td>
<td><img src="red_line.png" alt="Red Line" /></td>
</tr>
<tr>
<td>Pivot road location</td>
<td>An optional black dotted line represents pivot road location when enabled.</td>
<td><img src="dotted_line.png" alt="Dotted Line" /></td>
</tr>
<tr>
<td>System Fault</td>
<td>A red triangle centered on the pivot represents a System Fault. Push on the triangle to view the system fault.</td>
<td><img src="red_triangle.png" alt="Red Triangle" /></td>
</tr>
<tr>
<td>Waiting</td>
<td>A yellow triangle centered on the pivot, with a hourglass, represents Waiting.</td>
<td><img src="yellow_triangle.png" alt="Yellow Triangle" /></td>
</tr>
</tbody>
</table>
**Overview**

**Main Screen (continued)**

**Pivot Circle Colors and Shapes**

<table>
<thead>
<tr>
<th>Status</th>
<th>Color And Shape</th>
<th>Graphic</th>
</tr>
</thead>
</table>
| End Gun Enabled                | **Enabled State:** For each End Gun a different colored line is shown indicating the angle range. The enabled state is visible when the pivot position is outside the angle range. The End Gun must be enabled and the angles must be set. The color of the device will vary.  
EG1 - ▲ yellow indicates EG1 is enabled  
EG2 - ▲ purple indicates EG2 is enabled  
EG3 - ▲ gray indicates EG3 is enabled  
EG4 - ▲ red indicates EG4 is enabled | ![Icon](image1) |
| End Gun On (active state)      | **Active State:** For each End Gun that is on, a blue line is shown indicating the angle range. The active state is visible when the machine is running and the pivot position is in the angle range. The End Gun must be enabled and the angles must be set. The color of the device will vary.  
EG1 - ● indicates EG1 is on  
EG2 - ● indicates EG2 is on  
EG3 - ● indicates EG3 is on  
EG4 - ● indicates EG4 is on | ![Icon](image2) |
| Auto Stop On                   | Position Indicator: A black arrow pointing toward the AR/AS Forward/Reverse Positions. The Position Indicator is only displayed when both the AR/AS and Forward/Reverse Position are enabled. | ![Icon](image3) |
| Auto Reverse On                | Position Indicator: Black arrows pointing toward and away from the AR/AS Forward/Reverse Positions. The Position Indicator is only displayed when both the AR/AS and Forward/Reverse Position are enabled. | ![Icon](image4) |

**Other Buttons and Functions**

- **Next**  
  Push to go to the next screen within the function.

- **Previous**  
  Push to go back to the previous screen within the function.

- **Check Box**  
  Check the check box to enable a function or uncheck the check box to disable a function.

- **Return**  
  Push to go back to the previous screen.
Display Setup
The steps below and on the following pages explain how to set up the Display and do the following:

• Set the Language and Units of Measure
• Set the Screen Brightness and Sleep Delay Timer
• Set the Date / Time

Language and Units of Measure
1. On the Region screen set the Language, Numeric Format and Units of Measure for Distance, Volume, Temperature and Pressure. See Figure 31-1.
   (a) Push Menu, Setup, Display and Region.
   (b) Select the Language drop-down menu and choose the language.
   (c) Select a Unit of Measure drop-down menu and choose the unit of measure.
      • Distance: Imperial/US or Metric
      • Volume: Imperial/US or Metric
      • Temp: Fahrenheit or Celsius
      • Pressure: PSI or KPA
Display Setup (continued)

Screen Brightness and Sleep Delay Timer

2. Use Screen to adjust the Screen Brightness and Display Speed delay timer. See Figure 32-1.

   (a) Push **Menu**, **Setup**, **Display** and **Screen**.

   (b) Push the **Darker** or **Lighter** buttons to adjust the brightness of the screen in 5% increments from 25% to 100%.

   (c) Push the **+ Increase** or **- Decrease** buttons to adjust the Display Sleep delay timer in 1 minute increments from 1 to 10 minutes.
Display Setup (continued)

Date / Time

3. On the Date / Time screen you can set the Current Date and Time. See Figure 33-1.
   (a) Push Menu, Setup, Display and Date/Time.
   (b) Select the Date Format drop-down menu and choose how to display the date.
   (c) Select the Date field and enter the day, month and year on the numeric keypad.

   **NOTE**
   - The location of the day month and year will change depending on the selected date format.

   (d) Select the Time field and enter the hour and minutes on the numeric keypad.
   (e) Push to select AM or PM (12-hour clock format only).
   (f) Optional, check the 24 Hour Clock checkbox to display time in the 24-hour format. An empty 24 Hour Clock checkbox indicates a 12-hour format.

Figure 33-1

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD/MM/YY</td>
<td>Date Format</td>
</tr>
<tr>
<td>15/05/16</td>
<td>Date (DD/MM/YY)</td>
</tr>
<tr>
<td>AM</td>
<td>PM</td>
</tr>
</tbody>
</table>

24 Hour Clock
Main Screen Setup

The steps below and on the following pages explain how to set up the Main Screen and do the following:

- Add a pivot road, enable or disable part circle and configure part circle angles.
- Select the control buttons and statuses that you want to display on the Main Screen, in the order you want.

Field

1. On the Field screen, you can add the pivot road, enable or disable part circle and configure part circle angles. See Figure 34-1.

   (a) Push Menu, Setup, Main Screen and Field.
   (b) If desired, check the Pivot Road checkbox to enable it.
      (i) Select the Pivot Road field and enter its position, in degrees, where the road is located on the field using the numeric keypad.
   (c) If this is a part circle field, check the Part Circle checkbox to enable it.
      (i) Select the Start Angle field and enter the angle using the numeric keypad.
      (ii) Select the End Angle field and enter the angle using the numeric keypad.

NOTE

- When Part Circle is enabled, you are creating a graphical representation of the pivot field. The control panel does NOT prevent the machine from running outside the designated zone. It also does NOT stop the machine at the start angle or end angle.
- An empty Part Circle check box indicates a full circle field.
Main Screen Setup (continued)

Statuses

2. On the Status screen select up to four statuses that you want to appear on the Main Screen. The Status drop-down Menu number relates to the location of the status on the Main Screen. See Figure 35-1.

(a) Push Menu, Setup, Main Screen and Status.

(b) Select a drop-down menu and choose a status. Use the Next and Previous arrows to navigate through all available options. Choose Empty if you want to leave the field blank on the Main Screen.
Main Screen Setup (continued)

Controls

3. On the Controls screen select up to five buttons that you want to appear on the Main Screen. The Controls drop-down Menu number relates to the location of the control on the Main Screen. See Figure 36-1.

(a) Push Menu, Setup, Main Screen and Controls.

(b) Select a drop-down menu and choose a control. Use the Next and Previous arrows to navigate through all available options. Choose Empty if you want to leave the field blank on the Main Screen.
Minimum Control Panel Setup

Set up the control panel for use by completing the Minimum Control Panel Setup. If desired, control panel settings can be recorded on the System Constants Record at the end of this section.

Reference tables are included in this section for Voltage, Low Voltage, Estimated Drive Speed and GPS Angular Conversion of minutes and seconds into decimal degrees.

Listed below are the reference table locations:
- Voltage.....................................................................................................................................................page 49
- Low Voltage..............................................................................................................................................page 49
- Estimated Drive Unit Speed Table.............................................................................................................page 50
- GPS Angular Conversion Table.................................................................................................................page 50
- Angular Degree Examples........................................................................................................................page 51
- Constants Record.....................................................................................................................................page 52

To set up the control panel, do the following:

1. Go to the Constants screen to set the pivot minimum application, time per revolution, and voltage. See Figure 37-1.
   (a) Push Menu, Setup, Constants and System/Voltage.
   (b) Select the Minimum Application field and enter the rate on the numeric keypad. Refer to the VChart Report for this machine.
   (c) Select the Hours Per Revolution field and enter the number on the keypad. Refer to the VChart Report for this machine.
   (d) Select the Low Voltage field and enter the limit number on the keypad, if it’s lower than 440 volts. Refer to Low Voltage on page 49 for more information.
   (e) Push the Calibrate button and enter the actual voltage reading on the keypad. Refer to Voltage on page 49 for more information.

Figure 37-1
Minimum Control Panel Setup (continued)

2. Go to the Pump screen to verify settings and associate pressure sensor(s) with the machine status. See Figure 38-1.

   (a) Push **Menu, Setup, Constants, Pump / Pressure** and **Pump Setup**.

   (b) Verify that the following are set to the required values.

   (i) **Auto Restart Via**: To change, choose between Pressure, Power or Both.

   (ii) **Pump Type** To change, choose between Engine Pump or Electric Pump.

   (iii) **Low Pressure**: To change, select the Low Pressure field and enter the value on the numeric keypad.

   (iv) **High Pressure**: To change, select the High Pressure field and enter the value on the numeric keypad.

   (c) Push **Back** and **Sensor Setup**.

   (d) **Sensor Setup screen**: Check the checkbox associated with the existing pressure sensor(s) that should be used for input when the machine is stopped and/or running.

In this example a Pressure (mA) Sensor and Valley GPS Pressure Sensor are used.

A minimum of two checkboxes must be checked, one for stopped input and one for running input.

**NOTE**

- If none of the boxes are checked the machine will run with Water on. If multiple sensors are checked for running, the machine will start after the first sensor reaches the low pressure limit. However if all sensors do not meet the low pressure limit before the pressure delay the machine will shut down.

- Valley GPS Pressure can be used as the only transducer on the system. It will be able to stop the pivot on pressure loss, but will not be able to do pressure restart.

- Valley GPS Pressure cannot be used to restart on water pressure. A transducer must be wired at the control panel and a “Stopped” transducer selected for this pressure restart.

**CAUTION**

- IF USING MORE THAN ONE PRESSURE SENSOR, WITH AUTORESTART VIA; SET TO EITHER PRESSURE OR BOTH, MAKE SURE THE PUMP HAS THE PROPER RESTART PROTECTION.
Minimum Control Panel Setup (continued)

3. Calibrate Pressure Sensors. See Figure 39-1.
   (a) Push Back and Sensor Calibration to display the Pressure Sensor Setup screen.
   (b) Verify that the Max Pressure, Value at Max Pressure and Value at 0 Pressure are set to the required values for the sensor(s) being used.

   To change a value, select the value and enter a new value on the keypad.
   (c) With the pump off and the machine dry, push the Calibrate button for the sensor being used.
   (d) Push Yes to set the water pressure sensor to the current water pressure of zero.
   (e) To access other pressure sensors, use the Next and Previous (not shown) arrows.
   (f) Repeat steps (b) through (d) for other sensors.
Control Panel Setup

Minimum Control Panel Setup (continued)

4. Program the position-related control panel settings based on how the machine is equipped:
   - If the machine is equipped with a Position Encoder, continue with Set Up Position Encoder on this page.
   - If the machine is equipped with GPS Position, continue with Set GPS Position on page 42.

Set Up Position Encoder

To setup the Position Encoder, do the following:
1. Set the RJ11 Communications Port protocol:
   (a) Push Menu, Setup, Comm Port and RJ11.
   (b) Select the RJ11 Protocol field and choose Position Encoder from the list. See Figure 40-1.

![Figure 40-1](image-url)

Figure 40-1 1. Menu 2. Setup 3. Comm Port 4. RJ11 5. RJ11 Protocol
Minimum Control Panel Setup (continued)

Set Up Position Encoder (continued)

(c) Push Menu, Setup, Constants, and Position to display the Position screen.

(d) Push the Calibrate button and enter the pivot position in degrees on the numeric keypad. See Figure 41-1.

(e) Continue with Position Loss Setup on page 47.

Figure 41-1 1. Menu 2. Setup 3. Constants 4. Position 5. Calibrate
Minimum Control Panel Setup (continued)
Set Up GPS Position
(Machines equipped with GPS Pivot Position)

To setup GPS pivot position, do the following:

- Obtain the last tower speed and pivot length information from the VChart report for this machine or measure the span length from pivot to last regular drive unit, excluding the overhang, and use the Estimated Drive Unit Speed table on page 50.
- Use a handheld GPS receiver to obtain the GPS coordinates for the Pivot Point position.
- If necessary, use the GPS Angular Conversion table on page 50 to convert the GPS coordinate values into decimals of degree.

2. Set the RJ11 Communications Port protocol:
   Push Menu, Setup, Comm Port and RJ11.
Minimum Control Panel Setup (continued)

Set Up GPS Position (continued)

3. Select the RJ11 Protocol field and depending on which GPS position option is installed on the machine, choose either PLC (GPS Postion Tower Box) or Valley GPS (Valley GPS Antenna) from the list. See Figures 43-1 and 43-2).

- When PLC is chosen:
  (a) Check the GPS V2 checkbox to enable position. See Figure 42-1.
  (b) Enter the PLC ID for the GPS V2.
  (c) Push the Return button. See Figure 42-2.
  (d) Continue with step 4 on page 45.

- When Valley GPS is chosen:
  (a) Turn Water off,
  (b) Set the Dry % Timer to 0.0 (zero percent), and
  (c) Push a Start button to start the machine, energize the safety circuit and the Valley GPS. The machine should not move.
  (d) Select the Valley GPS Device List button.
  (e) Continue with step (f) on the next page.

Figure 43-1
1. RJ11 Protocol
2. PLC Setup
3. GPS V2
4. Return

Figure 43-2
1. Valley GPS
2. Valley GPS Device List
Control Panel Setup

Minimum Control Panel Setup (continued)
Set Up GPS Position (continued)

(f) Enter the **Number of Devices** installed.

(g) When only one Valley GPS is installed, enter 1.

(h) When other Valley GPS or VRI options are installed, enter the total number of devices, up to 254.

(i) Push the Discover Devices button. The control panel attempts to locate the devices.

NOTE
• The Discover Devices button must be pushed within four minutes of starting the machine.

(j) Discovery of devices can typically take between three and six minutes.

(k) After the device(s) have been discovered, note the PLC ID of the Valley GPS.

(l) Click the **Return** button to close the Valley GPS Device List.

(m) Continue with step 4 on the next page.

![Diagram of Control Panel Setup](image)
Minimum Control Panel Setup (continued)

Set Up GPS Position (continued)

4. Go to the GPS Setup screen. See Figure 37-3. Push Menu, Setup, Constants, Position and GPS Setup to display the GPS Setup screen.

NOTE

- Latitude and Longitude positions displayed on a handheld GPS receiver are usually displayed as North, South, East or West.
- The direction displayed affects how the position is entered into the control panel.
- If the position is shown as West or South the position MUST be entered as a Negative Degree.
- In North America, latitude positions are always positive, and longitude positions are always negative.

5. Set the Pivot Point GPS position:

(a) Select the Pivot Point GPS Latitude field and enter the pivot point latitude on the numeric keypad.

(b) Select the Pivot Point GPS Longitude field and enter the pivot point longitude on the numeric keypad.
Minimum Control Panel Setup (continued)
Set Up GPS Position (continued)

6. Set the Distance to GPS (the distance from pivot point to GPS tower box) including the plus and minus tolerance. Refer to Figure 46-1.

(a) Select the **Length to GPS (feet)** field and enter the length from the pivot point to the GPS tower box. Do not enter the pivot length. The default is 1320 ft (402.3 m), and the range is 10 to 6554 ft (3.0 to 1997.6 m).

(b) Select the **Radius +** field and enter the Plus Tolerance for the length from pivot point to GPS tower box. The default is 50 ft (15.2 m) and the range is 10 to 6554 ft (3.0 to 1997.6 m). A setting of 50 ft (15.2 m) or more is recommended to allow for variation in the GPS signal if Wide Area Application Services (WAAS) is unavailable.

(c) Select the **Radius -** field and enter the Minus tolerance for the length from pivot point to GPS tower box. The default is 50 ft (15.2 m) and the range is 10 to 6554 ft (3.0 to 1997.6 m). A setting of 50 ft (15.2 m) or more is recommended to allow for variation in the GPS signal if WAAS is unavailable.

(d) Continue with Set Up Position Loss on the next page.
Minimum Control Panel Setup (continued)

Set Up Position Loss

In the event of Position Loss, three different position loss functions can be used independently, or with each other, to control the machine operation. To access these functions, push Menu, Setup, Constants, Position and Position Loss Setup.

- **System Shutdown**: When checked, shuts the system down if the position is lost for a specified period of time. The default setting is checked (enabled) with a 20-minute delay.
- **Disable Endguns**: When checked, disables the end guns if the position is lost for a specified period of time. The default setting is unchecked (disabled) with a 10-minute delay.
- **Fallback Position**: When checked, if the position is lost, the position is calculated using Runtime until the position is re-acquired. The default setting is checked (enabled) with Runtime.

**System Shutdown**

To set up a shutdown of the system, do the following:
1. Check the **System Shutdown** checkbox. See Figure 47-1.
2. Select the System Shutdown Delay Time field and enter the number of minutes (1 to 255) on the numeric keypad. The default is 20 minutes.

**Disable Endguns**

To set up the disabling of end guns, do the following:
1. Check the **Disable Endguns** checkbox. See Figure 47-1.
2. Select the Disable Endguns Delay Time field and enter the number of minutes (1 to 255) on the numeric keypad. The default is 10 minutes.

**Runtime Fallback Position**

To set up the fallback position, do the following:
1. Check the **Runtime Fallback Position** checkbox. See Figure 47-1.
2. Select the LRDU Pivot Speed field and enter the speed on the numeric keypad. The default is 15.56 ft/min.
3. Select the Pivot Length field and enter the length on the numeric keypad. The default is 1320 ft (402.3 m).
Minimum Control Panel Setup (continued)

Test GPS Position

If the machine is equipped with GPS Position, do the following to verify that GPS Position is working.

1. Turn **Water** off, Set the **Dry % Timer** to 0.0 (zero percent), and push a **Start** button to start the machine, energize the safety circuit and the GPS pivot position tower box. The machine should not move.

2. Go to the Position screen. Push **Menu, Setup, Constants** and **Position**.

3. When GPS Position is working, the **GPS is Communicating** and the **GPS in Tolerance** lights will both be green indicating proper operation.
   - If the GPS is Communicating light is off (gray):
     » Valley GPS takes 1 minute before acquiring its position.
     » No connections have been established with one or more satellite(s).
     » No communications from the GPS antenna and the control panel.
     » Call your Valley dealer to diagnose the problem.
   - If the GPS in Tolerance light is off (gray) and/or the Present Position value is flashing, verify that the Length to GPS, Radius +, and Radius - values are correct on the GPS Setup screen.

4. Set the Present Position of the pivot span in degrees.
   - (a) Push **Calibrate**.
   - (b) Enter the pivot span position in degrees and push **Enter**.

5. To view the GPS Setup screen push **GPS Setup**. See Figure 48-1.
   - **Satellite Lock** – verify that there is DGPS lock. If it’s not, continue waiting. Depending on location it can take 15 minutes or longer for the GPS Antenna to lock on to the satellite signal and obtain DGPS accuracy. When GPS Position is lost or not found, the word **NONE**, or **No GPS** is displayed in the Satellite Lock field.
   - **Length to GPS, Radius + and Radius -** verify values are correct.
   - If GPS position is not working, call your local Valley Dealer. If it is working, then continue with the next step.

6. Run the machine in either direction to verify that the position displayed on the Status screen GPS Longitude changes periodically as the machine moves.
   - If GPS position is not working, call your local Valley Dealer. If GPS position is working, the minimum control panel setup for a machine with GPS pivot position is complete.
Voltage

The Voltage constant calibrates the volt meter with the actual voltage coming into the control panel so that the voltage fluctuations can be monitored correctly.

The incoming voltage to the control panel must be measured with a meter by a qualified electrician or service person. This value is entered as the voltage constant.

The supply voltage should never exceed the limits shown in the Maximum Supply Voltage chart. Refer to Figure 49-1.

<table>
<thead>
<tr>
<th>Nominal Supply Voltage</th>
<th>Maximum Supply Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>480 VAC @ 60Hz</td>
<td>505 VAC</td>
</tr>
<tr>
<td>415 VAC @ 50Hz</td>
<td>420 VAC</td>
</tr>
<tr>
<td>400 VAC @ 50Hz</td>
<td>420 VAC</td>
</tr>
<tr>
<td>380 VAC @ 50Hz</td>
<td>420 VAC</td>
</tr>
<tr>
<td>230 VAC @ 60Hz</td>
<td>253 VAC</td>
</tr>
<tr>
<td>220 VAC @ 50Hz</td>
<td>243 VAC</td>
</tr>
</tbody>
</table>

Figure 49-1 Maximum Supply Voltage

Low Voltage

The Low Voltage constant is used to set the low voltage limit. The low voltage limit factory default setting is 440 volts for use with a supply voltage of 480 VAC @ 60Hz. Recommended low voltage limits for other supply voltages are shown in the Recommended Low Voltage chart. Refer to Figure 49-2.

- If the voltage drops below the low voltage limit, a built-in timer keeps the machine running for up to 15 seconds to prevent nuisance shutdowns due to voltage fluctuations. If the low voltage condition still exists after 15 seconds, the machine will be shut down and the diagnostics screen will display a fault for machine power.

- If the voltage drops below half the low voltage limit for 3 seconds or more while the machine was waiting/running with water on or more than 1 second if running with water off, the machine will be shut down and the diagnostics screen will display a fault for machine power.

⚠️ CAUTION

- DO NOT SET LOW VOLTAGE LOWER THAN THE RECOMMENDED LOW VOLTAGE LIMIT.
- LOW VOLTAGE WILL DAMAGE THE DRIVE MOTORS AND OTHER ELECTRICAL COMPONENTS. CORRECT THE PROBLEM BEFORE RESUMING OPERATION.
Estimated Drive Unit Speed Tables

Use these tables to estimate the Intermediate Drive Unit and End Drive Unit speed based on the drive unit motor output RPM, tire size, and machine voltage. Refer to Figure 50-1.

### Estimated Drive Unit Travel Speed Feet/Minute (60 Hz)**

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>10R X 22.5</th>
<th>11.2 X 24</th>
<th>11R X 22.5</th>
<th>11R X 24.5</th>
<th>14.9 X 24 or 26 Non Directional</th>
<th>14.9 X 24 or 26 or Turf</th>
<th>16.9 X 24 or Turf</th>
<th>18.4 X 26 or Turf</th>
<th>11.2 X 38 or Non Directional</th>
<th>12.4 X 38 Valley Revolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet/Minute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>5.91</td>
<td>6.11</td>
<td>6.33</td>
<td>6.33</td>
<td>6.95</td>
<td>7.28</td>
<td>7.74</td>
<td>8.17</td>
<td>8.34</td>
<td>8.46</td>
</tr>
<tr>
<td>34</td>
<td>6.70</td>
<td>6.92</td>
<td>7.18</td>
<td>7.18</td>
<td>7.88</td>
<td>8.25</td>
<td>8.77</td>
<td>9.26</td>
<td>9.45</td>
<td>9.59</td>
</tr>
<tr>
<td>37</td>
<td>7.29</td>
<td>7.53</td>
<td>7.81</td>
<td>7.81</td>
<td>8.57</td>
<td>8.98</td>
<td>9.55</td>
<td>10.08</td>
<td>10.28</td>
<td>10.44</td>
</tr>
<tr>
<td>43</td>
<td>8.48</td>
<td>8.75</td>
<td>9.08</td>
<td>9.08</td>
<td>9.96</td>
<td>10.43</td>
<td>11.09</td>
<td>11.71</td>
<td>11.95</td>
<td>12.13</td>
</tr>
<tr>
<td>56</td>
<td>11.04</td>
<td>11.40</td>
<td>11.82</td>
<td>11.82</td>
<td>12.98</td>
<td>13.59</td>
<td>14.45</td>
<td>15.26</td>
<td>15.56</td>
<td>15.79</td>
</tr>
<tr>
<td>68</td>
<td>13.40</td>
<td>13.84</td>
<td>14.36</td>
<td>14.36</td>
<td>15.76</td>
<td>16.50</td>
<td>17.54</td>
<td>18.53</td>
<td>18.90</td>
<td>19.18</td>
</tr>
<tr>
<td>86</td>
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<td>17.50</td>
<td>18.16</td>
<td>18.16</td>
<td>19.93</td>
<td>20.87</td>
<td>22.19</td>
<td>23.43</td>
<td>23.90</td>
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</tr>
<tr>
<td>136</td>
<td>26.81</td>
<td>27.68</td>
<td>28.72</td>
<td>28.72</td>
<td>31.52</td>
<td>33.00</td>
<td>35.09</td>
<td>37.05</td>
<td>37.80</td>
<td>38.36</td>
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</table>

### Estimated Drive Unit Travel Speed Feet/Minute (50 Hz)**

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>10R X 22.5</th>
<th>11.2 X 24</th>
<th>11R X 22.5</th>
<th>11R X 24.5</th>
<th>14.9 X 24 or 26 Non Directional</th>
<th>14.9 X 24 or 26 or Turf</th>
<th>16.9 X 24 or Turf</th>
<th>18.4 X 26 or Turf</th>
<th>11.2 X 38 or Non Directional</th>
<th>12.4 X 38 Valley Revolution</th>
</tr>
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<tbody>
<tr>
<td>Feet/Minute</td>
<td></td>
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<td>5.28</td>
<td>5.79</td>
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<td>5.77</td>
<td>5.98</td>
<td>5.98</td>
<td>6.57</td>
<td>6.87</td>
<td>7.31</td>
<td>7.72</td>
<td>7.87</td>
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<tr>
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<td>6.28</td>
<td>6.51</td>
<td>6.51</td>
<td>7.15</td>
<td>7.48</td>
<td>7.96</td>
<td>8.40</td>
<td>8.57</td>
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<tr>
<td>36</td>
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<td>7.57</td>
<td>7.57</td>
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<td>9.76</td>
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<td>19.31</td>
<td>20.22</td>
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<td>28.72</td>
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<td>33.00</td>
<td>35.09</td>
<td>37.05</td>
<td>37.80</td>
<td>38.36</td>
</tr>
</tbody>
</table>

Drive Unit Speed(ft/min) = \[
\frac{(\text{Tire rolling Circumference} \times \text{Motor Speed(rpm)})}{(\text{Gearbox Reduction(52)} \times 12)}
\]

**These speeds are estimates only. Actual speeds will vary according to inflation pressure and field conditions. Machine speed should be measured after installation to determine the actual performance.**
GPS Angular Conversion Table

Use the GPS Angular Conversion table to convert the GPS angular degrees from minutes and seconds to decimal degrees when manually setting up the GPS coordinates in the control panel. Refer to Figure 51-1.

Minutes and Seconds into Decimals of a Degree
(Based on 1 second = 0.00027778 degrees)

<table>
<thead>
<tr>
<th>Minutes into Decimals of a Degree</th>
<th>Seconds into Decimals of a Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. Deg.</td>
<td>Sec. Deg.</td>
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<td>1 0.0167</td>
<td>1 0.0003</td>
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<tr>
<td>2 0.0333</td>
<td>2 0.0066</td>
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<tr>
<td>3 0.0500</td>
<td>3 0.0008</td>
</tr>
<tr>
<td>4 0.0667</td>
<td>4 0.0011</td>
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<tr>
<td>5 0.0833</td>
<td>5 0.0014</td>
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<tr>
<td>6 0.1000</td>
<td>6 0.0017</td>
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<td>7 0.1167</td>
<td>7 0.0019</td>
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<tr>
<td>8 0.1333</td>
<td>8 0.0022</td>
</tr>
<tr>
<td>9 0.1500</td>
<td>9 0.0025</td>
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<tr>
<td>10 0.1667</td>
<td>10 0.0028</td>
</tr>
<tr>
<td>11 0.1833</td>
<td>11 0.0031</td>
</tr>
<tr>
<td>12 0.2000</td>
<td>12 0.0033</td>
</tr>
<tr>
<td>13 0.2167</td>
<td>13 0.0036</td>
</tr>
<tr>
<td>14 0.2333</td>
<td>14 0.0039</td>
</tr>
<tr>
<td>15 0.2500</td>
<td>15 0.0042</td>
</tr>
<tr>
<td>16 0.2667</td>
<td>16 0.0044</td>
</tr>
<tr>
<td>17 0.2833</td>
<td>17 0.0047</td>
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<tr>
<td>18 0.3000</td>
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<td>19 0.3167</td>
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<tr>
<td>20 0.3333</td>
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<td>22 0.3667</td>
<td>22 0.0061</td>
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<tr>
<td>23 0.3833</td>
<td>23 0.0064</td>
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<tr>
<td>24 0.4000</td>
<td>24 0.0067</td>
</tr>
<tr>
<td>25 0.4167</td>
<td>25 0.0069</td>
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<tr>
<td>26 0.4333</td>
<td>26 0.0072</td>
</tr>
<tr>
<td>27 0.4500</td>
<td>27 0.0075</td>
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<tr>
<td>28 0.4667</td>
<td>28 0.0078</td>
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<tr>
<td>29 0.4833</td>
<td>29 0.0081</td>
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<tr>
<td>30 0.5000</td>
<td>30 0.0083</td>
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<td>31 0.5167</td>
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<td>35 0.5833</td>
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<tr>
<td>36 0.6000</td>
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<td>37 0.6167</td>
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<td>38 0.6333</td>
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<td>59 0.9833</td>
<td>59 0.0164</td>
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<tr>
<td>60 1.0000</td>
<td>60 0.0167</td>
</tr>
</tbody>
</table>

Angular Degree Examples

An angular degree in degrees, minutes, seconds will look like the following examples:

- **10° 11´ 37˝**, reads as 10 degrees, 11 minutes, 37 seconds.
  
  (a) Convert minutes and seconds to a decimal degree value using the table in Figure 51-1.
  
  11 minutes = 0.1833 degrees
  
  37 seconds = 0.0103 degrees

  (b) Add all decimal degree values together.

  10 degrees = 10.0000 degrees
  
  11 minutes = 0.1833 degrees
  
  37 seconds = 0.0103 degrees

  **10° 11´ 37˝ = 10.1936 degrees**

- **12° 5.245´**, read as 12 degrees, 5.245 minutes.
  
  (a) Convert decimals of a minute to decimal degrees using the table in 51-1 and multiply the decimal of a minute by 0.0167.

  5 minutes = 0.0833 degrees
  
  0.245 minutes =

  0.245 × 0.0167 = 0.0041 degrees

  (b) Add all decimal degree values together.

  12 degrees = 12.0000 degrees
  
  5 minutes = 0.0833 degrees
  
  0.245 minutes = 0.0041 degrees

  **12˚ 5.245´ = 12.0874 degrees**
## Control Panel Setup

### Constants Record
If desired, fill in the form below with the applicable constants for this machine.

<table>
<thead>
<tr>
<th>RTU ID</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Stop In Slot Position</th>
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</table>

<p>| | | |</p>
<table>
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<th></th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

### Menu/End Guns

#### End Gun 1

<table>
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<tr>
<th>Angle Pair</th>
<th>Left Angle</th>
<th>Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
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<tr>
<td>9</td>
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</tr>
</tbody>
</table>

#### End Gun 2

<table>
<thead>
<tr>
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<th>Left Angle</th>
<th>Right Angle</th>
</tr>
</thead>
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<td>4</td>
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<tr>
<td>5</td>
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#### End Gun 3

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<tbody>
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#### End Gun 4

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### Setup/Main Screen

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<tr>
<td>Pivot Road Angle</td>
</tr>
<tr>
<td>Part Circle Enable</td>
</tr>
<tr>
<td>Start Angle</td>
</tr>
<tr>
<td>End Angle</td>
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</table>
## Constants Record (continued)

<table>
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<th>Position</th>
<th>GPS Signal Loss</th>
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</tr>
<tr>
<td>Minimum application</td>
<td>% Change of Speed</td>
<td></td>
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</tr>
<tr>
<td>Hours per revolution</td>
<td>Field Size</td>
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</tr>
<tr>
<td>% Cycle Time</td>
<td>Resolution</td>
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<td>Current Voltage</td>
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<td><strong>Pump / Pressure</strong></td>
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<tr>
<td>Overwater</td>
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<tr>
<td>Run Timer Shutdown Time</td>
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<tr>
<td>Overwater Shutdown %</td>
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<th>Key Wait</th>
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<th>Flow Hours</th>
<th>Flow Multiplier</th>
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<tr>
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</table>

<table>
<thead>
<tr>
<th>Utilities</th>
<th>AR/AS</th>
<th>Auto Reverse/Auto Stop Enable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Delay</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Utilities</th>
<th>Forward/Reverse Position Enable</th>
<th>Change Direction to Forward</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Change Direction to Reverse</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather</th>
<th>Current Weather</th>
<th>Wind Shutdown Enable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MPH/KPH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather</th>
<th>Temp shutdown Enable</th>
<th>Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather</th>
<th>Rain Shutdown Enable</th>
<th>In / mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather Constants</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather Constants</th>
<th>Temperature Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather Constants</th>
<th>Rain Window</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather Constants</th>
<th>Rain Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Constants Record (continued)

### Utilities (continued)
- **Notice**
  - Notice Enable
  - Shutdown Event Enable
  - History Event Enable
  - Warning event Enable
- **Base ID**
- **Call Out Tries**
- **Comm Port**

### Radio Setup
- **Radio Hop Enable**
  - Number of Hops
  - Radio Hop ID
  - Radio Hop ID

### TPMS
- **TPMS Constants**
  - TPMS Shutdown Enable
  - Below Nominal Warning Pressure
  - Below Nominal Shutdown Pressure

### Programs
- **Daily OPS**
  - Daily OPS Enable
  - Mode
    - Daily OPS
  - Load Management
    - Days
    - Start Time
    - Stop time
    - Minimum application

### Cycles
- **Start$ Interval**
  - Start Time
  - Restart in Days
  - Start$ Interval Enable

### SIS Bypass
- **Number of Times to Bypass SIS**

### VRI
- **VRI-S Enable**
- **VRI-Z Enable**
  - **VRI-Z Constants**
    - Valve Resync Pressure
    - Number of Sprinkler Banks
    - Min Cycle Time
    - Speed Optimization Enable

### VRI-iS Enable
- **VRI-iS Constants**
  - Valve Resync Pressure
  - Min Cycle Time
  - Max Cycle Time
  - Number of Sprinklers
  - Last Sprinkler Position
  - Sprinkler Spacing
  - Speed Optimization Enable
Operation

Before Running the Machine

- ALWAYS make sure that vehicles, other equipment, livestock, and people are clear of the machine before operating.
- Turn the control panel main disconnect switch to the on position. If the power is supplied by an engine driven generator, set generator to proper voltage/Hz. Do not exceed system specifications.

Run The Machine Wet (With Water)

1. Push the Water button on the Main Screen to turn the water on. Refer to Figure 56-1.
2. To set the water application, select either the Depth field or Wet % Timer field.
   - In the Depth field, set the water application depth by inches or millimeters.
   - In the Wet % Timer field, adjust the percent to obtain the desired water application depth.
   (c) Enter either the depth or percent timer setting.
   (d) Push ENTER to retain the value.
3. Do one of the following:
   - Push button to start the machine in the forward direction.
   - Push button to start the machine in the reverse direction.
   - Push to stop the machine.

Run The Machine Dry (Without Water)

1. Push the Water button on the Main Screen to turn the water off. Refer to Figure 56-2.
2. To set the speed of travel, select the Dry % Timer field.
   - In the Dry % Timer field, adjust the percent to obtain the desired speed of travel.
   (c) Enter the percent timer setting.
   (d) Push ENTER to retain the value.
3. Do one of the following:
   - Push button to start the machine in the forward direction.
   - Push button to start the machine in the reverse direction.
   - Push to stop the machine.
Stopping The Machine  
Emergency Stopping  
To stop the machine in an emergency situation, shut off any one of the following. See Figure 57-1.

- Main Service Disconnect Switch from public power to the control panel (Item 1).
- Control Panel Main Disconnect Switch (Item 2).
- Any Tower Box Disconnect Switch (Item 3).

**NOTE**  
- The machine has a time delay that prevents it from restarting when you press a start button within five seconds after stopping the machine with water on.

**ICON5**

![Diagram of ICON5 with labels: 1. Main Service Disconnect Switch, 2. Control Panel Main Disconnect Switch, 3. Tower Box Disconnect Switch]

**ICONX**

![Diagram of ICONX with labels: 1. Main Service Disconnect Switch, 2. Control Panel Main Disconnect Switch, 3. Tower Box Disconnect Switch]
Stopping The Machine (continued)
Stopping Under Normal Conditions

To stop the machine under normal conditions, refer to Figure 58-1 and do the following:
1. Push the Stop button.
2. Turn the Main Disconnect Switch to the off position.
3. Turn the pumping unit off (if not automatic).
4. If an engine generator set is used, move the Engine Run/Start switch to the Start position for the next start-up sequence.

**WARNING**

- DO NOT SHUT THE MACHINE OFF BY SLOWLY IDLING DOWN THE ENGINE GENERATOR SET. THIS PRACTICE CAUSES LOW VOLTAGE AND WILL DAMAGE MACHINE COMPONENTS.
- ALWAYS STOP THE IRRIGATION MACHINE PRIOR TO SHUTTING DOWN THE ENGINE GENERATOR SET.

---

**Figure 58-1**

1. Stop Button 2. Control Panel Main Disconnect Switch
The Diagnostics section provides an overview of using the diagnostic features incorporated into the control panel. Diagnostics aid in identifying machine failures, troubleshooting and correcting problems.

**System Stops and Faults**

System Stops are recognized system or user commanded actions that cause the machine to shutdown. System Faults are failures that shut the machine down.

When a recognized fault or stop causes the machine to shut down, the Fault Notice icon is displayed on the pivot graphic and the item responsible for the shut down is displayed on the System Faults screen. See Figure 59-1.

The System Faults screen displays the current system stopped, system fault or no faults condition. The item causing the fault is shown at the bottom of the screen.

A list of all system stopped conditions and system faults are shown on the next page.

To view the current System Stop or System Fault do one of the following:

- Push **Menu, System, Diagnostics** and **System Faults**.
- Push the **Fault Notice** icon that appears on the pivot graphic.
- Push **Menu and Faults**.

**Clearing Faults**

The fault and fault notice icon are automatically cleared from the main screen the next time the machine runs successfully.

---

![Figure 59-1](image-url)
## System Stops and Faults (continued)

The stops and faults that can be indicated on the System Fault screen are shown in Figures 60-1 and 61-1. Refer to System Stops and Faults on page 72 in the Troubleshooting section for possible causes and corrective actions.

### System Stop Descriptions

<table>
<thead>
<tr>
<th>System Stop</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>The machine was commanded to stop by pressing the STOP button.</td>
</tr>
<tr>
<td>Stop-In-Slot (SIS)</td>
<td>The machine was stopped by the Stop-In-Slot feature.</td>
</tr>
<tr>
<td>Daily Ops</td>
<td>The daily operations sequence was completed.</td>
</tr>
<tr>
<td>Program</td>
<td>A Step or Sector Program stopped the machine.</td>
</tr>
<tr>
<td>Auto-Stop</td>
<td>The Auto Stop boundary was reached.</td>
</tr>
</tbody>
</table>

Figure 60-1
## System Stops and Faults (continued)
### System Fault Descriptions

<table>
<thead>
<tr>
<th>System Fault</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power Lost</td>
<td>Machine Power is lost.</td>
</tr>
<tr>
<td>System Power Low</td>
<td>Machine power is too low.</td>
</tr>
<tr>
<td>System Safety</td>
<td>Machine safety is not sensed.</td>
</tr>
<tr>
<td>Low Pressure</td>
<td>Water Pressure is too low.</td>
</tr>
<tr>
<td>High Pressure</td>
<td>Water pressure is too high.</td>
</tr>
<tr>
<td>NVMEM</td>
<td>E01 error is active.</td>
</tr>
<tr>
<td>Forward/Reverse</td>
<td>Both the forward and reverse circuits are energized.</td>
</tr>
<tr>
<td>Operating Sector</td>
<td>The machine position is not within operating sector.</td>
</tr>
<tr>
<td>Wind</td>
<td>The wind speed is too high. Requires optional hardware.</td>
</tr>
<tr>
<td>Temperature</td>
<td>The temperature is too low. Requires optional hardware.</td>
</tr>
<tr>
<td>GPS Com</td>
<td>GPS is not communicating.</td>
</tr>
<tr>
<td>GPS Lock</td>
<td>The GPS signal is lost.</td>
</tr>
<tr>
<td>Flow</td>
<td>The flow rate is too low. Requires optional hardware.</td>
</tr>
<tr>
<td>Tire Pressure</td>
<td>A tire's pressure is too low. Requires optional hardware.</td>
</tr>
<tr>
<td>Rain</td>
<td>The total rainfall is too high. Requires optional hardware.</td>
</tr>
<tr>
<td>Water Timer</td>
<td>The overwater shut down time has been exceeded.</td>
</tr>
<tr>
<td>Cut Cable</td>
<td>The span cable has been cut.</td>
</tr>
<tr>
<td>PCB Hardware</td>
<td>A PCB hardware issue has been detected.</td>
</tr>
<tr>
<td>12V Power</td>
<td>12V power has been lost.</td>
</tr>
<tr>
<td>Position Encoder Com</td>
<td>The position encoder is not communicating.</td>
</tr>
<tr>
<td>License</td>
<td>The protocol license is not valid.</td>
</tr>
</tbody>
</table>

Figure 61-1
Diagnostics

Error Codes

System Errors

System Error Codes are failures that may or may not shut the machine down.

When an error occurs, information about the error, including the first time and date that the error occurred, last time and date that the error occurred, and total count of all times that the error occurred, is recorded. See Figure 62-1. A list of Error Codes are shown on the next page.

Error Notification

If one or more failures occur, the word Errors will display next to the Error icon in the status area of the Main Screen. Errors must be selected as a Main Screen status for it to appear on the Main Screen. See Figure 62-1.

Viewing Error Codes

To view the Error Codes refer to Figure 62-1 and do the following:

1. Push Menu, System, Diagnostics, Error Codes and System.

2. Push View All Errors or View Active Errors to display the Error Codes screen.

   For this example, push View Active Errors to view only the active errors.

   Viewing an error code will clear it from the number of errors shown next to the Error icon in the status area of the Main Screen.

3. To access the desired error code do one of the following.
   • Push the Next button to search forward through the error codes.
   • Push the Previous button to search backward through the error codes.

Resetting Error Count

4. To set the Error Count to 0 (zero), push Reset Count. See Figure 62-1.

   The error count is reset to zero, and the first and last error occurrences are set to the current time and date.
**Error Codes (continued)**

**System Error Codes and Descriptions**

A list of possible System Error Codes is shown in the table below. Refer to System Error Codes on page 72 in the Troubleshooting section for possible causes and corrective action.

<table>
<thead>
<tr>
<th>Error Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>NVMEM corrupted</td>
</tr>
<tr>
<td>E02</td>
<td>PCB hardware issue</td>
</tr>
<tr>
<td>E03</td>
<td>Software reset - This is logged when the software resets</td>
</tr>
<tr>
<td>E04</td>
<td>Power dropped below low voltage limit</td>
</tr>
<tr>
<td>E05</td>
<td>System safety lost</td>
</tr>
<tr>
<td>E06</td>
<td>Pressure too low after pressure delay</td>
</tr>
<tr>
<td>E07</td>
<td>Pressure (mV) sensor out of range high</td>
</tr>
<tr>
<td>E08</td>
<td>Pressure (mV) sensor out of range low</td>
</tr>
<tr>
<td>E09</td>
<td>Pressure (mA) sensor out of range high</td>
</tr>
<tr>
<td>E10</td>
<td>Pressure (mA) sensor out of range low</td>
</tr>
<tr>
<td>E11</td>
<td>Pressure switch active with pump off</td>
</tr>
<tr>
<td>E12</td>
<td>Valley GPS pressure sensor out of range high</td>
</tr>
<tr>
<td>E13</td>
<td>Valley GPS pressure sensor out of range low</td>
</tr>
<tr>
<td>E14</td>
<td>FWD/REV Sense shorted</td>
</tr>
<tr>
<td>E15</td>
<td>Underwater error</td>
</tr>
<tr>
<td>E16</td>
<td>VDC communication error, primary COM module</td>
</tr>
<tr>
<td>E17</td>
<td>VRI-iS sprinkler communication error</td>
</tr>
<tr>
<td>E18</td>
<td>GPS communications error - check GPS connection and power</td>
</tr>
<tr>
<td>E19</td>
<td>GPS signal loss - check for clear path above antenna</td>
</tr>
<tr>
<td>E20</td>
<td>DGPS signal loss - check for clear path above antenna</td>
</tr>
<tr>
<td>E21</td>
<td>Flow rate below low flow limit</td>
</tr>
<tr>
<td>E22</td>
<td>Pressure above high pressure limit</td>
</tr>
<tr>
<td>E23</td>
<td>PLC communications error</td>
</tr>
<tr>
<td>E24</td>
<td>Valve duty cycles re synced due to high pressure</td>
</tr>
<tr>
<td>E25</td>
<td>GPS coordinates out of range - check distance to GPS or for crosstalk.</td>
</tr>
<tr>
<td>E26</td>
<td>Low tire pressure</td>
</tr>
<tr>
<td>E27</td>
<td>TPMS communications error</td>
</tr>
<tr>
<td>E28</td>
<td>VDC Error Report message received</td>
</tr>
<tr>
<td>E29</td>
<td>Valley GPS communication error, master OPMC</td>
</tr>
<tr>
<td>E30</td>
<td>Valley GPS Error Report message received</td>
</tr>
</tbody>
</table>

Figure 63-1
Diagnostics

Error Codes (continued)

Comm Board

Comm Board Error Codes are communications failures that may or may not shut the machine down.

The Comm Board Errors screen shows up to 6 errors. When the maximum number of 6 errors exist in the control panel memory, any new error is added to the top of the screen and the oldest record is discarded.

There is no notification that a Comm Board Error has occurred.

A list of component IDs and possible error messages is shown on the next page. Refer to the Troubleshooting section for possible causes and corrective actions.

Viewing Error Codes

To view the errors refer to Figure 64-1 and do the following:

1. Push **Menu**, **System**, **Diagnostics**, **Error Codes** and **Comm Board**.

   A maximum of 6 errors are listed on the screen, with the newest error at the top.

Clearing Error Codes

Clearing error codes will clear all Comm Board errors.

To clear the errors, push **Clear Errors**. After the errors are cleared the No Errors screen is displayed. Refer to Figure 64-1.

Figure 64-1

1. Menu  
2. System  
3. Diagnostics  
4. Error Codes  
5. RJ11 Comm  
6. Clear Errors
## Error Codes (continued)

### Comm Board Component IDs / Error Messages

Shown below are the component IDs and descriptions along with the possible error messages.

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI-000</td>
<td>Com Port in panel, Example: PRI-000 Error Message</td>
</tr>
<tr>
<td>ENC-250</td>
<td>Com board in Position Encoder, Example: ENC-250 Error Message</td>
</tr>
<tr>
<td>GPS-251</td>
<td>Com Board in GPS tower box, Example: GPS-251 Error Message</td>
</tr>
<tr>
<td>IND-XXX</td>
<td>Individual, Typically VRI-iS valve IDs. This can be an individual ID or a</td>
</tr>
<tr>
<td>or XXX-XXX</td>
<td>range of IDs followed by the error message.</td>
</tr>
<tr>
<td></td>
<td>Example: Individual ID, IND-033 Error Message - or - Range of IDs, 111-121</td>
</tr>
<tr>
<td></td>
<td>Error Message</td>
</tr>
</tbody>
</table>

### Error Messages

- No Error
- Invalid Request Length
- Invalid Request Data
- Invalid Request ID
- Production Mode Not Activated
- Serial Rx Buffer Full
- CLTX Buffer Full
- Cannot Commit When PLTX In Progress
- No Answer From External Device Serial
- Cannot Reach First Router
- No Answer From Destination
- Cannot Reach Destination
- Answer From Destination Invalid

Figure 65-1
Diagnostics

Error Codes (continued)

Valley GPS Errors

Valley GPS Error Codes are communications failures that may or may not shut the machine down.

The Valley GPS Errors screen shows up to four errors. When the maximum number of four errors exist in the control panel memory, any new error is added to the top of the screen and the oldest record is discarded.

There is no notification that the Valley GPS Error has occurred.

A list of Valley GPS error IDs and descriptions is shown on the next page. Refer to the Troubleshooting section for possible causes and corrective actions.

Viewing Error Codes

To view the Valley GPS errors push Menu, System, Diagnostics, Error Codes and Valley GPS. Refer to Figure 66-1.

A maximum of four errors are listed on the screen, with the newest error at the top.

Clearing Error Codes

Clearing error codes will clear all Valley GPS errors.

To clear the errors, push Clear Errors and then push Clear. Refer to Figure 66-1.
## Error Codes (continued)

### Valley GPS Error IDs and Descriptions

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>No Error</td>
</tr>
<tr>
<td>001</td>
<td>No Comm Mode</td>
</tr>
<tr>
<td>003</td>
<td>Invalid Security Key</td>
</tr>
<tr>
<td>004</td>
<td>Invalid Communications Mode</td>
</tr>
<tr>
<td>005</td>
<td>Block Status Already Set</td>
</tr>
<tr>
<td>010</td>
<td>Invalid Request Length</td>
</tr>
<tr>
<td>011</td>
<td>Invalid Data Request</td>
</tr>
<tr>
<td>012</td>
<td>Invalid ID Request</td>
</tr>
<tr>
<td>013</td>
<td>Production Mode Not Activated</td>
</tr>
<tr>
<td>014</td>
<td>Record Noise After Packet Reception</td>
</tr>
<tr>
<td>015</td>
<td>No Device To Be Discovered In MAC List</td>
</tr>
<tr>
<td>016</td>
<td>No Device To Be Recovered In Routing Table</td>
</tr>
<tr>
<td>017</td>
<td>FLASH Error</td>
</tr>
<tr>
<td>018</td>
<td>FLASH Verification Error</td>
</tr>
<tr>
<td>021</td>
<td>Serial Rx Buffer Full</td>
</tr>
<tr>
<td>022</td>
<td>GPS Buffer Full</td>
</tr>
<tr>
<td>023</td>
<td>Tx Error</td>
</tr>
<tr>
<td>030</td>
<td>Cannot Commit When GPS message In Progress</td>
</tr>
<tr>
<td>031</td>
<td>No Answer From External Serial Device</td>
</tr>
<tr>
<td>033</td>
<td>Cannot Reach First Router</td>
</tr>
<tr>
<td>034</td>
<td>No Answer From Destination</td>
</tr>
<tr>
<td>035</td>
<td>Cannot Reach Destination</td>
</tr>
<tr>
<td>036</td>
<td>Answer From Destination Invalid</td>
</tr>
<tr>
<td>040</td>
<td>Invalid Request For Current Board ID</td>
</tr>
<tr>
<td>050</td>
<td>Invalid Page In EEPROM Access</td>
</tr>
<tr>
<td>051</td>
<td>EEPROM Write Error</td>
</tr>
<tr>
<td>052</td>
<td>External PLP Process Running</td>
</tr>
<tr>
<td>053</td>
<td>OS Task Running</td>
</tr>
<tr>
<td>082</td>
<td>Cannot Reach First Router</td>
</tr>
<tr>
<td>0C1</td>
<td>Cannot Reach PLC Destination</td>
</tr>
<tr>
<td>0FD</td>
<td>Boot Loader Flash Error</td>
</tr>
<tr>
<td>0FE</td>
<td>Not Supported</td>
</tr>
<tr>
<td>0FF</td>
<td>NACK</td>
</tr>
</tbody>
</table>

Unknown error code

Figure 67-1
History

History provides a record of the 50 most recent machine operation status changes via the Standard and Advanced Screens. Refer to Figure 68-1.

The history record number appears at the bottom of the screen with the date and time of the record. Number 01 is the newest status change and number 50 is the oldest status change.

When the maximum number of 50 records exist in the control panel memory, any new status change is added as record number 01 and the oldest record is discarded.

Viewing Standard History

1. To view Standard History, push Menu, System, History, and Standard History. See Figure 68-1.

   The Standard History Screen shows a snapshot of the Main Screen on the date and time the history record was created.

2. To access the desired history record do one of the following.
   - Push the Next button to search forward through the History Records.
   - Push the Previous button to search backward through the History Records.

3. To leave Standard History and view Advanced History, push the Advanced History button.
**Viewing Advanced History**

The Advanced History Screen displays a record of all statuses and error codes related to the history record. Refer to Figure 69-1.

View additional information including the event that triggered this history record.

A list of trigger events is shown on the next page.

1. To view Advanced History, push **Menu**, **System**, **History**, and **Advanced History**. See Figure 69-1.

2. To access the desired history record do one of the following.
   - Push the **Next** button to search forward through the History Records.
   - Push the **Previous** button to search backward through the History Records.

3. Use the **Next Status** and **Previous Status** buttons to navigate through the Advanced History record.

4. To leave Advanced History and view the Standard History Screen, push the **Standard History** button.

---

**Figure 69-1**

1. Menu
2. System
3. History
4. Advanced History
5. Next
6. Previous
7. Next Status
8. Previous Status
9. Trigger Event
10. Standard History
History

History Screen Events

The following is a list of events that trigger the creation of history records. The event appears on the history record when viewed on the Advanced History Screen.

<table>
<thead>
<tr>
<th>Event</th>
<th>System Faults</th>
</tr>
</thead>
<tbody>
<tr>
<td>System_Run_Stop_Status change</td>
<td>Stopped - System Power Lost Fault</td>
</tr>
<tr>
<td>System_Percent_Timer change</td>
<td>Stopped - System Safety Fault</td>
</tr>
<tr>
<td>System went from no programs running to one or more step or sector programs running, or vice-versa</td>
<td>Stopped - Low Pressure Fault</td>
</tr>
<tr>
<td>Log Event program command executed</td>
<td>Stopped - Command Fault</td>
</tr>
<tr>
<td>Auto_Restart_Possible change</td>
<td>Stopped - SIS Fault</td>
</tr>
<tr>
<td>Daily_Ops_Restart_Possible change</td>
<td>Stopped - NVMEM Fault</td>
</tr>
<tr>
<td>Cycle_Repeat_Restart_Possible change</td>
<td>Stopped - For/Rev Fault</td>
</tr>
<tr>
<td>System_Direction change</td>
<td>Stopped - Operating Sector Fault</td>
</tr>
<tr>
<td>System_Water On/Off change</td>
<td>Stopped - Wind Fault</td>
</tr>
<tr>
<td>SIS_Control On/Off change</td>
<td>Stopped - Temperature Fault</td>
</tr>
<tr>
<td>SIS_Position change</td>
<td>Stopped - Daily Ops Fault</td>
</tr>
<tr>
<td>Cruise_Control enabled/disabled change</td>
<td>Stopped - GPS Com Fault</td>
</tr>
<tr>
<td>VRI-S_Status active/inactive change</td>
<td>Stopped - GPS Lock Fault</td>
</tr>
<tr>
<td>VRI-Z_Status active/inactive change</td>
<td>Stopped - Program Fault</td>
</tr>
<tr>
<td>VRI-iS_Status active/inactive change</td>
<td>Stopped - Auto-Stop Fault</td>
</tr>
<tr>
<td>Aux1 In active/inactive change</td>
<td>Stopped - Flow Fault</td>
</tr>
<tr>
<td>Aux2 In active/inactive change</td>
<td>Stopped - High Pressure Fault</td>
</tr>
<tr>
<td>Aux1 Out On/Off change</td>
<td>Stopped - Tire Pressure Fault</td>
</tr>
<tr>
<td>Aux2 Out On/Off change</td>
<td>Stopped - Rain Fault</td>
</tr>
<tr>
<td>End Gun On/Off change</td>
<td>Stopped - Water Timer Fault</td>
</tr>
<tr>
<td>Wide Boundary #1 On/Off change</td>
<td>Stopped - Cut Cable</td>
</tr>
<tr>
<td>Wide Boundary #2 On/Off change</td>
<td>Stopped - PCB Hardware Fault</td>
</tr>
<tr>
<td>Wide Boundary #3 On/Off change</td>
<td>Stopped - 12V Power Fault</td>
</tr>
<tr>
<td>Spare pull-to-ground input active/inactive change</td>
<td>Stopped - Position Encoder Com Fault</td>
</tr>
<tr>
<td>System crossed SIS_Position</td>
<td>Stopped - System Power Low Fault</td>
</tr>
<tr>
<td>Date changed (midnight)</td>
<td>Stopped - License Fault</td>
</tr>
</tbody>
</table>

Figure 70-1
Cruise Log

The Cruise Log Screen records the Percent Timer adjusted setting every 5° from the start position, regardless of the resolution setting.

1. To view the Cruise Log, push Menu, System, History, Cruise Log. See Figure 71-1.

2. To access the desired history record do one of the following.
   - Push the Next button to search forward through the Cruise Log Records.
   - Push the Previous button to search backward through the Cruise Log Records.
Troubleshooting

Use this Troubleshooting section with the machine owner’s manual to diagnose and troubleshoot problems with the machine and/or control panel.

Always perform service or maintenance safely, use personal protection equipment when required, maintain a minimum working clearance around the control panel and other equipment, use fall protection when required, and always use at least the minimal lockout/tagout procedure when maintaining or servicing the machine. For more information refer to the Safety section.

⚠️ WARNING

TO REDUCE THE POSSIBILITY OF SEVERE INJURY OR DEATH:

• TROUBLESHOOTING OR REPAIRING ELECTRICAL PROBLEMS SHOULD ONLY BE PERFORMED BY A QUALED VALLEY DEALER.

• ALWAYS CONTACT YOUR LOCAL VALLEY DEALER TO TROUBLESHOOT OR CORRECT ANY ELECTRICAL PROBLEMS ON OR ASSOCIATED WITH THE CONTROL PANEL OR MACHINE. NEVER ATTEMPT TO TROUBLESHOOT OR CORRECT ELECTRICAL PROBLEMS ON YOUR OWN.

• USE PERSONAL PROTECTION EQUIPMENT WHEN REQUIRED.

• MAINTAIN A MINIMUM WORKING DISTANCE AROUND THE CONTROL PANEL AND OTHER EQUIPMENT.

• USE FALL PROTECTION WHEN REQUIRED.

• BEFORE SERVICING OR PERFORMING MAINTENANCE ON THE MACHINE, ALWAYS SHUT OFF ALL ELECTRICAL POWER TO THE CONTROL PANEL AND MACHINE, THEN USE THE MINIMAL LOCKOUT/TAGOUT PROCEDURE ON THE SERVICE DISCONNECT AND CONTROL PANEL.

System Stops and Faults

Listed in the table below and on the following pages are the possible system stops and faults with the description, possible causes, whether the machine will shutdown if the error occurs, and corrective action to take.

<table>
<thead>
<tr>
<th>System Stop</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>The machine was intentionally commanded to stop by pushing the Stop button.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>• User commanded stop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop-In-Slot (SIS)</td>
<td>The current machine position matches the Stop-In-Slot position while the machine was waiting/running.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>• SIS position reached</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Ops</td>
<td>With the Daily Ops Control enabled and Daily Ops Mode selected, the system was started outside of the start/stop range of Daily Ops.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>• Daily operation sequence completed</td>
<td></td>
<td></td>
<td>If desired, reprogram Daily Ops to run at a different time or disable Daily Ops.</td>
</tr>
<tr>
<td>Program</td>
<td>A stop command in a step or sector program shut down the machine.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>• Program stop command</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto-Stop</td>
<td>The Auto Stop boundary was reached and shut down the machine.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>• Auto-Stop boundary reached</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Troubleshooting

## System Stops and Faults (continued)

<table>
<thead>
<tr>
<th>System Fault</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power Lost</td>
<td>Voltage dropped below half the low voltage limit for 3 seconds or more while the machine was waiting/running with water on or more than 1 second if running with water off.</td>
<td>Yes</td>
<td>Check Low Voltage Limit for correct value. Contact your Valley dealer.</td>
</tr>
<tr>
<td>System Power Lost – Machine power is lost</td>
<td>Voltage fell below the low voltage limit for 15 seconds or more while the machine was waiting/running.</td>
<td>Yes</td>
<td>Check power supply.</td>
</tr>
<tr>
<td>System Safety</td>
<td>Safety circuit was de-energized for more than 3 seconds.</td>
<td>Yes</td>
<td>Make sure a tower is not stuck. Check for flat tire on a tower. Check for wheel gearbox failure. Check End-Of-Field Stop for proper operation. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Low Pressure - Water pressure is too low</td>
<td>Water pressure fell below the Low Pressure Limit for more than the Operating Pressure Delay time while the machine was running with water on and after the Startup Pressure Delay has expired.</td>
<td>Yes</td>
<td>Make sure pump is on. Set Low Pressure Limit higher. Set Operating Pressure Delay for longer period of time. Contact your Valley dealer.</td>
</tr>
<tr>
<td>High Pressure - Water pressure is too high</td>
<td>Water pressure remained above the High Pressure Limit for at least the High Pressure Shutdown Delay time.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>NVMEM – E01 error is active</td>
<td>E01 error is active, Memory Error, Backup Battery failure.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Forward/Reverse – Both For/Rev circuits are energized</td>
<td>Both the forward and reverse circuits were on for more than 15 seconds while the machine was waiting/running.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Operating Sector – Machine position is not within the operating sector</td>
<td>With AR/AS and For/Rev Position both enabled, the machine is waiting/running or was started outside of the Forward or Reverse Position angles.</td>
<td>Yes</td>
<td>Walk the machine back. Check the For/Rev Position angles. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Wind – Wind is too high</td>
<td>With Wind Shutdown enabled, the Wind Speed went above the Wind Speed Limit for more than 1 minute while the machine is running with water on. Requires optional equipment.</td>
<td>Yes</td>
<td>Normal operation - No corrective action needed.</td>
</tr>
<tr>
<td>Temperature – Temperature is too low</td>
<td>With the Temperature Shutdown enabled, the Current Temperature goes below the Low Temperature Limit while water is on. Requires optional equipment.</td>
<td>Yes</td>
<td>Restart the machine when the temperature rises above the limit.</td>
</tr>
<tr>
<td>Rain – Total rainfall is too high</td>
<td>With the Rain Shutdown enabled, the Total Rainfall for the Rain Window goes above the Rain Shutdown Limit while water is on. Requires optional equipment.</td>
<td>Yes</td>
<td>Turn Rain Shutdown Off, or restart the machine when the Rain Total is below the Rain Limit.</td>
</tr>
</tbody>
</table>
## Troubleshooting

### System Stops and Faults (continued)

<table>
<thead>
<tr>
<th>System Fault</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>While the machine is running with water on, the Flow Rate falls below the Low Flow Limit after adequate water pressure has been achieved.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Water Timer</td>
<td>With the Water Timer enabled, the time accumulated by the Overwater Timer is greater than the Overwater Shutdown time.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Tire Pressure</td>
<td>With Shutdown Pressure Control enabled, the Reported Tire Pressure of a tire is below the Nominal Tire Pressure for that tire's tower by at least the Shutdown Pressure Drop for two consecutive sensor readings. This is checked only on the reception of new tire pressure sensor data. Requires optional equipment.</td>
<td>Yes</td>
<td>View error E26 to determine which tower has a tire with low pressure. Check the tires on the tower for low pressure, and repair as needed. Contact your Valley dealer.</td>
</tr>
<tr>
<td>GPS Com</td>
<td>With GPS Position and Shutdown On Position Loss enabled, while the machine is waiting/running there has been no GPS communications and the Shutdown On Position Loss Delay time has expired. Requires optional equipment.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>GPS Lock</td>
<td>With GPS Position and Shutdown On Position Loss enabled, while the machine is waiting/running the GPS Lock Status is None and the Shutdown On Position Loss Delay time has expired. Requires optional equipment.</td>
<td>Yes</td>
<td>Check for a clear path above the GPS antenna. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Cut Cable</td>
<td>A cut cable was Detected when the machine was started.</td>
<td>Yes</td>
<td>Check span cable Contact your Valley dealer.</td>
</tr>
<tr>
<td>PCB Hardware</td>
<td>PCB hardware issue detected while the machine is waiting/running.</td>
<td>Yes</td>
<td>Review Error E02 for which PCB hardware issue caused the fault. Contact your Valley dealer.</td>
</tr>
<tr>
<td>12V Power</td>
<td>With Backup Battery enabled: The battery backup supply voltage fell below 10 volts or the unit has been powered from the battery backup supply and the Battery Backup Time has expired. Requires optional equipment.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Position Encoder Com</td>
<td>With the Position Encoder option and Shutdown On Position Loss enabled, while the machine is waiting/running the position encoder has not been communicating and the Shutdown On Position Loss Delay time has expired.</td>
<td>Yes</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>License</td>
<td>The protocol license is not valid.</td>
<td>Yes</td>
<td>Normal shutdown the first time that a communications device talks to the control panel while the machine is running. Contact your Valley Dealer.</td>
</tr>
</tbody>
</table>
# System Error Codes

Listed in the table below and on the following pages are the possible system errors with the description, threshold for the error to occur, whether the machine will shutdown if the error occurs and possible causes.

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>NVMEM Corrupted.</td>
<td></td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td>E02</td>
<td>PCB Hardware Issue #1</td>
<td>The cut cable relay digital input failed to become active after the relay was energized.</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #2</td>
<td>The cut cable relay digital input was active while the machine was waiting/running.</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #3</td>
<td>The 5 volt regulator output is turned Off while the machine was waiting/running.</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #4</td>
<td>The main supply input is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #5</td>
<td>The battery charging voltage is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #6</td>
<td>The battery charging voltage is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #7</td>
<td>The switched 12V power output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #8</td>
<td>The switched charging voltage is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #9</td>
<td>The thermally fused 12V sensor power output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #10</td>
<td>The thermally fused 12V sensor power output is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #11</td>
<td>The thermally fused 12V daughter card power output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #12</td>
<td>The thermally fused 12V daughter card power output is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #13</td>
<td>The 5 volt regulator output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #14</td>
<td>The 5 volt regulator output is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #15</td>
<td>The thermally fused 5 volt sensor power output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #16</td>
<td>The thermally fused 5 volt sensor power output is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #17</td>
<td>The 3.3 volt regulator output is out of range (High).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>PCB Hardware Issue #18</td>
<td>The 3.3 volt regulator output is out of range (Low).</td>
<td>Yes</td>
<td></td>
<td>Contact your Valley Dealer.</td>
</tr>
<tr>
<td>E03</td>
<td>Software Reset</td>
<td>When the software is power cycled or reset.</td>
<td>No</td>
<td></td>
<td>Normal operation.</td>
</tr>
</tbody>
</table>
## System Error Codes (continued)

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| E04   | Power Dropped Below Low Voltage Limit  
• This error is only logged if it is not already active. | When machine is waiting/ running, and voltage drops below Low Voltage Limit. | Yes - by System Power Low fault after 15 seconds. | Nuisance shutdowns can be caused by setting the Low Voltage Limit too high. Contact your Valley Dealer. |  |
| E05   | System Safety Lost | When the machine is running and Safety In is de-energized. | Yes - by System Safety fault after 3 seconds. | The safety circuit is open due possibly to misaligned towers, guidance problems, over-watering timer timed out, or any other component in the safety circuit. Contact your Valley Dealer. |  |
| E06   | Pressure Too Low After Pressure Delay  
• This error is only logged if it is not already active. | While running with water on and after Startup Pressure Delay expires Low water pressure is reported by any pressure sensor selected for the Running input. | Yes - by Low Pressure fault after operating pressure delay expires. | Startup pressure delay time is too short. The pump, pressure transducer, or pressure switch may have failed. Low pressure limit set too close to operating pressure. Contact your Valley Dealer. |  |
| E07   | Pressure (mV) Sensor Out of Range High  
• This error is only logged if it is not already active. | When (mV) pressure is greater than the calculated Max Sensor Pressure. The (mV) pressure sensor must be selected for the Stopped or Running input. | No | The pressure sensor has failed. Contact your Valley Dealer. |  |
| E08   | Pressure (mV) Sensor Out of Range Low  
• This error is only logged if it is not already active. | When (mV) pressure is < -6 psi. The (mV) pressure sensor must be selected for the Stopped or Running input. | No | The pressure sensor has failed or is not installed. Contact your Valley Dealer. |  |
| E09   | Pressure (mA) Sensor Out of Range High  
• This error is only logged if it is not already active. | When (mA) pressure is greater than the calculated Max Sensor Pressure. The (mA) pressure sensor must be selected for the Stopped or Running input. | No | The pressure sensor has failed. Contact your Valley Dealer. |  |
| E10   | Pressure (mA) Sensor Out of Range Low  
• This error is only logged if it is not already active. | When (mA) pressure is < -6 psi. The (mA) pressure sensor must be selected for the Stopped or Running input. | No | The pressure sensor has failed or is not installed. Contact your Valley Dealer. |  |
| E11   | Pressure Switch Active With Pump Off  
• This error is only logged if it is not already active. | When the Pump Safety Relay is Off for more than 5 minutes and the pressure switch is still on. | No | The pressure switch has failed, is stuck, or water is still in riser pipe possibly because of a plugged machine drain. Contact your Valley dealer. |  |
## System Error Codes (continued)

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Possible Causes Corrective Actions</th>
</tr>
</thead>
</table>
| E12   | Valley GPS pressure sensor out of range high  
• This error is only logged if it is not already active. | When Valley GPS pressure is greater then the calculated Max Sensor Pressure. The Valley GPS pressure sensor must be selected for the Running input. | No | The pressure sensor has failed, calibration or setup is incorrect, or the Max pressure is set too low. Contact your Valley Dealer. |
| E13   | Valley GPS pressure sensor out of range low  
• This error is only logged if it is not already active. | When Valley GPS pressure is < -6 psi. The Valley GPS pressure sensor must be selected for the Running input. | No | The pressure sensor has failed or is not installed. Contact your Valley Dealer. |
| E14   | FWD/REV Sense Possible Short  
• The machine status will show running when AR/AS is Off even though the motor contactor is disabled.  
• The machine will stop if AR/AS is on and Auto Stop is selected.  
• If AR/AS is on and Auto Reverse is selected, the machine will alternate between forward and reverse direction control.  
• Since motor power is disabled until the direction has locked in, the machine will not move.  
• Error will not be logged again until one or both of the lines have been de-energized for a minimum of 1 second. | When both the forward and reverse run lines are energized. 
Logged after 2 seconds when AR/AS is enabled. 
Logged Immediately when AR/AS is disabled. | Yes - by FWD/REV Fault after 15 seconds if machine is waiting/running regardless of AR/AS settings. | Contact your Valley Dealer. |
| E15   | Underwater Error  
• This error is only logged if it is not already active.  
• Watering Timer must be enabled. | When the 5° Run Timer value is less than the Error Time value. | No | Contact your Valley Dealer. |
| E16   | VDC Communication Error, Primary Communication Module | Each time a command message is sent with no reply message being received (VRI-iS or Encoder options only). | Yes - if Position Loss Shut Down is enabled. | Communications error to Comm Board. Contact your Valley Dealer. |
## Troubleshooting

### System Error Codes (continued)

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Possible Causes Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>E17</td>
<td>VRI-iS Sprinkler Communication Error</td>
<td>Each time a sprinkler fails to respond to a Set Sprinkler command retry.</td>
<td>No</td>
<td>Communications error to VRI-iS valve. Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>• The sprinkler ID and number of occurrences for this sprinkler are logged with the error.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E18</td>
<td>GPS Communication Error</td>
<td>When a transition occurs from GPS communicating to GPS not communicating. GPS Position must be enabled.</td>
<td>Yes - if Shut Down System is selected.</td>
<td>When GPS option is powered by safety circuit, a loss of power will cause this error.</td>
</tr>
<tr>
<td>E19</td>
<td>GPS Signal Loss</td>
<td>When the GPS Lock Status transitions from Standard to DGPS or None. GPS Position must be enabled.</td>
<td>Yes - if Shut Down System is selected.</td>
<td>Check for clear path above the GPS antenna.</td>
</tr>
<tr>
<td>E20</td>
<td>DGPS Signal Loss</td>
<td>When the GPS Lock Status transitions from DGPS to Standard. GPS Position must be enabled.</td>
<td>No</td>
<td>Check for clear path above the GPS antenna.</td>
</tr>
<tr>
<td></td>
<td>• The Satellite Count is logged with the error.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E21</td>
<td>Flow Rate Below Low Flow Limit</td>
<td>After operating pressure has been achieved, while the Machine is running with water on, the flow rate fell below the low flow limit. Minimum flow rate must be enabled.</td>
<td>Yes - by Flow Fault.</td>
<td>Low Flow Limit may be set too high.</td>
</tr>
<tr>
<td>E22</td>
<td>Pressure Above High Pressure Limit</td>
<td>Every time the water pressure rises above the High Pressure Limit.</td>
<td>Yes - by High Pressure Fault after the High Pressure Shutdown Delay of 15 seconds.</td>
<td>Max pressure may be set too low. Contact your Valley Dealer.</td>
</tr>
<tr>
<td></td>
<td>• Error is logged every time the water pressure rises above the High Pressure Limit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E23</td>
<td>PLC Communication Error</td>
<td>After 3 consecutive command messages are sent to an OPMC ID with no reply message being received.</td>
<td>No</td>
<td>Verify Correct PLC Channel and ID Settings.</td>
</tr>
<tr>
<td></td>
<td>• The OPMC ID is logged with the error.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E24</td>
<td>Valve Duty Cycles Re-Synced Due to High Pressure</td>
<td>When the water pressure exceeds the VRI Resync Pressure.</td>
<td>No</td>
<td>The machine water pressure is equal to the valve resync water pressure setting. The valve duty cycle is automatically re-syncronized. Verify that the valve resync pressure is not set too low.</td>
</tr>
</tbody>
</table>
## System Error Codes (continued)

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>Threshold</th>
<th>Shut Down</th>
<th>Possible Causes Corrective Actions</th>
</tr>
</thead>
</table>
| E25   | GPS Coordinates Out of Range  
• The Satellite Count is logged with the error. | When GPS coordinates are out of range. | Yes, if Shut Down System is selected. | Verify that Distance to GPS, Radius + or Radius -, values are correct.  
Verify that pivot point coordinates are correct.  
Crosstalk from another GPS device on the same channel.  
Change GPS PLC to different channel to avoid crosstalk. |
| E26   | Low Tire Pressure  
• The tower number is logged with the error.  
• The error is logged for only one tower at a time.  
• If the error is already logged on a tower, errors on a different tower will not be logged.  
• Correct the problem and clear the error log to view other occurrences. | When new data indicates a tire with pressure at or below the tire pressure warning value is on the indicated tower. | Yes - after 2 consecutive readings of pressure below Shutdown Pressure Drop if Shutdown Pressure is enabled. | At least one tire on the indicated tower has low pressure. |
| E27   | TPMS Communications Error  
• The TPMS ID is logged with the error. | After 3 consecutive command messages are sent to an TPMS ID with no reply message being received. | No | Contact your Valley Dealer. |
| E28   | VDC Error Report Message Received | When a Communication board error report message is received from the comm board. | No | An error report was generated in response to a command.  
View the Error Report in System/Diagnostics/Error Codes/Comm Board. |
| E29   | Valley GPS communication error, master OPMC | The SRB was unable to communicate to the master OPMC. | No | Contact your Valley Dealer. |
| E30   | Valley GPS Error Report message received | When a communication Error Report message is received from the PLC. | No | An error report was generated in response to a command.  
View the Error Report in System/Diagnostics/Error Codes/Valley GPS. |
## Troubleshooting List

Listed in the table below and on the following page are various problems, with the descriptions and possible causes or corrective action to take.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause or Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivot auto reverses randomly.</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Pivot auto stops randomly.</td>
<td>Contact your Valley dealer.</td>
</tr>
<tr>
<td>Pivot breaks safety at barricade.</td>
<td>Barricade too high on actuator arm. Auto-Reverse/Auto-Stop disabled. Auto-Reverse/Auto-Stop box not adjusted correctly. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Pressure sensor reading incorrect.</td>
<td>Calibrate sensor without water. Check valve holding water in riser. Ice against sensor. Sensor plugged. Pressure tube plugged or damaged. Contact your Valley dealer.</td>
</tr>
<tr>
<td>No display.</td>
<td>Disconnect switch Off. No Power To Machine. Contact your Valley dealer.</td>
</tr>
<tr>
<td>End gun does not shut off.</td>
<td>End Gun angles not programmed correctly. &quot;T&quot; filter plugged. Defective end gun hardware. Direction offset incorrect; arc too small. Contact your Valley dealer.</td>
</tr>
<tr>
<td>End gun does not turn on.</td>
<td>End Gun angles not programmed correctly. End Gun disabled. Defective end gun hardware. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Screen cycles on and off.</td>
<td>Erratic incoming power. Low voltage. Contact your Valley dealer.</td>
</tr>
</tbody>
</table>
## Troubleshooting List (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause or Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivot does not stop at stop-in-slot.</td>
<td>Stop-In-Slot not turned on. Stop-In-Slot position has been changed. Machine must move at least 2° away from the Stop-In-Slot position before it can be stopped again by Stop-In-Slot. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Pivot won't auto restart.</td>
<td>START$ program written incorrectly or missing. Restart criteria has not been met. Off day in Daily Ops. System fault other than power or pressure. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Pivot won't stop with Daily Ops.</td>
<td>Start/stop times reversed. Daily Ops not enabled. A program other than Daily Ops starts machine. The STOP$ Program must be set to stop. Contact your Valley dealer.</td>
</tr>
<tr>
<td>Auto Restart does not work.</td>
<td>Make sure a Start$ program is entered. System fault must be either power or pressure for restart to work. Verify that Auto Restart is enabled and on. Contact your Valley dealer.</td>
</tr>
</tbody>
</table>
Troubleshooting

ICON5 Software
Update ICON5 Software

To execute a Software Update, refer to Figure 82-1 and do the following:

1. Stop the machine.
2. Insert the USB flash drive containing the software update into the USB port on the front of control panel.
4. Push Update ICON5 software.
5. Push Yes to start the update process.
6. Push Read USB to show the files that are on the flash drive.
ICON5 Software

Update ICON5 Software (continued)

7. Select a file to install.

8. Push Program File to update the software.
   The control panel will update the ICON5 Software and then automatically reboot.

9. After the ICON5 Software update completes, the USB flash drive can be removed.
Troubleshooting

Smart Relay Board

SRB Default Reset

SRB Default Reset, resets the Electrically Erasable Programmable Read-Only Memory to factory default settings.

- Resets current status to factory settings
- Resets all constants to factory settings
- Resets all options to factory settings
- Erases all current and stored programs
- Clears Review History
- Clears Error Log history

To execute an SRB Default Reset, refer to Figure 84-1 and do the following:

Backup or record all options settings, constants settings, and programs that will need to be restored or re-entered after the default reset.

2. Push SRB Default Reset.
3. Push Yes to set the Smart Relay Board to factory defaults and reboot the control panel.
Smart Relay Board

Update SRB Firmware

Updating SRB Firmware, uploads the most current version of firmware and preserves panel settings.

Refer to Figure 85-1 and do the following to Update SRB Firmware.

1. Insert USB flash drive into USB port located on the front of the panel.
4. Push Yes to start the update process.
5. Push Read USB.

---

Figure 85-1

1. Menu
2. System
3. Diagnostics
4. Firmware
5. SRB Firmware
6. Update SRB Firmware
7. Yes
8. Read USB
Troubleshooting

Smart Relay Board
Update SRB Firmware (continued)

6. Select desired file from the files found.

7. Push **Program File** to update the firmware.
   The control panel will update the SRB Firmware and then automatically reboot.

8. After the SRB Firmware update completes, the USB flash drive can be removed.

---

Figure 86-1 1. Select File  
2. Program File
Smart Relay Board
Backup Panel Settings

The Backup / Restore screen, allows the user to create and restore panel settings. Each of the files create restore points to load at a later date.

- Saves current statuses
- Saves all current constants
- Saves all options
- Saves all current and stored programs
- Saves Review History
- Saves Error Log history

To create a Backup File, refer to Figure 87-1 and do the following:

1. Insert USB flash drive into USB port located on the front of the panel.
2. Push **Menu, System, Diagnostics, Firmware** and **Backup / Restore**.
3. Push **Backup Panel Settings**.
4. Push **Yes** to create a backup file.
5. Push **Name File** to open the keypad (keypad not shown).

Performing a backup of your ICON5 panel's settings will save the customized settings for this panel onto a USB drive.

A restore will load the customized settings from a saved file.

Backup / Restore settings:

1) System Constants
2) Step and Sector Programs
3) TPMS

**Figure 87-1**

1. Menu
2. System
3. Diagnostics
4. Firmware
5. Backup/Restore
6. Backup Panel Settings
7. Yes
8. Name File
9. Named Backup File
10. Backup File
Troubleshooting

Smart Relay Board
Backup Panel Settings (continued)

6. Enter the file name. The file name can be one to eight characters long.

7. Push Enter and the named backup file appears on the screen.

8. Push Backup File to save the backup file to the USB flash drive.

9. After the backup file is saved, the USB flash drive can be removed.

Figure 88-1
Smart Relay Board

Restore Panel Settings

The Restore screen, allows the user to choose a file containing saved panel settings, Step and Sector programs, and TPMS. A restore will load the customized settings from a saved file.

- Restores all System Constants
- Restores all Step and Sector Program settings
- Restores all TPMS settings

To restore a Backup File, refer to Figure 89-1 and do the following:

1. Insert USB flash drive into USB port located on the front of the panel.
4. Push Yes.
5. Push Read USB.

Performing a backup of your ICON5 panel’s settings will save the customized settings for this panel onto a USB drive.

A restore will load the customized settings from a saved file.

Backup / Restore settings:

1) System Constants
2) Step and Sector Programs
3) TPMS

Figure 89-1

1. Menu
2. System
3. Diagnostics
4. Firmware
5. Backup / Restore
6. Restore Panel Settings
7. Yes
8. Read USB
Troubleshooting

Smart Relay Board
Restore Panel Settings (continued)

6. Select the file to be restored.

7. Push **Restore File** to restore the selected file from the USB flash drive.

8. After the fie is restored, the USB flash drive can be removed.

![Figure 90-1](image-url)

1. Select File
2. Restore File

Press ‘Restore File’ Button

- No Errors
- Connected

Restore Complete!

- No Errors
- Connected
Navigation

The following flowcharts are provided to help you navigate to settings, values, statuses, indicators and the advanced features, associated with the Menu, Setup, System, Utilities and Program buttons.

Key:
- Rounded Rectangles indicate Buttons used for menu navigation.
- Closed Bullets indicate User Input Settings and Values.
- Open Bullets indicate View Only Status and Status Indicators.

Menu Button

- CONTROLS
  - ALL CONTROLS
- STATUS
  - ALL STATUSES
- END GUNS
  - END GUN ENABLE
  - CONFIGURE EG
- VOLTS / PRS
  - VOLTS AND PRESSURE STATUS
- FAULTS
  - SYSTEM FAULTS
- SETUP
- SYSTEM
- UTILITIES
- PROGRAMS
System Button