



**Valley TouchPro  
Control Panel  
Owner's Manual**

**0999006\_B**

**Software Versions:  
TouchPro Module v9.02  
FlexBox v1.02 P1.9**



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

1. ALWAYS make sure that vehicles, other equipment, livestock, and people are clear of the machine before operating.
2. Turn the control panel main disconnect switch to the ON position. If the power is supplied by an engine driven generator, adjust the RPM of the generator until the voltmeter reads 460 – 505 volts. DO NOT EXCEED 505 VOLTS.

## Run The Machine Wet (With Water)

3. Push the button on the Main screen to turn the water ON.
4. Select the direction of travel by pushing the Forward or Reverse button.
5. Set the water application by pushing or .
  - Use to set water application by inches (mm) of water.
  - Use to set water application by percent timer setting.
6. Use the numeric keypad to enter the depth of water in inches (mm), or the percent timer setting.
  - Push (Enter) to retain the value.
7. Push to start the machine.
8. Push to stop the machine.

## Controlling Auxiliary Relays:

1. Push System (A) Control .
2. Push AUX1 or AUX2 to turn it on.
3. Push the button again to turn it OFF.

## Selecting Stop-In-Slot On/Off:

1. Push the Stop-In-Slot button to toggle between ON and OFF.
  - Stop-In-Slot OFF to bypass the stop-in-slot location.
  - Stop-In-Slot ON to stop at the stop-in-slot location.

## To Set The Stop-In-Slot Position:

1. Push the Stop-In-Slot Setting button .
2. Enter the desired stop-in-slot position in degrees and push .

## Turning Power and Pressure Restart On:

1. Push System Control .
2. Push the Auto Restart button to toggle between ON and OFF.
  - Auto Restart OFF .
  - Auto Restart ON .

NOTE: Refer to the section in the Advanced Features Manual entitled "Automatic Restart Option" for more information.

## Selecting Auto Reverse or Auto Stop:

1. Push System (A) Control .
2. Push the Auto Reverse/Auto Stop (AR/AS) button to toggle between OFF, Auto Stop On and Auto Reverse ON.
  - Auto Reverse/Auto Stop OFF .
  - Auto Stop ON .
  - Auto Reverse ON .

NOTE: Only applicable with the drive-unit-mounted, end-of-field stop/auto reverse hardware. AR/AS must be ON.

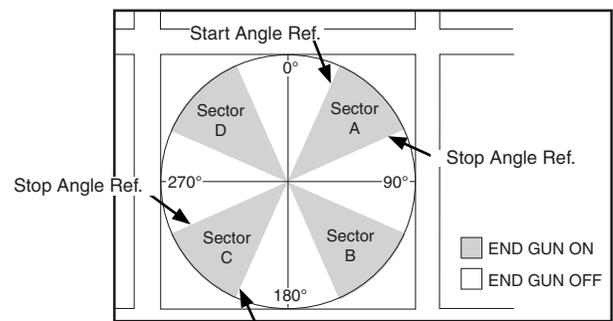
## Run The Machine Dry (Without Water)

3. Press the button on the Main screen to turn the water OFF.
4. Select the direction of travel by pushing the Forward or Reverse button.
5. Set the speed of travel by pushing .
6. Use the numeric keypad to enter the percent timer setting in inches (mm).
  - Push (Enter) to retain the value.
7. Push to start the machine.
8. Push to stop the machine.

## Setting The End Gun:

Refer to Figure 1.

1. Push Options (H) End Gun (F) .
2. Push the End Gun or Wide Boundary tab.
3. Push the Start Angle field (end gun ON) for a sequence, and enter degrees on the numeric keypad. Push .
4. Push the End Angle field (end gun OFF) for that same sequence, and enter degrees on the numeric keypad. Push .
5. Repeat steps 2-4 for other sequences as needed.



SECTOR A		SECTOR B		SECTOR C		SECTOR D	
START ANGLE	STOP ANGLE						
31	59	121	149	211	239	301	329

Figure 1.

# Quick Reference Guide

QUICK REFERENCE GUIDE

## System Faults & Descriptions

FAULT	DESCRIPTION
SYSTEM POWER FAULT	Voltage has fallen below the low voltage limit for more than 15 seconds, or power was lost while the machine was running.
SYSTEM SAFETY FAULT	Caused by a break in the safety return circuit that lasted longer than three seconds.
LOW PRESSURE FAULT	The pressure fell below the low pressure limit, or the Pressure Delay is not a sufficient amount of time to build pressure in the machine after it is started.
HIGH PRESSURE FAULT	With VRI-Zone on, the pressure went above the high pressure limit for more than three seconds.
WATER TIMER FAULT	The machine shut down because it was moving too slowly, thereby applying too much water.
COMMAND FAULT	The machine was commanded to stop by one of the following: 1) The STOP button was pressed. 2) An autostop condition occurred at the end-of-field stop. 3) A programmed STOP command was executed.
STOP-IN-SLOT (SIS) FAULT	The machine was shut down by the Stop-In-Slot.
PROGRAM FAULT	The machine was shut down because a Step program stopped the system.
AUTOSTOP FAULT	An autostop condition occurred at the end-of-field stop.
BBRAM FAULT	An attempt was made to start the machine when error E01 was displayed on the status screen.
FLOW FAULT	With VRI-Z on, the flow rate has fallen below the amount set in the FLOWMETER GAL/PULSE field.
FOR/REV FAULT	Both the forward and reverse sensor relays were on for more than 15 seconds while the system was running or waiting.
TIRE PRESSURE	While the system was running or waiting, two consecutive error messages from a particular tire were received.
WIND FAULT	The machine shut down because the wind speed reached the high wind limit. The wind speed indicator is an option. WIND is only displayed on the system faults screen when wind is turned ON.
TEMPERATURE FAULT	The machine shut down because the temperature fell below the low temperature limit.
RAIN FAULT	The machine shut down because the rain limit was exceeded in the rain window time period.
DAILY OPS FAULT	The daily operations program shut the machine down because it is not allowed to run between a certain time period, DAILY OPS is only displayed on the system faults screen when Daily Ops is turned ON.
NO ACK	No Acknowledge is enabled and the BaseStation did not acknowledge the message.
RELAY COM FAULT	There is a hardware or software communication problem between the TouchPro module and the electrical relay board within the control panel.
GPS COM FAULT	When GPS is selected as a protocol and the system shuts down due to no communication with GPS for a user-specified amount of time, when shut down of GPS signal loss is ON, or while the system was running or waiting.
GPS LOCK FAULT	When GPS is selected as a protocol and the System shuts down due to GPS signal loss for a user-specified amount of time, or when shut down of GPS signal loss is ON, or while the system is running or waiting.
BOUNDARY FAULT	The machine shut down because it traveled beyond the forward or reverse Position angles.

## Error Codes & Descriptions

ERROR	DESCRIPTION	ERROR	DESCRIPTION
E01	BBRAM - Checksum failed at power up.	E15	UNDERWATER ERROR - Check for induced voltages and % timer connections.
E02	EEPROM - Checksum failed at power up.	E16	NOT AVAILABLE
E03	UNIT RESETS - This is logged when the software resets.	E17	NOT AVAILABLE
E04	POWER DROP - Power dropped below low voltage limit.	E18	GPS COMMUNICATIONS ERROR - Check GPS connection and power.
E05	SYSTEM SAFETY - Possible tower misalignment, drive unit may be stuck.	E19	GPS SIGNAL LOSS - Check for clear path above antenna.
E06	PUMP SAFETY - Pressure too low after pressure delay.	E20	DGPS SIGNAL LOSS - Check for clear path above antenna.
E07	PRESSURE SENSOR - Out of range high. Check connection.	E21	LOW FLOW -
E08	PRESSURE SENSOR - Out of range low. Check connection.	E22	HIGH PRESSURE -
E09	PRESSURE SENSOR - Pressure high with pump off. Check connection.	E23	PLC COMMUNICATIONS ERROR. (GPS V2 Only)
E10	PRESSURE SENSOR - Mechanical switch could be stuck.	E24	RESYNC VALVE DUTY CYCLE DUE TO PRESSURE
E11	RESOLVER - Angle jumping around. Lube J pipe.	E25	GPS COORDINATES OUT OF RANGE. Check distance to GPS or for crosstalk.
E12	E12 RESOLVER - Out of range high. Check for loose or shorted wires.	E26	LOW TIRE PRESSURE
E13	KEYPAD - Possible key stuck. Check keypad connection.	E27	TPMS COMMUNICATIONS ERROR
E14	FWD/REV SENSE - Possible short FWD/REV. Check ARAS box.		

# EC Declaration of Conformity



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

Serial Number:

Purchase Order:

declare under our sole responsibility that the product,

## **Crop Irrigation System**

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

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

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

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

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

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

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

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

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# Electrical Safety Statement

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## Installation Of The Valley Electric Irrigation Machine - European Union Only

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

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

Good grounding of the Valley irrigation machine is required.

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

The power supply installation and inspection of equipment protection components or 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 TouchPro Control Panels with Software Versions - TouchPro Module v9.02 and FlexBox v1.02 P1.9. 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.

## Ancillary Equipment Warranty

The owner is responsible for warranty registration of all ancillary equipment such as engines, pumps and generators with its respective manufacturer.

## Recognize Safety Information

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

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

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

## Safety Messages

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



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

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

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

## Information Messages

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

### **NOTE**

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

# Safety

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## Use of Personal Protective Equipment

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

## Conductive Materials and Equipment

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

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

## Fall Protection

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

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

## Minimum Working Clearance

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

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

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

## Qualified Person

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

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

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

# Safety

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## Overhead Power Lines

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

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

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

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

## Minimal Lockout / Tagout Procedure

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

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

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

## Sequence of Lockout

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

### **DANGER**

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

## Restoring Equipment to Service

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

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

# Safety

## Operate Safely

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

### CAUTION

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

### EMPLOYEE INSTRUCTION ON SAFETY

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

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

### EMERGENCY STOPPING

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



Figure 14-1 1. Disconnect Switch

### WARNING

#### PROPER GROUNDING

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

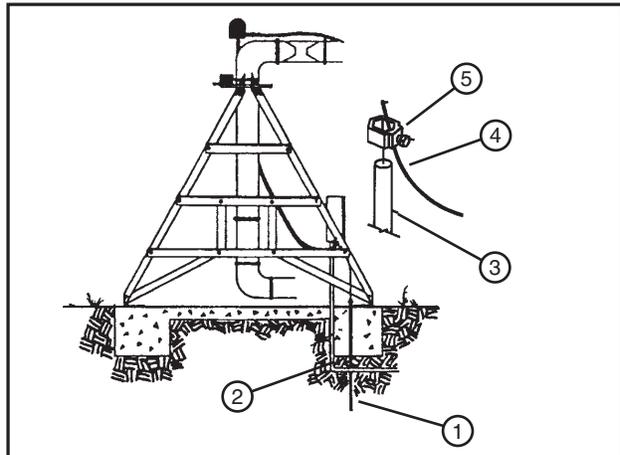


Figure 14-2 1. Ground Rod Installation 2. Service Conductor 3. Copper Ground Rod 4. Copper Ground Wire 5. Clamp

### NOTE

- **All 480 VAC, 60 Hz. (380 VAC, 50 Hz.) power supply services MUST be a 4 conductor service. Three 480 VAC (380 VAC) power lines and one ground conductor which is as large as the power carrying conductors for that service.**
- **Each time a towable machine is moved, the ground wire MUST be reattached to the ground rod and checked for electrical integrity before restarting the machine.**

## Operate Safely (Continued)

### **DANGER**

#### DISCONNECT POWER WHEN SERVICING

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

If you are going to perform maintenance on the machine, **YOU MUST** shut off and lock the main power disconnect as shown below. See Figure 15-1.

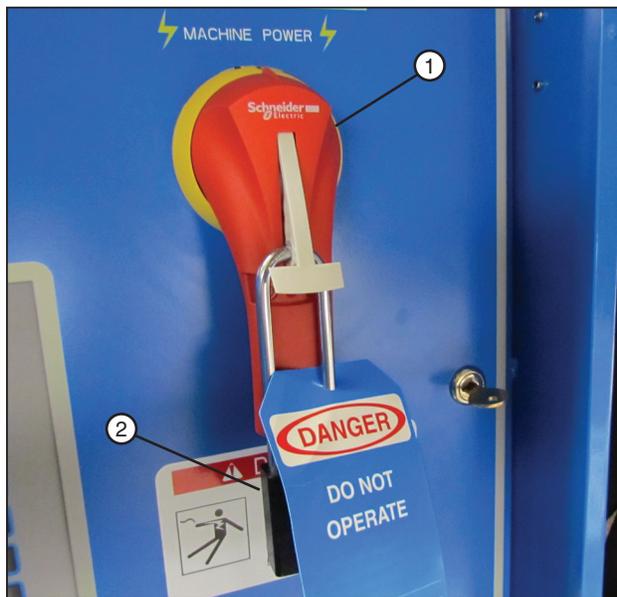


Figure 15-1 1. Main Power Disconnect  
2. Lock

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.

# Safety

## 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 counter-clockwise.

### CAUTION

#### KEEP WATER OFF ROADWAYS

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

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

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

### CAUTION

#### 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

### CAUTION

#### PROPER USE OF THE SAFETY OVERRIDE

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

- **NEVER DEPRESS AND HOLD THE START/STOP SAFETY OVERRIDE SWITCH IN THE START POSITION FOR MORE THAN 3 TO 5 SECONDS.**

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

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

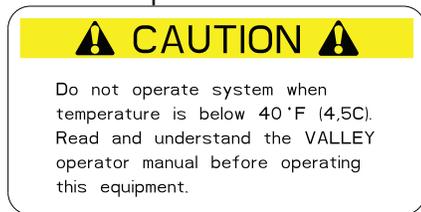
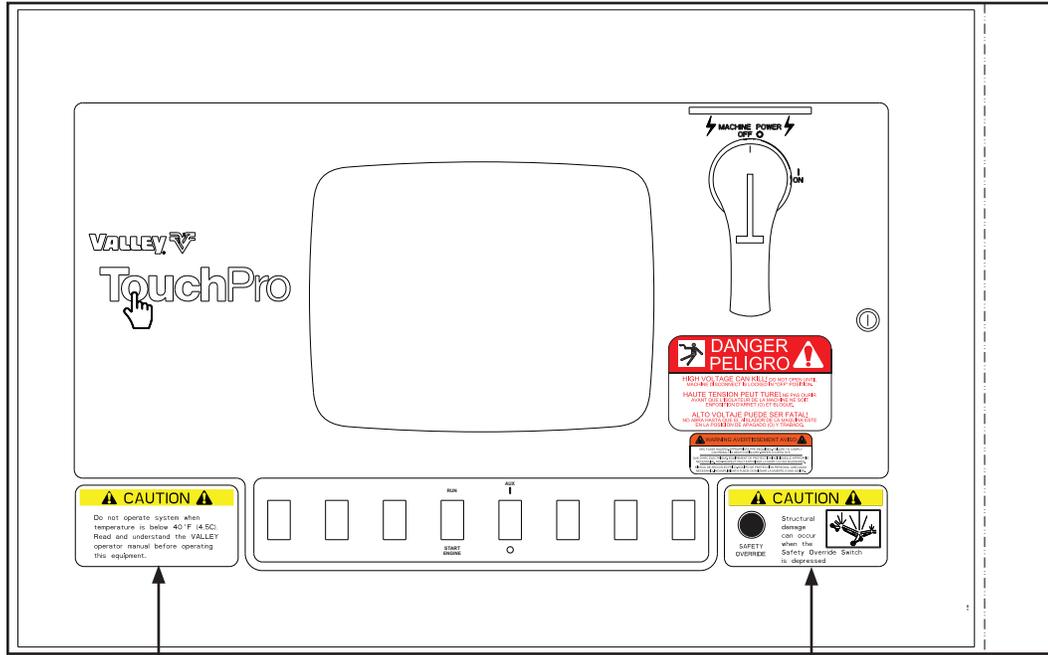
Repeated safety override start attempts can cause severe structural damage.

Call your Valley dealer if the machine fails to start.

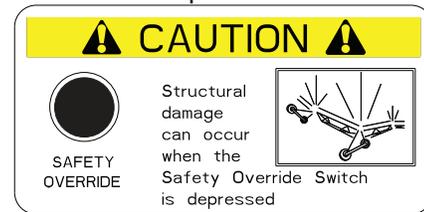
# Safety

## Safety Decals

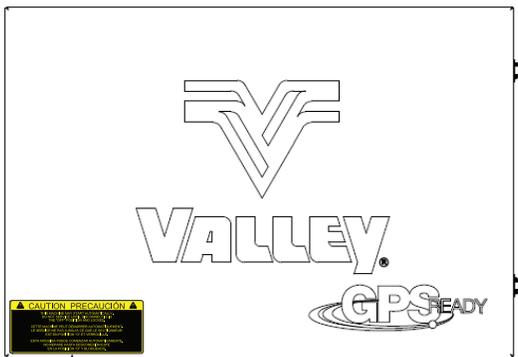
These Danger, Warning, and Caution decals appear in various locations on a Valley irrigation machine. You MUST familiarize yourself and other operator's with these safety decals. For replacement of any decal, contact your local Valley dealer.



Location: Control Panel



Location: Control Panel



0999126

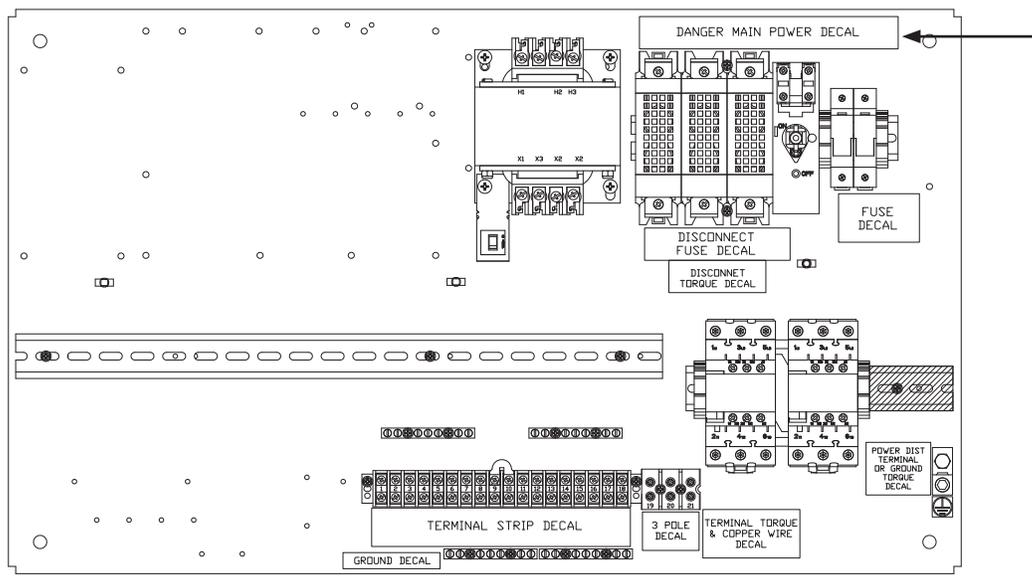


Location: Control Panel



0999135

Safety Decals (Continued)

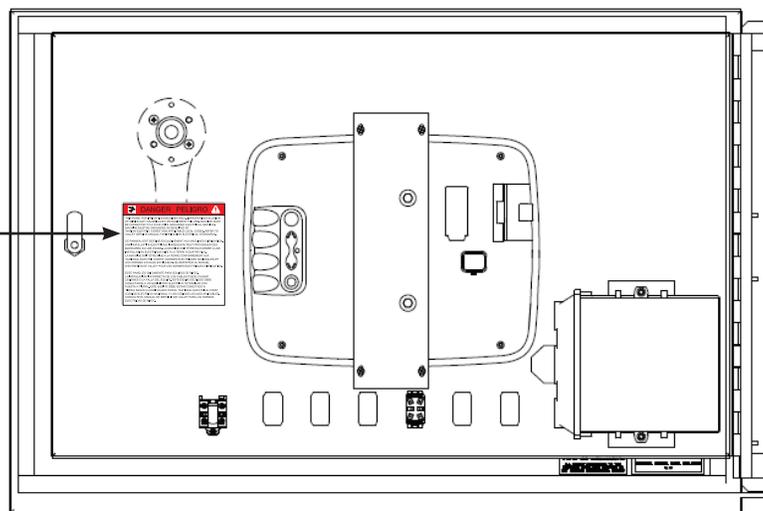


	<b>DANGER PELIGRO</b>		<b>BRANCHEMENT DE L'ALIMENTATION ÉLECTRIQUE PRINCIPALE UTILISER DU FIL DE CUIVRE ISOLATION 60 °C MINIMUM</b>
<b>MAIN POWER SUPPLY CONNECTION USE 60°C MINIMUM INSULATION COPPER WIRE</b>	<b>L1</b>	<b>L2</b>	<b>L3</b>
<b>CONEXIÓN DEL SUMINISTRO DE ENERGÍA ELÉCTRICA PRINCIPAL UTILICE CABLES DE COBRE CON AISLAMIENTO PARA 60 °C MÍNIMO</b>			

0999119

	<b>DANGER PELIGRO</b>	
<p>THIS PANEL FOR IRRIGATION MACHINES ONLY. IMPROPER INSTALLATION OF WIRING MAY CAUSE INJURY OR EQUIPMENT FAILURE. MACHINE MUST BE CONNECTED TO A FOUR WIRE GROUNDED ELECTRICAL SERVICE. MACHINE MUST BE GROUNDED AS REQUIRED BY "NATION ELECTRIC CODES" AND APPLICABLE LOCAL CODES. REFER TO VALLEY SERVICE MANUAL FOR IRRIGATION ELECTRICAL STANDARDS.</p>		
<p>CE PANNEAU EST DESTINÉ EXCLUSIVEMENT AUX MACHINES D'IRRIGATION. UNE INSTALLATION ÉLECTRIQUE INADÉQUATE PEUT PROVOQUER DES BLESSURES OU UNE PANNE. LA MACHINE DOIT ÊTRE RACCORDÉE À UNE INSTALLATION ÉLECTRIQUE MISE À LA TERRE À QUATRE FILS. LA MACHINE DOIT ÊTRE MISE À LA TERRE CONFORMÉMENT AUX "NATIONAL ELECTRIC CODES" (NORMES ÉLECTRIQUES NATIONALES) ET AUX NORMES LOCALES EN VIGUEUR. SE REPORTER AU MANUEL D'ENTRETIEN DE VALLEY POUR LES NORMES ÉLECTRIQUES D'IRRIGATION.</p>		
<p>ESTE PANEL ES ÚNICAMENTE PARA EQUIPOS DE RIEGO. LA INSTALACIÓN INCORRECTA DE LOS CABLES PUEDE CAUSAR LESIONES O LA FALLA DEL EQUIPO. ESTE EQUIPO DE RIEGO DEBE CONECTARSE A UN SUMINISTRO ELÉCTRICO TETRAFILAR CON PUESTA A TIERRA. ESTE EQUIPO DEBE ESTAR CONECTADO A TIERRA SEGÚN LO ESTIPULADO POR EL "NATIONAL ELECTRICAL CODE" (CÓDIGO ELÉCTRICO NACIONAL) Y LOS CÓDIGOS LOCALES APLICABLES. CONSULTE EL MANUAL DE SERVICIO DE VALLEY PARA LAS NORMAS ELÉCTRICAS DE RIEGO.</p>		

0999120

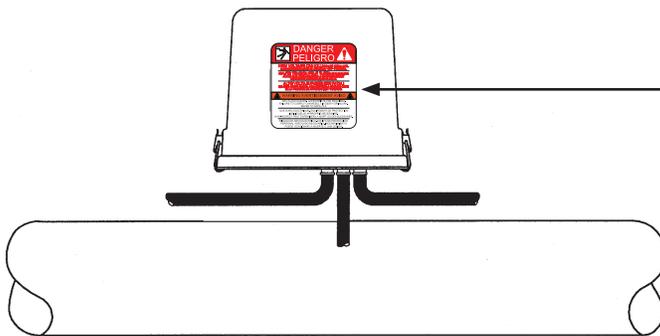
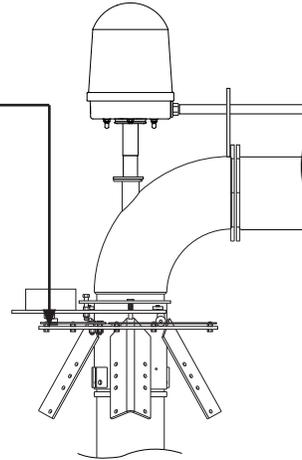


# Safety

## Safety Decals (Continued)

**DANGER**  
**HIGH VOLTAGE**  
 DO NOT OPEN UNLESS PIVOT  
 DISCONNECT SWITCH IS IN  
 THE "OFF" POSITION

00991148



**DANGER** PELIGRO

HIGH VOLTAGE CAN KILL! DO NOT OPEN UNTIL MACHINE DISCONNECT IS LOCKED IN "OFF" POSITION.  
 HAUTE TENSION PEUT TUE! NE PAS OUIR 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 MAQUINA ESTE EN LA POSICIÓN DE APAGADO (O) Y TRABADO.

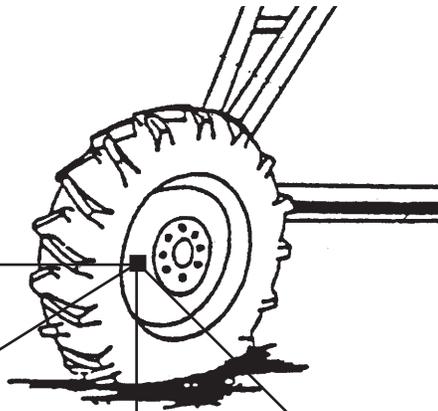
**WARNING** AVERTISSEMENT AVISO

ARC FLASH HAZARD, APPROPRIATE PPE REQUIRED. FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY. REFER TO NFPA 70 E  
 QUE D'ARC ÉLECTRIQUE. ÉQUIPEMENT DE PROTECTION INDIVIDUELLE APPROPRIÉ NECESSAIRE. NON-RESPECT PEUT ENTRAINER LA MORT OU DES BLESSURES.  
 RIESGO DE ARCO ELÉCTRICO. EQUIPO DE PROTECCIÓN PERSONAL ADECUADO NECESARIO. INCUMPLIMIENTO PUEDE OCASIONAR LA MUERTE O UNA LESIÓN.

0999122

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

0991532



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

0991593

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

0991366

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

0996109

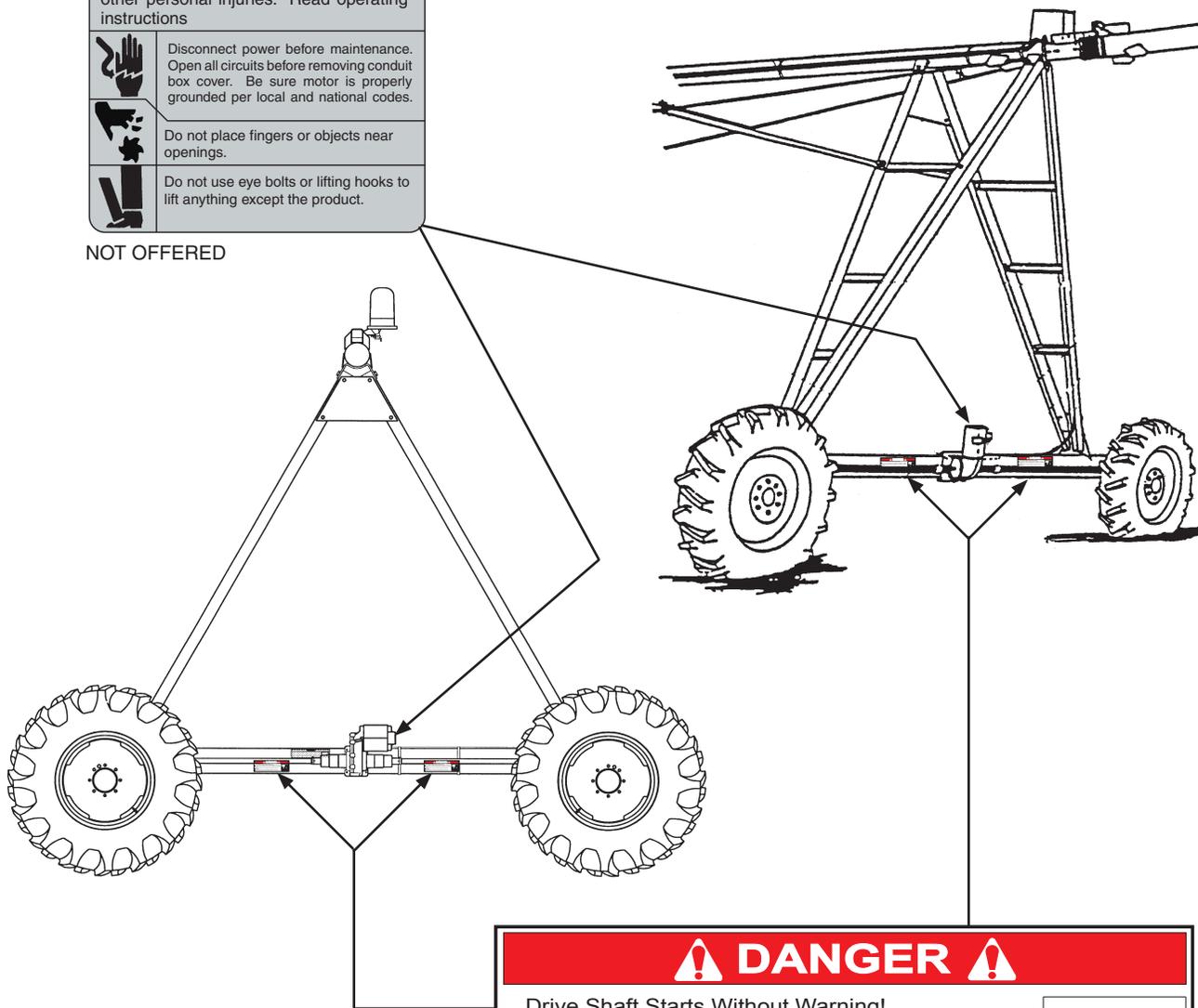
Safety Decals (Continued)

**⚠ WARNING**

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

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

NOT OFFERED



**⚠ 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.



0994146

# Safety

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

## Control Panel

This Valley control panel uses a TouchPro module for executing operator commands. See Figure 23-1.

## 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 the disconnect 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 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.**

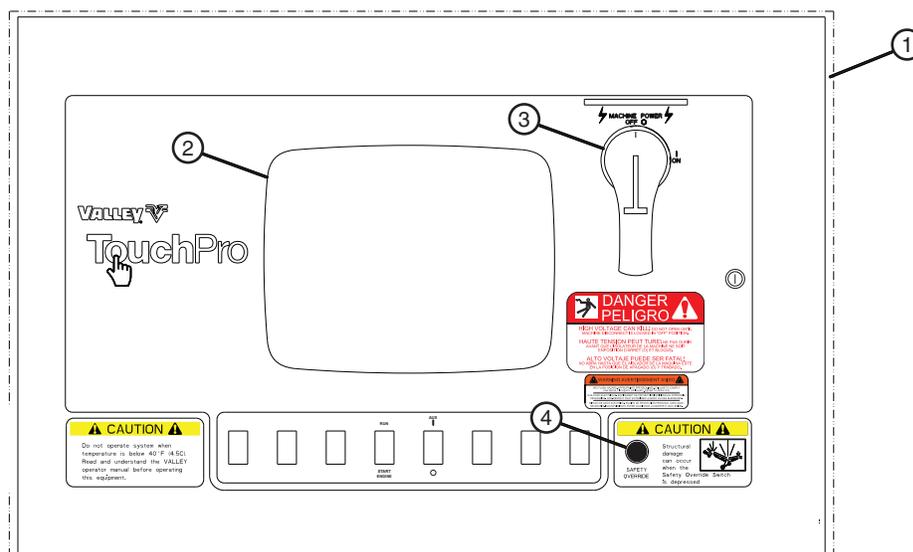


Figure 23-1 1. Control Panel 2. TouchPro Module 3. Main Disconnect Switch 4. Safety Override Switch

# Overview

## Main Screen

The Main Screen is where you begin operating your irrigation machine, and where you learn its current status. Control buttons are located on the left side of the screen, and menu buttons are on the right. The center contains information about the machine's current status and other selected details. See Figure 24-1, which presents the default main screen.

The following pages describe the elements that can appear on the Main Screen.

## Control Buttons

Up to eight control buttons can appear on the left side of the screen for programming and operating the machine. This section can also display the status of end guns, auxiliary inputs and the machine's hours per revolution. Below are descriptions of each available control button.

It is very important to understand that, except for the Start/Stop button, the control button indicates what the machine is currently doing. In Figure 24-1, the Forward button is displayed, indicating the machine's direction when it is moving. When you push that button to change direction, the Forward button becomes the Reverse button.

The Controls and Status fields can be customized and may look different than what is shown in Figure 24-1.

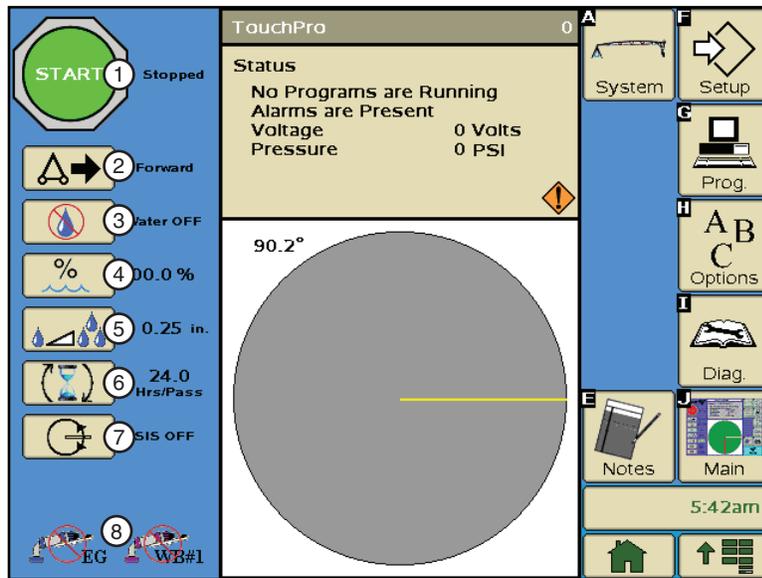


Figure 24-1 1. Start/Stop 2. Forward/Reverse 3. Water ON/OFF 4. Percent Timer 5. Depth 6. Hours/Pass 7. Stop-In-Slot ON/OFF 8. End Gun/Wide Boundary # 1

### START / STOP Button - Item 1



#### START

Push to start the machine, assuming safety circuits are operating correctly.



#### STOP

Push to halt machine movement, shut pump off, and close water valve.

The machine has a time delay that prevents it from restarting when you press the Start button within five seconds after stopping it.

### Forward / Reverse Button - Item 2



#### Forward

Machine movement is currently in the forward (clockwise) direction. Push to command movement in the reverse (counter-clockwise) direction.



#### Reverse

Machine movement is currently in the reverse (counter-clockwise) direction. Push to command movement in the forward (clockwise) direction.

## Main Screen (Continued)

### Control Buttons

#### Water ON/OFF Button - Item 3



##### Water ON

The pump and/or close water valve are currently on. Push to turn them off.

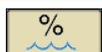


##### Water OFF

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.

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

#### Percent Timer Button - Item 4



Push to set the percent timer by entering the value on the numeric keypad.

#### Depth Button - Item 5



Push to set the desired water application depths in inches or millimeters, depending on the selected unit of measure, by entering the value on the numeric keypad.

#### Cruise Control Button - Item 6



##### Cruise Control Off

Cruise control is off. Push to turn on.



##### Cruise Control On

Cruise control is on. Push to turn off.



##### Hours per Pass

Push to set the number of hours to complete one pass.

#### Stop-In-Slot ON/OFF Button - Item 7



##### Stop-In-Slot ON

The 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

The stop-in-slot feature is OFF. Push to turn stop-in-slot ON.

#### End Gun/Wide Boundary #1 Buttons - Item 8



##### End Gun Enabled Not running

The end gun is currently enabled, but not running. If the end gun is disabled, the icon is not displayed. Push to open the end gun screen.



##### End Gun Running

The end gun is running between the user set start and stop angles.



##### Wide Boundary #1 Enabled Not running

Wide boundary #1 is currently enabled, but not running. If wide boundary #1 is disabled, the icon is not displayed. Push to open the wide boundary #1 screen.



##### Wide Boundary #1 Running

Wide boundary #1 is running between the user set start and stop angles.

#### Wide Boundary #2 and #3 Buttons



##### Wide Boundary #2 Enabled Not running

Wide boundary #2 is currently enabled, but not running. If wide boundary #2 is disabled, the icon is not displayed. Push to open the wide boundary #2 screen.



##### Wide Boundary #2 Running

Wide boundary #2 is running between the user set start and stop angles.



##### Wide Boundary #3 Enabled Not Running

Wide boundary #3 is currently enabled, but not running. If wide boundary #3 is disabled, the icon is not displayed. Push to open the wide boundary #3 screen.



##### Wide Boundary #3 Running

Wide boundary #3 is running between the user set start and stop angles.

#### Auto Restart ON/OFF Button



##### Auto Restart ON Button

The automatic restart feature is currently ON. Push to turn OFF.



##### Auto Restart OFF Button

The automatic restart feature is currently OFF. Push to turn ON.

# Overview

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## Main Screen (Continued) Control Buttons

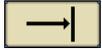
### AR/AS ON/OFF Button

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#### AR/AS is OFF

The Auto Reverse/Auto Stop feature is currently OFF. Push to turn the Auto Stop feature ON.



#### Auto Stop Button

The Auto Stop feature is currently enabled. Push to turn the Auto Reverse feature ON.



#### Auto Reverse ON

The Auto Reverse feature is currently ON. Push to turn the Auto Reverse/Auto Stop feature OFF.

### Auxiliary Buttons

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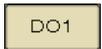
#### Auxiliary 1 Toggle Button

Push to turn the Auxiliary ON or OFF.



#### Auxiliary 2 Toggle Button

Push to turn the Auxiliary ON or OFF.



#### Digital Out 1 Toggle Button

Push to turn the Digital Out ON or OFF.



#### Digital Out 2 Toggle Button

Push to turn the Digital Out ON or OFF.



#### Relay Driver 1 Toggle Button

Push to turn the Relay Driver ON or OFF.



#### Relay Driver 2 Toggle Button

Push to turn the Relay Driver ON or OFF.

## Main Screen (Continued) Current Machine Settings

Next to each control button is the machine's current setting for that feature. The setting changes automatically every time you push the corresponding button. A description of each setting in Figure 27-1 appears below.

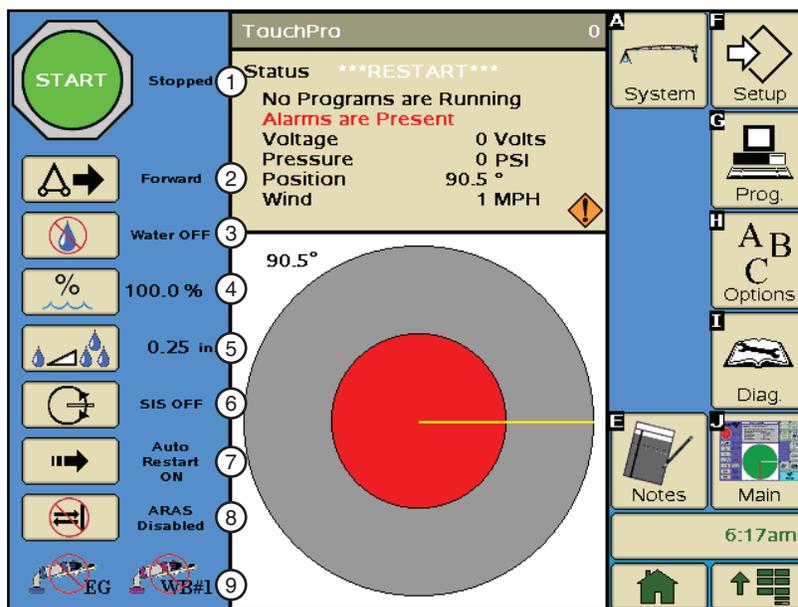


Figure 27-2

1. Machine Status	6. Stop-In-Slot Setting
2. Direction Setting	7. Auto Restart Setting
3. Water Setting	8. Auto Reverse/Auto Stop Setting
4. Percent Timer Setting	9. End Gun/Wide Boundary Setting
5. Depth Setting	

### Machine Status - Item 1

Indicates the current status of the irrigation machine, either Running, Stopped, or Waiting for water pressure.

### Direction Setting - Item 2

Indicates the direction, either Forward (clockwise) or Reverse (counter-clockwise), in which the machine is set to move, or is moving.

### Water Setting - Item 3

Indicates the current setting for applying water, either Water ON or Water OFF.

### Percent Timer Setting - Item 4

Indicates the current pivot or linear percent timer setting.

### Depth Setting - Item 5

Indicates the current depth setting in inches or millimeters, depending on the selected unit of measure.

### Hours per Pass Setting - Item 6

Indicates the number of hours to complete one pass of the field, based on the percent timer setting.

### Stop-In-Slot Setting - Item 7

Indicates the current Stop-In-Slot (SIS) setting.

- If the Stop-In-Slot is on, SIS ON and the position where the machine will stop (in degrees) appears.
- If the Stop-In-Slot is off, SIS OFF appears.

### Auto Restart Setting - Item 8

Indicates the current setting for restarting the machine automatically, either Auto Restart ON or Auto Restart OFF.

### End Gun/Wide Boundary #1 Setting - Item 9

Indicates the current End Gun and Wide Boundary #1 settings, either ON or OFF.

### AR/AS Disable, Auto Stop, Auto Reverse Setting

Indicates the current setting for ARAS, either Disabled, Auto Stop ON or Auto Reverse ON.

### AUX 1 and 2 Setting

Indicates the current Aux 1 and 2 settings, either ON or OFF.

### Wide Boundary #2 and #3 Setting

Indicates the current Wide Boundary #2 and #3 settings, either ON or OFF.

# Overview

## Main Screen (Continued)

### Status Section

Up to six statuses can appear below the machine's name in the center portion of the screen. Below the statuses is a graph depicting the machine's current position. A description of each field and all the statuses appear below.

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

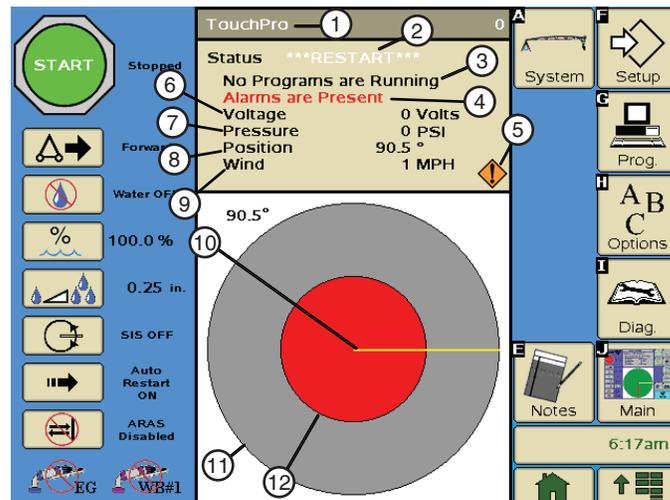


Figure 28-3 1. Machine Name 2. Restart Notice 3. Program Notice 4. Alarms Notice 5. Error Notice 6. Voltage 7. Pressure 8. Position 9. Wind 10. Field Position 11. Pivot Status 12. Fault Notice

#### Machine Name - Item 1

Displays the name associated with the machine.

#### Restart Notice - Item 2

Indicates whether the machine will restart.

#### Program Notice - Item 3

Indicates whether any program is running.

#### Alarms Notice - Item 4

Indicates whether any errors or system faults are present.

#### Error Notice - Item 5

Indicates whether any errors occurred. You can access the Error Codes screen by pushing the icon.

#### Voltage - Item 6

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

#### Pressure - Item 7

Indicates the current water pressure at the pressure transducer, in pounds per square inch (psi).

#### Position - Item 8

Indicates the machine location in the field. The location of the machine is expressed in degrees.

#### Wind - Item 9

Indicates the speed of the wind expressed in miles per hour. Requires optional hardware.

#### Field Position - Item 10

Graphic yellow line indicates the machine location in the field.

#### Pivot Circle Status - Item 11

Displays a color and shape to represent the current known status of the machine.

#### Fault Notice - Item 12

Indicates whether any system faults have occurred. You can access the System Faults screen by pushing the icon.

#### Other Statuses

The following statuses can also appear in the Main Screen. Below is a description of each status.

#### Temp

Indicates the current outdoor temperature. Requires optional hardware.

#### Wet Hours

Indicates the number of hours that the machine was irrigating while in motion.

#### Flow Meter

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

#### Total Hours

Indicates the total number of hours that the machine was in motion.

## Main Screen (Continued)

### Menu Buttons

The menu buttons are located on the right side of the screen. These buttons are used to program the panel, view data and select options not frequently used. Below are descriptions of each button.

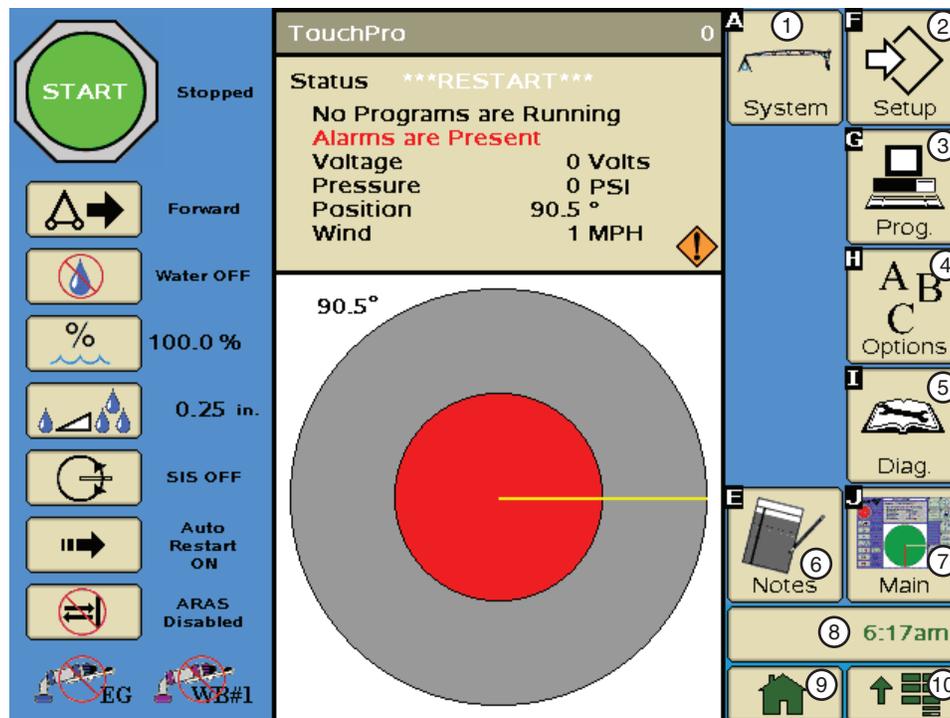


Figure 29-1 1. System 4. Options 7. Main Screen 9. Home  
2. Setup 5. Diagnostics 8. Time 10. Start  
3. Program 6. Notes



#### System (A) - Item 1

Used to input the constant values of the irrigation machine, reset other values and view machine operating data.



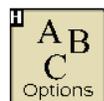
#### Setup (F) - Item 2

Used to input the constant values of the irrigation machine, reset other values and view machine operating data.



#### Program (G) - Item 3

Use to either write or run programs that execute commands in the future, based upon conditions such as date/time and position in the field.



#### Options (H) - Item 4

Use to control options not frequently used by the operator.



#### Diagnostics (I) - Item 5

Used to assist the operator in determining the cause of an unplanned machine shutdown or potential problem situation.



#### Notes (E) - Item 6

Used to view and enter notes. Push the Notes field to display a keyboard.



#### Main Screen (J) - Item 7

Push this button at any time to return to the Main Screen.



#### Time - Item 8

Displays the current time. This is not a button.



#### Home - Item 9

Used to input the values of the Display. Push this button again to return to the previous screen.



#### Start - Item 10

Used to reprogram the device or input the values of the Display. Push this button again to return to the previous screen.

# Overview

## Main Screen (Continued)

### Numeric Keypad

The numeric 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:

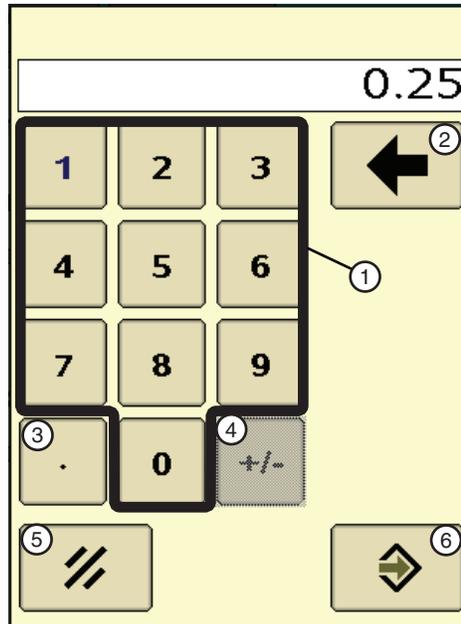


Figure 30-2 1. Keypad 2. Backspace 3. Decimal Point 4. Minus Sign 5. Escape 6. Enter



#### Keypad Number Buttons - Item 1

Used to input numerical values and select programming options.



#### Backspace - Item 2

Use to back space and delete the previous number or symbol.



#### Decimal Point - Item 3

Used when inputting numerical values in decimal form. Example: 1.75 in (44.45 mm).



#### Plus/Minus Sign - Item 4

Use to input positive or negative values (generally not used, except for entering GPS position values).



#### Escape - Item 5

Use to step backward from the current screen to a previous screen without performing any changes.

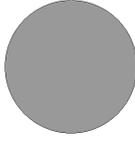
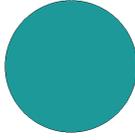
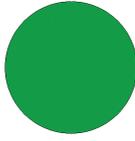
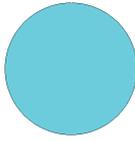
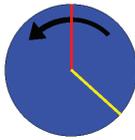
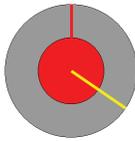


#### Enter - Item 6

Use at the end of a numerical value entry or programming sequence.

## Main Screen (Continued) Pivot Circle Colors and Shapes

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

STATUS	COLOR AND SHAPE	GRAPHIC
Pivot is stopped.	Gray circle.	
Pivot is waiting	Dark Cyan circle.	
Pivot is running dry.	Green circle.	
Pivot is running dry, with Auxiliary 1 ON.	Gold circle.	
Pivot is running wet.	Blue circle.	
Pivot is running wet, with Auxiliary 1 ON.	Cyan circle.	
Stop In Slot is ON.	A red line appears in the stop in slot location.	
Pivot representation and position in the field.	A yellow line represents the pivot and it's position in the field.	
Pivot is running in forward.	A black arrow is displayed pointing in the forward direction.	
Pivot is running in reverse.	A black arrow is displayed pointing in the reverse direction.	
System Fault	Red circle centered on pivot.	

# Overview

---

# Control Panel Setup

---

Set up the control panel for use by completing the Minimum Control Panel Setup.

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 setup and reference table locations.

## Control Panel Setup

Main Screen Setup .....	35
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Set GPS Position and Fallback Run Time Manual Method (Machines With GPS).....	39
Set Up GPS Position Loss.....	41
Test GPS Position.....	42
Voltage.....	43
Low Voltage .....	43
Estimated Drive Unit Speed Table .....	43
GPS Angular Conversion Table .....	44
Angular Degree Examples.....	44
System Constants Record.....	45

If desired, control panel settings can be recorded on the System Constants Record at the end of this section.

# Control Panel Setup

---

## Main Screen Setup

Use the Main Screen Setup screen to do the following:

- Configure the pivot and enable it for part circle, and add the pivot road.
- Select the control buttons and statuses that you want to display, in the order you want.

The steps below explain how to set up the Main Screen:

1. Go to the Main Screen Setup screen:
  - (a) Push the **Main** button (J).
  - (b) Push the **Setup** button (F) on the Main Screen.
  - (c) Push the **Main Screen Setup** button (F) on the Setup Screen.
2. On the Field screen, name the field, add the pivot road, and enable or disable the part circle. See Figure 35-1.
  - (a) Select the **Pivot Name** field and enter the name using the keyboard. See Figure 35-2.
  - (b) If desired, check the **Pivot Road** checkbox, and enter its position, in degrees, on the field using the numeric keypad. See Figure 35-3.
  - (c) If this a part circle field, check the **Part Circle** checkbox to enable it. Enter the angles in the **Start Angle** and **End Angle** fields using the numeric keypad. See Figure 35-3.

An empty **Part Circle** checkbox indicates a full circle pivot field.

### NOTE

- When **Part Circle** is enabled, you are creating a graphical representation of the pivot field. The control panel does **NOT** prevent the system from running outside the designated zone. It also does **NOT** stop the system at the start angle or end angle.

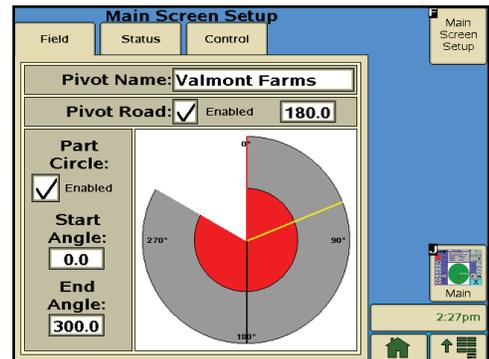


Figure 35-1 Field Setup



Figure 35-2 Keyboard

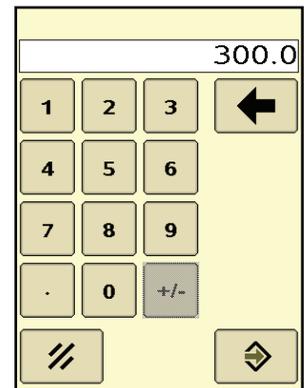


Figure 35-3 Keypad

# Control Panel Setup

## Main Screen Setup (Continued)

3. Push the Status tab to select up to six statuses on the Main screen.
  - (a) Select a Line field and choose a status from the drop-down menu. Choose **Empty** if you want to leave the field blank. See Figure 36-1.
4. Push the Control tab to select up to eight buttons or three statuses:
  - (a) Select a button field and choose a button or status from the drop-down list. Choose **Empty** if you want to leave the field blank. See Figure 36-2.

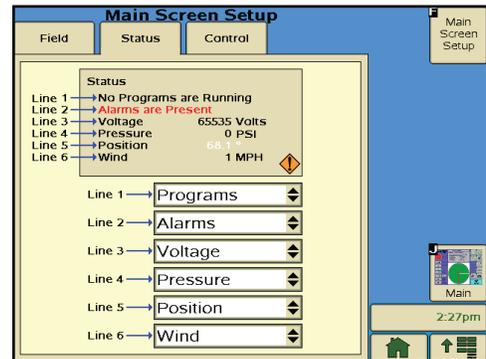


Figure 36-1 Status Setup

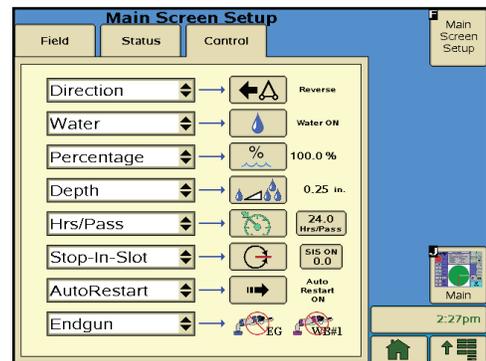


Figure 36-2 Control Setup

## Minimum Control Panel Setup

To set up the control panel for use with standard positioning or GPS positioning, do the following.

1. Push the **Home**  button.
2. On the Display - Main screen, push the **Global (G)** button to display the Display - Settings screen.
3. Push the **Regional** tab to set the Language and Unit of Measure. See Figure 37-1.
  - (a) Select the **Language** field and choose the language from the drop-down menu.
  - (b) Select the **Units** field and choose Imperial/US or Metric as the unit of measure.
4. Push the **Time/Date** tab to set the Current Date and Time. See Figure 37-2.

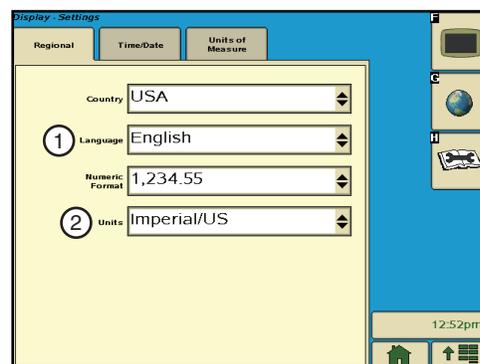


Figure 37-1 1. Language 2. Units

- (a) Select the **Date** fields and choose the month, day, and year from their respective drop-down lists.
- (b) Select the **Date Format** field and choose from the drop-down list how to display the date.
- (c) Select the **Time** fields and enter the hour and minutes on the numeric keypad. Push to select AM or PM.
- (d) Optional, check the **24 Hour Clock** checkbox to display time in the 24-hour format.
- (e) Optional, check the **Daylight Savings Time** checkbox to display the Daylight Savings Time for the selected region.
5. Go to the Constants screen to set the pivot minimum application, time per revolution, and voltage. See Figure 37-3.

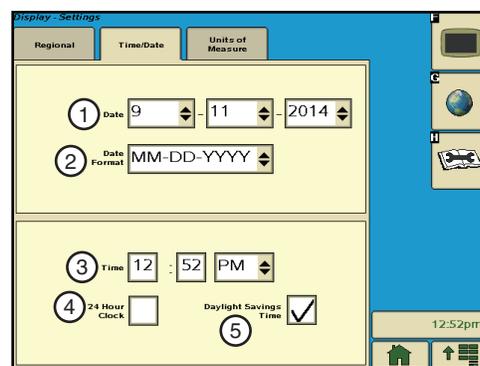


Figure 37-2 1. Date 2. Date Format 3. Time 4. 24-Hour Clock 5. DST

- (a) Push the **Home**  button to return to the Main screen.
- (b) Push the **Setup (F)** button.
- (c) Push the **Constants (G)** button.
- (d) Select the **Minimum Application** field and enter the rate on the numeric keypad. Refer to the VChart Report for this machine.
- (e) Select the **Hours Per Revolution** field and enter the number on the keypad. Refer to the VChart Report for this machine.
- (f) Select the **Low Voltage** field and enter the limit number on the keypad, if it's lower than 440 volts. Refer to the Low Voltage section for more information.

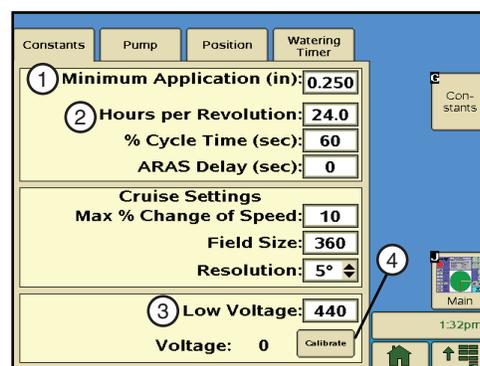


Figure 37-3 1. Minimum App 2. Hours per Rev 3. Low Voltage 4. Calibrate

- (g) Push the **Calibrate** button and enter the voltage number on the keypad. Refer to the Voltage section for more information.

# Control Panel Setup

## Minimum Control Panel Setup (Continued)

6. Go to the Pump screen to calibrate the pressure sensor.
  - (a) Select the **Pressure Sensor** field and choose the type of pressure sensor from the drop-down list. See Figure 38-1.
  - (b) With the pump OFF and the machine dry, push the **Calibrate** button on the Pump screen to set the water pressure sensor to the current water pressure of zero. See Figure 38-1.
7. Program the position-related control panel settings based on how the machine is equipped:
  - If the machine is NOT equipped with GPS Position, go to the Position screen. Push the Calibrate button and enter the position on the numeric keypad. See Figure 38-2.
    - » Minimum control panel setup is now complete.
  - If the machine is equipped with GPS Position, use SET GPS POSITION AND FALLBACK RUN TIME MANUAL METHOD on the next page and set the pivot point position and fallback run time to complete the minimum control panel setup for a machine with GPS Position.

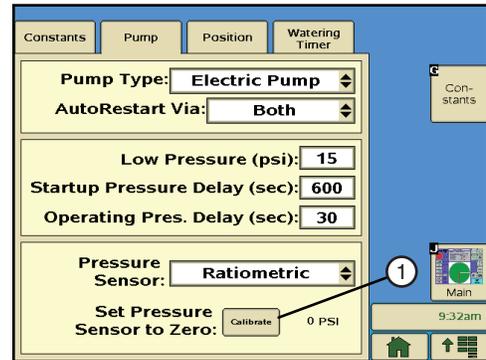


Figure 38-1 1. Calibrate Button

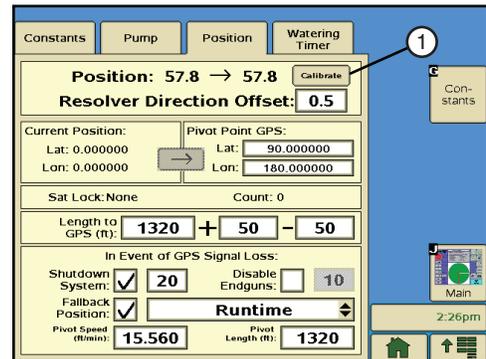


Figure 38-2 1. Calibrate Button

## Minimum Control Panel Setup (Continued)

### Set GPS Position and Fallback Run Time Manual Method (Machines With GPS)

To setup the GPS position type, 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 chart in this section.
- Use a handheld GPS receiver to obtain the GPS coordinates for the Pivot Point position.
- If necessary, use the GPS Angular Conversion chart in this section to convert the GPS coordinate values into decimals of degree.

1. Set the Y-DB9 Communications Port protocol:
  - (a) From the Main screen, push **Setup (F)** and then **Comm Port (H)**.
  - (b) Select the **Y-DB9** field and choose **PLC** from the drop-down list. See Figure 39-1.
  - (c) Select the **Baud Rate** field and choose **4800 bps** from the drop-down list.
  - (d) Select the **PLC** tab.
  - (e) Check the **GPSV2** checkbox. See Figure 39-2.
  - (f) Enter the **PLC ID** for the GPS tower box.
2. Go to the Position screen. See Figure 37-3.
  - (a) From the Main screen push **Setup (F)** and then **Constants (G)**.
  - (b) Select the **Position** tab on the Constants screen.

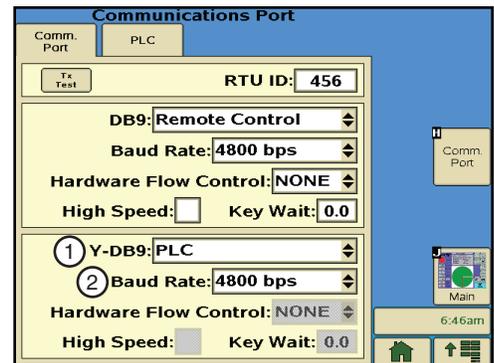


Figure 39-1 1. Y-DB9 Field 2. Baud Rate Field

3. Set the Pivot Point GPS position:
 

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.
  - (a) Select the **Lat** field and enter the latitude on the numeric keypad.
  - (b) Select the **Lon** field and enter the longitude on the numeric keypad.

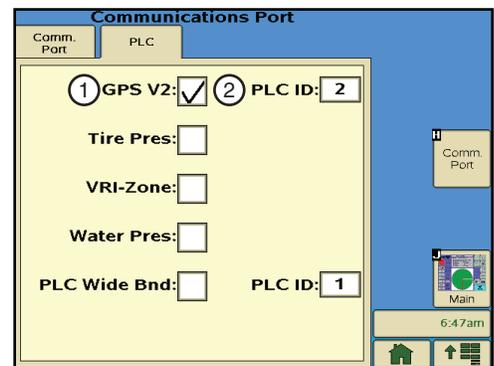


Figure 39-2 1. GPS V2 2. PLC ID

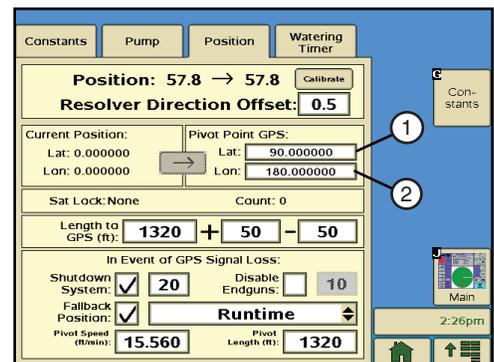


Figure 39-3 1. Latitude 2. Longitude

# Control Panel Setup

## Minimum Control Panel Setup (Continued)

Set the Distance to GPS (The distance from pivot point to GPS tower box).

Referring to Figure 40-1, in the **Length to GPS** fields (Item 1):

1. Select the **Length to GPS (ft)** field and enter the length from the pivot point to the GPS receiver. (Item 1) 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).
2. Select the **Plus Tolerance** field and enter the Plus Tolerance for the length from pivot point to GPS receiver (Item 3). 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. Refer to Figure 40-7.
3. Select the **Minus Tolerance** field and enter the Minus tolerance for the length from pivot point to GPS receiver (Item 4). 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.
4. Continue with Set Up Position Loss on the next page.

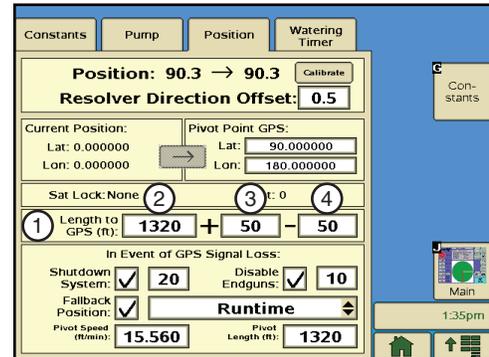


Figure 40-1 1. Length to GPS Fields  
2. From Pivot Point to GPS Receiver  
3. Plus Tolerance  
4. Minus Tolerance

## Minimum Control Panel Setup (Continued)

### Set Up GPS Position Loss

In the event of GPS Position Loss, three different position loss functions can be used independently, or with each other, to control the machine operation. Listed below are the functions and their default settings.

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

To access these functions, follow the steps below.

1. Push the **Setup** button (F) on the Main screen.
2. Push the **Constants** button (G) on the Setup screen.
3. Push the **Position** tab on the Constants screen.

### Shutdown System

To set up a shutdown of the system, do the following:

1. On the Position tab, check the **Shutdown System** checkbox. See Figure 41-1.
2. Select the **Shutdown System 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 endguns, do the following.

1. On the Position tab, check the **Disable Endgun** checkbox. See Figure 41-1.
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.

### Fallback Position

To set up the fallback position, do the following.

1. On the Position tab, check the **Fallback Position** checkbox. See Figure 41-1.
2. Select either Runtime or Resolver from the **Position Calculation Mode** drop-down menu. The default is Runtime. Resolver is not recommended.

When Runtime is selected, do the following:

- (a) Select the **Pivot Speed** field and enter the speed on the numeric keypad. The default is 15.56 ft/min.
- (b) Select the **Pivot Length** field and enter the length on the numeric keypad. The default is 1320 ft.

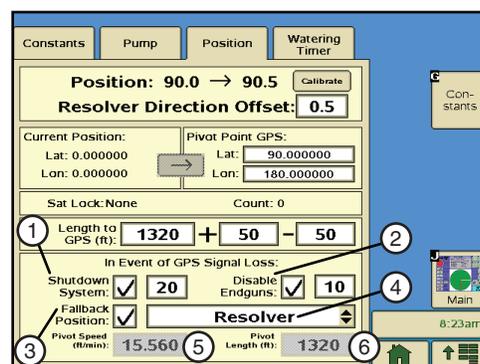


Figure 41-1 1. Shutdown System  
2. Disable Endguns  
3. Fallback Position  
4. Position Calculation Mode  
5. Pivot Speed  
6. Pivot Length

# Control Panel Setup

## 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. Go to the Position screen.
  - (a) Push the **Setup** button (F) on the Main screen.
  - (b) Push the **Constants** button (G) on the Setup screen.
  - (c) Push the **Position** tab on the Constants screen.
2. When GPS Position is working, the Position screen displays the fields listed below. See Figure 42-1.

- Current GPS Position:
  - » Count – the number of satellites in view
  - » Sat Lock – the satellite signal (None, Standard, DGPS, and No GPS) onto which the GPS receiver is locked
  - » Lat – the current latitude
  - » Lon – the current longitude
- Pivot Point GPS Position – the current position (latitude and longitude) of the machine's pivot point
- In Event of GPS Signal Loss:
  - » Shutdown System – a position loss function that shuts the system down
  - » Disable Endguns – a position loss function that disables the endguns
  - » Fallback Position – a position loss function that calculates the position until the GPS position is re-acquired
  - » Pivot Speed – the pivot's current speed (ft/min)
  - » Pivot Length – the pivot's current length (ft)

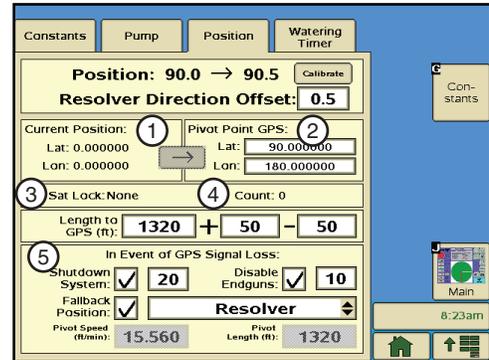


Figure 42-1 1. Current Position  
2. Pivot Point GPS  
3. Sat Lock  
4. Count  
5. In Event of GPS Signal Loss

When the GPS Position is lost **No GPS** is displayed in the **Sat Lock** field.

3. Run the machine in either direction to verify that the position displayed on the Status screen changes periodically as the machine moves.
  - If GPS position is not working, refer to the Troubleshooting section of this manual or call your local Valley Dealer.
  - If GPS position is working, the installation 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 43-1.

Nominal Supply Voltage	Maximum Supply Voltage
480 VAC @ 60Hz	505 VAC
415 VAC @ 50Hz	420 VAC
400 VAC @ 50Hz	420 VAC
380 VAC @ 50Hz	420 VAC
230 VAC @ 60Hz	253 VAC
220 VAC @ 50Hz	243 VAC
120 VAC @ 60Hz	132 VAC
110 VAC @ 50Hz	121 VAC

Figure 43-1 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 43-2.

If the control panel voltmeter senses voltage 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.

Nominal Supply Voltage	Recommended Low Voltage Setting
480 VAC @ 60Hz	440 VAC
415 VAC @ 50Hz	375 VAC
400 VAC @ 50Hz	365 VAC
380 VAC @ 50Hz	355 VAC
230 VAC @ 60Hz	220 VAC
220 VAC @ 50Hz	210 VAC
120 VAC @ 60Hz	105 VAC
110 VAC @ 50Hz	95 VAC

Figure 43-2 Recommended Low Voltage

## 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 Table

Use this table 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 43-3.

Estimated Drive Unit Speed																
Drive Unit Motor Output RPM	Tire Sizes / Machine Voltage and Hertz															
	11.2 x 24				14.9 x 24				16.9 x 24				11.2 x 38			
	480 Volt 60Hz		380 Volt 50Hz		480 Volt 60Hz		380 Volt 50Hz		480 Volt 60Hz		380 Volt 50Hz		480 Volt 60Hz		380 Volt 50Hz	
	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.	ft./min.	M/min.
29	5.90	1.80	4.91	1.50	6.54	1.99	5.45	1.66	6.98	2.13	5.81	1.77	8.06	2.45	6.71	2.04
30	6.10	1.86	5.08	1.55	6.77	2.06	5.64	1.72	7.22	2.20	6.01	1.83	8.34	2.54	6.95	2.12
34	6.95	2.12	5.79	1.76	7.40	2.25	6.16	1.88	8.16	2.48	6.80	2.07	9.45	2.88	7.87	2.40
35	7.12	2.17	5.93	1.81	7.89	2.40	6.57	2.00	8.42	2.56	7.01	2.14	9.73	2.96	8.11	2.47
37	7.53	2.29	6.27	1.91	8.53	2.60	7.11	2.16	8.90	2.71	7.41	2.26	10.28	3.13	8.56	2.61
43	8.75	2.66	7.29	2.22	9.91	3.02	8.26	2.51	10.34	3.15	8.61	2.62	11.94	3.64	9.95	3.03
56	11.39	3.47	9.49	2.89	12.63	3.85	10.52	3.20	13.48	4.10	11.23	3.42	15.56	4.74	12.96	3.95
58	11.80	3.59	9.83	2.99	13.08	3.98	10.90	3.32	13.96	4.25	11.63	3.54	16.12	4.91	13.43	4.09
68	13.84	4.21	11.53	3.51	15.34	4.67	12.78	3.89	16.36	4.98	13.63	4.15	18.90	5.76	15.74	4.79
69	14.03	4.27	11.69	3.56	15.57	4.74	12.97	3.95	16.60	5.05	13.83	4.21	19.18	5.84	15.98	4.86

Figure 43-3 Estimated Drive Unit Speed Table

# Control Panel Setup

## 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 Pro2 control panel. Refer to Figure 44-1.

Minutes and Seconds into Decimals of a Degree											
(Based on 1 second = 0.00027778 degrees)											
Minutes into Decimals of a Degree						Seconds into Decimals of a Degree					
Min.	Deg.	Min.	Deg.	Min.	Deg.	Sec.	Deg.	Sec.	Deg.	Sec.	Deg.
1	0.0167	21	0.3500	41	0.6833	1	0.0003	21	0.0058	41	0.0114
2	0.0333	22	0.3667	42	0.7000	2	0.0006	22	0.0061	42	0.0117
3	0.0500	23	0.3833	43	0.7167	3	0.0008	23	0.0064	43	0.0119
4	0.0667	24	0.4000	44	0.7333	4	0.0011	24	0.0067	44	0.0122
5	0.0833	25	0.4167	45	0.7500	5	0.0014	25	0.0069	45	0.0125
6	0.1000	26	0.4333	46	0.7667	6	0.0017	26	0.0072	46	0.0128
7	0.1167	27	0.4500	47	0.7833	7	0.0019	27	0.0075	47	0.0131
8	0.1333	28	0.4667	48	0.8000	8	0.0022	28	0.0078	48	0.0133
9	0.1500	29	0.4833	49	0.8167	9	0.0025	29	0.0081	49	0.0136
10	0.1667	30	0.5000	50	0.8333	10	0.0028	30	0.0083	50	0.0139
11	0.1833	31	0.5167	51	0.8500	11	0.0031	31	0.0086	51	0.0142
12	0.2000	32	0.5333	52	0.8667	12	0.0033	32	0.0089	52	0.0144
13	0.2167	33	0.5500	53	0.8833	13	0.0036	33	0.0092	53	0.0147
14	0.2333	34	0.5667	54	0.9000	14	0.0039	34	0.0094	54	0.0150
15	0.2500	35	0.5833	55	0.9167	15	0.0042	35	0.0097	55	0.0153
16	0.2667	36	0.6000	56	0.9333	16	0.0044	36	0.0100	56	0.0156
17	0.2833	37	0.6167	57	0.9500	17	0.0047	37	0.0103	57	0.0158
18	0.3000	38	0.6333	58	0.9667	18	0.0050	38	0.0106	58	0.0161
19	0.3167	39	0.6500	59	0.9833	19	0.0053	39	0.0108	59	0.0164
20	0.3333	40	0.6667	60	1.0000	20	0.0056	40	0.0111	60	0.0167

Figure 44-1 GPS Angular Conversion 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 44-1.

$$11 \text{ minutes} = 0.1833 \text{ degrees}$$

$$37 \text{ seconds} = 0.0103 \text{ degrees.}$$

(b) Add all decimal degree values together.

$$10 \text{ degrees} = 10.0000 \text{ degrees}$$

$$11 \text{ minutes} = 0.1833 \text{ degrees}$$

$$37 \text{ seconds} = 0.0103 \text{ degrees}$$

$$10^\circ 11' 37" = 10.1936 \text{ degrees}$$

- **12° 5.245', read as 12 degrees, 5.245 minutes.**

(a) Convert decimals of a minute to decimal degrees using the table in 44-1 and multiply the decimal of a minute by 0.0167.

$$5 \text{ minutes} = 0.0833 \text{ degrees}$$

$$0.245 \text{ minutes} =$$

$$0.245 \times 0.0167 = 0.0041 \text{ degrees}$$

(b) Add all decimal degree values together.

$$12 \text{ degrees} = 12.0000 \text{ degrees}$$

$$5 \text{ minutes} = 0.0833 \text{ degrees}$$

$$0.245 \text{ minutes} = 0.0041 \text{ degrees}$$

$$12^\circ 5.245' = 12.0874 \text{ degrees}$$

# Control Panel Setup

## System Constants Record

Enter system constants as needed. If desired, fill in the form below with the applicable constants for this machine.

Constants			
SIS			
	Stop-In-Slot Position		
End Gun			
	Sequence	Left Angle	Right Angle
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
Position			
	Pivot Point		
	Latitude		
	Longitude		
	Position Loss		
	Distance to GPS		
	Plus		
	Minus		
Pres Dly			
	Startup Pressure Delay in Seconds		
	Operating Pressure Delay in Seconds		
Low Pres			
	Low Pressure Limit		

Constants			
Min App			
	Minimum Application		
Hrs/Rev			
	Time Per Revolution		
Voltage			
	Current Voltage		
Wide Bnd			
	Sequence	Left Angle	Right Angle
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
Flowmeter			
	Flowmeter Pulse Rate		
RTU ID			
	Three Digit ID Number		
Daily Ops			
	Daily On/Off		
	On or Off		
	Mode		
	Activate		
	Daily Start/Stop		
	Start Time		
	Stop Time		
	Active Days		
	Cycle On/Off		
	Cycle Interval (Number of Days)		
	Cycle Start Time		

# Control Panel Setup

Constants				
Wind				
	Wind High Limit			
	On or Off			
AR/AS				
	On or Off			
	Delay in Seconds			
Percent Timer				
	Cycle in Seconds			
Low Voltage				
	Low Voltage Limit			
Dir Offset				
	Direction Offset			
Engine/Pump				
	Engine or Pump			
	Normal or Alt			
COM Port		9-Pin	25-Pin	9-Pin Y
	Protocol			
	Baud Rate			
	Hardware Flow Control			
	Key Wait			
	Config Notice			
	Base I.D.			
	Modem Type			
	Callout Tries			
	Radio Hop On or Off			
	Intermediate Unit ID			
	Phone Number			
	Notice On or Off			
	No Ack			

Constants			
Pres Sensor			
	Pressure Sensor Type		
Backlight			
	Backlight Delay		
Cruise Control			
	Max % Change of Speed		
	Field Size in Degrees		
VRI Zone			
	Minimum App. Rate		
	Minimum Flow Rate		
	Maximum Pressure		
	# of Sprinkler Banks		
Tire Pres			
	Warning Pressure Drop		
	Shutdown Pressure Drop		
End Pres			
	TPMS ID		
	Sensor ID		

# Control Panel Setup

Constants			
Watering Timer			
	% Overwater Shutdown		
	% Underwater Error		
Temperature			
	Temperature Shutdown		
	Low Temp Limit		
Rain			
	Rain Shutdown		
	Rain Limit		
	Rain Window		

# Control Panel Setup

---

## Before Running the Machine

Before running the machine (either with or without water) do the following.

1. ALWAYS make sure vehicles, other equipment, livestock, and persons are clear of the machine before operating.
2. Turn the control panel main disconnect switch to the ON position. If the power is supplied by an engine driven generator, adjust the RPM of the generator until the voltmeter reads 460 – 505 volts. DO NOT EXCEED 505 VOLTS.

## Run the Machine Wet (With Water)

3. Press the  button on the Main screen to turn the water ON. See Figure 49-1.
4. Select the direction of travel by pressing the Forward  or Reverse  button.
5. Set the water application by pressing  or .
  - Use  to set water application by inches(mm) of water.
  - Use  to set water application by percent timer setting.
6. Use the numeric keypad to enter the depth of water in inches (mm), or the percent timer setting.
  - Press  (Enter) to retain the value.
7. Press  to Start the machine.
8. Press  to Stop the machine.

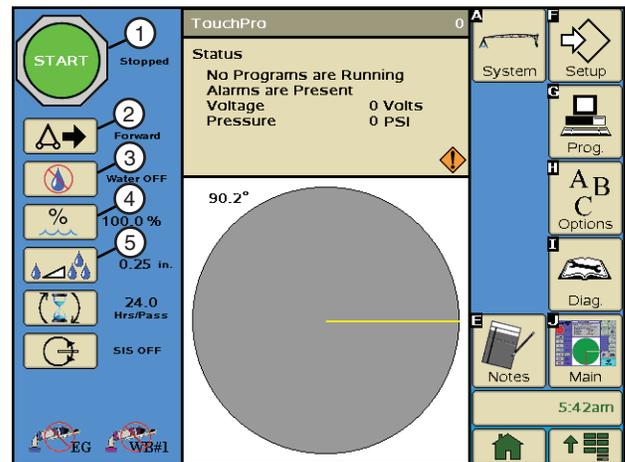


Figure 49-1 1. Start/Stop 4. Percent Timer  
2. Forward/Reverse 5. Depth  
3. Water On/Off

## Run the Machine Dry (Without Water)

3. Press the  button on the Main screen to turn the water OFF. See Figure 49-1.
4. Select the direction of travel by pressing the Forward  or Reverse  button.
5. Set the speed of travel by pressing .
6. Use the numeric keypad to enter the percent timer setting.
  - Press  (Enter) to retain the value.
7. Press  to start the machine.
8. Press  to stop the machine.

# Operation

## Stopping The Machine Emergency Stopping

To stop the machine in an emergency situation, shut off any one of the following. See Figure 50-1.

- 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)

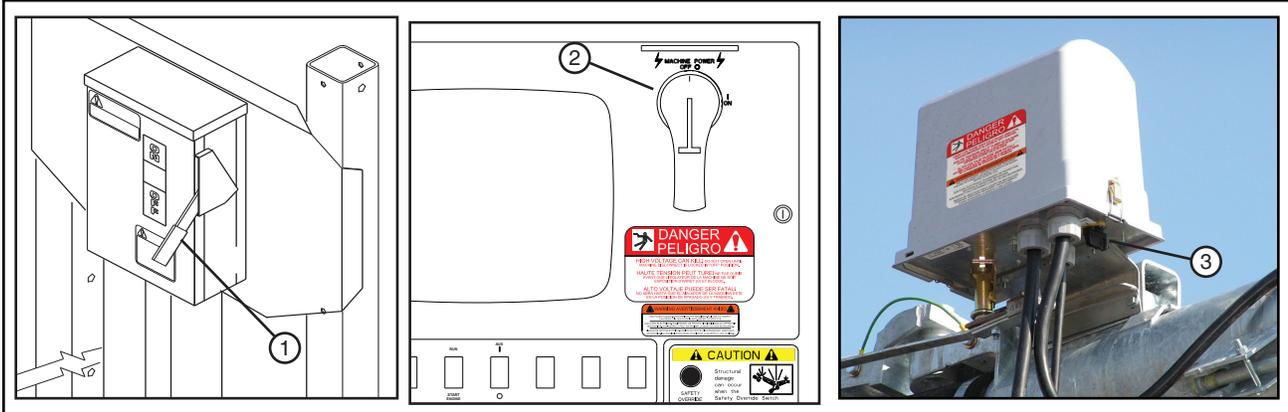


Figure 50-1 1. Main Service Disconnect Switch  
2. Control Panel Main Disconnect Switch  
3. Tower Box Disconnect Switch

## Stopping Under Normal Conditions

1. Push the Stop button. See Figure 50-2.
2. Turn the main disconnect switch to the OFF position. See Figure 50-3.
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.**

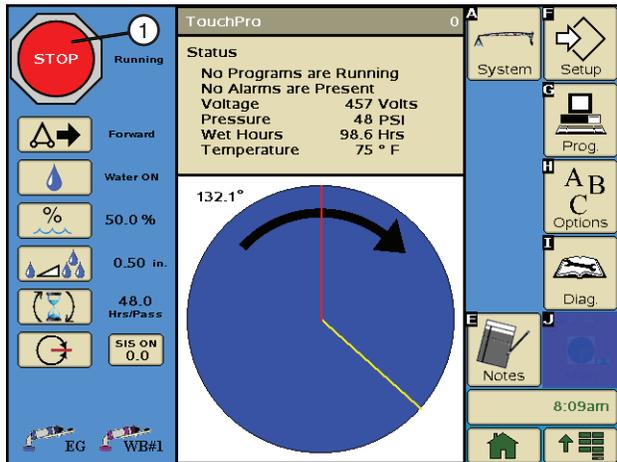


Figure 50-2 1. Stop Button

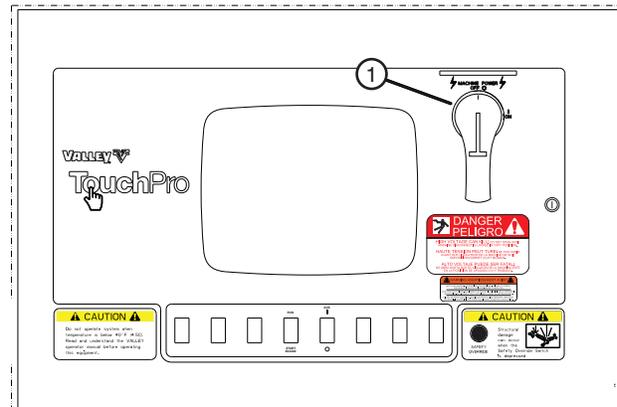


Figure 50-3 1. Main Disconnect Switch OFF

## Diagnostics Screen

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. Push the Diagnostics button (I) to view the screen. See Figure 51-1.

## System Faults

System Faults are failures that shut the machine down. Any item showing FAULT on the System Faults screen has caused the machine to shut down. The faults that can be indicated on the System Fault screen are shown in Figure 51-2. Refer to the Troubleshooting section for possible causes and corrective actions.

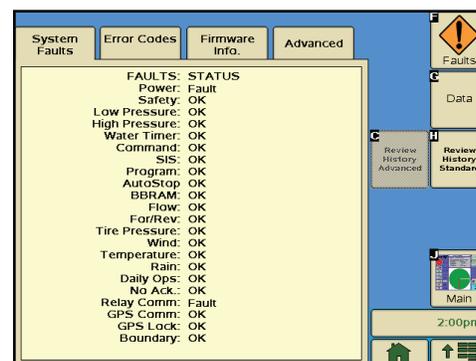


Figure 51-1

## Faults and Definitions

Fault	Definition
SYSTEM POWER FAULT	Voltage has fallen below the low voltage limit for more than 15 seconds, or power was lost while the machine was running.
SYSTEM SAFETY FAULT	Caused by a break in the safety return circuit that lasted longer than three seconds.
LOW PRESSURE FAULT	The pressure fell below the low pressure limit, or the pressure delay is not a sufficient amount of time to build pressure in the machine after it is started.
HIGH PRESSURE FAULT	With VRI-Zone on, the pressure went above the high pressure limit for more than three seconds.
WATER TIMER FAULT	The machine shut down because it was moving too slowly, thereby applying too much water.
COMMAND FAULT	The machine was commanded to stop by one of the following: 1) The STOP button was pressed. 2) An Autostop condition occurred at the end-of-field stop. 3) A programmed STOP command was executed.
STOP-IN-SLOT (SIS) FAULT	The machine was shut down by Stop-In-Slot.
PROGRAM FAULT	The machine was shut down because a Step program stopped the system.
AUTOSTOP FAULT	An auto stop condition occurred at the end-of-field stop.
BBRAM FAULT	An attempt was made to start the machine when error E01 was displayed on the status screen.
FLOW FAULT	With VRI-Z on, the flow rate has fallen below the amount set in the FLOWMETER GAL/PULSE field.
FOR/REV FAULT	Both the forward and reverse sensor relays were on for more than 15 seconds while the system was running or waiting.
TIRE PRES FAULT	While the system was running or waiting, two consecutive error messages from a particular tire were received.
WIND FAULT	The machine shut down because the wind speed reached the high wind limit. The wind speed indicator is an option. WIND is only displayed on the System Faults screen when WIND is turned ON.
TEMPERATURE FAULT	The machine shut down because the temperature fell below the low temperature limit.
RAIN FAULT	The machine shut down because the rain limit was exceeded in the rain window time period.
DAILY OPS FAULT	The Daily Operations program shut the machine down because it is not allowed to run between a certain time period. DAILY OPS is only displayed on the System Faults screen when Daily Ops is turned ON.
NO ACK FAULT	No acknowledgement was received from a communication device while the machine was running. Notice must be ON with No Ack set to SHUT DOWN.
RELAY COM FAULT	There is a hardware or software communication problem between the TouchPro module and the electrical relay board within the control panel.
GPS COM FAULT	When GPS is selected as a protocol, and the system shut down due to no communication with GPS for a user-specified time when shutdown of GPS signal loss is ON while system was running or waiting.
GPS LOCK FAULT	When GPS is selected as a protocol, and the system shut down due to GPS signal loss for a user-specified time when shutdown of GPS signal loss is ON while the system is running or waiting.
BOUNDARY FAULT	The machine shut down because it traveled beyond the forward or reverse position angles.

# Diagnostics

## Viewing System Faults

Push the **Fault Notice** icon or the **Diag, Faults** button, then the **System Faults** tab to display the System Faults screen. See Figures 52-1 and 52-2.

When a recognized fault causes the machine to shut down, the Fault Notice icon is displayed on the pivot and "Fault" is displayed on the System Faults screen next to the item responsible for the shut down.

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

## Error Codes

Error Codes are failures that may or may not shut the machine down. If one or more failures occur, the Error Notice icon appears on the Main screen. See Figure 52-2.

Refer to the Troubleshooting section for possible causes and corrective actions.

### NOTE

- Viewing the Error Codes screen clears the Error Notice icon from the Main screen.

## Viewing and Clearing an Error Code

Push the **Error Notice** icon or the **Diag, Faults** button, then the **Error codes** tab to display the Error Codes screen. See Figures 52-3 and 52-4.

Do the following to view and clear error codes:

1. Push the **Error Notice** icon to display the Error Codes screen. See Figure 52-3.
2. Push the **Prev** and **Next** buttons to view all of the error codes. Viewing an error code clears the Error Notice icon from the Main screen. See Figure 52-4.

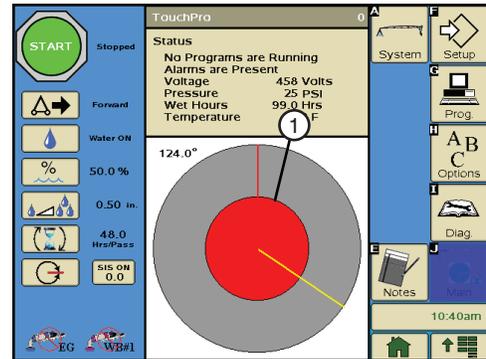


Figure 52-1 1. Fault Notice Icon

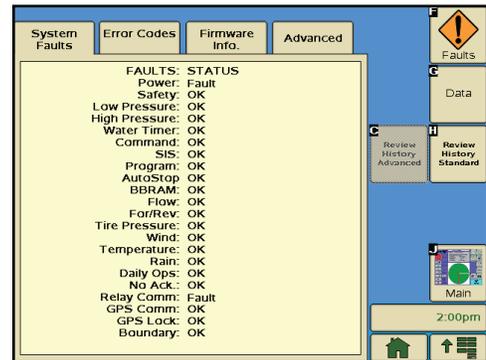


Figure 52-2 System Faults

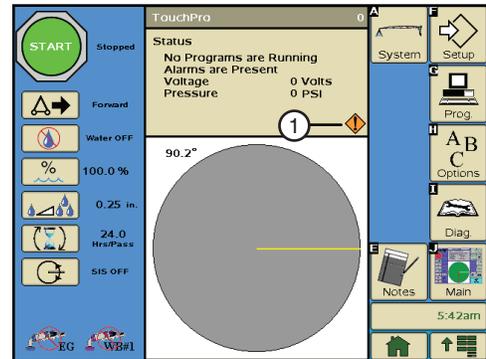


Figure 52-3 2. Error Notice Icon

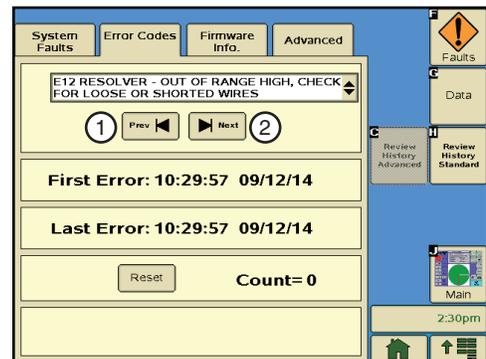


Figure 52-4 1. Previous Button  
2. Next Button

## Error Codes

A list of possible error codes is shown in the table below. Refer to the Troubleshooting section for possible causes and corrective action.

<b>ERROR CODES</b>	<b>DESCRIPTION</b>
E01	BGRAM - CHECKSUM FAILED AT POWER UP
E02	EEPROM - CHECKSUM FAILED AT POWER UP
E03	UNIT RESETS - THIS IS LOGGED WHEN THE SOFTWARE RESETS
E04	POWER DROP - POWER DROPPED BELOW LOW THE VOLTAGE LIMIT
E05	SYSTEM SAFETY - POSSIBLE TOWER MISALIGNMENT... OR DRIVE UNIT MAY BE STUCK
E06	PUMP SAFETY - PRESSURE TOO LOW AFTER PRESSURE DELAY
E07	PRESSURE SENSOR - OUT OF RANGE HIGH... CHECK CONNECTION
E08	PRESSURE SENSOR - OUT OF RANGE LOW... CHECK CONNECTION
E09	PRESSURE SENSOR - PRESSURE HIGH WITH PUMP OFF... CHECK CONNECTION
E10	PRESSURE SENSOR - MECHANICAL SWITCH COULD BE STUCK
E11	RESOLVER - ANGLE JUMPING AROUND... LUBE SWIVEL, ADJUST J-PIPE PACKING
E12	RESOLVER - OUT OF RANGE HIGH... CHECK FOR LOOSE OR SHORTED WIRES
E13	KEYPAD - POSSIBLE KEY STUCK... CHECK KEYPAD CONNECTION
E14	FWD/REV SENSE - POSSIBLE SHORT... CHECK WIRING
E15	UNDERWATER ERROR - CHECK FOR INDUCED VOLTAGES AND % TIMER CONNECTIONS
E16	NOT AVAILABLE
E17	NOT AVAILABLE
E18	GPS COMMUNICATION ERROR... CHECK GPS COMMUNICATION AND POWER
E19	GPS SIGNAL LOSS... CHECK FOR CLEAR PATH ABOVE ANTENNA
E20	DGPS SIGNAL LOSS... CHECK FOR CLEAR PATH ABOVE ANTENNA
E21	LOW FLOW
E22	HIGH PRESSURE
E23	PLC COMMUNICATIONS ERROR. (GPS V2 and VRI Zone Only)
E24	RESYNC VALVE DUTY CYCLE DUE TO PRESSURE
E25	GPS COORDINATES OUT OF RANGE... CHECK DISTANCE TO GPS OR FOR CROSSTALK
E26	LOW TIRE PRESSURE
E27	TPMS COMMUNICATIONS ERROR

# Diagnostics

## Error Logs

For each error code there is an error log. 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 in the error log. See Figure 54-1.

## Viewing an Error Log

To view an Error Log, push the **Error Codes** tab on the Diagnostics screen. See Figure 54-1.

There are several ways to access the desired error log.

- Push the **Previous** button to search backward through the Error Logs.

### NOTE

• Viewing the Error Codes screen clears the Error Notice icon from the Main Screen.

- Push the **Next** button to search forward through the Error Logs.
- Push the **Error Code** field and select the error from the drop-down list.

Push the **Main** button (J) to return to the Main Screen.

## Resetting an Error Log to Zero

To reset an Error Log to zero, on the Error Codes tab select the Error Code field, choose the error code and push the **Reset** button. The count is reset to zero, and the first and last error occurrences are set to the current time and date. See Figure 54-1.

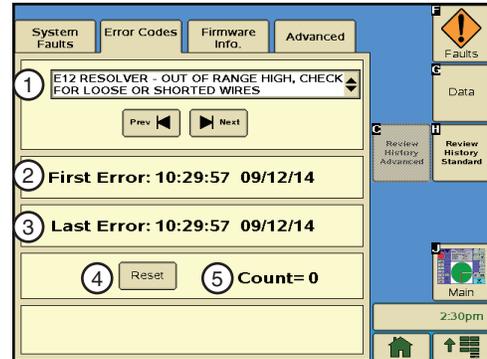


Figure 54-1 1. Error Code Field  
2. First Occurrence Time and Date  
3. Last Occurrence Time and Date  
4. Reset Button  
5. Total Occurrences

## Review History

Review History screens provide a record of the 99 most recent machine operation status changes via the Review History Standard and Review History Advanced screens. Refer to Figures 55-1 and 55-2.

The history record number is in the upper left hand corner. Number 01 is the newest status change and number 99 is the oldest status change.

When the maximum number of 99 records exist in the control panel memory, any new status change is added as record number 01 and the oldest record is discarded. Refer to Figure 55-1.

## Viewing a History Record

- To view a History Record, push the **Review History Standard** button on the Diagnostics screen. See Figure 55-1.
- There are several ways to access the desired history record.
  - Push the **Previous** button to search backward through the History Records.
  - Push the **Next** button to search forward through the History Records.
  - Select the **Review History** field and choose the History Record from the drop-down list.
- Push the **Review History Advanced** button to view additional information and the Event Code that triggered the history record. Refer to Figure 55-2.

A list of event codes is shown on the next page.

The Review History Advanced screen displays a record of all error codes related to the history record being displayed.

Each error code is represented by a 0 placeholder. Reading from right to left, the left most placeholder represents error code E01 (refer to Error Codes appearing earlier in this section). If an error occurred, the placeholder representing the error code is changed from 0 to 1. Refer to Figure 55-2.

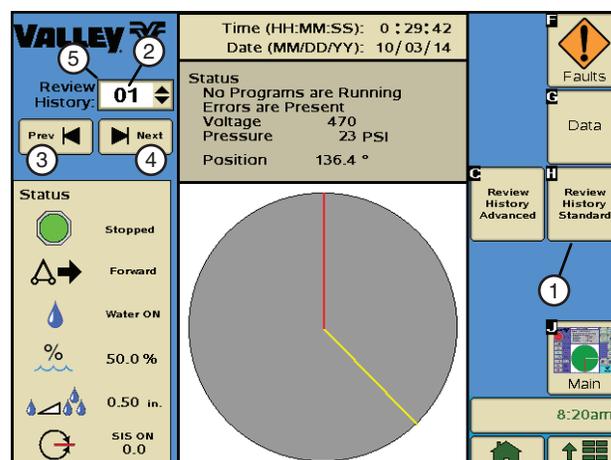


Figure 55-1 Review History Standard Screen  
 1. Review History Standard Button  
 2. History Record Number  
 3. Previous Button  
 4. Next Button  
 5. Review History Field

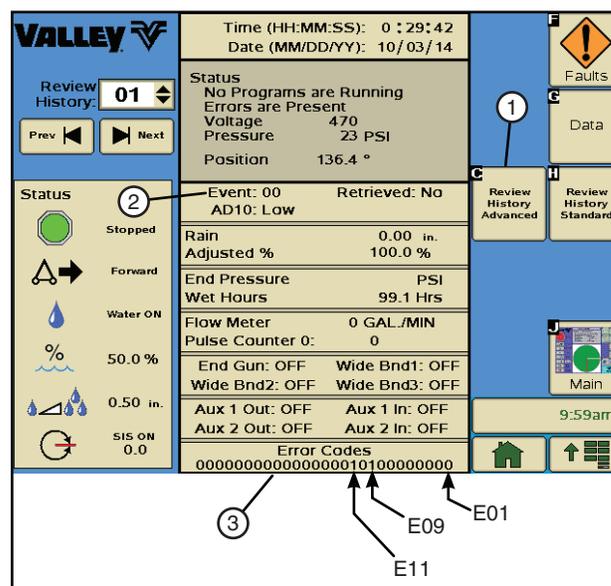


Figure 55-1 Review History Advanced Screen  
 1. Review History Advanced Button  
 2. Event Code  
 3. Error Codes

# Diagnostics

## Review History (continued)

### Event Codes

The following is a list of codes for events that trigger that create history records. The event code appears on the history record when viewed on the Review History Advanced screen.

### Review History Screen Event Codes

Code	Event
00	Date Change/Midnight event log
01	Percent Timer or Water Depth change
02	One or more step programs are running or no programs are running
03	Program command triggers an event log
04	Auto restart feature active/inactive change
05	System direction change
06	Water on/off change
07	SIS on/off change
08	SIS position change
09	Cruise on/off change
0A	VRI-Z on/off change
0B	VRI-S on/off change
0C	Auxiliary In 1 change
0D	Auxiliary In 2 change
0E	Auxiliary Out 1 change
0F	Auxiliary Out 2 change
10	End Gun on/off change
11	Wide Boundary on/off change
12	PLC Wide Boundary 2 on/off change
13	PLC Wide Boundary 3 on/off change
14	AD10 high/low change
15	System crossed SIS position (Doesn't have to be on)
16-7F	
80	Running
81	Waiting

Code	Event
82	Paused (Reserved use)
83	Stopped - Power Fault
84	Stopped - Safety Fault
85	Stopped - Low Pressure Fault
86	Stopped - High Pressure Fault
87	Stopped - Water Timer Fault
88	Stopped - Command Fault
89	Stopped - SIS Fault
8A	Stopped - Program Fault
8B	Stopped - AutoStop Fault
8C	Stopped - BBRAM Fault
8D	Stopped - Flow Fault
8E	Stopped - For/Rev Fault
8F	Stopped - Tire Pressure Fault
90	Stopped - Wind Fault
91	Stopped - Temperature Fault
92	Stopped - Daily Ops Fault
93	Stopped - No Acknowledge Fault
94	Stopped - GPS Com Fault
95	Stopped - GPS Lock Fault
96	Stopped - Transition Fault (Reserved use)
97	Stopped - Rain Fault
98	Stopped - Relay Com Fault
99	Stopped - Boundary Fault
9A-FF	

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 QUALIFIED 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.**

# Troubleshooting

## System Faults

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

SYSTEM FAULT	DESCRIPTION WITH POSSIBLE CAUSES	SHUT DOWN	CORRECTIVE ACTION
SYSTEM POWER FAULT	Voltage has fallen below the low voltage limit for more than 15 seconds, or power was lost while the machine was running.	YES	Check Low Voltage Limit for correct value. Contact your Valley dealer.
SYSTEM SAFETY FAULT	Caused by a break in the safety return circuit for more than three seconds.	YES - if more than 3 seconds	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.
LOW PRESSURE FAULT	The pressure fell below the low pressure limit for more than thirty seconds, or the pressure delay is not a sufficient amount of time to build pressure in the machine after it is started.	YES - if more than 3 seconds	Make sure pump is on. Set Low Pressure Limit higher. Set Pressure Delay for longer period of time. Contact your Valley dealer.
HIGH PRESSURE FAULT	With VRI-Zone on, the pressure went above the high pressure limit for more than three seconds.	YES - if more than 3 seconds	
WATER TIMER FAULT	The machine shut down because it was moving too slowly, thereby applying too much water.	YES	
COMMAND FAULT	The machine was intentionally commanded to stop by one of the following: 1) The stop button was pressed. 2) An autostop condition occurred at the end-of-field stop. 3) A programmed stop command was executed.	YES	Normal operation - No corrective action needed.
STOP-IN-SLOT (SIS) FAULT	The machine was shut down by the Stop-In-Slot.	YES	Normal operation - No corrective action needed. If desired, program a different Stop-In-Slot location.
PROGRAM FAULT	The machine was shut down because a Step program stopped the system.	YES	
AUTOSTOP FAULT	An autostop condition occurred at the end-of-field stop.	YES	Normal operation - No corrective action needed.
BBRAM FAULT	Indicates that an attempt was made to start the machine when Error E01 was displayed on the status screen.	YES	Contact your Valley dealer. Clear by viewing Diagnostics/System Fault when BBRAM is present.
FLOW FAULT	With VRI-Z on, the flow rate has fallen below the amount set in the FLOWMETER GAL/PULSE field.	YES	Examine the VRI-Z prescription to determine why so many sprinklers are turned off. Revise prescription.
FOR/REV FAULT	Both the forward and reverse sense relays were on for more than 15 seconds while the system was running or waiting.	YES	Contact your Valley dealer. Fault cleared when the system attempts to run.
TIRE PRES FAULT	While the system was running or waiting, two consecutive error messages from a particular tire were received.	YES  Tire Pressure Shut Down option must be enabled	Tire pressure is at or lower than the tire pressure shutdown value. 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.

## System Faults (continued)

SYSTEM FAULT	DESCRIPTION WITH POSSIBLE CAUSES	SHUT DOWN	CORRECTIVE ACTION
WIND FAULT	The machine shut down because the wind speed reached the high wind limit. The wind speed indicator is an option. WIND is only displayed on the system faults screen when wind is turned ON.	YES	Normal operation - No corrective action needed.
TEMPERATURE FAULT	The machine shut down because the temperature fell below the low temperature limit.	YES	Restart the machine when the temperature rises above the limit.
RAIN FAULT	The machine shut down because the rain limit was exceeded in the Rain Window field time period.	YES	Turn Rain Shutdown Off, or restart the machine when the Rain Total is below the Rain Limit.
DAILY OPS FAULT	The daily operations program shut the machine down because it is not allowed to run between a certain time period, DAILY OPS is only displayed on the system faults screen when Daily Ops is turned ON.	YES	Normal operation - No corrective action needed. If desired, reprogram Daily OPS to run at a different time or turn Daily OPS OFF.
NO ACK FAULT	No Acknowledgement was received from communication device while machine was running. Notice must be ON with No Ack set to Shut Down.	YES	Check communication devices for proper operation.
RELAY COM FAULT	There is a hardware or software communication problem between the Pro2 module and the electrical relay board within the control panel.	YES	Contact your Valley dealer.
GPS COM FAULT	While system was running or waiting, all of the following must have occurred: 1. GPS is selected as a protocol. 2. GPS signal loss is set to shut down the machine. 3. The machine shut down due to no communication with the GPS for a user specified time.	YES	Check the GPS connection and the power. Contact your Valley dealer.
GPS LOCK FAULT	While system was running or waiting, all of the following must have occurred: 1. GPS is selected as a protocol. 2. GPS signal loss is set to shut down the machine. 3. The machine shut down due to GPS signal loss for a user specified time.	YES	Check for a clear path above the antenna. Contact your Valley dealer.
BOUNDARY FAULT	The machine shut down because it traveled beyond the forward or reverse Position angles.	YES	Walk the machine back. Check the For/Rev Position angles. Contact your Valley dealer.

# Troubleshooting

## Error Codes

Listed in the table below are the possible error codes with the description, threshold for the error to occur, whether the machine will shutdown if the error occurs and possible causes or corrective action to take. See figures 60-1 and 61-1.

ERROR	DESCRIPTION	THRESHOLD	SYSTEM FAULT SHUT DOWN	POSSIBLE CAUSES or CORRECTIVE ACTION	SHOWN ON SCREEN
E01	BBRAM - BATTERY BACKED RAM CHECKSUM FAILED AT POWER UP.		YES	Contact your Valley dealer.	YES
E02	EEPROM - CHECKSUM FAILED AT POWER UP.	One of the blocks failed.	YES	This error can occur when power is lost while entering constants. Data being entered may be lost. Try to hard reset module. Contact your Valley dealer.	YES
E03	UNIT RESETS - THIS IS LOGGED WHEN THE SOFTWARE RESETS.	Every time the software is power cycled.	NO	Records every time the module is power cycled. Normal operation. No corrective action.	NO
E04	POWER DROP - POWER DROPPED BELOW LOW VOLTAGE LIMIT.	If running/waiting, and voltage drops below low voltage.	YES - after 15 seconds.	This error occurs when the voltage drops below the low voltage limit. Nuisance shutdowns can be caused by setting the Low Voltage Limit too high. Contact your Valley dealer.	YES
E05	SYSTEM SAFETY - POSSIBLE TOWER MISALIGNMENT, DRIVE UNIT MAY BE STUCK.	Safety lost while running.	YES - after 3 seconds.	This error occurs when the safety circuit is open due to misaligned towers, guidance problems, over-watering timer timed out, or any other component in the safety circuit. Contact Your Valley Dealer.	YES
E06	PUMP SAFETY - PRESSURE TOO LOW AFTER PRESSURE DELAY.	Pressure with pump off.	YES - until started.	This error may occur when the pressure delay time or the low pressure setting are not correct. The pump, pressure transducer, or pressure switch may have failed. Low pressure set point too close to operating pressure. Contact your Valley dealer.	YES
E07	PRESSURE SENSOR - OUT OF RANGE HIGH, CHECK CONNECTION.	> 4.5 volts.	NO	This error occurs when the pressure transducer has failed. Contact your Valley dealer.	YES
E08	PRESSURE SENSOR - OUT OF RANGE LOW, CHECK CONNECTION.	< 0.5 volts.	NO	This error may occur when the pressure transducer has failed or is not installed. Contact your Valley dealer.	YES
E09	PRESSURE SENSOR - PRESSURE HIGH WITH PUMP OFF, CHECK CONNECTION.	Pump off for 5 min., and more then 7 PSI (0.5 bar)	NO	This error may occur when the pressure transducer has failed or water is still in riser pipe because a machine drain may be plugged. Re-calibrate pressure transducer.	YES

# Troubleshooting

## Error Codes (continued)

ERROR	DESCRIPTION	THRESHOLD	SYSTEM FAULT SHUT DOWN	POSSIBLE CAUSES or CORRECTIVE ACTION	SHOWN ON SCREEN
E10	PRESSURE SENSOR - MECHANICAL SWITCH COULD BE STUCK.	Pump off for 5 min, and switch still on.	NO	This error may occur if the pressure transducer or switch has failed or is stuck. Contact your Valley dealer.	YES
E11	RESOLVER - ANGLE JUMPING AROUND, LUBE J PIPE.	5° jump in 1 second (twice).	NO	This error may occur if the pivot swivel is binding or sticking, and requires lubrication.	YES
				J-tube overtightened or seized.	
				Pipe not secured to H-bracket.	
				Collector ring loose. Contact your Valley dealer.	
E12	RESOLVER - OUT OF RANGE HIGH, CHECK FOR LOOSE OR SHORTED WIRES.	X AND Y = 2.5 volts.	NO	This error may occur if the resolver wires are loose or shorted. Contact your Valley dealer.	YES
E13	KEYPAD - POSSIBLE KEY STUCK CHECK KEYPAD CONNECTION.	10 seconds.	NO	This error may occur if the key pad has failed or a key is stuck.. Contact your Valley dealer.	YES
E14	FWD/REV SENSE - POSSIBLE SHORT, CHECK WIRING.	2 seconds.	YES - after 15 seconds.	When this error is detected, both the forward and reverse run lines are powered.  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.  Contact your Valley dealer.	YES
E15	UNDERWATER ERROR - MACHINE MAY BE MOVING TOO FAST.	Number of minutes as set in the % UNDERWATER ERROR field.	NO	Check for induced voltages and Percent Timer connections.	YES
E16	NOT ASSIGNED			This error code is not assigned.	
E17	NOT ASSIGNED			This error code is not assigned.	
E18	GPS COMMUNICATION ERROR, CHECK GPS CONNECTION AND POWER.	10 seconds.	YES, if Shut Down System is selected.	This error occurs when GPS is selected as a protocol, and a transition occurs from communications to no communications for 10 seconds.	NO, position will flash.
				Check GPS connection.  When GPS option is powered by safety circuit, a loss of power will cause this error.	

# Troubleshooting

## Error Codes (continued)

ERROR	DESCRIPTION	THRESHOLD	SYSTEM FAULT SHUT DOWN	POSSIBLE CAUSES or CORRECTIVE ACTION	SHOWN ON SCREEN
E19	GPS SIGNAL LOSS, CHECK FOR CLEAR PATH ABOVE ANTENNA.  Position of machine will flash when error occurs.	10 seconds.	YES, if Shut Down System is selected.	This error occurs when the signal from the GPS transitions from GPS Lock to GPS Unlock.  Check for clear path above the antenna.	NO, position will flash.
E20	DGPS SIGNAL LOSS, CHECK FOR CLEAR PATH ABOVE ANTENNA.	10 seconds.	NO	This error occurs when the signal from the DGPS transitions from DGPS to Standard.  Check for clear path above the antenna.	NO
E21	LOW FLOW	Minimum flow rate is enabled, and the machine water pressure is above the low pressure setting	YES	A Low Flow error can only occur if the constant's Minimum Flow Rate is enabled, and the machine water pressure is above the low pressure setting.	YES
E22	HIGH PRESSURE	3 Seconds		A High Pressure error occurs if the machine water pressure reaches the constant's Maximum Pressure setting for 3 seconds.	YES
E23	PLC COMMUNICATIONS ERROR. (GPS V2 Only)	3 Times in a Row.	NO	This error occurs when a PLC with GPS V2 does not reply to control panel messages three times in a row.  Verify Correct PLC Channel and ID Settings.	YES
E24	RESYNC VALVE DUTY CYCLE DUE TO PRESSURE	Pressure reaches the constant's valve resync water pressure setting		A Resync Valve Duty Cycle error is recorded if the machine water pressure reaches the constant's Valve Resync Water Pressure setting.	YES
E25	GPS COORDINATES OUT OF RANGE, CHECK DISTANCE TO GPS OR FOR CROSSTALK.	When GPS coordinates go out of range	YES, if Shut Down System is selected.	This error occurs when:  The distance from the pivot to the GPS receiver is outside of the set length $\pm$ - Set correct distance to GPS.  The pivot point coordinates are incorrect - Set pivot point to correct coordinates.  There is crosstalk from another GPS device on the same channel - Change GPS PLC to different channel to avoid crosstalk.	YES
E26	LOW TIRE PRESSURE	Records every occurrence on one tower	NO	A tire with pressure at or below the tire pressure warning value is on the indicated tower.  The error and the number of occurrences are 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 to log other occurrences.	YES
E27	TPMS COMMUNICATIONS ERROR	3 Failed Attempts in a Row	NO	A particular TPMS ID did not reply to control panel messages 3 times in a row.	YES

## Troubleshooting List

Listed in the following tables are various problems, with the descriptions and possible causes or corrective action to take.

PROBLEM	POSSIBLE CAUSE OR CORRECTIVE ACTION
RESOLVER POSITION IS NOT ACCURATE.	PIVOT POINT BINDING
	J-TUBE OVERTIGHTENED OR SEIZED
	PIPE NOT SECURED TO H-BRACKET
	COLLECTOR RING LOOSE
	DIRECTION OFFSET INCORRECT
	CONTACT YOUR VALLEY DEALER.
PIVOT AUTO REVERSES RANDOMLY.	CONTACT YOUR VALLEY DEALER.
PIVOT AUTO STOPS RANDOMLY.	CONTACT YOUR VALLEY DEALER.
PIVOT BREAKS SAFETY AT BARRICADE.	BARRICADE TOO HIGH ON ACTUATOR ARM
	AUTO-REVERSE/AUTO-STOP DISABLED
	AUTO-REVERSE/AUTO-STOP BOX NOT ADJUSTED CORRECTLY.
	CONTACT YOUR VALLEY DEALER.
PRESSURE TRANSDUCER READING INCORRECT.	CALIBRATE WITHOUT WATER.
	CHECK VALVE HOLDING WATER IN RISER.
	TRANSDUCER HAS ICE AGAINST SENSOR.
	TRANSDUCER PLUGGED
	PRESSURE TUBE PLUGGED OR DAMAGED
	CONTACT YOUR VALLEY DEALER.
NO DISPLAY	CONTRAST ADJUSTED TOO LIGHT OR DARK
	DISCONNECT SWITCH OFF
	NO POWER TO PIVOT
	CONTACT YOUR VALLEY DEALER.
ENDGUN DOES NOT SHUT OFF.	INCORRECT ENDGUN ENTRY
	FILTER PLUGGED
	DEFECTIVE ENDGUN HARDWARE
	DIRECTION OFFSET INCORRECT; ARC TOO SMALL.
	CONTACT YOUR VALLEY DEALER.
ENDGUN DOES NOT TURN ON.	ENDGUN CONSTANTS NOT PROGRAMMED CORRECTLY.
	ENDGUN OPTIONS SET TO DISABLE.
	DEFECTIVE ENDGUN HARDWARE
	CONTACT YOUR VALLEY DEALER.
SCREEN CYCLES ON AND OFF.	ERRATIC INCOMING POWER
	LOW VOLTAGE
	CONTACT YOUR VALLEY DEALER.
	LOOSE CONNECTION

# Troubleshooting

## Troubleshooting List (continued)

PROBLEM	POSSIBLE CAUSE OR CORRECTIVE ACTION
DOES NOT STOP AT SIS.	SIS NOT TURNED ON.
	SIS POSITION HAS BEEN CHANGED.
	MACHINE MUST MOVE AT LEAST 2° AWAY FROM THE SIS POSITION BEFORE IT CAN BE STOPPED AGAIN BY SIS.
	CONTACT YOUR VALLEY DEALER.
BACKLIGHT DOES NOT TURN ON.	CONTACT YOUR VALLEY DEALER.
BACKLIGHTING DOES NOT TURN OFF.	INCORRECT CONSTANT ENTERED.
	CONTACT YOUR VALLEY DEALER.
SCREEN DARK.	CONTRAST SET TOO HIGH OR LOW.
	CONTACT YOUR VALLEY DEALER.
	PUSH ON THE CENTER OF THE SCREEN TO TURN ON BACKLIGHTING.
PIVOT WON'T AUTO RESTART.	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.
PIVOT WON'T STOP WITH DAILY OPS.	START/STOP TIMES REVERSED.
	DAILY OPS NOT ACTIVE.
	A PROGRAM OTHER THAN DAILY OPS STARTS MACHINE.
	CONTACT YOUR VALLEY DEALER.
AUTO RESTART DOES NOT WORK	MAKE SURE A START\$ IS ENTERED.
	SYSTEM FAULT MUST BE EITHER POWER OR PRESSURE FOR RESTART TO WORK.
	VERIFY THAT AUTO RESTART IS TURNED ON.
	CONTACT YOUR VALLEY DEALER.

## Hard Reset

A hard reset resets the Electrically Erasable Programmable Read-Only Memory (EEPROM).

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

## Executing a Hard Reset

To execute a hard reset, follow the steps below.

1. Record all options settings, constants settings, and programs that will need to be re-entered after the hard reset.
2. From the Main screen, push the **Diagnostics (I)** button.
3. Push the **Advanced** tab.
4. Push one of the following buttons.

- **Pro2 Default** (Figure 65-1) - Used to reset and clear the battery-backed memory. If a reset is executed, all values within the Pro2 are set back to their default values. Examples:

- » All System Constants
- » Direction = Forward
- » Water = Water Off
- » SIS = SIS Off
- » End Gun and wide boundary angles are set to 0.0
- » All counter readings are reset to zero.
- » Flow/Wind/Temp screen values are reset to zero.
- » AUX 1 and 2 are reset to Off.
- » Programs are deleted.

- **Pro2 EMC Reset** (Figure 65-1) - Used to reboot the Touch-Pro module. Memory is not affected.

- **Flexbox Default** (Figure 65-1) - Used to reset and clear the flex box memory. If a reset is executed, appearance of the Main screen is affected as the settings on the following tabs are reset back to their default values:

- » **Field** Tab: Pivot Name - TouchPro, Pivot Road - Disabled, Full Circle Pivot
- » **Status** Tab: Line 1 - Programs, Line 2 - Alarms, Line 3 - Voltage, Line 4- Percentage, Line 5 - Empty, Line 6 - Empty
- » **Controls** Tab: Position 1 - Direction, Position 2 - Water, Position 3 - Percentage, Position 4 - Depth, Position 5 - Hrs/Pass, Position 6 - Stop In Slot, Position 7 - Empty, Position 8 - Endgun

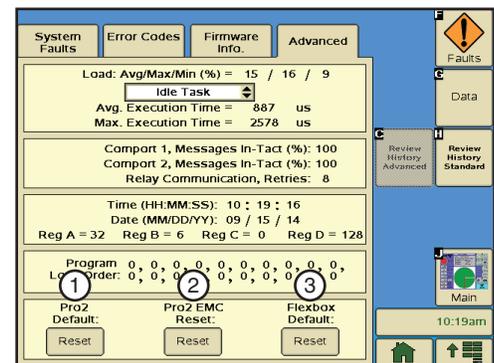


Figure 65-1 1. Reset Pro2 Memory to Default  
2. Reset Pro2 EMC  
3. Reset Flexbox to Default

# Troubleshooting

## Executing a Hard Reset (continued)

If you choose **Pro2 Default** or **Flexbox Default**, a dialog box appears warning you that the system will reset to its default values. See Figures 66-2 and 66-3.

5. Push the  (Escape) button to cancel out of the reset:
6. Push the  (Enter) button to complete the reset.

If no selection is made within 60 seconds, the reset is canceled.

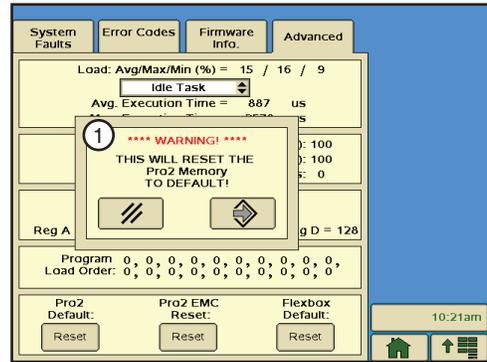


Figure 66-2 1. Pro2 Memory Reset Warning

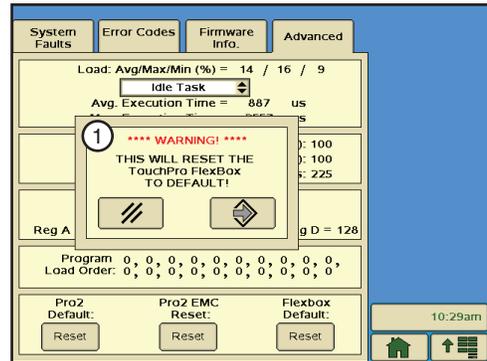
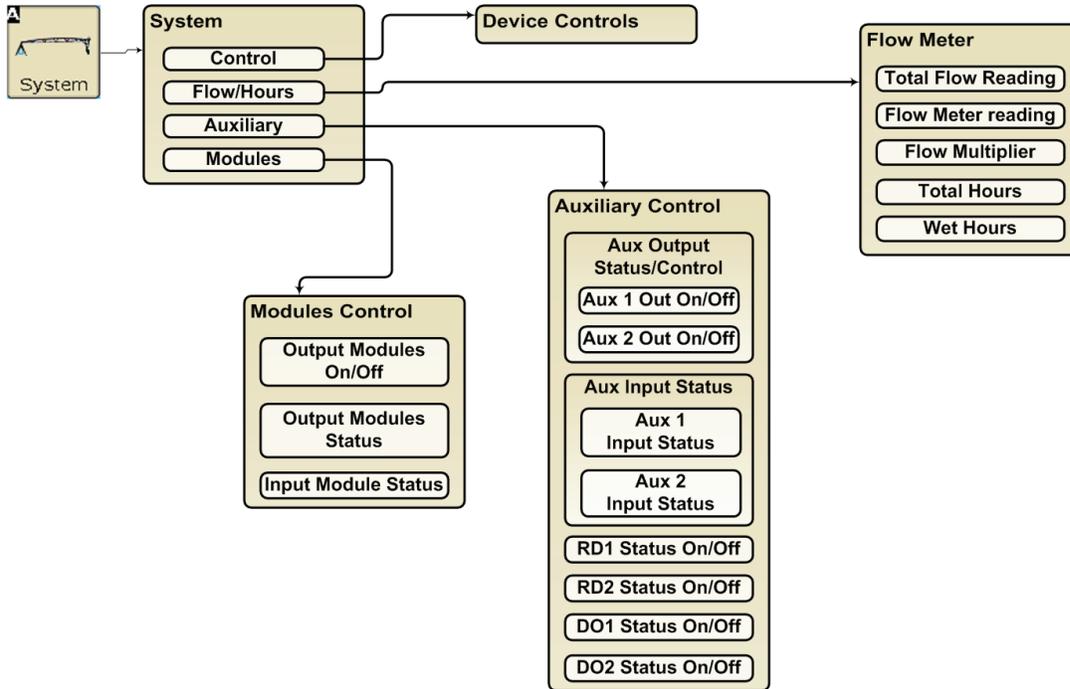


Figure 66-3 1. Flexbox Reset Warning

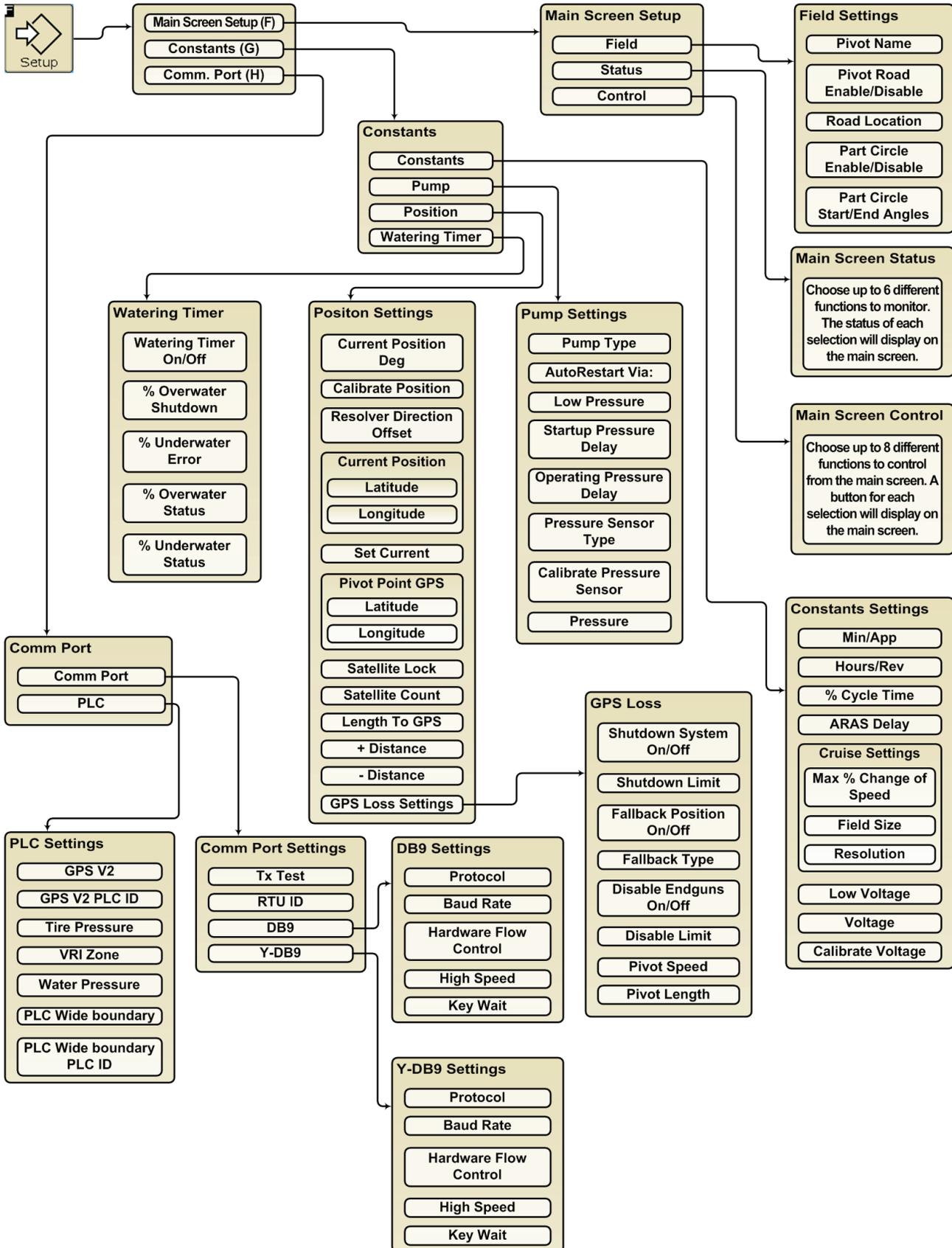
The following flowcharts are provided to help you access the features associated with the System, Setup, Program, Options, Diagnostics, Home and Start menu buttons.

## System Button

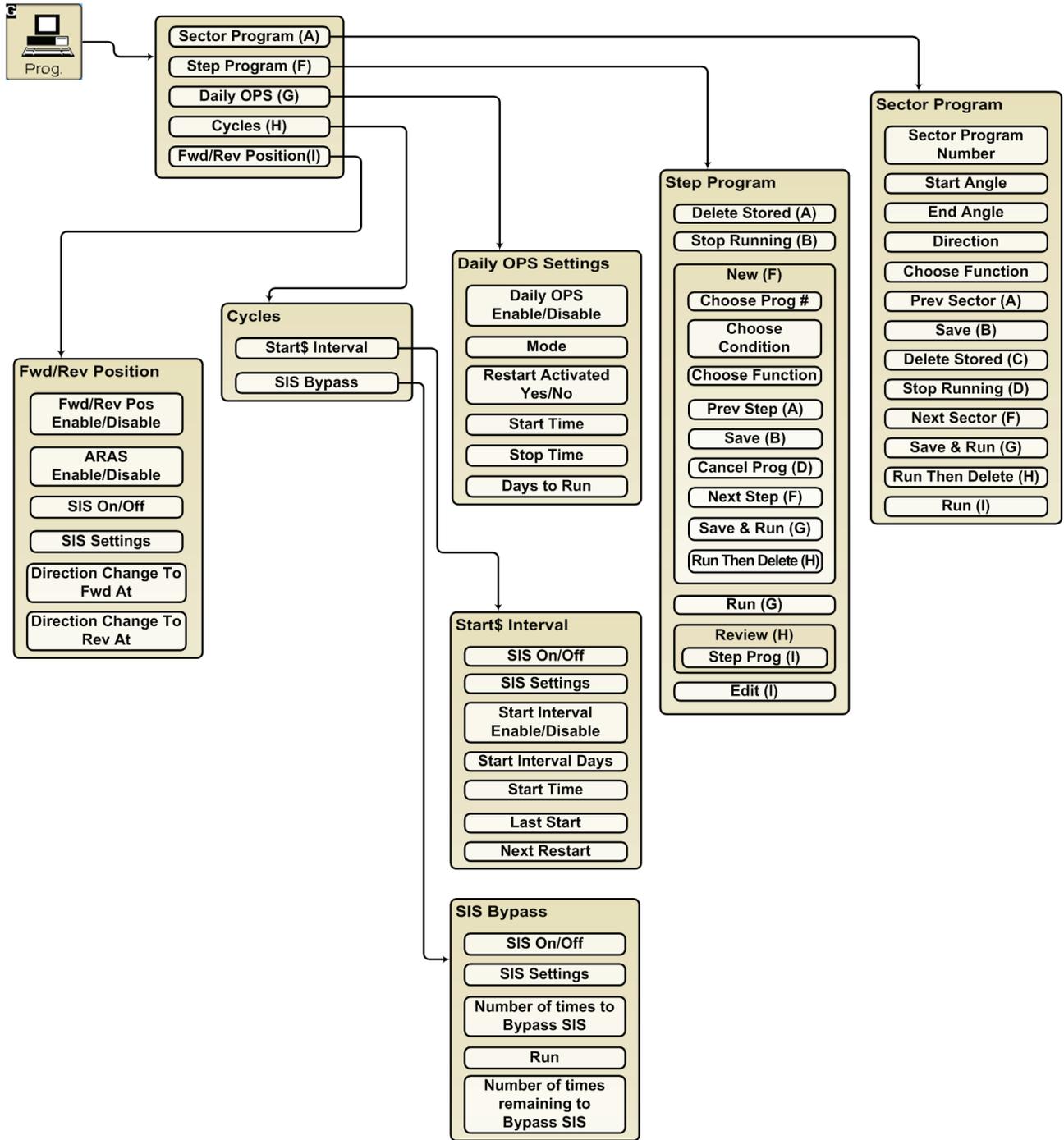


# Button Flowcharts

## Setup Button

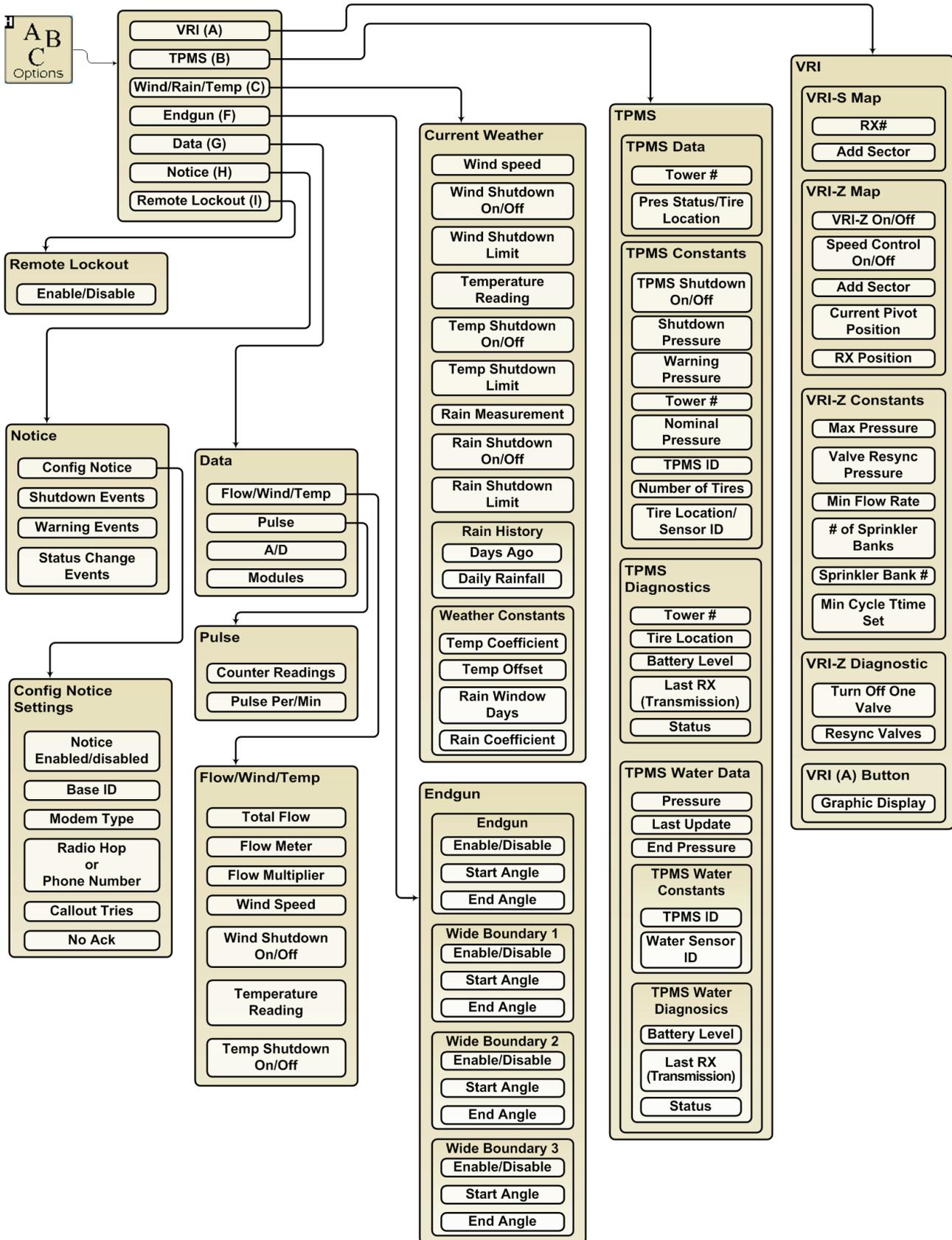


## Program Button

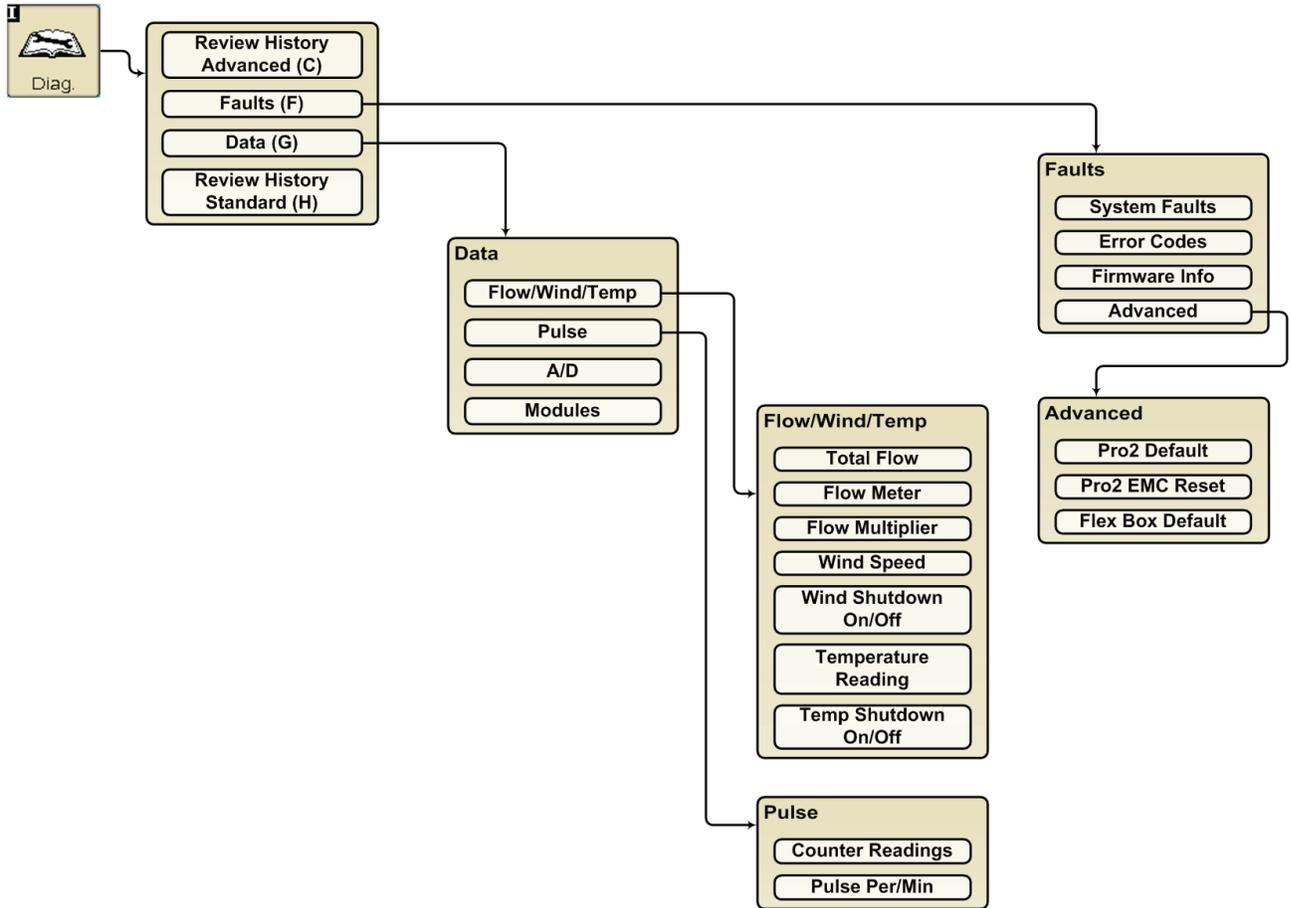


# Button Flowcharts

## Options Button



## Diagnostics Button



# Button Flowcharts

## Home Button

