

Reinke Operator's Manual

Pivot and Swing Arm Corner System with Touch Screen Control Panel

Revision: -

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Table of Contents

System Safety.....	5
Lockout / Tagout.....	6
Restoring Equipment to Service.....	7
Safety Labels.....	10
Standard Panel.....	10
Tower Box.....	11
Tower Base.....	11
Main Screen.....	12
System Status.....	12
Speed Control.....	12
Start and Stop Control Buttons.....	13
Forward and Reverse.....	13
ETA (Barr).....	13
SETUP Button.....	13
SETUP Screen.....	14
PROGRAM Button.....	14
PROGRAM Screen.....	14
PARK Button.....	15
LOGS Button.....	15
Logs Table and Graphs.....	15
Information Center.....	17
Recent Activity.....	17
Output Control Buttons.....	17
Screen - Navigation.....	18
System Setup.....	18
System Setup.....	19
General System Settings.....	19
Pump Setup.....	22
Main Water Pump Settings.....	22
Restart Setup.....	24
Power / Pressure Restart Settings.....	24
Start Setup.....	25
Start Sequence Set Up.....	25

Weather Setup	26
Weather Station Set Up.....	26
Flow Setup	27
Main Line Flow Meter Settings	27
Comm Setup	28
Communication Settings.....	28
Alarm Setup	29
Alarm Input Set Up	29
Aux Setup	30
Auxiliary Output Set Up.....	30
Temp Setup.....	31
Temperature Set Up	31
Programming.....	32
Programming.....	32
End Gun.....	33
Barriers	34
Sectors: Pivot Only	36
Step	37
Time	38
Run	39
VRI Interface.....	40
Getting Started with VRI.....	40
Downloading the VRI Prescription	41
Zone Tab.....	46
Review of the VRI Settings.....	47
Touch Screen Update	48
Starting the System.....	49
About the Generator	50
Primary Settings	51
System Speed.....	51
End Gun Settings.....	52
Cam Plate Switches (Optional).....	53
End Gun Switch Ramp	53

Part Circle Operations	54
Pivot Center Options	54
Pivot Auto-Stop Option	54
Cam Plate - Pivot Auto-Stop Option	55
Tower Options	55
Tower Auto-Reverse Option	55
Tower Auto-Stop Option	55
Tower Barricade	56
Options	58
Disconnecting Spans	58
Chemical Injection	59
Chemigation	59
Fertigation	60
Insectigation	60
Maintenance	60
Wheel Gearbox Maintenance	60
Non-Towable Gearboxes	60
Center Drive Gearbox Maintenance	61
Three Phase (480 VAC) Center Drive Gearboxes	61
Single Phase (230 VAC) Center Drive Gearboxes	61
Initial and Preseason Maintenance	62
Maintenance During Season	64
Winterization Procedure	67
Swing Arm Maintenance	67
Troubleshooting	69

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SYSTEM SAFETY

Reinke irrigation systems are designed with many electrical and mechanical safety features. However, each operator must read and understand this and all other accompanying owners manuals for the safe and efficient operation of your Reinke irrigation system. If this system is operated incorrectly, it can pose a safety threat to the operator and others, including serious injury or death. This system is powered by high voltage electricity. Any individual that will be engaging with the system in any way must read and fully understand the contents of this manual. This includes both the basic operation instructions (such as starting, stopping, adjusting water application amounts, and changing directions) as well as the safety obligations noted in this section.

In addition to the operational and safety information provided by this manual, you will also find safety signs and decals located throughout the system itself. For the safest experience possible, make sure you are able to locate and recognize every safety sign and decal located on the system. Throughout this manual, you will find safety information preceded by the words **Caution, Warning, or Danger**. These will be marked with a hazard symbol as shown below. Read each of these warnings closely, as they indicate potential hazards.

 Caution	<i>The Caution sign indicates that a situation, or action, may result in minor damage to property or harm to individuals.</i>
 Warning	<i>The Warning sign indicates that a situation, or action, may result in serious damage to property, injury, or death.</i>
 Danger	<i>The Danger sign indicates that a situation, or action, poses an immediate threat that could result in severe injury or death.</i>

Caution

Make sure you read and understand the operator's manual BEFORE operating, or maintaining, the system. If anything seems unclear, contact your local Reinke dealer.

Ensure that anyone else who operates the system reads and understands the operator's manual.

Follow ALL safety guidelines on the system and in this manual. Please keep in mind that any unauthorized changes made to the system could cause damage to that system.

Danger

DO NOT attempt to perform any maintenance procedures until the Reinke main control panel disconnect switch and all pump and other disconnect switches are locked in the OFF position. Electrical component troubleshooting and replacement should be performed by a certified Reinke Service Technician to ensure built-in safety features remain intact. This also ensures the system remains compliant with the National Electric Code and Reinke Manufacturing specifications. Replace all protective guards and shields before restoring power to the system.

 **Danger**

The movement of an electrically powered, gear-driven, irrigation system is relatively slow. Moving parts are exposed and may present a potential hazard. Therefore, keep all equipment, vehicles, people, livestock, etc. out of the system's path.

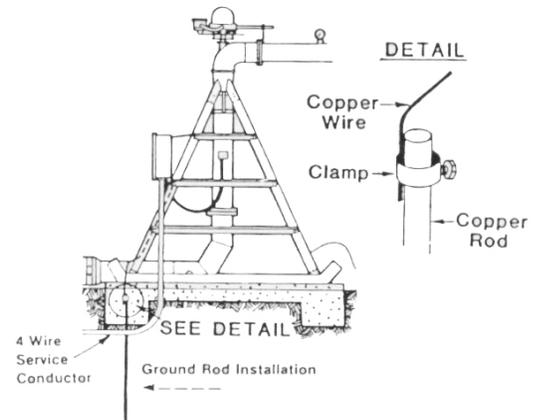
DO NOT allow anyone to ride, or climb, on the system unless they are qualified and required to do so for maintenance purposes.

The tower steps have been provided for access to the tower control boxes only. They are not intended for access to the span. For instance, should the sprinkler heads require service, use a ladder to reach them from the ground.

 **Danger**

DO NOT start the system until all electrical has been properly installed and grounded by a qualified electrician. Failing to do so could result in serious injury or death. Ensure that your contractor has grounded the system as required by the National Electrical Code and by all applicable local electrical codes.

When towing a system from field to field, avoid ditches, rough terrain, overhead power lines, etc. The ground wire **MUST** be re-attached to the ground rod, or concrete-encased electrode, and checked for electrical integrity each time the system is towed.



Lockout / Tagout

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.

On the following pages, you will find the typical minimal lockout procedures, as according to U.S. Occupational Safety & Health Administration (OSHA) Regulations. This procedure is used whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before anyone performs any servicing or maintenance where the unexpected start-up of the machine or equipment, or release of stored energy, could cause injury. When the energy isolating devices are not lockable, tagout may be used. Below is the sequence of Lockout:

1. Notify all affected employees 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 employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, understand the hazards of the energy, and know the methods to control the energy.
3. If the machine, or equipment, is operating, shut it down by the normal stopping procedure.

4. De-activate the energy isolating device(s).
5. Lock out the energy isolating device(s) with assigned individual locks.
6. Stored or residual energy (such as that in capacitors, springs, elevated system members, rotating fly-wheels, hydraulic systems, air, gas, steam, water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the system, or equipment, is disconnected from the energy sources by first checking that no personnel are exposed, then verify the isolation of the system, or equipment, by operating the push button or other normal operating controls or by testing to make certain the system, or equipment, will not operate. CAUTION: Return operating controls to the neutral or OFF position after verifying the isolation of the equipment.
8. The system, or equipment, is now locked out.



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 nonessential items have been removed and that the machine, or equipment, components are operationally intact.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.
5. Notify affected employees that the servicing, or maintenance, is completed and the machine, or equipment, is ready for use.

“UNITED STATES DEPARTMENT OF LABOR.” Occupational Safety and Health Administration (1996). *Occupational Safety and Health Standards: General Environmental Controls*, (Standard No. 1910.147 App A). Retrieved from www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9805.



Exercise caution when handling fuel near systems equipped with combustion engine-driven generators and pumps.



Keep away from the system during thunderstorms or other severe weather conditions. The system is grounded and is probably the highest object in the field, making it a good lightning receptor.

 **Danger**

Be sure protective guards are installed on all belts and driveshafts of ancillary equipment such as combustion engines, electric motors, pumps, etc.

 **Danger**

If you suspect a short circuit, or the system is not working correctly, DO NOT touch the system and keep others away from it. Call your Reinke service technician. Electrical component troubleshooting and replacement should be performed by a certified Reinke Service Technician to ensure built-in safety features remain intact. This also ensures the system remains compliant with the National Electric Code and Reinke Manufacturing Specifications.

 **Danger**

Avoid any bodily contact with high pressure water streams from sprinklers and end guns.

 **Caution**

Do not operate the system with water when temperatures are below 40°F (4.5°C). This can cause structural damage to the system. Damage from freeze-up is not covered under warranty.

 **Warning**

Keep away from fields where the system is chemigating. Make sure the applied chemical and water does not blow or drift past the area of intended operation. A check valve must be installed between the pivot center and the pump to prevent the mixture of water and chemical from siphoning back into the irrigation water source. Comply with all local, state, and federal regulations.

 **Caution**

Maintain adequate crop clearance. Allowing the systems trussing to drag in the crop, can cause structural damage to the system.

 **Caution**

DO NOT oversize fuses. Fuses are sized for a specific circuit. It is very important to make sure you have the proper fuse size in place before initially starting the system and when replacing fuses.

 **Caution**

In most states, it is unlawful to spray water on state and county roadways. This is a serious hazard and must not be allowed.

 **Warning**

If your system is equipped with any auto-stop or auto-reverse mechanism, make sure they are working correctly and a tower barricade is properly installed. ***Reinke disclaims any and all liability (including any liability created pursuant to the Irrigation Systems Warranty) with regard to damage to the irrigation system, or to other property, or personal injury or death, caused by improper installation or maintenance of Reinke-supplied tower auto-reverse or auto-stop switches or tower barricades, or by use of customer-supplied barricades.***

 **Danger**

Drive shafts may start without warning. Keep away from drive shafts to prevent clothing or limbs from being entangled, resulting in severe injury.

This manual was developed based on the information that was available at the time it was written. Reinke reserves the right to update this information, at any time, without providing prior notice.

SAFETY LABELS

The following safety signs and decals can be found on your system as indicated below. Make sure that you can locate and identify each of these. If these labels become illegible at any time, contact your Reinke dealer to order replacements.

Standard Panel

RPM

REINKE PRECISION MANAGEMENT

Operating Instructions

ELECTROGATOR II

⚠️ **Before starting System, each operator must read and understand all Reinke and supporting equipment owners manuals.**

1. Observe field and System conditions to be sure the System and System's path are clear of people and any other obstacles. See "System Safety" section at the beginning of appropriate Reinke System Owners Manual.
2. If you desire to run water with the System, ensure Electric Pump Control is enabled and safe to start as per Pump Manufacturer's recommendations. Then turn Pump Disconnect Switch to the "ON" position.
3. If your System utilizes an optional Generator Switch to control a Combustion Engine Driven Well or Generator, turn the Generator Switch to the "START" position. Ensure Engine is safe to start as per Engine Manufacturer's recommendations. Then start Engine as per Engine Manufacturer's recommendations.
4. Turn Main Disconnect Switch to the "ON" position.
5. Observe the voltage on the Main Control Panel Voltmeter. This meter should read 456-504 VAC, 60 HZ (380-420 VAC, 50 HZ). **In no event should the operational voltage read below 456 VAC or above 504 VAC.**
6. Ensure "Safety OK" Indicator Light is lit up. If it is not lit up, the Safety Circuit is open. See "Safety OK Indicator Light" in the "Main Control Panel Layout" section of appropriate Reinke System Owners Manual.
7. Turn System Power Switch to the "ON" position.
8. Turn Water Supply Switch to the "ON" position if you desire to run water with the System. Turn Water Supply Switch to the "OFF" position if you do not desire to run water with the System.
9. If your System is equipped with an optional Low Pressure Shut Down, turn the Pressure Override Switch to the "BYPASS" position.
10. If your system is equipped with the optional Auto-Stop Cam Plate Option, it may be necessary to turn the Park Override Switch to the "BYPASS" position until the System moves off the Auto-Stop Ramp. See "Cam Plate Switches" section in appropriate System Owners Manual.
11. If your System is equipped with the optional Low Temperature (Frost) Shutdown kit, turn the switch to the "BYPASS" position if you desire to move the System without pumping water through it at temperatures below 45°F. Turn the switch to the "AUTO" position for normal operation. This will ensure the System will shut down if the temperature falls below the temperature set on the Frost Control Board on the Back Plate of the Main Control Panel. **In no case should the System be operated with water in potential icing conditions.**
12. Set ATC Timer to desired speed. See Speed Chart in Main Control Panel or "Speed Chart" Section in appropriate Reinke System Owners Manual.
13. Turn Direction Switch to desired direction. "FORWARD" = Clockwise and "REVERSE" = Counterclockwise.
14. Push Start Button and hold for three (3) seconds or less. You should hear the magnetic Contactor engage (snap) and the System should start. If not, recheck this procedure to make sure you have followed it correctly. Release the button. If another snap is heard, a Malfunction is indicated. See "Start Button" in the "Main Control Panel Layout" section of appropriate Reinke System Owners Manual. **Do not hold the Start Button in for more than three (3) seconds as this will override the safety circuits.**
15. If your System is equipped with an optional Low Pressure Shut Down, turn the Pressure Override Switch to "AUTO."
16. If your System utilizes an optional Generator Switch to control a Combustion Engine Driven Well or Generator, turn the Generator Switch to "RUN."
17. If your System is interlinked with a Chemigation Pump or other auxiliary device, turn the Chemigation/Auxiliary Switch to "ON."
18. If your System is equipped with an optional End Gun, turn the End Gun Switch to "RUN" if you desire to operate the End Gun. Turn the switch to "STOP" if you do not desire to operate the End Gun.
19. If your system is equipped with the optional Auto-Stop Cam Plate Option, and you desire to park the System, set Auto-Stop Ramp to desired location and turn Park Override Switch to the "AUTO" position. See "Cam Plate Switches" section in appropriate System Owners Manual.

Reinke P/N 11884

Operating instructions and the operator's manual can be found on the inner door of the panel.

⚠️ DANGER / PELIGRO

480 VOLTS / 480 VOLTIOS

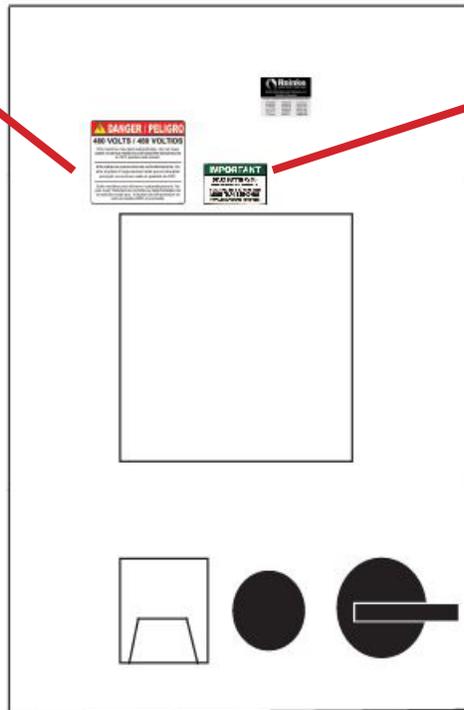
This machine may start automatically. Do not open panel or service machine until machine disconnect is in OFF position and locked.

Esta máquina puede arrancar automáticamente. No abrir el panel ó haga servicio hasta que el interruptor principal -en el panel- esté en posición de OFF.

Cette machine peut démarrer automatiquement. Ne pas ouvrir l'armoire de contrôle ou faire l'entretien de la machine avant que le bouton de déconnexion ne soit en position OFF et verrouillé.

IMPORTANT

START BUTTON OVERRIDES SAFETY CIRCUIT HOLDING BUTTON IN FOR MORE THAN 3 SECONDS COULD DAMAGE SYSTEM

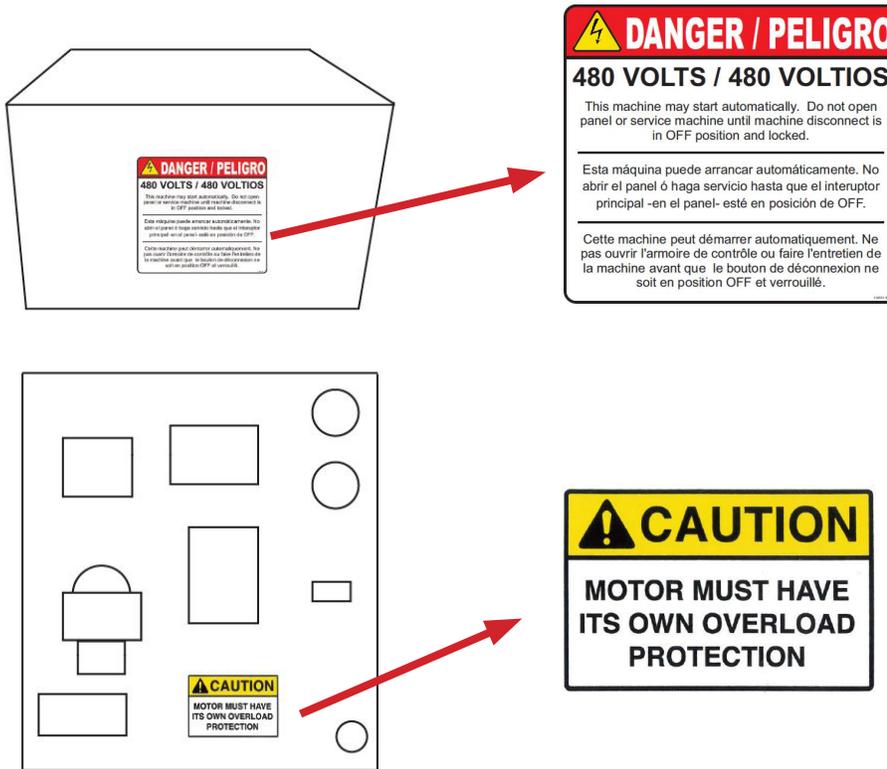


This caution label is found on the bottom of the panel.

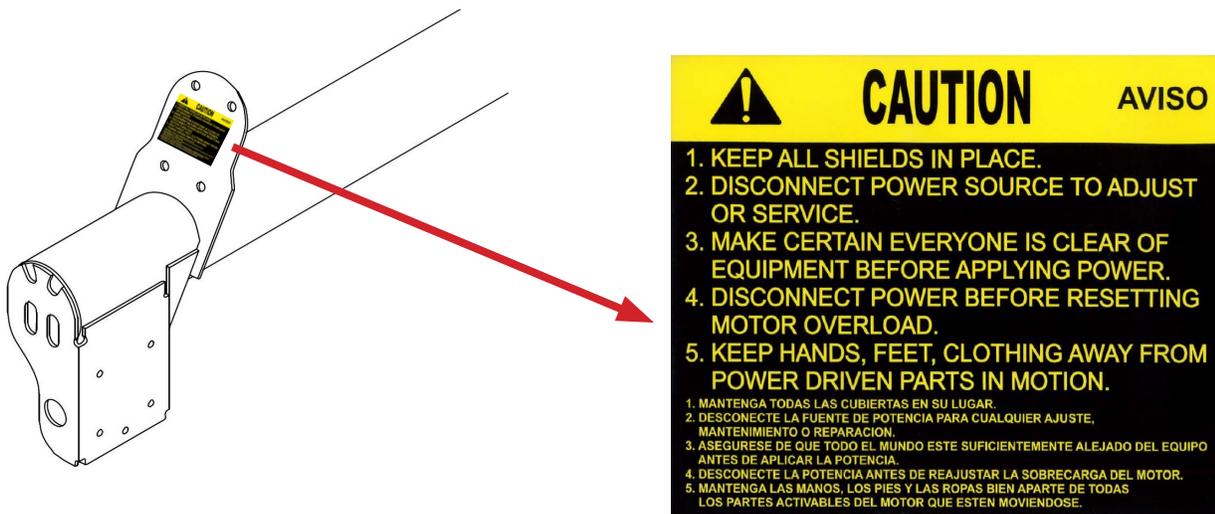
⚠️ CAUTION

IRRIGATION MACHINES AND EQUIPMENT MUST HAVE FOUR WIRES FROM THE LOAD SIDE OF THE POWER SOURCE TO THIS DISCONNECT. (GENERATORS INCLUDED)
ARTICLE 675 AND 250-61 --- NATIONAL ELECTRICAL CODE

Tower Box



Tower Base



MAIN SCREEN

System Status

System Status displays the current status of the system: stopped, running, direction of movement, running wet, running chemical, end gun, and park position.

System Status Color Codes

- Blue = System Moving Wet
- Green = System Moving Dry
- Dark Green = System Moving w/Chemicals
- Red Blinking Line on Location = Safety Shutdown

Note: On a VRI controlled pivot is shown in this diagram and only the very center circle will show the system status (green in this instance). On a non-VRI system, the diagram will show one solid color for the full pivot diagram.



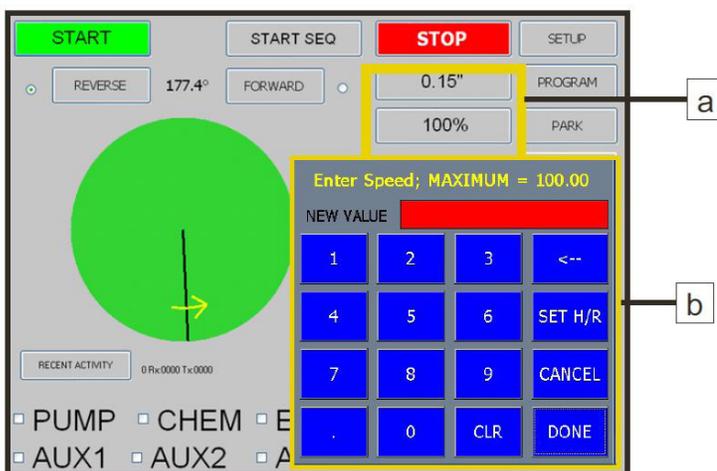
Speed Control

Depth: Select the amount of water to apply in inches.

Speed: Select the speed to run the system as a percentage, 100% being full speed.

Note: A "+" sign next to the percentage indicates when the end tower is moving, and the percent timer output is energized.

- a. Pressing the DEPTH button will open the keypad, allowing the application rate in inches to be entered.
- Note: The SET H/R button will not be shown.*
- b. The SET H/R button will only be shown if the percentage button is selected. It is used to set the desired hours per revolution for application and it will automatically set the application rate/speed.



Start and Stop Control Buttons

a. Use the START button to start the system moving in the forward or reverse direction. Use the STOP button to stop the system at any time. If there is a start sequence setup, the START SEQ button can be used to start the system using that sequence.

Forward and Reverse

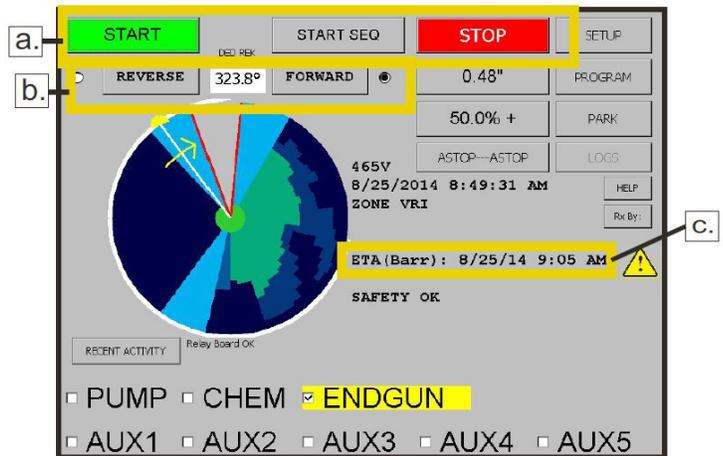
b. Use the FORWARD button to select the forward direction. Use the REVERSE button to select the reverse direction. When switching directions, there will be a seven second delay before the system will start in the new direction.

The position indicator located between the FORWARD and REVERSE buttons has several functions. It can show GPS signal, resolver signal, position sensor, number of satellites, whether or not you have WAAS, dead reckoning, or to tell you when something is wrong. When something is wrong, the background color will change from white to yellow.

Note: GPS users, system will enter forced dead reckoning after five minutes if no GPS signal is found.

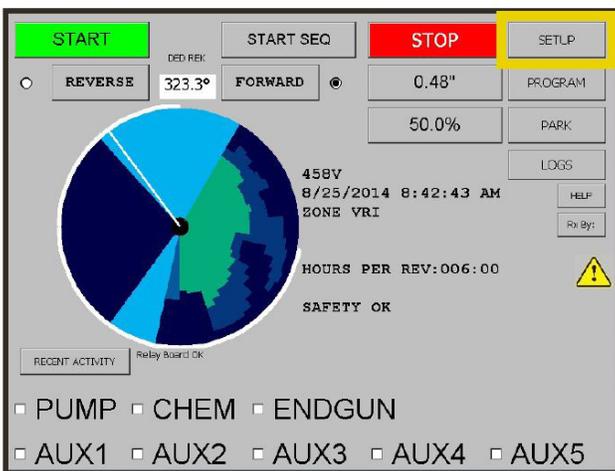
ETA (Barr)

c. This displays estimated time of arrival to the barrier or park position, whichever is closer to the current position, or it will show “hours per revolution” if there are no barrier or park positions programmed.



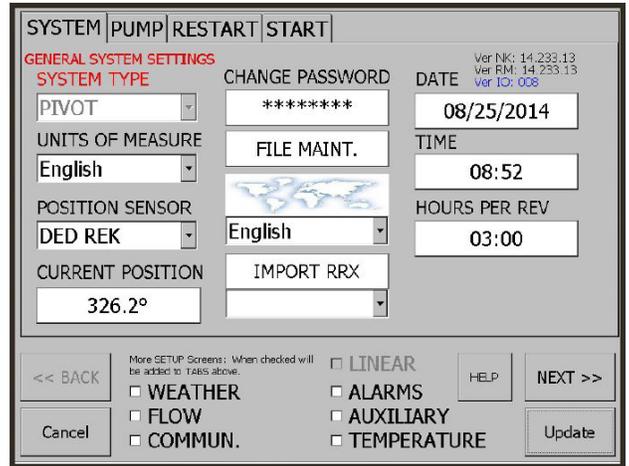
SETUP Button

Pressing the SETUP button as shown below will take you to the setup screen. If the system is running, you will only be allowed to view the current setup. To change the system setup, you must first stop the system.



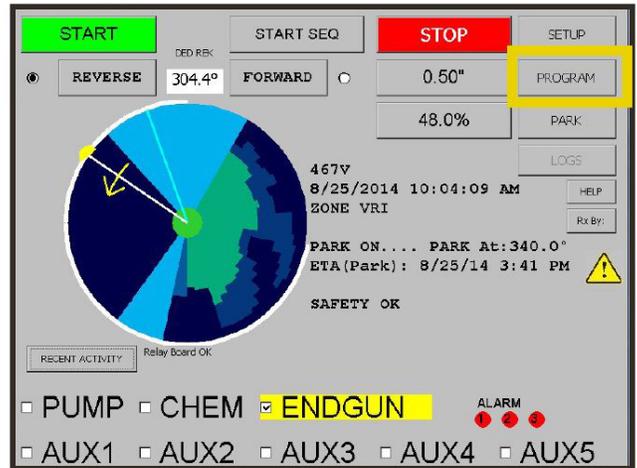
SETUP Screen

More detail about setting up the system can be found in a later section of this manual. See Setup on pages 19-31.



PROGRAM Button

Pressing the PROGRAM button will take you to the program screen as shown here.



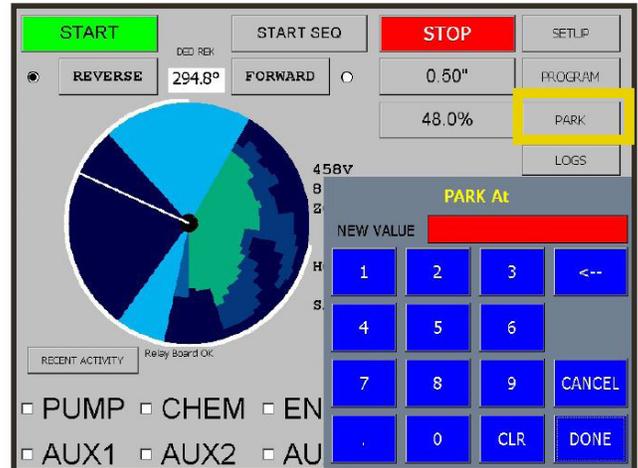
PROGRAM Screen

More detail about programming the system can be found in a later section of this manual. See Programming Options on pages 32-39.



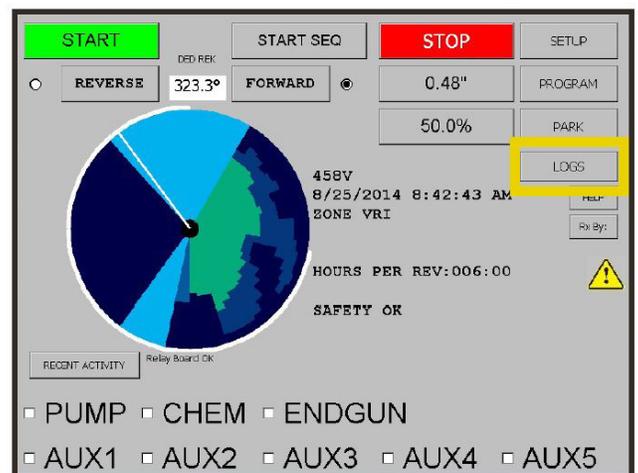
PARK Button

Pressing the PARK button will open a keypad as shown here, so you can enter the position in which the system should park. If there is already a park position entered, pressing the park button again will turn off the park position.



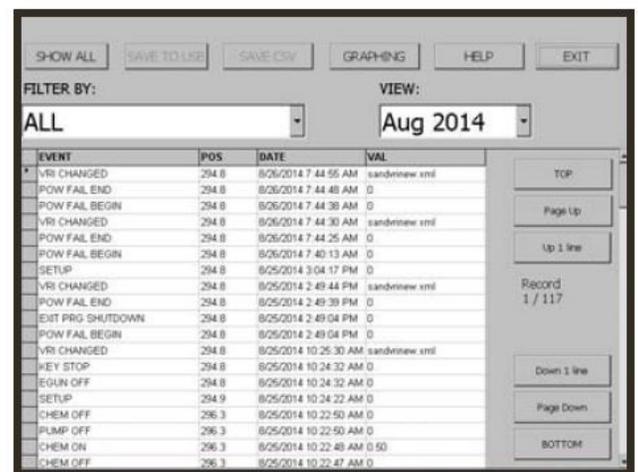
LOGS Button

Press the LOGS button to access the data that has been logged by the system. An example of the LOGS screen is shown below and on the next page. This button is only active when the system is stopped.



Logs Table and Graphs

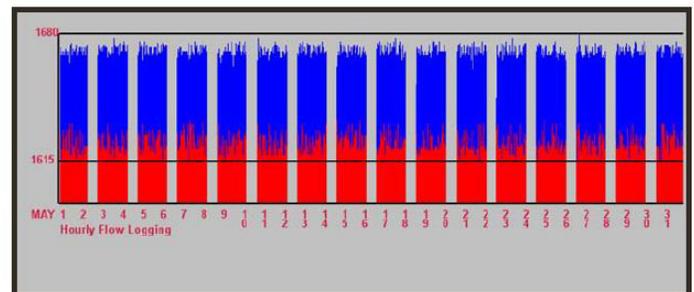
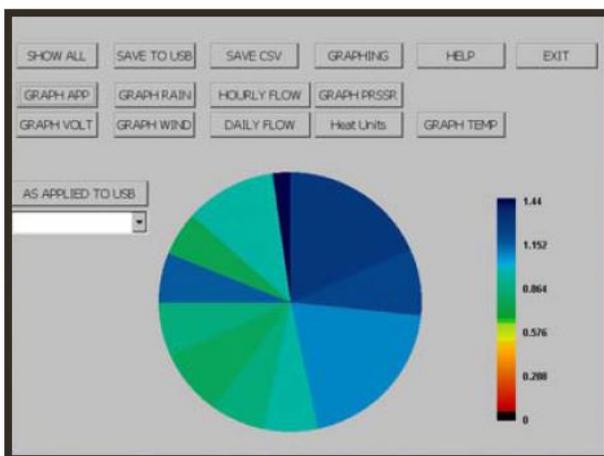
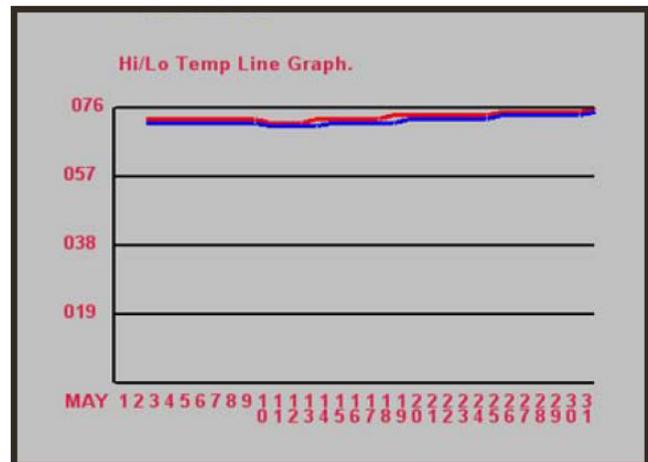
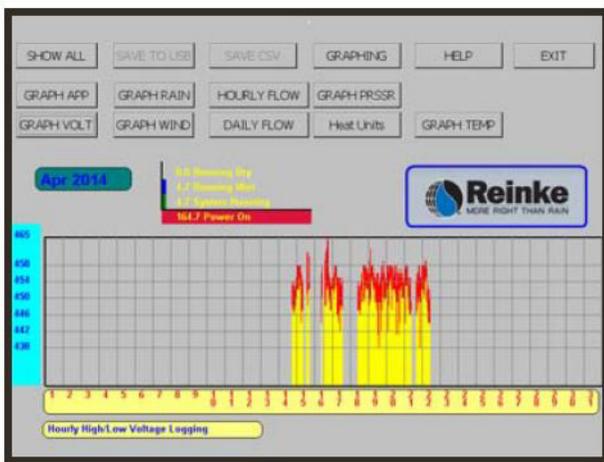
The logs table shows a spreadsheet of the data that has been logged by the system. The table can be filtered using the “Filter By” pull down menu. The data is displayed in the table by month. The month displayed can be changed by using the “View” pull down menu.

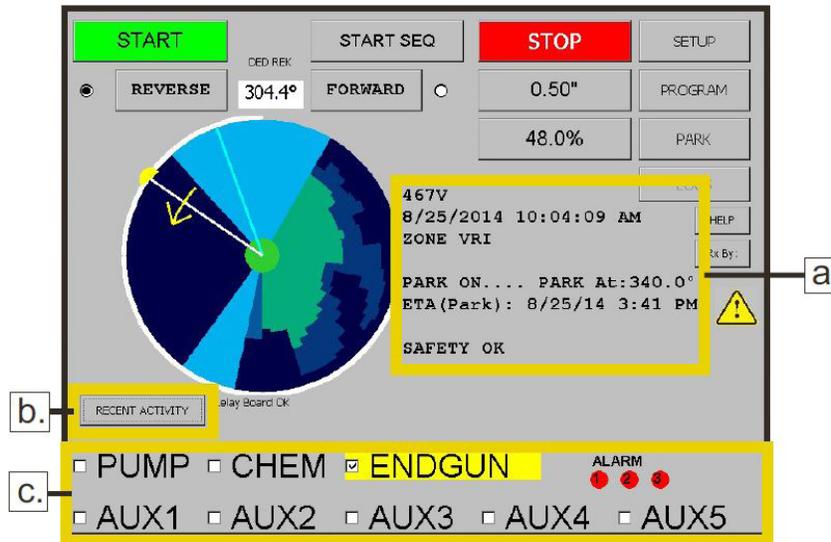


The SAVE TO USB button saves the logs to a USB flash drive. Note that each month needs to be saved individually. For example, if June and July data are required to be saved, then first select June from the drop-down menu, then save to USB. Next, select July and then save to USB.

The GRAPHING button shows graphs of the data collected (shown below). Use the buttons located at the top of the “Graphing Screen” to navigate through the available graphs. Similar to the logs screen, each graph only displays one month at a time. In order to save multiple graphs, each month must be individually selected and saved. Graphs are saved in the bitmap (.bmp) format.

Note: To use the heat units function and graph, a temperature sensor must be installed on the system.





Information Center

a. Different information will be displayed in this area, pertaining to the status and operation of the system.

Recent Activity

b. Pressing the RECENT ACTIVITY button will display the most recent actions of the system.

RECENT ACTIVITY		
POW FAIL END	294.8	8/26/2014 7:44:25 AM
POW FAIL BEGIN	294.8	8/26/2014 7:40:13 AM
POW FAIL END	294.8	8/25/2014 2:49:39 PM
POW FAIL BEGIN	294.8	8/25/2014 2:49:04 PM
EXIT PRG SHUTDOWN	294.8	8/25/2014 2:49:04 PM
KEY STOP	294.0	8/25/2014 10:24:32 AM
SETUP	294.9	8/25/2014 10:24:22 AM
PUMP OFF	296.3	8/25/2014 10:22:50 AM
PUMP ON	296.3	8/25/2014 10:22:47 AM
PUMP OFF	296.4	8/25/2014 10:22:44 AM
KEY START	296.4	8/25/2014 10:22:40 AM
PUMP ON	296.4	8/25/2014 10:22:39 AM
SETUP	296.4	8/25/2014 10:12:48 AM
PUMP OFF	296.4	8/25/2014 10:12:47 AM
KEY STOP	296.4	8/25/2014 10:12:46 AM
SETUP	302.5	8/25/2014 10:06:19 AM
PUMP ON	303.3	8/25/2014 10:05:23 AM
PUMP OFF	304.6	8/25/2014 10:03:56 AM
PUMP ON	304.9	8/25/2014 10:03:38 AM
KEY START	304.9	8/25/2014 10:03:35 AM
SETUP	304.9	8/25/2014 10:02:42 AM

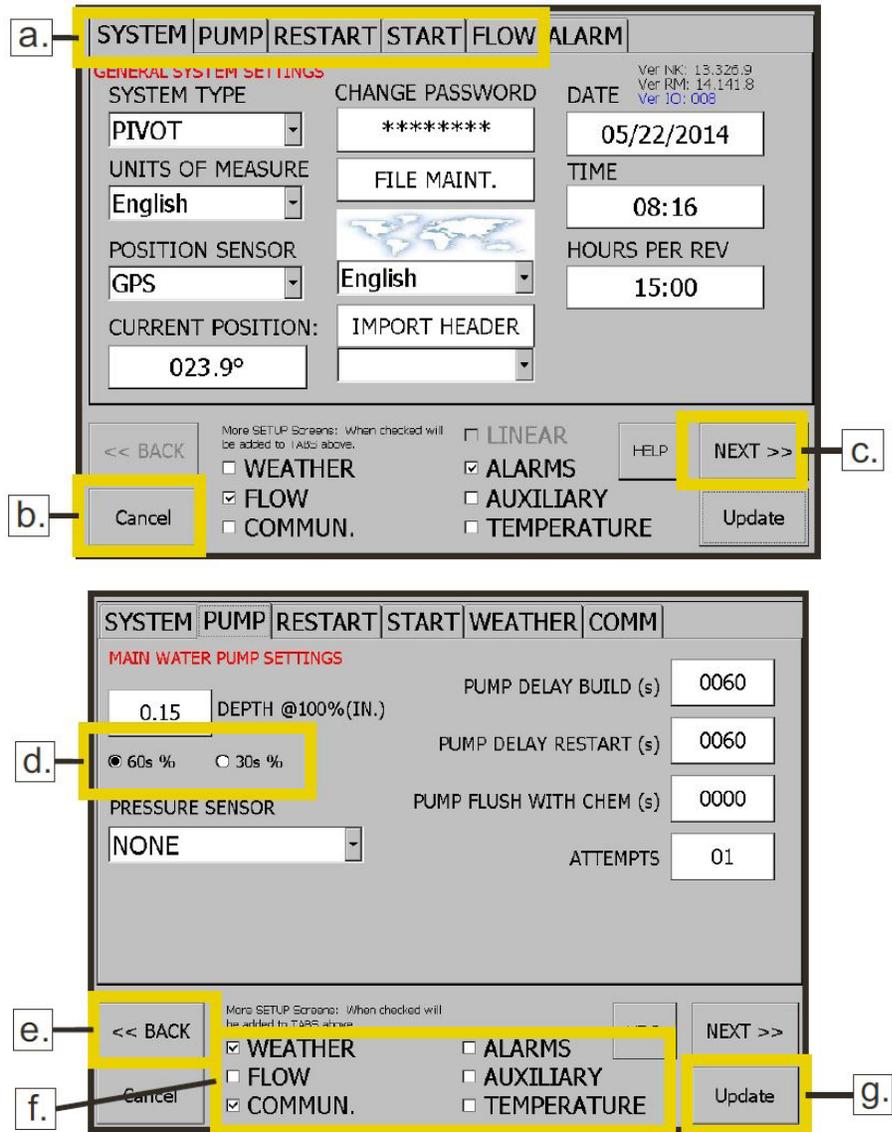
DONE

Output Control Buttons

c. Checking any of these boxes allows the user to manually control the output of the systems pump, chemical, end gun, and all auxiliaries. Clicking the output turns them on and off. If the option is on, then it will be highlighted and a check will appear in the box next to the option as shown above.

SCREEN - NAVIGATION

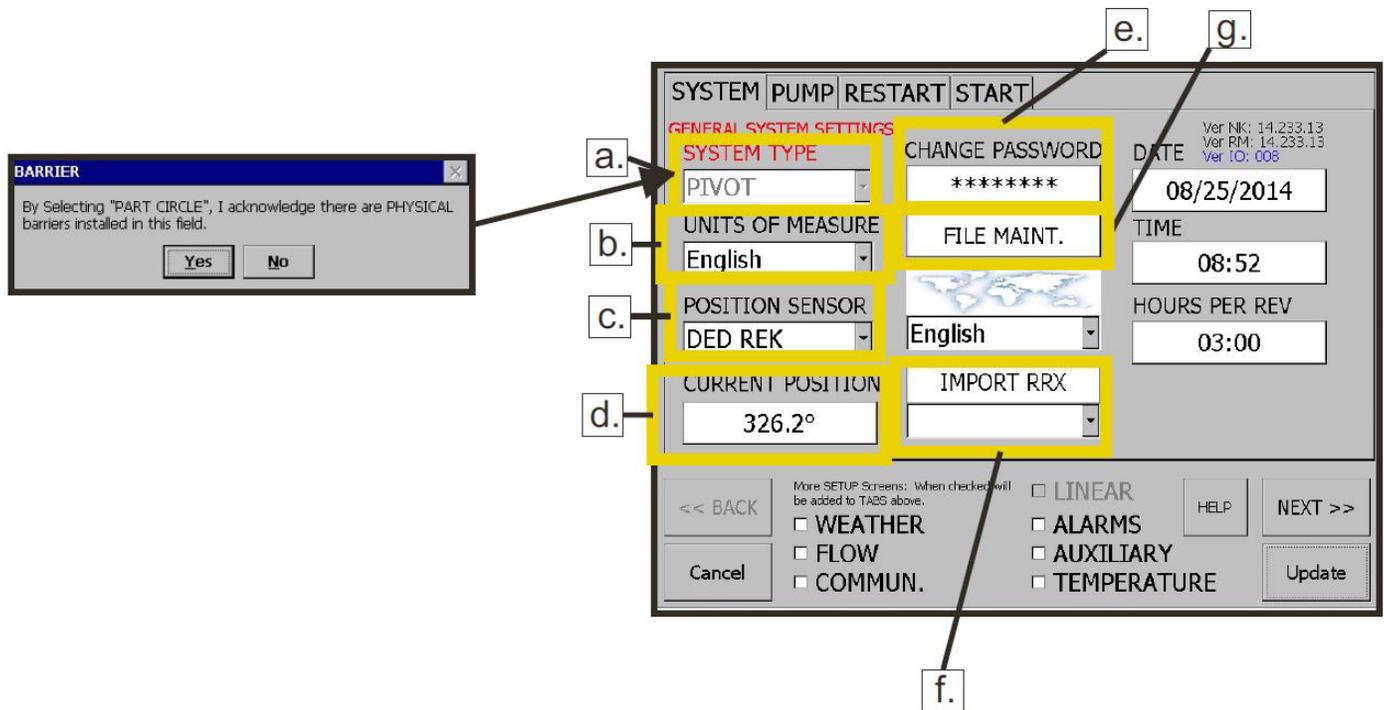
System Setup



- a. **Setup Tabs:** The tabs at the top of the screen are used to easily navigate through the different setup screens.
- b. **Cancel Button:** The CANCEL button exits to the main screen without saving any settings that have been changed.
- c. **Next Button:** The NEXT button scrolls forward through the tab pages.
- d. **Percent Timer:** The 30sec and 60sec radial buttons allow the operator to set the “Base Percent Timer” cycle.
- e. **Back Button:** The BACK button is used to scroll backward through the tab pages.
- f. **Check Boxes for Options:** The check boxes add additional options to the system setup.
- g. **Update Button:** The UPDATE button saves all settings and exits to the main screen.

SYSTEM SETUP

General System Settings



a. System Type: The “System Type” drop-down menu allows the selection of pivot, linear, or part circle or pivoting lateral. If pivoting/lateral is selected, also select the linear checkbox. Part circle allows the user to set a barrier down to 1° from 5°. Use extreme caution when selecting this option. The operator must select “yes” on the barrier pop-up to use this option. See page 35 for barrier programming.

b. Units of Measure: The “Units of Measure” drop-down menu allows the selection of English or metric measurements. In metric, the date on any screen will appear as day/month/year instead of month/day/year. Also, length measurements will be in meters, and depths in mm.

c. Position Sensor: This option will not appear with pivoting lateral selected. The “Position Sensor” drop-down menu allows the selection of GPS, resolver, or dead reckoning.

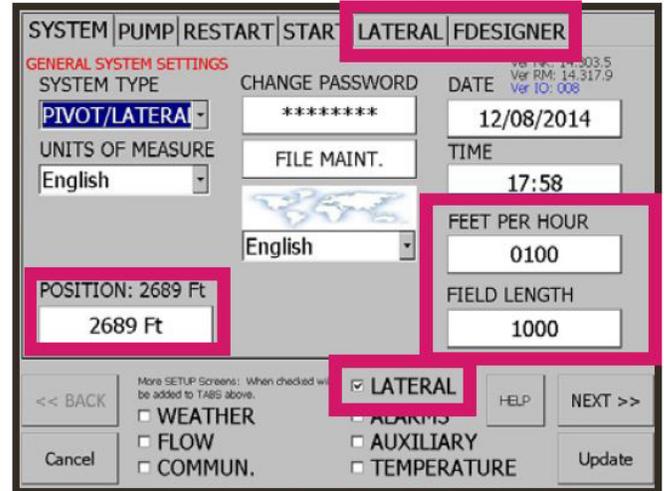
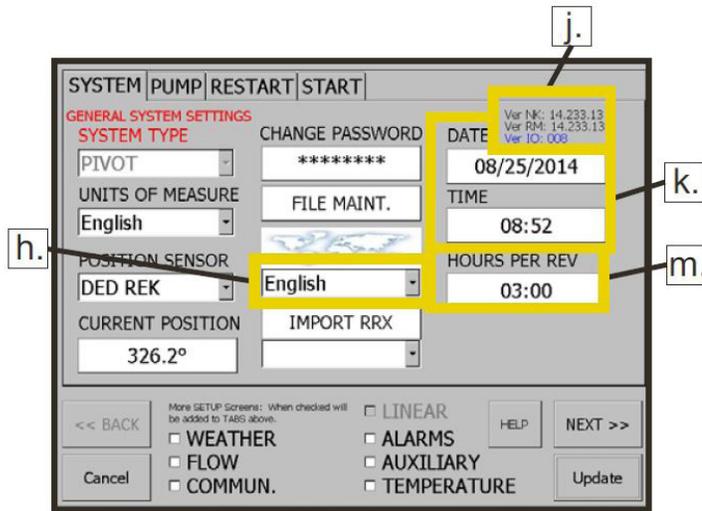
d. Current Position: Set after field design is complete for pivoting/lateral. “Current Position” shows the current position of the system.

e. Change Password: The “Change Password” field is used to password protect the setup from other users. To disable this function, set the password to “0” (zero).

f. Import RRx: This option is not used for the pivoting/lateral system. It allows the selection of an RRx that is located on the “root” of the USB drive for downloading.

g. File Maintenance: By pressing the FILE MAINTENANCE button, the file maintenance screen will appear (shown on page 21).

Pivoting/Lateral Systems



h. Language Drop-Down Menu: Select local languages here. Supported languages/fonts are English, Spanish, Russian, Simplified Chinese, and Hungarian. Please note that all buttons and logs will be re-labeled in the selected language.

j. Version Indicator: Shows all software versions currently running on the Touch Screen.

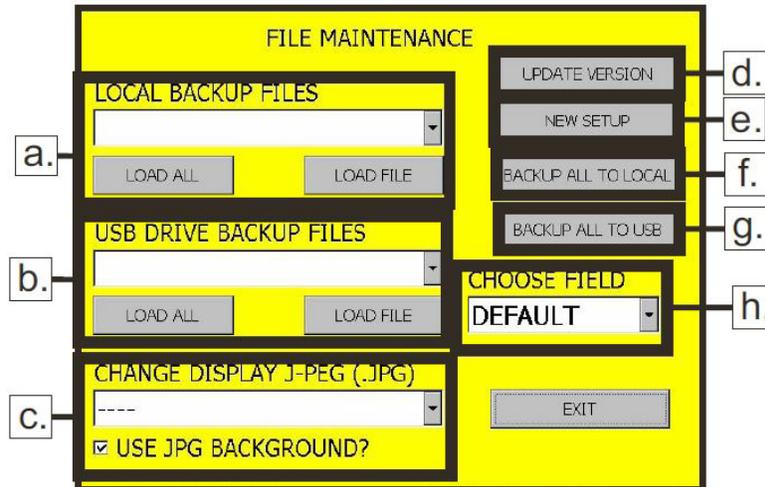
k. Date and Time: The “Date” is entered by month/day/year. The “Time” is entered in a 24hr format. For example, 1:00pm would be entered as 13:00.

m. Hours Per Revolution: This option will change for pivoting/lateral depending upon what stage is currently selected. It is the time it takes the system to travel a full circle at 100% using hours and minutes. Refer to the chart located inside the main control panel, or as shown below, for this value. Keep in mind that it makes no difference that the system is only moving 270°, the time entered is based on 360°.

n. Pivoting/Lateral Systems Only: Pivoting/lateral machines have different options than standard pivot, lateral move, or part circle. See highlights in pink above.

Note: Some options will no longer be visible. All setup and programming will be completed under LATERAL or FDESIGNER tabs.

		Reinke Manufacturing Co. Inc. 101 Reinke Road P.O. Box 166 Deshler, Nebraska 68340 USA (402) 365-7251 www.reinke.com				
System Serial No:	REINKE SAC	Ext./Ret. Design Flowrate (gpm):	400	System Length (ft):	897.6	
Owner's Name:	REINKE CUSTOMER	System Press. (psi):	31.0	Dist. To H-Tower (ft.):	628.3	
End (H) Tower Tire Size:	11.2x24	(H) Center Drive Spd:	40:1	(H) Speed @ 100% (fpm)	9.38	
SAC (S) Tower Tire Size:	18.4x26	(S) Center Drive Gear Ratio:	25:1	(S) Speed @ 100% (fpm):	19.48	
SAC % Timer Setting:	25%	SAC Options:	E.S.P.	End Gun Model No:	SR100	100.4 (ft.)
Min. Transition Flowrate (gpm):	287.5	Max. Transition Flowrate (gpm):	510.3			
Water Application Depth (in):	0.218	0.49	0.75	0.99	1.28	1.45
Percent Timer Setting 60 Hz.:	100%	44%	29%	22%	17%	15%
Application Duration (hr : min):	11:49	26:52	40:46	53:44	69:33	78:49
End Gun Trip Adjustment:	1/4 inch at the cam wheel is equivalent to 15 feet at the end of the system.					



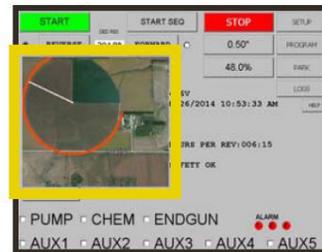
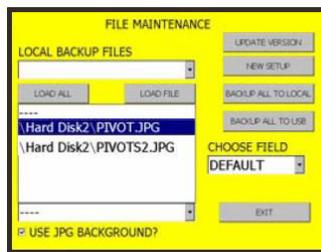
Note: In “File Maintenance”, unless a USB drive is inserted into the control panel, only local hard drive buttons will be available to save or backup files to.

a. Local Backup Files: Backs up current setup and programs to the system hard drive.

1. Load All: Reloads all setup and programs on the system hard drive.
2. Load File: Select and load a file from the system hard drive.

b. USB Drive Backup Files: After a USB drive is inserted in the panel, the USB buttons will appear and will function like the system buttons, except the information will be saved/loaded or to/from the USB instead of the system hard drive.

c. Change Display J-PEG (.JPG): Press the box to check the use jpg background, using the drop-down menu to select a background for the main screen. Note: The pixel size of the .jpg must be 320 x 320 to fit.

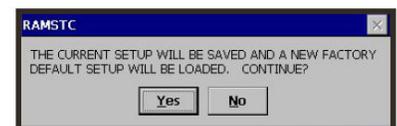


d. Update Version: The software may be updated by using the USB jump drive with a current NK.BIN file loaded to the jump drive by the dealer, then pressing the UPDATE VERSION button. Further instruction can be found on page 48 of this manual.

e. New Setup: Pressing the NEW SETUP button will bring up a pop-up to save the current setup and to reset the system to the default option.

f. Backup All to Local: Backup all current setups and programs to the hard drive.

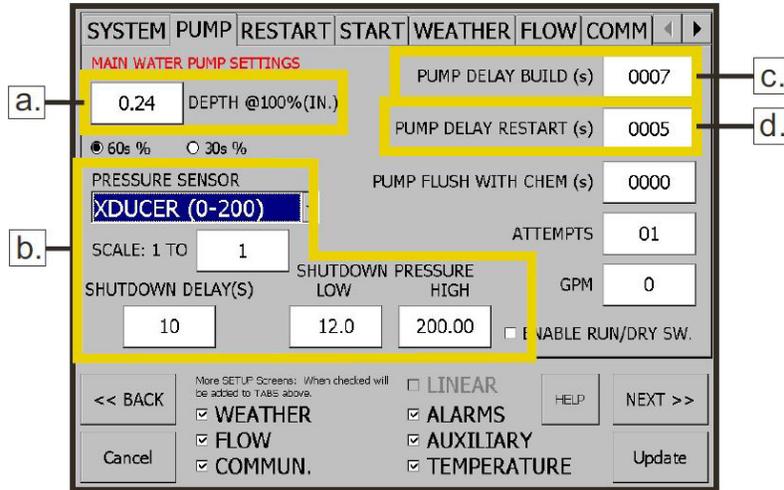
g. Backup All to USB: Backup current setups and programs to the USB jump drive.



h. Choose Field: Allows for five separate field setups and programs to be stored at the same time, reducing field to field moving time.

PUMP SETUP

Main Water Pump Settings



a. Depth @ 100%(IN.): For “Depth”, enter the depth of water applied by the system while running at 100%. Again, see the system chart in the panel or shown below.

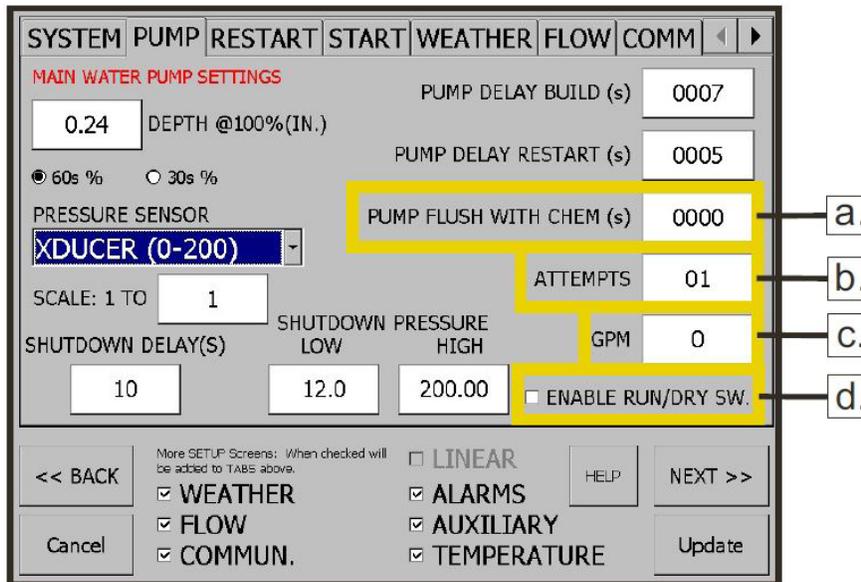
b. Pressure Sensor: On the “Pressure Sensor” drop-down menu, select the pressure device installed: None, Switch, Transducer (0-200), Transducer (0-25), or EOS Transducer (0-200). If the switch is selected, only the scale and shutdown delay will be shown.

- A. “Scale” controls input voltage. For instance, a 1 to 2 scale would make 5V into 10V.
- B. In “Shutdown Delay”, enter the time in seconds to delay a pressure shutdown in order to reduce nuisance shutdowns. If the system suddenly loses pressure and goes below the set pressure, this time will allow the system to continue to run for the set time, allowing the pressure to rebuild.
- C. “Shutdown Pressure” should be set according to the type of pressure transducer selected.

c. Pump Delay Build: In “Pump Delay Build”, enter the number of seconds to allow the pump to operate, to build up pressure. When the pump is started or restarted by automatic restart, the pump will be allowed to operate for this amount of time in seconds to build up pressure. The computer will then check to see if the pressure is above the minimum water pressure before it will start or restart the system.

d. Pump Delay Restart: “Pump Delay Restart” is entered in seconds, so if the pressure switch does not close, or the pressure transducer does not reach minimum pressure during the pressure build-up delay, the pump will shut down and wait. This allows the well time to settle before allowing the pump to be restarted.

REINKE SAC		Ext/Ret. Design Flowrate (gpm)		System Length (ft)		
System Serial No:	REINKE SAC	400	31.0	597.6	629.3	
Owner's Name:	REINKE CUSTOMER	System Press. (psi):	31.0	Dist. To H-Tower (ft.):	629.3	
End (H) Tower Tire Size:	11.2x24	(H) Center Drive Spd:	40:1	(H) Speed @ 100% (fpm)	9.38	
SAC (S) Tower Tire Size:	18.4x28	(S) Center Drive Gear Ratio:	25:1	(S) Speed @ 100% (fpm)	19.48	
SAC Linear Setting:	26%	SAC Options:	E.S.P.	End Gun Model No:	SR100 100.4 (ft.)	
Min. Transition Flowrate (gpm):	297.5	Max. Transition Flowrate (gpm):	810.3			
Water Application Depth (in.):	0.218	0.49	0.75	0.99	1.28	1.45
Percent Timer Setting 60 Hz.:	100%	44%	29%	22%	17%	15%
Application Duration (hr : min):	11:49	26:52	40:46	53:44	69:33	78:49
End Gun Trip Adjustment:	1/4 inch at the cam wheel is equivalent to 15 feet at the end of the system.					



a. Pump Flush with Chem(s): When adding chemicals, enter the number of seconds for the water pump to continue running in order to flush the chemical out of the system once the system is stopped.

b. Attempts: “Attempts” enter the number of times the pump will be allowed to try to restart using the “Pump Delay Build” and “Pump Delay Restart”. *Note: If all attempts fail, the pump and system will be shut down.*

c. GPM: Enter the rate in gallons per minute for the pump being used.

d. Enable Run/Dry Switch: Check this box to add a RUN/DRY button to the main screen. This will allow the pump to run and ignore the pressure switch or transducer. *Note: This is only used to run dry when the pump and generator are on the same power unit. This is controlled by the RUN/DRY option button on the main screen that appears only when this box is checked.*

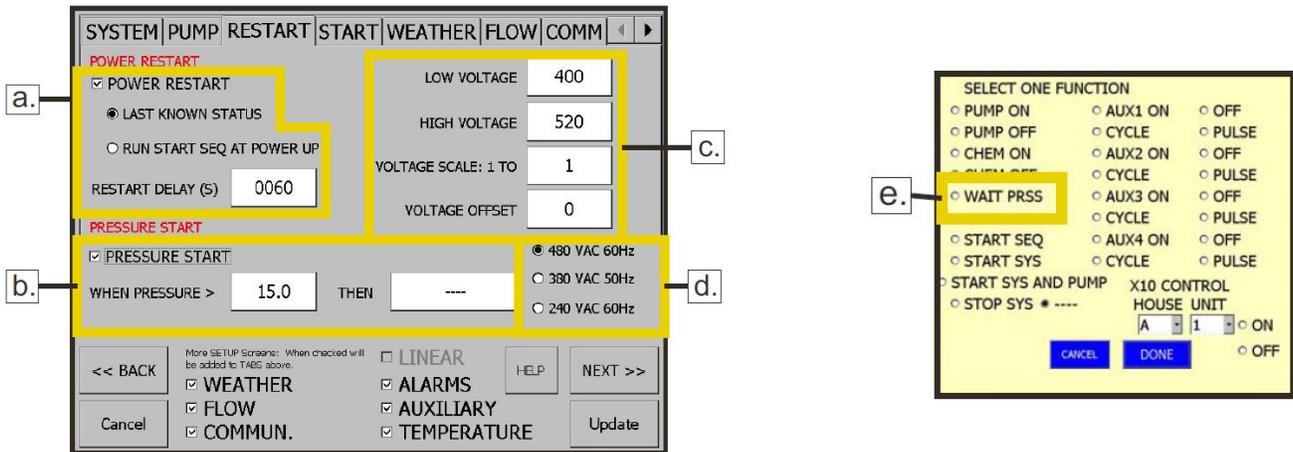
RESTART SETUP

Power / Pressure Restart Settings



Warning

If power restart is checked, it is possible for the system to restart on its own if the main power supply is in the ON position. If auto-restart is not desired, make sure to shut the main power supply OFF.



a. Power Restart: Check the “Power Restart” box if you want the system to automatically restart once an acceptable voltage is re-obtained.

A. With “Last Known Status”, the system will restart to its last known status.

B. “Run Start Seq at Power Up” *Note: After seven days of no activity, this will no longer work and will have to be re-selected (see start tab).*

C. “Restart Delay” is entered in seconds for the length of time which the voltage must remain between the high and low set points before it will try to restart. Both the high and low set points need to be entered.

b. Pressure Start: Check “Pressure Start” to start the system once the pressure switch closes or the transducer reaches a safe value. If using the pressure transducer, enter the PSI at which the system can restart. Then select an option from the pop-up menu for the start-up procedure to follow. *Note: If using the pressure switch, the system will execute the selected function once the switch sees pressure.*

c. Voltage Settings: Low Voltage: Set this voltage to the minimum allowable voltage for normal system operation.

High Voltage: Set this voltage to the maximum allowable voltage for normal system operation.

Voltage Scale: Controls the input voltage. If voltage reads 470, but is actually 480, enter 1.02 to calibrate closer to the actual voltage on the system.

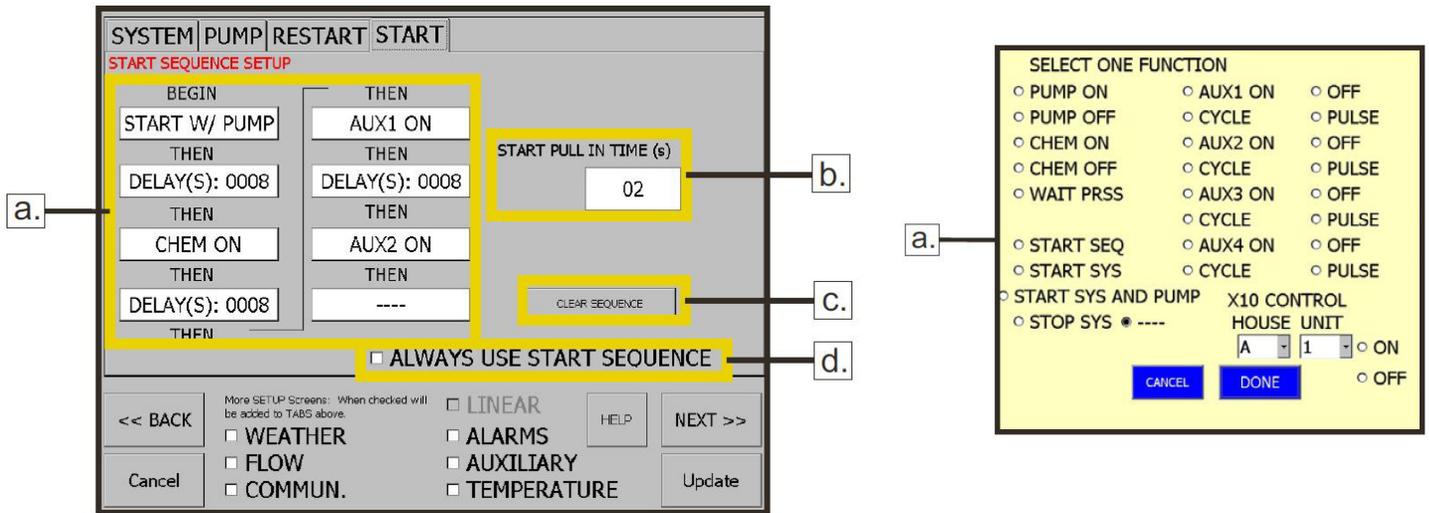
Voltage Offset: Enter either a negative or positive number to offset what the actual voltage coming in to what is shown.

d. Voltage Selection Radial Buttons: Select the voltage and frequency that best fits the available power supply. If you are unsure which is correct, please contact your dealer before changing this setting.

e. Wait Prss: If “Wait Prss” is selected for pressure start, the pump will remain energized all of the time and the pressure input will start/stop the system.

START SETUP

Start Sequence Set Up



a. Start Sequence Setup: Select all “Start Sequence Setup” commands, which the system should run upon start-up, from the pop-up menu.

b. Start Pull In Time: “Start Pull In Time” is the amount of time the computer will hold-in the forward or reverse contactor, overriding the limit circuit. The maximum value is 15 seconds, but 2 seconds is recommended for most systems.

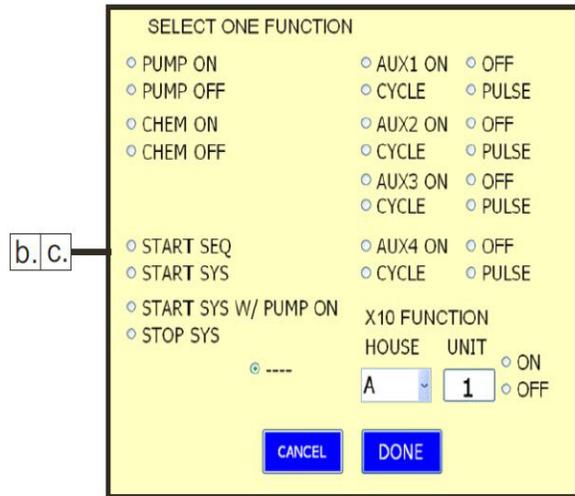
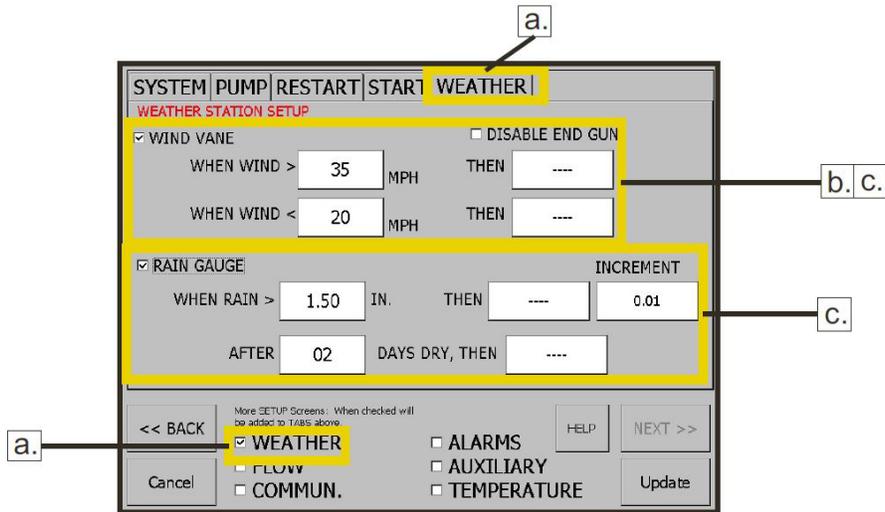
 **Warning** *Safety limit circuit will be overwritten during this time.*

c. Clear Sequence: Clear the current start sequence.

d. Always Use Start Sequence: Check the box for “Always Use Start Sequence” only if you want this sequence used every time the system starts. This disables the START SEQUENCE button on the main screen.

WEATHER SETUP

Weather Station Set Up



a. Weather Check Box: Check the box to enable the weather tab.

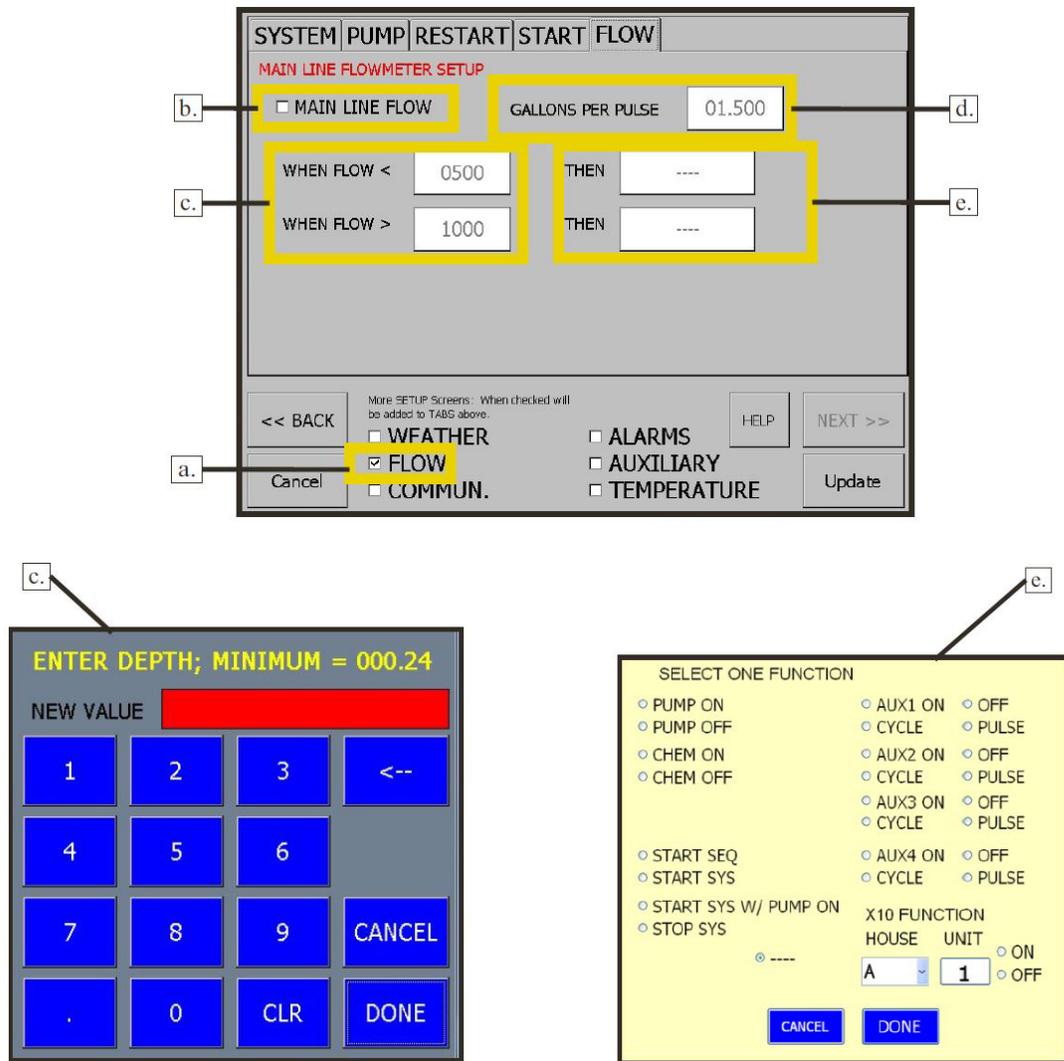
b. Wind Vane Check Box: Check the box to enable wind options. Select an operation from the pop-up menu for when the wind gets greater and less than the speeds entered. Select the “Disable End Gun” check box to turn the end gun off during high winds.

c. Rain Gauge Check Box: Check the box to enable the rain options. Select an operation to run from the pop-up menu when the amount of rain reaches the amount entered, then enter the hours of dry weather before the selected operation can run.

Note: The increment setting must be set by the dealer only during set-up and must be set according to the installed rain gauge for calibration.

FLOW SETUP

Main Line Flow Meter Settings



a. Flow Check Box: Check the “flow” box to enable the flow tab.

b. Main Line Flow: Put a check in the “Main Line Flow” box to turn on and use the flow meter if installed.

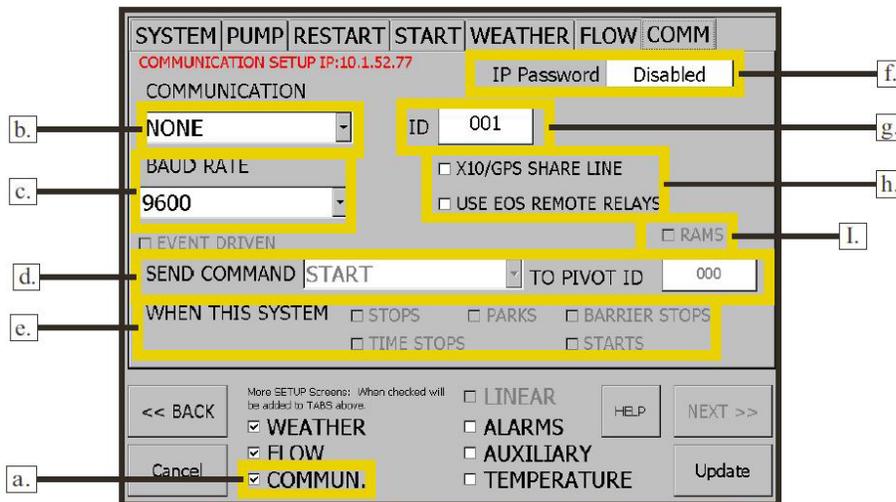
c. When Flow Settings: Enter the number of gallons per pulse for the flow meter that is installed. Enter the “Low” and “High” flow values.

d. Gallons per Pulse: This setting must be set by the dealer only during set-up and must be set according to the installed flow meter for calibration.

e. Then Function Settings: Select the system function for the set flow values from the pop-up menu.

COMM SETUP

Communication Settings



a. Commun.: Check the “Commun.” box to enable the communications or (COMM) tab.

b. Communication: Select the communication device that is installed from the drop-down menu:

1. None (allows no remote access)
2. Phone Link (option #350955 system ID must be set to 001)
3. Remote PC (to use this selection, the system must have the telemetry option installed, also requires software and radios provided by your local dealer)
4. Open Comm (allows communication between Touch Screen and another Reinke computer panel, via radio signal, to send start, start/pump, or stop commands to another system. Keep in mind, each system has to have a different ID# and if connecting to a RAMS panel, put a check in the RAMS box - see item d)

c. Baud Rate: Select the Baud Rate from the drop-down menu: 1200, 2400, 4800, 9600, or 19200 (9600 is the most standard). Ensure that each communication device is set to the same baud rate.

d. Send Command: Select a send command to send to the remote system, then enter the system number under pivot ID (this is only allowed when using open comm selection).

e. When this System: Select the operations that will trigger the local system to send a command to the remote system.

f. IP Password: Further unlocks remote access features. Contact your Reinke dealer for more information.

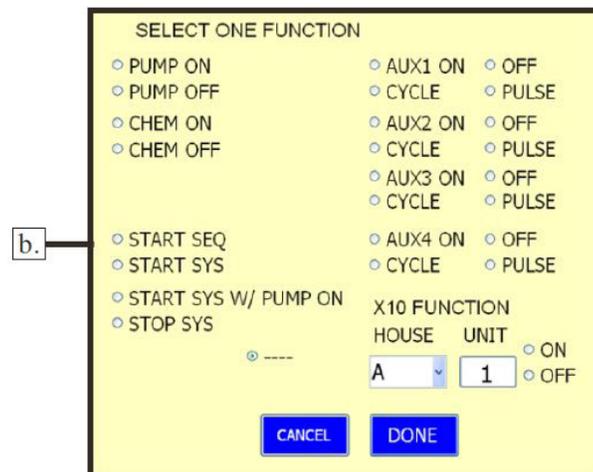
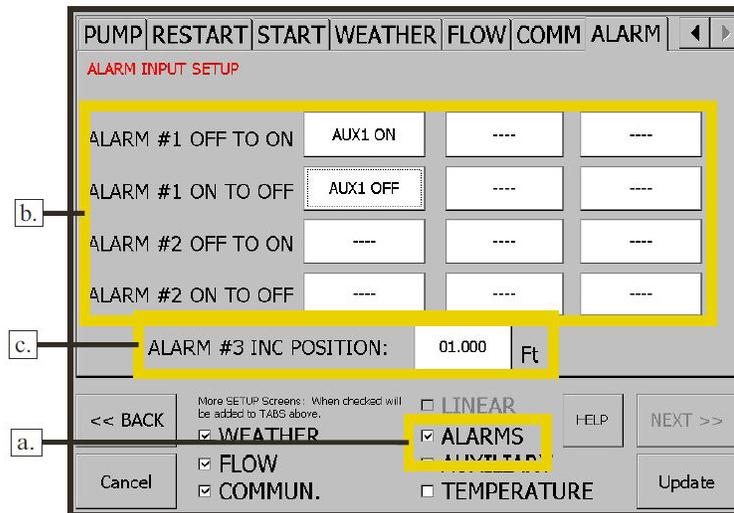
g. “ID”: Enter the local unique system ID here. The range available is 1-99.

h. x10/GPS or EOS Check Boxes: Check the x10/GPS box if using x10 relays and have the GPS and EOS working together. Check the EOS Remote box to use the GPS EOS relays. Required for zone VRI. This can be used as a substitute for x10 relays.

i. RAMS: Check the RAMS box if the remote system is a RAMS panel.

ALARM SETUP

Alarm Input Set Up



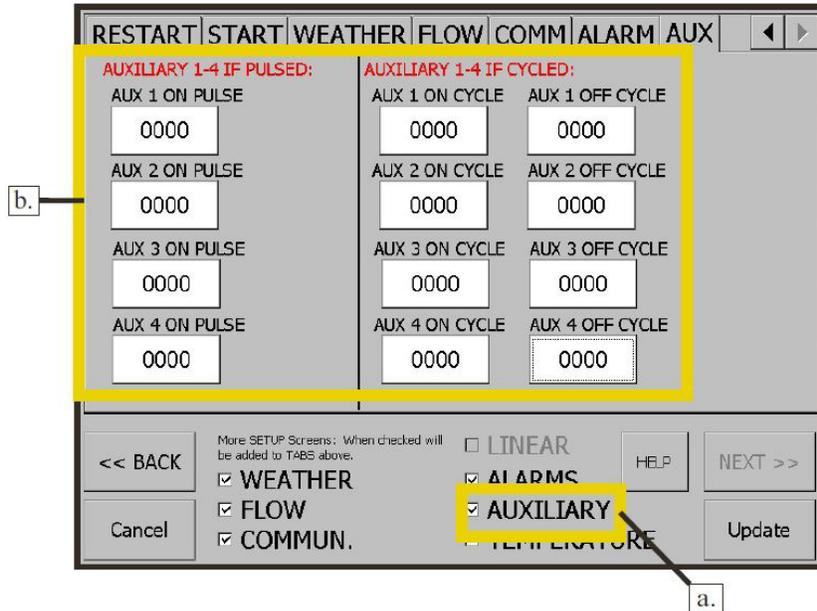
a. Alarms Check Box: Check the “Alarms” box to enable the alarms tab.

b. Alarms #1 and #2: Alarm #1 or #2 is a switched 120V device, such as a chemical mixer, diesel fuel tank, flow switch, or any other external input outside the irrigation system. For Alarm #1 or #2, select up to three functions from the pop-up menu for when they switch from OFF to ON. For example, when Alarm #1 switches from OFF to ON, AUX1 will turn on. Many different commands can be controlled by using alarms.

c. Alarm #3: The “Alarm #3 INC Position” alarm is only used on linear systems. Enter the number of feet the linear system should increment per pulse. This defaults to 1’ but is generally set using a wheel counter switch on a system wheel, and the distance that wheel travels in one rotation.

AUX SETUP

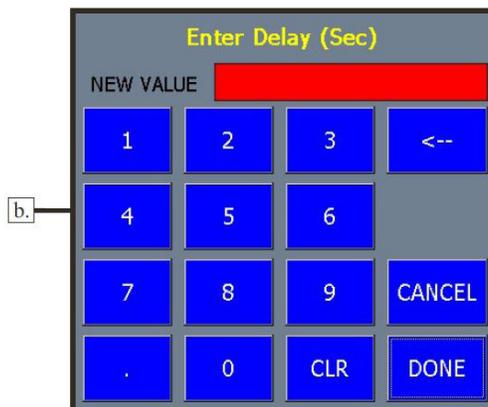
Auxiliary Output Set Up



a. Auxiliary Check Box: Check the “Auxiliary” box to enable the auxiliary tab.

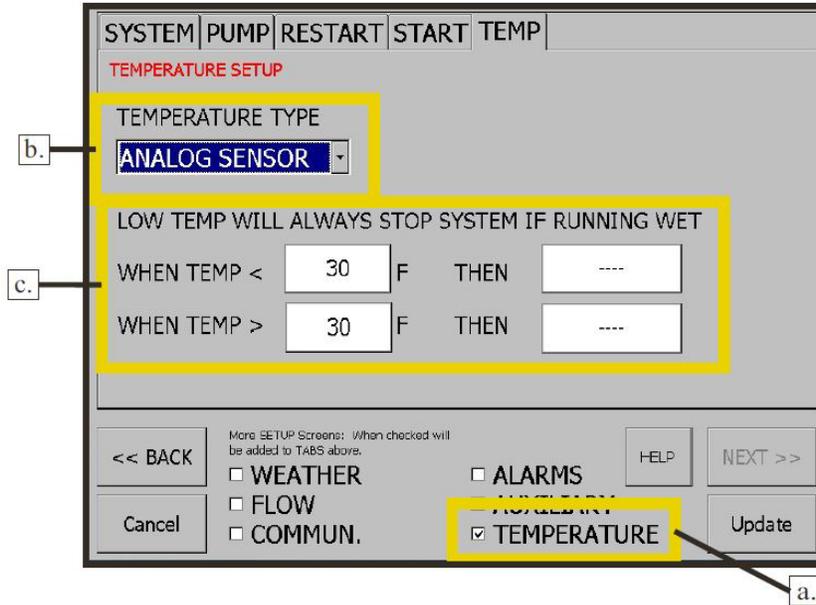
b. Auxiliary 1-4: For “Auxiliary 1-4 if Pulsed”, use the pop-up menu to enter the number of seconds the pulsed output should remain on. This is a one time pulse for duration specified only. For “Auxiliary 1-4 if Cycled”, use the pop-up menu to enter the time in seconds in which the output should remain both on and off. This is used for applications such as running an agitator in the chemicals as needed to keep them mixed for the application. *Note: This will cycle on and off until turned off.*

Note: This page is setup only. To use these functions, the operator must go to a program screen, start setup screen, or any screen that has the pop-up menu to turn these functions on.



TEMP SETUP

Temperature Set Up



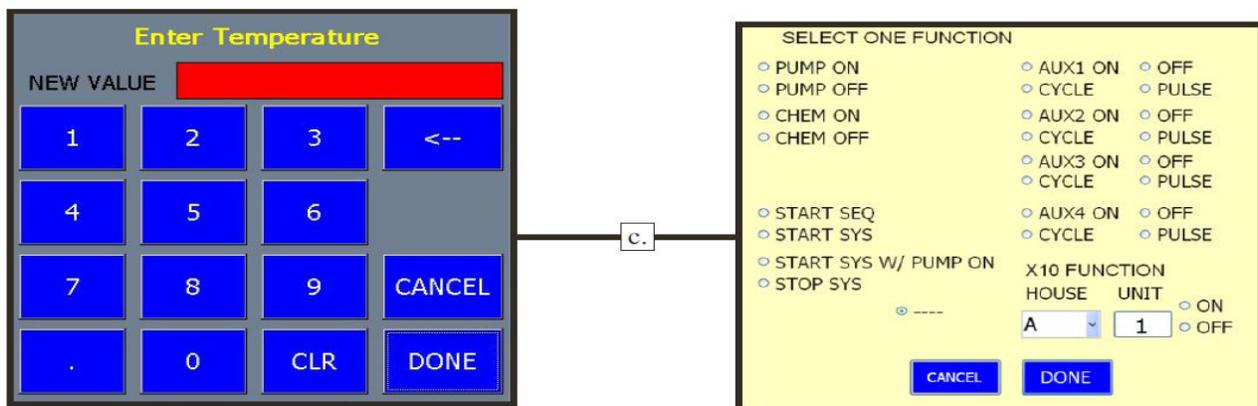
a. Temperature Check Box: Check the “Temperature” box to enable the temp tab.

b. Temperature Type: None: No temperature control is installed on the panel.

Analog: With the “Analog Sensor”, enter the low and high temperatures and then select the function from the pop-up menu to run when the set temps are met.

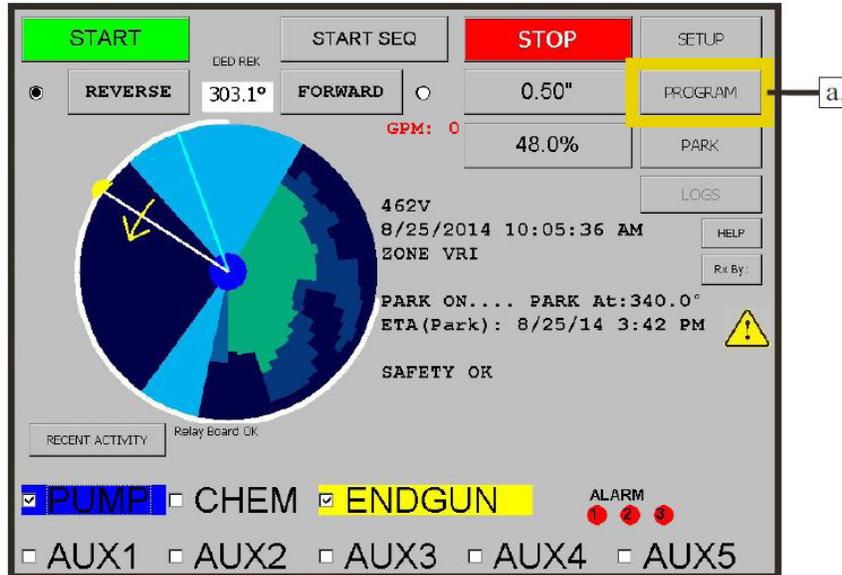
Note: The Temperature Switch is only used when retrofitting a RAMS panel with a Touch Screen and the RAMS had an existing Temperature Switch. The temperature is preset and the new switches are not available.

c. Low Temp: With the “Analog Sensor”, enter the low and high temperatures and then select the function from the pop-up menu to run when the set temps are met.



PROGRAMMING

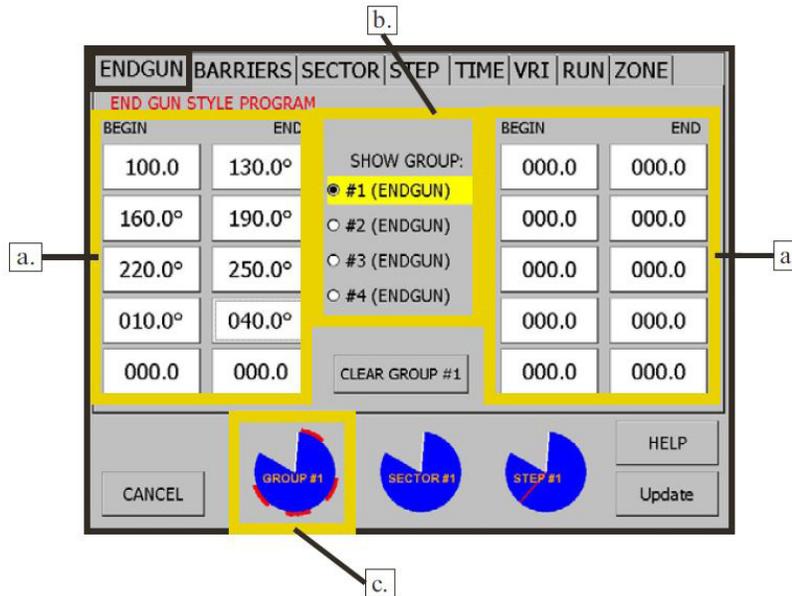
Programming



a. Program Button: From the main screen, select the program button to begin the programming of the system.

b. Programming Tabs: Tabs will bring up pages for programming the end gun, barriers, sector, step, time, VRI, run and zone functions.

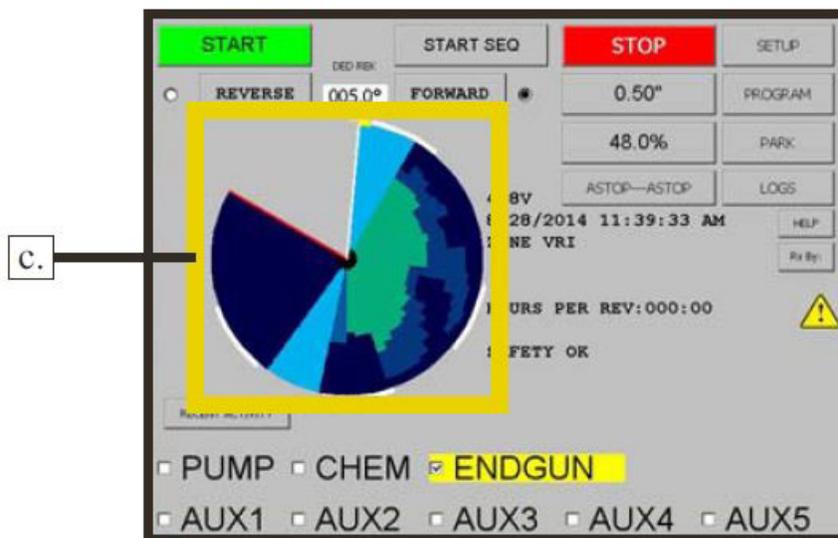
End Gun



a. Begin & End: Enter the begin and end positions for each area that the selected group should run. Each group can hold up to ten different sectors. Multiple groups can be ran simultaneously, allowing for up to forty positions to operate the end gun or another output.

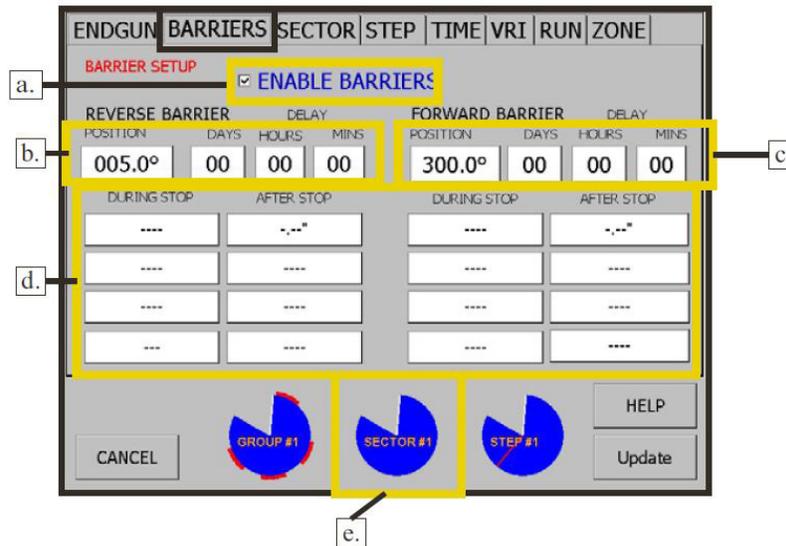
b. Show Group: Select the “End Gun” program group that you are wanting to change or add. There are four program groups available on the Touch Screen. Beside each group number is the output to which that group is tied to. The output type can be changed under the run tab.

c. Graphics for End Gun Settings: As positions are entered for the end gun, the graphic diagram below will show on the system main screen display. Also on the end gun page (above), the red lines on the graph at the bottom also show the end gun program or programs.



Warning *This page is only to program end guns. To enable the end guns to operate, go to the Run Tab and select the group number, sector program, or step program required.*

Barriers



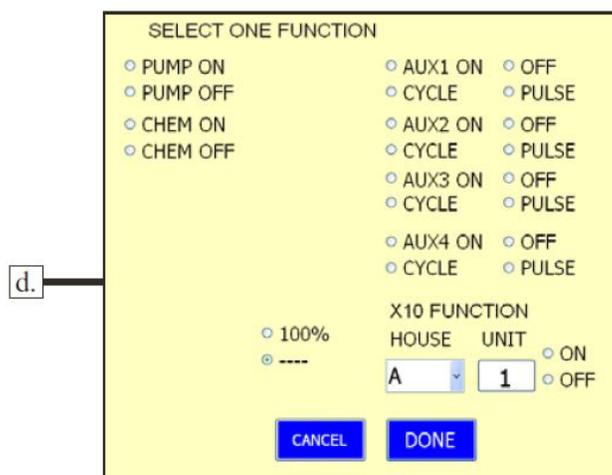
a. Enable Barriers Check Box: This box must be checked in order for the barriers to be present. The box can be unchecked to turn off the barriers without deleting the current barrier settings. *Note: 10° is the minimum distance allowed between barriers, unless “Part Circle” is selected from system type on the “System Set-up” screen. Selecting Part Circle will allow a 5° minimum between barriers.*

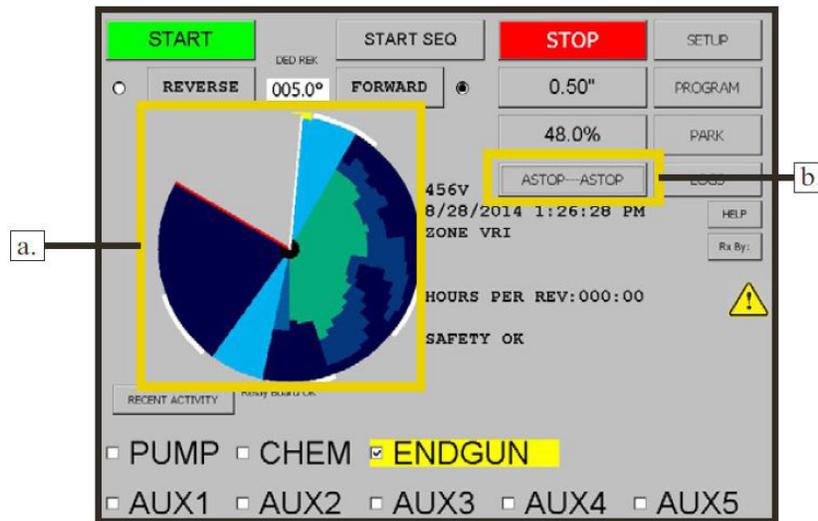
b. Reverse Barrier: “Reverse Barrier” position is entered here in degrees. Enter the amount of delay in days, hours, and minutes when the system reaches the reverse barrier.

c. Forward Barrier: “Forward Barrier” position is entered here in degrees. Enter the amount of delay in days, hours, and minutes when the system reaches the forward barrier.

d. Functions: Used with forward and reverse barriers during stop. Select the desired operations for the pivot once it reaches the barrier from the pop-up menu. Then select the desired operations from the pop-up menu for the pivot to run after the delay.

e. Pie Charts: The gray area of the pie charts at the bottom of the page will show the location of the entered barriers.





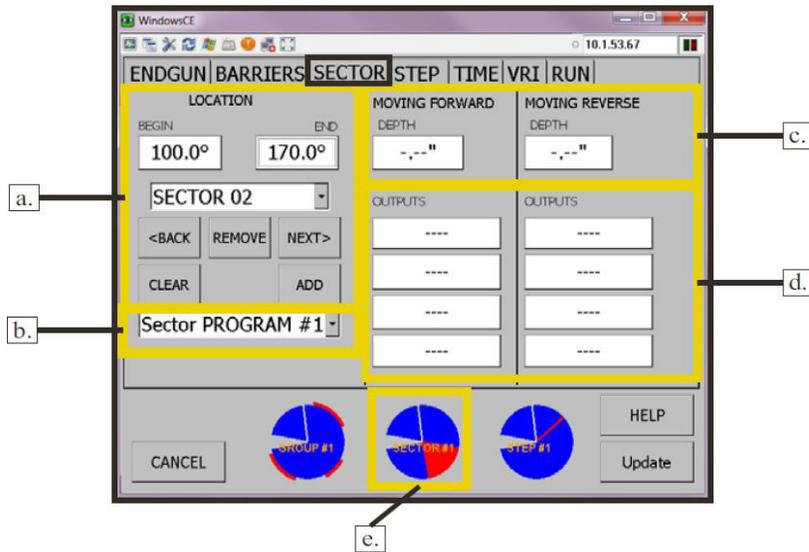
a. System Status Display: The system status display shows a pictorial display of the barrier location. A red barrier means the pivot will auto stop. A green barrier means the pivot will auto reverse. Both will occur at the barrier in the direction the system is moving.

b. Barrier Control Button: When looking at the main screen with barriers enabled, the BARRIER CONTROL button will display one of the following. Each time the button is pressed, it will toggle through each setting one at a time.

- ASTOP---ASTOP = Stops the system at the forward barrier limits and reverse barrier. Barrier lines shown on the screen will both be red.
- AREV---AREV = Auto reverse from forward to reverse or reverse to forward at barrier limits. Both barrier lines shown on the screen will be green.
- AREV---ASTOP = Auto reverse when system at reverse barrier and auto stop at forward barrier. Reverse barrier line will be green and forward barrier line will be red.
- ASTOP---AREV = Auto stop the system at reverse barrier and auto reverse at forward barrier. Reverse barrier line will be red and forward barrier line will be green.

 **Warning** *This button can be pushed and selection can be changed while the system is running or stopped. Please use caution.*

Sectors: Pivot Only



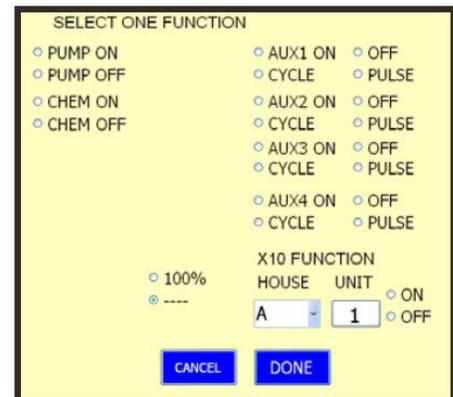
a. Location: To determine a sector of the field, enter the beginning and end points of the selected sector in degrees. In this example, sector 2 has been selected to run. Use the BACK and NEXT buttons to navigate through the sectors. To delete one sector from the program, select REMOVE. This will delete only that sector. To delete all sectors from a program, use the CLEAR button.

b. Sector Drop-Down: Select a sector program to set up. The system can hold up to three sector programs and each sector program can hold up to twenty-five sectors. Only one sector program can be run at a time.

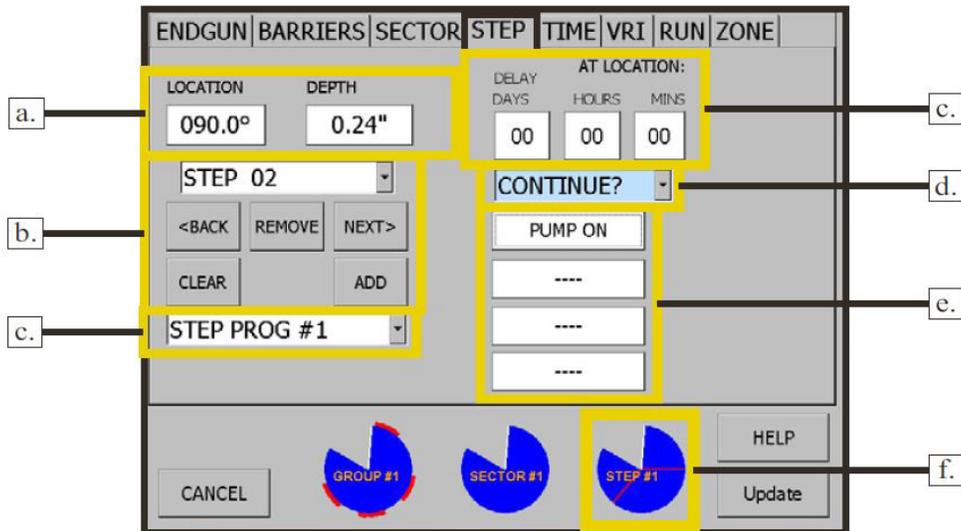
c. Moving Forward/Reverse Depth: Enter the depth in inches and functions from the pop-up menu that should run while moving in the forward or reverse direction respectively in the selected sector. See the pie chart to determine which sector is being programmed. For instance, if the sector shown needs an auxiliary pump to turn on, then you would set the depth (if needed) and select AUX1 on for either moving forward or moving reverse, or both, depending on the need.

d. Outputs: Use the pop-up menu to select what needs to happen in each selected sector (i.e. pump on, pump off, cycle, or pulse, etc.).

e. Pie Chart Graphic: As sectors are programmed, they will be highlighted in red at the bottom of the screen.



Step



a. Location and Depth: Enter the desired location of the selected step in degrees and enter the depth at which the pivot should run during the selected step.

b. Step Drop-Down: Select the step from the drop-down menu. If more steps are required, use the ADD button to add up to twenty-five steps per program. Buttons below the drop-down menu work the same as the sector buttons.

c. Step Program Drop-Down: Select the program number from the drop-down menu. Up to three programs can be saved, but only one program can be ran at a time.

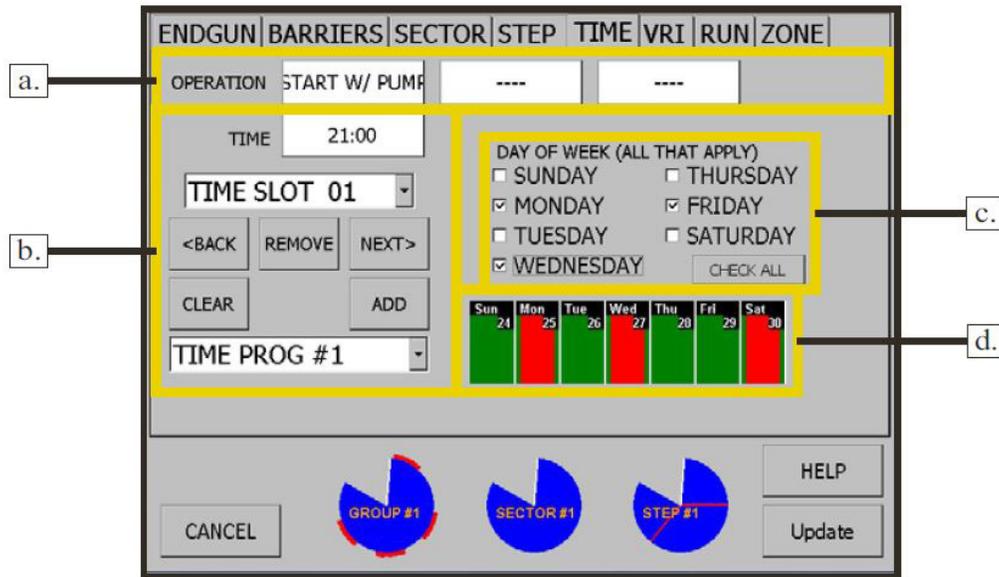
d. At Location: Enter the amount of delay, if any, when the pivot hits the location for the selected setup in days, hours, and minutes.

e. Action Drop-Down: Choose a function for when the system reaches the location for the selected step.

f. Function Pop-Up: Chose a function for when the system reaches the location for the selected step, from the pop-up menu.

g. Pie Chart: Each programmed step will be shown as a red line.

Time



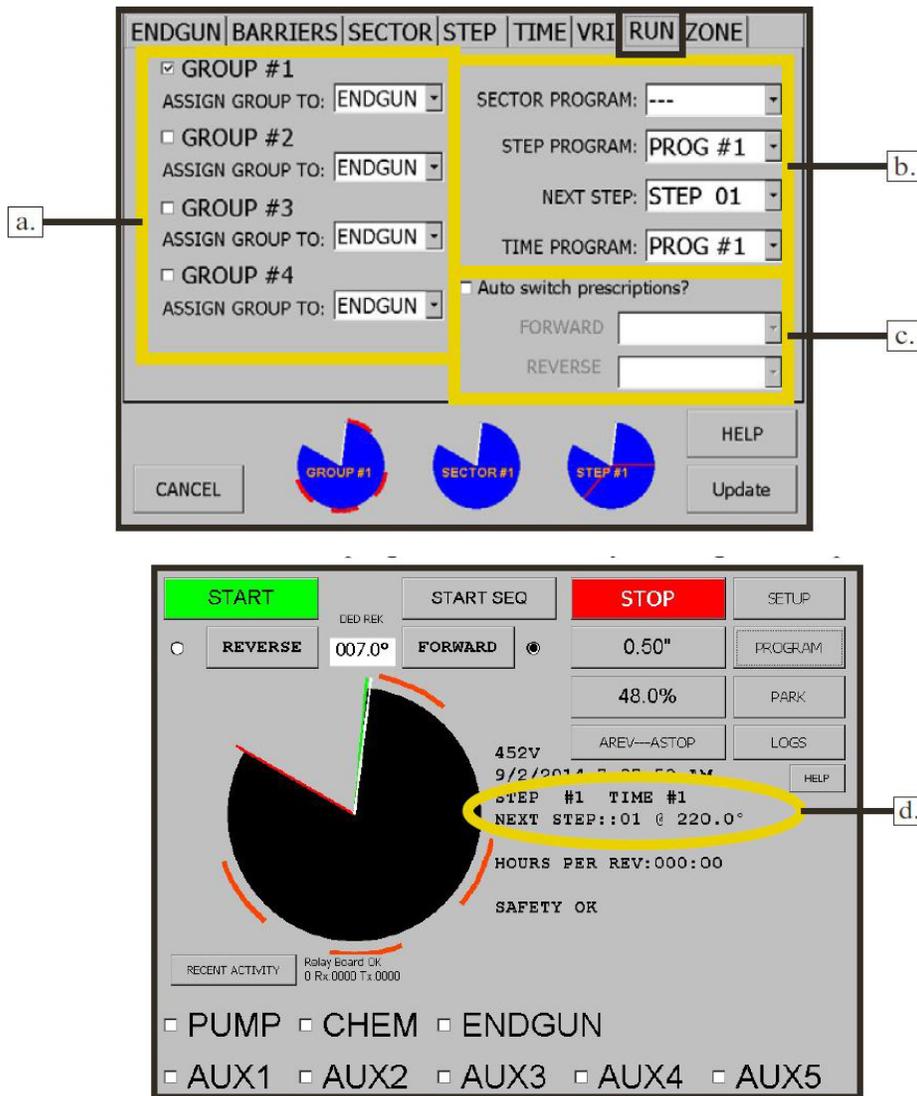
a. Operation: Select up to three operations from the pop-up screen for the system to run at the scheduled time entered.

b. Time Section: Select the time slot from the drop-down menu. Enter the time (in 24 hours time or military time) in which the selected time slot should start. Use the ADD button to add up to twenty-five time slots to a program. Select the time program from the drop-down menu. Up to three programs can be saved to the computer, but only one program can be ran at a given time.

c. Day of the Week: Select the days of the week that the selected time slot should run or select the CHECK ALL button to select every day.

d. Time Graphic: The program running and stopped times will be displayed graphically. Green is when the system is running and red is when the system is stopped.

Run



a. Group # and Assign Group To: For each group program, check the box next to the group that is to run. From the drop-down menu, choose the output to use with that group. Multiple groups can be run at the same time.

b. Program Types: Sector, Step, or Time: Select a “Sector Program” from the drop-down menu. Next, select a “Step Program” from the drop-down menu. If a “Step Program” is selected, choose the step that the pivot should start at. Last, select a “Time Program” from the drop-down menu. *Note: All of these are optional.*

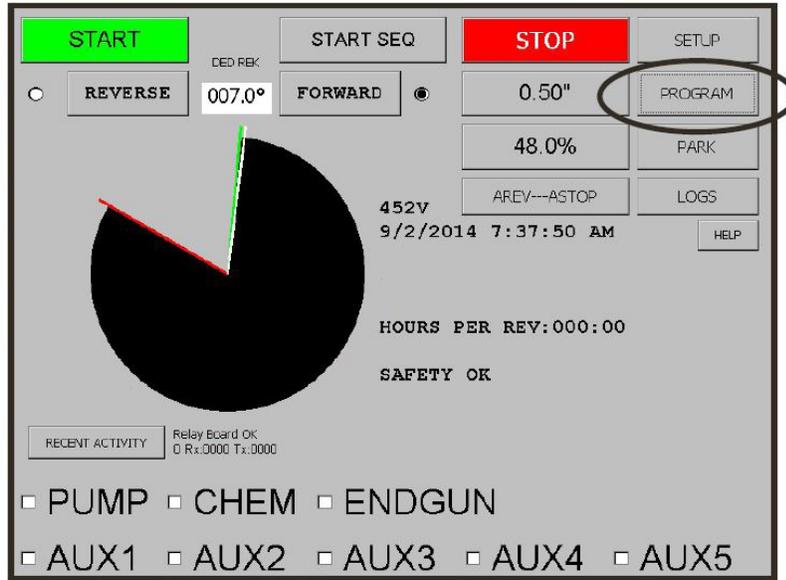
c. Auto Switch Prescriptions: This is a new option for VRI only, that allows the user to run a separate prescription in each direction. To use this function, check the “Auto Switch Prescription” box. Then select which prescription from the hard drive to run while the system is moving forward, and which should run when the system is running backward.

d. Main Screen: The main screen will show what programs are currently running and the position of the current step.

Congratulations on completing the programming of a Reinke Touch Screen System!!

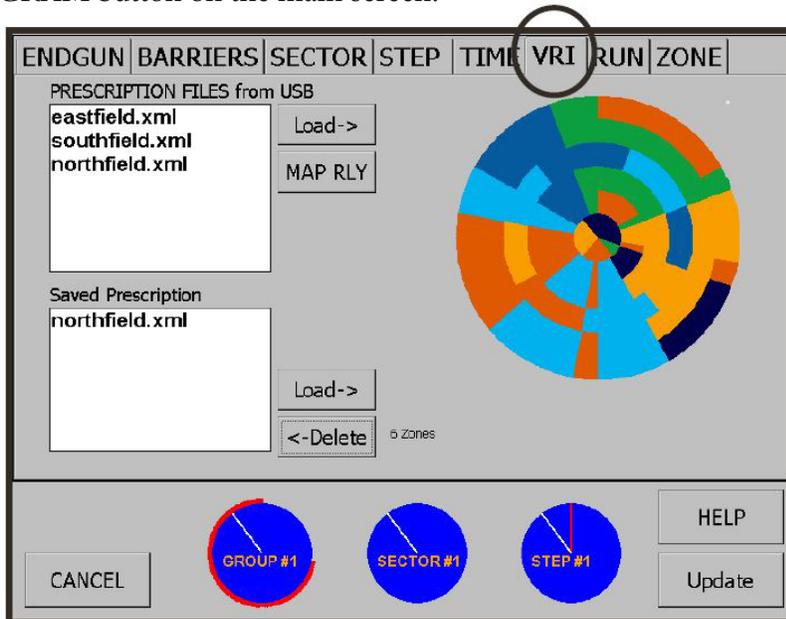
VRI INTERFACE *(Additional hardware required for "Zone" VRI)*

Getting Started with VRI



Step 1: Insert a thumb drive into the panel using the USB port.

Step 2: Press the PROGRAM button on the main screen.



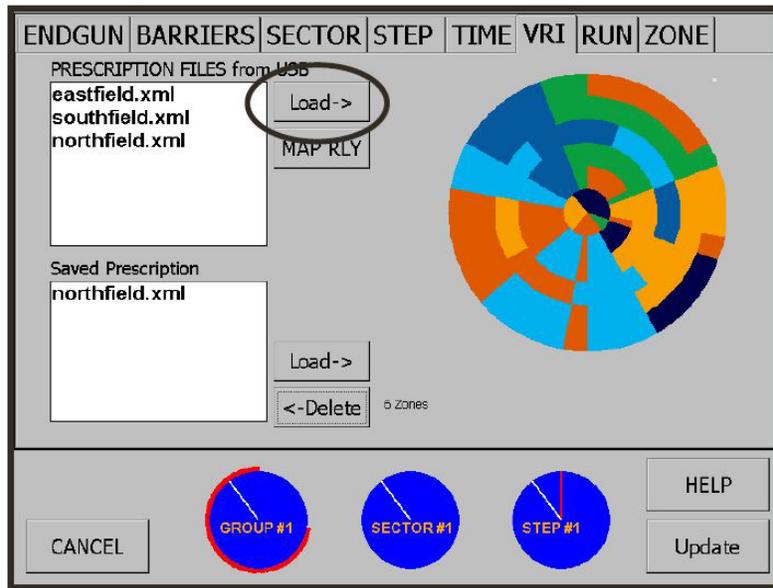
Step 3: Select the "VRI" tab at the top of the screen.

Step 4: A list of all prescriptions available on the thumb drive will appear under the "Prescription Files" window.

Step 5: If no box appears, that means you have no loaded prescriptions.

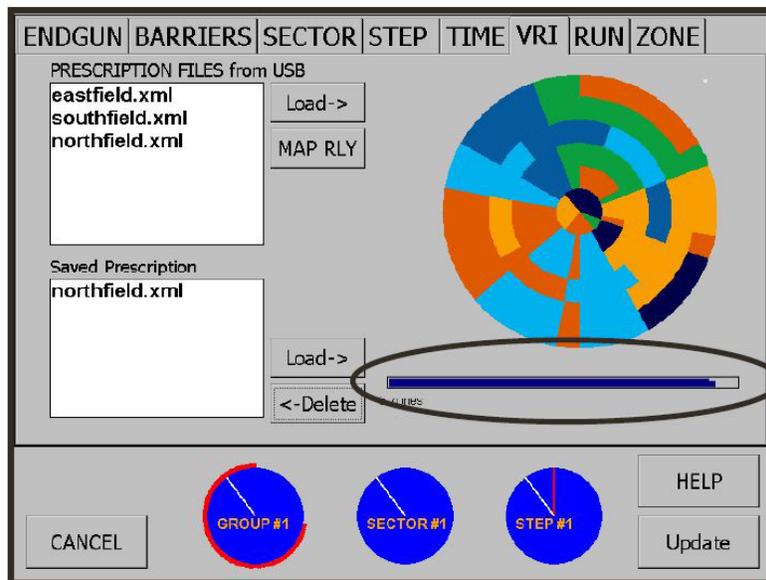
Note: The panel will have to be restarted after a prescription has been loaded for the first time.

Downloading the VRI Prescription



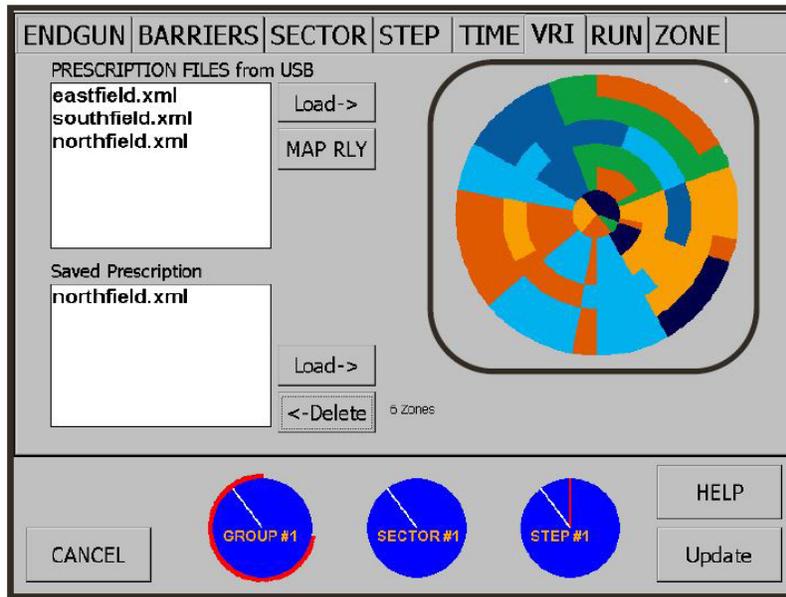
Step 1: Select a prescription by clicking on it.

Step 2: Press the LOAD button to begin the download.



Step 3: A progress bar will display on the screen while the prescription downloads.

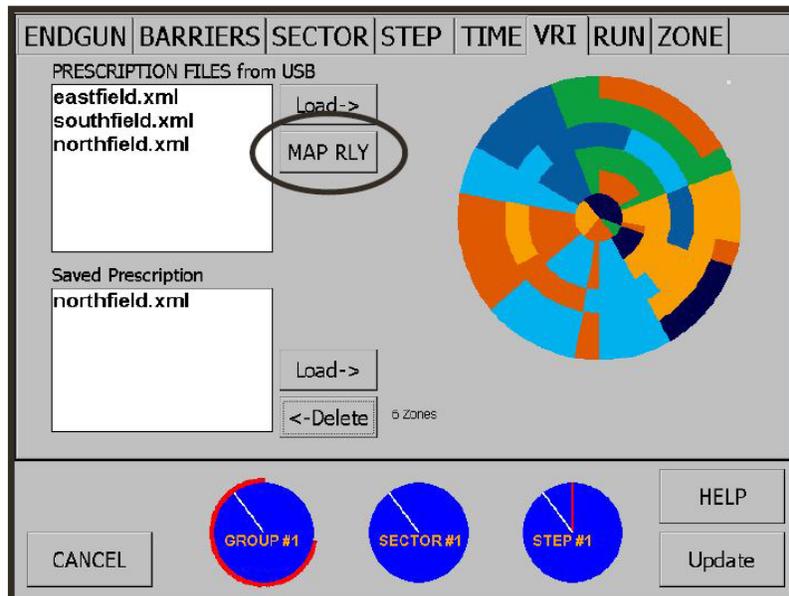
Step 4: Do Not Touch the screen while downloading is in progress.



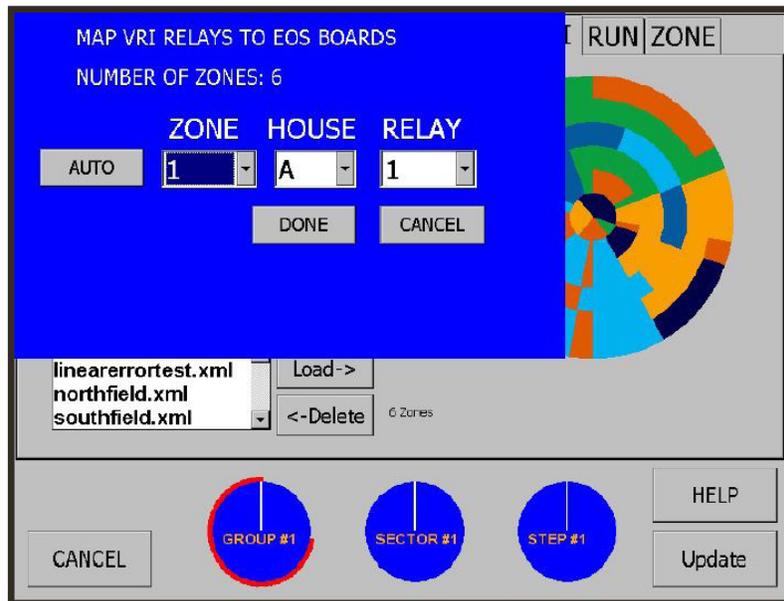
Step 5: When download is complete, a diagram of the loaded prescription will appear.

Step 6: If the system is using “Sector VRI Prescription”, skip to **Step 16**.

Step 7: If the system is using “Zone VRI Prescription”, proceed to **Step 8**.

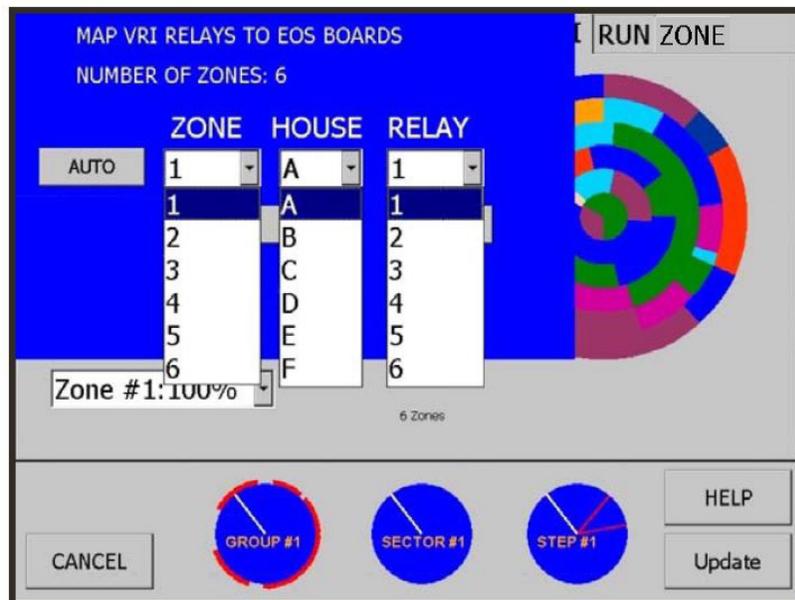


Step 8: When download is complete, notice the MAP RLY button is available for selection. If the loaded prescription needs its zones re-assigned, then proceed to **Step 9**. Otherwise, skip to **Step 16**.



Step 9: Now coordinate each zone with a touch screen address as shown below.

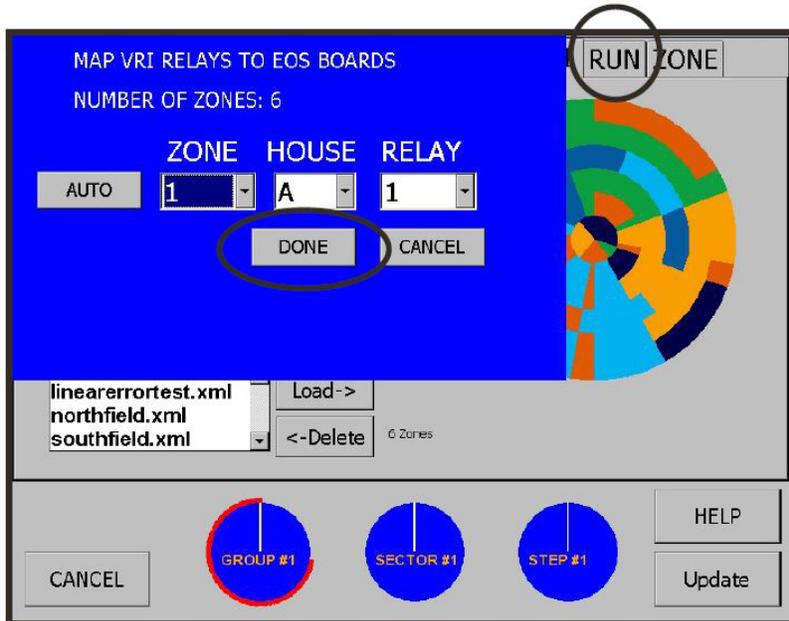
Step 10: If the system is using all six relays in order, for each valve box throughout the system, select the "AUTO" button and skip to **Step 15**. If unsure, contact the dealer who installed the system.



Step 11: If it is determined that AUTO cannot be used for zone set up, then create an address for each zone.

Step 12: "House" refers to the valve box(es) and "Relay" refers to the control relays (typically six) in each box.

Step 13: "House A, Relay 1" would be closest to the pivot center and "House A, Relay 6" would be the furthest from the pivot center. This is true for each House (valve box) on the system.

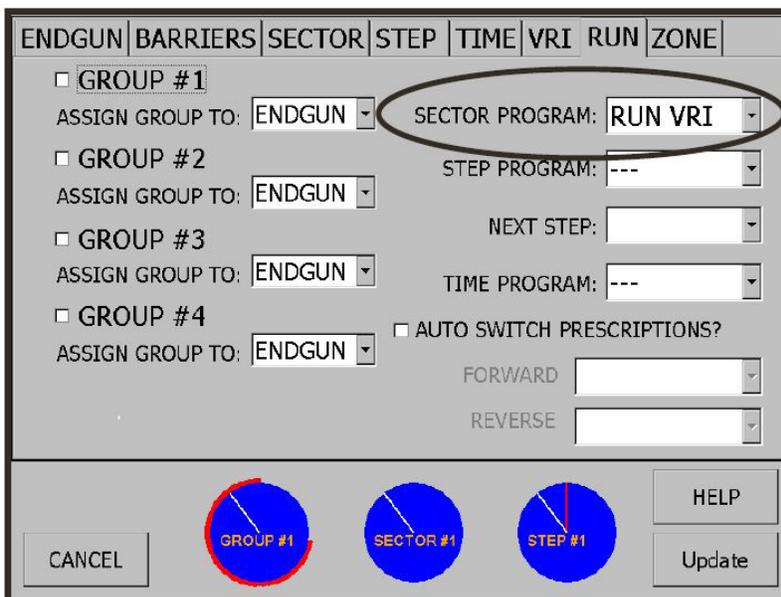


Step 14: Reasons for manually entering zone addresses:

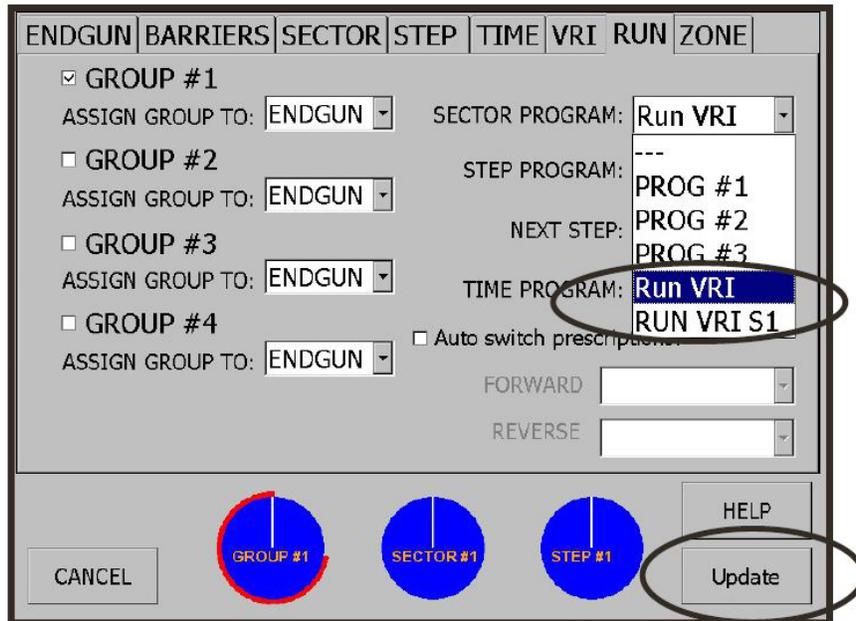
- a. Incorrect installation of tubing. This may need to be programmed in a different order to fix the issue, rather than re-plumbing the valve box.
- b. Some control valves in the valve boxes are unused. This requires skipping some of the relays that would normally be set up in “Auto” mode.

Step 15: After completing the zone addresses, whether entered manually or using the “Auto” function, select DONE (all drop down menus have to be closed to select this).

Step 16: Select the “Run” tab at the top right hand side of the screen.



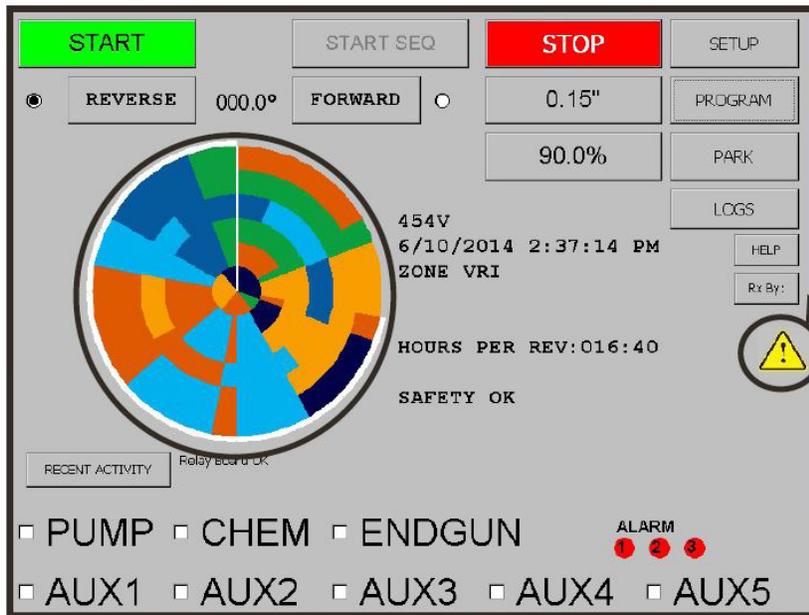
Step 17: To use the loaded VRI program, select the drop-down next to the title “Sector Program”.



Step 18: There are two options available to run the VRI program. “Run VRI” runs only the VRI program, and the “Run VRI S1” runs the VRI and Sector Program #1 (from the program, sector tab) together.

Note: Step and Time programs can be selected to run also with either of these VRI options.

Step 19: Select the UPDATE button at the bottom right hand side of the screen.



Note: This warning sign will appear if the prescription downloaded does not match the Rx file's description of the mechanical abilities of the system. System may not water as intended.

Step 20: The VRI prescription map will be displayed on the main screen now.

Zone Tab

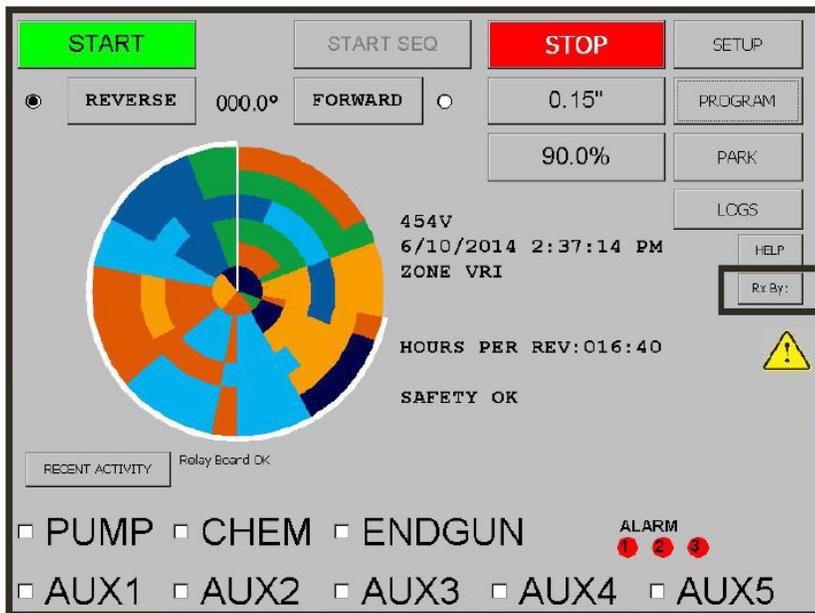
ENDGUN	BARRIERS	SECTOR	STEP	TIME	VRI	RUN	ZONE
ZONE	START	STSPAN	END	ENDSPAN	SPRINKLERS	DIAMETER	
A1	0	1	271.5	2	27	0	
A2	271.5	2	545.5	4	28	0	
A3	545.5	4	825	5	29	0	
A4	825	5	1099	7	20	0	
A5	1099	7	1369	8	28	0	
A6	1369	8	1644	10	29	0	

Note: This area of the Zone tab will show blank if the prescription does not match the RRx file for the system. A caution symbol will also display on the main screen. See the diagram on the bottom of the next page.

Step 1: Select the desired VRI cycle time in seconds. For example, if 180s is selected, over a 75% zone, the sprinklers will be on for 135s out of every 180s.

Step 2: If it is desired that a zone be tested, select the alpha and numeric character for that zone using the drop-downs and check the box to turn on this function.

Review of the VRI Settings

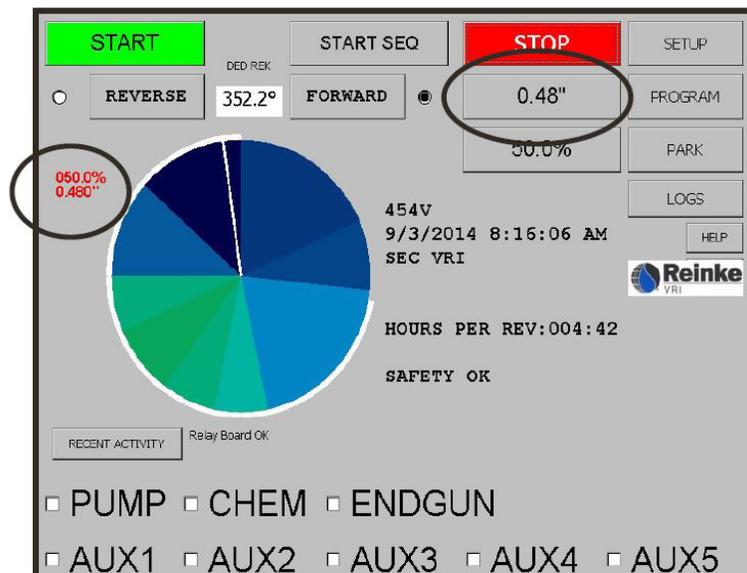


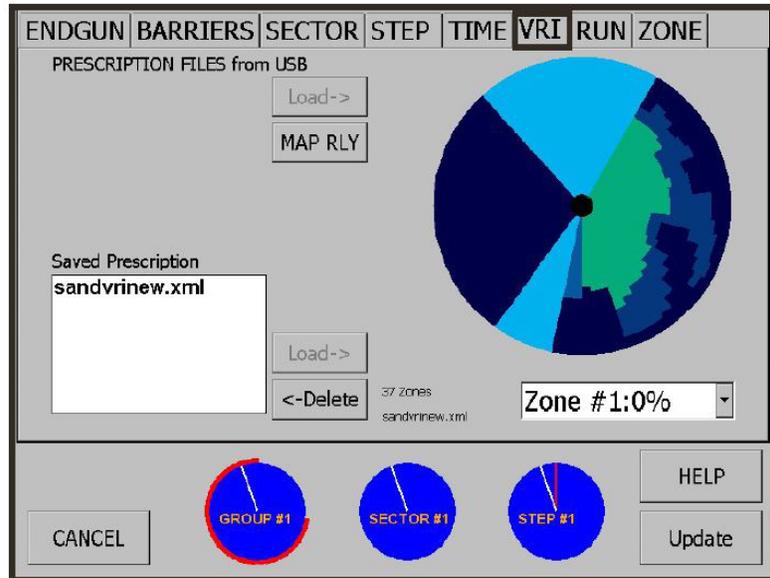
Note: Shows who wrote the Rx when pressed.

The following steps are for Sector prescriptions only, with the system running, and the pump on.

Step 1: Once a base depth is set for watering and the system is running, the actual current speed and depth applied is displayed on the left side of the graphics. The numbers are red if the system has not been started or the system cannot match the desired depth. If the numbers are blue, the system is performing as desired.

Step 2: In this instance, the system is in a sector of the prescription that was set to 50% of the base water rate. So for this sector, the machine adjusts speed to put 0.48” of water, or 50% of the base depth of 1.00” and subsequently must travel at 30%, or twice the base speed, to achieve this.





The following steps are for Zone prescriptions only.

Step 3: When the system is running in the Zone VRI mode, the operator can view the rate of watering in each zone at the pivot's current location by pressing the program button and looking under the VRI tab. This rate of watering will be a percentage (100% or less) of the desired base water depth entered on the SETUP/PUMP screen.

Step 4: A list of all zones will appear with the percentage of the base watering rate for each zone at the system's current position.

Congratulations, you have completed setting up the VRI prescription for this system.

STARTING THE SYSTEM

If the system has just been installed, the generator (or its direction of rotation) has been changed, or the power service has been worked on or changed; have your service person check the system for proper phasing. Knowing the functions of the various controls in the main control panel is necessary for the operation of your irrigation system. The system is electrically connected to your water supply so that if one fails, the other will shut down. For this reason, you must coordinate the operation of the water supply and the system controls. The following procedures are for typical installations. If your installation is other than typical, consult your Reinke dealer or service person.

1. Observe field and system conditions to be sure the system and system's path are clear of people and obstacles. See "System Safety" section at the beginning of this manual for more information.
2. If you want to run water with the system, ensure the electric pump control is enabled and safe to start as recommended by your pump manufacturer. Then turn the pump panel disconnect switch to the ON position.
3. If your system utilizes an optional generator switch to control a combustion engine-driven well and/or generator, turn the generator switch to the START position. Start the engine following all engine manufacturer's safety and operating instructions.
4. Turn the main disconnect switch to the ON position.
5. Observe the voltage on the main control panel voltmeter. This meter should read 456-504 VAC, 60 HZ (380-420 VAC, 50 HZ) on 480 VAC systems or 230-250 VAC, 60 HZ on 240 VAC systems. At no time, should the operational voltage read outside these parameters.
6. Turn the system power switch to the ON position.
7. Ensure the "Safety OK" indicator light is on. If it is not on, the safety circuit is open.
8. Turn the water supply switch to the ON position if you want to run water with the system. Turn the water supply switch to the OFF position if the system is to run dry.
9. If the system is equipped with an optional low pressure shut down, turn the pressure override switch to the BYPASS position.
10. When the system is equipped with the optional auto-stop cam plate option, it may be necessary to turn the park override switch to the BYPASS position until the system moves off the auto-stop ramp.
11. If the system is equipped with the optional low temperature (frost) shutdown kit, turn the switch to the AUTO position for normal operation. This will ensure the system will shut down if the temperature falls below the temperature set on the frost control board on the back plate of the main control panel. At no time, should the system be operated with water in potential icing conditions. Set the switch to the BYPASS position if you want to move the system without pumping water through it at temperatures below 45°F.

12. Set the percent timer to the desired speed. See the speed chart in the main control panel or on the next page.
13. Turn the direction switch to the desired direction. FORWARD = Clockwise and REVERSE = Counterclockwise.
14. Push the start button and hold for three (3) seconds or less. You should hear the magnetic contactor engage (snap) and the system should start. If not, repeat step 14 and release the button. If another snap is heard, a malfunction is indicated. Do not hold the start button in for more than three (3) seconds as this will override the safety circuits.
15. If the system is equipped with an optional low pressure shut down, turn the pressure override switch to the AUTO position.
16. When the system utilizes an optional generator switch to control a combustion engine-driven well or generator, turn the generator switch to the RUN position.
17. If the system is interlinked with a chemigation pump or other auxiliary device, turn the chemigation/auxiliary switch to the ON position.
18. When the system is equipped with an optional end gun, turn the end gun switch to RUN if you desire to operate the end gun. Turn the switch to the STOP position if you do not desire to operate the end gun.
19. If your system is equipped with the optional auto-stop cam plate option, and you desire to park the system, set the auto-stop ramp to the desired location and turn the "Park Override Switch" to the AUTO position.

About the Generator

Reinke Manufacturing Co., Inc. supplies compact generator models that are a suitable source of electrical power for an irrigation system. The generator is normally driven from the same engine as the well pump. The drive consists of a double v-belt arrangement. The generator can be mounted near the engine regardless of whether the engine is trailer-mounted or secured to a concrete base.

The generator voltage is controlled by the engine speed. The voltage should not fall below 456 or go above 504 Volts. This should correspond to a generator RPM of 1750 to 1825. The generator RPM for 60 HZ output is 1800 (1500 RPM for 50HZ output). At no time, should the operational voltage read in excess of +5%. The generator pulley may initially be rotated either direction to generate power.

If the generator rotation is ever reversed later, the system will be out-of-phase.

Call your Reinke dealer or service person to correct the phasing problem if you plan to operate the generator while rotating it in the opposite direction.



NOTE: The generator warranty requires that all combustion engines coupled to a generator, driving the system, must have a governor, a tachometer, and a safety load meter. The generator and system controls will be damaged by over, or under, engine speeding.

PRIMARY SETTINGS

System Speed

A speed chart with an adhesive back is provided with each system. The information given on the chart has been specifically calculated for each particular installation. Two sets of numbers are given on this chart: the percent timer setting for various application amounts and the time it takes to complete one revolution at these settings. Place the sticker on the main control panel front where it can be referenced in the future.

		Reinke Manufacturing Co. Inc. 101 Reinke Road P.O. Box 166 Deshler, Nebraska 68340 USA (402) 365-7251 www.reinke.com	
System Serial No:		System Flowrate (gpm):	
Owner's Name:		System Press. (psi):	
End (H) Tower Tire Size:		(H) Center Drive Gear Ratio:	
		(H) Speed @ 100% (fpm)	
		End Gun Model No:	
Water Application Depth (in):			
Percent Timer Setting 60 Hz.:		100%	
Application Duration (hr : min):			
End Gun Trip Adjustment:		1/4 inch at the cam wheel is equivalent to feet at the end of the system.	

The speed chart has been calculated for ideal conditions. Actual conditions may vary from chart accuracy. When the system is used to apply fertilizer or pesticides, a high level of accuracy is desired. The operator can calculate speed chart data based on the actual performance of the system. Ask your Reinke dealer representative for assistance calculating the actual rotation time and the correct percent timer setting before you start.

The percent timer setting can be calculated using the following formula:

$$\% = \frac{GPM \times 320 \times W}{D \times L \times L \times S}$$

Where:

- GPM = Gallons per minute supplied to the pivot.
- W = Distance from the pivot to the end wheel track in feet.
- D = Desired depth of water to be applied in inches.
- L = Length of the system coverage in feet.
- S = Speed of end tower in feet per minute.

“L”

LENGTH OF THE SYSTEM

In most cases, the length of the system coverage varies because end gun sprinkler(s) are used in the corners only. Therefore, using an “L” value equal to the average coverage length will give the best results.

“S”

GROUND TRAVEL SPEED

Ground travel speed is measured in feet per minute.

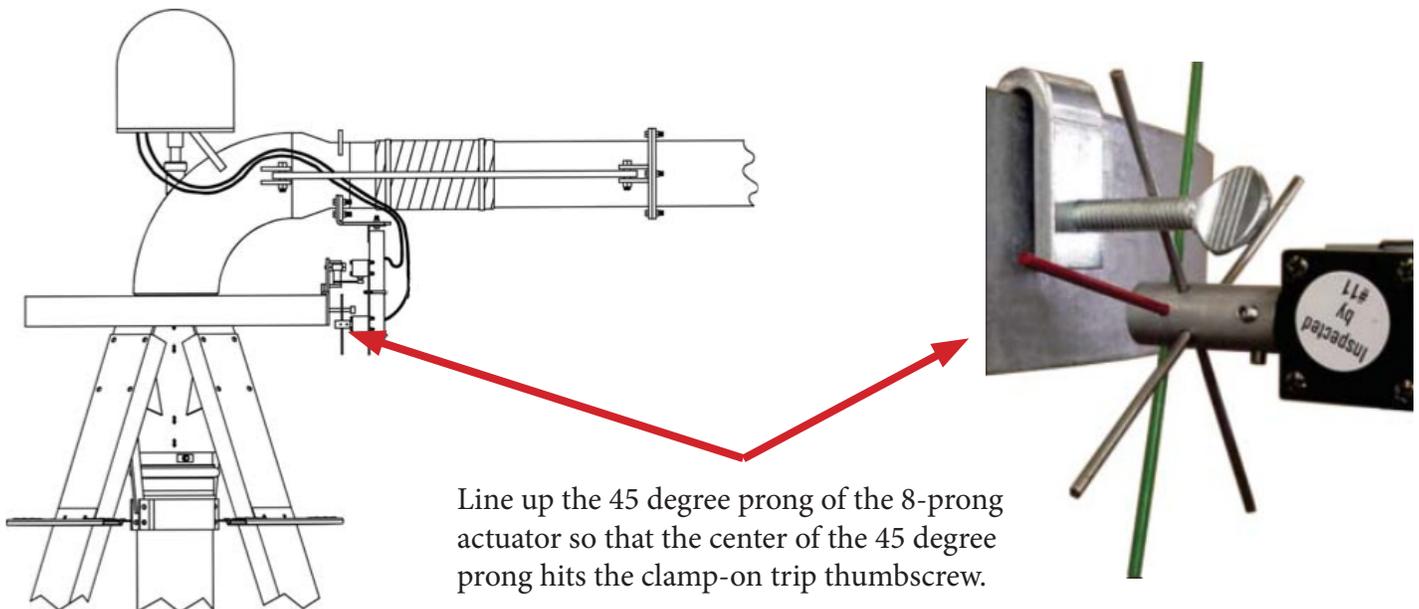
End Gun Settings



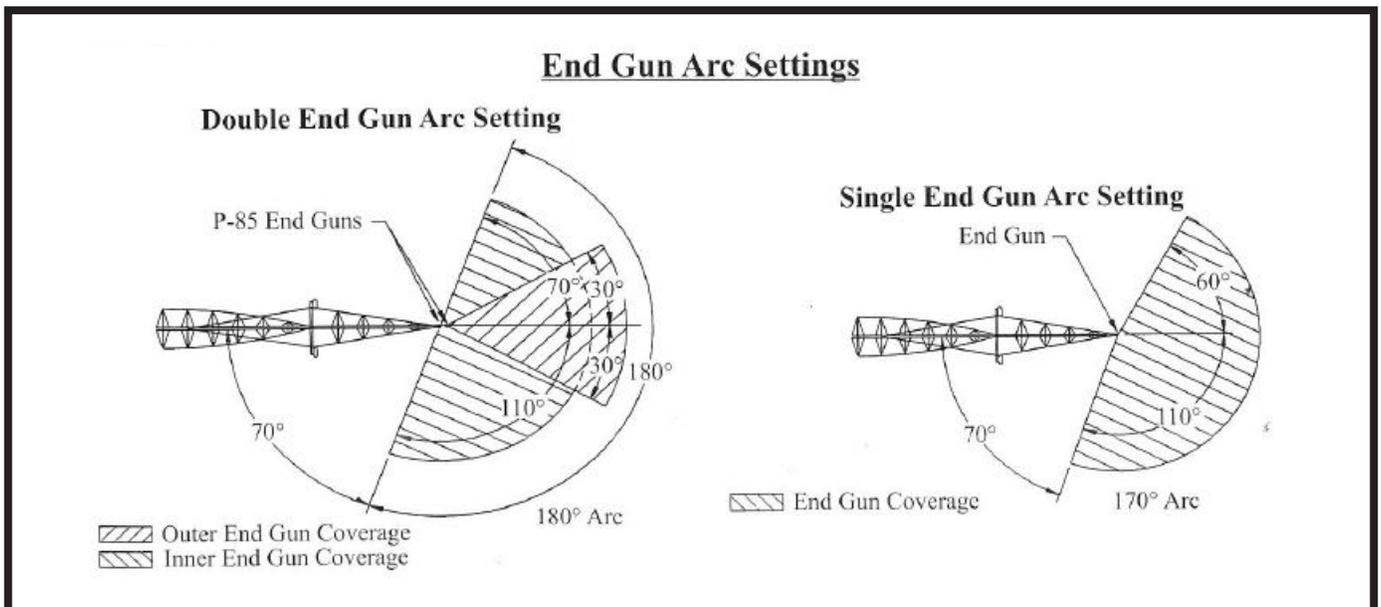
Caution

In most states, it is unlawful to spray water on state and county roadways. This is a serious hazard and must not be allowed.

The end gun switch is the bottom switch on the cam wheel mounting plate. It utilizes a 90-degree increment switch and is activated by an 8-prong actuator contacting a movable clamp-on trip on the cam wheel. Line up the 45 degree prong of the 8-prong actuator so that it hits the center of the clamp-on trip thumbscrew. When the green bar of the 8-prong actuator is in the horizontal position, the switch is ON. When the red bar of the 8-prong actuator is horizontal, the switch is OFF. To activate the end gun, place a clamp-on trip on the cam wheel so it turns the 8-prong actuator. Make sure the end gun is properly set to the arc settings below, before installing the clamp-on trip on the cam wheel. Install the next clamp-on trip on the cam wheel when the end gun starts to reach its boundaries. Repeat this procedure in each of the corners where you desire to operate the end gun.

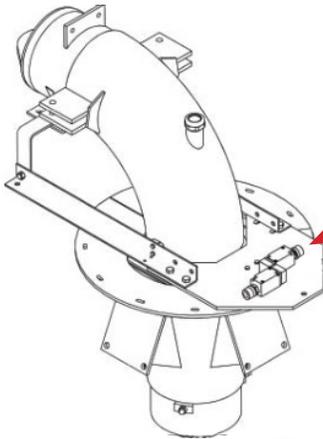


Line up the 45 degree prong of the 8-prong actuator so that the center of the 45 degree prong hits the clamp-on trip thumbscrew.



Cam Plate Switches (Optional)

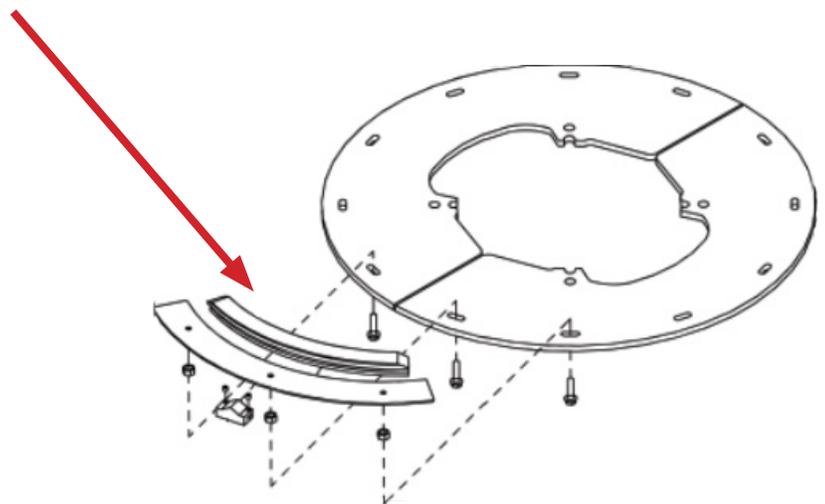
Reinke Manufacturing also has an optional cam plate switch assembly for end gun control. This is an alternative to the traditional Reinke cam wheel switch assembly.



The end gun switch is a plunger switch activated by rubber ramps located on top of the cam plate. See the illustration here for details.

End Gun Switch Ramp

The end gun switch ramps fit onto a metal retainer plate bolted to the cam plate. Place the ramp so the end gun plunger switch contacts the ramp where the end gun is to be activated and the end gun plunger switch exits the ramp where the end gun is to be deactivated. The ramp may have to be trimmed to achieve the desired area. Make sure the end gun is properly set to the arc settings on the previous page.



PART CIRCLE OPERATIONS

Part circle systems require safeguards to make sure the system doesn't go beyond desired boundaries. There are options to either stop, or automatically reverse, the system when it reaches the end of the run. These mechanical control options are either located at the pivot center or on a tower. **All part circle systems require a physical barricade to constrain the system in the event of a control failure.**

Disclaimer

Reinke disclaims any and all liability (including any liability created pursuant to the Irrigation Systems Warranty) with regard to damage to the irrigation system, or to other property, or personal injury or death, caused by improper installation or maintenance of Reinke-supplied auto-reverse or auto-stop switches or tower barricades, or by use of customer-supplied barricades.

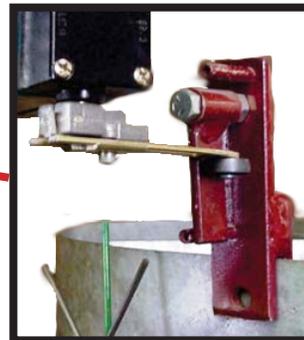
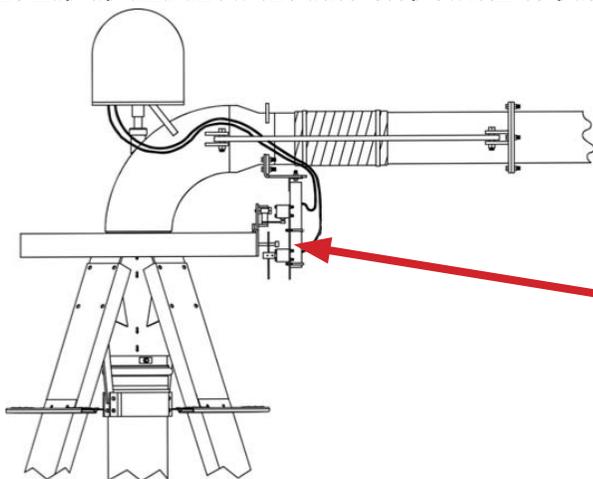
 **Warning** *All auto-stop and auto-reverse devices require the use of a barricade in the tower wheel track. The barricade should extend to the inside of the track to accommodate possible movement of the tower. The system may become shorter due to misalignment, but it cannot grow longer. See the barricade drawings on page 56.*

Pivot Center Options

Before starting the system, check the cam or trips and make sure they are in the desired position. When initially starting the system, make a point of being nearby when the switches are due to trip. This could prevent a catastrophe if a trip is located in the wrong position on the cam wheel or cam plate.

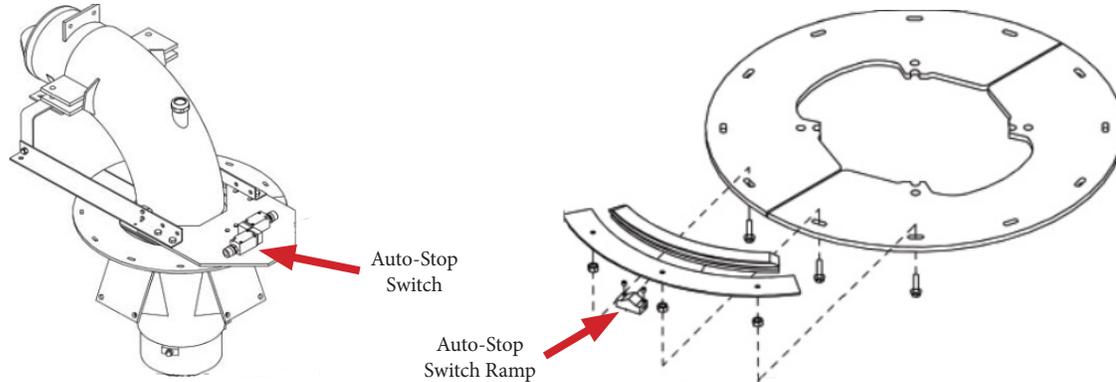
Pivot Auto-Stop Option

The auto-stop switch is the top switch on the switch mounting plate. This switch has a wide trip arm with a roller on the end. The heads of the auto-stop switch have a momentary contact. This allows the switch to trip from side to side and return to the center position. The auto-stop trip is a short arm with a flap attached to it. A pin on the bottom stops the rotation of the flap. There is a left and right trip provided with each auto-stop switch assembly. Each trip is differentiated from the other by the location of the pin at the bottom of the trip. The pin on the right trip will be on the left side of the flap when it is observed mounted on the cam wheel. The left trip will be the opposite. This arrangement allows the switch to pass through the trip when you wish to reverse the system the other direction. To restart the system after it has been stopped by the auto-stop switch, the switch arm must be returned to the center position. To do this, simply move the switch arm beyond the stopped position, rotate the flap up and allow the auto-stop switch to pass through the trip. This will allow the switch to rotate the flap when the system reverses the other direction. Be sure you have changed the direction switch to move the system in the opposite direction!



Cam Plate - Pivot Auto-Stop Option

The pivot auto-stop switch ramp fits onto a metal retainer plate bolted to the cam plate. To adjust the ramp, simply loosen the set screws and move the ramp to the desired point where the system is to auto-stop. Then re-tighten the set screws.



Tower Options

Warning *All auto-stop and auto-reverse devices require the construction of a barricade in the tower wheel track. The barricade should extend to the inside of the track to accommodate possible movement of the tower. The system may become shorter due to misalignment, but it cannot grow longer. See the barricade drawings on the following page.*

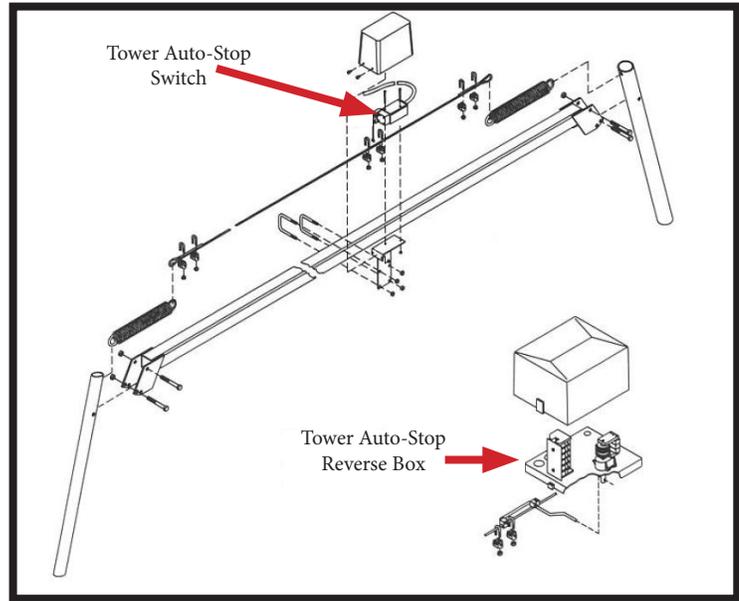
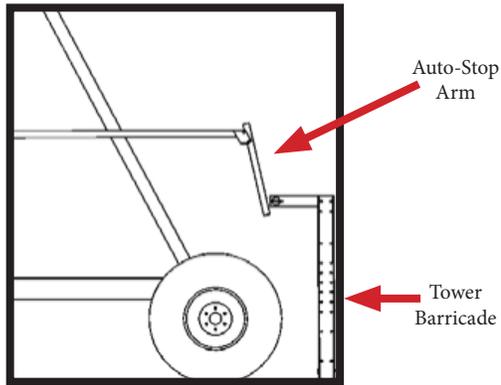
Tower Auto-Reverse Option

Systems equipped with the tower auto-reverse option have the auto-reverse mechanism mounted on one of the outer towers. The tower auto-reverse switch is activated by a spring-loaded cable coupled to two auto-stop arms. As shown on the next page, when the tower moves and the auto-stop arm contacts a barricade placed in the tower wheel track, the cable moves, tripping the tower auto-reverse box, reversing the direction of the system.

The system can be reversed between barricades by placing the direction switch in the desired direction of travel and pushing the start button. It can then be restarted with the direction switch in the AUTO position. The system will continue to run in the direction that it was last moving. Two indicator lights have been placed in the inner panel door to indicate the direction of travel. After any idle period, the auto-reverse system must be tested to ensure proper operation. Visually check the lever and switch mechanism for damage. With the system running in auto-reverse, manually push the auto-stop arm opposite the direction of travel. The system should immediately reverse and the arm should return back to normal position. Repeat the process in the opposite direction to ensure the system reverses from both directions of travel. Pushing the auto-stop arm beyond the auto-reverse position will open the safety circuit and shutdown the system. The safety function must also be verified to ensure proper operation.

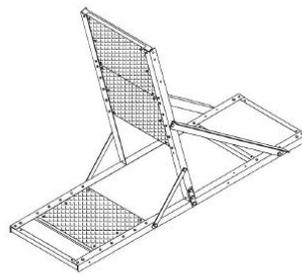
Tower Auto-Stop Option

The tower auto-stop switch is activated by a spring-loaded cable coupled to two auto-stop arms. As shown on the next page, when the tower moves and the auto-stop arm contacts a barricade placed in the tower wheel track, the cable moves, tripping the tower auto-stop switch. This action sends a signal to the main control panel, which disengages the starter contactor and stops the system.

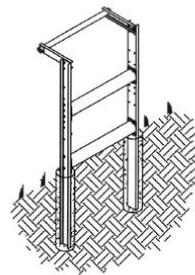


Tower Barricade

As stated earlier, all part circle systems are required to have an approved physical barricade to provide a safety backup in the case of an auto-stop or auto-reverse failure. Reinke Manufacturing provides two barricade options as shown below. One option is a portable barricade and the other is a stationary barricade. In both cases, it is critical that the barricade be properly placed and adjusted for reliable operation. Annual inspection of the barricade is part of the maintenance inspection.



Portable Barricade

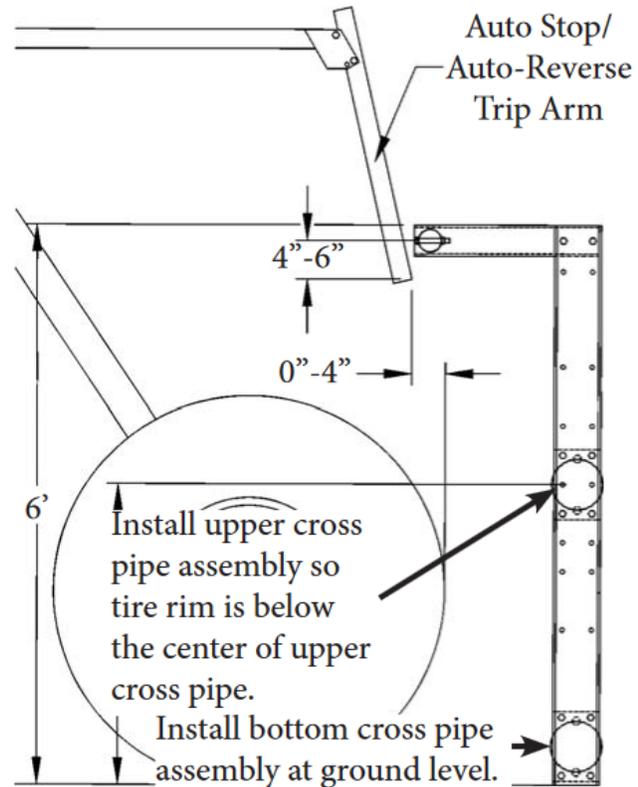


Stationary Barricade

Note: These barricades are designed to be used on Reinke Systems, equipped with any auto-reverse or auto-stop option.

Warning *Great care must be taken to make sure the system alignment is maintained and the barricade remains centered on the wheel track.*

Proper Adjustment of the Reinke Stationary Barricade:



- The barricades are designed for use with systems having the following tire sizes: 11.2 x 24, 11 x 22.5, 14.9 x 24, 16.9 x 24, and 11.2 x 38.
- Center the barricade in the tower wheel track where the tower auto-stop or tower auto-reverse switch is mounted.
- The portable barricade must be adequately staked down on all four corners to prevent barricade movement. Stake size will vary depending on soil type and field conditions. The minimum stake size is 1" x 36" with cap heads. **The system warranty is void if the barricade is not adequately staked.**
- The stationary barricade channels must be set in concrete in a 10" diameter hole and 48" deep.
- The system must be kept properly aligned. Changes in system alignment will vary the distance from the pivot point to the wheel tracks. Severe misalignment may cause the tower to miss the barricade completely.

Disclaimer

Reinke disclaims any and all liability (including any liability pursuant to the Irrigation Systems Warranty) with regard to damage to the irrigation system, or to other property, or personal injury or death, caused by improper installation or maintenance of Reinke-supplied auto-reverse switches or tower barricades, or by use of customer-supplied barricades.

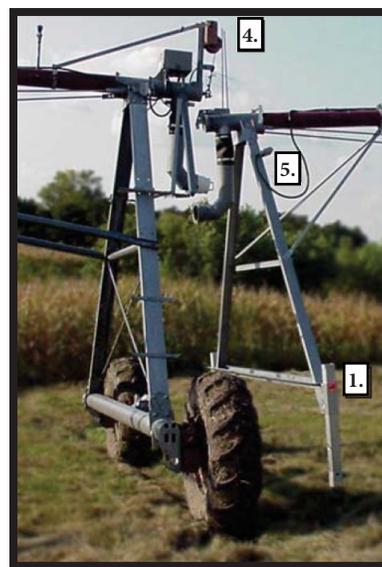
OPTIONS

Disconnecting Spans

This option allows one person to disconnect and reconnect spans from the system. This enables the system to continue operating through the remainder of the field, leaving the unused tower(s) behind. Use the following instructions when disconnecting a span.

 **Danger** *DO NOT attempt to disconnect or reconnect disconnecting spans until the Reinke main control panel disconnect switch, and all pump disconnect switches, are locked in the OFF position.*

1. Remove pin and lower leg stands. Replace pin to secure leg stands.
2. Disconnect the span cable receptacle connection, typically located below the tower control box, and plug into empty receptacle on disconnected span. Remove control rods.
3. Separate the drop pipes and insert the provided plug in the drop pipe on the tower side.
4. A winch (optional) or other device is used to lift the hook joint out of the receiver joint and lower the span. To lower or lift the span without the winch option, you will need equipment capable of lifting 2,500 pounds and something to support the disconnected span while not in operation.
5. Detach the cable from the hook joint.
6. Switch the A/C toggle switch on the tower control box at the disconnected span to "C" (end tower). When the disconnected span is reconnected, switch the A/C toggle switch on the tower control box located at the disconnected span to "A" (intermediate tower).
7. This process is reversed when the span is reconnected. Allow the auto-stop switch on the top of the disconnecting span to shut the system down for reconnecting.



Chemical Injection

A flush time of at least ten minutes is typically recommended for center pivot systems. However, longer and low-gallon systems will require additional flush times. Allowances must also be made if the well and injection pump are not located at the pivot. A rough estimate for center pivot systems is one minute of flush time for each 100 feet of the center pivot system and mainline pipe. **THE SYSTEM WARRANTY IS VOID IF IT IS NOT FLUSHED AND MAINTAINED PROPERLY. CHECK AND ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS WHEN UTILIZING CHEMICAL INJECTION.**

Chemigation

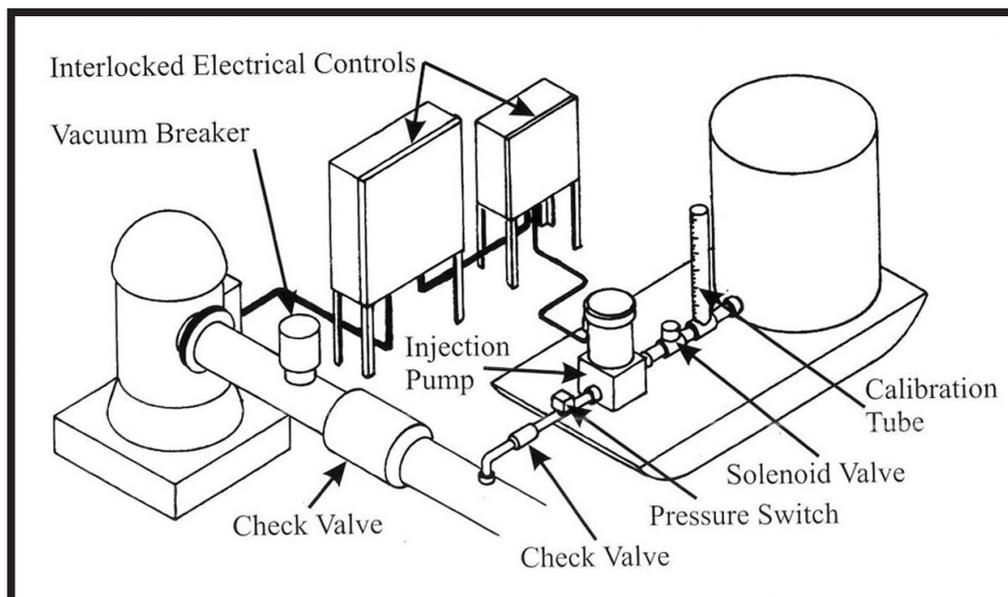
Chemigation is the application of agricultural chemicals through center pivot irrigation systems. The main advantages to this technique are lower application costs and uniformity of application. The biggest disadvantage is the possibility of groundwater pollution. Some potential hazards are:

- Water flowing back through the chemical injection system, causing the chemical supply tank to overflow.
- Irrigation pumping plants shutting down from mechanical or electrical failures of the system, while the injection equipment continues to operate.
- Lack of a check valve on the irrigation line may result in the mixture of water and chemical siphoning back into the irrigation well and polluting the groundwater.

You can avoid these hazards by:

- Utilizing a check valve in the chemical injection line to stop the flow of water from the irrigation system into the chemical supply tank when the chemical injection pump is not operating.
- Interlocking the irrigation pumping plant and the chemical injection pump so if one stops, the other will also.
- The use of check and vacuum relief valves (anti-siphoning devices) on the irrigation pipeline.

Additional safety equipment could include a pressure switch in the injection line to detect a break in the line and a solenoid valve at the chemical tank outlet for a positive shutoff when the system shuts down. The injection system equipment should also include a calibration tube and the system should be calibrated before each application. Most injection systems include a built-in calibration tube, which allows the calibration to be re-checked periodically during application. (See illustration below.) See your local Reinke dealer for available chemigation systems.



Fertigation

Fertigation is the application of fertilizers through center pivot irrigation systems. Fertigation is more popular on sandy soils. Sandy soils are more prone to leaching of fertilizers beyond the root zone. Fertigation allows for time release fertilizer application, thus reducing the potential for leaching and loss of fertilizer, and allowing the farmer to “spoon feed” crops. A word of caution: not all fertilizers are compatible with fertigation. Consult your fertilizer supplier before applying unfamiliar chemicals. Materials that should not be applied through irrigation systems include:

Anhydrous Ammonia: excessive nitrate loss, a calcium precipitate forms in the water.

Ammonium Polyphosphate: causes a precipitate to form in water.

Phosphoric Acid (or any acid): corrosive to steel and forms a precipitate in water.

See your local Reinke dealer for available fertigation systems.

Insectigation

Insectigation is the application of insecticides through center pivot irrigation systems. Always follow label directions! Allow time for a contaminated field to reach a safe level before re-entering the field. See your local Reinke dealer for available insectigation systems.

MAINTENANCE

All Reinke irrigation systems are designed for many years of use. However, studies have shown irrigation system reliability strictly depends upon good preventative maintenance. The following maintenance practices will help prolong the life of your Reinke system.

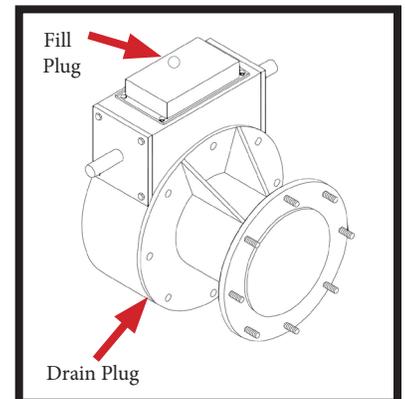
 **Danger** *DO NOT attempt to perform any maintenance procedures until the Reinke main control panel disconnect switch and all pump disconnect switches are locked in the OFF position. Electrical component troubleshooting and replacement should be performed by a certified Reinke Service Technician to ensure built-in safety features remain intact. Replace all protective guards and shields before restoring power to the system.*

Wheel Gearbox Maintenance

Non-Towable Gearboxes

The Reinke 50:1 wheel gearboxes use a good quality S.A.E. 85W-140 that meets or exceeds A.P.I. - GL.5 and IL.-21056 specifications. Change the oil after the first year of service and every three years thereafter. Fill the gearboxes so oil level is just above worm gear. Oil capacity is approximately one (1) U.S. gallon. Before and after each irrigation season, remove the drain plug just long enough to drain any condensed water.

 **Caution** *DO NOT overfill these gearboxes! Overfilling may result in seal damage.*

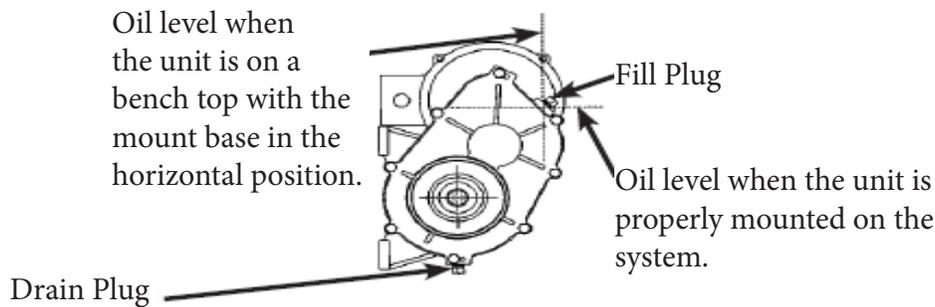


Center Drive Gearbox Maintenance

Three Phase (480 VAC) Center Drive Gearboxes

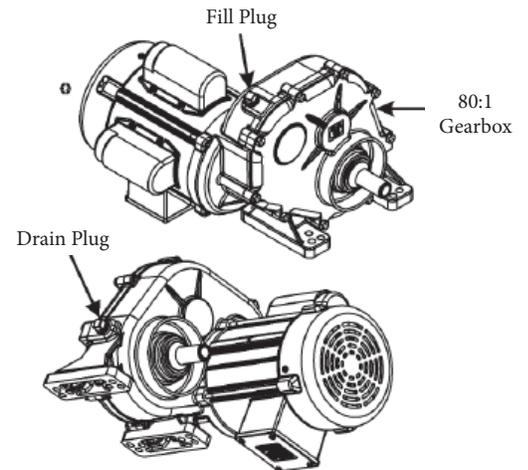
The Reinke helical center drive gearboxes use a good quality SAE 20W-50 multi-viscosity engine oil; or ISO 460 or EP 460 gear oil. Change the oil after the first year of service and every three years thereafter. Fill the gearboxes so the oil level reaches the threads of the oil fill hole. (See illustration below.) Oil capacity is approximately 0.4 U.S. gallon.

Caution *Do not overfill these gearboxes! Overfilling may result in seal damage. Before and after each irrigation season, remove the drain plug just long enough to drain any condensed water.*



Single Phase (230 VAC) Center Drive Gearboxes

The Reinke 80:1 helical center drive gearboxes are composed of triple reduction 240 volt single phase 80:1 center drive, which is a complete integral gear and motor (P/N 112297) GR/MTR-UMC-CTR 80:1-06168-104A. These 80:1 gearboxes use a good quality SAE 50W or SAE 20W-50 multi-viscosity engine oil; or ISO 460 or EP 460 gear oil. Change the oil after the first year of service and every three years thereafter. Fill the gearboxes so the oil level reaches the threads of the oil fill hole. (See illustration on the right.) Oil capacity is approximately 72 ounces. Before and after each irrigation season, remove the drain plug just long enough to drain any condensed water.



Caution *DO NOT overfill these gearboxes! Overfilling may result in seal damage.*

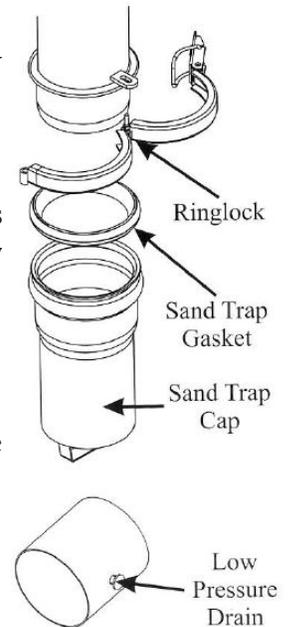
Initial and Preseason Maintenance

Before placing the system into service each season, check the following:

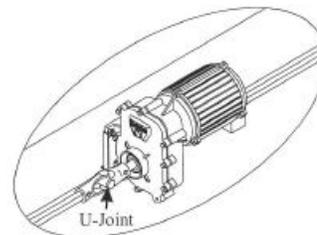
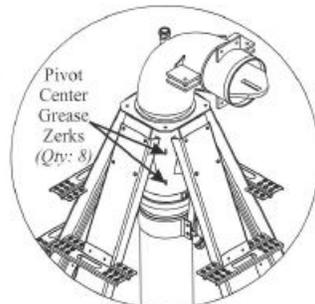
1. Make a visual check of all bolts in the system, making sure something has not become loose during the idle period. When the system has been newly installed, all the bolts should be checked with an end wrench to make sure they have been tightened by the erection crew. One loose bolt may cause serious structural damage.
2. Check the electrical boxes and wiring of the system to make sure the ground wires are secured and rodents or insects have not damaged the systems' mechanisms.
3. Flush the system. Place the disconnect switch in the OFF position. Only water is required for this procedure - the system does not need to move.

 Danger *DO NOT start the flushing procedure while the system is under water pressure. Removing sand trap caps while the system is under pressure can cause personal injury or death.*

Remove the sand trap cap and pump water through the system. This will flush out any foreign material that might plug the sprinkler heads or sprinkler valves. This is particularly important on newly installed systems, because of possible straw, dirt or any other material that may have accumulated in the pipe during erection. After the sand trap cap is back in place, pump water through the system and check the sprinklers for proper operation. The arc travel of the end gun should be set as the diagrams show on page 31. Also, check the system water pressure to see if it is operating at the proper pressure. If the water pressure has fallen, your pump may need adjustment or repair, or after time, the sprinkler head nozzles may be worn. These problems will reduce the uniformity of water application and should be corrected. If a sprinkler nozzle is replaced, make sure the new one is the same size. After flushing the system, check the function of the low pressure drains by pushing each one upward in a rotating motion. Low pressure drains are located on the bottom side of each hook joint, the last tower top, and on the end boom pipe.



4. Grease fittings are located on the pivot (8), at any optional steel u-joints (1 each) and on any towable gearboxes (2 each). These fittings should be greased with good quality grease.



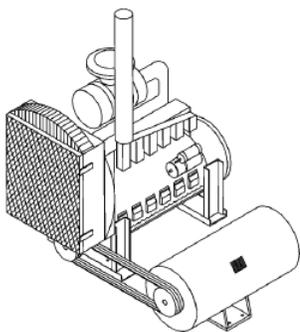
5. All automatic controls such as auto-stop, end gun, tower auto-stop, and tower auto-reverse should be cycled to check for proper operation. Consult your local Reinke dealer, or authorized service technician, for assistance.
6. If a booster pump is installed on your system, it should be inspected for proper operation. A second person should be located near the end boom. Turn the percent timer to zero and, with power to the system, press the start button. When the system is at normal operating pressure, turn the end gun switch to the ON position and check the phasing of the booster pump. When viewing from above, the pump shaft would be turning in a clockwise direction when running. Operating the pump backward can damage the pump. When the end gun switch is OFF, the booster pump should be OFF. If the phasing needs to be changed, contact your Reinke dealer or service person.
7. Check the oil level in the center drive and wheel gearboxes. Water condenses in the gearboxes and should be drained. The water may be drained by loosening the drain plug on the bottom. When the plug is removed, if there is any water, it will be the first to drain out. Gears should be filled to the specifications on pages 59-60.

⚠ Caution *DO NOT overfill these gearboxes! Overfilling may result in seal damage.*

8. Tire pressure should be maintained according to the chart shown here. Also, inspect the tires for impending problems (cuts, breaks, etc.).
9. Main control panel switches should be cycled and checked for proper system operation.
10. If the system utilizes generator belts, check them for proper tension. (See illustration below.) Before starting the engine, remove any rodent nests from the engine fan cover. The generator pulley may initially be rotated either direction to generate power.

<i>Tire Size</i>	<i>Max. Load & Infl. (lbs @ PSI)</i>
11R x 22.5 (Recaps)	4000 @ 52
11.2 x 24	3900 @ 35
11.2 x 38	4410 @ 23
13.6 x 38	6965 @ 29
14.9 x 24	4640 @ 16
16.9 x 24	7215 @ 23
18.4 x 26	No longer offered

⚠ Caution *If the generator rotation is ever reversed later, the system will be out-of-phase. Call your dealer or service person to correct the phasing problem if you plan to operate the generator in the opposite direction.*



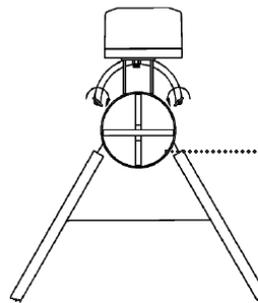
Note: The generator warranty requires that all combustion engines coupled to a generator, driving the system, must have a governor, a tachometer, and a safety load meter. The generator and system controls will be damaged by over or under engine speeding.

Maintenance During Season

1. Periodically check the built-in voltmeter on the main control panel inner door and make sure it reads 456-504 VAC, 60 HZ (380-420 VAC, 50 HZ) on 480 VAC systems or 230-250 VAC, 60 HZ on 240 VAC systems. At no time, should the operational voltage read outside these parameters. If it does, find out why and correct it. This will prevent possible damage to the drive motors and other electrical components. If your system uses a generator, excessive voltage indicates it is running over speed. This can damage the generator and the system's controls. Also check the tension of the generator drive belts. Loose belts can cause slippage and low voltage output may result. Exercise caution if you manually check your system for proper voltage using a multimeter.
2. Grease fittings are located on the pivot, at any steel u-joints, and on any towable gearboxes. These fittings should be greased approximately three times a season, depending on use, with good quality grease. (See illustrations on pages 59-60.)
3. The system should be inspected periodically. Look for under-inflated tires, oil leakage from gear boxes, structural damage from the result of severe storms, etc.
4. Periodically check the alignment of the system. The system is initially aligned when it is erected. Alignment is a very important factor in the operation of an irrigation system. A misaligned system develops very high stresses which could cause structural damage and reduced center drive and wheel gearbox life. If the alignment of the system needs to be reset, it is done by turning the adjusting screws on the control yoke located at each tower. It is better to turn both screws (in opposite directions) rather than making an alignment adjustment with one screw. The illustrations below show which way to turn the screws for the desired alignment. The descriptions for turning the screws are given for someone looking toward the end of the system.
5. Reinke Manufacturing recommends that the alignment and safety switches be replaced after 10 years of service to ensure reliable system operation.

Leading Bow

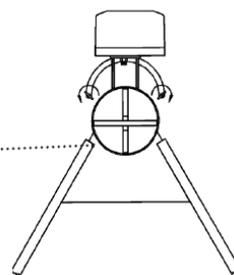
A leading bow can cause problems by creating extreme tension or pull that could cause structural damage.



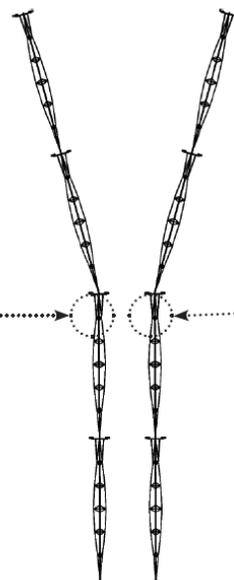
Turn thumbscrews as shown above to correct alignment if the tower is ahead with the system running in the forward direction or behind running in the reverse direction.

Reverse Bow

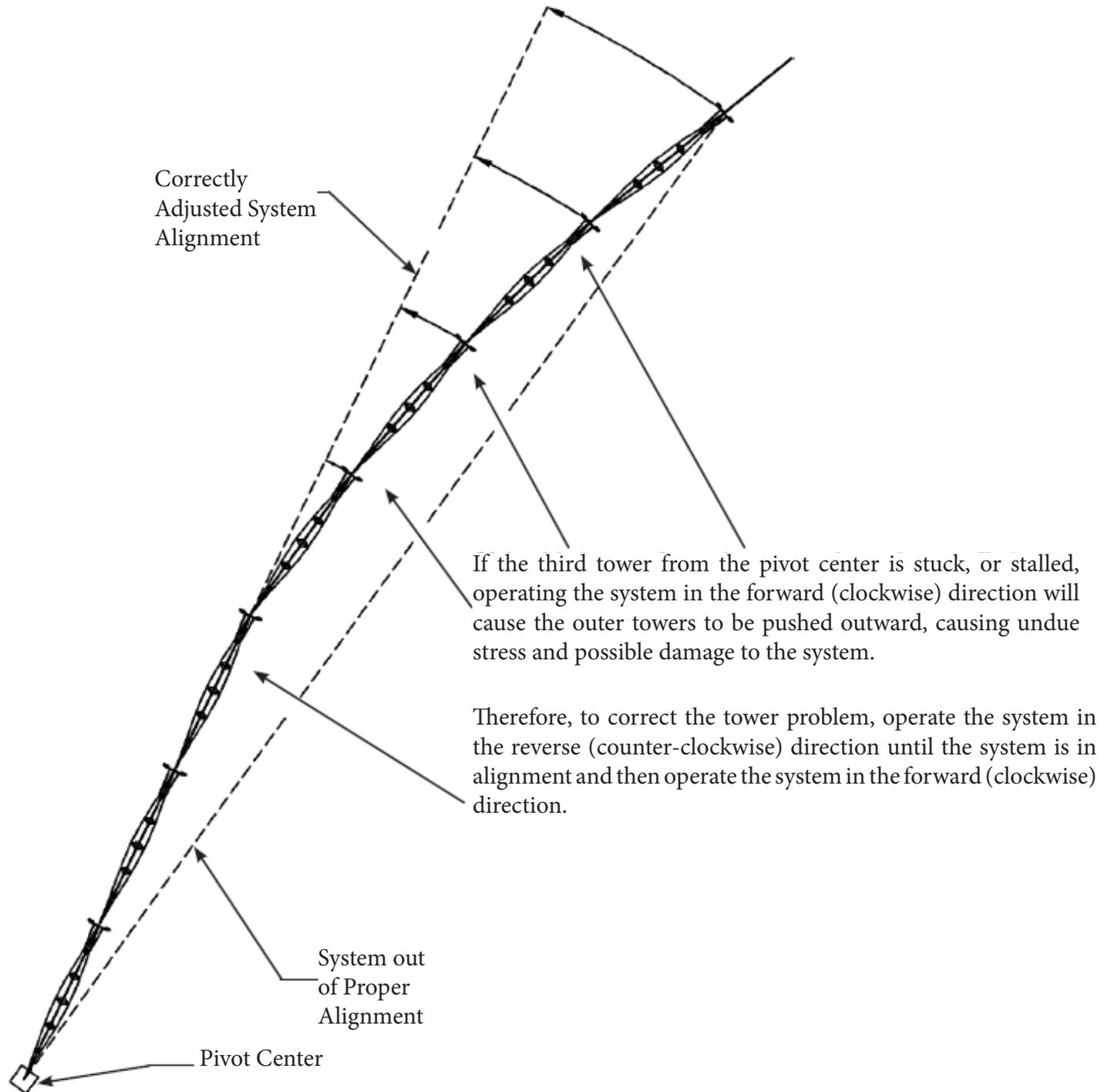
A reverse bow is very critical as it causes a compression of the entire system. When the spans are compressed, they tend to lose their inherent strength.

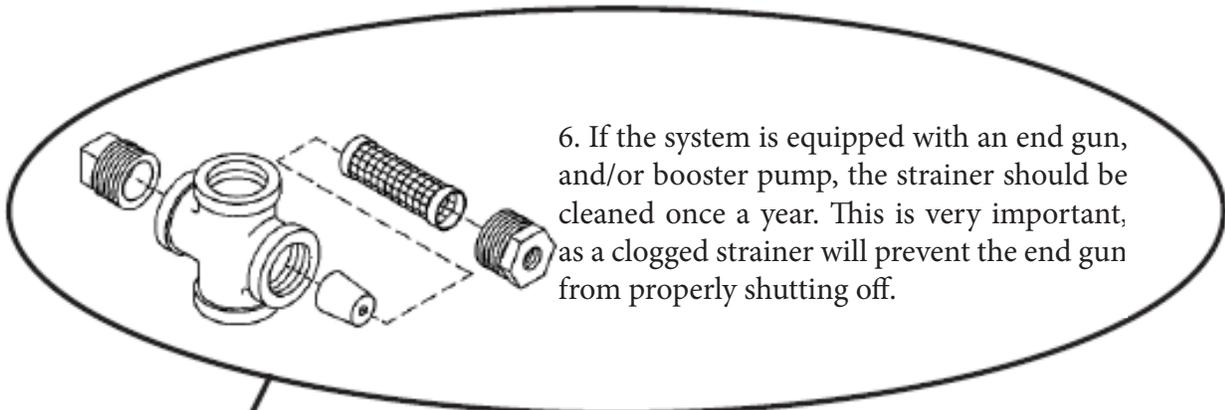


Turn thumbscrews as shown above to correct alignment if the tower is behind with the system running in the forward direction, or ahead running in the reverse direction.

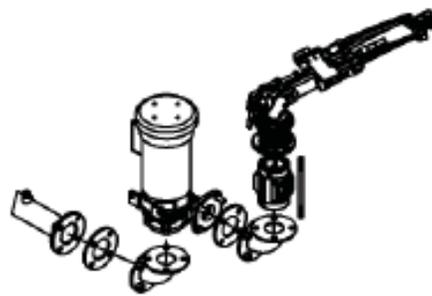


When the system is correctly aligned, it will have a slight bow with the center tower leading. When the direction of travel is changed, the system should bow the same amount only in the opposite direction. If a tower becomes stuck, or some other problem causes it to stop, the towers toward the end of the system will continue to run until the misalignment safety circuit shuts the system down. This results in a bend in the system at that tower. See the drawing below. If the lagging tower is brought into alignment by continuing to run in the same direction, the outer towers will be forced outward to compensate. This causes considerable stress and possible damage to the system's structure. Therefore, after the problem has been corrected, run the system in the opposite direction so the outer towers run back even with the stalled tower. Then it is safe to operate the system in the desired direction.

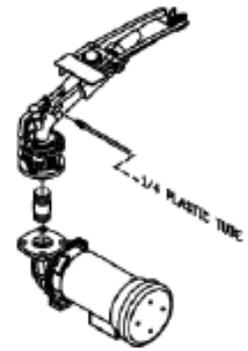




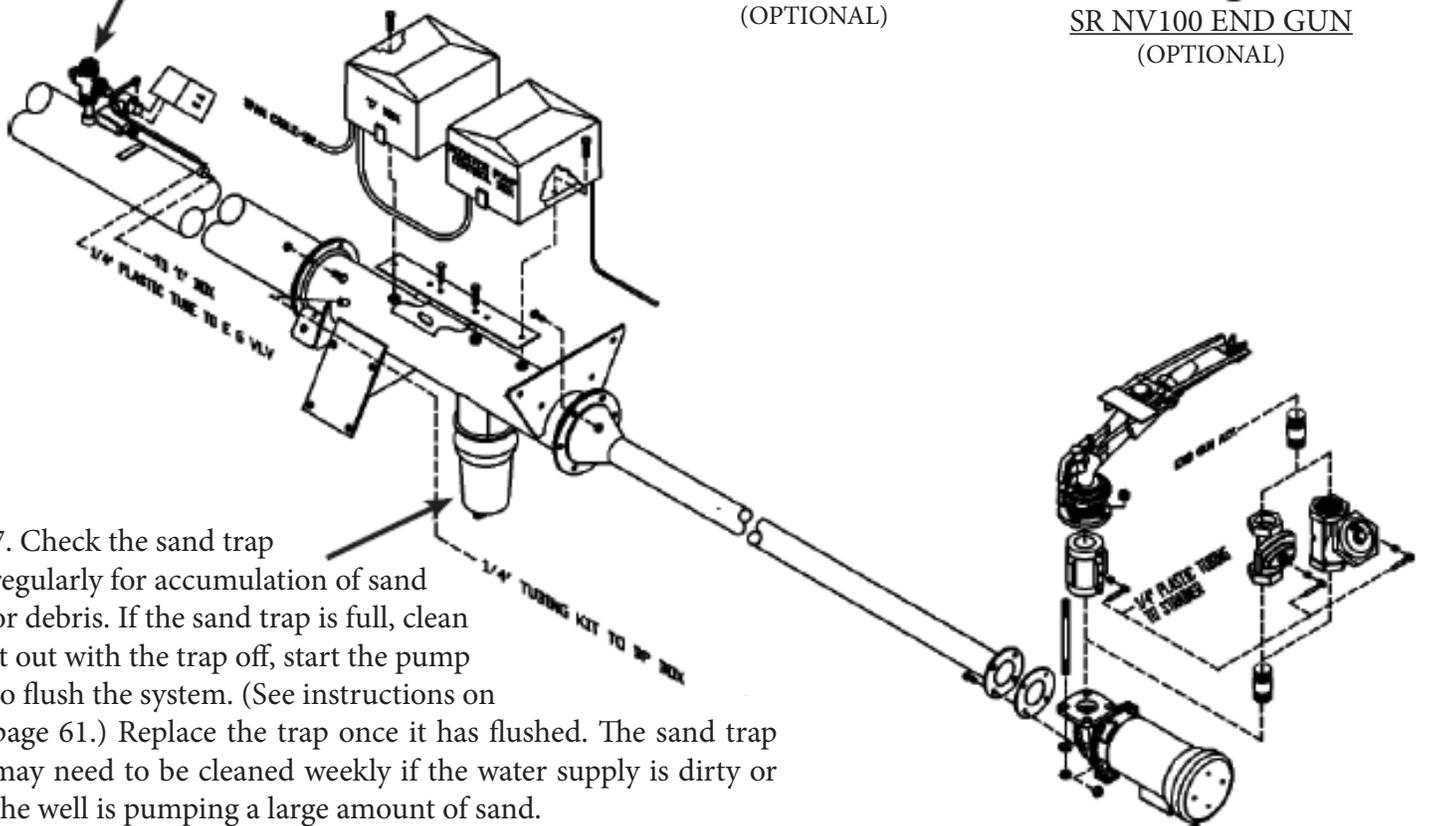
6. If the system is equipped with an end gun, and/or booster pump, the strainer should be cleaned once a year. This is very important, as a clogged strainer will prevent the end gun from properly shutting off.



VERTICAL PUMP MOUNT
(OPTIONAL)



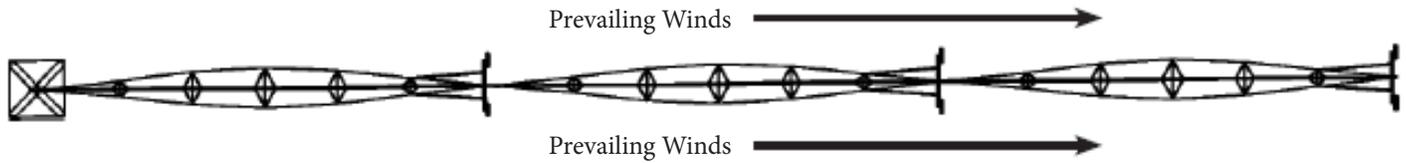
SR NV100 END GUN
(OPTIONAL)



7. Check the sand trap regularly for accumulation of sand or debris. If the sand trap is full, clean it out with the trap off, start the pump to flush the system. (See instructions on page 61.) Replace the trap once it has flushed. The sand trap may need to be cleaned weekly if the water supply is dirty or the well is pumping a large amount of sand.

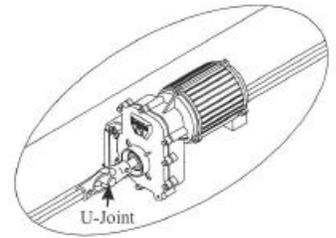
Winterization Procedure

1. Park the system on a smooth surface, out of the wheel ruts. Also, park the system parallel to prevailing winds to avoid, as much as possible, the effects of damaging winds.



2. Flush the system following the same instructions found on page 61.
3. Check the low pressure drains by pushing each one upward in a rotating motion.

3. Grease fittings are located on the pivot (8), at any optional u-joints (1 each). These fittings should be greased with good quality grease. This will prevent corrosion and decrease the amount of moisture accumulation during the idle season.



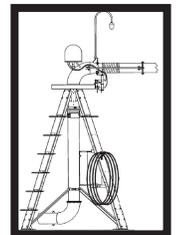
4. Check the oil level in the center drive and towable gearboxes. Water condenses in the gearboxes and should be drained. The water may be drained by loosening the drain plug on the bottom. When the plug is removed, if there is any water, it will be the first to drain out.

Caution *DO NOT overfill any of these gearboxes! Overfilling may result in seal damage. Gearboxes should be filled to the specifications on pages 59-60.*

5. Protect the drive train components from damage if livestock will be pastured during the off season.

6. Sometimes water is trapped between the well and the pivot bottom elbow. Some means of drainage should be installed (if none exists) on or near the check valve and in the underground pipeline.

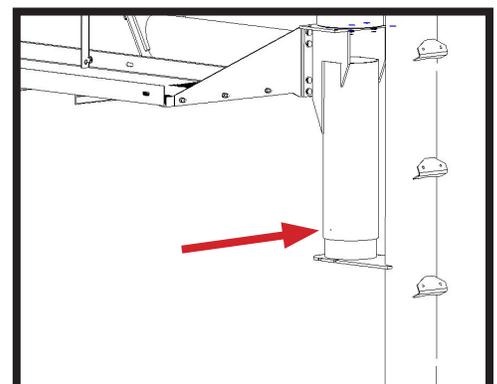
7. Generator power cords, plugs, and receptacles should be protected with waterproof covers. Wrap the cords up and hang them up off the ground.



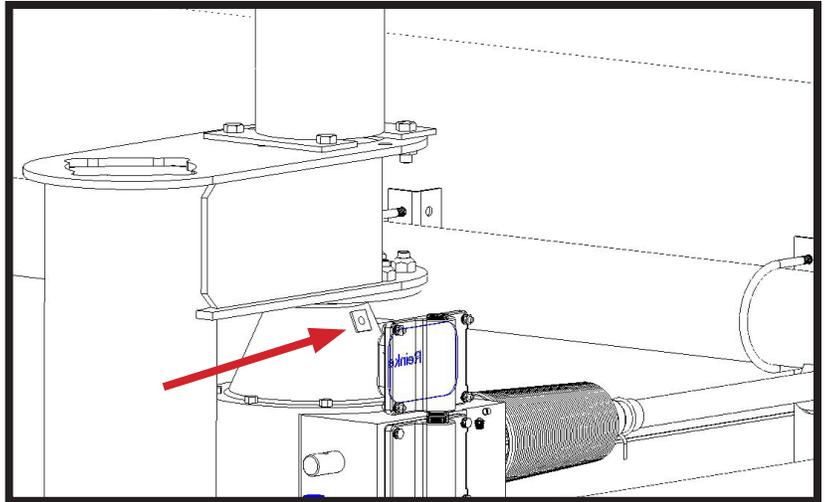
Swing Arm Maintenance

The SAC/SSAC has multiple grease zerks. Greasing the machine should occur annually, at the very least.

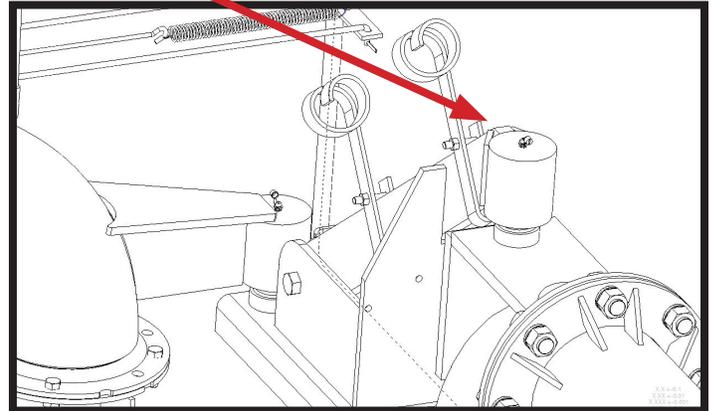
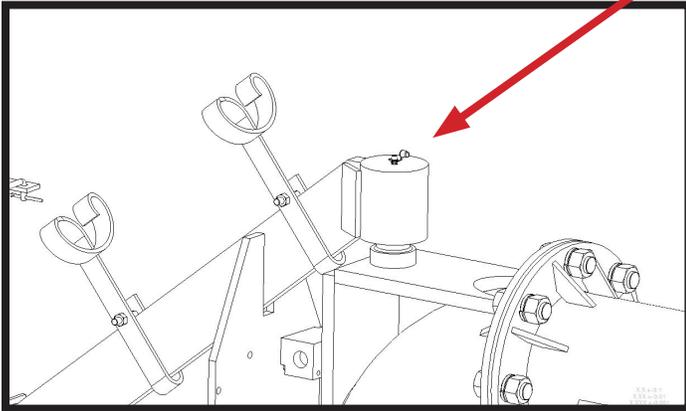
There is a grease zerk located on the leg above the wheel on the swing tower. Add grease until it starts coming out of the bottom of the leg. There is a zerk on each leg of the swing arm.



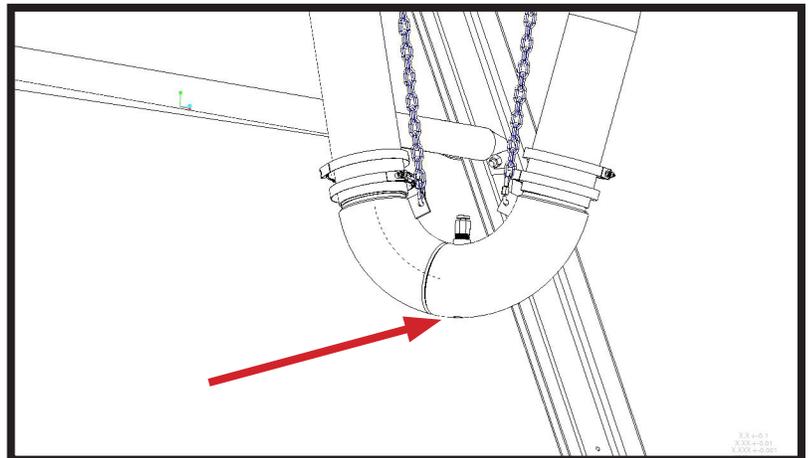
The next area to be greased is on the steering gear of the swing arm. There is one on each leg. Because the gear is on its back, as opposed to standing up, there is a grease zerk installed into the output shaft area. There is also an expansion chamber that is installed to keep the pressure of the oil from leaking out.



The last two grease zerks that are on the swing arm are located at the joint between the swing span and the hinge tower. They keep the ball greased so that the swing span can walk smoothly.



One post-season maintenance item on the swing arm is the elbow that gets the water from the parent machine to the swing span. The “U” pipe has a low pressure drain that can stick because the pressure never gets low enough to release the drain. Once the irrigation season is over, it is good practice to push the drain up and allow the water to drain so that it does not freeze and damage the system.



TROUBLESHOOTING



Before troubleshooting, turn the power at the main control panel OFF and LOCK in position. If you attempt to repair your system and are uncertain of your methods, contact your authorized service person. If a repair is made, replace all protective guards and shields before restoring power to the system.

As a system is being checked for errors, make notes of each situation. This will help to explain the possible problem, and what measures have been completed so far to correct it. The items on the following checklist should be used as a guideline, before contacting a service technician:

- System Serial Number including Model Number
- Optional Equipment (Auto Reverse, Auto Stop, Frost Control, etc.)
- Location of system in the field, and approximate time when the system shut down
- Alignment of the system
- What has been done since the system shut down

PROBLEM I: System will not continue to run when you release the start button.

Possible causes and solutions:

- Set the generator Start/Run switch to the START position.
- Set the pressure override switch to the BYPASS position.
- Set the park override switch to the BYPASS position.
- Make sure the system is not against a tower barricade.
- Check to see if the system is out of line. Check the alignment making sure a stuck tower, a flat tire, or broken u-joint has not caused the system to become out of line.
- A tower does not move. The center drive motors contain an internal overload switch that resets after shutdown. Contact your Reinke dealer or service technician if the problem persists.
- The tower auto-reverse system fails. Check the tower auto-reverse mechanism or contact your Reinke dealer or authorized service technician.

PROBLEM II: System shuts off in line.

Possible causes and solutions:

- Incoming power voltage surges or low voltage may cause the system to shut down.
- If a generator is used, check the belts to make sure they are tight. Make sure the motor is not overheating and shutting off.
- Check to see if the auto-stop switch is against a trip on the cam wheel or the tower is against the barricade. Adjust the switch trips or reverse the system away from the barricade if necessary.
- With the main disconnect switch in the OFF position, check the fuses in the main control panel with an ohmmeter. If no continuity is found in a fuse, replace it. Call your Reinke dealer or authorized service technician if you continue to blow fuses.
- Check fuses in the generator with an ohmmeter. Replace if necessary.

PROBLEM III: System shuts off out of line.

Possible causes and solutions:

- Check the tower where the misalignment occurs to see if the tower is stuck. If this is the case, reverse the system until it is back in line, then add rock or something to the wheel track so the tower can continue on its path.
- Check for flat tires, damaged gearboxes, or broken u-joints where the misalignment occurred.

PROBLEM IV: System will not move in either direction.

Possible causes and solutions:

- No 480 VAC or 230 VAC power to the system.
- A fuse is burned out in the main control panel.
- The start button is defective.
- The main control panel disconnect switch is bad.
- The direction switch is defective.

PROBLEM V: Sprinklers on the swing arm are ON when they should be OFF.

Possible causes and solutions:

- Check for any bad valve tubing. Replace any that are broken or cracked. Do not stretch the tubing tight between connections, it will shrink over time.
- Check each of the coils in the valve box for resistance. They should read 170 to 180 ohms.



Caution

Be sure the power is turned OFF at the main control panel.



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