



OWNER'S MANUAL

SURGE CONTROL WITH THE P&R STAR

Surge irrigation is usually completed in two phases: **ADVANCE** and **SOAK**.

The **ADVANCE** phase pushes water across the field almost twice as fast as continuous flood irrigation. Surge reduces deep percolation and applies water more uniformly. It alternates or cycles the flow between two sets of furrows. Surging normally requires 4 to 6 cycles per side to **ADVANCE** to the end of the field. Each pair of cycle times gets progressively longer, but will advance about the same distance down the field. With surge, both sets should get to the end in about the same time as one set would take with continuous flooding.

The **SOAK** phase begins automatically when **ADVANCE** is complete. It gives you control over the depth of infiltration, and reduces or eliminates runoff. The **SOAK** phase stops **ADVANCE** by using shorter cycle times. Each **SOAK** cycle flows from the top of the furrow all the way to the bottom of the wetted field. **SOAK** cycles repeat continuously. They do not stop until you turn off the controller.

Tell the controller just one number: HOW MANY HOURS OF ADVANCE you need to get water to the end of your field.

It automatically figures for you:

- How many **ADVANCE** cycles are needed,
- How long each **ADVANCE** cycle should be,
- How long the **SOAK** cycles should be.

You have options to change the **ADVANCE** time and the number of **ADVANCE** cycles, change the **SOAK** cycle time, or change the ratio of time between the left and right sides. Changes can be made at any time during a watering. You can also delay the start of your watering for up to 99 hours.

The P&R STAR moves the valve flap in 2 steps with an adjustable pause time between steps, gives you a reading of the battery and solar panel voltage on demand, lets you know if the voltage is low, and communicates in English or Spanish.

GENERAL OPERATION

Please read these instructions thoroughly to get the best performance from your P&R STAR surge controller.

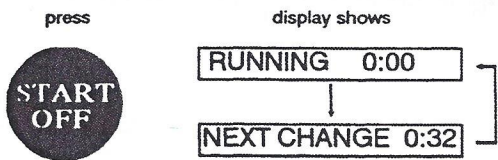
The controller begins **RUNNING** immediately after **START** is pressed.

To set **ADVANCE** time, **SOAK** cycles, or **CUSTOM** functions, press the appropriate function key, then press **[+]** or **[-]** to adjust the setting. Press the same function key again to resume **RUNNING**. If no key is pressed within 30 seconds, the controller will always resume **RUNNING** on its own.

All settings are retained in memory when the controller is turned **OFF**. It is not necessary to re-enter any settings when the controller is re-**STARTED**, unless a different setting is needed.

Very little maintenance is necessary with the P&R surge system. The following tips will help to avoid problems. If the battery gets low, the display will flash "LOW BATTERY". However, the controller will continue to operate for up to a day or two before shutting itself off. A low battery can be avoided by keeping the solar panel clean, keeping the gears between the controller and valve clean, and avoiding short cycles of less than 10 minutes each. Also, set the controller in sunlight at least one week before a new watering season starts to ensure a full charge.

STARTING A SURGE SET



RUNNING time counts up from 0:00 (hours and minutes).

In this example, the valve will change sides 32 minutes from now.

The unit starts running a surge program using the last ADVANCE time that was set.

IMPORTANT: Turn OFF the unit and re-START it each time you start watering a new set of rows.

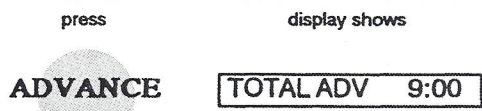
optional



If you need to adjust gates on both sides of the valve, press the CHANGE SIDES button to reverse the direction of water flow.

Changing sides during the first cycle restarts the RUNNING time to 0:00.

SETTING THE ADVANCE TIME



In this example, the unit will run advancing cycles on both sides of the valve for a total of 9 hours.

To increase ADVANCE time, press [+].

To decrease ADVANCE time, press [-].

The unit automatically calculates how many advancing cycles to run and how long they should be, based on the total ADVANCE time.

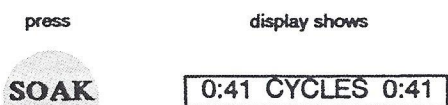
The ADVANCE time may be changed at any time during the watering.

If you set the ADVANCE time to 0:00, the unit will start out running SOAK cycles (which will all be the same length).

SETTING THE LENGTH OF SOAK CYCLES

SOAK cycles are automatically set to a recommended time when you set the ADVANCE time. Adjust only if necessary to control runoff.

SOAK cycles begin running after the ADVANCE time is complete. They repeat continuously until the unit is turned off and restarted.



In this example, each SOAK cycle is 41 minutes (based on 9 hours ADVANCE).

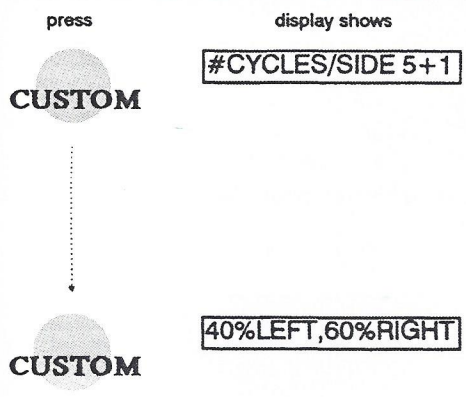
To increase SOAK cycle time, press [+].

To decrease SOAK cycle time, press [-].

Normally all SOAK cycles run the same length of time.

For shorter and shorter SOAK cycles, set the displayed time to 0:00. The display will show "AUTO CYCLES". When the SOAK phase begins, each pair of SOAK cycles will automatically run a little less time than the previous pair.

SETTING THE NUMBER OF ADVANCE CYCLES PER SIDE - SETTING THE LEFT/RIGHT RATIO



In this example, the unit will run 6 ADVANCE cycles per side (the normal 5 plus 1 additional).

To add cycles, press [+].
To subtract cycles, press [-].

The normal number of ADVANCE cycles per side is based on the ADVANCE time.
Although the normal number of cycles will vary with the ADVANCE time, the number added or subtracted remains constant.

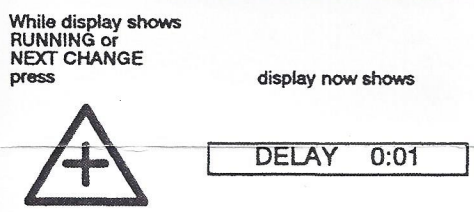
Cycle times will be divided between the left and right sides according to the ratio shown.

The normal left/right ratio is 50/50, giving equal cycle times on each side.

For shorter cycles on the left and longer cycles on the right, press [+].
For longer cycles on the left and shorter cycles on the right, press [-].

A "C" will appear in the RUNNING display to remind you if either of the CUSTOM functions has been changed.

TO DELAY STARTING or PAUSE DURING A SURGE PROGRAM

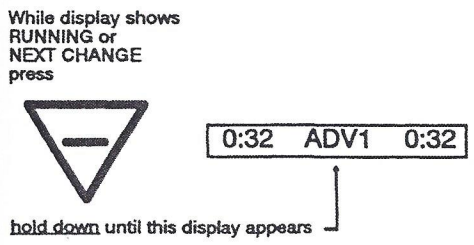


To increase DELAY time, press [+].
To decrease DELAY time, press [-].

DELAY time counts down to zero; then the surge program resumes.
The DELAY time can range from 1 minute to 99 hours and 59 minutes.

TO DISPLAY ALL CYCLE TIMES

Hold down the [-] key for 5 full seconds to access this feature.



The first pair of ADVANCE cycles is displayed. This example shows 32 minutes per side.

This display simply shows how long each cycle will be. The cycles are not adjustable in this display.

Press [-] or [CUSTOM] to see the rest of the cycle times.

THE LANGUAGE BUTTON

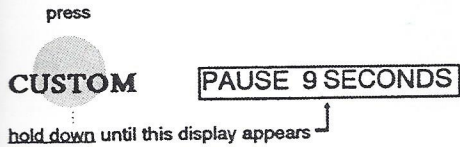


Pressing the Language button changes the display from English to Spanish and vice versa.

SETTING THE VALVE PAUSE - - CHECKING THE BATTERY & SOLAR PANEL

Hold down the CUSTOM button for 3 full seconds to access these features.

When changing sides, the valve turns in 2 steps with a pause between steps. The duration of the pause and the position of the pause is adjustable. The following examples illustrate how to set the valve so it opens 40% - pauses for 9 seconds - then continues turning until it closes on the opposite side. The settings will control how the valve operates each time it changes sides. **NOTE: The controller will not pause unless it is mounted on a valve.**



To increase the PAUSE time, press [+].
To decrease the PAUSE time, press [-].

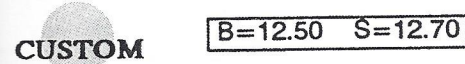
The PAUSE time can be adjusted from 0 to 99 seconds. If it is set to 0, no pause will occur.



To increase the position, press [+].
To decrease the position, press [-].

The pause position can be adjusted from 20% to 80%. A setting of 50% would make the valve PAUSE at the center when changing sides.

If the PAUSE time is set to 0 no pause will occur, so the position is ignored.



The battery and solar panel voltages are displayed. They are not adjustable.

The battery voltage may vary from 12.00 - 14.70 volts during normal operation.

----- CHECKING THE BATTERY AND SOLAR PANEL -----



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