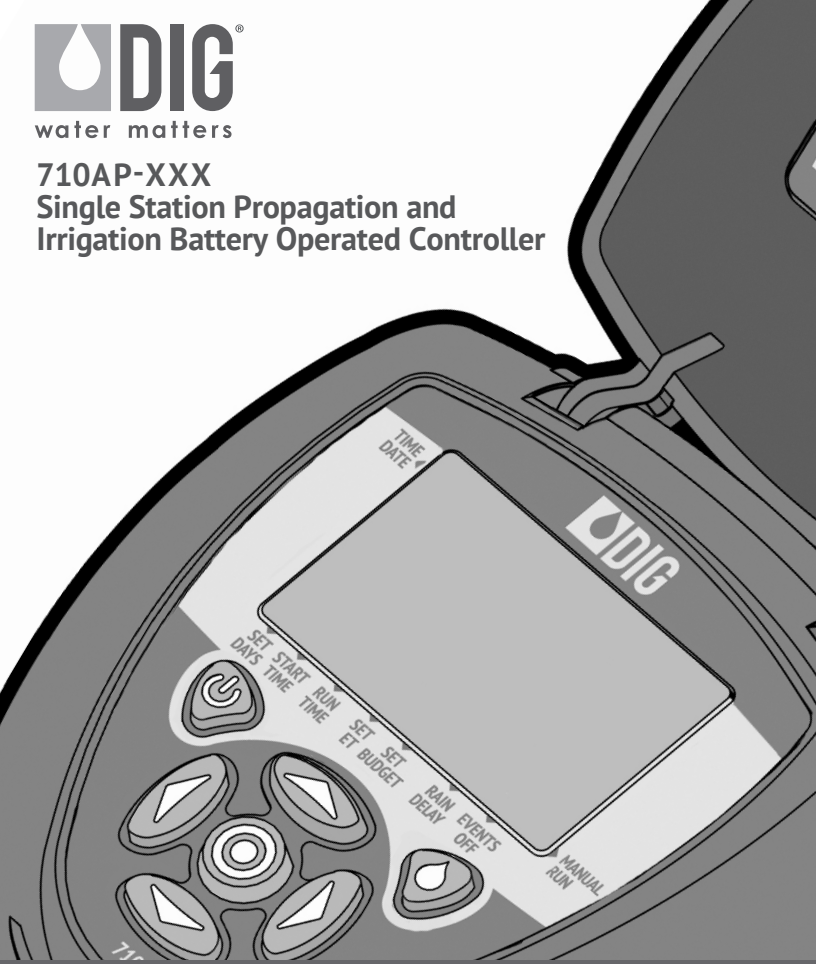
DIG®
water matters

710AP-XXX
Single Station Propagation and Irrigation Battery Operated Controller



INSTRUCTION MANUAL

TABLE OF CONTENTS

INTRODUCTION

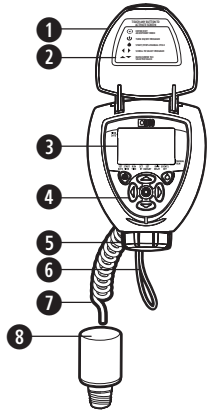
Thank you for purchasing DIG's 710AP Series Single Station propagation and irrigation Battery Operated Controller. This manual describes how to get the 710AP series controller up and running quickly. After reading this manual and becoming familiar with the basic functionality of the controller, use the manual as a reference for less common tasks in the future.

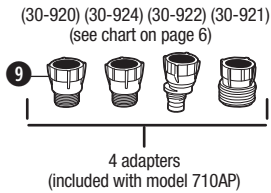
1. ABOUT THE CONTROLLER

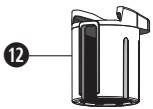
The 710AP propagation and irrigation controller employs the latest in propagation and irrigation programming features to allow for complete control of any system and is available assembled on an in-line valve, or controller alone with solenoid adapters to fit most manufacturers' valves. The 710AP series is available in single station with a rain sensor connection, and is powered by two AA batteries that can last up to 3 years in irrigation mode (using name brand alkaline batteries). The controller is enclosed in a rugged, compact, waterproof housing to protect it from the elements and to ensure a long, trouble-free life.

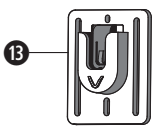
2. COMPONENT IDENTIFICATION

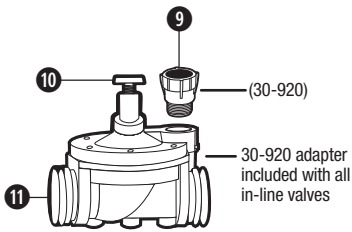
1. Controller cover
2. Quick reference label
3. LCD displays the icon-based applications / programs
4. 7 button programming keypad: Use for programming, system on/off, manual run and reviewing program
5. Battery compartment cap for two AA alkaline batteries (not included)
6. Rain sensor yellow wire connection
7. Collapsible 36 in. solenoid wire
8. DC solenoid with 11/16 in. UN thread
9. Solenoid adapters
10. Manual flow control
11. 3/4 in. professional grade in-line valve
12. Solenoid mount adapter
13. Wall/Valve box mounting bracket



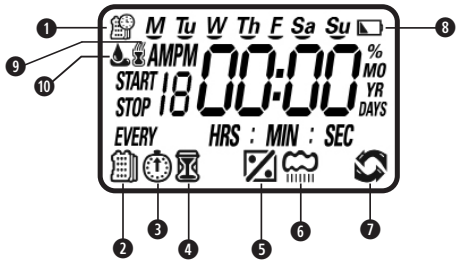








3. LCD DISPLAY AND CONTROLS



LCD Display

1. **Time and Date icon –** Indicates current time and day
2. **Set Watering Days icon –** Indicates the scheduling setting
3. **Start Time icon –** Indicates the start time setting
4. **Run Time icon –** Indicates the run time setting
5. **Monthly Budget icon –** Indicates the monthly budget setting or that monthly budgeting is active
6. **Rain Delay icon –** Indicates the rain delay setting or that a rain delay is active
7. **Manual Run icon –** Indicates the manual run screen or that a valve or program is being run manually
8. **Battery Indicator icon –** Flashes when batteries need to be replaced
9. **Sensor icon –** Indicates that a rain sensor is connected and active
10. **Watering icon –** Indicates that a valve is open and running

Control Buttons

Enter/Exit adjustment mode

Turn On/Off program*

Start/Stop a manual cycle

Scroll to select a value to adjust

Raise/Lower the selected value

*NOTE: Turning the controller OFF using the button will suspend all scheduled programming and OFF will appear on the display. The Manual Run feature will still function when the controller is OFF.

4. VALVE OR WALL MOUNTING

4.1 VALVE MOUNTING

1. Slide the controller ❶ into the controller valve mount ❷.
2. Press the controller with the valve onto the solenoid in the desired position.

4.2 WALL MOUNTING

2. Place the mounting plate ❹ on the wall and secure using 3 screws (not included).
3. Slide the controller assembly ❸ up and into the mounting plate to secure. (Mounting solenoid sleeve is not used).

NOTE: The length of the controller connecting cable limits the distance between the controller and the solenoid.

Figure A

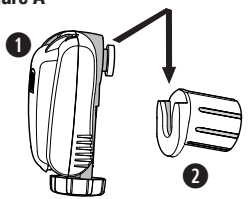
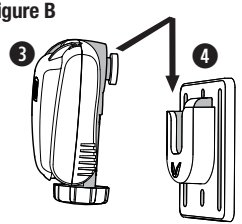


Figure B



5. INSTALLING THE BATTERIES

1. Open the battery compartment cap by turning it counter-clockwise.
2. Install two, fresh, brand name, AA alkaline batteries (not included) and ***note the proper direction of the positive and negative orientation on the underside of the controller.***

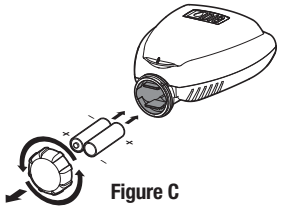


Figure C

3. Insert and screw the battery cap clockwise. Make sure to securely tighten the cover firmly by hand only. The controller display appears with a day, PM, and the hour digit flashing. The controller is ready to be installed and programmed.

6. VALVE ADAPTER INSTALLATION 710AP

The 710AP-000 (only) controller includes 4 adapters to retrofit DIG, Rainbird, Hunter and Toro valves. Follow the instructions below to install.

1. Shut off the main water supply
2. Remove the existing solenoid if applicable.
   NOTE: If adapting to an IRRITROL valve, remove the solenoid but **leave the existing solenoid adapter installed.**
3. Select the appropriate solenoid adapter associated with the valve (see chart A). (Available through your distributor)
4. Screw the solenoid adapter into the valve bonnet by hand, tighten with pliers if necessary – but do not over tighten.
5. Thread the 710AP series solenoid into the valve adapter. Hand tighten only.

6. Turn the main water supply on and pressurize the valve; the valve may discharge water momentarily but should then shut off.

7. Test the controller and the installation by pushing the button to perform a manual run (or see section 16). To turn the valve on via the solenoid, lift the 710AP series controller from the solenoid and turn the solenoid counter clockwise 1/2 to 3/4 of a turn, or until you hear or see water flowing through the valve. To turn the water off, turn the solenoid clockwise 1/2 to 3/4 of a turn and wait for the a few seconds for the valve to close.

Chart A

Model	Compatible Valves
30-920 INCLUDED 	DIG series S305DC, BERMAD series 200, HIT series 500, DOROT series 80, GRISWOLD series2000, DW and BUCKNER series VB valves
30-921 INCLUDED 	RAIN BIRD DV, DVF, PGA, PEB (1" only), GB, EFB-CP, BPE, PESB (1" only) and ASVF valves
30-922 INCLUDED 	HUNTER series ASV, HPV, ICV,PGV, SRV, IBV and ASVF valves
30-923* 	WEATHERMATIC series 12000, 21000, 8200CR valves
30-924 INCLUDED 	IRRITROL series 100, 200B, 205, 217B, 700, 2400, 2500, 2600 and TORO series 220, P220 valves

*INCLUDED WITH MODEL 710AP-000

7. IN-LINE VALVE INSTALLATION 710AP

Operating pressure: 10-150 PSI

Recommended operating pressure: 10-80 PSI

Warning: Wrap all fittings with Teflon tape. Do not use pipe cement on the valve as this will damage the valve and void the warranty.

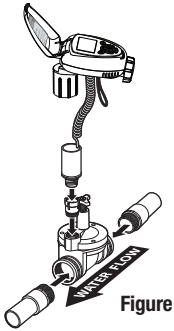


Figure E

1. Shut off main water supply.
2. Install a 3/4 in. ball or gate valve onto the PVC pipe or to the valve manifold before installing the controller (Figure F and G).
3. Turn water supply on to flush the line and then shut the water off using the ball or gate valve.
4. Wrap the male threads of the PVC adapters with 4-6 layers of Teflon tape, then tighten into the valve with a wrench.
5. Glue fittings to PVC main line and allow to dry.
6. Turn water supply on to pressurize the system. The controller will open momentarily and then will shut off.
7. The unit is now ready to be programmed.

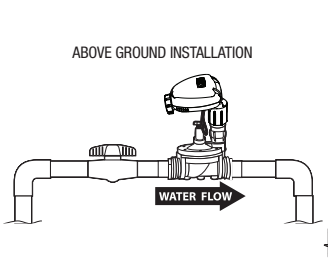


Figure F

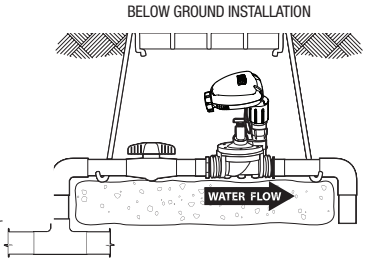


Figure G

8. PROGRAMMING

This section explains the programming features and the steps necessary to assign irrigation or propagation schedules. To program the controller use the ◀ or ▶ buttons to select the desired program setting, then push ◎ to make the entry flash and the ▼▲ buttons to change the value. **Only a flashing value can be changed.** This controller features a normal irrigation mode as well as a propagation mode. Changing the controller's mode is explained in section 10 (Setting Watering Frequency).

NOTE: The program settings are arranged in a circle. The ◀ or ▶ buttons can be used to go from one setting to another in either backwards or forwards motion. This guide is written in a linear fashion using only the ▶ button to move between settings, but the controller does not need to be programmed linearly. The ◀ or ▶ buttons can be used to visit any setting in any order for either modification or review. Figure H below shows how the settings are arranged.

Figure H

9. SETTING TIME AND DATE

The controller can display the time in either a 12 or 24 hour format.
To change the time format, from the current time (after it has been set):

1. Push and hold the ▼ button for three seconds until the display switches format (AM/PM disappears).

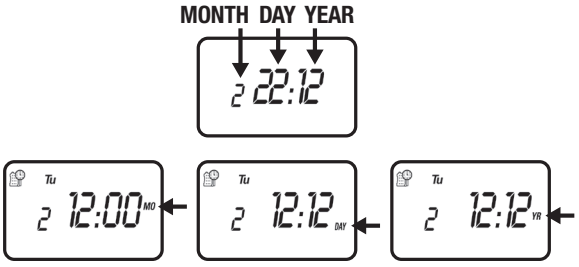
SETTING THE CURRENT TIME AND DATE

To enable the controller to operate properly, the current time and date must be set.

2. Push ◎ to select the hour and adjust using ▼▲. AM/PM is changed by increasing or decreasing the hour.

   NOTE: If the batteries have just been inserted for the first time, the ◎ button should not be pushed to select the hour, it will have already been selected by default.

3. Continue to push ▶ to set the minutes, and current month, day, then year.



4. Push ◎ to confirm your settings. The current day is set automatically.

Push ▶ to proceed to the next step Set Days.

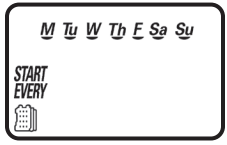
10. SETTING WATERING FREQUENCY

This setting determines how often (in days, hours, or minutes) the 710AP controller will operate. Choose either watering on specific days of the week, Even/Odd days, by-hour or by-minute propagation mode, or daily cyclical from once a day up to every 30 days. The controller's default setting is to water on all specific days of the week (all days are underscored).

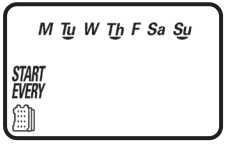
This controller features two programming modes, one for normal irrigation and one for propagation. The propagation mode is programmed in a slightly different manner and is given its own section in this instruction manual. To switch between the modes, simply change the watering frequency; propagation mode operates when a by-hour or by-minute frequency is chosen and normal irrigation operates when any other frequency is chosen.

Option 1 – Setting Specific Days of the Week:

1. Push ▶ to select Set Days. By default all days are set to water.



2. Push ◎ and M will begin to flash. Advance through days of the week using ◀ ▶. Deselect or select a day to water using ▼ ▲.



F WATERING DAY

F NON-WATERING DAY

3. Push ◎ to confirm your settings.

Option 2 – Setting Even or Odd Days:

1. Push ▶ to select Set Days.
2. Push ◎ and M will begin to flash then advance through days of the week using ▶ until Even appears flashing, push ▼ ▲ to select Odd.

3. Push ◎ to confirm your settings.

Option 3 – Propagation Mode, Watering by Minute or Hour

1. This option is used to program the controller to operate the system in a cyclical (propagation mode) manner from once every 1 minute up to every 12 hours.

   Example: If a 5 minute watering frequency is selected, the controller will water for the selected run time every 5 minutes from the entered start time until the entered stop time every day until canceled by changing the program or turning off irrigation.

NOTE: This mode is programmed differently. If you would like to proceed with the controller in propagation mode, skip to section 15. Otherwise, continue on to Option 4.

Option 4 – Watering Once Every X Days (Cyclical Watering)

1. Push ▶ to select Set Days.
2. Push ◎ and M will begin to flash then advance through days of the week using ▶ until 1 DAY appears flashing.
3. Push ▼▲ to select to water once every 1 to 30 days.

4. Push ◎ to confirm your settings.

To set the controller back to specific days mode:

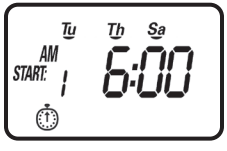
1. Push ▶ to select Set Days. Previously selected days will be saved.
2. Push ◎ and then push ▶ until the days of the week can be seen at the top of the LCD screen.
3. Push ▶ and advance through days of the week using ◀ ▶ and select each day to water using ▼▲ .
4. Push ◎ to confirm your settings.

Push the ▶ button to proceed to the next step Start Time.

11. SETTING START TIMES

The 710AP controller can have up to five separate irrigation start times per day set up for irrigation. If in propagation mode, only one start time is available (along with a stop time).

1. Push ▶ to select Start Time. By default Start Time 1 is set to 6:00 AM.
   You can view all start times by pushing ▼▲ .

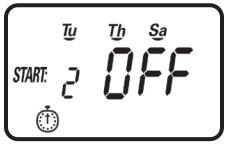


2. Push ◎ to select the hour and adjust using ▼▲ then push ▶ to set minutes.
3. Push ◎ to confirm your settings.

4. To set additional start times push then push through the hours and minutes to the next desired Start Time. Up to 5 start times can be programmed.

To delete a start time:

1. Push to select Start Time and push to enter adjustment mode.
2. Push or to advance the hours until the display shows OFF.



3. Push to confirm your settings and scroll through to review all start times by pushing .

Push the button to proceed to the next step Run Time .

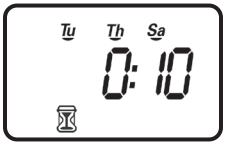
NOTE: In Propagation Mode, the controller will begin watering on the entered start time for the run time entered. It will then operate every X minutes or hours depending on what was entered for the watering frequency until it hits the stop time where it will stop for the rest of the day. Watering will begin again on the next day at the start time. Please see section 15 for more information.

12. SETTING WATERING RUN TIMES

This setting determines the length of time the 710AP controller will allow the valve to remain open (run time is from 1 minute up to 5 hours and 59 minutes in Irrigation Mode and from 5 seconds up to 59 minutes and 59 seconds in Propagation Mode). For example, setting watering run time to 10 minutes on certain days of the week will program the controller to turn the water on for 10 minutes on each of the days chosen and at every start time selected.

To set the watering run time:

1. Push ▶ to select Run Time. By default the Run Time is set to 5 min.
2. Push ◎ to select the hour and adjust using ▼▲ then push ▶ to set the minutes.



3. Push ◎ to confirm your settings.

Push the ▶ button to proceed to the next step Seasonal Adjustment (Monthly Budget) %.

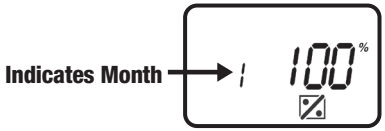
13. SETTING SEASONAL ADJUSTMENT (MONTHLY BUDGET)

The Seasonal Adjustment percentage feature can be utilized to alter the programmed watering run time on a monthly basis.

NOTE: This setting is not available while in Propagation Mode.

To set seasonal adjustment in %:

1. Push ▶ to select Set Budget %.
   You can review all monthly budgeting settings by pushing ▼▲.



2. Push the ◎ button and the 100% appears flashing.
3. To set the desired seasonal adjustment % (5-200%), Push ▲ or ▼.
   Example, if a 20 minute duration is programmed, and then the monthly budget is changed from 100% to 50%, the duration will now be 10 minutes for the selected month.

4. Repeat the steps to set the desired seasonal adjustment % for each month by pushing ▶ and following the previous steps for each month.
5. Push ◎ to confirm settings.

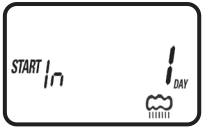
Push the ▶ button to proceed to the next step Rain Delay.

14. RAIN DELAY SETTING

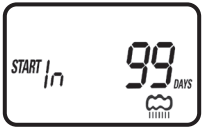
This feature is used to shut down the controller in winter or when it is raining. It can also be used to delay starting any programming until a later date. Set schedules will be retained and programmed watering will resume after the set delayed time is completed.

1. Push ▶ to select Rain Delay.

2. Push ◎ then adjust to the number of days to suspend watering using ▼▲. You can set up to 99 days.



3. Push ◎ to confirm your settings.



To cancel the Rain Delay, set the days to OFF using ▼▲.

Note: OFF appears in between numeric value of 99 and 1.

Push the ▶ button to return to the main screen, programming is completed.

15. PROPAGATION MODE

To set the controller into propagation mode:

1. Push ▶ until Set Days is selected.
2. Push ◎ to edit this setting and push ▶ until 1:00 and HRS appears flashing.
3. This setting allows an interval of every 1 minute up to 12 hours to be set as the watering frequency. Push ▲ or ▼ to modify the hours.
4. Push ▶ and the minutes and MIN will flash. Push ▲ or ▼ to modify the minutes.
5. Push ◎ to confirm your settings.

NOTE: If the frequency selected is less than the currently set run time (the default run time is 1 minute), the controller will flash Err for 3 seconds and then return to this screen with an allowed frequency. Push ◎ again to confirm the new settings.

After the controller is in propagation mode, proceed to the next screen, Start Time. In propagation mode, this screen contains a start time and the stop time. The start time denotes when the controller will start running the frequency set and the stop time denotes when it will stop.

To set start time:

1. Push ▶ to select ⏱ (START will appear on the display on the left).
2. Push ◎ to cause the hours digit to flash and adjust it using ▲ or ▼ then push ▶ and ▲ or ▼ to set minutes.
3. Push ◎ to confirm your settings.

The stop time is located on this screen as well.

To set the stop time:

1. Push ▲ to view the stop time (STOP will appear on the display on the left).
2. Push ◎ to cause the hours digit to flash and adjust it using ▲ or ▼ then push ▶ and ▲ or ▼ to set minutes.
3. Push ◎ to confirm your settings.
4. You can review your settings for start and stop time on this screen at any time by pushing ▲ or ▼ .

NOTE: To start the program outside of the set start time, you can push the ⏻ button from this screen to start it. Once started, the program will function as normal, stopping at the stop time and starting again the next day at the set start time. For example, if the start time set is 6:00 AM, but programming is taking place at 10:00 AM, the ⏻ button can be used to start the program immediately instead of waiting until 6:00 AM the next day. Before using this option, make sure that the start time, stop time, run time and frequency settings are finalized and correct.

Once a start and stop time have been set, push ▶ to continue on to the Run Time ⧗ screen. On this screen, HRS : MIN has been replaced by MIN : SEC to denote that the time is now in minutes and seconds instead of hours and minutes. In propagation mode, the run time must be in between 0:05 (5 seconds) and 59:59 (59 minutes and 59 seconds). To set the run time:

1. On the ⧗ screen, push ◎ to make MIN and the minutes digit flash.
2. Push ▲ or ▼ to modify the number of minutes and then ▶ and ▲ or ▼ to set seconds.
3. Push ◎ to confirm your settings.

NOTE: If the run time entered is under 0:05 (5 seconds) or longer than the frequency selected, the screen will flash Err for 3 seconds and then return to this screen with an allowed run time. Push ◎ again to confirm the new settings.

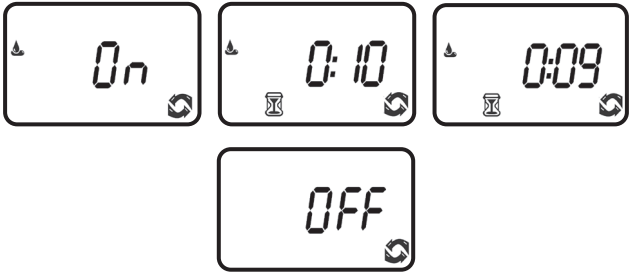
Programming is now completed. You can push the ▶ button to continue to the Rain Delay setting and see section 14 on the Rain Delay or push ▶ again to continue back to the main screen. Use the ◀ ▶ buttons to review or modify all of your settings.

16. MANUAL WATERING

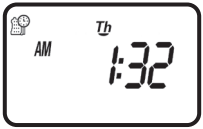
The manual mode allows the user to test the system and water for a specified run time. The controller will automatically close the valve at the end of the defined irrigation period. The originally programmed irrigation schedules will continue to function at the times assigned. The sensor condition and OFF mode is disregarded in this mode.

To start a manual run,

1. Push the button and the icon and icon appear. ON appears momentarily and then the last watering run time is displayed with . The controller will open the valve and in 3-5 seconds a count down of the remaining irrigation run time appears, showing when the controller will close the valve. The default run time is 5 minutes. Adjust to the desired manual run time length by pushing .



2. Push the button to end manual run.
3. After 3-5 seconds the display will revert to the current time screen.



17. CONNECTING A RAIN SENSOR

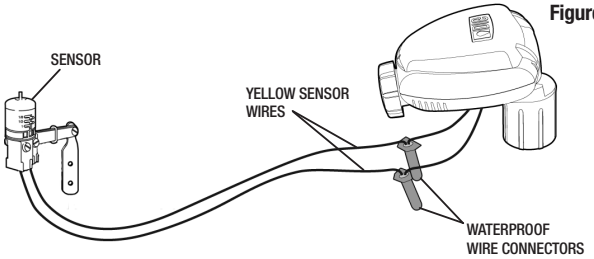
Most “normally closed” rain or soil moisture sensors can be connected to the 710AP controller. The function of the sensor is to prevent automatic watering by the set program due to excessive rainfall or when the soil is too moist.

To connect the sensor to the controller, please follow these steps:

1. Cut the yellow wire loop that exits the controller in the middle of the loop.
2. Strip approximately 1/2 in. of insulation from the end of each wire.
3. Splice one yellow wire to each of the wires coming from the sensor. Use waterproof wire connectors to secure the connections.
4. Follow the sensor manufacturer’s instructions for calibrating the sensor.
5. When the sensor is active and preventing automatic operation, a icon will appear on the display.

   The icon will only appear when the sensor is active.

Figure V



Recommended rain sensors are the Rain Bird RSD and Hunter Mini-Clik

Recommended soil moisture sensor is the Irrometer WEM-B

To restore the controller to the default settings

1. Push the ▶ button until ***START EVERY*** is displayed and the  icon appears on the bottom left of the screen.
2. Push and hold down the ▲ button for three seconds.
3. The screen returns to the home screen (clock) and all the default settings are restored. The current time and date is retained.

18. MAINTENANCE, TROUBLESHOOTING AND REPAIRS

PROBLEM: Valve is not opening automatically or manually
CAUSE: No water pressure
SOLUTION: Open main water supply valve
CAUSE: Faulty solenoid
SOLUTION: Replace solenoid
CAUSE: Flow control handle is turned down
SOLUTION: Open flow control handle on valve

PROBLEM: Valve functions in manual mode but not automatically
CAUSE: Controller is set to OFF mode
SOLUTION: Verify that controller does not show OFF in current time mode
CAUSE: AM/PM not set correctly in current time mode
SOLUTION: Check current time, change AM/PM if necessary
CAUSE: AM/PM not set correctly in start time mode
SOLUTION: Check start time(s), change AM/PM if necessary
CAUSE: Watering restriction or rain delay is preventing watering
SOLUTION: Remove watering restrictions or set rain delay to off
CAUSE: Yellow sensor wires have been cut
SOLUTION: Re-connect sensor wires together with waterproof connector
CAUSE: Sensor is installed and is in a state that prevents watering
SOLUTION: Check sensor and wire splices and verify sensor is normally closed

PROBLEM: The display is blank

CAUSE: No buttons have been pushed in the previous 15 minutes

SOLUTION: Push any button

PROBLEM: Valve fails to close

CAUSE: Valve is installed backwards

SOLUTION: Check flow arrow and verify arrows point away from water source

CAUSE: Debris is blocking solenoid port

SOLUTION: Shut off water supply, unscrew and remove solenoid, then open water supply and flush out solenoid port, re-install solenoid

PROBLEM: Rain sensor does not prevent watering

CAUSE: Rain sensor is normally open, malfunctioning, or not wired correctly

SOLUTION: Verify that sensor icon appears on display when pin is pushed down & check all wire splices

PROBLEM: Controller waters more than once per day

CAUSE: More than one start time has been programmed

SOLUTION: Change start time 2,3,4, and 5 to OFF

19. TECHNICAL ASSISTANCE

Should you encounter any problem(s) with this product or if you do not understand its many features, please refer to this instruction manual first. If further assistance is required, DIG offers the following customer support:

TECHNICAL SERVICE USA

- DIG's Technical Service Team is available to answer questions in from 8:00 AM to 5:00 PM (PST) Monday-Friday (except holidays) at 760-727-0914.
- Questions in English and Spanish can be emailed to: questions@digcorp.com or faxed to 760-727-0282.
- Specification documents and manuals are available for downloading in English and Spanish at www.digcorp.com.

20. WARRANTY

DIG CORPORATION warrants these products to be free from defects in material and workmanship for a period of three years from date of purchase. This warranty does not cover damage resulting from accident, misuse, neglect, modification, improper installation or subjection to line pressure in excess of DIG CORPORATION'S recommendations. This warranty shall extend only to the original purchaser of the product for use by the purchaser.

The obligation of DIG CORPORATION under this warranty is limited to repairing or replacing at its factory this product which shall be returned to the factory within three years after the original purchase and which on examination is found to contain defects in material and workmanship. **DIG CORPORATION SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND; THE SOLE OBLIGATION OF DIG BEING LIMITED TO REPAIR OR REPLACEMENT OF DEFECTIVE PRODUCTS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.**

Unattended use for prolonged periods without inspection to verify proper operation is beyond the intended use of this product, and any damage resulting from such use shall not be the responsibility of DIG CORPORATION. There are no warranties, which extend beyond the description on the face hereof. In the case of purchase of the product for use other than, for irrigation purposes, DIG CORPORATION hereby disclaims any implied warranties including any warranties of merchantability and fitness for a particular purpose. In the case of the purchase of the product for personal, family or household purposes, DIG CORPORATION disclaims any such warranties to the extent permitted by law. To the extent that any such disclaimer or implied warranties shall be ineffectual, then any implied warranties shall be limited in duration to a period of three years from the date of the original purchase for use by the purchaser. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

In order to obtain performance under this warranty, the unit must be returned to the factory, along with proof of purchase indicating original date of purchase, shipping prepaid, addressed as follows:

DIG CORPORATION, 1210 Activity Drive, Vista, CA 92081. Repaired or replaced units will be shipped prepaid to the name and address supplied with the unit returned under warranty. Allow four weeks for repairs and shipping time. Repair of damaged units not otherwise within warranty may be refused or done at a reasonable cost or charge at the option of DIG CORPORATION.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

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