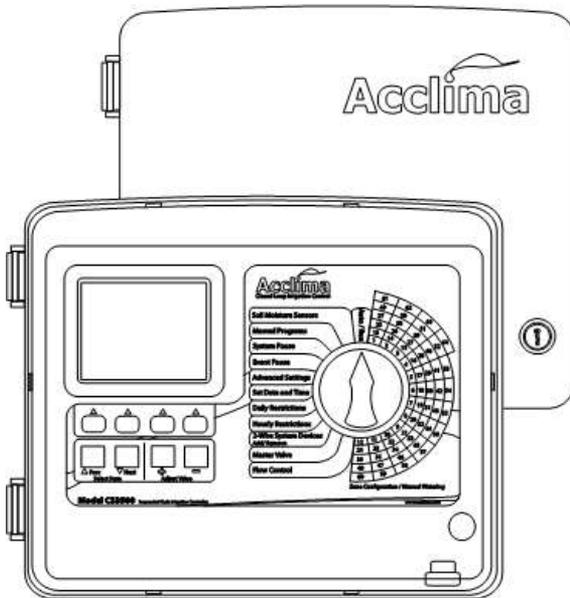Acclima
Closed Loop Irrigation Systems

User Manual for CS3500 Controller

Water on Demand® 2-Wire Irrigation Controller

The CS3500 is an advanced computerized irrigation controller using patented Digital TDT soil moisture sensors to accurately and efficiently control irrigation. The CS3500 uses advanced 2-Wire system design and is a powerful, yet flexible controller that can be monitored remotely over the internet or phone line using Irrigation Manager™ Software.

Part Number: **ACC-CON-WD64**

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Before you Begin

Water on Demand®

The Acclima CS3500 is a Water on Demand® irrigation system that accurately measures soil moisture and controls an irrigation system with up to 64 zones and 10 Acclima Digital TDT® Soil Moisture Sensors.

> Typical irrigation timers are programmed to water at regular timed intervals, whether water is needed or not. The Acclima CS3500 Water on Demand® Controller waters only when water is needed by the plants.

2-Wire System

The Acclima CS3500 uses a patented 2-wire system allowing the controller to communicate with all sensors, valves and accessories in the system. The advanced 2-wire system saves copper wire at installation and facilitates adding zones and upgrading landscaping without the need to dig trenches to add more zone wires back to the controller. An existing conventionally-wired system can be converted to a 2-wire system.

Flow Control

The Acclima CS3500 allows up to 4 zones to water simultaneously. To avoid low pressure when watering multiple zones the flow rates of each zone and the flow capacity of the water source are programmed into the system. The Acclima CS3500 will automatically maximize the use of your water supply without exceeding its capacity.

Sensors

Closed Loop Irrigation® (irrigation controlled by accurate moisture feedback from the root zone) is made possible through soil moisture sensors buried in the root zone of your lawns and shrubs. Acclima's Digital TDT® Sensors provide stable, accurate soil moisture readings year after year through widely varying soil temperature and soil chemistry conditions.

Installation

Controller

Mounting

The control box may be installed indoors or outdoors. It must have access to 110 volt power and to a #6 or #10 bare copper grounding conductor to an exterior ground rod.

1. Open the front cover of the controller. The weather-tight seal may make opening a little difficult. Swing back the display panel by pulling gently on the two tabs at the top and bottom right of the display.
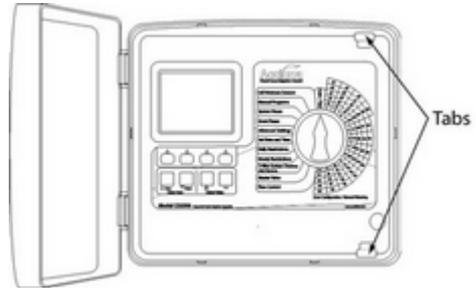
Open the front cover

2. Mount the Control Box

Stud Mount - Mount the Control box with 2" wood screws through the center top and bottom mounting holes.
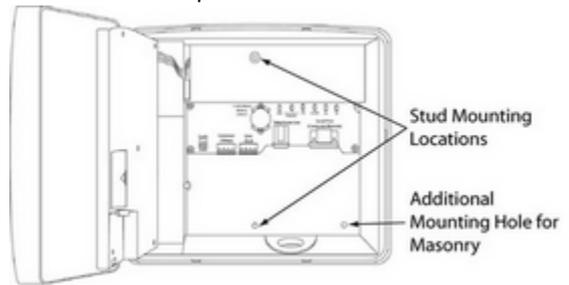
Wall Board or Masonry Mount - Use wallboard or masonry anchors and screws through the top and the bottom center and right mounting hole.

Mount the Controller

Connecting the Power

The Acclima control box is intended to be hard-wired with 110 volt power. The controller incorporates a lightning arrestor that must be grounded using #6 or #10 bare copper grounding conductor to an exterior grounding rod. This wire is to be connected to the 'Earth' terminal in the controller box.

1. Attach a conduit union and splice box to the ½" transformer nipple protruding from the controller box. Avoid excessive torque on the transformer nipple. Excessive force could break the transformer loose inside the box. Make sure the power to the controller is off before attempting any electrical work.

Drill hole to install 1/2" conduit for exterior mounted earth ground

Attach ground wire to Earth terminal

Connect to power using 1/2" electrical conduit and splicing box
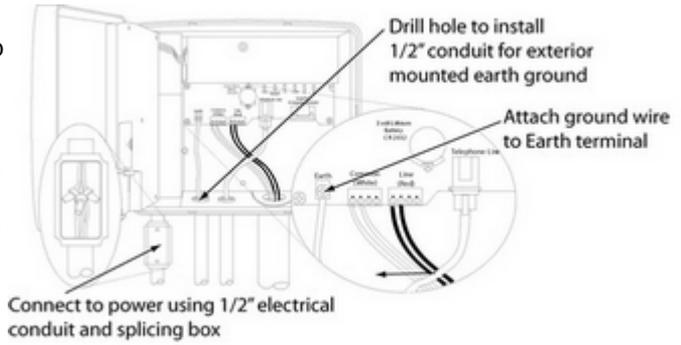
2. Drill a hole to install a 1/2" conduit for a #6 or #10 bare copper grounding conductor to an exterior mounted earth ground. Attach the ground wire to the 'Earth' terminal inside the controller.

Phone Line (optional)

An optional phone line may be installed into the control box to communicate with the controller from an offsite central control computer (not pictured). The phone line could be an extension of an existing line that can be shared by the controller since line usage for the irrigation system will be minimal.

1. Drill a hole and install a 1/2" conduit adapter. Run telephone wire from the splice point through the conduit and into the control box.

2. Attach an RJ11 connector on the end of the phone wire and plug into the RJ11 jack in the control box as shown.

Attach RJ11 connector

Drill hole to install 1/2" conduit for telephone wire
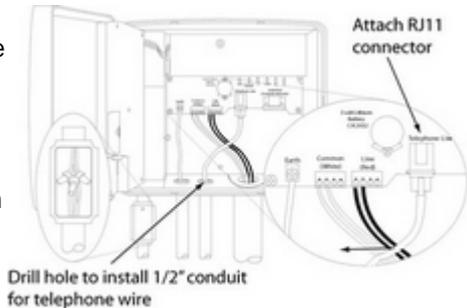
2-Wire BUS

The Acclima system utilizes two 12 or 14-gauge underground sprinkler wires to connect all solenoid valves and other system devices to the

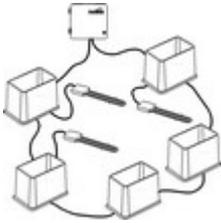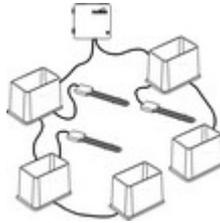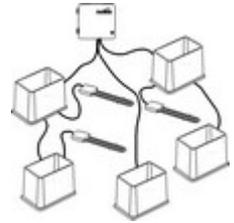controller. There is no required configuration design for the two-wire network; however, the recommended full loop approach allows the system to function properly even if some wires are severed.

| 2-Wire Full Loop Design (recommended) | 2-Wire Broken Loop Design | 2-Wire Star Design |

Up to four 2-wire pairs may originate from the controller. Each wire pair may have any number of branches (star approach). There are three limitations. First, the wire route to the device furthest from the controller should not exceed 4,000 feet. Second, the total amount of paired wire on the system should not exceed 10,000 feet. Third, the wire size must be sufficient to keep the voltage drop at the end of the run to less than 5 volts when maximally loaded.

Recommended Wire:

Special irrigation control cable designed to operate valve decoders consisting of tin coated copper conductors, insulated with PVC and having a high density polyethylene direct burial jacket. ie "Maxi pair"

Conductor:	**Insulation:**	**Jacket:**
Soft annealed copper conforming to ASTM B-33	Polyvinyl Chloride conforming to UL Standard 493 for TYPE UF rated 60ºC	Impregnated Polyethylene

Acclima recommends a 1 in 5' twist be applied to the wire throughout the system to avoid electrical interference with controller communications.

All wiring connection should be made using grease caps, direct burial type, water-proof connectors. Insure the wires are tightly twisted before installing the connector.
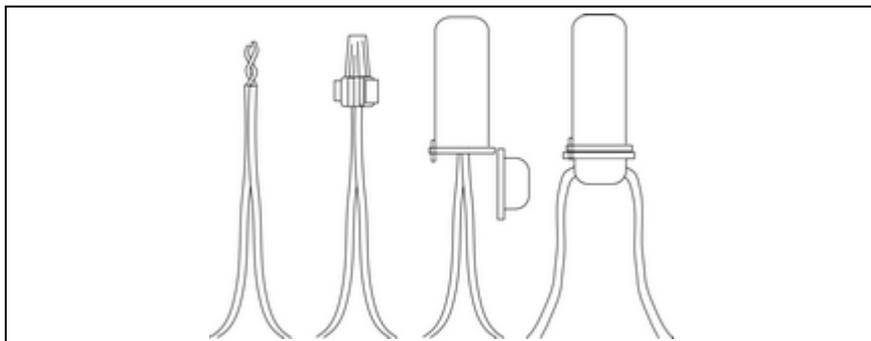
For installations with wire runs exceeding 1000 feet, 12-gauge wire is recommended, the wires must be rated for underground feeder use. The insulation on the wire should be polyethylene (PE).
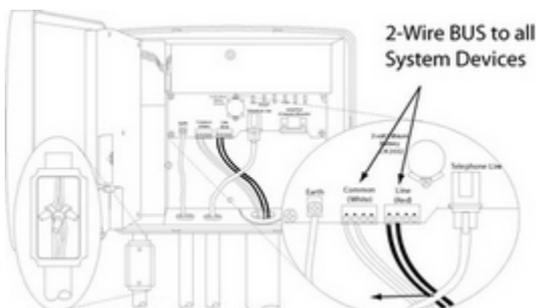
Connecting the 2-Wire BUS to the Controller

Zone Adapters

Valves are connected to the two-wire bus using zone adapters inside the valve box or near the CS3500.

2 or 4 Zone Adapters

Each adapter has a red and a white wire protruding from the bus side for connection to the 2-wire bus. The valve end has one white wire (COM) and 2 or 4 black wires that connect to the valves. You will attach one black wire to each individual valve. The valve end white wire is the common wire connection for all valves connected to that adapter. Unused black wires from zone adapters may be left with insulation attached, capped and coiled neatly in the valve box for possible future use.
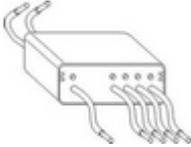
2 or 4 Zone Adapter
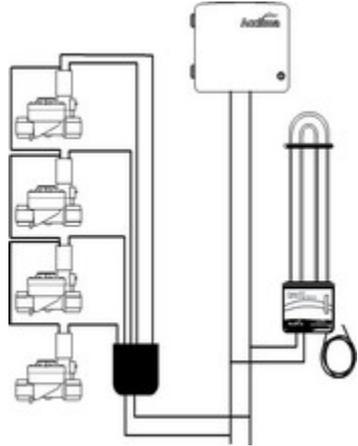
2 or 4 Zone Adapter configuration

16 or 32 Zone Adapters

Acclima's 16-zone and 32-zone adapters are usually used to adapt an existing conventionally-wired system to the CS3500 2-wire controller. Each 16-zone and 32-zone adapter comes in a case that can be mounted on the wall near the controller. The adapters have terminals for connecting the 2-wire system from the CS3500 controller to the adapter. The terminal to which the white wire is connected serves as the 'common' wire to the valves. The zone wires from the valves connect to the 16 or 32 terminal points provided.
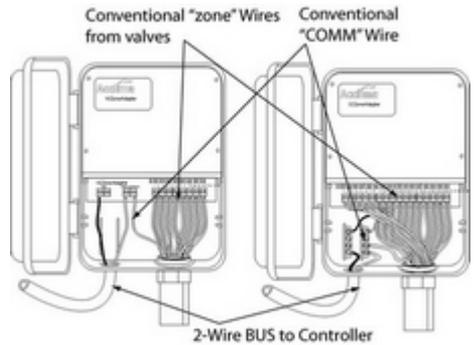
16-Zone Adapter 32-Zone Adapter

Moisture Sensors

Sensor locations

1. Select a location for sensor placement

Classify your irrigated area into full sun zones, full shade zones, partial sun/shade zones and zones with varying soil types (sand vs.

loam vs. clay.) It is best to install a sensor in one of each of these classified areas. If you have a sloped hillside that faces south or west it is advisable to place a sensor there also.

Sensor locations should be representative of the entire zone throughout the entire day; however, it should favor areas in the zone that receive the most sun.

Each sensor location should be well drained and not a low area where water may collect.

Avoid large, dense, tree roots.

Avoid placing sensors within four feet of a sprinkler head or in an area that may be watered by more than one zone.

For sloped areas, place sensors about 1/3 of the way down the slope from the top in an area that receives the most sun (south or west facing slope). Do not place sensors at the bottom of a slope or close to a sidewalk where runoff may collect.

Use sensors sparingly to keep material and installation costs down, however be sure to use sufficient sensors to cover major microclimate and soil variations. A typical ratio of sensors to irrigation zones would be one sensor for every 4 to 8 zones.

2. Installing sensors

Sensor Installation

2-Wire Connection

The wire should be buried at least 8" deep.
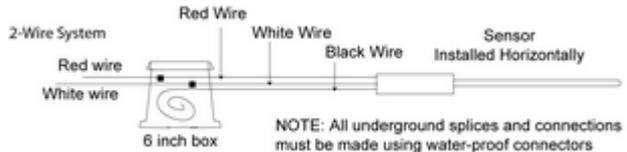
Coil the black wire in the valve box. Install the sensor no deeper than 4 inches.

Valve Connection

Connect the Red and White wires to the 2-wire system. One valve wire connects to the sensor black wire, the other to the white wire.

Install the sensor no deeper than 4 inches.
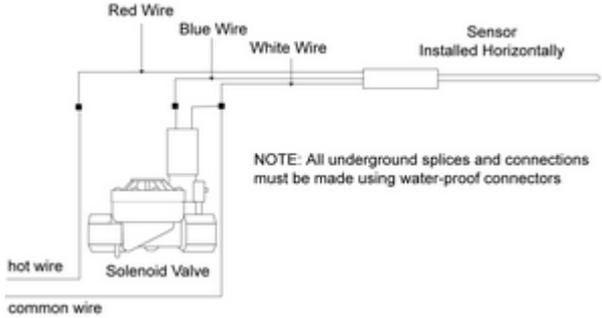
Moisture Thresholds

To properly set the threshold you will need to know the 'Field Capacity' (water holding capacity) of the soil around the sensor. To determine Field Capacity slowly soak the soil above the sensor with at least 10 gallons of water. It is important that the area is very wet so that the water is standing on the surface. Allow several hours for the water to drain into the subsoil. To insure that the soil moisture has come down to 'Field Capacity' it is best to do the soaking in the evening and then come back early in the morning before the sun gets hot to measure Field Capacity. The next morning, after flooding the sensor, take a moisture reading by rotating the CS3500 knob to 'Soil Moisture Sensors', selecting the sensor and initiating a sensor reading. This reading is your soil's Field Capacity. It represents the maximum volumetric water content your soil can hold without percolating to the subsoil. Set the sensor turn-on threshold to 75% of Field Capacity. The turn-off threshold should be set at field capacity. Alternately you can turn off the water after a fixed watering time. To do this set the upper threshold at 20% above field capacity and set the 'Maximum Watering Time' for the zone to the desired watering time.

Pressure Gauge, Flow Meter, Master Valve

The module and the master valve and flow meter are mounted in one or more valve boxes near your water source. The master valve is the first item upstream which is followed by the flow meter then the Acclima module with the pressure gauge. The Flow Meter must be installed ten straight pipe diameters downstream from the master valve and should be followed by five straight pipe diameters before the Acclima Module that houses the pressure gauge.

The Data Industrial Series 200 Flow Meter comes from the factory mounted in a "T". The "T" should be glued into the pipe run with the arrows facing in the direction of the flow of water.
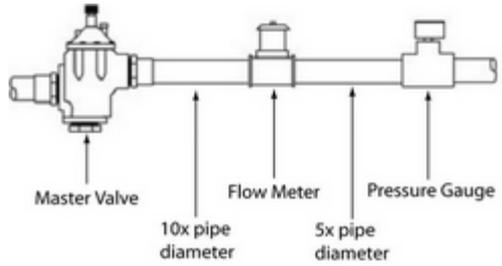
The "T" for the Acclima module is not supplied and must have a 1/8" NPT female port for the pressure gauge to screw into. Screw the pressure gauge into the "T" using Teflon tape. The module has three pairs of wires emanating from it. The white and red pair connect to the 2-wire system using direct burial DBY connectors (white to white and red to red). The red and black pair of wires at the other end of the module connects to the red and black wires on the flow meter respectively using direct burial DBY connectors. The remaining black pair of wires connects to the master valve. The master valve must use 24 volts AC at no more than 500 MA.

Configuration

User Interface

NOTE: Soft Keys are labeled by symbols near the bottom of the display. Their function changes with each new screen.
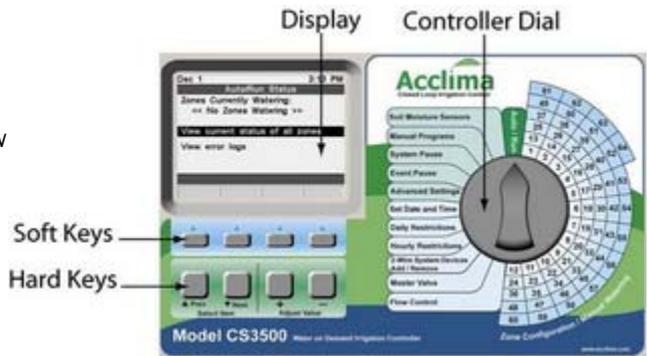
User Interface

Text Screen: You will use this screen to adjust text fields throughout the controller.

Use the Prev and Next buttons to move through the text options. Press the Adjust Value keys to make your selection. When finished press the soft key Apply.

Set Date and Time

Turn the controller knob to 'Set Date and Time'.

1. Use the + and - Adjust Value buttons to change the date and time fields.

3. When finished press the soft Save button

2-Wire Devices

Each 2-Wire device throughout the system must be configured at the controller, including sensors, flow meters, and valve adapters.

1. Turn the controller dial to '2-Wire System Devices Add/Remove'. 'Add new Device' appears highlighted. Press the + key. The screen at the right appears.

2. Use the Next/Prev keys to select the first digit of the serial number. Press + to enter the first

digit.

3. Enter the subsequent digits of the serial number as in step 2.

4. Press the 'Apply' button. A temporary screen will appear indicating the type of device that was detected. If the device is a valve adapter another screen will appear prompting you to identify how it will be used: Zone Switch, Master Valve, Pump Switch, Emergency Shutoff, or Backflush Switch. Highlight the selection and press +.

5. Repeat 1 through 4, entering serial numbers for all devices you have attached to the 2-wire system including valve adapters, sensors and flow meter modules.

Water Source

The Acclima CS3500 allows up to 4 zones to water simultaneously if there is sufficient water capacity from your source. In order to configure the system to efficiently manage the water you must configure a water source. Choose from the following two options:

Default Water Source: If you do not have a master valve installed on your system then select the default water source. This setting assumes a constant flow from a water main.

Master Valve:

NOTE: If you have more than one source of water the CS3500 will manage multiple sources provided they are not interconnected. Each separate source must provide water to its own unique group of zones. You will need to use the Acclima Irrigation Manager Software to configure additional water sources.

1. Turn the controller dial to 'Master Valve'.

2. Press the + Adjust Value button to edit the master valve.

3. Using the Prev and Next Keys hard keys to choose default water source or assign the Mater Valve. When Finished Press the + Adjust Value Button.

4. Next, Configure the Water Source either the default or Master Valve. You may change the water source name as well as adjust the maximum flow rate in GPM (gallons per minute).

You can also test the valve current from this screen. Simply move to the Test Valve Current field using the Prev and Next Keys and press the adjust value button. This will take you to a test screen where you can test the valve current of just the master valve or all the system devices. (SEE TEST VALVE SCREEN)

Water Restrictions

The Acclima CS3500 Water on Demand™ system will apply water the instant the sensor detects the watering threshold has been crossed. This could happen at any time of the day or any day of the week. You may not want irrigation to occur during specific times of the day or on specific days. To prevent watering when you do not want it you must create a Watering Restriction. You can create as many of these as you wish and assign them to the zones in any combination you need. Zones assigned to restrictions will not water during the times specified by the restriction.

There are two types of restrictions that can be used to inhibit watering. A restriction in either or both will prevent watering for the specified period.

Daily Restrictions

Daily restrictions apply to the whole system and are not assignable to individual zones. Your controller will not water during the restricted days.

1. Turn the controller dial to 'Daily Restrictions' to configure year-round, day cycle, and seasonal restrictions.

2. Use the hard keys to select among the options and set the system's daily restrictions.

3. Select Add a new Restriction to create a new daily restriction. Once the restriction is selected you can adjust the following:
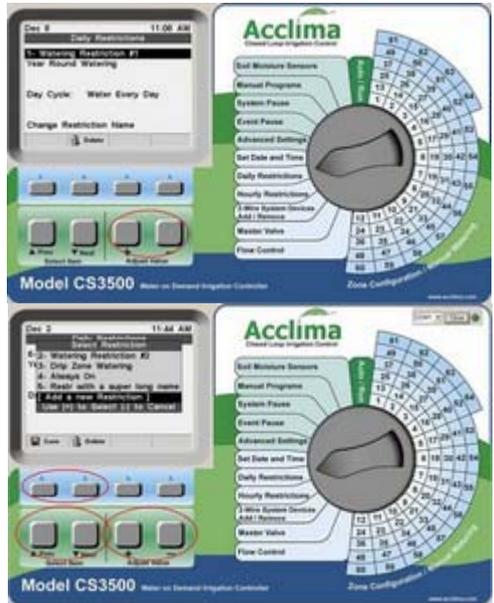
The controller will water all year

Seasonal: The controller will only water during your watering season
  Start Date: The first day of your watering season
  End Date: The last day of your watering season
  Day Cycle:
    Everyday
    Even Days
    Odd Day
    Custom Days
      Water Every _Days

4. Use can also change the name of the restriction from the panel. Select the Change Restriction Name field and use the text screen to name your restriction.

5. Press the soft Save key when complete.

Hourly Restrictions

Hourly restrictions control the time of day that watering will be allowed. Each day of the week can be set up as desired. The generated restriction

pattern can be assigned to whatever zones need it. Multiple restriction patterns can be set up and assigned to different zones as desired.

The water drop signifies watering permitted, the X indicates restricted watering.

1. Turn the controller dial to 'Hourly Restrictions' to configure hourly restrictions.

2. Use the soft keys Prev Time and Next Time to move between the times on the controller. Use the Prev and Next keys to move between days of the week. Press the + and - Adjust Value buttons to change the water drops to an X and vise versa.

3. After you have finished the restriction table press the save soft key.

Zones

With the devices installed onto the system and the water source and restriction information entered you are ready to complete the system configuration by setting up the details for each zone.

1. Turn the controller dial to any of the 'Numbered Zones'. The 3rd soft key selects which ring you are accessing.

2. Use the **Next/Prev** buttons to navigate through the configuration options. Highlight the '**Zone Setup**' field and press the **+** key.

3. Use the **Next/Prev** buttons to navigate through the options on the Zone Setup screen. You can choose the following options:

Manual Watering
Pause this Zone

View Automatic Watering History
Test Valves
Zone Setup

Manual Watering

1. Use the + and - Adjust Values buttons to change the manual watering duration.

2. When finished, press the soft Start Manual button to initiate manual watering.

Pause This Zone

1. Use the + and - Adjust Values buttons to change the pause zone duration.

2. When finished, press the soft Pause Zone button to pause the zone's watering for the set duration.

View Automatic Watering History

You can view the past history of the zone by selecting the View Automatic Watering History.

A list of the last several waterings is displayed. You can view the date and time the watering began, plus the duration of the watering.

Test Valves

You can test and view all the valve's readings in one easy to use screen.

Test One

1. Use the Prev and Next buttons to move to the desired valve.

2. Press the soft Test one button to test and display the selected valve's reading.

Test All

1. Press the soft Test All button to read and display all valve's reading.

Zone Setup

Each zone can be set up independently of other zones. The zone types are very important as they determine the behavior of the zone and how it will water. You must designate each zone to be one of the following zone types:

Sensor

1. Use the Prev and Next buttons to move through the field on the screen.

2. Press the + and - Adjust Value buttons to change the values of the fields.

3. You can use the soft Back button at any time to go back to the Zones screen.

4. To setup the zone as a Sensor Zone adjust the following:

Run Time: Set the run time for this zone
Track Sensor: Indicate which sensor the zone will track
 Set the upper soil moisture threshold for the sensor, or the turn off level.
Lower Threshold: Set the lower soil moisture threshold for the sensor, or the turn on level.

Percolation Time:
Soak Cycle:
   Water For: Indicate the duration the zone will water until it stops to soak.
   Soak For: Indicate the soak duration before the zone continues to water.
Water Restrictions: Indicate which restriction to use for this zone from the list of restrictions you set previously.
Valve Current Sep Point
Water Source: Select the water source from the list of configured water sources.
Normal Flow Rate
Critical Flow Rate
High Flow Rate
Low Flow Rate
Change Zone Name: Enables you to change the zone name by using the test edit screen.

5. When finished making all changes press the soft Save button.

<u>Dependant</u>

1. Use the Prev and Next buttons to move through the field on the screen.

2. Press the + and - Adjust Value buttons to change the values of the fields.

3. You can use the soft Back button at any time to go back to the Zones screen.

4. To setup the zone as a Dependent Zone adjust the following:

Track Sensor Zone: Indicate which sensor zone the zone will track
Tracking Ratio: Indicates the tracking duration. 100% and the zone will water the same duration, 50% it will water half as long.
Soak Cycle: Turn the soak cycle option on or off.
   Water For: Indicate the duration the zone will water until it stops to soak.
   Soak For: Indicate the soak duration before the zone continues to water.
Water Restrictions: Indicate which restriction to use for this zone from the list of restrictions you set previously.
Valve Current Sep Point
Water Source:
Normal Flow Rate
Critical Flow Rate

High Flow Rate
Low Flow Rate
Change Zone Name: Enables you to change the zone name by using the test edit screen.

5. When finished making all changes press the soft Save button.

<u>Timer</u>

1. Use the Prev and Next buttons to move through the field on the screen.

2. Press the + and - Adjust Value buttons to change the values of the fields.

3. You can use the soft Back button at any time to go back to the Zones screen.

4. To setup the zone as a Timer Zone adjust the following:

Run Time: Set the run time for this zone
Water Every _Day _Hours: Set the time between waterings.
Soak Cycle:
   Water For: Indicate the duration the zone will water until it stops to soak.
   Soak For: Indicate the soak duration before the zone continues to water.
Water Restrictions: Indicate which restriction to use for this zone from the list of restrictions you set previously.
Valve Current Sep Point
Water Source: Select the water source from the list of configured water sources.
Normal Flow Rate
Critical Flow Rate
High Flow Rate
Low Flow Rate
Change Zone Name: Enables you to change the zone name by using the test edit screen.

5. When finished making all changes press the soft Save button.

Backflush

1. Use the Prev and Next buttons to move through the field on the screen.

2. Press the + and - Adjust Value buttons to change the values of the fields.

3. You can use the soft Back button at any time to go back to the Zones screen.

4. To setup the zone as a Backflush Zone adjust the following:

Run Time: Set the run time for this zone
After Operating:
Valve Current Set point:
Water Source: Select the water source from the list of configured water sources.
Change Zone Name: Enables you to change the zone name by using the test edit screen.

5. When finished making all changes press the soft Save button.
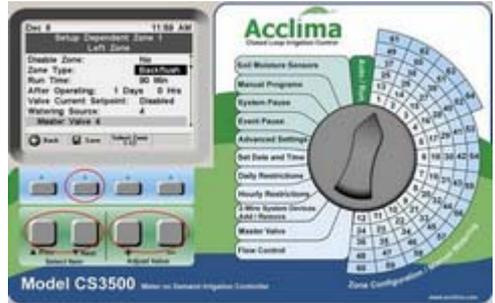
Irrigation Manager Software

The Acclima CS3500 can be configured by using the controller interface or Acclima Irrigation Manger™ software connected to the controller through a serial port. For instructions on configuration the Acclima CS3500 by the Irrigation Manager please consult the software operation manual.

Irrigation Manager™ Software can be downloaded at www.acclima.com

Operation

Auto/Run

The system is always in
Auto/Run mode even if the
controller dial is not positioned
here. From this screen you can
view the current status of all
zones or view error logs.

View Current Status of all Zones

1. Press the + Adjust Value
button to view zone status.

2. Use the Prev and Next
buttons scroll through the list of
zones.

3. When finished press the soft Back button.

View error logs

1. Press the Next button to move to View error logs and press the + Adjust
Value button.

2. Use the Prev and Next buttons scroll through the list of errors.

3. When finished press the soft Back button.

Zones

Use these switch positions to
set up and edit zones. Use the
soft button to cycle through
zones 1,13,25,37,49, and 61.

Soil Moisture Sensors

You can view all the sensor's readings in one easy to use screen.

Read One Sensor

1. Use the Prev and Next buttons to move to the desired sensor.

2. Press the soft Read one Sensor button to read and display the selected sensor's reading.

Read All Sensors

1. Press the soft Read All Sensors button to read and display all sensors' reading.
Show Thresholds

Manual Programs

Set Manual Program

1. Turn the controller knob to the 'Manual Programs' setting.

2. Press the + Adjust value to change the program.

3. Use the Prev and Next buttons to choose a program to edit, or choose Add new Programs to create a new manual program.

4. Use the Prev and Next buttons to move to the Step 1 field. The field to the right shows the step type. Move to the type field and press the + or - Adjust Value buttons to change the

step type.

5. Once the step type is selected you can edit the step using the Prev and Next buttons to move between fields and the + or - Adjust Value buttons to edit the step.

6. To build the second step move to the Step field and pres the + Adjust Value button to move to Step 2. Repeat number 4 to edit Step 2.

7. Continue building steps until your Manual Program is complete. The final step should be End Program.

8. Rename your program by moving to the Change Manual Program Name field. Use the text edit screen to rename your Manual Program.

9. Press the soft Save button when finished.

Run Manual Program

1. Select the program you wish to run by using the + and - Adjust Values button.

2. Press the soft Start Program button to run the program

Adjust Manual Program

While a Manual Program is running you can skip ahead to the next steps or repeat previously run steps. You can also stop the program.

Use the soft keys to skip to the Prev Step, Next Step, or Stop Program.

NOTE: If you select to Stop the Program the Manual Program will terminate. To restart the Program press the soft Start Program button.

System Pause

System pause will pause the entire system for a set time.

To Pause the System

1. Use the Prev and Next buttons to move between the days, hours, and minutes fields.

2. Use the + and - Adjust Values buttons to change the number of days, hours, and minutes you want to pause the system.

3. Press the soft Pause System button to pause the system.

To Resume Operations

1. Press the soft Resume Auto button to cancel the system pause and resume automatic operations.

Event Pause

Rather than wait for the start of the event to place the system in pause mode, you can schedule up to 6 future events using this function. At the day and time you schedule the system will shut down all watering for the duration you specify.

1. Turn the knob to the 'Event Pause' setting.

3. Use the Prev and Next buttons to move between field and the + and - Adjust Value fields to edit the event. Set the start date, time, and the

duration of the paused event.

4. Press the soft Save button to save the changes and the soft Back button to move back to create a new event.

Advanced Settings

Contrast Adjustment: This field adjusts the display contrast.
Select Display Language: Select between English, French, Italian, Portuguese, or Spanish.
Minutes between Sensor Logs: Changes the interval of how often sensor readings are saved in the data logging memory.
Enable Modem Answer: Turns modem on or off.
: Updates the panel with fresh configuration information. Not generally needed, this function happens automatically.

1. Use the Prev and Next buttons to move between fields.

2. Use the + and - Adjust Value buttons to change the fields.

3. Press the soft Save button when finished to save your changes.

Flow Control

When multiple zones are due for water the CS3500 will turn on a first zone. If you have a flow meter installed on that source it will measure the water being consumed by the zone and compare it to the available water from the source. If you do not have a flow meter installed it will use the zone flow rate you have programmed for that zone. If the source capacity is not fully used the CS3500 will find another zone waiting for water wherein the total flow of the two zones does not exceed the capacity of the source. And likewise a third and fourth zone will be added if the source has sufficient capacity. You can limit the maximum number of zones that will be on at one time. To do this highlight **'Manage Global Flow Settings'** from the **Flow Control** screen and press **+**. Then highlight the field **"Zones watering at a time"** and increment or decrement the number.

Manage Zone Water Use

1. Use the Prev and Next buttons to move through the fields.

2. Press the + and - Adjust Values buttons to change the settings.

3. When you are finished with the flow meter settings press the soft Save key.

Manage Flow Meter

Note that the Acclima CS3500 controller and Flow Meter Adapter support the Data Industrial 200 series flow meters. The meter, adapter and master valve (if you use one) must be installed in accordance with the instructions in the **INSTALLATION** section.

Water Source: You must specify the water source on which you installed the flow meter. When you select this field and press **+** a pull down list of your installed water sources will appear. Select the one to which the flow meter is attached.

Diameter: This is the diameter of the Flow Meter. The standard diameters available in the Data Industrial 200 series are 1", 1.5", 2", 3", 4", 6", 8", 10", 12" and 16". Select the size you have installed.

Set Source Flow to Recommended: The flow capacity of the flow meter will default to the capacity of the water source to which it is attached. However the pipe diameter you specified with the flow meter provides an alternate capacity derived from standards of recommended flow rates for various pipe diameters. If you wish to use the recommended standard instead of the default you programmed for the water source press + while this field is highlighted. That will set the flow capacity to a rate corresponding to 5 feet per second flow velocity in your water main.

Read Flow Meter: If you wish to read the current flow rate (with one or more zones running) press the soft Read Flow Meter button.

1. Use the Prev and Next buttons to move through the fields.

2. Press the + and - Adjust Values buttons to change the settings.

3. When you are finished with the flow meter settings press the soft Save key.

Manage Pressure Meter

If you entered the serial number of a pressure meter in the **2-wire System Devices** setup it will appear on this screen. You can set high and low pressure limits. If the water pressure exceeds the high limit you specify you can program the system to shut off the master valve to protect your pipes. If the pressure falls below the low limit you can program the system to stop watering. It is often futile to water with low pressure because the sprinkler heads do not cover all of the turf and brown spots will develop in the uncovered areas.

Change Meter Name: You can give the pressure meter a name by selecting this field then using the alphanumeric entry screen that follows.

Water Source: You must specify the water source to which the pressure meter is attached.

High Threshold: Set the highest pressure to which you will allow your system to be subjected to. The use of this limit to shut off the master valve is enabled or disabled under **Manage Global Flow Settings**.

Set the lowest pressure you will allow your system to operate under. The use of this setting to stop watering at low pressure is enabled or disabled under **Manage Global Flow Settings.**

Read Pressure: You can take a current pressure reading by pressing the soft Read Pressure button.

1. Use the Prev and Next buttons to move through the fields.

2. Press the + and - Adjust Values buttons to change the settings.

3. When you are finished with the pressure meter settings press the soft Save key.

<u>**Manage Global Flow Settings**</u>

Zones Watering at a Time: Set the maximum number of zones that you will allow the controller to turn on simultaneously. This number is automatically limited by the flow capacity of your source and the flow rates of your zones, but if you wish to place your own constraints on multiple zone watering this is the place to do it.

Seconds Valve Delay: The CS3500 provides a programmable delay in the time from when a valve turns off until the next valve turns on. This is sometimes required to keep water pressure high enough to shut down the first valve. It is also used in recharging ponds and wells between zone watering periods. You can enter up to 254 seconds in this field.

Enable Flow and Pressure Meters: Check this field to enable the flow and pressure meters.

High Flow Shutoff: If you check this field the CS3500 will shut off the master valve whenever the MV flow setting is exceeded by 50%. It will likewise shut down any zone if the zone flow rate is exceeded by 50%.

Low Flow Shutoff: If you check this option the CS3500 will report 'Low Water Flow on Zone X' whenever the zone flow rate is less than 50% of the nominal zone setting.

High Pressure Shutoff: If you check this option the CS3500 will shut off the master valve whenever the water pressure exceeds the high limit you specified in the Pressure Meter Setup.

Low Pressure Shutoff: If you check this option the CS3500 will not water when the water pressure is below the low pressure limit you specified in the Pressure Meter Setup.

1. Use the Prev and Next buttons to move through the fields.

2. Press the + and - Adjust Values buttons to change the settings.

Glossary

Acclima Pronounced as in Acclimatize. Manufactures of the world's best absolute moisture sensors.

Automatic circuit protection A built-in circuit protection circuit designed to prevent damaged to the controller caused by a faulty valve solenoid or pump start relay. The instant an overload current condition is

detected, the affected zone is turned OFF and the next zone in the watering sequence is turned ON.

Back Flush The process of flowing water backwards through a filter to remove trapped debris and restore the filter for ongoing use.

Calendar Schedule A Calendar Schedule enables you to select specific days of the week to water, for example, Monday, Wednesday and Friday. This is a 14 day schedule which starts on Sunday and ends on Saturday.

Dependent Zone A zone that is watered based on data from a reference zone. Setting up dependent zones saves money on sensor costs. One reference zone with a sensor can effectively control irrigation in several other dependent zones provided all such grouped zones are similar in soil type, microclimate and sprinkler precipitation rate.

Field Capacity The maximum volumetric water content that can be held in soil against the pull of gravity. Amounts greater than this are pulled downward into the subsoil and groundwater and are wasted.

Flow Meter A device used to measure the rate of water flow in a hydraulic system.

Management Allowed Depletion The minimum volumetric water content required to prevent stress in growing plants. If the plant does not receive water it will continue to pull moisture from the soil under stress until the Permanent Wilt Point is reached where the plant dies.

Manual Program A watering program that waters one or more zones in a sequence specified by the user and which is started manually.

Master Valve

Master Valve Circuit At the beginning of each irrigation cycle, before the first sprinkler valve is turned on, the master valve circuit is energized to open the system master valve.

Microclimate The climatic conditions of a small plot of irrigated property. The conditions include the amount and intensity of sunlight, wind exposure and velocity, relative humidity, inclination, and temperature. These factors along with soil type and plant type determine the water needs of the plants growing in the microclimate. A typical landscaped property includes several widely different microclimates. A soil moisture sensor should be installed in each microclimate type.

Odd/Even Schedule The Odd/Even schedule enables odd or even numbered days of the month as watering days.

Permanent Wilt Point The soil moisture level where plant life dies.

Pump Control Circuit The pump control circuit is energized to start the pump whenever a zone is active that has been configured to use the pump.

Pump Relay A electrical device with a low voltage input used to turn on a water pump on command from a controller.

Rain Delay This feature enables all watering operations on timer programs (A, B, C, and D) to be delayed from 1 to 14 days.

Rain Sensor A rain sensor is a device required by some municipalities to suspend irrigation during a rain storm. Such a device can be connected directly to the SC24/36. When water activates the rain sensor the SC24/36 will suspend all watering operations, including timer and sensor programs for as long as the sensor is activated. The SC24/36 accommodates normally closed, common-interrupting type rain sensors.

Saturation Saturation is the soil moisture level where the water begins to puddle on the surface due to the inability of the soil to assimilate any more water. The saturation water causes runoff and/or leeching to the subsoil until the moisture level reaches field capacity. Saturation irrigation wastes water, leeches out nutrients, contaminates groundwater and suffocates roots.

Scheduling Planning how long to water (zone run times), when to water (program start time) and which days to water (watering days).

Soak Cycle A Soak Cycle is used for hillsides or slopes to avoid surface runoff by watering for a short period of time, stopping and allowing the water to soak in, then continuing another short period of time until the full required amount of water has been applied.

Soil Moisture Sensors

Solenoid Valve An electrical and hydraulic device that turns water on and off based on an electrical input.

Start Time A start time is the time of day selected to begin the watering cycle. Each program (A, B, C, and D) and each sensor program (S1, S2, S3...S36) can have up to 6 separate start times.

Suspended Cycle® Irrigation The SC24/36 operates as a Suspended Cycle® controller when using sensor programs. The controller uses programs to control the time and date of watering but then suspends irrigation if the soil moisture level is above the user set threshold when the program start time arrives. Irrigation is allowed at the next start time when the moisture level drops below the threshold.

Terminal Block Connection points for valve wires, common wires, master valve, pumps and other accessories located behind the front panel of the controller.

Volumetric Water Content The amount of water in soil as measured volumetrically. 25% water content measured as VWC means that in every cubic foot of soil there are 0.25 cubic feet of water.

Valve Adapter (or Zone Adapter) An electronic device that interfaces a standard solenoid valve or pump relay to a 2-wire system.

Valve Common Wire The common wire is the circuit that is common to all the valves in the system. Each valve has one wire attached directly to the common. The SC24/36 uses this wire for communication from the controller to the sensors, and flow meters throughout the system. The other wire connected to the valve that is not common to the other valves is often called the Zone Wire.

Water Budget Water budget is a seasonal adjustment that enables the runtime of all zones only to be adjusted in 5% increments from 10% to

200%. For selected months, the timer program duration is multiplied by the water budget percentage and activated for that adjusted duration.

Water on Demand® Irrigation Acclima manufactures both Suspended Cycle® and Water on Demand controllers (see Suspended Cycle® Controller). A Water on Demand Controller applies water immediately when the soil moisture level falls below the watering threshold - provided it is not restricted from watering at that time. It does not use Programs. Allowable watering windows are set up in which the controller can apply water when it is needed.

Watering Threshold The volumetric water content of soil where a watering cycle is initiated by the CS3500. The user sets this limit for the reference zone. It is normally the Management Allowable Depletion level of water content.

Watering Program A watering program (or schedule) is the information store in the controller memory that determines when an automatic water cycle will occur and how long each zone will water. The controller requires three basic instructions to operate automatically. A watering program consists of four data points:

What days to water—watering days
What time to water—start time
How long to water—run time
Sensor threshold (for sensor programs)

NOTE: Sensor programs may or may not water. They are dependant on soil moisture levels.

Watering Day The days of the week selected to water.

Zone Each solenoid valve controls a specific group of sprinkler heads called a watering zone. The zones are generally laid out and installed according to the type of plant material to be watered, such as lawn or flower bed and sprinkler head type. Each valve is connected to a numbered terminal within the controller, identifying it as Zone 1, Zone 2...Zone 36.

Zone Run Time The length of time a zone will operate during a watering cycle. Run time can be set from 1 minute to 18 hours.

Limited Product Warranty

Your controller is warranted for two years from date of purchase to be free of defective materials and workmanship, provided it is used within the working specifications for which the product was designed and under normal use and service. Unless installed by an authorized Acclima trained technician, Acclima assumes no responsibility for installation. Acclima also assumes no responsibility for removal or unauthorized repair. Acclima's liability under this warranty is limited solely to replacement or repair of defective parts, and Acclima will not be liable for any crop or other consequential damages resulting from any defects in design or breach of warranty. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER**
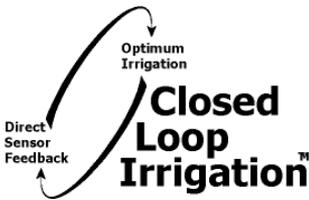
WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES and of all other obligations or liabilities of manufacturer. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of warranty, nor to make representations or warranty not contained herein.

Should you have any claim under this warranty, please contact Acclima's warranty desk by calling toll free 866-887-1470 for prompt assistance.

NOTES

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