

Installation and Operating Instructions

Controller Unit ESP-SAT and MAXICOM Interface Board (MIB) Kit



RAIN BIRD

Safety Information

Warning!

Important safety information and warning messages appear throughout this manual. To ensure correct operation and to avoid additional expense, read this manual thoroughly before you begin installation.

“WARNING: A CIRCUIT BREAKER OR CUTOFF SWITCH IS TO BE PROVIDED IN THE FIXED WIRING TO ISOLATE THE CONTROLLER”

“ATTENTION: UN DISJONCTEUR OU UN INTERRUPTEUR DOIT ETRE INSTALLE SUR LE PRIMAIRE POUR ISOLER LE PROGRAM-MATEUR”

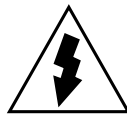
“MEMORY IS RETAINED BY A BATTERY WHICH IS TO BE DISPOSED OF IN ACCORDANCE WITH LOCAL REGULATIONS”

“LA MEMOIRE EST MAINTENUE GRACE A UNE BATTERIE RECHARGEABLE A DISPOSER SELON LA REGLEMENTATION LOCALE”

CAUTION ICONS



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



L’éclair avec is symbole de la flèche, placé dans les limites d’un triangle équilatéral est prévu pour avertir l’utilisateur de la présence de “tension dangereuse” non isolée dans l’enceinte du produit qui pourrait être d’une importance suffisante pour présenter un risque d’électrocution aux personnes.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



Le point d’exclamation dans un triangle équilatéral est prévu pour avertir l’utilisateur de la présence d’instructions importantes pour les opérations et l’entretien (service) dans les manuels fournis avec l’appareil.

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Introduction

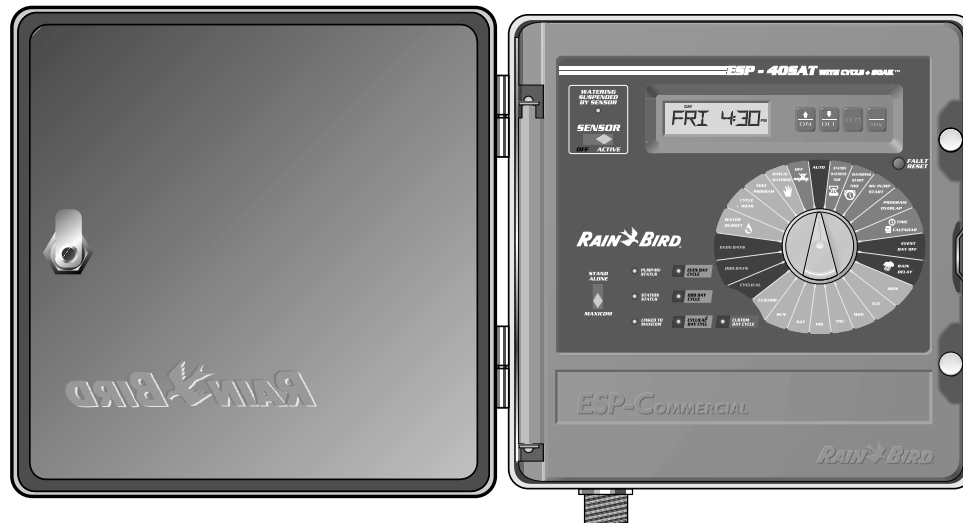
Welcome to Rain Bird

Thank you for purchasing your new, state-of-the-art Rain Bird controller. For more than six decades, Rain Bird has led the irrigation industry in meeting all of your water management needs by providing the highest quality products and services available. Your new Rain Bird controller is designed to give you a lifetime of on-site watering control.

The ESP-SAT Controller and MAXICOM Interface Board (MIB) Kit

The Extra Simple Programming-Satellite controller is ready to be used in conjunction with the MAXICOM irrigation system or as a stand-alone unit. It is appropriate for residential or commercial use and its easy-to-use, built-in computer offers four programs for up to 40 watering stations.

The MAXICOM Interface Board (MIB) kit for the ESP-MC controller converts the stand-alone ESP-MC to an ESP-SAT controller that can be linked to the MAXICOM system.



Introduction (continued)

Special Features and Model Descriptions

The ESP-SAT controllers are available as Wall-mount (WM) or stainless steel Pedestal-mount (SS) models, with 12-, 16-, 24-, 32- or 40-station capability and all have the following special features:

- Anti-rust, corrosion-resistant design
- Easy-to-use keypad and display area
- Variable watering cycle for water-restricted areas
- Water budgeting capability for seasonal irrigation adjustments
- Water monitoring capability while watering is in progress
- Rain shut-down for rainy days or during winter
- Programming retained even in the event of power outage or disconnection from power source
- Ability to operate manually without disturbing programmed settings

Introduction (continued)

- Surge protection
- Satellite interface for use with MAXI, MAXICOM, and Links Master control systems
- Available in two-wire (TW) or radio (LINK) models
- Default setting options for additional programming flexibility
- Automatic activation of standby operation in case of a central control failure

All ESP-SAT controller models are also available with the following satellite data path options:

- Two-wire path (TW)
- Wireless radio path (LINK)

Introduction (continued)

Overview of the MAXICOM Central Control System

The ESP-SAT controllers are one part of Rain Bird's MAXICOM Central Control System. (See the illustration on the next page.) The satellite controllers receive commands from the cluster control unit (CCU) and operate stations according to schedules programmed at the central computer.

The MAXICOM Central Control System chiefly consists of seven parts:

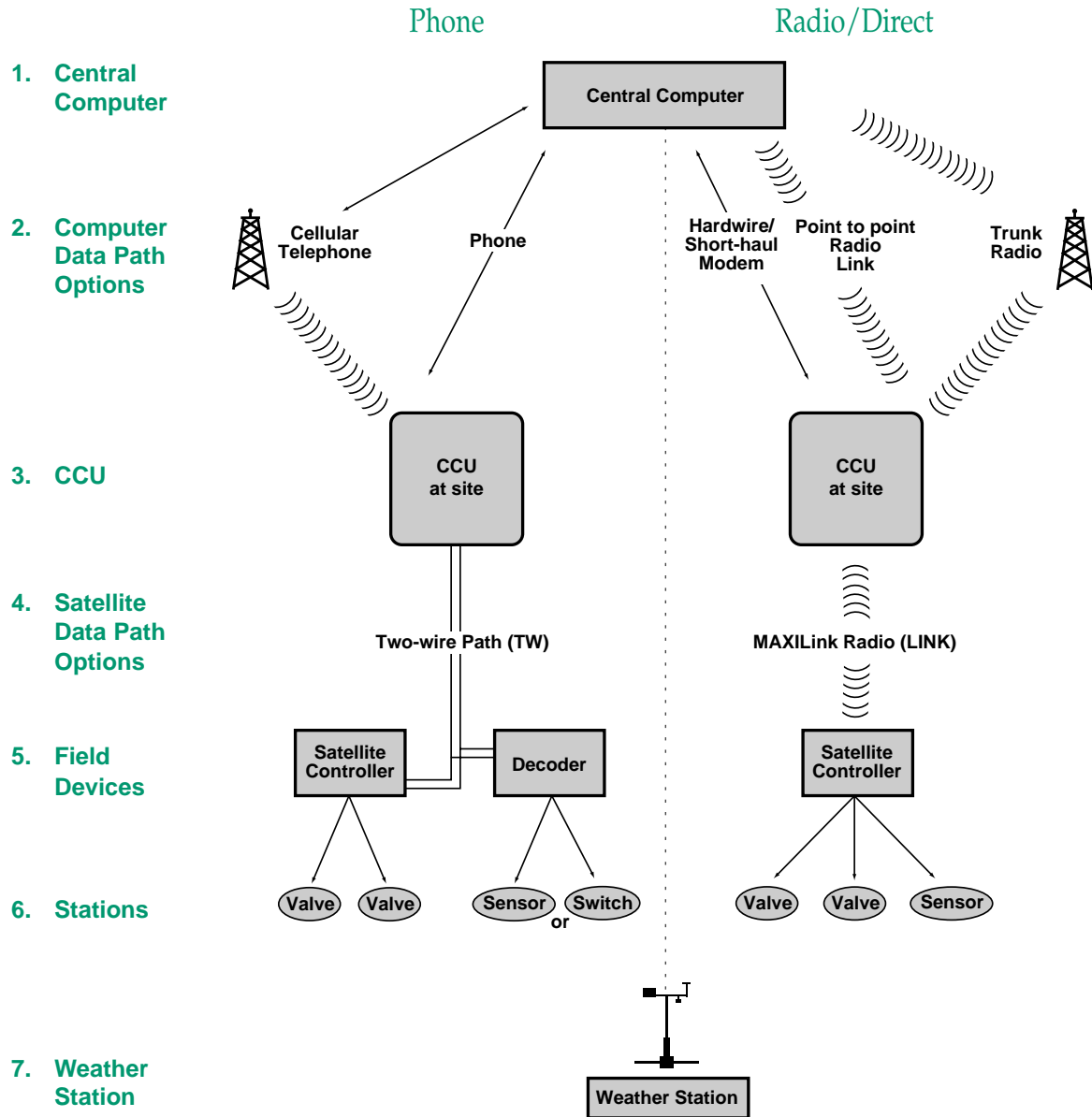
1. **Central Computer** uses MAXICOM software program to control the entire irrigation system.
2. **Computer Data Path** transfers information from the central computer to the CCU by phone communication or by radio/direct communication.
3. **Cluster Control Unit** operates field devices by executing commands received from the central computer.
4. **Satellite Data Path** transfers information from the cluster control unit to the field devices by a two-wire path (TW) or by MAXILink radio communication.
5. **Field Devices** include either satellite controllers or decoders:

Satellite controllers — send a 24 VAC power signal to each station.

Decoders — control and monitor system functions.
6. **Stations** consist of irrigation valves, sensors, or switch-operated devices.
7. **Weather Station** interprets weather conditions and sends information to the central computer.

Note: Your ESP-SAT controller is already set up for satellite data path installations. Some additional equipment may be required for some types of installations.

MAXICOM Central Control System



Introduction (continued)

About This Manual

This manual contains instructions on:

- mounting the ESP-SAT controller Wall-mount model or Pedestal-mount model,
- making the field valve, communications, main power, and grounding connections for an ESP-SAT controller,
- operating an ESP-SAT controller as a satellite or programming it to operate as a stand alone controller, and
- installing a MAXICOM Interface Board (MIB) into an existing ESP-MC controller to convert it to an ESP-SAT controller.

If you are installing a new Wall-mount ESP-SAT controller, begin with "Chapter 1: Installing the Controller" on page 7.

If you are installing a new Pedestal-mount ESP-SAT controller, begin with "Chapter 1: Installing the Controller" on page 12.

If you are installing a MAXICOM Interface Board into an ESP-MC controller to convert it from a stand alone controller to a satellite-capable controller, begin with "Appendix B: Installing a MAXICOM Interface Board (MIB)" on page 56.

Chapter 2 contains instructions for connecting the controller. Chapter 3 presents programming and operating information. Chapter 4 suggests answers to any problems you may encounter.

Chapter 1: Installing the Controller

Before You Begin

Important: Before installing your controller, make sure that the area around you is free from dirt and dust and that your hands and arms are clean. This will avoid contamination of the controller's internal parts.

Warning! Don't let water or other liquids come in contact with any part inside the controller cabinet.

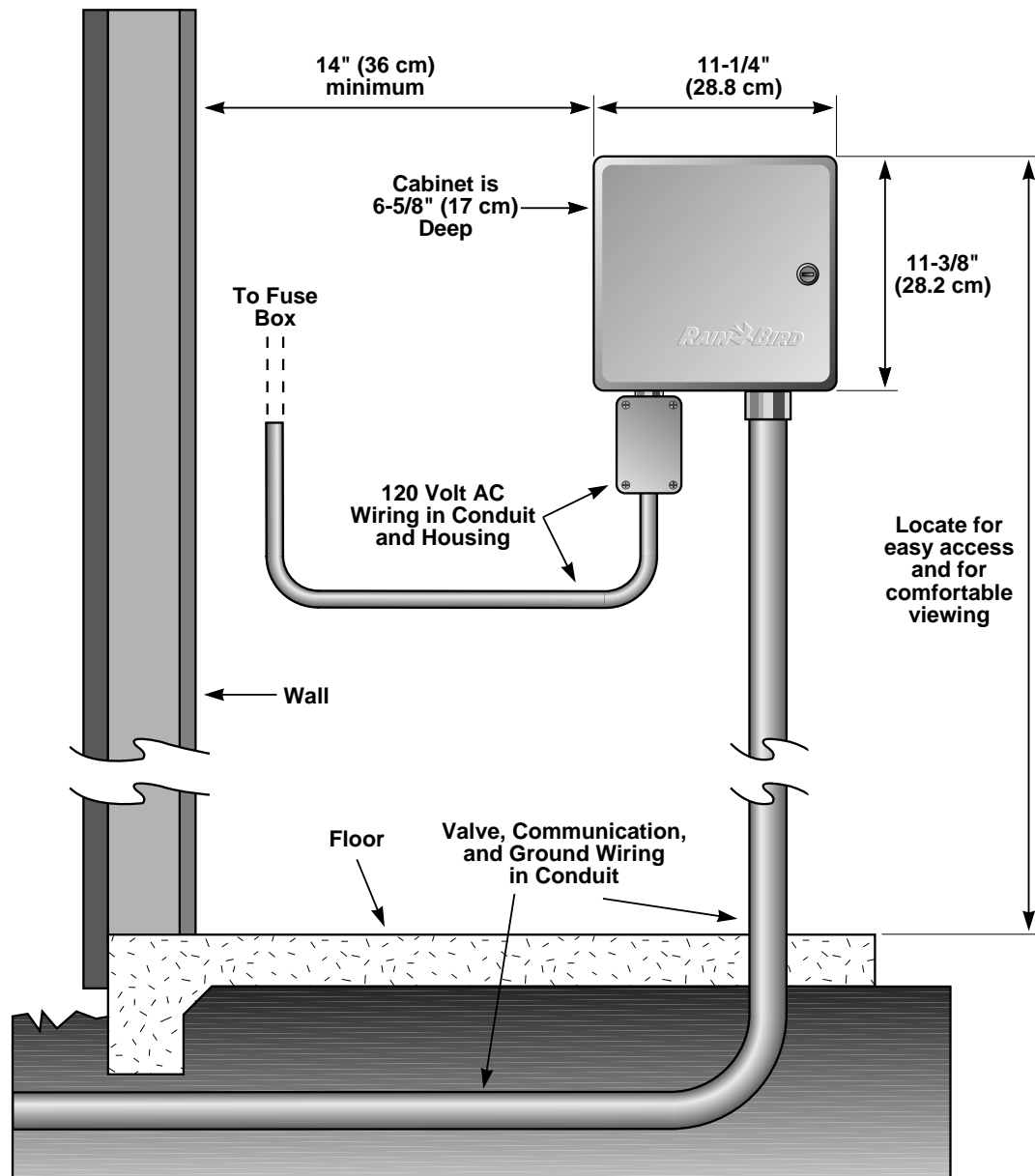
If you have the Wall-mount ESP-SAT controller, follow the instructions for "Wall-mount Installation," which begin on this page. If you have a Pedestal-mount ESP-SAT controller, follow the instructions for "Pedestal-mount Installation," which begin on page 12.

Wall-mount Installation

Choosing a Location

When choosing the best location to install your wall-mount controller, please consider the following:

- ✓ **Warning!** All wiring must be installed and connected in accordance with local codes.
- ✓ We recommend an indoor area, protected from vandalism, where the user can easily reach the controller.
- ✓ Select a location that has access to 120 volt AC electrical power (or the proper electrical supply voltage outside the United States).
- ✓ Choose a flat, stable, vertical surface where you can mount the controller. Allow sufficient conduit clearance for the electrical connections at the bottom of the controller cabinet.
- ✓ Allow 14" (35.9 cm) minimum clearance for the hinged cabinet door to swing fully to the left.



Typical Wall-mount installation

Chapter 1: Installing the Controller (continued)

What You Will Need

Before you begin installation, you will need the following tools:

- ✓ Phillips Head Screwdriver
- ✓ Slotted Head Screwdriver
- ✓ Slotted Thin Blade Screwdriver
- ✓ Wire Strippers
- ✓ Lineman's Pliers
- ✓ Needlenose Pliers
- ✓ Tape Measure
- ✓ Marking Pencil
- ✓ Electric Drill (or Hammer Drill if installing in masonry or concrete wall)
- ✓ Nut Driver (size according to type of mounting bolts used)
- ✓ Metal or Plastic Anchors (Toggle Bolts may be used if installing in drywall. We strongly advise you to locate a wall stud and mount at least one mounting screw into the stud.)

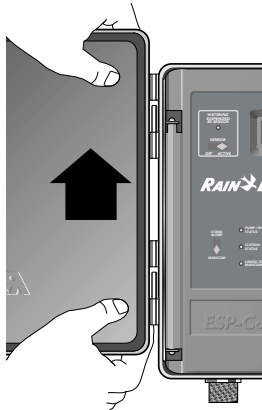
Chapter 1: Installing the Controller (continued)

Removing the Controller's Faceplate

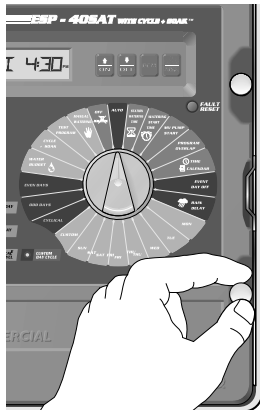
You must first remove the faceplate before you can mount the controller. To do so,

1. Remove the controller cabinet door from its two hinges by opening the door then holding the bottom of the door and sliding up.
2. Pull out gently on the two white plastic snap latches on the right side of the faceplate, then swing the panel open.
3. Disconnect the two-wire harness from the terminal board by pressing the latch away from the connector and pulling the connector away from the terminal board.
4. Disconnect the wide gray ribbon cable by grasping the wide sides of the connector and gently pulling the connector away from the terminal board.
5. Disconnect the six-wire cable from the MAXICOM Interface Board (MIB) by firmly grasping the base of the cable connector and gently pulling the connector away from the MIB.
6. Remove the faceplate from its hinges by pushing up on the panel until the lower hinge comes up out of its hole. Slide the faceplate down and away to clear the upper hinge from its hole. Set the faceplate aside.
7. Remove the foam block containing the battery from the inside of the controller.

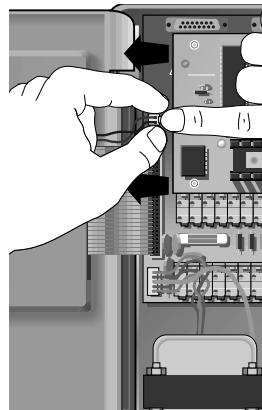
Remove cabinet door



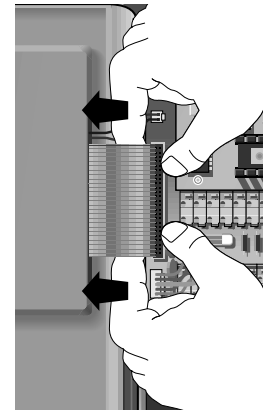
Pull snap latches



Disconnect two-wire harness



Disconnect ribbon wire



Chapter 1: Installing the Controller (continued)

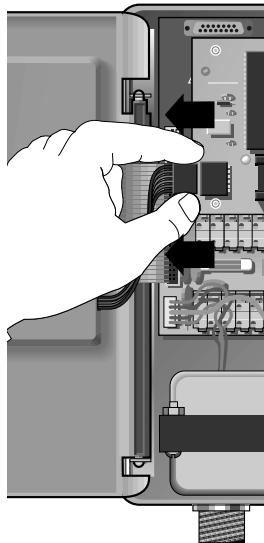
Mounting the Controller on the Wall

1. Pick up the metal cabinet. Using a thin blade screwdriver, push out the three largest plastic plugs at the back of the cabinet. The three new holes should form an up-side down triangle.
2. Place the mounting template onto your mounting surface, then drill the holes.
3. Mount the controller cabinet with the mounting hardware supplied.

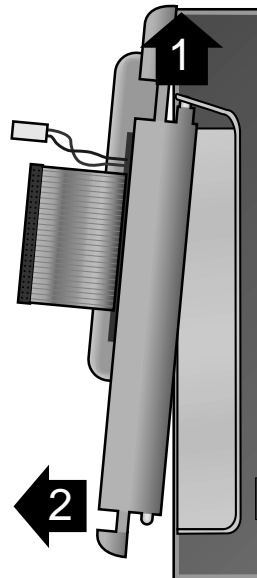
Note: The mounting materials and specific screws you need will vary according to the kind of mounting surface (i.e., wood, cement, masonry, drywall, etc.).

You have completed the Wall-mount installation. Turn to page 17 for connection instructions.

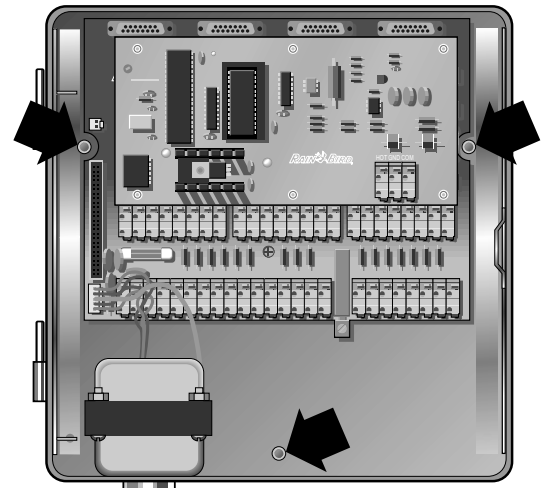
Disconnect six-wire cable



Remove faceplate from hinges



Remove the three plastic plugs



Chapter 1: Installing the Controller (continued)

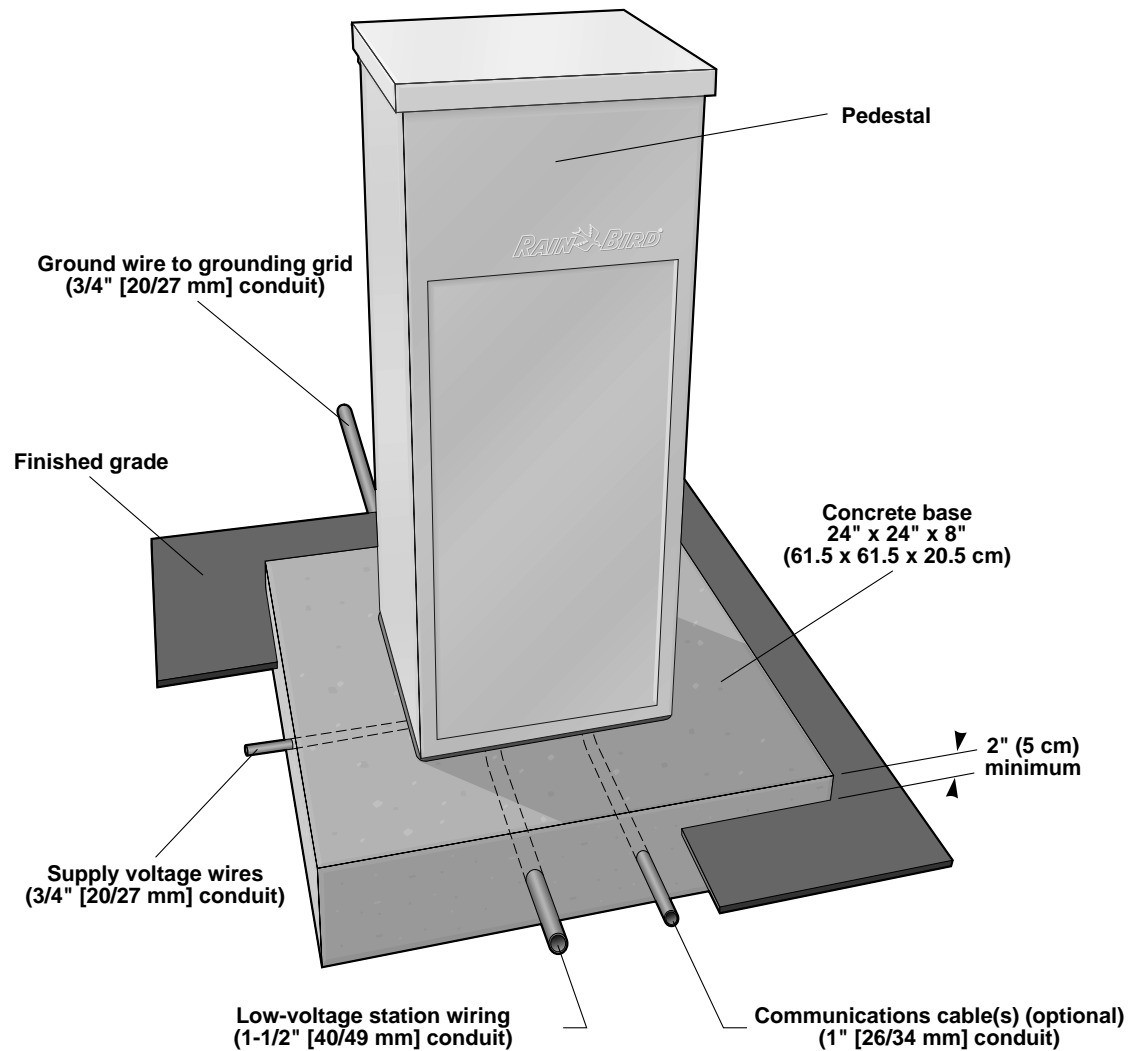
Pedestal-mount Installation

Choosing a Location

When choosing the best location for installing your Pedestal-mount controller, consider the following:

- ✓ **Warning!** All wiring must be installed and connected in accordance with local codes.
- ✓ Select an outdoor area protected from vandalism, where the user can easily reach the controller.
- ✓ Select a location that has access to 120 volt AC electrical power (or the proper electrical supply voltage outside the United States).
- ✓ Allow 14" (35.6 cm) minimum clearance for the hinged pedestal door to swing fully up and then to the left.

Chapter 1: Installing the Controller (continued)



Typical Pedestal-mount installation

Chapter 1: Installing the Controller (continued)

What You Will Need

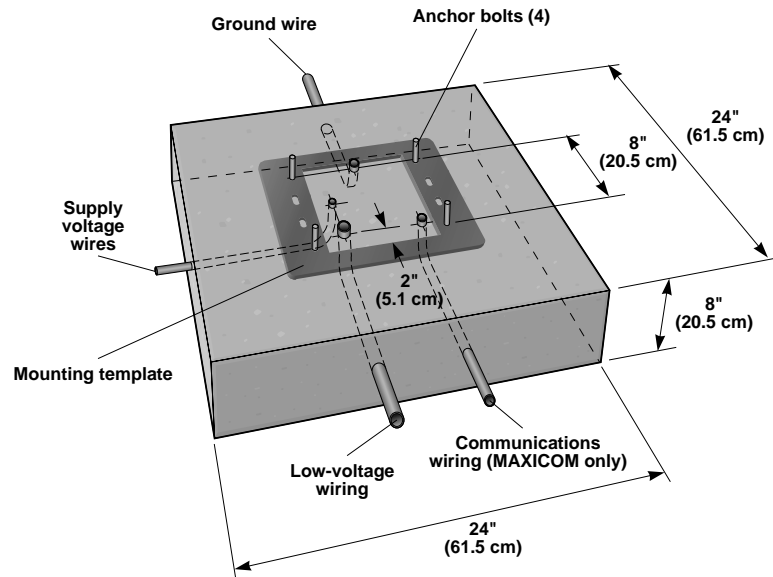
Before you begin installation, you need the following tools and supplies:

- ✓ Phillips Head Screwdriver
- ✓ Wire Strippers
- ✓ Open End Wrenches (1/2" and 9/16")
- ✓ Tape Measure
- ✓ Level
- ✓ Shovel
- ✓ Saw Horse
- ✓ Sledge Hammer
- ✓ Wheelbarrow
- ✓ Trowel for Concrete
- ✓ Wide Sweep Ell Conduits
- ✓ Concrete
- ✓ Wood for Concrete Forms
- ✓ Surge Protection and Grounding Supplies
- ✓ Metal Drill Bit (for radio units)

Chapter 1: Installing the Controller (continued)

Site Preparation and Mounting

1. Mount the pedestal on a level concrete base with the top of the base at least 2" (5 cm) above grade. The base dimensions are: 24" x 24" x 8" (61.5 x 61.5 x 20.5 cm).
2. Before pouring the concrete, position the following in the concrete form: a 1-1/2" (40/49 mm) sweep elbow for the communication wiring; a 3/4" (20/27 mm) sweep elbow for the 120 volt AC input wiring; a 3/4" ground wire conduit; and a 1" cable conduit.
3. Thread the four anchor bolts into the plastic mounting template provided. Position the bolts so they are perpendicular to the template. The threaded ends must protrude between one and two inches above the template.
4. Pour the concrete.
5. Before the concrete sets, position the template with the anchor bolts in the base. Make sure the sweeps are centered within the template window. Level the template.



Typical Pedestal-mount installation

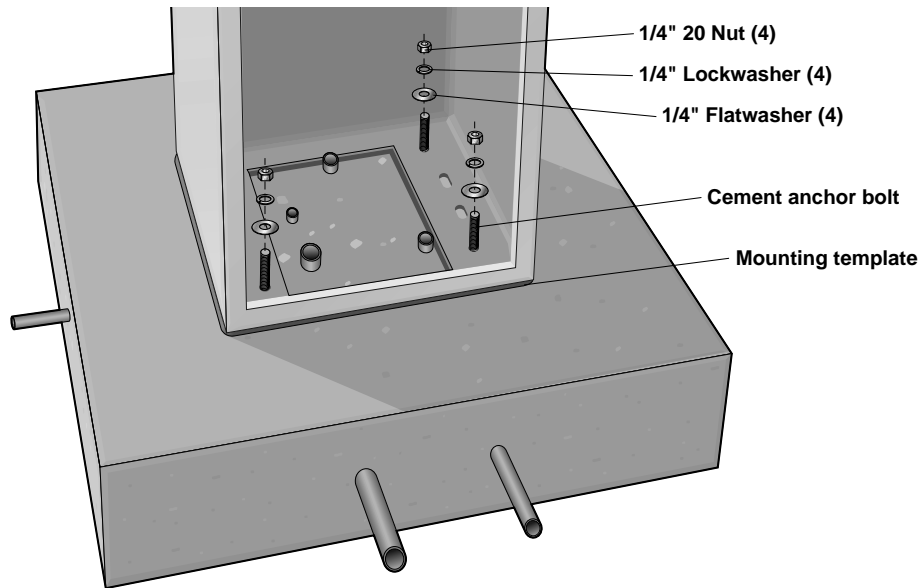
Chapter 1: Installing the Controller (continued)

6. If more than one pedestal is required per base, leave 6" (14.7 cm) or more between the outside edges of each adjoining mounting template.
7. Allow the concrete to set for at least 24 hours before continuing.
8. After the concrete completely sets, position the pedestal over the anchor bolts and on top of the template. In high humidity areas or locations where excessive moisture may be a concern, allow a small gap between the concrete

pad and pedestal for air circulation and drainage.

9. Open the pedestal door, pull up and remove the front access panel. Mount the pedestal to the base with the washers and nuts provided. Tighten all nuts. Make sure the pedestal is vertical and shim if necessary.

You have completed the Pedestal-mount installation. Turn to page 17 for connection instructions.



Mount the base with the provided washers and nuts

Chapter 2: Connecting the Controller

Connecting the Controller

There are four types of connections you must make to your ESP-SAT controller:

- connections to the field valves,
- communications connections to the cluster control unit (CCU),
- connections to the main power supply, and
- grounding connections.

You may also want to connect an optional sensor, which prevents watering during rainfall or when the soil is moist.

This section of the manual contains instructions for all five types of connections.

Important: All wiring must be installed and connected in accordance with local codes.

Connections to the Field Valves

Each valve that is controlled by the ESP-SAT must have its own wire that is connected to a numbered station terminal on the controller's terminal strip. Each station terminal is capable of operating two valves.

Important: The wires you use to connect the controller to the field valves must be approved for underground use. See the Rain Bird catalog for exact wire specifications.

Important: Do not install the valve wires in the same conduit as the wires to the main power source.

To connect the valve wires,

1. Route each valve wire up through the large hole at the bottom of the controller cabinet.

For Pedestal-mount models, route the valve wires through any of the three holes.

2. Strip 1/2" (1.3 cm) from the end of the valve wire. Insert the wire into the appropriate station terminal. If the wire does not enter securely into the hole, press down on the orange lever as you insert the wire.

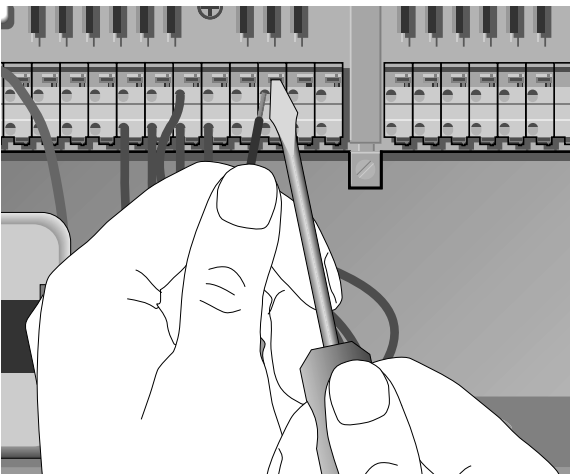
Chapter 2: Connecting the Controller (continued)

Note: Each station has two holes because each station is capable of operating two valves.

3. Repeat for all used stations.
4. Attach the valve common wire to one of the two common terminals in the same way.
5. If your system includes a master valve or pump start, connect the wire from that device to the MV (master valve) terminal on the controller in the same way you connected the other wires.

Note: MV2 (master valve 2) is enabled when any station operates. MV1 (master valve 1) can be enabled or disabled for each individual station. See page 42 for more information.

Insert the valve wire



Chapter 2: Connecting the Controller (continued)

Communications Connections to the CCU

The communication between a satellite controller and the cluster control unit (CCU) is two-way: the signal is transmitted from the CCU to the satellite controller and feedback is transmitted from the controller to the CCU.

There are two possible types of connections between the controller and the CCU:

- two-wire path (TW) or
- wireless radio path (LINK).

If you are connecting the controller by the two-wire path (TW) method, follow the instructions beginning on this page.

If you are connecting the controller by the wireless radio path (LINK), follow the instructions beginning on page 23.

Two-wire Path (TW)

Important: If your controller is set up for two-wire communication to the CCU, we recommend using PE-39 or PE-89 telephone-type cable available from most telecommunications supply warehouses. Indoor wire installations may require a different type of wire. See your authorized Rain Bird MAXI-COM distributor for more information.

Warning! Wires that connect the controller to the CCU must be installed in a conduit other than the one used for wires to the main power source.

Chapter 2: Connecting the Controller (continued)

To connect a two-wire controller to the CCU,

1. Turn off the field breaker on the CCU's faceplate.
2. Route the communication wires up through the large hole on the bottom of the ESP-SAT controller cabinet.

For Pedestal-mount models, route the communication wires through any of the three holes.

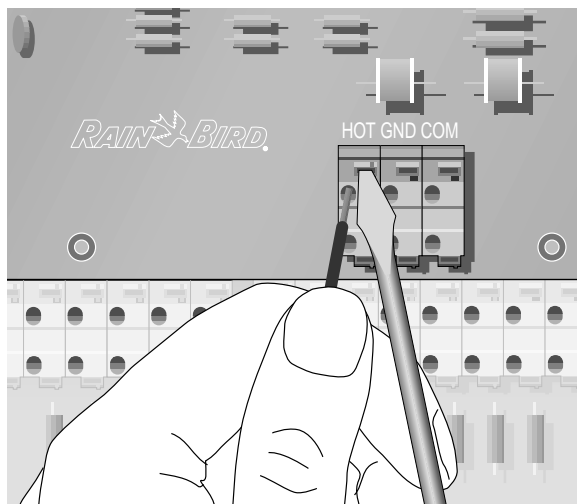
Important: The communication wires should be installed in a conduit other than the one that contains the wires to the main power source.

3. On the controller faceplate, place the STAND ALONE/MAXICOM switch in the STAND ALONE position.
4. Strip 1/2" (1.3 cm) from the ends of the wires, if necessary. On the MAXICOM Interface Board (MIB), connect the CCU MAXICOM hot wire to the controller's "HOT" terminal, the ground wire to the controller's "GND" terminal, and the common wire to the controller's "COM" terminal.

Place switch in STAND ALONE position

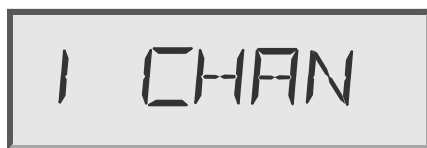


Insert wire into the MIB terminal



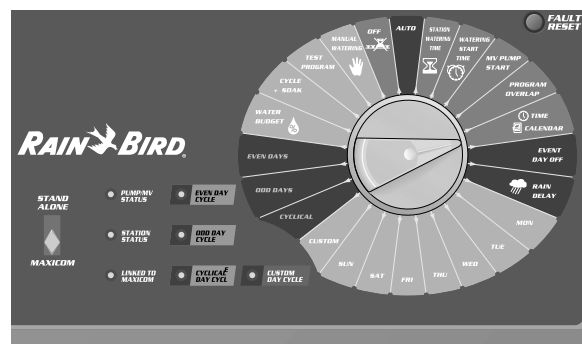
Chapter 2: Connecting the Controller (continued)

5. Each MAXICOM satellite on a CCU must have a channel number for successful communication. To set the channel number,
 - a. Turn the dial on the ESP-SAT faceplate to the TIME/CALENDAR position.
 - b. Press the MAN. START/ADV. key on the faceplate until the number "1" and the word "CHAN" appear in the LCD.



- c. Use the up arrow/ON key and the down arrow/OFF keys to select the channel number you desire.

Turn the dial to TIME/CALENDAR



Note: If the satellite is a 32- or 40-station model, the controller will operate the first 24 stations on the channel number you select, and the remaining stations on the next number in the sequence. For example, if you select channel 5 on a 40-station satellite, stations 1-24 will operate on channel 5, and stations 25-40 will operate on channel 6.

Warning! Never select channel 28 (on a CCU-28) or channel 6 (on a CCU-6) for a 32- or 40-station satellite. There are no channels higher than 28 for the CCU-28 and no channels higher than 6 for the CCU-6. Stations will not operate when assigned to channels higher than 28 (CCU-28) or 6 (CCU-6).

6. Return the STAND ALONE/MAXICOM switch to the MAXICOM position.

If the two-wire controller is communicating, the LINK TO MAXICOM light on the faceplate displays a steady light. If the two-wire controller is not communicating correctly, the light flashes. If the light flashes, check the connections.

If the satellite is at rest, the faceplate LCD will display the time and day. If a station is operating under MAXICOM control, the LCD will display the words "CENTRAL" and "CONTROL," alternately.

Chapter 2: Connecting the Controller (continued)

Connections to an Optional Sensor System

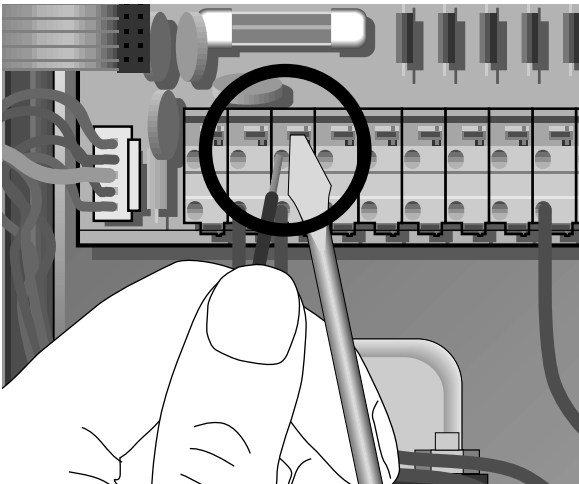
The ESP-SAT allows you to connect an optional sensor system. The ESP-SAT works with any open or closed switch sensor such as Rain Bird Raincheck, Rain Bird Aquamiser, Rain Bird Intellisense, or Rain Bird Rain/Freeze Switch.

Note: The information from this sensor system does **not** feed back information to the central control system (MAXICOM).

Important: The wires you use to connect the controller to the sensor must be approved for underground use. See the Rain Bird catalog for exact wire specifications.

Important: The sensor wires should be installed in a conduit other than the one that contains the wires to the main power source.

Insert one wire into each of the terminal holes



To connect the sensor's wires to the controller,

1. Strip 1/2" (1.3 cm) from the end of the sensor wires. Insert one wire to each of the sensor terminal holes. If the wire does not enter securely into the hole, press down on the orange lever as you insert the wire.
2. Route the wires through the hole at the bottom right of the cabinet.

For Pedestal-mount models, route the communication wires through any of the three holes.

3. Connect the other end of the wires to the sensor's valve common terminals or wires.
4. Follow the sensor's directions for placing and connecting the sensor's probes and for setting the shutoff level, if appropriate.

Chapter 2: Connecting the Controller (continued)

Wireless Radio Path (LINK)

Before you install radio communication, you must perform a radio site survey to ensure that the site is conducive to radio operation.

Note: The radio/modem kit is sold separately from the ESP-SAT controller. Contact your Rain Bird distributor for ordering information.

Connecting the Wireless Controller to the CCU

To connect the wireless controller to the CCU, you must:

- install the radio/modem in the controller,
- install the antenna,
- connect the antenna to the radio, and
- set the switches.

Note: These instructions are for the installation of Rain Bird-brand antenna and radio/modem only. If you have purchased another brand of antenna or radio/modem, please follow the manufacturer's installation instructions.

Warning! Do not turn power on to the radio/modem until the antenna is attached.

Installing the Radio/Modem

To install the radio/modem,

1. On the controller faceplate, place the STAND ALONE/MAXICOM switch in the STAND ALONE position.
2. Remove the backing tape from the radio/modem unit and mount it on the back of the front panel, in the lower right corner in a Wall-mount model or on an inside wall of the base in a Pedestal-mount model.
3. Connect the female end of the radio/modem's 9-wire ribbon cable (packaged with the radio/modem kit) into the 9-pin jack at the top of the radio/modem.
4. Connect the male end of the radio/modem's 9-wire ribbon cable into the J1 connector at the center of the MIB.

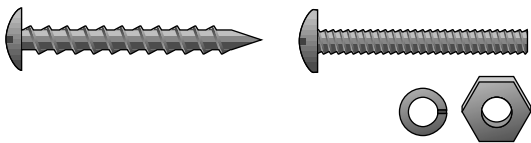
Chapter 2: Connecting the Controller (continued)

Installing the Antenna

In preparation for installing the antenna, you will prepare the mounting surface. To do so,

1. Choose a flat mounting surface for the antenna that is large enough to accommodate the antenna base.
2. Use the template enclosed in the antenna kit to determine the placement of the mounting holes.
3. Determine which type of the supplied screws to use to secure the antenna to the mounting surface – the #10 screws or the sheet metal screws. Use #10 screws for wood or drywall, use sheet metal screws for metal surfaces.
4. Drill the mounting holes.
 - For the #10 screws, drill 7/32" diameter holes.
 - For the sheet metal screws, drill .136" holes (use a size 29 drill bit).

Sheet metal and #10 screws



Installing the antenna with #10 screws

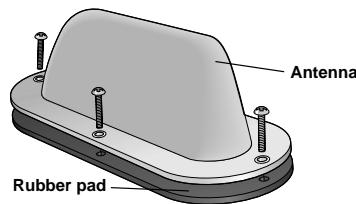
If you use #10 screws, follow the instructions below. If you use sheet metal screws, skip to "Installing the antenna with sheet metal screws," on the following page.

1. Make sure the supplied rubber pad is placed between the mounting surface and the antenna base.
2. Insert the screw into one of the mounting holes on the antenna, through the rubber pad, and then into the mounting surface.
3. Place a lockwasher and a hex nut at the end of the screw.
4. Tighten the screw with a phillips head screw driver and tighten the hex nut with a hex wrench.

Note: At least one of the screws must make good contact with the antenna's metal surface for a secured ground connection.

5. Repeat steps 2 through 4 until you have installed all four of the #10 screws.

Antenna with rubber pad in place



Chapter 2: Connecting the Controller (continued)

Installing the antenna with sheet metal screws

To install the antenna,

1. Make sure the supplied rubber pad is placed between the mounting surface and the antenna base.
2. Insert a screw into one of the mounting holes on the antenna, the rubber pad, and then into the mounting surface.
3. Tighten the screw with a phillips head screw driver.

Note: At least one of the screws must make good contact with the antenna's metal surface for a secured ground connection.

4. Repeat steps 2 and 3 until you have installed all four of the sheet metal screws.

Connecting the Antenna to the Radio

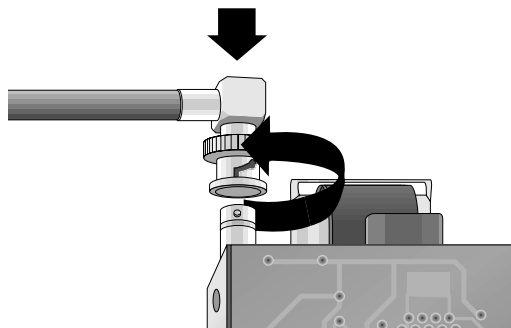
To connect the antenna to the radio,

1. Route the coaxial cable attached to the antenna through the hole in the base of the controller cabinet. For Pedestal-mount controllers, route the coaxial cable through any of the three holes.
2. Connect the coaxial cable to the coaxial jack on the radio.

If your antenna already has a coaxial cable affixed to it, use this cable to connect the antenna to the coaxial jack on the radio/modem. Discard the coaxial cable shipped with the radio/modem.

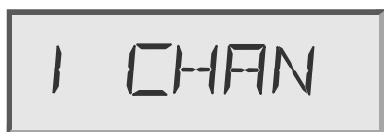
If your antenna does not already have a coaxial cable affixed to it, connect the coaxial cable supplied with the radio/modem to the coaxial jack on the antenna and the coaxial jack on the radio/modem.

Connect the antenna's coaxial cable to the radio/modem



Chapter 2: Connecting the Controller (continued)

3. Each MAXICOM satellite on a CCU must have a channel number for successful communication. To set the channel number,
 - a. Turn the dial on the ESP-SAT faceplate to the TIME/CALENDAR position.
 - b. Press the MAN. START/ADV. key on the faceplate until the number “1” and the word “CHAN” appear in the LCD.



- c. Use the up arrow/ON key and the down arrow/OFF keys to select the channel number you desire.

Note: If the satellite is a 32- or 40-station model, the controller will operate the first 24 stations on the channel number you select, and the remaining stations on the next number in the sequence. For example, if you select channel 5 on a 40-station satellite, stations 1-24 will operate on channel 5, and stations 25-40 will operate on channel 6.

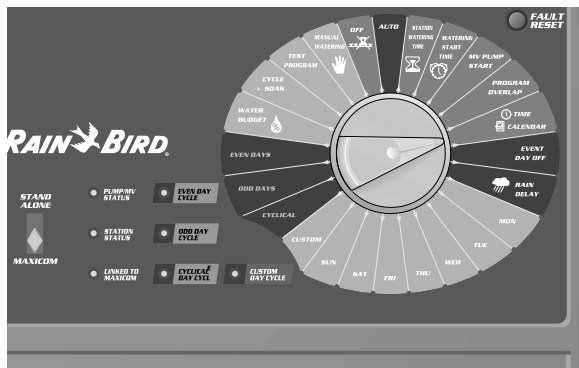
Warning! Never select channel 28 (on a CCU-28) or channel 6 (on a CCU-6) for a 32- or 40-station satellite. There are no channels higher than 28 for the CCU-28 and no channels higher than 6 for the CCU-6. Stations will not operate when assigned to channels higher than 28 (CCU-28) or 6 (CCU-6).

4. On the controller faceplate, place the STAND ALONE/MAXICOM switch in the MAXICOM position.

If the link path is communicating, the LINK TO MAXICOM light on the faceplate displays a steady light. If the link path is not communicating, the light flashes. If the light flashes, check all of the connections.

The antenna and radio/modem are now installed. The antenna is factory-tuned to the correct frequency range.

Turn the dial to **TIME/CALENDAR**



Chapter 2: Connecting the Controller (continued)

Connections to an Optional Sensor System

The ESP-SAT controller allows you to connect an optional sensor system to the MIB. The ESP-SAT works with any open or closed switch sensor such as Rain Bird Raincheck, Rain Bird Aquamiser, Rain Bird Intellisense, or Rain Bird Rain/Freeze Switch. It will also work with pulse-type devices.

Note: The information from this sensor system feeds back information to the central control system (MAXICOM).

Important: The wires you use to connect the controller to the sensor must be approved for underground use. See the Rain Bird catalog for exact wire specifications.

Important: The sensor wires should be installed in a conduit other than the one that contains the wires to the main power source.

To connect the sensor's wires to the controller,

1. Strip 1/2" (1.3 cm) from the end of the sensor wires. Insert one wire to each of the sensor terminal holes on the MIB. If the wire does not enter securely into the hole, press down on the orange lever as you insert the wire.
2. Route the wires through the hole at the bottom right of the cabinet.

For Pedestal-mount models, route the communication wires through any of the three holes.
3. Connect the other end of the wires to the sensor's valve common terminals or wires.
4. Follow the sensor's directions for placing and connecting the sensor's probes and for setting the shutoff level, if appropriate.

Chapter 2: Connecting the Controller (continued)

Setting the Switches

The MIB contains four dip switches (located at the upper left corner of the board and labeled “S1”), which must be set before operating with the MAXICOM system.

To set the dip switches,

1. Switches $S1_1$ and $S1_2$ control the group identification and must be set to the same positions as the site CCU’s group identification settings to complete the link path.

The factory default settings for these switches are: $S1_1 = \text{ON}$, $S1_2 = \text{OFF}$.

2. Switch $S1_3$ controls the sensor 1 and 2 mode and can be toggled between MAXICOM MODE (off) and MAXI MODE (on).

The factory default setting for this switch is: $S1_3 = \text{OFF}$ (MAXICOM mode).

3. Switch $S1_4$ controls ISC compatibility and can be toggled between the OFF (not ISC compatible) position and the ON (ISC compatible) position.

The factory default setting for this switch is: $S1_4 = \text{OFF}$ (not ISC compatible).

Note: When sensor inputs are used, you must consider the following information.

If the satellite is a 32- or 40-station model, MAXICOM will access the first 24 stations on the channel number you select, the remaining stations on the next number in the sequence, and sensor 1 and 2 on the next two numbers in the sequence.

For example, if you have a 40-station satellite and you select channel 5, stations 1 through 24 will operate on channel 5; stations 25-40 will operate on channel 6; sensor 1 will operate on channel 7; and sensor 2 will operate on channel 8.

If the satellite has fewer than 32 stations, the MAXICOM will access the first 24 (or lower) stations on the channel number you select, and sensor 1 and 2 will operate on the next two numbers in the sequence.

Chapter 2: Connecting the Controller (continued)

Connections to the Main Power Source

The three main power input wires for the standard 120 volt, 60 Hz/AC transformer are black, white, and green. The international version 230 volt, 50 Hz wires are brown, blue, green, and yellow. The wires exit the controller through the smaller hole at the cabinet base.

Important: The wires that connect the controller to the main power source must be installed in a conduit other than the one that contains the field wires, sensor wires, and/or communication wires.

To connect the power input wires to the main power source,

1. Connect a junction box to the transformer nipple. To do this, place the

junction box on the nipple, then thread the washer on. Twist it to tighten.

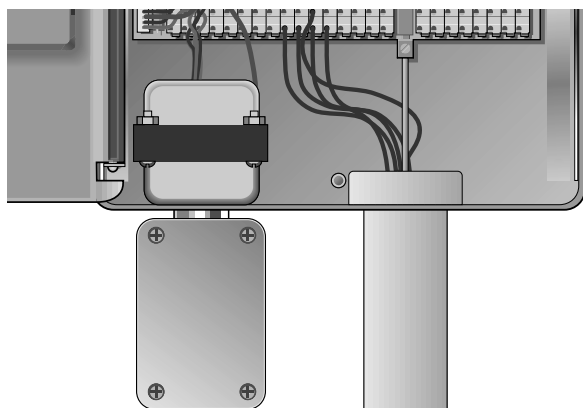
2. If you have the standard 120 volt, 60 Hz model, use wire nuts to connect the black wire to the power source hot wire, the white wire to the common wire, and the green wire to the ground wire.

OR

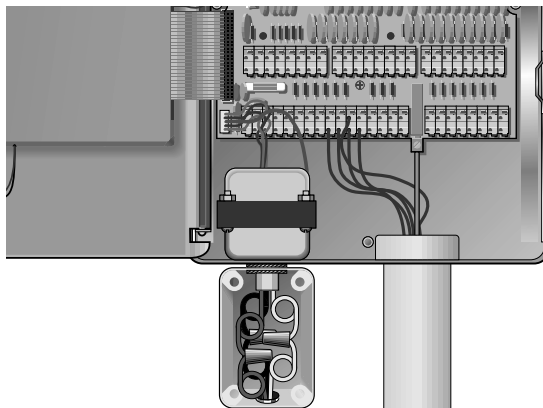
If you have a 230 volt, 50 Hz model, use wire nuts to connect the brown wire to the power source hot wire, and the blue to the power source common wire. Connect the green and yellow wire to the ground wire.

3. Close the junction box.
4. Install a conduit for the wires from the power source to the junction box.

Location of junction box



Main power wire connections



Chapter 2: Connecting the Controller (continued)

Grounding Connections

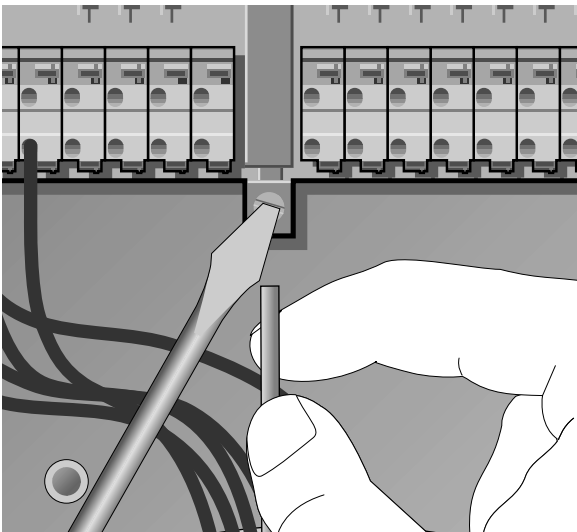
The ESP-SAT controller has built-in electrical surge protection. For the system to work, the controller's earth ground terminal must be connected to a ground rod that is driven into the earth.

Important: Use a #10 (6 mm) or #8 (10 mm) bare wire to connect the controller to the ground rod or grounding grid.

To connect the ground wire,

1. Feed the ground wire through the large hole at the bottom of the cabinet.
2. Loosen the screw on the copper earth ground terminal and place the ground wire into the terminal. Tighten the screw to secure the ground wire.

Insert ground wire



Chapter 2: Connecting the Controller (continued)

Putting the Controller Back Together

Congratulations! You have completed the connections for your new controller. To put the controller back together,

1. Attach the battery recharging clip to the 9-volt battery supplied. Then push the battery into the battery holder.

The ESP-SAT controller fully charges the nickel metal hydride, 9 volt battery in about 48 hours and continues to charge the battery whenever the con-

troller is supplied with power. The 9 volt battery provides power for keeping track of what cycle is in progress when there is a power outage. The 9 volt battery also allows the controller to be programmed when the face plate is detached from the cabinet. This feature lets the installer walk a site while setting watering times and schedules.

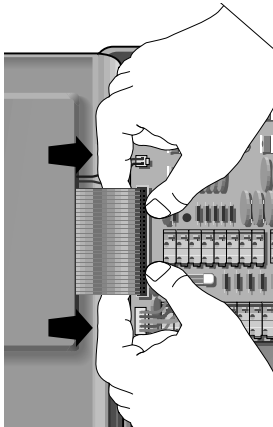
Note: The ESP-SAT controller also has a built-in lithium battery that provides for non-volatile program memory.

Chapter 2: Connecting the Controller (continued)

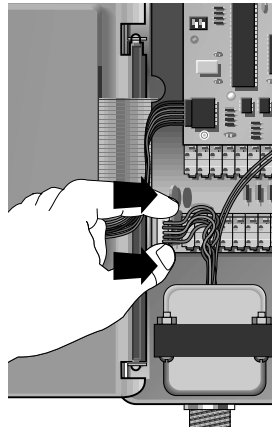
Warning! Do not use an alkaline battery in the controller; alkaline batteries can cause an explosion.

2. Connect the wide gray ribbon wire from the back of the faceplate to the J1 slot on the terminal board.
3. Connect the transformer's five-wire cable to the J7 terminal board connector.
4. Connect the two-wire harness to the J2 terminal board connector.
5. Connect the six-wire cable to the J1 connector on the MIB.
6. Reattach the faceplate to its hinges.
7. If you have a Wall-mount controller, reattach the controller door to its hinges. If you have a Pedestal-mount controller, reinsert the access panel.
8. Turn on the main power to the controller.

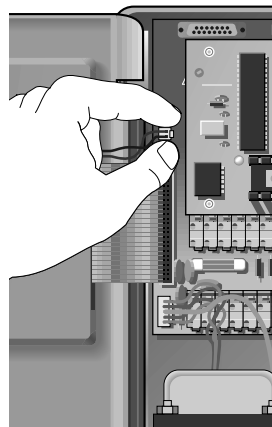
Connect the gray wire



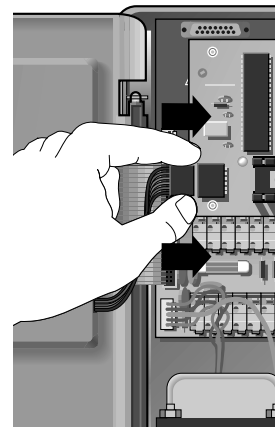
Connect the five-wire cable



Connect the two-wire harness



Connect the six-wire cable



Chapter 3: Programming and Operation

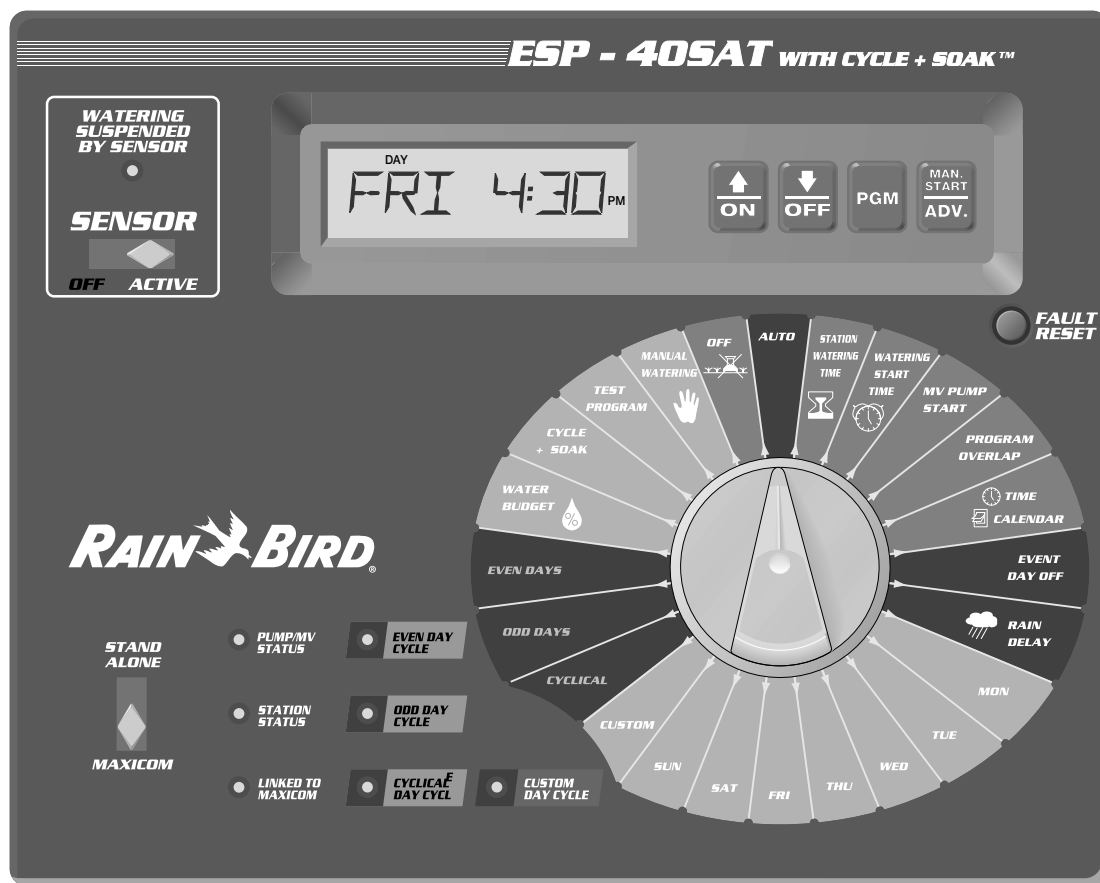
The ESP-SAT controller will usually operate automatically, receiving commands from the central computer. A satellite controller can also operate as a stand-alone controller, using locally programmed instructions. Local programming will be used, for example, if the satellite loses communication with the CCU. You can use the keypad to program the controller locally so that it will operate automatically. You can also make changes in watering schedules without disturbing the programmed information.

This chapter will guide you through the use of the controller's keypad and LCD, as well as the local programming and operation of the controller.

Chapter 3: Programming and Operation (continued)

Familiarizing Yourself with the Controller's Faceplate

Before beginning to program or operate your controller, take a moment to familiarize yourself with the controller's faceplate. The following pages contain a short description of each of the buttons and indicators. Specific instructions for all of the operations you can perform begin on page 38.



Chapter 3: Programming and Operation (continued)

WATERING SUSPENDED BY SENSOR

This light is on when watering has been suspended by a sensor.

SENSOR OFF/ACTIVE

If you want to activate the sensor, set the switch to ACTIVE. If you wish to override the sensor or there is no sensor connected to the controller, set the switch to OFF. When no sensor is connected, be certain that the jumper cable connecting the SENSOR terminals on the controller's circuit board is installed. If you set the SENSOR switch to ACTIVE without a sensor or jumper cable connected, the controller cannot operate the valves and no watering will occur.

▲/ON

Press to turn a setting on or to advance the setting in the display.

▼/OFF

Press to turn a setting off or to decrease the setting in the display.

PGM

Press to change the program indicator in the display. The indicator cycles through programs A, B, C, and D.

MAN. START/ADV.

Press to advance to the next setting in the display or to start an operation.

FAULT RESET

Press to clear the fault reading from the display. Press this button after you have fixed the short circuit indicated by the diagnostic fault indicator in the display.

STAND ALONE/MAXICOM

If you want your controller to function as a stand-alone unit, set this switch to STAND ALONE. If you want it to function as a satellite connected to the MAXICOM system, set this switch to MAXICOM.

PUMP/MV STATUS

This light is on when the Master Valve 1 (MV1) circuit is enabled for the active station.

STATION STATUS

This light is on when a valve is active.

Chapter 3: Programming and Operation (continued)

LINKED TO MAXICOM

This light is on when the STAND ALONE/MAXICOM switch is in the MAXICOM position and the controller is physically linked to the MAXICOM system.

EVEN DAY CYCLE

This light is on when the controller's active program is set to water on even days of the month.

ODD DAY CYCLE

This light is on when the controller's active program is set to water on odd days of the month.

CYCLICAL DAY CYCLE

This light is on when the controller's active program is set to water in a cycle with a specified number of days.

CUSTOM DAY CYCLE

This light is on when the controller's active program is set to water on specific days of the week.

AUTO

Set the dial here to run the controller automatically on the programs you set.

STATION WATERING TIME

Set the dial here to set the length of an individual station's watering time.

WATERING START TIME

Set the dial here to set a program's watering start times. Eight start times are available for each program.

MV PUMP START

Set the dial here to enable or disable Master Valve 1 (MV1) for a particular station.

PROGRAM OVERLAP

Set the dial here to set programs to either stack or overlap. The default for all programs is stack.

TIME/CALENDAR

Set the dial here to set the time and calendar.

Chapter 3: Programming and Operation (continued)

EVENT DAY OFF

Set the dial here to set optional day(s) off within the month.

RAIN DELAY

Set the dial here to delay watering for a specified number of days.

MON — SUN

Set the dial to the day of the week to turn that day off or on when setting a custom program cycle.

CUSTOM

Set the dial here to set a program cycle to water on specific days of the week.

CYCLICAL

Set the dial here to set a program cycle to water at specific intervals such as every day, every second day, every third day, etc.

ODD DAYS

Set the dial here to set a program cycle that waters on odd days of the month.

EVEN DAYS

Set the dial here to set a program cycle that waters on even days of the month.

WATER BUDGET

Set the dial here to set the water budget percentage for a program. 100% is the default.

CYCLE + SOAK

Set the dial here to break a station's watering time into intervals to conserve water and prevent erosion.

TEST PROGRAM

Set the dial here to set and start a test program cycle for all stations.

MANUAL WATERING

Set the dial here to water a station manually.

OFF

Set the dial here to shut the controller and its valves down, such as during the winter months.

Chapter 3: Programming and Operation (continued)

Programming

This section of the manual contains instructions for programming your ESP-SAT controller locally. The controller comes from the factory without a pre-set default program.

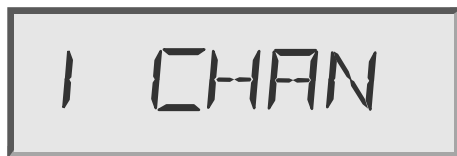
Before you begin programming, it is a good idea to chart your watering schedule on a piece of paper, taking into account the schedule for all stations and how often you want to repeat the schedule. A blank schedule is provided for you on pages 54-55.

Chapter 3: Programming and Operation (continued)

Setting the Channel Number

Each MAXICOM satellite on a CCU must have a channel number for successful communication. To set the channel number,

1. Turn the dial on the ESP-SAT faceplate to the TIME/CALENDAR position.
2. Press the MAN. START/ADV. key on the faceplate until the number "1" and the word "CHAN" appear in the LCD.



3. Use the up arrow/ON key and the down arrow/OFF keys to select the channel number you desire.

Note: If the satellite is a 32- or 40-station model, the controller will operate the first 24 stations on the channel number you select, and the remaining stations on the next number in the sequence. For example, if you select channel 5 on a 40-station satellite, stations 1-24 will operate on channel 5, and stations 25-40 will operate on channel 6.

Warning! Never select channel 28 (on a CCU-28) or channel 6 (on a CCU-6) for a 32- or 40-station satellite. There are no channels higher than 28 for the CCU-28 and no channels higher than 6 for the CCU-6. Stations will not operate when assigned to channels higher than 28 (CCU-28) or 6 (CCU-6).

Setting the Clock and Calendar

In order to program the controller, you must first set the controller's internal clock and calendar. To do so,

1. Rotate the dial to TIME/CALENDAR.

The hour digits in the display flash, indicating that they are ready to be set.



2. Use the arrow keys to set the hour to the current time.

If you have a 60 Hz model, as you pass 12:00 the am/pm designation changes.

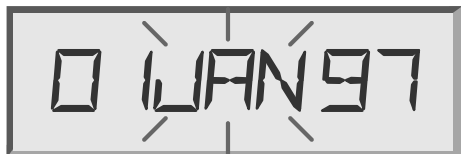
Note: the 60 Hz model displays time in the 12 hour am/pm mode. The 50 Hz model displays time in the 24 hour military mode.

3. Press MAN. START/ADV.

The minute digits flash, indicating that they are ready to be set.

4. Use the arrow keys to set the minutes to the current time.
5. Press MAN. START/ADV.
A new display appears with the day, month and year. The month is flashing, indicating that it is ready to be set.

Chapter 3: Programming and Operation (continued)



6. Use the arrow keys and the MAN START/ADV key to set the month, day, and year the same way you set the hour and minutes.
7. Press MAN START/ADV to return to the time of day display. The hour continues to flash as long as the dial is left at TIME/CALENDAR.
8. Return the dial to AUTO. The display shows the day of the week and time of day.



Setting Up a Program

There are four program settings available with the ESP-SAT controller: A, B, C, and D. You can set each program to operate according to your specifications. When you set up a program, you

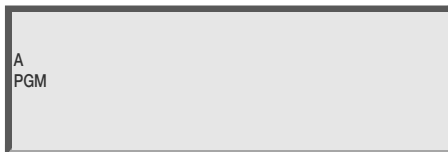
- select the program,
- choose a cycle setting for the program, and
- assign stations and set the station's watering durations and start times.

Note: It is easier to select a program and program it completely. Jumping from program to program can be confusing.

Step one: Selecting a program

To select the program you want to set up,

1. Press PGM to cycle through the available programs. The program indicator on the far left side of the display changes.



Chapter 3: Programming and Operation (continued)

Step two: Selecting the cycle

Each program can operate in one of four cycle modes:

- CUSTOM waters on the days of the week you select
- CYCLICAL waters according to a cycle with a specified number of days.
- ODD waters only on odd days of the month.
- EVEN waters only on even days of the month.

Note: All programs default to the custom cycle.

To set a **custom cycle**,

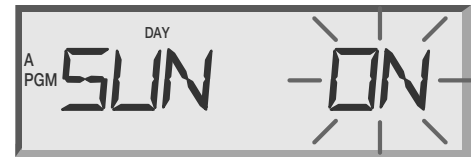
1. Rotate the dial to CUSTOM.
The display shows the program and CUSTOM.



The display shows USED if the program is active and using a different cycle mode. If so, you can override the previous setting.

2. If the program you want is not displayed, press PGM until it is.
3. Press ON.
The display shows CUSTOM and the custom light on the faceplate illuminates.

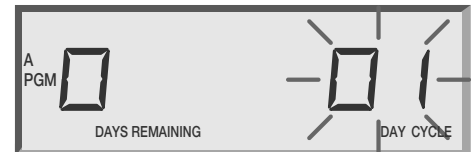
4. Rotate the dial to the first day of the week and use the ON and OFF keys to turn the day on or off.
The display shows the day and the ON/OFF setting.



5. Repeat step 4 for all the days of the week you want to change.
6. Return the dial to AUTO.
The controller returns to the time of day display and waters on the days you have specified.

To set a **cyclical cycle**,

1. Rotate the dial to CYCLICAL.
The display shows the number of days remaining and the number of days in the cycle. The number of days in the cycle is flashing, indicating that it is ready to be set.



Chapter 3: Programming and Operation (continued)

The display shows USED if the program is active and using a different cycle mode. If this is the case, you can override the previous setting.

2. If the program you want is not displayed, press PGM until it is.
3. Press ON.
The cyclical display shows and the cyclical light on the faceplate illuminates.
4. Use the arrow keys to set the number of days in the cycle.
For example, if you set a 3-day cycle, the controller skips two days and waters on the third day.
5. Press MAN START/ADV to toggle to the left side of the display.
The number of days remaining in the cycle flashes, indicating that it is ready to be set.
6. Use the arrow keys to set the number of days remaining before the next watering day. This tells the controller where today is in the cycle you have just set.
7. Return the dial to AUTO.
The controller returns to the time of day display and waters on the days you have specified.

To set an **odd or even cycle**,

1. Rotate the dial to ODD DAYS or EVEN DAYS.

The display shows the program and ODD or EVEN.



The display shows USED if the program is active and using a different cycle mode. If this is the case, you can override the previous setting.

2. If the program you want is not displayed, press PGM until it is.
3. Press ON.
The display shows either ODD or EVEN and the corresponding light on the faceplate illuminates.
4. Return the dial to AUTO.
The controller returns to the time of day display and waters on the days you have specified.

Note: The 31st day of the month defaults to ON, so if you do not want to water on the 31st, you must set that day to OFF. See page 47 for more information.

Chapter 3: Programming and Operation (continued)

Step three: Setting the length of a station's watering time

Within the program you are setting, you can set the length of a station's watering time from 0 minutes to 12 hours. Set the time in one-minute increments for up to two hours; set it in 10-minute increments from two hours to 12 hours.

To set the length of a station's watering time,

1. Rotate the dial to STATION WATERING TIME.

The display shows the program, the station number, and the length of watering time. The station number is flashing, indicating that it is ready to be set.



If the station is included in any other program, the controller will let you know by replacing the length of watering time with USED.

2. If the program you want is not displayed, press PGM until it is.
3. Use the arrow keys to display the station number you wish to set.

4. Press MAN START/ADV to toggle to the right side of the display. The length of watering time flashes, indicating that it is ready to be set.
5. Use the arrow keys to set the length of time. If USED is displayed, you can still set the length of time. (You can include the same station in different programs and give that station different lengths of watering time)
6. Return the dial to AUTO. The display shows to the time of day.

Step four: Setting watering start times

For each program, you may assign up to eight start times per day, available on the quarter hour.

To do so,

1. Rotate the dial to WATERING START TIME. The display shows the program, the number of the start time, and the start time. The start time number flashes, indicating that it is ready to be set.



Chapter 3: Programming and Operation (continued)

2. If the program you want is not displayed, press PGM until it is.
3. Use the arrow keys to select one of the eight start times.
4. Press MAN START/ADV to toggle to the right side of the display. The start time flashes, indicating that it is ready to be set.
5. Use the arrow keys to select a start time. Start times are available in fifteen minute intervals, with an OFF setting available between the 11:45 pm and 12:00 am options on the 60 Hz model (and between 23:45 and 24:00 on the 50 Hz model).

Note: Start times are displayed in chronological order. If a start time is deleted from the order by setting it to OFF, all later start times are automatically moved down one start time number. When a start time is added to any start time number, the controller automatically reorganizes the times so that times appear in chronological order. This reorganizing only occurs after the dial has been moved off the WATERING START TIMES position.

6. If you want to set additional start times, press MAN START/ADV to toggle back to the left side of the display and the next available start time number. Set the next start time in the same fashion as the first.
7. Return the dial to AUTO. The controller returns to the time of day.

Step five: Setting programs to stack or overlap

You can set a program to stack (run one at a time) or overlap (run simultaneously). The ESP-SAT controller can run up to nine valves simultaneously. The default setting is to stack all programs.

To set programs to stack or overlap,

1. Rotate the dial to PROGRAM OVERLAP. The display shows the program and STACK or OVERLAP.



2. If the program you want is not displayed, press PGM until it is.
3. Use the arrow keys to set the program to either STACK or OVERLAP.
4. Return the dial to AUTO. The controller returns to the time of day display.

Chapter 3: Programming and Operation (continued)

Step six: Setting the MV/PUMP start

The ESP-SAT has two master valve terminals on its circuit board. MV2 (master valve 2) is enabled when any station operates. MV1 (master valve 1) can be enabled or disabled for each individual station.

To set MV1 for a station,

1. Rotate the dial to MV PUMP START.
The display shows the station number and MV ON or OFF. The station number is flashing, indicating that it is ready to be set.



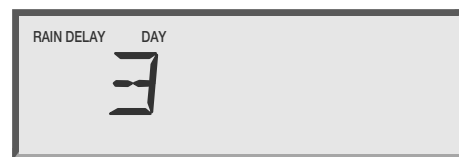
2. Use the arrow keys to select the station number.
3. Press MAN START/ADV to toggle to the right side of the display. The ON or OFF flashes, indicating that it is ready to be set.
4. Press either the ON or OFF key.
5. If you want to set another station, press MAN START/ADV to toggle back to the left side of the display to continue setting stations.
6. When you are finished setting stations, return the dial to AUTO.
The controller returns to the time of day.

Setting Rain Delay

The ESP-SAT controller allows you to delay watering for a specified number of days. The Rain Delay setting affects all programs.

To set a Rain Delay,

1. Rotate the dial to RAIN DELAY.
The display shows RAIN DELAY and the number of days until the next cycle.



2. Use the arrow keys to set the number of days to the next cycle.
3. Return the dial to AUTO.
The controller returns to the time of day display and will delay watering for the number of days you have specified.

Note: To cancel a Rain Delay, re-set the number of days to 0.

Chapter 3: Programming and Operation (continued)

Setting Cycle + Soak

The Cycle + Soak feature is designed to conserve water that might puddle in tight soils such as clay, or end up as runoff on slopes. Cycle + Soak lets you break up the total watering time of a station into shorter cycles with a soak time between cycles. You set the maximum watering time length and the minimum soak time. This setting affects all programs in which the station is included.

For example, if you want to water a station for a total of 20 minutes, but runoff begins to occur after 5 minutes, you can set the station for 5-minute maximum cycles, and a minimum of 25 minutes between cycles. While the station is in soak mode, the controller operates other stations in the program.

Note: If there is nothing left for the controller to do but wait until a soak time elapses, the display shows SOAK.

Note: The Test program does not respond to Cycle and Soak settings.

To set Cycle + Soak,

1. Rotate the dial to CYCLE + SOAK. The display shows the station number, the length of time to water, and the length of time to soak. The station number is flashing, indicating that it is ready to be set.



2. Use the arrow keys to select the station.
3. Press MAN. START/ADV. The length of time to water flashes, indicating that it is ready to be set.



4. Use the arrow keys to set the maximum length of time to water from 1 to 60 minutes.
5. Press MAN. START/ADV. The length of time to soak flashes, indicating that it is ready to be set.
6. Use the arrow keys to set the minimum length of time to soak for from 1 to 60 minutes.
7. If you want to set Cycle and Soak for another station, press MAN. START/ADV. again.
8. When you have finished setting Cycle and Soak, return the dial to AUTO. The controller returns to the time of day.

Chapter 3: Programming and Operation (continued)

Setting the Water Budget

The water budget feature allows you to increase or decrease a program's watering time in increments of 1% without having to reset the timing for each station in the program. You can set the budget for 0% to 300%. You can use the 0% setting to shut a program down temporarily. To set the water budget,

1. Rotate the dial to WATER BUDGET.
The display shows the program and the water budget percentage.



2. Press PGM until the program you want is displayed.
3. Use the arrow keys to set the percentage.
4. Return the dial to AUTO.
The controller returns to the time of day display. The default percentage for all programs is 100%. When the water budget for a program is set to other than 100%, WATER BUDGET will show in the display whenever that program is selected.

Setting Event Day Off

The Event Day Off feature allows you to omit temporarily a calendar day or days from the watering cycle. After a calendar day passes, that day returns to the default setting. The default for all days is ON. If the 31st is set to OFF, it remains off until it is set to ON. This is to accommodate odd day watering cycles which do not allow watering on the 31st and 1st. To set a day off,

1. Rotate the dial to EVENT DAY OFF.
The display shows the day of the month on the left and the ON or OFF setting on the right. The day of the month is flashing, indicating that it is ready to be set.



2. Use the arrow keys to set the day of the month you wish to change.
3. Press MAN. START/ADV. to toggle to the right side of the display.
The ON/OFF setting flashes, indicating that it is ready to be set.
4. If you are setting the day to on press ON; if you are setting the day to off, press OFF.
5. Return the dial to AUTO.
When a day off arrives, the display shows NON (for non-watering day) and the controller does not allow watering.

Chapter 3: Programming and Operation (continued)

Operating the Controller

Once you have programmed the ESP-SAT, operating the controller is easy. You may choose to operate it completely automatically or to operate it manually from time to time. When you operate the ESP-SAT manually, you do not disturb any of the programmed instructions.

Operating Automatically

To operate the controller automatically,

1. Rotate the dial to AUTO.
The controller runs each of the programs as you have specified.

Operating Manually

There are a number of functions you can perform manually. Each one is described in this section.

Operating a program or programs manually

You can select, start, and manually advance programs for semi-automatic operation. To do so,

1. Rotate the dial to AUTO.
The display shows the day of the week and the time of day.



2. Press PGM until the program you wish to operate is displayed.
3. Press MAN. START/ADV. to start the selected program.
4. If you want to operate more than one program, press PGM to select another program and press MAN. START/ADV. again.
The second program runs when the first is complete. You can stack all four programs in this way.

Operating a station or stations manually

You can initiate one-time operation of a single station or a combination of stations. If you run more than one station, they will run in the order in which they were selected.

To operate one station or multiple stations,

1. Rotate the dial to MANUAL WATER.
The display shows the program, the station number, and any watering time remaining on that station.



Chapter 3: Programming and Operation (continued)

2. Press PGM until the program you want is displayed.
3. Use the arrow keys to select the station you want to operate.
4. Press MAN. START/ADV. to start the selected station.
5. If you want to operate more than one station, repeat steps 2 through 4.
6. Return the dial to AUTO.
The controller returns to the time of day display and the stations operate in the sequence they were selected. After the stations are finished watering, the controller returns to the automatic mode.

Note: When you operate a station manually, you cannot change the amount of time the station will water. You must water for the amount of time already programmed.

Using the Test Program

The test program allows you to run a test cycle for all the stations on a particular program. It also lets you decide how long the test will last.

To set and then start a test program,

1. Rotate the dial to TEST PROGRAM.
The display shows the program, TEST, and the length of time to test.



2. Press PGM until the program you want to test is displayed.
3. Use the arrow keys to set the length of time to test each station for from 1 to 99 minutes.
4. Press MAN. START/ADV. to start.
The test time flashes and the controller runs the test program immediately, suspending any work in progress.
5. If you want to add other programs to the test, with the dial set to TEST PROGRAM, press PGM to select the program. Then press MAN. START/ADV. to stack the new program after the first one. You can stack four programs.

Note: To cancel the test on all programs, rotate the dial to OFF.

Chapter 3: Programming and Operation (continued)

Using the Sensor Option

The ESP-SAT controller allows you to connect a sensor that can disable watering. When a sensor is connected to the ESP-SAT controller and it suspends watering, the sensor light on the front panel illuminates.

To enable the sensor,

1. Set the sensor switch to ACTIVE.
The controller operates as usual until the sensor suspends watering and the controller display shows SUSPENDED BY SENSOR.

Note: When no sensor is attached, the jumper cable supplied with each controller must be in place, connecting the SENSOR terminals on the controller's circuit board. If you set the SENSOR switch to ACTIVE with neither a sensor nor the jumper cable connected, the controller cannot operate the valves and no watering will occur.

Using the Diagnostic Circuit Breaker

The ESP-SAT controller is equipped with a circuit overload protection system. This system causes the controller to skip over a station that has an electrical short circuit, rather than blow a fuse which would shut down the entire system.

When the controller tries to start a station that has a short circuit, the electronic circuit breaker senses the short circuit and skips that station. The controller skips to the next station, but flashes the skipped station number and FAULT in the display.

Once you have corrected the problem, push the FAULT RESET button to clear the flashing fault indicator.

Note: The diagnostic circuit breaker allows detection on all valves, including the master valve.

Chapter 4: Troubleshooting

The following pages contain possible problems you may encounter and some solutions. Before calling Rain Bird, check this list. If you cannot solve the problem yourself, call our Technical Service Hotline at 1-800-247-3782 and we will be glad to help you.

Problem: The power to the controller is interrupted for an extended period of time.

Solution: The controller has a 9-volt battery to keep data and instructions for up to 24 hours. When there is a power outage, the time of day will be displayed, but no watering will take place. When power is restored, watering will resume.

Problem: The display will not light.

Solution: Check the main power source and the plug. Check to see if there is a blown fuse inside the controller.

Problem: The display is flashing.

Solution: There may be a power outage. Or check the battery; it may be dead or not connected properly.

Problem: No watering is taking place.

Solution: Check the circuit breaker; it may have tripped. Also check the cables inside the controller; they may be improperly connected.

Chapter 4: Troubleshooting (continued)

Problem: The controller is not operating under MAXI control.

Solution: Contact the Rain Bird Technical Service Hotline for assistance.

Problem: The controller does not water, but the MAXICOM system reports normal operation.

Solution: The SENSOR switch is in the incorrect position. Move the SENSOR switch to OFF.

Appendix A

Scheduling Chart (for stand alone operation)

Before you begin programming, it is a good idea to chart your watering schedule, taking into account the schedule for all stations and how often you want to repeat the schedule. For specific programming instructions, see page 33. A sample schedule appears below. A blank schedule that you can copy and fill in appears on the following two pages.

ESP-SAT Programming Chart											
	Program "A"		Program "B"		Program "C"		Program "D"				
Cycle	M, TU, TH, SA, SU		CYC 1-3		ODD		EVEN				
Overlap	STK	OVR	STK	OVR	STK	OVR	STK	OVR			
Start 1	8:00 AM		8:48 AM		7:00 AM		9:00 AM				
Start 2	7:00 PM		6:00 PM		9:00 AM		3:00 PM				
Start 3					11:00 AM						
Start 4					2:00 PM						
Start 5					4:00 PM						
Start 6					8:00 PM						
Start 7					10:00 PM						
Start 8					11:45 PM						
Water Bgt.	100%		100%		120%		43%				
									Cycle	Soak	Days Off
Station 1	10										1
Station 2	20										1
Station 3	20										1
Station 4	5										1
Station 5			10						4	10	1
Station 6			10								1
Station 7			20								0
Station 8					20						0
Station 9					20						1
											1
											OFF

Appendix B: Installing a MAXICOM Interface Board

Before You Begin

Important: Before installing the MIB, make sure that the area around you is free from dirt and dust and that your hands and arms are clean. This will avoid contamination of the ESP-MC controller's internal parts.

Warning! Don't let water or other liquids come in contact with any part inside the controller cabinet.

Overview of the MAXICOM Interface Board (MIB)

To convert your ESP-MC stand alone controller into an ESP-SAT satellite controller, you must install the MAXICOM Interface Board (MIB). Once installed, the MIB allows your ESP-MC controller to function as either an ESP-SAT controller in conjunction with the MAXICOM irrigation system, or as a stand-alone unit.

Before you install the MIB, you must determine how your controller will communicate with the cluster control unit (CCU): two-wire path or wireless radio path. If your controller will communicate with the CCU via two-wire path, follow the instructions on page 57, Installing the MIB (TW). If your controller will communicate with the CCU via wireless radio path, follow the instructions, "Installing the MIB (LINK)," on page 61.

The two installation types require different MIB kits. The MIB kit for the two-wire connection is ESP-MIB-TW; the MIB kit for the wireless radio is ESP-MIB-LINK. Be certain that you have received the correct MIB kit before you begin the installation.

Appendix B: Installing a MIB (continued)

Installing the MIB (TW)

ESP-MIB-TW Kit Packing List

Please check to make sure that you received all of the items on the list. If any item is missing or damaged, contact your Rain Bird distributor.

- 1 MAXICOM Interface Board (MIB)
- 6 Plastic Standoffs
- 1 6-wire Cable
- 1 Disposable Grounding Strap

Appendix B: Installing a MIB (continued)

Removing the controller's faceplate.

In order to install the MIB, you must first remove the controller's faceplate. To do so,

1. Open the controller cabinet door.
2. Pull out gently on the two white plastic snap latches on the right side of the faceplate, then swing the panel open.

Warning! Be certain to follow the instructions for disconnecting the power before you proceed with the MIB installation.

Disconnecting the power

You must disconnect the controller from all power sources before installing the MIB. To do so,

1. Disconnect the three primary power transformer wires (the three wires protruding from the base of the cabinet).
2. Disconnect the transformer's five-wire cable, which is plugged into the terminal board.
3. Remove the 9V battery from the battery holder on the back of the faceplate and detach the recharging clip from the battery.

Appendix B: Installing a MIB (continued)

Mounting the MIB on the terminal board

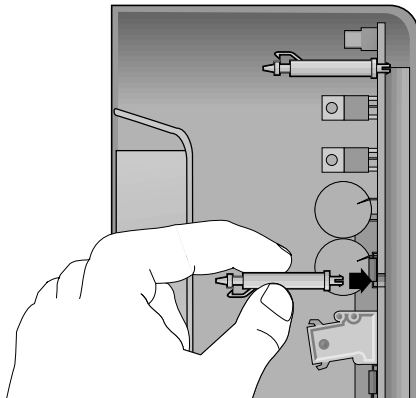
The MIB is held in place by the supplied plastic standoffs. To install the plastic standoffs and mount the MIB,

1. Locate the six holes on the floor of the terminal board. Three of the holes run across the top of the board, the remaining holes run across the center.
2. Place the smaller end of a plastic standoff into each of the holes. For the top three holes, turn the standoff until the appendage on the top of the standoff is away from you. For the lower three holes, turn the standoff until the appendage on the top of the standoff is closest to you.
3. Before removing the MIB from its packaging, make sure to use the disposable wrist strap included in the kit and to follow the instructions on the wrist strap packaging.
4. Remove the MIB from its protective packaging. Orient the board so that the back of the board (the flat side) is down and the printing on the top side of the board is facing you.

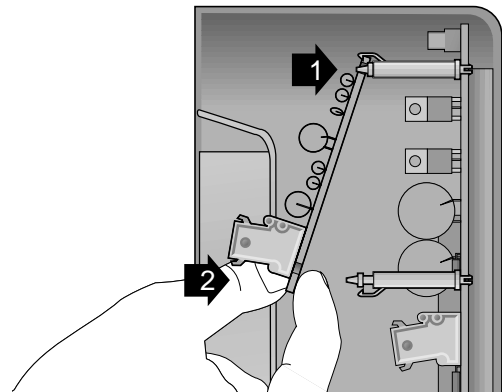
When the MIB is in the correct orientation, the MIB's green terminal board connectors will be in the lower right corner.

5. Align the top row of holes on the MIB with the top row of plastic standoffs on the terminal board. Tilt the MIB forward until the top edge of it catches under the standoffs' appendages.
6. Gently lower the bottom edge of the MIB until it rests on the lower standoffs. Press the bottom edge of the MIB until it snaps into place on all of the lower standoffs.

Insert plastic standoffs into the terminal board



Tilt the top edge of the MIB forward



Appendix B: Installing a MIB (continued)

Connecting the MIB to the controller

1. Examine either one of the clips at the end of the supplied 6-wire cable. Turn the clip so that the side with the two small ridges is facing up and insert it into the jack on the back of the face plate, directly beneath the grey flat ribbon cable.
2. Take the other end of the cable and turn the clip so that the two small ridges are facing down. Insert this clip into the J1 connector on the lower left corner of the MIB.

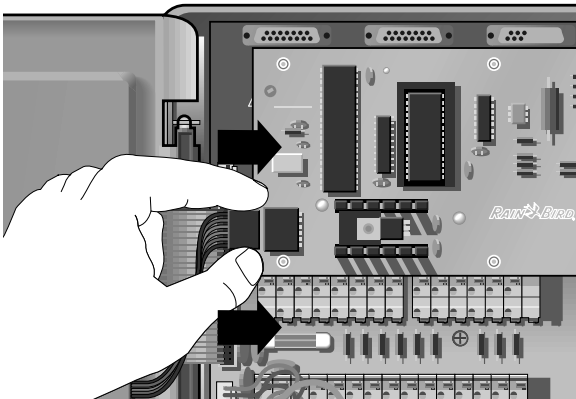
Reconnecting the power

Reconnect the controller to all power sources. To do so,

1. Connect the three primary power transformer wires (the three wires protruding from the base of the cabinet) to your power source.
2. Connect the transformer's five-wire cable to the terminal board.
3. Insert the 9V battery into the battery holder on the back of the faceplate and attach the recharging clip to the battery.

The MIB is now installed. To connect the MIB to the CCU, please see "Communications Connections to the CCU," on page 19.

Connect the 6-wire cable to the J1 connector on the MIB



Appendix B: Installing a MIB (continued)

Installing the MIB (LINK)

ESP-MIB-LINK Kit Packing List

Please check to make sure that you received all of the items on the list. If any item is missing or damaged, contact your Rain Bird distributor.

- 1 MAXICOM Interface Board (MIB)
- 6 Plastic Standoffs
- 1 6-wire Cable
- 1 Power Transformer
- 1 Disposable Grounding Strap

You will also need the following:

- 1 MaxiLink Radio/Modem Kit (ordered separately)

Appendix B: Installing a MIB (continued)

Removing the controller's faceplate

In order to install the MIB, you must first remove the controller's faceplate. To do so,

1. Open the controller cabinet door.
2. Pull out gently on the two white plastic snap latches on the right side of the faceplate, then swing the panel open.

Warning! Be certain to follow the instructions for disconnecting the power before you proceed with the MIB installation.

Disconnecting the power

You must disconnect the controller from all power sources before installing the MIB. To do so,

1. Disconnect the three primary power transformer wires (the three wires protruding from the base of the cabinet).
2. Disconnect the transformer's five-wire cable, which is plugged into the terminal board.
3. Remove the 9V battery from the battery holder on the back of the faceplate and detach the recharging clip from the battery.

Appendix B: Installing a MIB (continued)

Mounting the MIB on the terminal board

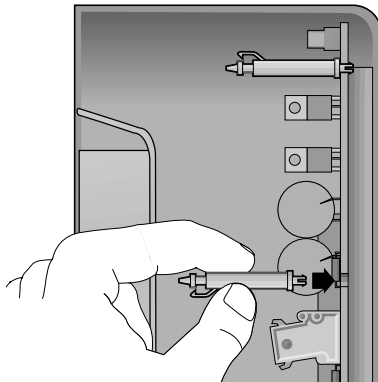
The MIB is held in place by the supplied plastic standoffs. To install the plastic standoffs and mount the MIB,

1. Locate the six holes on the floor of the terminal board. Three of the holes run across the top of the board, the remaining three holes run across the center of the board.
2. Place the smaller end of a plastic standoff into each of the holes. For the top three holes, turn the standoff until the appendage on the top of the standoff is away from you. For the lower three holes, turn the standoff until the appendage on the top of the standoff is closest to you.
3. Before removing the MIB from its packaging, make sure to use the disposable wrist strap included in the kit and to follow the instructions on the wrist strap packaging.
4. Remove the MIB from its protective packaging. Orient the board so that the back of the board (the flat side) is down and the printing on the top side of the board is facing you.

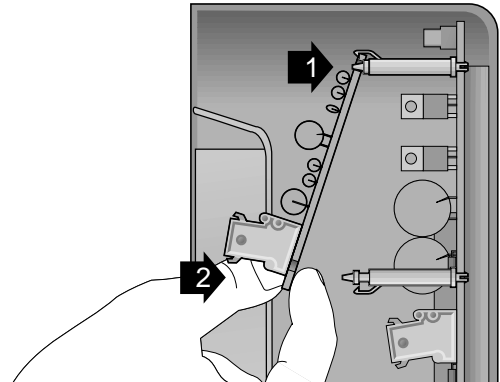
When the MIB is in the correct orientation, the MIB's green terminal board connectors will be in the lower right corner.

5. Align the top row of holes on the MIB with the top row of plastic standoffs on the terminal board. Tilt the MIB forward until the top edge of it catches under the standoffs' appendages.
6. Gently lower the bottom edge of the MIB until it rests on the lower standoffs. Press the bottom edge of the MIB until it snaps into place on all of the lower stand offs.

Insert plastic standoffs into the terminal board



Tilt the top edge of the MIB forward



Appendix B: Installing a MIB (continued)

Connecting the MIB to the faceplate

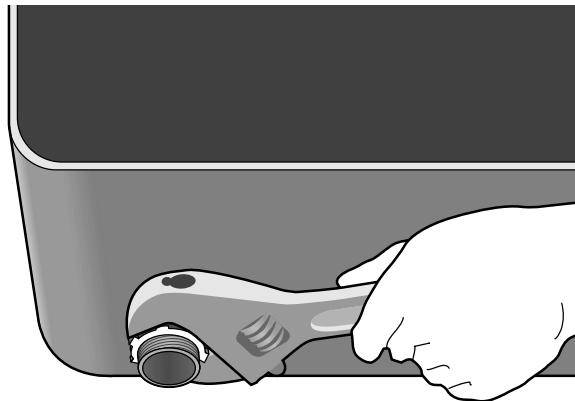
1. Examine either one of the clips at the end of the supplied cable. Turn the clip so that the side with the two small ridges is facing up and insert it into the jack on the back of the face plate, directly beneath the grey flat ribbon cable.
2. Take the other end of the cable and turn the clip so that the two small ridges are facing down. Insert this clip into the J1 connector on the lower left corner of the MIB.

Removing the existing power transformer

You must replace the existing power transformer with the new power transformer. First you will remove the existing transformer:

1. Locate the nut and washer that secure the existing transformer to the base of the controller cabinet.
2. Use a wrench to remove the nut and washer from the power transformer's nipple. Retain the nut and washer.
3. Push the power transformer's nipple into the cabinet until it clears the hole in the cabinet. Lift the power transformer out of the controller cabinet.

Remove the nut and washer from the transformer nipple



Appendix B: Installing a MIB (continued)

Installing and connecting the new transformer

Now you are ready to install the new power transformer and connect it to the terminal board and the MIB. To do so:

1. Place the new power transformer into the same position as the old transformer and slide the transformer's nipple through the hole at the base of the cabinet.
2. Thread the washer and the nut on to the new power transformer's nipple. Tighten the nut with a wrench.
3. Plug the power transformer's 2-wire yellow cable into the J3 connector on the right edge of the MIB.
4. Plug the power transformer's 5-wire cable into the J7 connector on the lower left edge of the terminal board.

Reconnecting the power

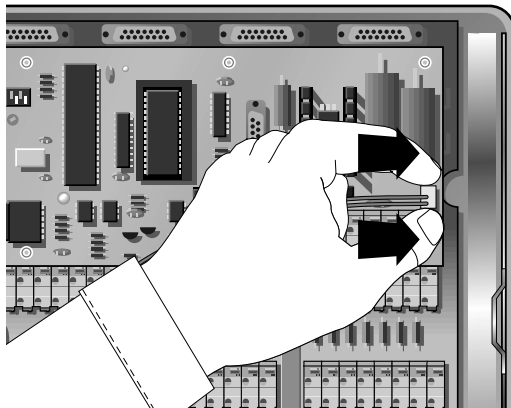
Reconnect the controller to all power sources. To do so,

1. Connect the three primary power transformer wires to your power source.
2. Connect the transformer's five-wire cable to the terminal board.
3. Insert the 9V battery into the battery holder on the back of the faceplate and attach the recharging clip to the battery.

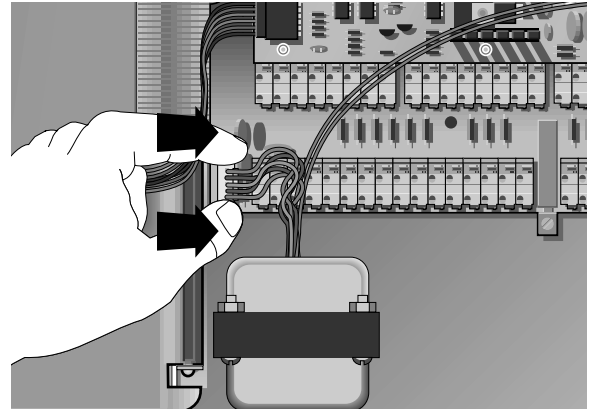
The MIB is now installed. To connect the MIB to the CCU, please see "Communications Connections to the CCU," on page 23.

Note: In order for your controller to communicate with the CCU via wireless radio path (LINK), you must install the radio/modem and antenna. Please see page 22 for installation instructions.

Plug 2-wire cable into J3 connector on the MIB



Plug 5-wire cable into J7 connector on the terminal board



Appendix C: Notices for a Radio Device

The U.S. Federal Communications Commission (FCC) requires certain notifications to the user of any digital device which can radiate radio frequency energy.

FCC rules Part 15

This equipment is covered by FCC rules for a Class B computing device. As required by FCC regulations, the following is provided for the information and guidance of the user.

Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it can cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

Determine if the equipment does cause interference to radio or television by turning the equipment off and on. The user is encouraged to try to correct the interference by one or more of the following measures:

1. Where it can be done safely, reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Rain Bird Sales, Inc., could void the user's authority to operate the equipment.

Glossary of Terms

- **circuit board**
one of the etched, copper clad sheets of insulating material onto which electronic components and terminals are assembled. Controllers contain circuit boards.
- **controller**
a device that sends a 24 VAC power signal to the field solenoid valves.
- **CPU board**
the central processing unit circuit board inside the controller.
- **default setting**
the start-up settings for the controller. The default settings cannot be changed.
- **ESP-SAT**
Extra Simple Programming-MAXICOM Compatible Satellite series, a controller that can operate as a stand-alone unit, or a satellite controller linked to MAXICOM.
- **GPM**
gallons per minute.
- **hardwire**
communication cable used to transmit data between devices.
- **liquid crystal display (LCD)**
the illuminated display used on the faceplate of most controllers.
- **manual**
requires user input, rather than being automatically performed by the PC program.

Glossary of Terms (continued)

- **master valve (MV)**
an electrically operated valve located on a system's main line that controls the flow of water to all other electric and manual valves downstream of it.
- **master valve circuit**
an electrical circuit located on many controllers used to control a master valve. Regardless of what station is on at the controller, the master valve circuit produces voltage to control the master valve. When all of the stations on the controller are off, the master valve circuit turns off.
- **MIB**
MAXICOM Interface Board. Allows for satellite controller operation. The MIB is preinstalled in ESP-SAT controller models, but can also be installed in ESP-MC controller models to add satellite capability.
- **monitor**
to observe conditions in and around the irrigation system and send the information to the different components in the system for appropriate action.
- **satellite**
a controller in the field capable of communicating with the Cluster Control Unit (CCU).
- **satellite controller**
same as satellite.
- **sensor**
an optional addition to the controller that disables watering. Examples are the Rain Bird Aquamiser, Intellisense, Rain Check, and Rain/Freeze Switch.
- **site**
a single, remote irrigated area controlled by a CCU. For example, one park is a site in a city-wide park system.

Glossary of Terms (continued)

- **soil infiltration rate**
the rate at which soils accept water.
- **solenoid**
a portion of a field valve that receives a 24 VAC electrical current from the controller.
- **station schedule**
the watering schedule for one of the stations controlled by the controller.
- **valve**
a manual or electrically operated device used to control flow of water in an irrigation system.
- **water budget**
a feature available in some controllers and central control systems allowing adjustment of water application times without reprogramming each station or irrigation schedule.
- **watering cycle**
the complete cycle of watering for all stations controlled by the controller.

Service Information

In the unlikely event this equipment should malfunction, all repairs should be performed by an authorized Rain Bird MAXICOM Authorized Service Center.

For information on MAXICOM Authorized Service Centers, contact Rain Bird at:

Rain Bird Sales, Inc.
Turf Products
4261 South Country Club Road
Tucson, AZ 85714

Phone: (520) 741-6100
Fax: (520) 741-6146

Rain Bird Specifications Hotline
1-800-458-3005

Warranty Information

This product is covered by Rain Bird's Three-year Trade Warranty. For details, see the Rain Bird Landscape Irrigation Products Catalog.

