Rain Bird® Two-Wire PAR+ES Controllers

Two-Wire PAR+ES Controllers install quickly, boast the best-in-class user interface, a pedestal enclosure and are durably constructed. The base configuration of 16 stations can be upgraded at any time — in eight-station increments up to 72 stations — to accommodate changing course irrigation requirements. In the central control mode, an unlimited number of irrigation schedules can be programmed to further enhance watering flexibility and precision.
Tools Required

- Flat head screwdriver
- Philips screwdriver
- Digital multi-meter
- Clip-on fuse holder and set of alligator clips

Error Codes

- **Error. Incompatible OSM**: ROM-8 being used or damaged OSM
- **ROM Memory Error**: EPROM is defective
- **RAM Memory Error**: Dallas Chip is defective
- **Breaker Tripped**: Circuit breaker is open
- **RT Clock Error**: Dallas Chip is defective
- **No Boards Found**: No OSM installed or first OSM is damaged
- **Hardware Failure**: PIB is defective or main power not clean

Terminology and Acronyms

- **Control Module Assembly**: Front Panel = Faceplate
- **Erasable Programmable Read-only Memory**: EPROM
- **Light Emitting Diode**: LED
- **Liquid Crystal Display**: LCD
- **Main Logic Board**: MLB
- **MAXI Interface Module**: MIM
- **Output Station Module**: OSM
- **Power Interconnect Board**: PIB
- **Random Access Memory**: RAM, e.g. Dallas Chip
- **Relay Output Module**: ROM-8
- **Two-wire Interface Module**: IFX
- **Integrated Control Interface Pulse**: ICI+
Recommended Rain Bird®
Troubleshooting Procedure for
“Controller Does Not
Power Up Properly”

Go To Troubleshooting Card:
“Front Panel Does Not
Power Up Properly”

START

Verify voltage selector switch is
set for power line voltage.

OKAY

Verify power switch is ON.

OKAY

Check to see if
left PIB LED light is on.

NO

Check output voltage from
transformer at PIB connection.
Orange Wires: 26.5 VAC
Blue Wires: 8.5 VAC

NO VOLTAGE

Disconnect all black OSM power
wires, all green station plug-in
connectors and OSM ribbon
cables. Replace PIB F1 fuse with
a temporary replaceable fuse
holder. Reconnect each OSM one
at a time and turn ON controller
each time until bad OSM is found.

BLOWN FUSE

FUSE NOT BLOWING

OKAY

Disconnect all black OSM power
wires, all green station plug-in
connectors and OSM ribbon
cables. Replace PIB F1 fuse with
a temporary replaceable fuse
holder. Reconnect each OSM one
at a time and turn ON controller
each time until bad OSM is found.

FUSE NOT BLOWING

OKAY

Replace Last
OSM Connected

BLOWN FUSE

FUSE NOT BLOWING

OKAY

Contact Your Local
Distributor or GSP

BLOWN FUSE

Blown fuse. Replace PIB and check
if issue resolved.

OKAY

BLOWN FUSE AGAIN

OKAY

Start over and turn on individual stations
until bad OSM is found.

FUSE NOT BLOWING

OKAY

Blown fuse.
Replace PIB and check
if issue resolved.

OKAY

Replace Transformer

Replace Surge
Arrestor and/or Lightning
Protection Device

OKAY

OKAY

NO

NO VOLTAGE

Check incoming voltage
to transformer.

NO VOLTAGE

Check incoming voltage to surge
arrestor and/or third party
lightning protection device.

NO VOLTAGE

Check Power Wire
and Power Source
*Refer any power
source issues to a
certified electrician.

NO VOLTAGE

OKAY

OKAY

OKAY

NO

NO VOLTAGE

Check Power Wire
and Power Source
*Refer any power
source issues to a
certified electrician.
Troubleshooting

Two-Wire PAR+ES Controllers

**POWER INTERCONNECT BOARD (PIB)**

- Orange ~26.5 VAC
- Blue ~8.5 VAC
- Circuit Breaker
- Power/Communication to Control Module Assembly
- Power/Communication with OSM 7–9
- Transformer Incoming Power
- Circuit Breaker
- F1: 2.5 Amp Slow Blow Fuse

**OUTPUT STATION MODULE (OSM)**

- From Previous OSM or from PIB if OSM-1
- Station Switches
- Incoming Power to OSM
- To Next OSM
- Station LED
- Outgoing OSM Power
- Station Wire Output

**TWO-WIRE INTERFACE MODULE (IFX)**

- P1: Power/Communication from PIB
- Board Assembly Date Code
- F1: 4 Amp Slow Blow Fuse
- Socket: Two-wire Path Connector

**MAIN LOGIC BOARD (MLB)**

- LCD Display with Backlight
- Power Wire
- EPROM without Carrier
- Socket Soldered in PWB
- RAM Microprocessor, Dallas Chip (Date-Channel ID-Time)
- EPROM Assembled in Carrier Socket Soldered in PWB
- Flat Header Connector to Overlay Membrane
- LCD Potentiometer

**Note:** PAR+/PAR+ES and MSC+ PIB’s are not interchangeable. Installing the wrong boards will result in a “Hardware Failure” error code.

**Note:** OSMs replaced Relay Output Modules (ROM-8) in 2002. Installing ROM-8s in a controller manufactured after 2002 will result in an “Incompatible OSM” error code.

PRE-APRIL 2005 DESIGN

PRE-MAY 2006

POST-MAY 2006

PRE-MAY 2006
Recommended Rain Bird®
Troubleshooting Procedure for
“Front Panel Does Not
Power Up Properly”

- **START**
  - Verify power switch is on and check display.
  - Check to see if left PIB LED light is on.
  - Check output voltage from transformer at PIB connection.
    - Orange Wires: 26.5 V
    - Blue Wires: 8.5 V
  - Check incoming voltage to transformer.

- **Fuse Blown; Replace PIB Soldered Fuse**

- **No Voltage**
  - Check incoming voltage to surge arrestor and/or third party lightning protection device.

- **Problem With Power Wire Path or Source**

- **No Further Action**
  - Check display wire connection to MLB.
  - Check to see if any front panel LEDs are on.

- **Replace MLB**

- **GOOD**
  - Adjust display potentiometer on MLB.
  - Open front panel and check ribbon cable to MLB at P2 for proper connection or damage.

- **BAD**
  - Reconnect or replace ribbon cable.

- **Verify front panel is working.**
  - YES
    - NO
  - NO

- **No Further Action**
  - Check ribbon cable to PIB at P4 for proper connection or damage.
  - Open front panel and check ribbon cable to MLB at P2 for proper connection or damage.

- **GOOD**
  - GOOD

- **BAD**
  - BAD

- **WORKING**
  - Verify front panel is working.
  - YES
    - NO
  - NO

- **No Further Action**
  - Reconnect wire and check display.
  - Check display wire connection to MLB.

- **GOOD**
  - NO

- **GOOD**
  - NO

- **GOOD**
  - NO

- **GOOD**
  - NO

- **GOOD**
  - NO

- **GOOD**
  - NO

- **GOOD**
  - NO
Recommended Rain Bird®
Troubleshooting Procedure for
“Tripping Circuit Breaker”

No Further Action

YES
Reset circuit breaker. See if problem is resolved.

NO

Disconnect 26.5 VAC black wire to top OSM. Reset circuit breaker. See if problem is resolved.

NO

Check connection between transformer wire on P1 connector at PIB or bent pin on P1 connection. See if problem is resolved.

NO

Replace PIB and see if problem is resolved.

NO

Disconnect all black wires to OSMs and all green station OSM ribbon cable plug-in connectors.

Reconnect black wires and OSM ribbon cables one OSM at a time, starting with the top one until circuit breaker trips again.

NO TRIP

NO

In system information, check number of valves per stations. (Maximum of 4).

In system information, check number of valves per stations. (Maximum of 4).

Replace last OSM connected and see if problem is resolved.

TRIP

NO

Reconnect green station connectors. Using switch, activate stations one by one until circuit breaker trips.

NO TRIP

TRIP

Check harness for damage.

GOOD

BAD

Check terminal board for damage.

GOOD

BAD

Replace terminal board. Check to see if problem is resolved.

BAD

GOOD

No Further Action

Not a Controller Issue – Short on Wire Path or Bad Solenoid

No Further Action

Adjust number of valves. See if problem is resolved.

WRONG NUMBER

NO

Replace harness. See if problem is resolved.

BAD

GOOD

Recommended Rain Bird® Troubleshooting Procedure for “Tripping Circuit Breaker”

Reset circuit breaker. See if problem is resolved.

NO

Disconnect 26.5 VAC black wire to top OSM. Reset circuit breaker. See if problem is resolved.

NO

Check connection between transformer wire on P1 connector at PIB or bent pin on P1 connection. See if problem is resolved.

NO

Replace PIB and see if problem is resolved.

NO

Disconnect all black wires to OSMs and all green station OSM ribbon cable plug-in connectors.

Reconnect black wires and OSM ribbon cables one OSM at a time, starting with the top one until circuit breaker trips again.

NO TRIP

NO

In system information, check number of valves per stations. (Maximum of 4).

In system information, check number of valves per stations. (Maximum of 4).

Replace last OSM connected and see if problem is resolved.

TRIP

NO

Reconnect green station connectors. Using switch, activate stations one by one until circuit breaker trips.

NO TRIP

TRIP

Check harness for damage.

GOOD

BAD

Check terminal board for damage.

GOOD

BAD

Replace terminal board. Check to see if problem is resolved.

BAD

GOOD

No Further Action

Not a Controller Issue – Short on Wire Path or Bad Solenoid

No Further Action
Recommended Rain Bird® Troubleshooting Procedure for “All/Some Stations Not Working”

Front panel indicates that stations are running but no irrigation.

Start

- Yes: Reset circuit breaker and verify problem is resolved.
- No: Verify LED at PIB is on. Reset circuit breaker and verify problem is resolved.
- Yes: Verify station switches are on AUTO. No further action.
- No: Verify that number of valves per station is between 1 and 4. No further action.
- Yes: Clean and reconnect. See if problem is still present.
- No: DIRTY: See if 26.5 VAC black OSM wires are connected, or if connections are dirty.
- Yes: Disconnect all black wires to OSM's and all green station plug-in connectors.
- No: No further action.
- Yes: Reconnect black wires one OSM at a time, starting with the top one.
- No: No further action.
- Yes: Using the station switches, turn on one station at a time and measure output voltage. Verify voltage is 26.5 VAC.
- No: No further action.
- Yes: Check input voltage (26.5 VAC) at OSM board.
- No: No further action.
- Yes: Check output voltage (26.5 VAC) at OSM board.
- No: No further action.
- Yes: Not a controller problem – check field wires.

»» Note: This troubleshooting card assumes that water and pressure are ok.
How to perform a Factory Reset/Cold Boot with a non-responding key pad

1. Turn Power **OFF**
2. Hold **COPY PASTE** and **SYSTEM INFORMATION**
3. Turn Power **ON**
4. Hold button down until **NEW SYSTEM SETUP** appears in display
Recommended Rain Bird® Troubleshooting Procedure for
“Controller Not Responding to MAXI™ Signal”

START

See what the MAXI light on the controller is doing.

OFF

Change controller mode to MAXI. Verify issue resolved.

BLINKING

Turn controller OFF then ON. Verify issue resolved.

SOLID

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

MISSING OR INCORRECT

Enter proper channel ID’s. Verify issue is resolved.

CORRECT

Change controller from MAXI to another mode. Verify issue is resolved.

Problem Is Likely a Short on Wire Path

No Further Action

Measure incoming voltage at MSP-1.

NO

Measure outgoing voltage at MSP-1.

OVER 19 VAC

Replace MAXI 2-wire module.

SOLID

No Further Action

OVER 19 VAC

Replace 2-wire module ribbon.

SOLID

No Further Action

OVER 19 VAC

Replace PIB

SOLID

No Further Action

UNDER 19 VAC

Check incoming voltage to third party lightning protection device, if any.

OVER 19 VAC

Measure outgoing voltage at MSP-1.

UNDER 19 VAC

Verify continuity of MSP-1

YES

Replace MSP-1

NO

Contact Your Local Distributor or GSP

Note 1: This troubleshooting section assumes that the MAXI Interface Module is functioning properly and not the cause of the problem.

Note 2: In a two-wire system, Control Mode LED should turn solid within one minute.

See what the MAXI light on the controller is doing.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.

Change controller mode to MAXI. Verify issue resolved.

Turn controller OFF then ON. Verify issue resolved.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.

Change controller mode to MAXI. Verify issue resolved.

Turn controller OFF then ON. Verify issue resolved.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.

Change controller mode to MAXI. Verify issue resolved.

Turn controller OFF then ON. Verify issue resolved.

No Further Action

Measure incoming voltage at MSP-1.

No Further Action

Measure incoming voltage at MSP-1.

No Further Action

Measure outgoing voltage at MSP-1.

No Further Action

Verify continuity of MSP-1

YES

Replace MSP-1

NO

Contact Your Local Distributor or GSP

Note 1: This troubleshooting section assumes that the MAXI Interface Module is functioning properly and not the cause of the problem.

Note 2: In a two-wire system, Control Mode LED should turn solid within one minute.

See what the MAXI light on the controller is doing.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.

Change controller mode to MAXI. Verify issue resolved.

Turn controller OFF then ON. Verify issue resolved.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.

Change controller mode to MAXI. Verify issue resolved.

Turn controller OFF then ON. Verify issue resolved.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

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Enter proper channel ID’s. Verify issue is resolved.

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Turn controller OFF then ON. Verify issue resolved.

Assuming the MAXI Interface Module is functioning properly, check channel ID’s (press System Info three to four times). See if ID’s are missing and incorrect or present and correct.

Enter proper channel ID’s. Verify issue is resolved.
Testing of MSP-1 Surge Arrester

When installed properly:

- All three wires are a continuous path through the LINE and EQUIP ends.
- The green wire from both ends must be physically grounded together.
- The MSP-1 surge arrester unit is directional and the end marked LINE must be connected to the two-wire path coming from the field.

Test procedure:

Use digital multi-meter on its Ohm setting

- Check for continuity through red to red, black to black, and green to green. Reading should be ~ 0Ω.
- There should NOT be continuity between any wire of mixed colors. Reading should be ~ 750Ω.

The failure of any of the above tests indicates a malfunctioning surge arrester and will not provide any further protection and necessitates the replacement of the current MSP-1.
Discover the TRUE Benefits™ of a Rain Bird System

**Timeless Compatibility**
Rain Bird golf irrigation products make it easy and affordable to maintain a state-of-the-art irrigation system that updates as your course does.

**Real-Time Response**
Get automatic optimization between your Central Control and the field with continuous two-way communication.

**Unmatched Quality**
In engineering, design and testing, Rain Bird rigorously tests every product to stand up to the world’s harshest conditions.

**Easy To Use**
From software interfaces to rotor designs, Rain Bird products help you and your crew find a quicker, hassle-free path to top playability.