

CONTENTS

Scope of This Manual	4
Unpacking and Inspection	4
Safety Considerations.	4
Terminology and Symbols.	4
Safety Instructions	5
Safety Rules and Precautionary Measures	5
Description	6
Functions and Features	6
Flow Meter Input	6
Digital Inputs	6
Relay Control Outputs	6
Power Supply.	7
Configuring the Unit	7
Display Information.	7
Installing the PT5002	7
Mounting Options.	8
Installation Overview	11
Wiring the PT5002	16
Terminal Connector Descriptions	17
Operator Interface	22
Keypad and Soft Keys	22
Scrolling	22
Control Panel Keys	22
Icon Functionality	23
Numeric Editing	24
Alpha-Numeric Editing.	24
Selection/Enumeration Editing	25
Confirmation Screen	25
Navigating the Menus	26
Menu Structure	27
Info/Sensor Data	28
System Information	29
Basic Setup	30
Display	30
Resets	30
Passcode Setup	31

Units	32
Advanced Setup	34
Configuring a Flow Meter	34
Configuring Outputs	35
Configuring Digital I/O	38
Configuring BACnet Communications	39
BACnet Map	39
Troubleshooting	40
Specifications	42
Standards and Certifications	45
Agency Approval/Standards	45
EMI/EMC Compliance.	45
Enclosure Protection	45
APPENDIX A.	46
For Rain Bird Tee Type Flow Sensors and Anemometer.	46
APPENDIX B	47
For Rain Bird Insert Type Flow Sensors.	47
Rain Bird's Professional Customer Satisfaction Policy	52

SCOPE OF THIS MANUAL

This manual describes how to install and program the PT5002.

IMPORTANT

Read this manual carefully before attempting any installation or operation. Keep the manual in an accessible location for future reference.

UNPACKING AND INSPECTION

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

SAFETY CONSIDERATIONS

Terminology and Symbols



Indicates a hazardous situation, which, if not avoided, will result in death or serious personal injury.



Indicates a hazardous situation, which, if not avoided, could result in death or serious personal injury.



Indicates a hazardous situation, which, if not avoided, could result in minor or moderate personal injury or damage to property.



Please consult the user manual in all cases where this symbol is used in order to find out the nature of potential hazards, and any actions which have to be taken to avoid them.



This symbol signifies that the PT5002 may be powered by a DC power supply. Acceptable DC input voltage range is: 10...40V DC.



This symbol signifies that the PT5002 may be powered by an AC power supply. Acceptable AC input voltage range is: 9...28V AC RMS (50...60 Hz).

- Operating temperature is 32...130° F (0...55° C) with a maximum humidity of 85% non-condensing. Always select a mounting location with proper ventilation and environmental protection.
- Maximum operating altitude: 2000 meters (6561 feet)
- Pollution Degree 2: Only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be expected
- Over-Voltage Rating: CAT II

Safety Instructions

WARNING

- **LIFE SUPPORT APPLICATIONS: THE PT5002 IS NOT DESIGNED FOR USE IN LIFE SUPPORT APPLIANCES, DEVICES, OR SYSTEMS WHERE MALFUNCTION OF THE PRODUCT CAN REASONABLY BE EXPECTED TO RESULT IN A PERSONAL INJURY. CUSTOMERS USING OR SELLING THESE PRODUCTS FOR USE IN SUCH APPLICATIONS DO SO AT THEIR OWN RISK AND AGREE TO FULLY INDEMNIFY THE MANUFACTURER AND SUPPLIER FOR ANY DAMAGES RESULTING FROM SUCH IMPROPER USE OR SALE.**
- **ELECTROSTATIC DISCHARGE INFLECTS IRREPARABLE DAMAGE TO ELECTRONICS. BEFORE INSTALLING OR OPENING THE UNIT, INSTALLERS MUST DISCHARGE THEMSELVES BY TOUCHING A WELL-GROUNDED OBJECT.**
- **THIS UNIT MUST BE INSTALLED IN ACCORDANCE WITH THE EMC (ELECTROMAGNETIC COMPATIBILITY) GUIDELINES.**

Safety Rules and Precautionary Measures

The manufacturer accepts no responsibility whatsoever if the following safety rules and precaution instructions and the procedures as described in this manual are not followed.

- Modifications of the PT5002 implemented without preceding written consent from the manufacturer will result in the immediate termination of product liability and warranty period.
- Installation, use, maintenance, and servicing of this equipment must be carried out by authorized technicians.
- Check the mains voltage and information on the manufacturer's nameplate before installing the unit.
- Check all connections, settings and technical specifications of the various peripheral devices with the PT5002 supplied.
- Never open the enclosure.
- Never touch the electronic components (ESD sensitivity).
- Never expose the system to heavier conditions than allowed according to the casing classification (see manufacturer's nameplate).
- If the operator detects errors or dangers, or disagrees with the safety precautions taken, then inform the owner or the principal responsible.
- Adhere to the local labor and safety laws and regulations.

DESCRIPTION

The PT5002 is a microprocessor-driven device that is designed for flow and wind speed monitoring. This manual was written for firmware version 1.3.3.683

Functions and Features

This product is designed with a focus on:

- Large display for easy viewing
- Ease-of-use with softkeys and a full numeric keypad
- Ruggedness for its application with a robust enclosure, keypad and mechanical relays
- Info/Sensor Data Screen—view raw and calculated data, both to and from the unit, including flow data and output statuses
- User-friendly installation with quality plug-and-play terminals
- A wide range of outputs and functions for a broad fulfillment in many applications
- User defined relay triggers for flow rates and totals

Flow Meter Input

The PT5002 accepts a passive or active signal output. The input circuit supports low and high frequency (0.5...3500 Hz) flow meters. A 12V DC excitation terminal is available for flow meter sensors that require power.

Digital Inputs

The PT5002 control inputs allow the following functions:

- Unlatch Relays
- Reset Totalizers
- Unlatch Relays and Reset Totalizers

Relay Control Outputs

The PT5002 has two independent relay outputs, a mechanical Form C switch and a solid state form A switch. All control functions are always available by dedicated relay outputs. Unneeded outputs may be left disconnected or disabled within the firmware.

Relays in general, can be used for alarm indication or as a totalizing output.

Form-C

- Can be powered directly from mains circuits rated up to 240V.
- Must be powered through circuits that are insulated from mains by at least basic insulation.
- Connected sources of power need to be limited to 240V AC and fused at 5A or less.
- Not suitable for connection to external circuits that are insulated from mains by at least double insulation (SELV).

Form A

- Located on TB4 and recommended to use, if configured as a high-rate, totalizing output.
- Relay energizes (contact closes) with a minimum input current of 3 mA through the input LED.
- The relay turns off (contact opens) with an input voltage of 0.8V or less.

Power Supply

The power supply used must be isolated from mains by double or reinforced insulation (for instance, SELV power supply).

The PT5002 operates on 10...40V DC or 9...28V AC supplied by any suitable source that also meets the requirement listed above. A pre-wired wall wart power supply is included with the device, as well as several adapters for different kinds of power outlets.

A power supply not sourced from the factory must be capable of supplying a minimum of 8 Watts.

Configuring the Unit

The PT5002 is designed for many types of applications. See “Advanced Setup” on page 34 for instructions on configuring your PT5002 to your specific requirements.

All information is stored in EEPROM memory and will not be lost in the event of power failure.

Display Information

The PT5002 has a large transfective LCD with a bright LED backlight that displays symbols and digits for measuring units, status information and keyword messages. See “Units” on page 32.

INSTALLING THE PT5002

CAUTION

MOUNTING, ELECTRICAL INSTALLATION, STARTUP AND MAINTENANCE OF THIS INSTRUMENT MAY ONLY BE CARRIED OUT BY TRAINED PERSONNEL AUTHORIZED BY THE OPERATOR OF THE FACILITY. PERSONNEL MUST READ AND UNDERSTAND THIS OPERATING MANUAL BEFORE CARRYING OUT ITS INSTRUCTIONS.

CAUTION

THE PT5002 MAY ONLY BE OPERATED BY PERSONNEL WHO ARE AUTHORIZED AND TRAINED BY THE OPERATOR OF THE FACILITY. OBSERVE ALL INSTRUCTIONS IN THIS MANUAL.

CAUTION

OBEY ALL SAFETY PRECAUTIONS IN “SAFETY CONSIDERATIONS” ON PAGE 4.

Mounting Options

The PT5002 can be mounted on a wall, shelf or instrumentation panel. Wall-mount units are shipped in a NEMA 4X enclosure, ready to mount.

Panel-Mount Installations

NOTE: Mounting clips can accommodate a maximum panel thickness of 1.5 in. (38.1 mm).

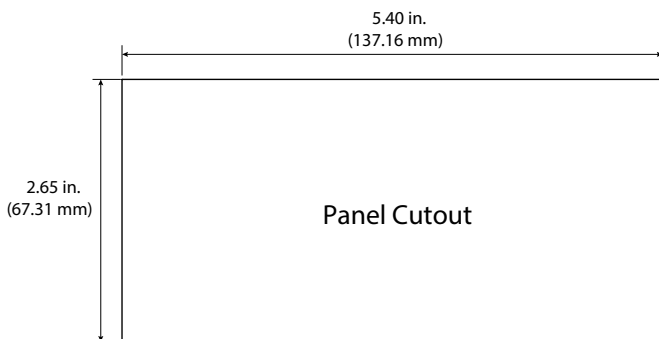


Figure 1: Panel cutout

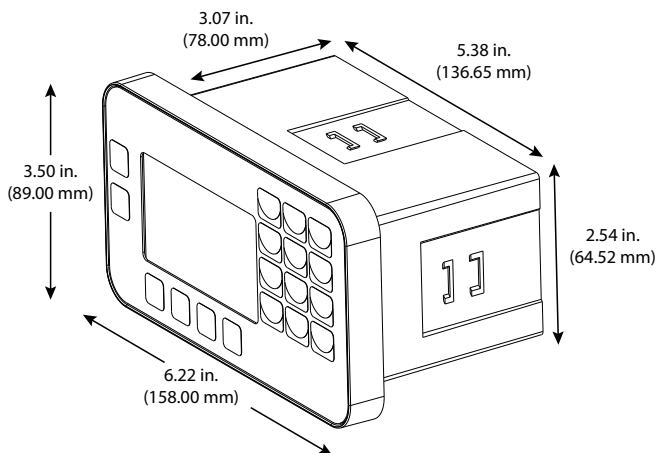
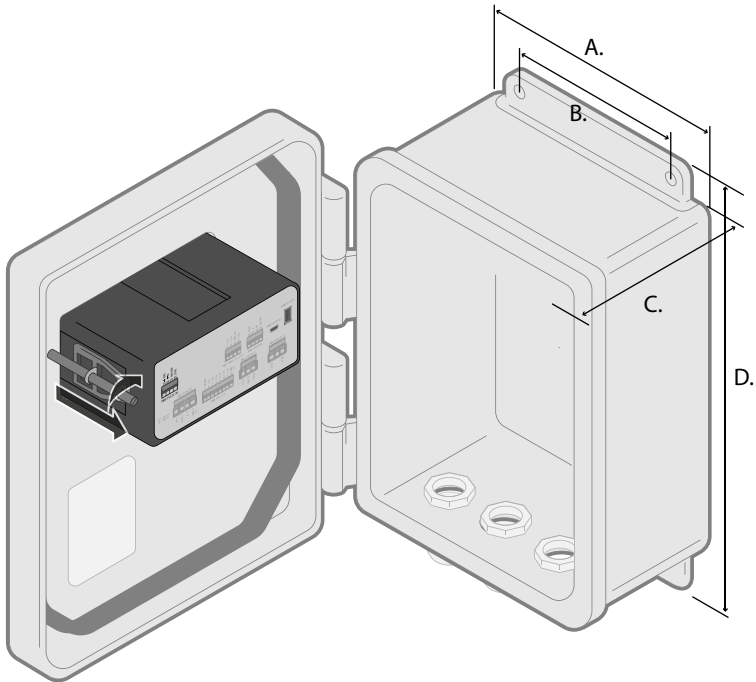


Figure 2: Mounting dimensions

To install:

1. Measure and cut a mounting hole to the dimensions shown in *Figure 1*.
2. Verify that the gasket is secure inside the mounting bezel.
3. Insert the unit through the panel cutout.
4. Secure the unit to the panel with the provided mounting clips (*see page 9*).

NEMA Installation



A.	Width	9.38 in. (238.25 mm)
B.	Distance between mounting holes	6.00 in. (152.40 mm)
C.	Total depth	4.88 in. (123.95 mm)
D.	Height	9.65 in. (245.11 mm)

Wall-Mount Installations

To install the PT5002 cabinet on a wall, secure the enclosure to the wall with four mounting screws (customer-supplied).

MOUNTING THE PT5002

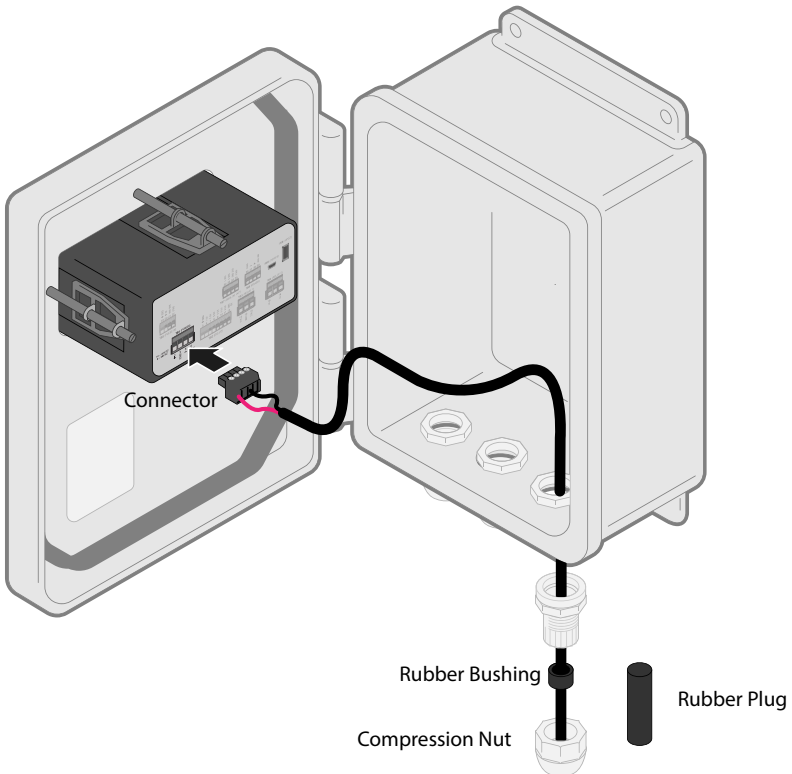
When mounting the PT5002 to a Panel, or to the NEMA enclosure, place the PT5002 through the cabinet's front panel, and hold against the outer surface. Slide the mounting hardware firmly into the shallow undercut on the left and right sides of the monitor, pulling away from the panel surface. Firmly tighten the screw clockwise, to compress the rubber seal against the outer surface. Do not overtighten.

Installation Materials

1. Wire Strippers
2. Wire Cutters
3. Thin blade screwdriver
4. PE-39 #19 AWG Wire (for Anemometer Installation)
5. 10 AWG Wire
6. #18 AWG Wire
7. Wire Nuts

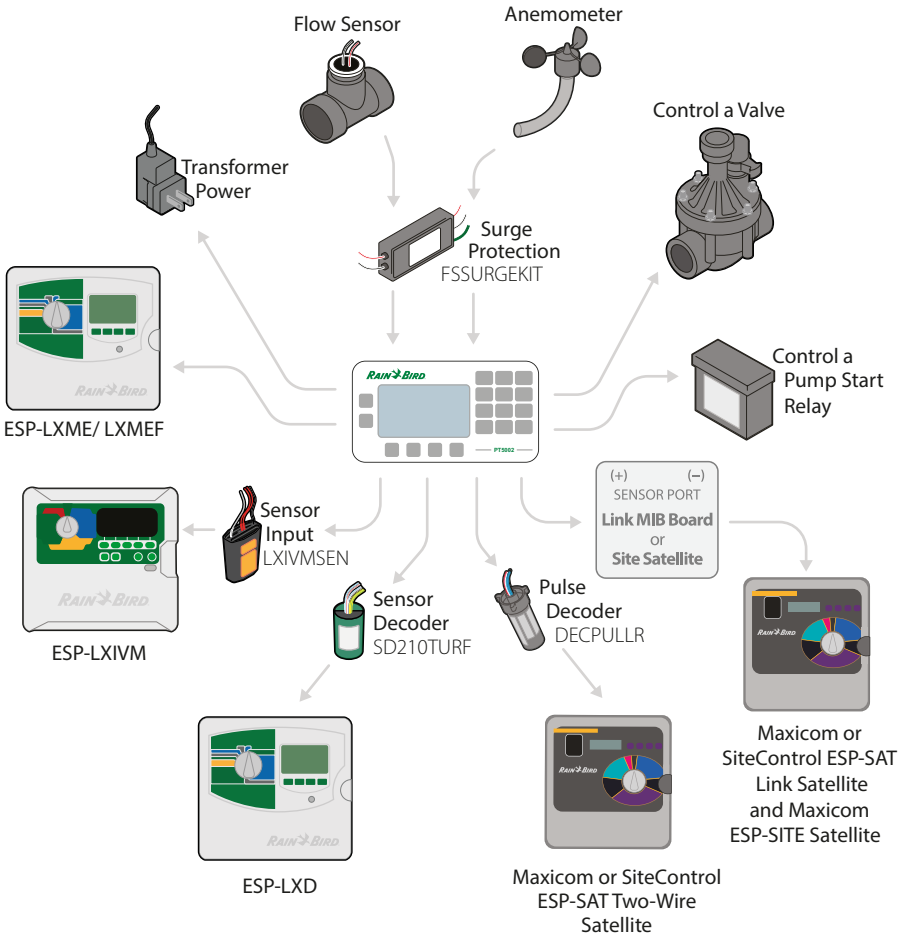
Wiring Instructions

1. Remove compression nut
2. Remove Rubber bushing and rubber plug
3. Discard Rubber Plug
4. Thread the wire through the compression nut, rubber bushing and housing
5. Install connector (*see wiring instructions p. 16 – 21*)
6. Snap connector into back panel
7. Press rubber bushing into housing seat
8. Tighten compression nut until sealed



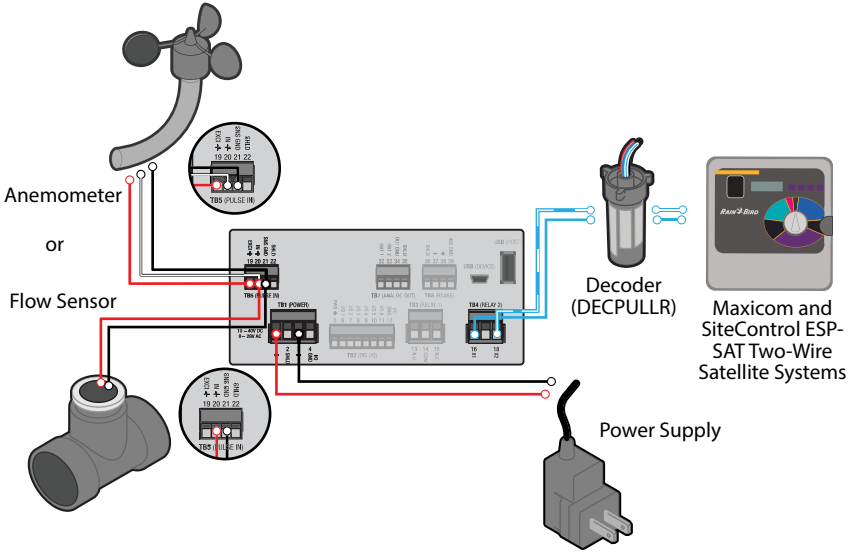
INSTALLATION OVERVIEW

The PT5002 scales the flow sensor or Anemometer wind sensor output for input into Maxicom and SiteControl Satellite Controller Systems. It can also be used with the Anemometer wind sensor for high wind shutdown for ESP-LX Controllers. When connecting to Flow Sensors or Anemometers, a surge kit may be required to protect the components. When connecting to various controllers, a decoder may be required. Please check the following pages in this manual as well as the Tech Specs for each controller on the Rain Bird website www.rainbird.com.

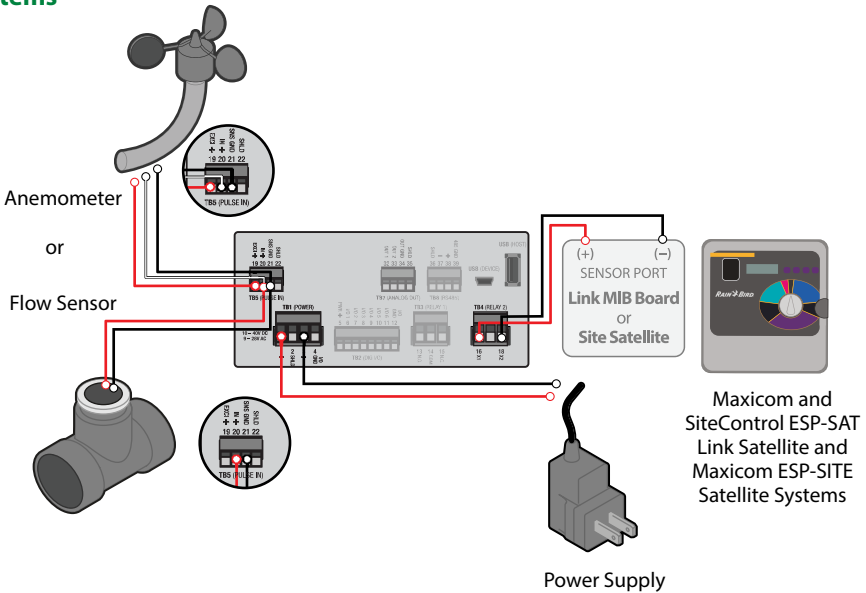


- PT5002 required for Anemometer use with LXLD, LXIVM, and LXME/F
- PT5002 not required for Flow Sensing with LXLD, LXIVM, and LXME/F

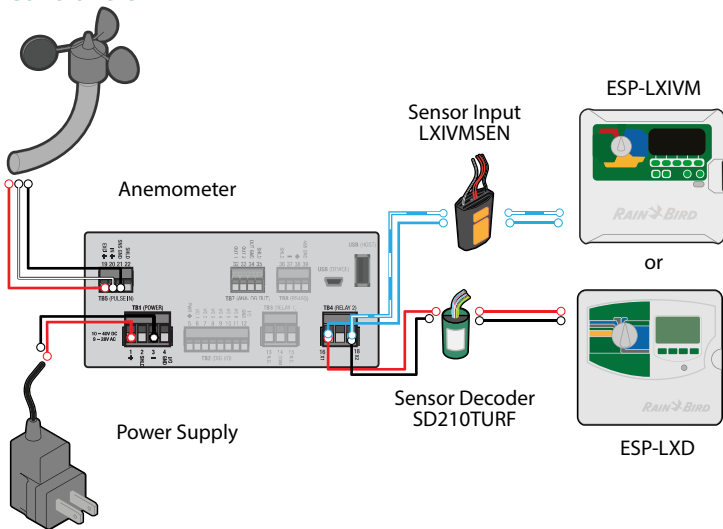
PT5002 Terminal Connections for Flow Sensor or Anemometer for Maxicom and SiteControl ESP-SAT Two-Wire Satellite Systems



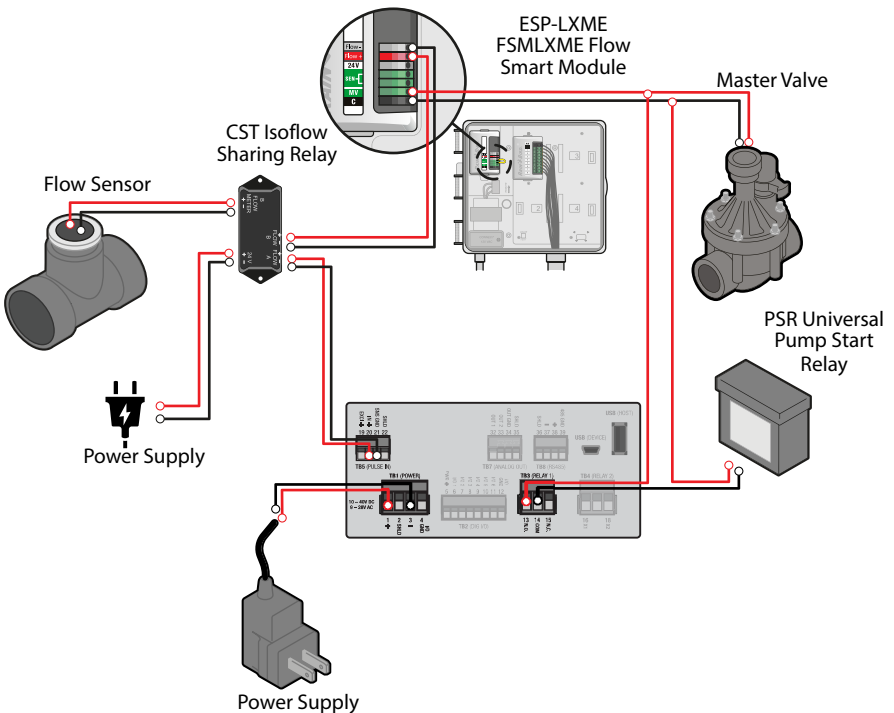
PT5002 Terminal Connections for Flow Sensor or Anemometer for Maxicom and SiteControl ESP-SAT Link Satellites and Maxicom ESP-SITE Satellite Systems



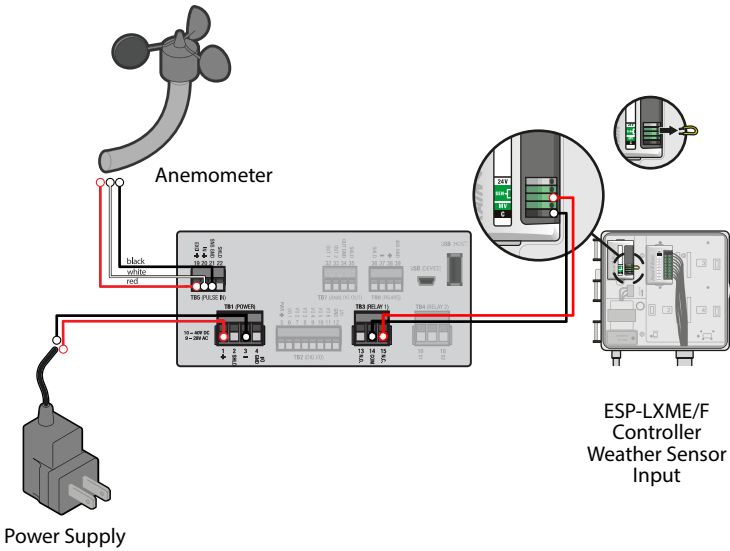
PT5002 Terminal Connections for Anemometer for 2-Wire Sensor LXLD or LXIVM Controllers



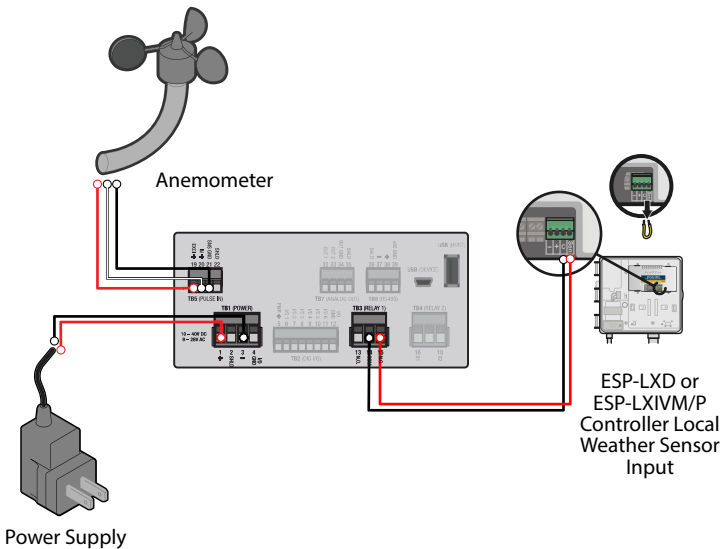
ESP-LXMEF with 1 Flow Sensor, 1 Master Valve, and a Pump Start Relay controlled by a PT5002 Flow Monitor used to control a Booster Pump



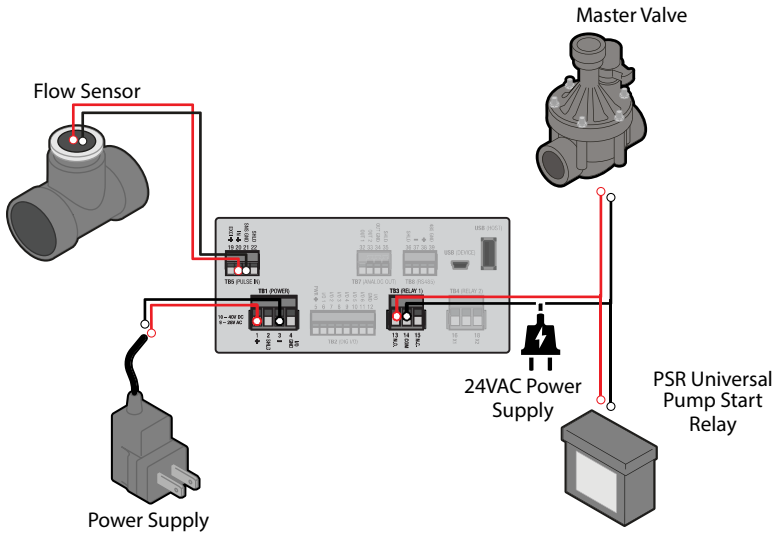
ANEMOMETER Wiring to PT5002 Relay & ESP-LXME/-LXMEF Controller



Anemometer to PT5002 Relay & ESP-LXD or ESP-LXIVM Controller



PT5002 Controlling a Master Valve or Pump Start Relay at a Preset Flow Rate



WIRING THE PT5002

At installation, be sure to comply with the following requirements:

- Disconnect power to the unit before attempting any connection or service to the unit.
- Avoid using machine power service for AC power. When possible, use a dedicated circuit or a lighting circuit.
- Observe all local electrical codes.
- The unit must be wired with wires and/or cables with a minimum temperature rating of 167° F (75° C).



TO PREVENT ACCIDENTS, DO NOT APPLY POWER UNTIL ALL OTHER CONNECTIONS HAVE BEEN COMPLETED.

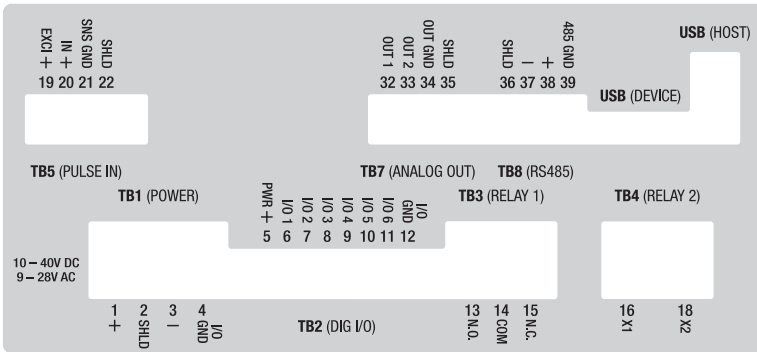


Figure 3: One sensor input, analog output



THE PT5002 IS MICROPROCESSOR CONTROLLED. IT IS VERY IMPORTANT THAT THE POWER SUPPLY BE FREE OF ELECTRICAL NOISE. AVOID USING POWER LINES THAT FEED HEAVY LOAD ELECTRICAL DEVICES SUCH AS PUMPS AND MOTORS.

Terminal Connector Descriptions

Power Input

The PT5002 power input is internally fused and protected from common line noise by a filtering network.

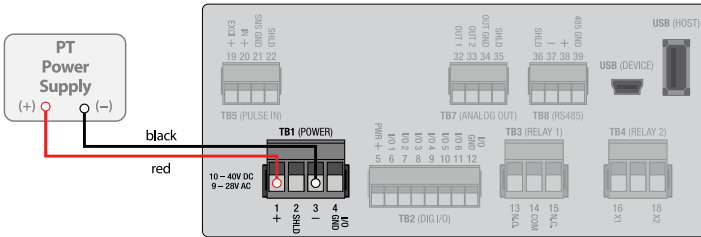
TB1 (POWER)

Connector Pin	Function		Reference Pin
	AC Power	DC Power	
1	Line (L)	Positive (L+)	1
2	Shield (Chassis GND)		2
3	Neutral (N)	Negative (L-)	3
4	Digital I/O GND		4



Table 1: Power input

PT Power Supply



Power supply is pre-wired for your convenience. Plug the connector into TB1 (power).

Digital Inputs and Outputs

The PT5002 has six independent channels available for digital input. The channels accept TTL voltage signals in the 0...5V DC range. Input range for a logic low signal is 0...1V, logic high is 4...5V.

TB2 (DIG I/O)

Connector Pin	Function	Reference Pin
1	Excitation or Power	5
2	Input/Output 1 Signal	6
3	Input/Output 1 Signal	7
4	Input/Output 1 Signal	8
5	Input/Output 1 Signal	9
6	Input/Output 1 Signal	10
7	Input/Output 1 Signal	11
8	Ground or Neutral	12

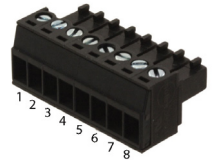


Table 2: Digital inputs

Communications

The PT5002 comes with BACnet communication protocols. Signals are transmitted over an EIA-485 (RS-485) physical layer.

TB8 (RS-485)

Connector Pin	Function	Reference Pin
1	Shield (Chassis GND)	36
2	Negative (-)	37
3	Positive (+)	38
4	Output Ground	39



Table 3: Communications input

Scaled Outputs

The PT5002 has two scaled output channels for use in applications requiring remote data collection and/or monitoring. The outputs are firmware configurable.

TB7 (Analog OUT)

Connector Pin	Function	Reference Pin
1	Output 1 Signal	32
2	Output 2 Signal	33
3	Output Ground	34
4	Shield (Chassis GND)	35



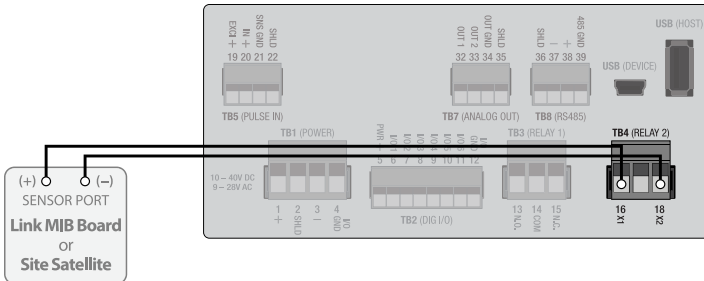
Table 4: Scaled output channels



ANALOG OUTPUT CONFIGURATIONS ARE DESIGNED TO PROVIDE A SOURCING OUTPUT SIGNAL. THE RECEIVING DEVICE MUST NOT PROVIDE POWER TO THE LOOP.

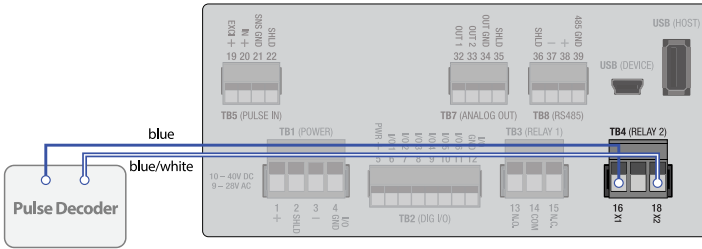
Wiring for Output to Maxicom® or Site Control

Link MIB Board or Site Satellite



Connect the positive (+) wire of the sensor port to terminal 16 on TB4. Connect the negative (-) wire of the sensor port to terminal 18 on TB4.

Pulse Decoder



Connect the blue wire of the pulse decoder to terminal 16 on TB4. Connect the blue/white wire of the sensor port to terminal 18 on TB4.

Relay Output Connectors

The PT5002 has two relay output terminals.

One Form C and One Form A

TB3 (RELAY 1) - Form C

Connector Pin	Function	Reference Pin
		Relay 1
1	Normally Open (N.O.)	13
2	Signal Common	14
3	Normally Closed (N.C.)	15

Table 5: Form C Relay Output Connector



TB4 (RELAY 2) - Form A

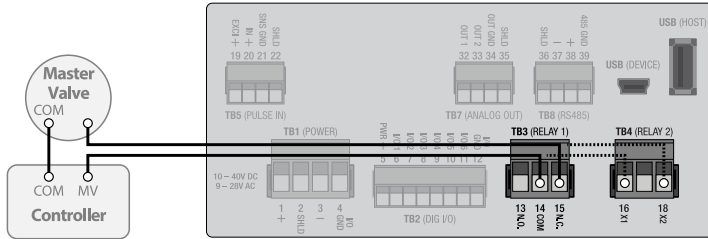
Connector Pin	Function	Reference Pin
		Relay 2
1	Connection Point 1	16
2	Not Used (No Contact)	17
3	Connection Point 2	18

Table 6: Form A Relay Output Connector



Wiring for Use as a High Flow Shutoff Device with a Stand-alone Controller

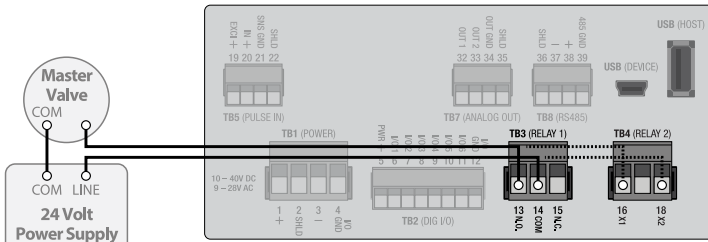
Use a Normally Closed Master Valve



NOTE: Wire master valve common to controller common.

Connect one leg of the master valve solenoid wire to terminal 15 on TB3 (or to terminal 18 on TB4). Connect the controller master valve wire to terminal 14 on TB3 (or to terminal 16 on TB4).

Use a Normally Open Master Valve



NOTE: Wire master valve common to power supply common.

Connect one leg of the master valve solenoid wire to terminal 13 on TB3 (or to terminal 16 on TB4). Connect the power supply line wire to terminal 14 on TB3 (or to terminal 18 on TB4).

Flow Sensor Inputs

The PT5002 is designed to accept pulses from open collector transistors or dry contact closure transmitters.

Before making any connections:

- Always use shielded wire to protect the signal line from external noise (ground shield to terminal #3).
- Make sure the signal lines are not bundled with or touching power lines.

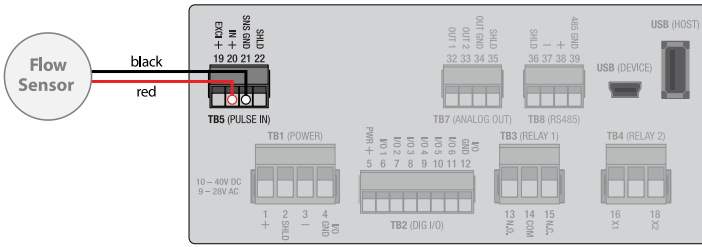
TB5 (PULSE IN): Single Pulse

Connector Pin	Function	Reference Pin
1	Sensor Excitation (+)	19
2	Sensor Input (+)	20
3	Sensor Input/Common (-)	21
4	Shield (Chassis GND)	22

Table 7: Single pulse

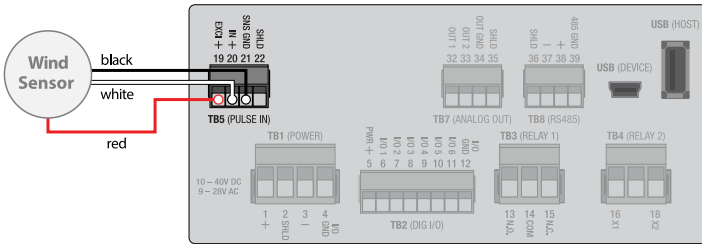


Flow Sensor



From the flow sensor, connect red wire to terminal 20 and the black wire to terminal 21 on TB5.

Wind Speed Sensor (Anemometer)



From the Anemometer, connect red wire to terminal 19, the white wire to terminal 20 and the black wire to terminal 21 on TB5.

OPERATOR INTERFACE

Keypad and Soft Keys

The keypad and soft keys are for programming, editing and changing views.

Scrolling

The screens can display up to four lines at a time. Some menus have more than four items to display. To see the off-screen items, press **UP/DOWN** to scroll through the entire list.

CAUTION

THE PT5002 MAY BE OPERATED ONLY BY PERSONNEL WHO ARE AUTHORIZED AND TRAINED BY THE FACILITY. OBSERVE ALL INSTRUCTIONS IN THIS MANUAL. OBEY ALL SAFETY PRECAUTIONS MENTIONED IN "SAFETY CONSIDERATIONS" ON PAGE 4.

Control Panel Keys

NOTE: Always press  (ENTER) to save a new value.






	The numbered keys are used to enter or change parameter values.
	In editing mode, BACKSPACE deletes the character to the left of the cursor. While navigating, BACKSPACE moves to a previous menu selection.
	Depending on the current screen, ENTER : <ul style="list-style-type: none"> • Saves the current value and ends the editing session • Advances deeper into the menu structure • Toggles enumerations
	The UP/DOWN keys: <ul style="list-style-type: none"> • Toggle the display views on the home screen • While editing, use UP/DOWN to advance the cursor to the right or left • In the menu structure, scroll through the menus and parameters
	The F1-F4 function keys are soft keys that change function to whichever icon is present above them. See "Icon Functionality" on page 23.

Table 8: Control panel keys

Icon Functionality

Depending on the task being performed, one or more of the following icons may appear on the screen. To activate an icon, press the Function key (**F1**, **F2**, **F3** or **F4**) directly under the icon, where applicable.














Icon	Function
	Display the Home screen or cancel an edit (if you activate it without saving first)
	Display the menu structure
	Create a custom label (name) for unit of measure
	Return to Setup menu
	Cycle through alpha characters
	Enter a decimal point
	Cycle through special characters
	Reveal raw and calculated info/sensor data for the PT5002
	Clear the selected value or cancel edit (press twice, consecutively)
	Enter conversion factor for custom unit of measure
	Change selected value to positive (+) or negative (-)
	Set totalizer rollover point
	Appears on Home screen for various events. Refer to <i>"Troubleshooting"</i> on page 40 for details.

Table 9: Icon functionality

Numeric Editing

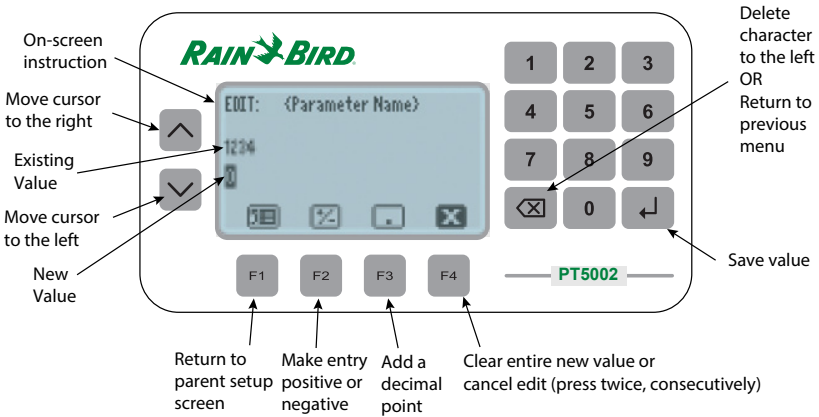


Figure 4: Numeric editing

Alpha-Numeric Editing

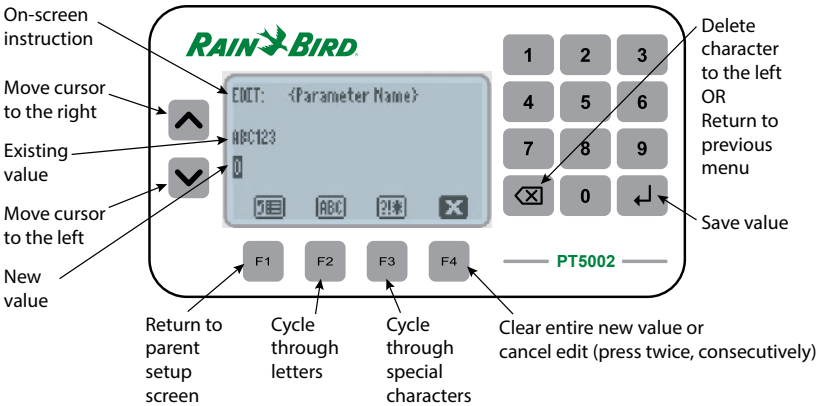


Figure 5: Alpha-numeric editing

Selection/Enumeration Editing

NOTE: Depending on the menu, the selection during an enumeration style edit may appear different.

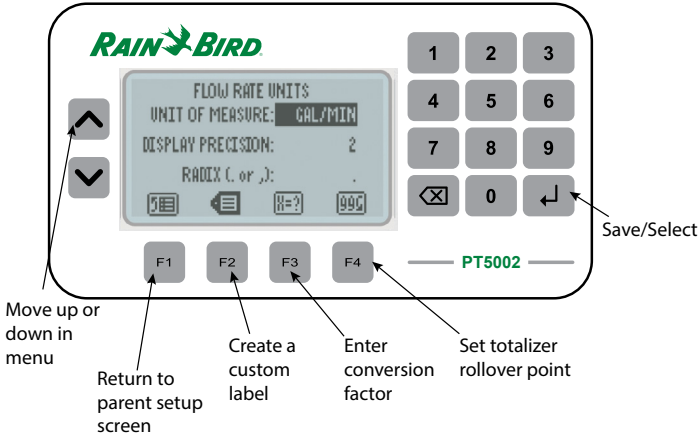


Figure 6: Selection editing

Confirmation Screen

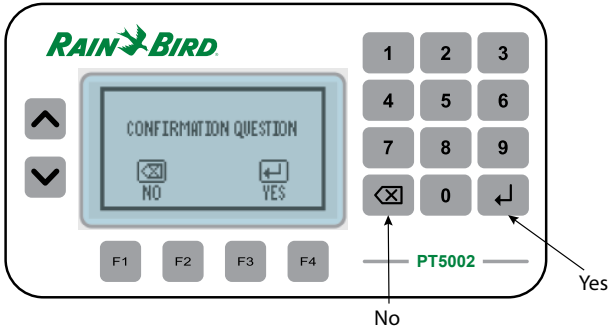


Figure 7: Confirmation screens

Navigating the Menu

The *Home* screen display shows rates and totals, either separately or simultaneously. Status and alarm messages or alarm icons appear on the display when appropriate.

Press **UP/DOWN** to toggle views on the *Home* screen.

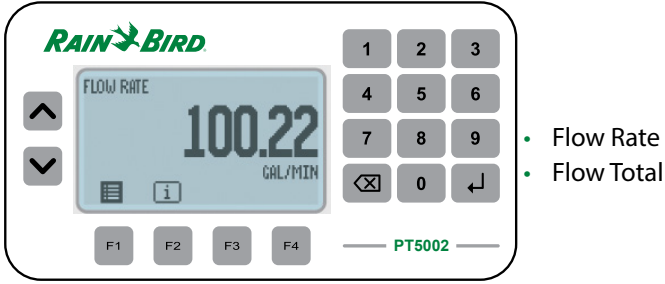


Figure 8: Single display

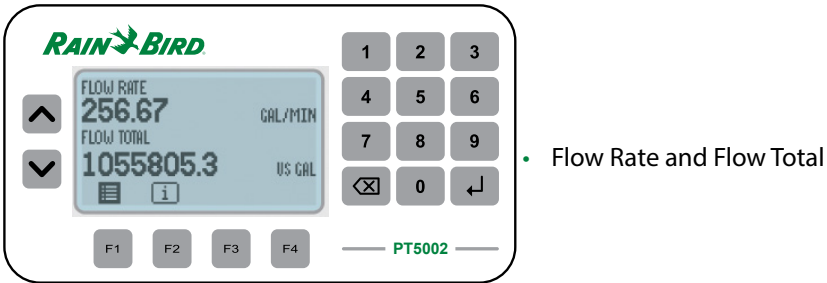


Figure 9: Dual display

Press **F1** to enter the *Main* menu to access *Setup* and *System Information*, or press **F2** to enter the *INFO/SENSOR DATA* menu.

Menu Structure

The available menu items depend on the PT5002 configuration. Each menu item is explained in detail in the following pages.

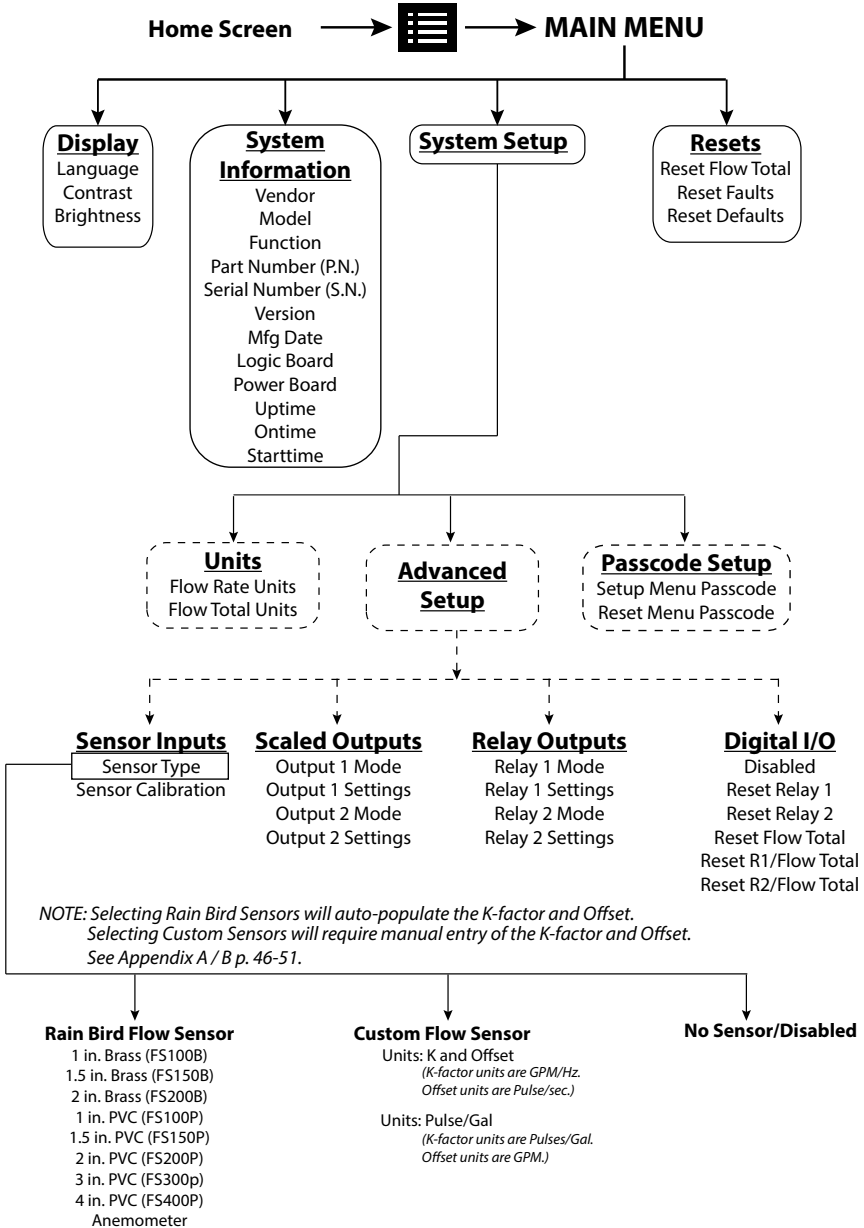


Figure 10: Menu structure

INFO/SENSOR DATA

The PT5002 features a quick method to view measured data transmitting to and from the device. You can use the data for informational purposes or for troubleshooting. The type of data displayed can include raw input frequency, relay status or calculated data, such as flow rate.

Item	Description
FLOW FREQ	Raw frequency of the flow sensor
FLOW COUNT	Raw pulse count of the flow sensor
FLOW RATE	Calculated flow rate of the flow sensor
FLOW TOT	Calculated flow total of the flow sensor
RELAY 1	ENERGIZED/OFF status of relay 1
RELAY 2	ENERGIZED/OFF status of relay 2
D-I/O 1	ENABLED/DISABLED status of digital I/O port 1
D-I/O 2	ENABLED/DISABLED status of digital I/O port 2
D-I/O 3	ENABLED/DISABLED status of digital I/O port 3
D-I/O 4	ENABLED/DISABLED status of digital I/O port 4
D-I/O 5	ENABLED/DISABLED status of digital I/O port 5
D-I/O 6	ENABLED/DISABLED status of digital I/O port 6

Table 10: Info/sensor data screen

To return to the home screen, press **BACKSPACE** or **F1** (home).

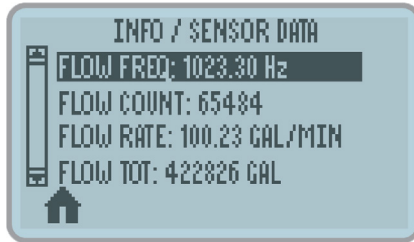


Figure 11: Info/sensor data screen

SYSTEM INFORMATION

The *System Information* menu contains build information specific to the configuration of the unit.

To view your system information, navigate to *System Information* from the *Main* menu.

Item	Description
VENDOR	Manufacturer of the product
MODEL	Product family/series
FUNCTION	For factory/diagnostic purposes only
P.N.	Configured part number
S.N.	Serial number
MFG DATE	The original manufacture/build date
VERSION	Loaded firmware version
LOGIC BRD	For factory/diagnostic purposes only
POWER BRD	For factory/diagnostic purposes only
UPTIME	Time, in seconds, since last power-on session start
ONTIME	Total lifetime power-on, in seconds
STARTTIME	Ontime at start of power-on session

Table 11: System information menu

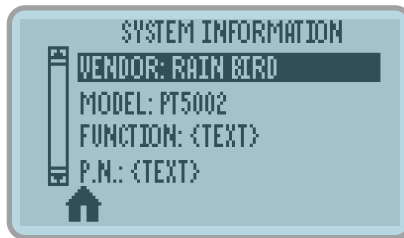


Figure 12: System information screen

BASIC SETUP

Display

Use this menu to change the display settings for *Language*, *Contrast* or *Brightness*.

1. Navigate to *Display* from the main menu.
2. Press **UP/DOWN** to scroll through the available display parameters, then press **ENTER**.
3. Scroll through available options, then press **ENTER** to select and save your changes.



Figure 13: Display configuration screen

Resets

Use this menu to reset *Totalizers*, *Faults*, *Defaults* and *latched relays*:

1. Navigate to *Resets* from the main menu.

NOTE: If a passcode was configured, enter the passcode, then press **ENTER** to access this menu.

2. Press **UP/DOWN** to scroll through the available reset options, then press **ENTER**.
3. On the confirmation screen press **ENTER** to confirm the reset.

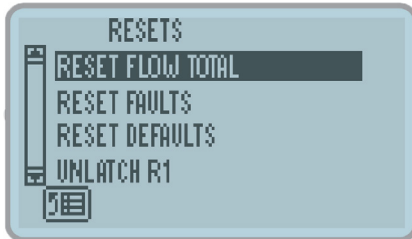


Figure 14: Resets menu

Clearing a Latched Relay

To clear a relay that latches after a trigger:

1. Navigate to the main menu.
2. Press **UP/DOWN** to scroll to *UNLATCH R1* or *UNLATCH R2*, then press **ENTER**.

Passcode Setup

Enabling a Passcode

PT5002 units are shipped without passcode protection enabled. Passcodes can be optionally configured for *Setup* and *Reset* functions. To enable a passcode:

1. Navigate to *SETUP > PASSCODE SETUP*.
2. Press **UP/DOWN** to scroll to the passcode you want to enable, then press **ENTER**.



Figure 15: Set passcode screen

3. Enter a numeric passcode from 4 to 8 digits in length, then press **ENTER**.
4. On the confirmation screen, press **ENTER** again to confirm the passcode.

NOTE: An asterisk (*) appears next to each passcode if it is enabled.



Figure 16: Asterisk indicates set passcode

Disabling a Passcode

1. Navigate to *SETUP* > *PASSCODE SETUP*.
2. Press **UP/DOWN** to scroll to the passcode you want to delete, then press **F4** (clear).
3. On the confirmation screen, press **ENTER** to confirm removal of the passcode.

Units

Use the *UNITS* menu to configure units of measure, display precision (resolution) and radix (comma or decimal point). You can configure these settings for each Parameter Unit: Flow (Rate and Total), Temperature and Energy (Rate and Total).

1. Navigate to *SETUP* > *UNITS*.
2. Press **UP/DOWN** to scroll through the available parameter units.
3. Scroll to *Unit of Measure*, *Display Precision* or *Radix*, then press **ENTER** to activate the drop-down menu for that setting.

Unit of Measure

The *Unit of Measure* setting determines the engineering unit and/or time interval for calculated measurements of the selected parameter unit.

1. Press **UP/DOWN** to scroll through the available units of measure, then press **ENTER** to select and save the new setting.

NOTE: For most rate measurements, all options are available in time intervals of seconds (S), minutes (M), hours (H) and days (D).

For any of the *Flow* parameters (*Rate* or *Total*), the available units are:

Unit	Description
US GAL	US Gallon
M ³	Cubic Meters
L	Liters

Table 12: Flow units

Changing Custom Units for Rate or Total Measurement

1. Follow the procedure outlined in “Unit of Measure” on page 32 to enter the Unit of Measure menu for a parameter.
2. Press **UP/DOWN** to choose *CUST*, then press **ENTER**.

NOTE: The display populates with additional icons that need to be modified for custom units.

3. Press **F2** (custom label). Use the soft keys in conjunction with the numeric keypad and **UP/DOWN** to create a custom label, then press **ENTER**.

NOTE: See Table 8 on page 22 and Table 9 on page 23 for button functionality.

4. On the confirmation screen, press **ENTER** to confirm the new custom unit. The new label displays in the selection list.
5. Press **F3** (conversion) to assign a conversion factor for this custom unit. The number entered will be a factor related to the specific parameter.
 - ◇ FLOW RATE: GAL/MIN
 - ◇ FLOW TOTAL: GALLONS (GAL)
6. Press **ENTER** to save the change.
7. On the confirmation screen, press **ENTER** to confirm the change.

NOTE: For example, if making a custom unit for Flow Rate and 2 is programmed as a conversion factor, the custom unit is equivalent to 2 GAL/MIN. If 0.5 is entered, the custom unit is equivalent to 0.5 GAL/MIN.

Display Precision

The *Display Precision* setting determines the resolution of a value, indicated by the number of digits after the decimal place, for the selected parameter unit.

1. Press **UP/DOWN** to scroll to *DISPLAY PRECISION*, then press **ENTER**.
2. Scroll through the available options (0...4), then press **ENTER** to select and save the change.

Radix

The *Radix* parameter determines if a period or comma is used to represent a decimal place for the selected parameter unit.

1. Press **UP/DOWN** to scroll to *RADIX*, then press **ENTER**.
2. Scroll through available options (decimal point or comma), then press **ENTER** to select and save the change.

ADVANCED SETUP

Use the *ADVANCED SETUP* menu to configure flow meters, outputs and relays.

Configuring a Flow Meter

Flow Sensor Type

See "*Flow Sensor Inputs*" on page 20 for more details on flow type selection for Rain Bird products. Use this menu to select the flow meter that the device is connected to.

1. Navigate to *SETUP > ADVANCED SETUP > SENSOR INPUTS*.
2. Press **UP/DOWN** to scroll to *FLOW SENSOR TYPE*, then press **ENTER**.
3. Scroll through the available sensor types, then press **ENTER** to select and save the new settings.

The flow sensor types are shown in *Table 13*.

Option	Description
RAIN BIRD FLOW SENSOR	1 in. Brass (FS100B) 1.5 in. Brass (FS150B) 2 in. Brass (FS200B) 1 in. PVC (FS100P) 1.5 in. PVC (FS150P) 2 in. PVC (FS200P) 3 in. PVC (FS300P) 4 in. PVC (FS400P) Anemometer
CUSTOM FLOW SENSOR	Units: K and Offset (K-factor units are Pulses/Gal. Offset units are GPM.) Units: Pulse/Gal (K-factor units are GPM/Hz. Offset units are Pulse/sec.)
NO SENSOR/DISABLED	Disables the sensor input in the firmware

Table 13: Flow sensor types

Flow Sensor Calibration

Use this menu to change the calibration settings (K-factor, offset and low flow cutoff) for the selected Flow Meter Type (*see p. 46-51*).

1. Navigate to *SETUP > ADVANCED SETUP > SENSOR INPUTS*.
2. Press **UP/DOWN** to scroll to *FLOW SENSOR CAL*, then press **ENTER**.
3. Scroll to and edit each option, as necessary. The options include:

Option	Description
K-FACTOR	A singular K-factor entry point.
OFFSET	Used to apply an offset to sensor input calibration
LOW FLOW CUTOFF	The point at which the display reads zero. Represented in configured unit of measure

Table 14: Flow sensor calibration options

NOTE: If a pre-loaded Rain Bird Sensor was chosen for the flow sensor type, modifying any of these values causes an asterisk to appear to the left of the setting to indicate setting doesn't match the default.
To revert back to default, navigate to *RESET DEFAULT CAL*, then press **ENTER**.

Configuring Outputs

Scaled Outputs: Output Mode

Use this menu to change the mode of one or both scaled outputs. The mode defines the behavior of the output.

1. Navigate to *SETUP > ADVANCED SETUP > SCALED OUTPUTS*
2. Press **UP/DOWN** to scroll to an output mode, then press **ENTER**.
3. Scroll through the available modes, then press **ENTER** to select and save the setting.

Analog Output	NO OUTPUT/DISABLED	Disables Output
	ANALOG: 0...5V	0...5V output signal, scaled to an output source
	ANALOG: 0...10V	0...10V output signal, scaled to an output source
	ANALOG: 4...20 mA	4...20 mA output signal, scaled to an output source

Table 15: Output mode options

Scaled Outputs: Output Settings

Use this menu to change the output settings for the respective output mode.

1. Navigate to *SETUP > ADVANCED SETUP > SCALED OUTPUTS*.
2. Press **UP/DOWN** to scroll to the applicable output settings, then press **ENTER**.
3. Scroll to and edit each option, as necessary.

Option	Description
OUTPUT SOURCE	Parameter assignment of the output (such as rate, total or temperature)
ANALOG FULL SCALE	Maximum value associated with output maximum
ANALOG LOW SCALE	Minimum value associated with output minimum

Table 16: Analog output settings

Relay Outputs: Relay Mode

Use this menu to change the mode of one or both relay outputs. The mode defines the behavior of the output.

1. Navigate to *SETUP > ADVANCED SETUP > RELAY OUTPUTS*.
2. Press **UP/DOWN** to scroll to an output mode, then press **ENTER**.
3. Scroll through the available modes, then press **ENTER** to select and save the setting.

Option	Description
NO RELAY/DISABLED	Disables output
TOTALIZER	Totalizer output
ALARM: HIGH	On/Off function, energized at the high set point
ALARM: LOW	On/Off function, energized at the low set point
ALARM: RANGE	On/Off function, energized beyond high and low set points
MANUAL	On/Off function of manual operation

Table 17: Relay mode options

Relay Outputs: Relay Settings

Use this menu to change the relay settings for the respective relay mode.

1. Navigate to *SETUP > ADVANCED SETUP > RELAY OUTPUTS*.
2. Press **UP/DOWN** to scroll to the applicable relay setting, then press **ENTER**.
3. Scroll to and edit each option, as necessary.

NOTE: Alarm icons "R1" and "R2" will appear in the upper right section of the Home Screen to provide a local indication when a relay condition has been met and when the relay has been energized.

Output Mode	Option	Description
TOTALIZER	OUTPUT SOURCE	Parameter assignment (e.g. Flow Total or Energy Total)
	SCALING FACTOR	Pulse(s) transmitted per unit of measure
	UNITS	Converts output unit of measure
	PULSE WIDTH	Time between the rising and falling edges of a single pulse
ALARM: HIGH	OUTPUT SOURCE	Parameter assignment (such as Flow Rate or Temperature)
	HIGH SETPOINT	Instructs the device to energize the relay if this value reached/exceeded. This value is linked to the <i>OUTPUT SOURCE</i> and its unit of measure (for example, Flow Rate in GPM)
	HYSTERESIS HI	Creates a window/zone below the <i>HIGH SETPOINT</i> value where the relay remains in an energized state
	SET DELAY	Time in seconds that will elapse before the relay energizes, if the <i>HIGH SETPOINT</i> value is reached/exceeded
	RELEASE DELAY	Time in seconds that the relay will remain energized, if the <i>HYSTERESIS HI</i> value is reached/exceeded
	LATCHING	Leaves the relay in an energized state until it is manually cleared on the device, either through the keypad interface or through the Digital I/O channels

Output Mode	Option	Description
ALARM: LOW	OUTPUT SOURCE	Parameter assignment (such as Flow Rate or Temperature)
	LOW SETPOINT	Instructs the device to energize the relay if this value reached/exceeded. This value is linked to the <i>OUTPUT SOURCE</i> and its unit of measure (for example, Flow Rate in GPM)
	HYSTERESIS LO	Creates a window/zone above the <i>LOW SETPOINT</i> value where the relay remains in an energized state
	SET DELAY	Time in seconds that will elapse before the relay energizes, if the <i>LOW SETPOINT</i> value is reached/exceeded
	RELEASE DELAY	Time in seconds that the relay will remain energized, if the <i>HYSTERESIS LO</i> value is reached/exceeded
	LATCHING	Leaves relay in an energized state until it is manually cleared on the device, either through the keypad interface or through the Digital I/O channels
ALARM: RANGE	OUTPUT SOURCE	Parameter assignment (such as Flow Rate or Temperature)
	HIGH SETPOINT	Instructs the device to energize the relay if this value reached/exceeded. This value is linked to the <i>OUTPUT SOURCE</i> and its unit of measure (for example, Flow Rate in GPM)
	HYSTERESIS HI	Creates a window/zone below the <i>HIGH SETPOINT</i> value, where the relay remains in an energized state
	LOW SETPOINT	Instructs the device to energize the relay if this value reached/exceeded. This value is linked to the <i>OUTPUT SOURCE</i> and its unit of measure (for example, Flow Rate in GPM)
	HYSTERESIS LO	Creates a window/zone above the <i>LOW SETPOINT</i> value, where the relay remains in an energized state
	SET DELAY	Time in seconds that will elapse before the relay energizes, if either setpoint value is reached/exceeded
	RELEASE DELAY	Time in seconds that the relay will remain energized, if either hysteresis value is reached/exceeded
LATCHING	Leaves relay in an energized state until it is manually cleared on the device, either through the keypad interface or through the Digital I/O channels	
MANUAL	OVERRIDE	Bypasses any programmed triggers to trigger the relay, which will remain triggered until deactivated

Table 18: Relay settings

Configuring Digital I/O

The PT5002 has remote reset capabilities for relays and totalizers through any one of six channels.

All six channels are input-only and can be configured for any combination of the following.

Option	Description
DISABLED	The I/O channel will have no function
RESET: RELAY 1	Resets latch on Relay 1
RESET: RELAY 2	Resets latch on Relay 2
RESET: RELAY 1 AND RELAY 2	Resets latches on Relays 1 and 2
RESET: FLOW TOTAL	Resets <i>Flow Total</i>
RESET: RELAY 1 AND FLOW TOTAL	Resets latch on Relay 1 and resets <i>Flow Total</i>
RESET: RELAY 2 AND FLOW TOTAL	Resets latch on Relay 2 and resets <i>Flow Total</i>
RESET: ALL RELAYS AND ALL TOTALS	Resets Relay 1, Relay 2 and <i>Flow Total</i>

Table 19: Channel options



Figure 17: Digital I/O menu

1. Navigate to *SETUP* > *ADVANCED SETUP* > *DIGITAL I/O*.
2. Press **UP/DOWN** to scroll to any of the six input channels.
3. Press **ENTER** repeatedly until the desired function appears. Each time **ENTER** is pressed, the channel toggles through the available functions.

To disable any channel, simply highlight the digital I/O channel, and press **ENTER** until *DISABLED* appears.

Configuring BACnet Communications

The *Communications* menu configures the device to communicate to other systems via BACnet interface.

The available communication settings vary based on Network Type.



Figure 18: BACnet communications menu

1. Navigate to *SETUP* > *ADVANCED SETUP* > *COMMUNICATIONS*.
2. Press **UP/DOWN** to scroll to *NETWORK TYPE*, then press **ENTER**.
3. Scroll through the available options, then press **ENTER** to select save the change.
4. Press **BACKSPACE** to return to the *COMMUNICATIONS* menu.
5. Scroll to and edit each option, as necessary. The options are:

Settings	Options
BAUD RATE	1200, 2400, 4800, 9600, 14400, 19200, 28800, 34800, 57600, 76800 or 115200
MSTP ADDRESS	1...255
MAX MASTER	
DEVICE INSTANCE	1...4,294,967,295
DEVICE NAME	User-defined ID

Table 20: BACnet settings

BACnet Map

Object Description	BACnet Object ID	BACnet Object Type
FLOW RATE	2	Analog Value
FLOW TOTAL	3	Analog Value
FLOW TOTAL PRECISION	4	Large Analog Value

Table 21: BACnet register map

TROUBLESHOOTING

This section lists common problems that may be encountered with the flow monitor, the possible causes and the recommended remedies. Most problems are due to improper wiring and/or programming procedures. The problem may also be in the flow meter, valve, pump or other piece of equipment.

Be sure that all other equipment is functioning properly. The PT5002 Flow Monitor is extensively tested at the factory before shipment. However, the unit may get damaged during transit or installation. If after all possible remedies have been tried and the problem persists, contact your local representative or Rain Bird.

Problem	Possible Causes	Remedies
Unit has power but display does not light up	<ol style="list-style-type: none"> 1. Incorrect power wiring 	<ol style="list-style-type: none"> 1. Re-check power wiring
Transmitter is connected but the PT5002 does not count	<ol style="list-style-type: none"> 1. Incorrect transmitter wiring or broken wire 2. Transmitter is defective 3. No sensory type selected 4. Wrong scale factor 5. Low frequency input must be on terminal #7 6. Meter is defective, rotor not turning 	<ol style="list-style-type: none"> 1. Check wiring diagrams 2. Replace parts or entire unit 3. Select a sensor type. See <i>"Flow Sensor Type"</i> on page 34 4. Check scale factor calculation. For example, if programmed 0.001 instead of 0.100, unit will wait for 100 pulses before decrementing one count 5. Verify connection 6. Disassemble meter, check rotor, replace if defective
Valve does not close at setpoints	<ol style="list-style-type: none"> 1. Relay output is not properly connected 2. Relay is defective 3. Valve components are defective 	<ol style="list-style-type: none"> 1. Reconnect relay wiring 2. Contact factory for replacement 3. Check and replace valve components.
Counter accumulates too many counts	<ol style="list-style-type: none"> 1. Wrong scale factor 2. Electrical noise causing extra pulses. 3. Excessive vibration. 	<ol style="list-style-type: none"> 1. Check scale factor calculation 2. Check wiring. Make sure power lines are not touching or close to pulse signal line. Always use shielded cable 3. Dampen vibration
Some of the keys on the control panel are not operational	<ol style="list-style-type: none"> 1. Broken switch behind control panel 2. Function not available on this model 3. Problem with internal components 	<ol style="list-style-type: none"> 1. Replace the Flow Monitor 2. See <i>"Operator Interface"</i> on page 22 3. Return the Flow Monitor to the factory for repair 4. Cycle the power to the Flow Monitor
DISPLAY OVERRUN error	<ol style="list-style-type: none"> 1. There are more than 8 digits in the display 	<ol style="list-style-type: none"> 1. Check that the unit of measure you entered will not result in a readout greater than 8 digits 2. Check the display precision and reduce it, if possible


Problem	Possible Causes	Remedies
Alarm notification from the <i>Home</i> screen 	1. The rate or total values indicated on the Home Screen are in an overrun condition (value exceeds 8 digits)	1. Change the unit of measure associated with the parameter (see <i>"Unit of Measure" on page 32</i>) or reset the totalizer (see <i>"Resets" on page 30</i>)
"R1" and/or "R2" appear on home screen	1. Relay 1 and/or Relay 2 are latched 2. Relay 1 and/or 2 are energized	1. See <i>"Clearing a Latched Relay" on page 31</i> 2. The programmed alarm conditions are met. Check process or programming
"DISABLED" displays on home screen	1. Flow sensor type setting set to "NO SENSOR/DISABLED"	1. Configure a flow sensor. See <i>"Flow Sensor Type" on page 34</i>

Table 22: Troubleshooting

SPECIFICATIONS

Power Supply	Input range: 10...40V DC and 9...28V AC RMS (50...60 Hz)	
	Maximum power consumption: 8 Watts (power supply must provide 8 watts at minimum)	
	Isolated from power ground	
	Over-voltage, transient and reverse polarity protected	
Flow Meter Input	Input Range: 0.3 Hz... 10 kHz	
	One (1) independent channel	
	Configurable as square wave 0...30V pulse with 2.5V threshold	
	Configurable as sine wave, zero-centered with 45 mV threshold	
	Configurable debounce	
	Excitation Output	12V DC source
	Voltage	Low: -0.3...1.85V DC
		High: 2.5...25V DC
	Impedance	Pullup to 12V DC
	VDC Current	±50 mA, short circuit current
Response	100 µs/3.5 ms min pulse (high/low speed)	
Scaled Outputs	Two (2) independent channels	
	Isolated from power ground	
	Over-voltage, transient and reverse polarity protected	
	Output is multiplexed on the process out pins	
	Analog Output	Configurable to 0...5V, 0...10V or 4...20 mA
		Uncertainty: ±0.1% of reading
		16-bit resolution (0...10V and 4...20 mA), 15-bit resolution (0...5V)
200 ms, 90-10% step response		
Sourcing analog output signal		
Digital I/O	Six (6) independent channels	
	Isolated from power ground	
	Over-voltage, transient and reverse polarity protected	
	0...30 Volts as input	
	Debounce	
	0...5V, TTL, 200 ms 90... 10% step response, driving < 0.1 uF	
Calculations	Flow Calculation	± 0.01% uncertainty
		Adjustable FIR/IIR filtering

Relay Outputs	Isolated coil drivers		
	Over-voltage, transient and reverse polarity protected		
	Form C Relay	Load	Resistive
		Rated Carry Current	5 A (N.C. or N.O.)
		Maximum Switching Voltage	250V AC, 30V DC
		Minimum Permissible Load	10 mA at 5V DC
		Coil Rating	5...24V DC
		Life Expectancy	5,000,000 operations
	Form A Relay (N.O. SPST)	Switching Speed	On (0.25 ms), Off (0.02 ms)
		Current Rating (I_o)	1 A
		Maximum Output Voltage (V_o)	60V
		Output On-Resistance ($R_{(ON)}$)	0.5 Ohms (Ω) @ $I_F = 5$ mA, $I_o = 1$ A
Output Withstand Voltage ($V_{(OFF)}$)		60-65V @ $V_F = 0.8$ V, $I_o = 250$ μ A, $T_A = 77^\circ$ F (25 $^\circ$ C)	
Network Communications	Network Types/ Communication Protocols	BACnet	
	Physical Layer	EIA-485 (RS-485)	
	Baud Rates	1200...115.2K	
	Two-wire (half-duplex)		
	Over-voltage/ESD Protection		
	Isolated from power ground		
USB Communications	USB (HOST)	Type-A Receptacle Currently not supported	
	USB (DEVICE)	Mini-B Receptacle (used for field updates)	
	Over-voltage/ESD/transient protected		
Display/User interface	Keypad	Membrane overlay, domed tactile response keys	
	Display	128 \times 64 pixel LCD graphical display, LED backlit	
	Protected from EMI/RFI		
	Keypad interface is protected from ESD		

Environmental Ratings	Pollution Degree	2	
	Altitude Restriction	Up to 2000 m (6561 ft)	
	Over-Voltage Rating	Category II (CAT II)	
	Ambient Temperature Range	32...130° F (0...55° C)	
	Storage Temperature Range	-40...160° F (-40...70° C)	
	Humidity	0...85%, non-condensing	
Weights (Approx.)	Panel Mount	1.25 lb (0.57 kg)	
	Wall Mount (Including Unit)	4.54 lb (2.06 kg)	
Operator Functions	Unlatch Relays, Reset Totalizers, Unlatch Relays and Reset Totalizers		
Parameters	Maximum Displayed Digits	Rates	Max 8 (7 with decimal)
		Totals	Max 9 (8 with decimal)
	Resolution/ Display Precision	Configurable, 0...4	
	Volumetric Flow Rate Units Seconds (S), Minute (MIN), Hour (H), Day (D)	US Gallons (US GAL), Cubic Meters (M ³), Liters (L), Custom (user-specified)	
Volumetric Flow Total Units			

STANDARDS AND CERTIFICATIONS

Agency Approval/Standards

- CE Marked for Low Voltage Directive and RoHS

EMI/EMC Compliance

Conducted and Radiated Emissions per CISPR11:2009 / EN55011	Class A, Group 1
IEC 61000-4-2:2008 Electrostatic Discharge	2/4 kV - Contact Discharge, 2/4/8 kV Air Discharge Performance Criteria B
IEC 61000-4-3:2006 Radiated RF Immunity	Test levels: 80...1000 MHz & 1400...2000 MHz Performance Criteria A
IEC 61000-4-4:2004 EFT Immunity (Signal and Power lines)	Tested per specification to Performance Criteria B
IEC 61000-4-5:2005 Surge Protection	Tested per specification to Performance Criteria B
IEC 61000-4-6:2008 Conducted RF Immunity (Signal and Power lines)	Test Levels: 0.15...80 MHz Level 3, Performance Criteria A
IEC 61000-4-11:2004 Voltage Dips, Interruptions, and Dropouts	Tested per specification to Performance Criteria B & C

Table 24: EMI/EMC compliance

Enclosure Protection

- IEC/CSA/UL 60529-1: Degrees of protection provided by enclosures (IP65), when installed with all four mounting clips in a similarly rated enclosure, which includes the optional wall mount enclosure.
- Additional Protection (optional): NEMA 4X (wall mount enclosure only).

APPENDIX A

For Rain Bird Tee Type Flow Sensors and Anemometer

Rain Bird FS Series Tee Type Flow Sensor K Factor and Offset are pre-programmed into the PT5002 Memory. Select Menu > Setup > Advanced Setup > Sensor Inputs > Sensor Type > Rain Bird Flow Sensor. Use the down arrows on the keypad to select the proper model. The following tables indicate the suggested flow range for Rain Bird Flow Sensors. Rain Bird Sensors will operate both above and below the indicated flow rates. However, good design practice dictates the use of this range for best performance. Sensors should be sized for flow rather than pipe size.

Model	Description	K-Factor	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
Brass Tee's						
FS200B	2" Brass T Flow Sensor	2.747	0	10 - 100	38 - 380	2.3 - 23
FS150B	1 ½" Brass T Flow Sensor	1.065	0.089	4 - 80	15 - 300	1 - 18
FS100B	1" Brass T Flow Sensor	0.397	0.262	2 - 40	7.6 - 150	0.5 - 9
Plastic Tee's						
FS400P	4" PVC T Flow Sensor	13.742	0.231	40 - 500	150 - 1900	9 - 110
FS300P	3" PVC T Flow Sensor	8.309	0.227	20 - 300	75 - 1130	4.5 - 70
FS200P	2" PVC T Flow Sensor	2.843	0.144	10 - 200	40 - 750	2.3 - 45
FS150P	1 ½" PVC T Flow Sensor	1.697	-0.316	5 - 100	19 - 380	1.1 - 23
FS100P	1" PVC T Flow Sensor	0.261	1.2	5.4 - 54	20 - 200	1.2 - 12
FS075P	¾" PVC T Flow Sensor	0.156	0.9	3.3 - 33.2	12.6 - 125.8	0.75 - 7.5
FS050P	½" PVC T Flow Sensor	0.078	0.9	1.9 - 18.9	7.2 - 71.7	0.43 - 4.3
Wind Speed Sensor						
ANEMOMETER	Brass Insert Flow Sensor	1.6965	0.059	N/A		

APPENDIX B

For Insert Type Flow Sensors Rain Bird Models FS350B or FS350SS

The following table indicates the suggested flow range for Rain Bird Flow Sensors. Rain Bird Sensors will operate both above and below the indicated flow rate. However, good design practice dictates the use of this range for the best performance. Sensors should be sized for flow rather than pipe size.

FS350B AND FS350SS: K Value, Offset and Suggested Operating Range

Model	Pipe O.D.	Pipe I.D.	K Value	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
3 inch Sch 10S	3.500"	3.260"	5.009	0.09	12-400	50-1500	1-90
Std. Wt., Sch 40	3.5"	3.068"	4.362	0.063	12-400	50-1500	1-90
Extra Strong, Sch 80	3.5"	2.900"	3.858	0.043	12-400	50-1500	1-90
PVC Class 125	3.5"	3.284"	5.094	0.093	12-400	50-1500	1-90
PVC Class 160	3.5"	3.230"	4.902	0.085	12-400	50-1500	1-90
PVC Class 200	3.5"	3.166"	4.682	0.076	12-400	50-1500	1-90
4 inch Sch 10S	4.5"	4.260"	9.597	0.241	20-600	80-2300	1-140
Std. Wt., Sch 40	4.5"	4.026"	8.34	0.229	20-600	80-2300	1-140
Extra Strong, Sch 80	4.5"	3.826"	7.354	0.188	20-600	80-2300	1-140
PVC Class 125	4.5"	4.224"	9.396	0.24	20-600	80-2300	1-140
PVC Class 160	4.5"	4.154"	9.013	0.24	20-600	80-2300	1-140
PVC Class 200	4.5"	4.072"	8.578	0.239	20-600	80-2300	1-140
5 inch Sch 10S	5.563"	5.295"	16.305	0.25	30-900	110-3400	10-200
Std. Wt., Sch 40	5.50"	5.047"	14.674	0.248	30-900	110-3400	10-200

Model	Pipe O.D.	Pipe I.D.	K Value	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
3 inch Sch 10S	3.500"	3.260"	5.009	0.09	12-400	50-1500	1-90
Std. Wt., Sch 40	3.5"	3.068"	4.362	0.063	12-400	50-1500	1-90
Extra Strong, Sch 80	3.5"	2.900"	3.858	0.043	12-400	50-1500	1-90
PVC Class 125	3.5"	3.284"	5.094	0.093	12-400	50-1500	1-90
PVC Class 160	3.5"	3.230"	4.902	0.085	12-400	50-1500	1-90
PVC Class 200	3.5"	3.166"	4.682	0.076	12-400	50-1500	1-90
4 inch Sch 10S	4.5"	4.260"	9.597	0.241	20-600	80-2300	1-140
Std. Wt., Sch 40	4.5"	4.026"	8.34	0.229	20-600	80-2300	1-140
Extra Strong, Sch 80	4.5"	3.826"	7.354	0.188	20-600	80-2300	1-140
PVC Class 125	4.5"	4.224"	9.396	0.24	20-600	80-2300	1-140
PVC Class 160	4.5"	4.154"	9.013	0.24	20-600	80-2300	1-140
PVC Class 200	4.5"	4.072"	8.578	0.239	20-600	80-2300	1-140
5 inch Sch 10S	5.563"	5.295"	16.305	0.25	30-900	110-3400	10-200
Std. Wt., Sch 40	5.50"	5.047"	14.674	0.248	30-900	110-3400	10-200
Extra Strong, Sch 80	5.50"	4.813"	13.165	0.246	30-900	110-3400	10-200
6 inch Sch 10S	6.625"	6.357"	24.089	0.26	50-1,500	190-5700	10-340
Std. Wt., Sch 40	6.5"	6.065"	21.574	0.257	50-1,500	190-5700	10-340
Extra Strong, Sch 80	6.5"	5.761"	19.457	0.254	50-1,500	190-5700	10-340

Model	Pipe O.D.	Pipe I.D.	K Value	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
PVC Class 125	6.625"	6.217"	22.853	0.258	50-1,500	190-5700	10-340
PVC Class 160	6.625"	6.115"	21.968	0.257	50-1,500	190-5700	10-340
PVC Class 200	6.625"	5.993"	21.068	0.256	50-1,500	190-5700	10-340
8 inch Sch 10S	8.625"	8.329"	43.914	0.286	80-2,500	300-9500	20-570
Sch 20	8.625"	8.125"	41.653	0.283	80-2,500	300-9500	20-570
Sch 30	8.625"	8.071"	41.063	0.283	80-2,500	300-9500	20-570
Std. Wt., Sch 40	8.625"	7.981"	40.086	0.281	80-2,500	300-9500	20-570
Sch 60	8.625"	7.813"	38.288	0.279	80-2,500	300-9500	20-570
Extra Strong, Sch 80	8.625"	7.625"	36.315	0.276	80-2,500	300-9500	20-570
PVC Class 125	8.625"	8.095"	41.324	0.283	80-2,500	300-9500	20-570
PVC Class 160	8.625"	7.961"	39.869	0.281	80-2,500	300-9500	20-570
PVC Class 200	8.625"	7.805"	38.203	0.279	80-2,500	300-9500	20-570
10 inch Sch 10S	10.75"	10.420"	70.195	0.321	125-4,000	470-15100	30-910
Sch 20	10.75"	10.250"	67.668	0.318	125-4,000	470-15100	30-910
Sch 30	10.75"	10.136"	66.069	0.316	125-4,000	470-15100	30-910
Sch 40, Std. Wt.	10.75"	10.020"	64.532	0.314	125-4,000	470-15100	30-910
Extra Strong, Sch 60	10.75"	9.750"	61.016	0.309	125-4,000	470-15100	30-910
Sch 80	10.75"	9.564"	58.644	0.306	125-4,000	470-15100	30-910
PVC Class 125	10.75"	10.088"	65.431	0.315	125-4,000	470-15100	30-910
PVC Class 160	10.75"	9.924"	63.272	0.312	125-4,000	470-15100	30-910
PVC Class 200	10.75"	9.728"	60.733	0.309	125-4,000	470-15100	30-910

Model	Pipe O.D.	Pipe I.D.	K Value	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
12 inch Sch 10S	12.75"	12.390"	104.636	0.367	175-5,000	660-18900	40-1140
Sch 20	12.75"	12.250"	102.553	0.364	175-5,000	660-18900	40-1140
Sch 30	12.75"	12.090"	99.347	0.36	175-5,000	660-18900	40-1140
Std. Wt., Sch 40S	12.75"	12.000"	97.576	0.358	175-5,000	660-18900	40-1140
Sch 40	12.75"	11.938"	96.369	0.356	175-5,000	660-18900	40-1140
Sch 60	12.75"	11.625"	90.441	0.348	175-5,000	660-18900	40-1140
Extra Strong	12.75"	11.750"	92.775	0.351	175-5,000	660-18900	40-1140
Sch 80	12.74"	11.376"	85.922	0.342	175-5,000	660-18900	40-1140
PVC Class 125	12.75"	11.966"	96.912	0.357	175-5,000	660-18900	40-1140
PVC Class 160	12.75"	11.770"	93.152	0.352	175-5,000	660-18900	40-1140
PVC Class 200	12.75"	11.538"	88.842	0.346	175-5,000	660-18900	40-1140
14 inch Sch 10S	14.00"	13.500"	122.307	0.391	200-6,000	760-22700	50-1360
Sch 20	14.00"	13.375"	120.216	0.388	200-6,000	760-22700	50-1360
Std. Wt., Sch 30	14.00"	13.250"	118.151	0.385	200-6,000	760-22700	50-1360
Sch 40	14.00"	13.124"	116.096	0.382	200-6,000	760-22700	50-1360
Sch 60	14.00"	12.814"	111.148	0.376	200-6,000	760-22700	50-1360
Extra Strong	14.00"	13.00"	114.098	0.33	200-6,000	760-22700	50-1360
Sch 80	14.00"	12.50"	106.299	0.369	200-6,000	760-22700	50-1360
16 inch Sch 10S	16.00"	15.500"	159.243	0.44	300-9,000	1140-34100	70-2040
Sch 20	16.00"	15.375"	156.742	0.436	300-9,000	1140-34100	70-2040
Std. Wt., Sch 30	16.00"	15.250"	154.267	0.433	300-9,000	1140-34100	70-2040
Sch 60	16.00"	14.688"	143.456	0.419	300-9,000	1140-34100	70-2040

Model	Pipe O.D.	Pipe I.D.	K Value	Offset	Suggested Operating Range (Gallons/Minute)	Suggested Operating Range (Liters/Minute)	Suggested Operating Range (Cubic Meters/Hour)
Extra Strong, Sch 40	16.00"	15.000"	149.394	0.427	300-9,000	1140-34100	70-2040
Sch 80	16.00"	14.314"	136.548	0.41	300-9,000	1140-34100	70-2040
18 inch Sch 10S	18.00"	17.500"	202.739	0.498	350-10,000	1320-37900	80-2270
Sch 20	18.00"	17.375"	199.828	0.494	350-10,000	1320-37900	80-2270
Sch 30	18.00"	17.124"	194.061	0.486	350-10,000	1320-37900	80-2270
Std. Wt.	18.00"	17.250"	196.943	0.49	350-10,000	1320-37900	80-2270
Sch 40	18.00"	16.876"	188.464	0.479	350-10,000	1320-37900	80-2270
Sch 60	18.00"	16.500"	180.171	0.469	350-10,000	1320-37900	80-2270
Extra Strong	18.00"	17.000"	191.25	0.482	350-10,000	1320-37900	80-2270
Sch 80	18.00"	16.126"	172.152	0.457	350-10,000	1320-37900	80-2270
20 inch Std. Wt., Sch 20	20.00"	19.25"	246.179	0.555	400-12,000	1510-45400	90-2730

RAIN BIRD'S PROFESSIONAL CUSTOMER SATISFACTION POLICY

⚠ CAUTION

THERE ARE NO FIELD-REPLACEABLE PARTS INSIDE. OPENING THE UNIT WILL VOID ALL WARRANTIES.

Rain Bird will repair or replace at no charge any Rain Bird professional product that fails in normal use within the warranty period stated below.

You must return it to the dealer or distributor where you bought it within the period of three years from purchase.

Product failures due to acts of God including without limitation, lightning and flooding, are not covered by this warranty.

This commitment to repair or replace is our sole and total warranty.

Implied Warranties of Merchantability and Fitness, if Applicable, are Limited to One Year from the Date of Sale.

We will not, under any circumstances be liable for incidental or consequential damages, no matter how they occur.

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