2014-2015 Golf Products Catalog

Learn more about Rain Bird's
commitment to water-efficient products at
www.rainbird.com/iuow

Preserving beauty while conserving water.

That's intelligent.

Through innovative product development, Rain Bird is helping sustain healthier landscapes—and a healthier planet.

Lush fairways and manicured greens can also be highly water-efficient. Every Rain Bird product is a testament to that truth. From water-saving nozzles to highly efficient pumps to leading-edge Integrated Control Technology, Rain Bird products make the most of every drop, delivering superior results with less water. Keeping the world and your golf course beautiful. That's The Intelligent Use of Water.™

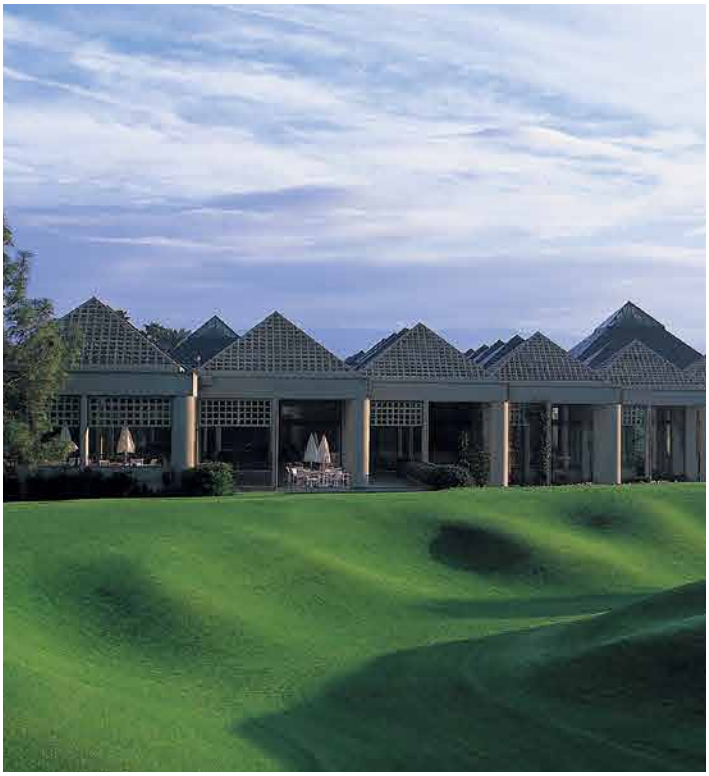
RAIN BIRD®

Table of Contents

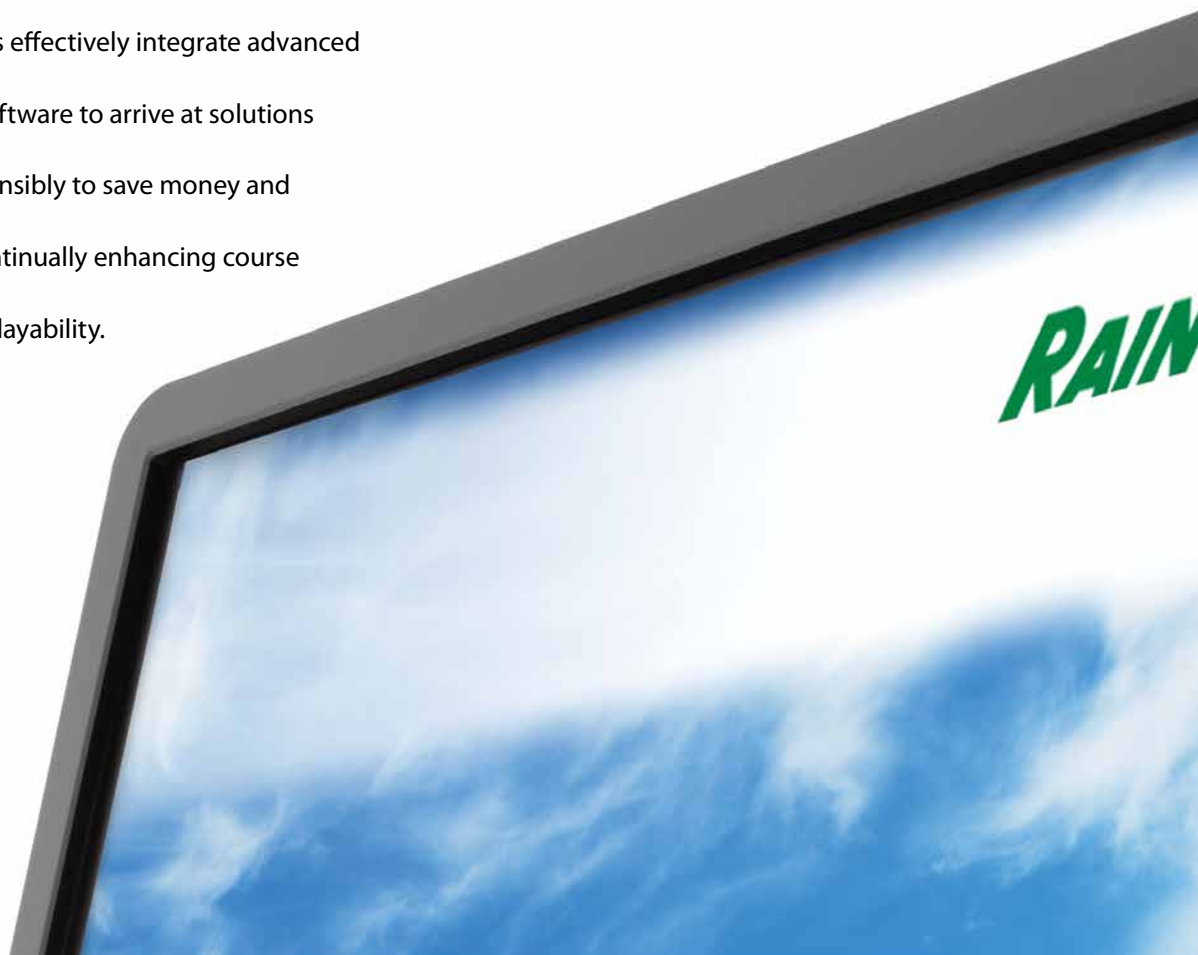
= Exclusive Rain Bird Feature

An irrigation leader for over 80 years, Rain Bird has developed hundreds of breakthrough products and features not available from any other irrigation manufacturer. The combined result of these many innovations is the world's most water-efficient, dynamically adaptable golf irrigation system. Look for this symbol throughout the catalog and discover the Rain Bird difference.

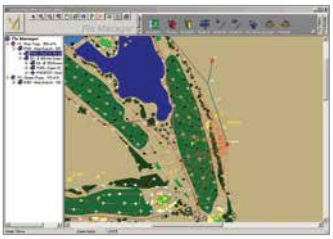
CENTRAL CONTROL



Rain Bird® Central Control Systems are designed with ease of use in mind. These systems effectively integrate advanced technologies and optional software to arrive at solutions that manage water use responsibly to save money and reduce utility costs, while continually enhancing course appearance and improving playability.



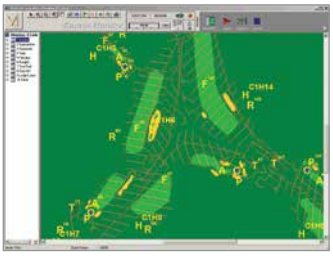
Rain Bird Offers These Central Control Systems:



Cirrus Flo-Manager®

Cirrus™

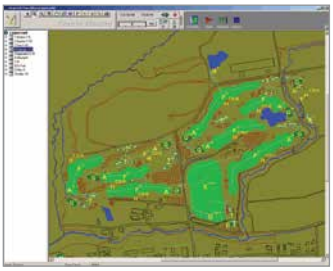
By combining Computer-Aided Design (CAD) with GPS technology, Cirrus™ shows you your course like no other central control system can. With state-of-the-art ET-based scheduling, customized course graphics and multiple mapping options, controlling your irrigation system is fast and easy.



Nimbus II Course Monitor

Nimbus™ II

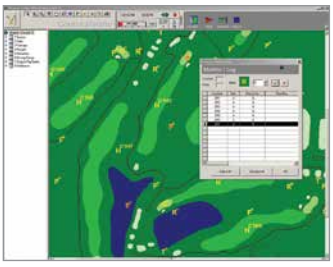
For a superior combination of ET-based scheduling, advanced flow management and Windows-based simplicity, Nimbus™ II is an excellent choice to efficiently control all irrigation applications on up to three individual courses with a maximum of 54 holes.



Stratus II Course Monitor

Stratus™ II

For easy-to-use, time- or ET-based scheduling, there's really only one choice — Stratus™ II — the one irrigation central control system that combines the point-and-click simplicity of Windows® with intuitive Rain Bird features to control as many as 27 holes.



StratusLT Map

StratusLT™

The Rain Bird Start-up Wizard built right into StratusLT™ will have you watering your 18-hole golf course in no time — from the greens to the roughs, clubhouse to driving range — without having to become a computer expert or spend extensive time learning to operate the system. StratusLT now supports ET-based scheduling with WS-PRO LT and a weather software module.

All too often, superintendents or greens committees purchase a central control system that exceeds the irrigation requirements for their golf course. Before deciding which central control system to purchase, think about the level of control you believe is necessary to maintain course appearance and playability, while reducing water, labor and energy costs. Keep in mind, all Rain Bird Central Controls are backward compatible so upgrading your system as the irrigation needs of your course change is easy and affordable.

Refer to the chart on the following page to compare the features and irrigation management tools provided with each of these systems.

CENTRAL CONTROL COMPARISON CHART

		CIRRUS™	NIMBUS™ II	STRATUS™ II	STRATUS LT™
FEATURES	Real-time decision making	✓	✓	✓	✓
	Radio communication option	✓	✓	✓	✓
	Works with all Rain Bird satellites	✓	✓	✓	✓
	Works with decoders	✓	✓	✓	✓
	Works with Rain Bird Integrated Control™ System (ICS)	✓	✓	✓	✓
	Works with FREEDOM™ System	✓	✓	✓	✓
	Works with Rain Bird® MI Series Mobile Controller	✓	✓	✓	✓
	Number of 2-wire satellite wire groups standard	4	4	2	1
	Number of IC™ wire groups standard	4	4	1	1
	Maximum number of interfaces – Hybrid (same or mix)	12	3	2	–
	Maximum number of 2-wire satellite wire groups – Hybrid	48**	12**	4**	–
	Maximum number of 2-wire satellite stations	32,256**	8,064**	2,688†	672
	Maximum number of wireless satellite stations	32,256**	8,064**	2,688†	672
	Maximum number of IC™ stations	36,000‡	9,000‡	3,000‡	750
	Number of decoders/solenoids standard	500/1,000	500/1,000	500/1,000	200/400
	Maximum number of decoder/solenoids – Hybrid	6,000/12,000Δ	1,500/3,000Δ	700/1,400Δ	300/600 with LDI◊
	Number of active decoder solenoids	40/LDI	40/LDI	40 with LDI	15 with SDI
	Maximum number of weather stations	5	5	1	1 (WS-PRO LT only)
	Maximum number of pump stations	6	6	6	2
PROGRAMMING	Standard/QuickIRR™/SimpleIRR™	✓	✓	✓	✓
	Number of courses	3	3	2	1
	Number of holes	54	54	27	18
	Number of Flo-Zones™	500	500	500	50
	Programs	Unlimited	Unlimited	500	250
	Schedules	50 per program	50 per program	25 per program	25 per program
	Irrigation programs – active simultaneous	50	50	20	10
SOFTWARE FEATURES	Flo-Manager® - Dynamic Power and Hydraulic Management	✓	✓	✓	✓
	Flo-Guard™	✓	✓	✓	✓
	ET Management (fully automatic)	✓	Optional	Optional	Optional
	ET-Based scheduling	✓	✓	✓	✓
	ET Spreadsheet™ Analysis	✓	✓	✓	✓
	Rain Bird® MI Series Mobile Controller	✓	✓	✓	✓
	Wireless satellite radio diagnostics	✓	✓	✓	✓
	Comprehensive decoder diagnostics	✓	✓	✓	✓
	Advanced IC™ diagnostics	✓	✓	✓	✓
	Real-Time Run Log	✓	✓	✓	✓
	Report Generation	✓	✓	✓	–
	Water Budgeting 0 – 300%	✓	✓	✓	✓
	Rain Bucket™ – accumulated rainfall	✓	Optional	Optional	Optional
	Rain Sensor	✓	✓	✓	✓
	Rain Watch™	✓	✓	✓	✓
	QuickStart™	✓	✓	✓	✓
	Help Screens	✓	✓	✓	✓
	Course Monitor™	✓	✓	✓	✓
	Hole View	✓	✓	✓	✓
	Projected flow (Dryrun™)	✓	✓	✓	✓
	Graphics – Course View™	✓	✓	✓	✓
	Import GPS, CAD or Aerial photo	✓	✓	✓	✓
	Visual Monitoring – Area	✓	✓	✓	✓
	Visual Monitoring – Station level	✓	Optional	Optional	–
	Smart Weather™ Alarms	✓	Optional	Optional	–
	Precipitation Data	✓	✓	✓	✓
	Rotor Data	✓	✓	✓	✓
	Cycle + Soak™	✓	✓	✓	✓
SOFTWARE MODULES	Automatic ET	✓	Optional	Optional	Optional
	Smart Weather™	✓	Optional	Optional	–
	Additional Weather Stations	✓	Optional	Optional	–
	Smart Sensors™ with Flo-Watch™	✓	Optional	Optional	Optional
	Rain Bird® Messenger™	✓	Optional	Optional	Optional
	Hybrid – Additional interfaces (same or mix)	✓	Optional	Optional	–
	The FREEDOM System™	✓	Optional	Optional	Optional
	Map Utilities™	✓	Optional	Optional	Optional
	Station Layers – Map/Operations	✓	Optional	Optional	–
	Smart Pump™	✓	Optional	Optional	Optional
	Additional Wire Groups	✓	✓	Optional	–

**Possible with Hybrid Module and additional MIM™(s) †Possible with Hybrid Module and additional Wire Groups Module(s) ‡Possible with Hybrid Module and additional ICI(s) ΔPossible with Hybrid Module and additional LDI(s) ◊Possible using a LDI instead of Standard SDI. Hybrid not required.

Cirrus™

UNIQUE FEATURES

- QuickIRR™ programming is a quick and easy method for automatically building programs to meet your irrigation challenges.
- Smart Sensors™ monitor standard in-field sensors to activate alarms, turn off or pause individual programs, schedules or the entire system then turn on or resume the same.
- Exclusive Cycle + Soak™ reduces or eliminates wasteful runoff by matching each sprinkler's application rate to the localized soil infiltration rate. Total application of water is precisely controlled regardless of number of cycles.
- Course monitor screens are intuitively designed to instantly show you exactly what is going on with your course.
- Pump Profiling™ automatically manages pump station power consumption during peak electrical rate periods.
- Industry's only innovative, guided initialization and start-up programming results in a customized QuickStart™ program.
- Dryrun™ helps you fine-tune your irrigation programs for peak performance.
- Smart Weather™ monitors evapotranspiration (ET) rates and modifies schedules based on actual turf requirements.
- The highest performance irrigation engine in the industry means you can expect some of the highest Water Window Efficiencies available.
- Smart Pump™ links your pump station to your central control system; optimizing each and every irrigation cycle. Smart Pump can also monitor and instantly react to changes in pump station capacity so an overheated motor won't take down your entire irrigation system.
- Manage up to five (5) different weather stations throughout the golf course and target them to sprinklers in any microclimate on your course.
- Hybrid technology means your system can adapt to use any combination of field hardware necessary to precisely meet your needs. Cirrus can have up to 12 field interfaces (mix and match).

Nimbus™ II

UNIQUE FEATURES

- QuickIRR™ programming is a quick and easy method for automatically building programs to meet your irrigation challenges.
- Exclusive Cycle + Soak™ reduces or eliminates wasteful runoff by matching each sprinkler's application rate to the localized soil infiltration rate. Total application of water is precisely controlled regardless of number of cycles.
- Course monitor screens are intuitively designed to instantly show you exactly what is going on with your course.
- Pump Profiling™ automatically manages pump station power consumption during peak electrical rate periods.
- Industry's only innovative, guided initialization and start-up programming results in a customized QuickStart™ program.
- Dryrun™ helps you fine-tune your irrigation programs for peak performance.
- The highest performance irrigation engine in the industry means you can expect some of the highest Water Window Efficiencies available.

SOFTWARE OPTIONS

- Smart Weather™ Software enhances regular weather software to include weather station call-back based on user-defined conditions for any of the instruments, i.e., rainfall, windspeed, temperature, humidity, etc.
- Smart Sensors™ monitor standard in-field sensors to activate alarms, turn off or pause individual programs, schedules or the entire system then turn on or resume the same.
- Station Layers-Map/Operation lets you individually control, manage and program sprinklers directly from the map.
- Hybrid allows multiple field interface devices on a central. These could be multiple MIMs or LDIs, or a combination of these devices, therefore allowing the possibility of having a decoder system in addition to a satellite system operate from the same central. Nimbus can have up to 3 interfaces (mix and match).
- Manage up to five (5) different weather stations throughout the golf course and target them to sprinklers in any microclimate on your course.
- Smart Pump™ links your pump station to your central control system; optimizing each and every irrigation cycle. Smart Pump can also monitor and instantly react to changes in pump station capacity so an overheated motor won't take down your entire irrigation system.

Stratus™ II

UNIQUE FEATURES

- QuickIRR™ programming is a quick and easy method for automatically building programs to meet your irrigation challenges.
- Exclusive Cycle + Soak™ reduces or eliminates wasteful runoff by matching each sprinkler's application rate to the localized soil infiltration rate. Total application of water is precisely controlled regardless of number of cycles.
- Course monitor screens are intuitively designed to instantly show you exactly what is going on with your course.
- Pump Profiling™ automatically manages pump station power consumption during peak electrical rate periods.
- Industry's only innovative, guided initialization and start-up programming results in a customized QuickStart™ program.
- Dryrun™ helps you fine-tune your irrigation programs for peak performance.
- The highest performance irrigation engine in the industry means you can expect some of the highest Water Window Efficiencies available.

SOFTWARE OPTIONS

- Smart Weather™ Software enhances regular weather software to include weather station call-back based on user-defined conditions for any of the instruments, i.e., rainfall, windspeed, temperature, humidity, etc.
- Smart Sensors™ monitor standard in-field sensors to activate alarms, turn off or pause individual programs, schedules or the entire system then turn on or resume the same.
- Station Layers-Map/Operation lets you individually control, manage and program sprinklers directly from the map.
- Hybrid allows multiple field interface devices on a central. These are a combination of two of these devices, therefore allowing the possibility of having a decoder system in addition to a satellite system operate from the same central.
- Weather Software allows central to communicate with Rain Bird weather station, being able to monitor, receive, update and calculate ET value for establishing run times.
- Smart Pump™ links your pump station to your central control system; optimizing each and every irrigation cycle. Smart Pump can also monitor and instantly react to changes in pump station capacity so an overheated motor won't take down your entire irrigation system.

StratusLT™

UNIQUE FEATURES

- QuickIRR™ programming is a quick and easy method for automatically building programs to meet your irrigation challenges.
- Exclusive Cycle + Soak™ reduces or eliminates wasteful runoff by matching each sprinkler's application rate to the localized soil infiltration rate. Total application of water is precisely controlled regardless of number of cycles.
- Course monitor screens are intuitively designed to instantly show you exactly what is going on with your course.
- Pump Profiling™ automatically manages pump station power consumption during peak electrical rate periods.
- Industry's only innovative, guided initialization and start-up programming results in a customized QuickStart™ program.
- Dryrun™ helps you fine-tune your irrigation programs for peak performance.
- The highest performance irrigation engine in the industry means you can expect some of the highest Water Window Efficiencies available.

SOFTWARE OPTIONS

- Add a WS-PRO LT weather station and a weather software module to monitor evapotranspiration (ET) rates and modify schedules based on actual turf requirements.
- Smart Sensors™ monitor standard in-field sensors to activate alarms, turn off or pause individual programs, schedules or the entire system then turn on or resume the same.
- Smart Pump™ links your pump station to your central control system; optimizing each and every irrigation cycle. Smart Pump can also monitor and instantly react to changes in pump station capacity so an overheated motor won't take down your entire irrigation system.

ADVANCED CONTROL TECHNOLOGIES

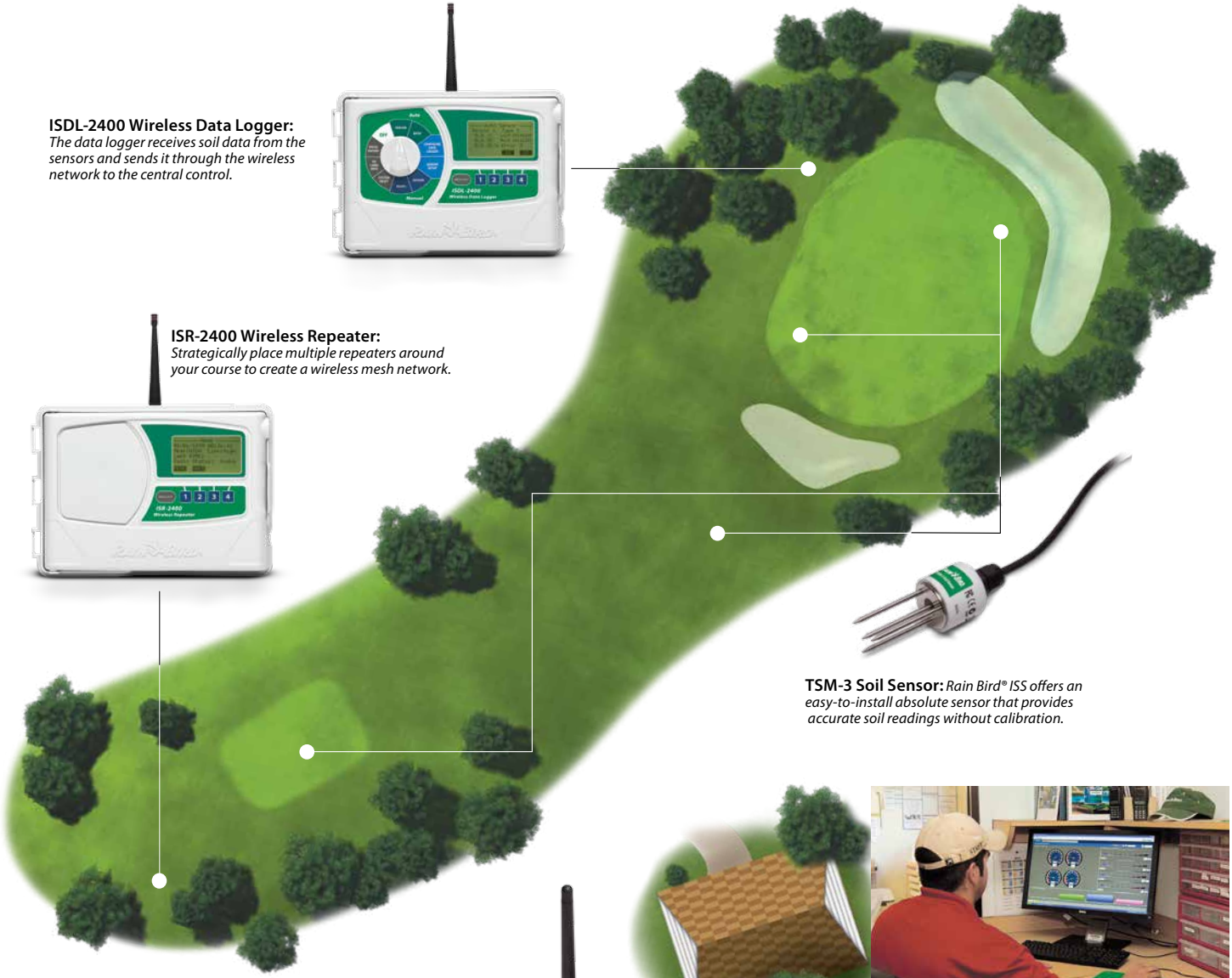
Rain Bird® Advanced Control Technologies are designed with ease of use in mind. From soil sensing to pump management with our powerful central control, we offer a full range of solutions that integrate advanced technologies and optional software. With their help, you can manage water responsibly, save money and reduce utility costs, while continually enhancing course appearance and improving playability.

The Rain Bird® Integrated Sensor System™ (ISS) gives you absolute control over your turf

Every golf course is its own complex ecosystem. To provide a consistent, playable environment, you need an accurate understanding of turf health. The Rain Bird® Integrated Sensor System™ offers a snapshot of soil conditions to help you to understand what is happening below ground. It is also the only system in the industry to deliver easy-to-install absolute soil sensing and full integration with the central control system. As a result, you'll save more time, water and money with Rain Bird.

ISDL-2400 Wireless Data Logger: *The data logger receives soil data from the sensors and sends it through the wireless network to the central control.*

ISR-2400 Wireless Repeater: *Strategically place multiple repeaters around your course to create a wireless mesh network.*



TSM-3 Soil Sensor: *Rain Bird® ISS offers an easy-to-install absolute sensor that provides accurate soil readings without calibration.*

ISG-2400 Gateway: *Located at the computer, the gateway is the link between data loggers and repeaters in the field and the Soil Manager™ software.*

ISS Soil Manager: *From the convenience of your computer, receive accurate, real-time information on soil conditions, as well as manually or automatically adjust run times based on soil moisture, with Rain Bird's state-of-the-art Soil Manager software.*

Integrated Sensor System™ (ISS)

FEATURES AND BENEFITS

- **Dynamic integration. Fully automatic.** When paired with a Rain Bird Central Control System, the Integrated Sensor System can automatically adjust sprinkler run times to reach or maintain moisture levels, minimizing water consumption, resulting in healthier turf and better playing conditions.
- **Intelligent monitoring.** As a standalone system, the ISS analyzes soil moisture and calculates water budget recommendations for any golf course.
- **Maximum accuracy. Zero calibration.** The ISS uses research-grade soil sensors backed by years of field experience. The ISS takes highly accurate real-time readings of soil moisture, salinity and temperature immediately following installation and without calibration — for easy installation and immediate accuracy.
- **Adjustable soil sensing rate.** With the Rain Bird ISS, the frequency of soil sensing measurements can be adjusted to match course needs.
- **Dependable results.** Sensor readings are automatically stored by the data logger on Secure Digital High Capacity (SDHC) storage cards. Data is not lost due to power outages or wireless communication issues.
- **Dependable communication.** The ISS uses a proven wireless mesh network which ensures the necessary range of transmission and a secured traffic from the data logger to the Soil Manager™ software.
- **Simple installation.** Network devices (data loggers and repeaters) are battery-powered and easy to install. There is no AC power source to worry about.
- **Improves turf health, course consistency and playability.** The ISS can help deliver more consistent turf quality, anticipate plant stress, weed germination, pest infestations and other factors. You can use less water to flush salts from the soil profile.

SPECIFICATIONS

- **System capacity:** 200 sensors, 20 ISDL-2400 data loggers, 40 ISR-2400 repeaters per ISG-2400 gateway.
- Frequency of sensor readings can be adjusted between 2 and 120 minutes.

Electrical Input:
- **ISDL-2400 and ISR-2400 repeater:** Four (4) D-cell alkaline batteries
- **Minimum battery life:** 12 months at 20°C (68°F) assuming 100 sensor readings per day (every 15 minutes)
- **ISG-2400 gateway:** Powered via PC USB port
- Each gateway and repeater communicate directly with up to eight (8) network devices (data loggers and repeaters) to enable wireless mesh capability and ensure optimum radio communication.

Grounding Requirements:
- ISDL-2400 data logger and ISR-2400 repeaters are battery-powered devices and do not have grounding requirements.

● **Integrated Sensor System**

HOW TO SPECIFY

IS – X – 1 – XX – 3 – X – 0

Model

Output Power
10 = 10mW
63 = 63mW

Frequency:
1 = 2.4GHz

Power Supply
3 = Battery

Language:
1 = All available, except
2 = Chinese

Product
DL = Data Logger
R = Repeater
GK = Gateway Kit

Note: Check country of use output power regulations before ordering.

Wireless Network:

- **General:**
  - 2.4 GHz ISM DSSS (Digital Sequencing Spread Spectrum) unlicensed frequency
  - Power output 10mW and 63mW per country of use regulations
  - Protocol: DigiMesh™ proprietary mesh network
  - Communication Range: Unobstructed line of sight 800 yards min.
- **Data Logger:**
  - **Capacity:** 18 Rain Bird specified TSM-3 Soil Sensors that use SDI-12 protocol. Nine (9) sensors per channel on two (2) channels.
  - **Electrical input:** 4.1-6.5V using four (4) D-cell alkaline batteries
  - **Data storage:** Sensor data stored on 4GB or higher capacity SDHC card (card included)
  - **Upgrades:** Firmware can be upgraded using SD card
  - **Display:** Backlit with 10-position menu and four (4) soft keys for automatic and manual operation including system settings, (language, date, time, units), automatic and manual sensor operation, sensor setup and special features
  - **Languages:**
    - English • French • Spanish
    - German • Chinese • Portuguese
    - Swedish • Italian
  - External antenna tuned for 2.4 GHz communication
  - **Operating temperature:** -10°C to 54°C (14°F to 130°F)
  - **Storage temperature:** -40°C to 66°C (-40°F to 150°F)
- **Repeater:**
  - **Electrical input:** 4.1-6.5V using four (4) D-cell alkaline batteries
  - **Languages:** Same as Data Logger
  - **Display:** Backlit with four (4) soft keys
  - Firmware upgrade using SDHC card (card not included)
  - **Operating temperature:** -10°C to 60°C (14°F to 140°F)
  - **Battery operating temperature:** -20°C to 54°C (-4°F to 130°F)
  - **Storage temperature:** -40°C to 66°C (-40°F to 150°F)
- **Gateway:**
  - USB to serial to USB

Sensors:

- **TSM-3 Soil Sensors**
  - Sensor connects to a Rain Bird ISDL-2400 Wireless Data Logger and provide soil moisture, salinity and temperature readings
  - Sensor takes accurate readings immediately following installation and without calibration
  - Sensor measures and reports:
    - Soil temperature
    - Absolute water fraction by volume (WFV) in % with loam calibration
    - 0.1 to 15 dS/m in-soil electro conductivity
    - 1% stable WFV readings over the following conditions:
      - -30°C to 55°C (-22°F to 131°F) (non-frozen soil)
      - 0.1 to 4 dS/m EC
  - Robust, long life materials and construction
  - Industry standard SDI-12 interface
  - Sensor connects to a data logger through an 18-gauge three-wire cable that is at most 500 feet (152 meters) long. Sensor itself shall have a 25 ft (7,6 meters) long 18-gauge three-wire cable. Additional cable, not provided, is required to reach 500 feet.
  - Low power operation:
    - 9 to 20 VDC
    - <1 mA typical standby mode
    - 30 mA moisture read mode

Software:

- Hardware requirements, same as Rain Bird central:
  - Microsoft® Windows® XP Professional SP3 and Windows® 7
  - PC with 300 KHz or higher processor
  - 128 MB of RAM
  - 1.5 GB of available hard disk space
  - Power profile of computer should be configured to not sleep
- **Languages:**
  - English • French • Spanish
  - German • Chinese • Portuguese
  - Swedish • Italian

Soil Manager™: (monitoring)

- Dashboard view
- Sensor graph view with annotation capability
- Sensor table view with annotation and export to Excel capabilities
- Communication, power and sensor alerts
- Diagnostics including network device battery level and signal strength status (RSSI)
- User-defined email alerts for out-of-range soil moisture, salinity and temperature values, communication and power status
- Water budget recommendations available when one sensor is linked to a particular irrigation program

Soil Manager: (monitoring with dynamic central integration enabled)

- Same as monitoring version
- Full integration with any Rain Bird irrigation central control software version 7 or higher
- Sprinkler runtime adjustment based on soil moisture measurements and water budget predictions

MI Series Mobile Controllers

Remote access to your central control is now as convenient as the Internet, with mobile control. This software runs on your central control computer to provide remote irrigation control via a web-enabled device or smart phone.

Rain Bird® MI series mobile controllers are designed to work on a smartphone or tablet with Internet connectivity and offer far more remote options than anything else available.

Once connected to the Internet, up to nine (9) remote users can simultaneously control sprinklers and programs, review system activity or directly change settings on both sprinklers and irrigation programs. All activity is logged at the central control for convenient review.

MI series mobile controllers now also include MI FREEDOM user interfaces. MI FREEDOM provides two smartphone interfaces for users to implement traditional The FREEDOM System™ commands: 1) Handheld radio keypad for users with years of handheld radio keypad experience. 2) Soft keyboard interface for use of The FREEDOM System commands on a standard smartphone virtual keyboard.

SYSTEM REQUIREMENTS

- Designed for Windows® XP SP2 or Windows® 7 32-bit.
- Requires an Internet connection to the central control computer.
- Requires a smart phone or tablet.

FEATURE COMPARISON

LINK NAME	ADVANCED	PROFESSIONAL
Satellites (Areas)/Stations	X	X
Programs/Schedules	X	X
Diagnostics		X
Accessories		X
Alarm Log		X
Cancel All	X	X

ACCESSORIES

LINK NAME	ADVANCED	PROFESSIONAL
Water Budget		X
Demand Flow	X	X
Smart Pump™		X
Smart Weather™		X
Activity Log	X	X
Online Users	X	X

● **MI Series Mobile Controller**
(Software License only)*

HOW TO SPECIFY

MI – XXXX(X)

Model
MI

Control Type
ADVANCED
PROF

*Phone not included.

The FREEDOM System™

The FREEDOM handheld provides reliable, two-way communication with your Rain Bird system. Use it to choose from command-based or schedule-based operations, making irrigation adjustments a snap. Either way, The FREEDOM System puts you in control of your irrigation management system wherever you are.

System Features and Benefits

- **Two-way Communication with Rain Bird Centrals.** Audio response at radio indicates command received by central.
- **Station- and Program-based Commands.** Provides the flexibility to turn ON or OFF any station or an entire area with the click of a few buttons.
- **FREEDOM-based Commands Recorded at Central.** Irrigation activity logged at the central whether stations turned ON with FREEDOM System or with central.
- **Optional Flo-Manager® Bypass.** Permits FREEDOM user to bypass Flo-Manager.
- **Optional Operating Window.** Allows user to define FREEDOM usage hours, which helps superintendents to control irrigation activity.
- **Two-Way Voice Communication**
- **Telephone Operation.** All FREEDOM commands can be activated using a telephone connection.

Radio Features and Benefits

Weather-resistant and reliable. The TK 3180 handheld radio is built to survive the drops, hard-knocks and weather environments of its users. The TK 3180 meets or exceeds the demanding MIL-STD "driven rain" standard, which guarantees water-resistant performance even in wet weather.

- **LCD Display.** The backlit, high-resolution dot matrix 12-character display furnishes the user with a simple easy-to-read interface.
- **High-Quality Audio Output.** Equipped with an extra-large 1.58-inch speaker that delivers a half-watt of audio power for robust clarity.
- **Extra-Long Battery Life.** 1100 mAh batteries deliver more than nine (9) hours of operating time on a single charge (5-5-90 duty).
- **Wide/Narrow Channel Bandwidth.** Each channel can be programmed for wide or narrow bandwidth operation.
- **Radio Warranty.** One-year warranty.
- **MIL-STD 810 C/D/E/F Environmental Tests.** Meets or exceeds the stringent IP/54/55 dust and water intrusion standards and a full range of tough MIL-STD 810 C, D, E and F environmental standards in categories such as vibration, shock, dust, humidity, rain, temperature, solar radiation and atmospheric pressure.

SPECIFICATIONS

Frequency: 450 – 470 MHz (Narrowband)

Note: Site survey and license required

Power:
100 V/110 V: 60 Hz
230 V: 50/60 Hz

● **The FREEDOM System™**

HOW TO SPECIFY

FREEDOM – SPL

Model
FREEDOM

Control Type
SPL

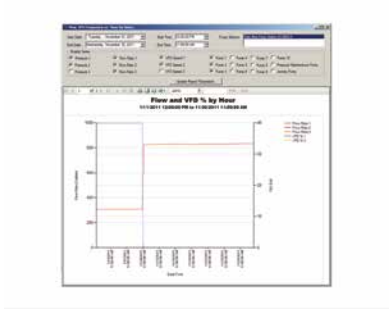
Pump Manager 2

Rain Bird® Pump Manager 2 is engineered for the golf course professional looking to simplify pump control, monitoring and data reporting. This powerful software application gives you full control of your pump station from your computer or central control.

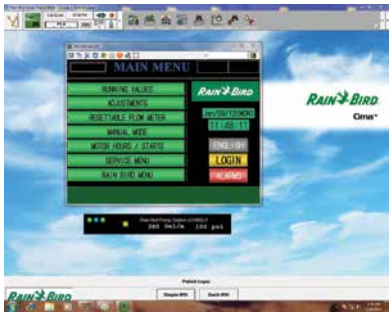
FEATURES AND BENEFITS

- Pump Manager 2 provides a direct link to the pump station touchscreen so you can view and modify pump operations from your computer or tablet as though you were standing right in front of it.
- Since all pump operation data is contained on your computer, Pump Manager 2 and its built-in reporting capabilities can keep you apprised of operations, flow, water use and other key information.
- Pump Manager 2 includes common reports for future review or regulatory reporting.
- For customized reporting, data can be exported in a file compatible with common spreadsheet applications such as Microsoft® Excel®.
- Pump Manager 2 is standard with ten different language options.
- Pump Manager 2 can be used with any computer or fully integrated with Rain Bird's many central control systems.
- Best of all, Pump Manager 2 is fully integrated with Rain Bird's exclusive central control feature, Smart Pump™.

Pump Manager 2 monitor



Pump Manager 2 customized reports



Pump Manager 2's touchscreen interface

Smart Pump™

FEATURES AND BENEFITS

Rain Bird's Smart Pump™ is a powerful central control software tool that improves pump station performance more than any comparable product on the market. It integrates your irrigation system from Reservoir to Rotor, constantly comparing actual flow to expected flow. By making smart, real-time decisions based on this information, it optimizes your system — saving water, conserving electricity and reducing wear and tear on your valuable pumping system.

ACTUAL FLOW MEASUREMENT

Unlike other irrigation central control software, Smart Pump bases its decisions on actual flow, not estimated flow. By using accurate information — in real time — Smart Pump automatically balances supply with system demand. That means greater efficiency and an end to wasted water and electricity.

24-HOUR PUMP SUPERVISION

With Smart Pump, you can relax knowing your system will instantly respond to actual field conditions with the right decisions. For instance, if a pipe breaks, Smart Pump will stop water flow to the pipe to prevent turf damage. Or if the pump station fails, Smart Pump will make immediate water demand adjustments to keep the system from shutting down permanently. It's like having your own irrigation supervisor at every sprinkler, 24/7.

INTEGRATION MEETS INTELLIGENCE

Smart Pump seamlessly integrates your entire irrigation system. It automatically starts waiting sprinklers or pauses active sprinklers to reduce flow or increase demand, keeping your irrigation system running at peak efficiency at all times.

● **Smart Pump™**

HOW TO SPECIFY

SMARTPUMPM

Model
Smart Pump

Weather Stations

Rain Bird offers two Weather Station options to help meet your course's unique irrigation management needs. Both WS-PRO2 and the WS-PRO LT provide evapotranspiration (ET) management and reporting capabilities; while only the WS-PRO2 offers optional intelligent alarm and irrigation control responses through Rain Bird's powerful Smart Weather™ software.

FEATURES AND BENEFITS

Superior ET Model. Rain Bird's Central Control Systems use weather sensor input to determine ET rates based upon a field-proven proprietary equation for ET.

Automatic ET Download/Selective Usage. Automatically download weather data daily and calculate ET to determine irrigation times for the entire system or by specific areas, holes or stations.

ET Override. Allows you to easily set certain programs to ignore ET values when determining run times.

Rain Bucket. Allows rainfall from one day to be carried over to the following day(s) for more accurate ET calculations.

Multiple Station Capacity. Connect up to five (5) weather stations to one central control system for more precise ET values based upon different weather conditions and micro climates around the golf course.

Max Rainfall. User-defined maximum rainfall can be set to limit the amount of acceptable rainfall for specific soil types or other areas that are subject to high run-off.

Weather Data Reports. Generate reports to show current or past weather conditions by the hour, day, week, month or year.

● **WS-PRO LT**

Unlimited Data Storage. Store unlimited weather data at the central control.

Multiple Languages. Choose from 10 different languages (English, French, German, Italian, Japanese, Korean, Portuguese, Spanish, Swedish or Chinese).

English or Metric Measurement Units. Easily select between English or Metric units of measure.

The WS-PRO2 Weather Station along with Rain Bird's Smart Weather Software supports alarms when thresholds are exceeded in:

- Rain
- High or Low Ambient Temperatures
- High Winds
- Rainfall Intensity

When any of these alarms exceed user-defined thresholds in a programmed time period, the system will intiate an alarm condition. The alarms will automatically reset when temperature, rain or wind conditions are again within acceptable ranges for irrigation.

Automatic Shut Off/Turn On. Rain Bird Central Control Systems automatically shut OFF irrigation operation for the entire system or in specific areas of the course (tee box, fairway, green, etc.) when alarm conditions are detected at the weather station. They also automatically turn ON irrigation when weather conditions return to the acceptable range for irrigation.

Automatic Pause/Resume. Rain Bird Central Control Systems automatically suspend irrigation to the entire system or specific areas (tee box, fairway, greens, etc.) when alarm conditions are detected. They also automatically resume irrigation when weather conditions return to the acceptable range for irrigation.

Automatic Notification. The WS-PRO2 Weather Station, using Rain Bird® Messenger,™ can automatically notify you wherever you are, at the central control or via text messaging or e-mail when alarm conditions exist.

The WS-PRO2 sensor array records vital weather information and sends it to your computer.

● **WS-PRO2 Weather Station**

HOW TO SPECIFY

WS – XXXX-XX – XX – X

Connection
SH = Short Haul
PH = Phone Modem†
WL = Wireless*

Model
PRO2 = Professional Series
PRO LT = Professional Light Series

Power
Blank = User Supplied
S = Solar Powered

**Only available on WS-PRO LT*
† Only available on WS-PRO2

Weather Stations

	WS-PRO LT	WS-PRO2
SPECIFICATIONS		
Compatible Modules	• Automatic ET • Multiple Weather Station	• Automatic ET • Multiple Weather Station • Smart Weather™ Alarms • Smart Messenger Module
Communication Options	• Wireless *(900 MHz SS Radio or 2.4 GHz Radio)* • Short Haul	• Telephone • Short Haul

Transmission Range	• Wireless 900 MHz
	  • ½ mile (805 m)
	• Wireless 2.4 GHz
	  • ¼ mile (402 m)
	• Short Haul – 20,000 ft (6.096 m)
		• Telephone – no limit
		• Short Haul – 20,000 ft (6.096 m)

Power Supply Required	• 16 to 22 VDC	• 9.5 to 16 VDC
Optional Power Supplies	• Solar Panel	• Solar Panel
Temperature Range	• -40° to 122° F (-40° to 50° C)	• -13° to 122° F (-25° to 50° C)
Air Temperature Sensor		
Operating Range	• -40° to 122° F (-40° to 50° C)	• -13° to 122° F (-25° to 50° C)
Accuracy	• ±0.9° F (±0.5° C)	• ±2.7° F (±1.5° C)
Relative Humidity Sensor		
Operating Range	• 0 – 100%	• 0 – 100%
Accuracy	• ±5% – 90% to 100% RH • ±3% – 10% to 95% RH	• ±6% – 90% to 100% RH • ±3% – 0% to 90% RH
Rain Gauge Sensor		
Resolution	• 0.04" (1 mm)	• 0.01" (0.25 mm)
Solar Radiation Sensor		
Accuracy	• ±2.5%	• ±3%
Wind Direction Sensor		
Range	• 360° mechanical, 352° electrical	• 360° mechanical, 356° electrical
Accuracy	–	• ±4°
Wind Speed Sensor		
Starting Threshold	• 0.78 ms^{-1} (1.75 mph)	• 0.4 ms^{-1} (0.9 mph)

	AUTOMATIC ET MODULE	ALARMS MODULE
SMART WEATHER FEATURES		
Compatible Weather Stations	WS-PRO LT, WS-PRO2	WS-PRO2
Generate Alarms *(rain, ambient temperature, wind, rain intensity and soil temperature)*	–	X
Reset Alarms	–	X
Automatic Shut Off/Turn On	–	X
Automatic Pause/Resume	–	X
Automatic Notification*	–	X
Superior ET Model	X	X
Automatic ET Download	X	X
ET Override	X	X
Cost Savings	X	X
Rain Bucket	X	X
Multiple Station Capacity**	X	X
Max Rain Fall	X	X
Reliable Sensor Input	X	X
Weather Data Reports	X	X
Unlimited Data Storage	X	X
Multiple Languages	X	X
English or Metric Units of Measure	X	X
Cirrus™ Central Control	X	X
Nimbus™ II Central Control	Optional	Optional
Stratus™ II Central Control	Optional	Optional
Stratus LT™	Optional	

** Requires Smart Messenger Module.*
*** Requires Multiple Weather Station Module.*

Rain Watch™

Patented Rain Bird® Rain Watch™ technology maximizes water efficiency, while minimizing system wear and tear, through intelligent, real-time decision-making based accurate rainfall measurement.

FEATURES AND BENEFITS

- The industry's first active rainfall monitoring and response system.
- The only system designed to automatically react to rainfall and adjust sprinkler application rates to take full advantage of natural rain, thereby eliminating over-watering.
- Saves water and electricity, while keeping the course drier and more playable, by pausing, adjusting or canceling irrigation in the event of rainfall.
- Results in reduced wear and tear on irrigation system components.
- An integral part of Rain Bird® Central Control Software versions 4.0 and higher.

HOW RAIN WATCH MANAGES RAINFALL

- Stationed throughout the course, up to four (4) high-resolution Rain Watch rain cans collect environmental data.
- A rotor can be set to react to any of the rain cans.
- The central control system continuously polls each rain can.

Rainfall data received by the system is used to make intelligent decisions based on user-defined responses:

System Response: For course-wide reactions

Program Response: For program-specific responses

No-Action Response: For monitoring only

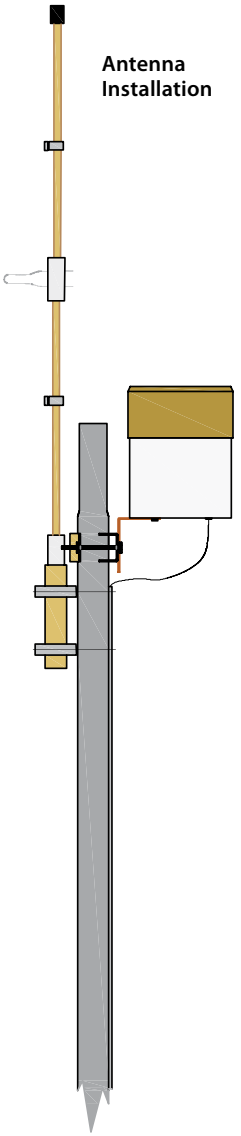
Intelligent responses include:

- Pause
- Resume
- Adjust runtimes and resume
- Cancel

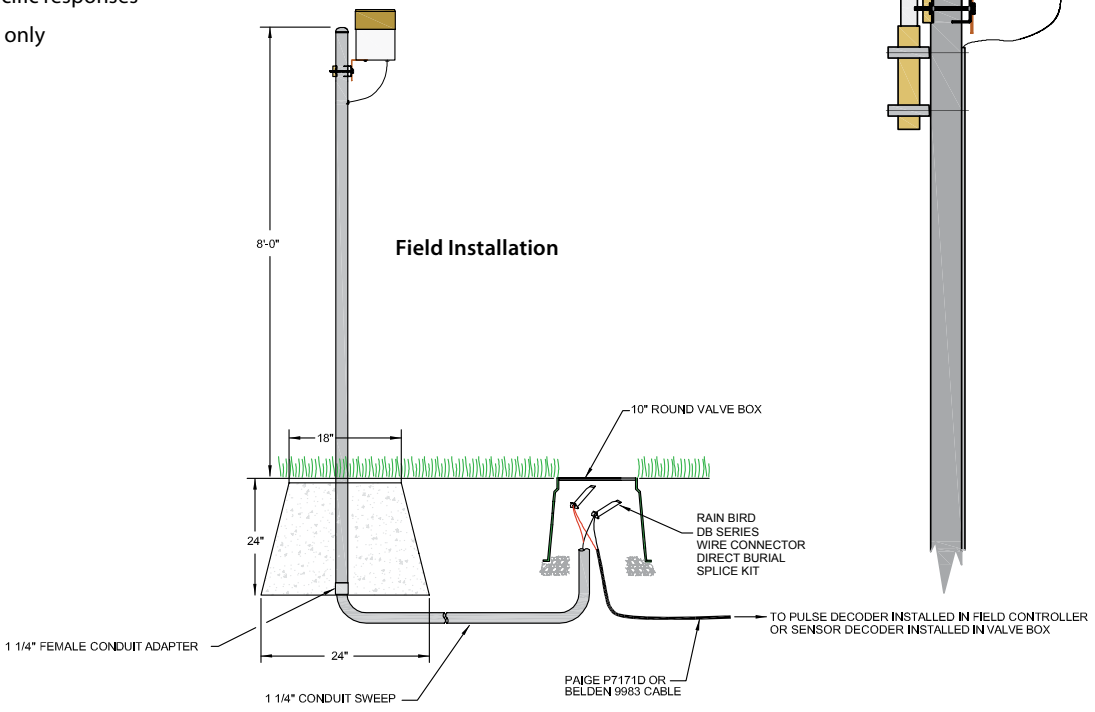
Rain Can

AN EXAMPLE OF RAIN WATCH IN ACTION

- Your daily irrigation schedule calls for 0.20 inches (0.51 cm) of precipitation.
- A storm begins and once accumulated rainfall reaches your desired 0.04-inch (0.10 cm) threshold, Rain Watch suspends irrigation.
- The storm passes after putting down 0.11 inches (0.28 cm) of rain.
- Rain Bird software automatically adjusts remaining runtimes for active stations, as well as those stations yet to run.
- Natural precipitation is seamlessly integrated into scheduled irrigation, resulting in a water savings of 0.11 inches (0.28 cm).



Antenna Installation



Field Installation

FIELD CONTROL SYSTEMS

Rain Bird® Field Control Systems are engineered to deliver the trusted performance that golf course professionals need to optimize course appearance and playability. From best-in-class satellite-based systems to reliable field decoders to the dynamic IC System,™ Rain Bird offers a full range of solutions. Choose Rain Bird field control for easy irrigation scheduling, adjustment and maintenance.

Integrated Control System™ (IC System) Rotors and Valves

Now, Integrated Control Technology is built into the rotor and valve for easy, streamlined control. The Rain Bird® IC System™ connects central control directly to the rotor or valve. No field controllers, separate decoders, secondary wiring or unnecessary splices mean fewer areas that can breakdown, wear out or malfunction.

FEATURES AND BENEFITS

Simple to Install – Requires up to 90% less wire than traditional satellite control systems and 50% fewer splices than a traditional decoder system.

Cost Savings – Fewer splices and less wire require less time and effort to install the system.

System Database Management – The Integrated Control Module (ICM) offers tear off bar codes and an easy to use scanner to simplify the creation of the central control system database for quick operation. As soon as the wire path is connected to the computer, you can turn on the sprinklers and valves.

Reliable Control – The IC System is a simple yet sophisticated controller/rotor/valve system built around a new generation of Rain Bird's proven solenoid and satellite technology. Simplicity results in reliability.

Easier to Design – The IC System is easier to design—only simple calculations are required. It eliminates an array of troublesome considerations—there are no satellite controllers to design around or conceal.

Easier Maintenance – The IC System is capable of intelligent, two-way communication with each and every ICM on the golf course. Almost all troubleshooting can be managed through intuitive diagnostics built into the central control software. The learning curve for maintenance is minimal.

Course technicians can easily accomplish most maintenance tasks. The ICM is easily removed and can be replaced if necessary.

Dependable – The IC System is designed to always turn off if problems occur. When the wire path is damaged or cut, or if central control communication is lost, the ICM is designed to turn off automatically.

True "Below 30 Volt Control System" – As the IC System wire path output is 28.5 Volt, the IC System is a "true less than 30 Volt" control system. A lower than 30 Volt system is considered a low voltage system and is typically not subjected to code requirements regarding deep burial of the wire path.

Below Ground Control – Since the ICM is built right into the rotor or valve, the entire control system is below ground. Unlike field controller systems, the below-ground system offers protection against damage from vandalism, flooding and insects.

Golf Course Aesthetics – Since the IC System control is designed to be entirely below ground, the golf course vistas are clear of irrigation components as envisioned by the golf course designer.

The IC System allows the full benefits of Rain Bird central control systems including: ET-based scheduling, customized course graphics, multiple mapping options, and the ability to "see" the placement and operation of individual rotors.

Central Control "Smart Features" – With the IC System, you have the ability to utilize all of Rain Bird's central control "Smart Features" including: Minimum ET,™ Smart Weather,™ Smart Pump,™ and superior monitoring of system operation.

● 751 IC Rotors

● PESB ICM Valve

HOW TO SPECIFY

ICM Rotors*

A – XXX – IC – XX – XX

- **A** – Thread Type: ACME Only
- **XXX** – Model: 700, 751, 900, 950
- **IC** – Body
- **XX** – Pressure Regulator: 60 (4.1), 70 (4.8), 80 (5.5)
- **XX** – Nozzle: See nozzle charts for each rotor

Valves**

XXX – XXX(X) – ICM

- **XXX** – Size: 125, 150, 200, 300
- **XXX(X)** – Model: PESB, PESB-R, EFB-CP-R, BPE, BPES
- **ICM** – Optional Feature: ICM

** For exact combinations of Rotors (Nozzles and Pressure Regulator) see pages 31–44 for correct model.*

***For exact combinations of Valves (Size), see pages 45–50 for correct model.*

SPECIFICATIONS

System Capacity*: 750 ICMs per Output Wire Path, 1500 ICMs per Output Driver Board, 3000 ICMs per IC Interface (ICI), up to 36,000 ICMs with Cirrus

** Specific System Capacity is dependent on the Central Control System*

ICI Electrical Input: 100 VAC Nominal 91-110 VAC @ 60 HZ +/- 2 HZ,115 VAC Nominal 98-132 VAC, 220-240 VAC Nominal 208-255 VAC

Electrical Output: 28.5 VAC, 1.25 AMP Per Wire Path

Active Stations: No electrical limit — only limited by hydraulics of pipe network and size of pump station

ICM Current Requirements: Varies based on wire path length — Nominal Current Draw is 0.33 mA on 5000 feet (1500 meters) of wire

Grounding Requirements: ICSD to be grounded at less than 50 ohms every 500 feet (150 meters) or 15 ICMs whichever is less. The central control is to be grounded with less than 10 ohms of resistance

Compliance: CE, FCC, UL

Environment:
Working Range: 32° F to 122° F (0° C to 50° C)
Storage Temperature: -40° F to 150° F (-40° C to 65° C)
Operating and Storage Humidity: 100%

Dimensions:
ICM: 2.23" x 1.70" (57 mm x 43 mm)
ICSD: 2.00" x 1.41" (51 mm x 43 mm)

Compatibility: Rain Bird 700/751 Series Rotors, Rain Bird EAGLE™ 700 and 900 Series Rotors** and Rain Bird PES-B, PEB, PGA, EFB, and BPE Electric Valves with ICM Adapter

*** Note EAGLE Rotors sold before 6/2009 will have a random orientation of the ICM relative to the Selector Housing*

Maximum Wire Paths: Two (2) Outputs per IC Driver Board and Up to four (4) total per ICI and Multiple Branches Per Wire Path

INTELLIGENCE BUILT INTO EVERY ICM

PAR+ES Controller

The easy-to-program, central control-ready Rain Bird® PAR+ES Controller features 72-Station capability, unlimited programs with central control, standard premium surge protection, as many programs as extensive diagnostics and a best-in-class pedestal enclosure.

FEATURES AND BENEFITS

Communication: Standalone, two-wire and LINK.

Central Control Ready — Works with any Rain Bird Central Control System. End-user can access controller via cellular phone (MI Series Mobile Controller*) or UHF radio (FREEDOM System).

- » Dynamic Flo-Manager®
- » Smart Pump™
- » Smart Sensor™
- » Smart Weather™

Pedestal Colors — Available in gray.

Easy Programming — Large, raised control buttons with clear, descriptive icons and a high-contrast Liquid Crystal Display (LCD) panel make programming easy — even for the novice. Lights indicate active schedules and central control status, while unique Copy/Paste function speeds programming process. An angled keypad aids visibility as well as water drainage, and makes the PAR+ES controller extremely easy to use.

Greater Water Precision — The PAR+ES controller allows you to program six (6) automatic and two (2) manual schedules. It allows you to turn on a maximum of 16 valves at 60 Hz and 12 valves at 50 Hz, and features four (4) control modes — giving you ample programming and operating control.

Modular Configuration Allows Easy Expansion — The PAR+ES is available in 16 to 32- and 56-station base configurations and can be easily upgraded in 8-station increments. By simply plugging in an eight-station Output Station Module (OSM) you can expand your PAR+ES controller capabilities to accommodate 24, 40, 48, 64 or 72 stations.

Multi Manual with Station and Program Stacking — Perfect for syringing or putting down fertilizer, multi manual allows to manually launch up to 16 stations at one time. Split second delayed start prevents water hammer and high inrush current.

Multiple Schedule Operation — No schedule limit when operated with Rain Bird Central Control Systems. Six (6) automatic (with 12 start times each) and two (2) manual schedules available for standalone operation.

Universal Performance Simplifies Installation and Operation — The intuitive PAR+ES Controller reduces installation and training hassles with its many universal features. For quick electrical hookups, the system automatically senses and adjusts for either a 50 or 60 Hz current; while one (1) transformer accommodates 100 V/120 V, 220 V or 230 V/240 V with the flip of a switch. The PAR+ES Controller also displays system activities and accepts user input in eight (8) different languages. The icon-driven controls and multilingual display eliminate confusion and translation problems.

Mix and Match — Mix and match with any other Rain Bird Controller and with any Rain Bird Central Control System.

Easy to Use — Large buttons with clear, descriptive icons make programming easy.

Enclosed Electronics — Provides the best protection against the elements.

16-Solenoid Simultaneous Operation — Heavy-duty transformer permits simultaneous operation of up to 16 solenoids (12 at 50 Hz).

Irrigation Control — Variable or weekday programming, for weekday cycle or for irrigation every other day, every three (3) days or up to every nine (9) days.

Water Budget— Increase or decrease run times on a schedule in 10% increments from 0 to 200%.

Simplified Installation — One (1) transformer accommodates various power inputs.

Front Panel Lighting — LEDs and backlit Liquid Crystal Display (LCD) make programming easy even in poor lighting.

Large Capacity Terminal Strip — Accepts up to two (2) 14-gauge wires per station.

Standard Station Lights — OSM lights provide easy identification of active stations.

Standard Station Switches — Turn stations on or off quickly for easy operation and troubleshooting.

Premium Surge Protection — Premium surge protection included in all models.

Sensor Response — Sensor activation cancels irrigation at controller.

Master Valve Activation — Activate master valve output with station activation.

Available PAR+ES Retro Kit — Extends the useful life of older control systems by converting to PAR+ES water-saving technology (see page 25).

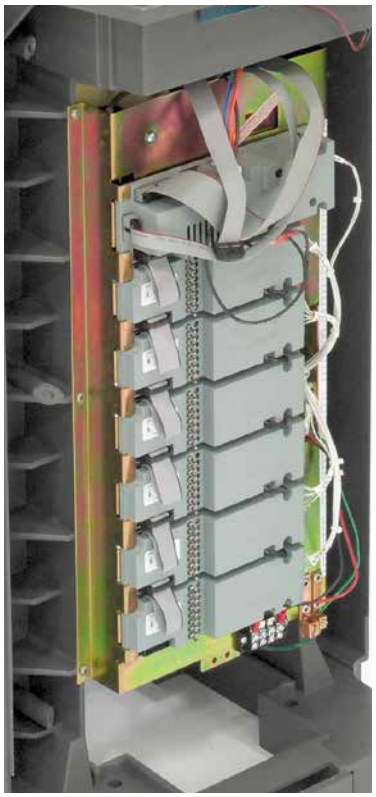
The flexible PAR+ES can be ordered in the following configurations:

- PAR+ES standalone controller in a plastic pedestal.
- PAR+ES satellite with two-wire module in a plastic pedestal.
- PAR+ES satellite with LINK (wireless) module in a plastic pedestal.

All configurations are offered with a weather proof and impact-resistant plastic pedestal.

Buy only the control you need today and increase your operating capabilities or change your communication method at any time.

**Software required*



● **PAR+ES**

HOW TO SPECIFY

PAR+ES – XX – X – S

Model
PAR+ES

Station Count
16
32
56

Configuration
Blank = Standalone
2 = Two-wire
L = LINK

OSM Type
S = OSMs with Station Switches

Note: Expandable up to 72-Station count by adding OSMs.

SPECIFICATIONS

Station Capacity: 72 stations, up to 16 solenoids operating simultaneously (60 Hz)

Electrical Input: (50/60 Hz)
117 VAC Nominal 98 to 132 VAC
220 VAC Nominal 208 to 232 VAC
240 VAC Nominal 225 to 255 VAC

Electrical Output: 26.5 VAC, 5.25 AMP

Station Load Capacity: Up to four (4) 24 VAC, seven (7) VA solenoids per station

Plastic Pedestal Dimensions:
Width: 17" (43.2 cm)

Height: 34¾" (88 cm)

Depth: 21" (53.4 cm)

Programs: As many programs as possible with Rain Bird Central Control Systems or six (6) automatic (12 start times each) and two (2) manual in standalone mode

Water Budget: 0 to 200% in 10% increments

Station Runtimes: One (1) to 120 minutes, in one (1) minute increments

Languages: English, French, German, Italian, Japanese, Portuguese, Spanish and Dutch

Grounding Requirements: Less than 10 ohms

Compliance: UL & C-UL Listed, CE approved, C-Tick Compliant and FCC

PAR+ES Retro Kit

The PAR+ES Retro Kit is the perfect controller upgrade for low budget upgrade to extend the life of your irrigation system.

FEATURES

Installation — Installs in any Rain Bird small plastic or stainless steel pedestal as well as several other competitors' pedestal — with additional hardware required.

Versatile Configurations — Available as standalone, hardwired[1] or wireless[1,2]. Hardwired and wireless configurations have real-time two-way communication with central control. In wireless mode, up to four controllers can share a single radio.

Expandable — 16-station configuration up to 48-station using plug-in 8-station output station modules with switches and station LED.

Easy Programming — Large, raised control buttons with clear, descriptive icons and a high-contrast Liquid Crystal Display (LCD) panel make programming easy. Lights indicate active schedules and central control status, while unique Copy/Paste function speeds programming process.

Central Control Ready — Works with any Rain Bird Central Control System. Compatible with Flo-Manager,® Smart Weather,™ RainWatch™ and Smart Pump™ modules. Factory-configured to receive commands via cellular phone (MI Series Mobile Controller*) or UHF radio (The FREEDOM System™).

Multiple Schedule Operation — No schedule limit when operated with Rain Bird Central Control Systems. Six (6) automatic (with 12 start times each) and two (2) manual schedules available for standalone operation.

Multi Manual with Station and Program Stacking — Perfect for syringing or putting down fertilizer, multi manual allows to manually launch as many stations as necessary. Split-second delayed start prevents water hammer and high inrush current.

SPECIFICATIONS

Water Budget: 0 to 200% in 10% increments

Station Runtimes: One (1) to 120 minutes, in one (1) minute increments

Configurations: Standalone, hardwired and wireless

Programs: No limit with Rain Bird Central Control Systems. Six (6) automatic (12 start times each) and two (2) manual programs

Schedule: Variable day watering (up to nine (9) days), custom day-of-the-week by program

Electrical Input:
117 VAC ±10% (60 Hz)
220 VAC (50 Hz)

Electrical Output: 26.5 VAC, 3 AMP

Station Load Capacity: Up to four (4) 24 VAC, seven (7) VA solenoids per station

Languages: English, French, German, Italian, Japanese, Portuguese, Spanish and Dutch

[1]Requires interface module not included.
[2]Requires additional transformer.

PAR+ES Sat Decoder

The PAR+ES Sat Decoder combines the features and benefits of a controller system with those of a decoder system. The resulting advantages for the user include:

- Easy Installation
- Reduced Installation Costs
- Easy Expansion

The idea is simple:

1. Install the controller.
2. Install a single two-wire path to control all the sprinklers.
3. Install decoder between wire path and each sprinkler head.
   - » Uses up to 90 percent fewer wires than conventional hardwire systems
   - » Built-in diagnostic tools
   - » Compatible with all Rain Bird Golf Decoders (FD-101, FD-102, FD-202, FD-401 and FD-601)
   - » Simply attach new decoder to the wire path
   - » Operates as a standalone controller or add a Rain Bird® Central Control System for greater control
   - » Operates up to 72 decoder addresses
4. Program controller with decoder address.

SPECIFICATIONS

Station Capacity: 72 decoder addresses, up to 16 solenoids operating simultaneously (60 Hz)

Configurations: Standalone, two-wire, LINK and LINK with Radio

Electrical Input: (50/60 Hz)
115 VAC Nominal 98 – 132 VAC
220 VAC Nominal 208 – 232 VAC
240 VAC Nominal 225 – 255 VAC

Electrical Output: 26.5 VAC, 5.25 AMP

Station Load Capacity: Up to two (2) 24 VAC, seven (7) VA solenoids per station depending on decoder type

Plastic Pedestal Dimensions:
Width: 17" (43.2 cm)

Height: 34¾" (88 cm)

Depth: 21" (53.4 cm)

Programs: As many programs as possible with Rain Bird Central Control Systems or six (6) automatic (12 start times each) and two (2) manual in standalone mode

Water Budget: 0 – 200% in 10% increments

Station Runtimes: One (1) – 120 minutes, in one (1) minute increments

Languages: English, French, German, Italian, Japanese, Portuguese, Spanish and Dutch

Grounding Requirements: Less than 10 ohms

Compliance: UL & C-UL Listed, CE approved, C-Tick Compliant and FCC

Maximum Wire Length Between Controller and Decoder:
#12 AWG:
Star Design: 3.8 miles (6.1 km)
Loop Design: 15.2 miles (24.4 km)

#14 AWG
Star Design: 2.4 miles (3.8 km)
Loop Design: 9.6 miles (15.2 km)

Maximum Wire Length Between Decoder and Rotor: 456 ft (#14 AWG)

Maximum Wire Paths: Four (4), plus multiple branches per wire path

- **PAR+ES Decoder Controller**

HOW TO SPECIFY

PAR+ES – DEC – X – 72

Model
PAR+ES

Configuration
Blank = Standalone
2 = Two-wire
L = LINK

Decoder Controller

ESC-1 Decoder

Get the power of advanced water management in one, easy-to-use package with the full-featured ESC-1 Controller. This golf-quality, value-priced controller features four programs, a real-time calendar, RASTER™ troubleshooting technology and the best customer satisfaction program in the industry.

FEATURES

Station Capacity — 16, 24 or 40 stations.

Central Control Ready — Works with any Rain Bird® Central Control System. Factory-configured to receive commands via cellular phone (MI Series Mobile Controller*) or UHF radio (The FREEDOM System™).

- » Dynamic Flo-Manager®
- » Smart Pump™
- » Smart Sensor™
- » Smart Weather™

Mix and Match — Mix and match with any other Rain Bird Controller and with any Rain Bird Central Control System.

Pedestal — Best-in-class weather-proof plastic pedestal.

Easy to Use — Large buttons with clear, descriptive icons make programming easy.

Large Capacity Terminal Strip — Accepts up to two (2) 14-gauge wires per station.

Standard Surge Protection — Heavy-duty surge protection included in all models.

RASTER (rapid station test routine) — Allows to detect short and open circuits between controller and station.

Cycle + Soak™ — Helps to avoid water puddles and run off.

Irrigation Control — Two (2) master valve terminals, one programmable by station.

Easy Programming — ODD day watering. EVEN day watering. Variable day cycle from one (1) to 99 days per program. Custom day-of-the-week by program.

Battery Programmable Controller — Allows for programming prior to installation.

Multiple Schedule Operation — As many programs as permitted by Rain Bird Central Control Systems or four (4) independent programs with eight (8) start times each in standalone mode.

The flexible ESC-1 can be ordered in the following configurations:

- ESC-1 standalone controller in a plastic pedestal.
- ESC-1 satellite with hardwired module in a plastic pedestal.

** Software required*

SPECIFICATIONS

Configurations: Standalone, two-wire

Electrical Input:
117 VAC ±10% (60 Hz)

Electrical Output: 26.5 VAC, 3 AMP

Station Load Capacity: Up to two (2) 24 VAC, seven (7) VA solenoids per station

Power Supply Overload: Backup fuse 3 AMP SLO-BLO

Battery Backup: 9 VDC, NiCad rechargeable

Water Budget: 0 to 300% in 1% increments

Rain Delay: Enables system to stay off for up to 99 days with auto-restart

Station Runtimes: 0 to 2 hours, in 1-minute increments; 2 to 12 hours in 10-minute increments

Compliance: UL & C-UL Listed, CE approved, C-Tick Compliant and FCC

Plastic Pedestal Dimensions:
Width: 17" (43.2 cm)

Height: 34 ¾" (88 cm)

Depth: 21" (53.4 cm)

● **ESC-1**

HOW TO SPECIFY

ESC – XX– X – PN – X

Model
ESC

Number of Stations
16 = 16 stations
32 = 32 stations
40 = 40 stations

Communication path
2 = Two-wire
Blank = Standalone

Mounting
PN = Plastic Pedestal (Gray)

Voltage
Blank = 60Hz
1 = 50 Hz

FD-101, FD-102, FD-202, FD-401 and FD-601 Decoders

A technology long-since proven on golf courses around the world, Rain Bird decoders provide best-in-class field control on centrally controlled irrigation systems. Installed underground and featuring simple, low-cost wiring, decoders are an aesthetically pleasing, full-featured, economical option for reliable in-field control.

FEATURES AND BENEFITS

- Improve aesthetics and reduce costs with buried in-field controls.
- Easy system expansion — simply splice into the communication line and add additional decoders.
- Installation requires up to 80 percent less wire than conventional controller systems.
- Electronic components are completely encapsulated to protect against the elements.
- Simple, two-wire system can be spliced and stored during installation.
- Underground decoders reduce the chance of damage from animals or vandals.
- Pre-coded addressing eliminates confusion associated with switch-based addressing.
- With the addition of Rain Bird's Decoder Programming Unit (DPU), decoder addresses can be reassigned if necessary.

SIMPLE, RELIABLE CONTROL

If you're looking for an alternative to a traditional in-field controller, Rain Bird decoders may be the right solution for you. These self-contained switching stations for your central control system are simple, yet very reliable. They work with your central control system just like conventional controllers but are buried underground away from the elements.

A COST-EFFECTIVE ALTERNATIVE

A simple wiring configuration and absence of protective enclosures keeps installation and maintenance costs low. Rain Bird decoders are a "true lower than 30 volt" system that utilize a two-wire path of 14-gauge wire connecting the central control system, decoders and valves or valve-in-head sprinklers.

SENSOR CAPABILITY

If you need information from analog, pulse or switch sensors to manage your irrigation, connect the sensor to the SD-210 sensor decoder and view the data at the central. Using Smart Sensor™, sensor data can even be used to control the irrigation.

PROTECT AGAINST THE ELEMENTS

With all electronic components fully sealed within a water-tight enclosure and buried underground, damage from floods, frost, rodents or vandals is virtually eliminated. Rain Bird decoders are an especially good choice for flood plains.

AN OUT-OF-SIGHT SOLUTION

Buried decoder systems leave nothing exposed to the elements. With no evidence of in-field control, this aesthetically pleasing alternative works perfectly in situations where controller enclosures are unwanted or impractical.

EXCELLENT FOR RENOVATIONS

Thanks to advanced central control technology and simple wiring requirements, decoders are a smart choice for many golf course renovations. With Rain Bird's Cirrus,™ Nimbus™ II and Stratus™ II Central Control Systems, it is now possible to use Rain Bird's hybrid feature to operate controllers, decoders and IC concurrently. This makes it easy to expand irrigation coverage using a minimal amount of wire and decoders.

IN-FIELD CONTROL OPTIONS

The addition of decoders doesn't mean the elimination of in-field control. Decoders can be turned on and off in the field with The FREEDOM System™ or MI series mobile controllers*. The MI series mobile controller allows precise control of the decoder system anywhere Internet access is available. Another alternative is The FREEDOM System™. This handheld radio remote allows you to signal changes to the central control system from anywhere on the course.

THE RIGHT AMOUNT OF CONTROL

Select different decoders to operate one, two, four or six solenoids. Five different decoders let you choose the amount of control you need.

** Software required*

● **Decoders**

HOW TO SPECIFY

FD – XXX

Model	Decoder Type
101	Single Address (1 solenoid)
102	Single Address (up to 2 solenoids)
202	Dual Address (up to 4 solenoids)
401	Four Addresses (up to 4 solenoids)
601	Six Addresses (up to 6 solenoids)

MAXIMUM CRITICAL PATH LENGTHS FOR TWO-WIRE PATHS

Nominal Wire Size	ohms/1000' ohms/Km	MAXIMUM LENGTH FOR CRITICAL PATH			
		LOOP		STAR	
		Km	Miles	Km	Miles
2.5 mm²	15.00 ohms/Km	12.0	7.5	3.0	1.8
14 AWG	2.58 ohms/1000'	15.2	9.6	3.8	2.4
12 AWG	1.62 ohms/1000'	24.4	15.2	6.1	3.8
10 AWG	1.02 ohms/1000'	39.2	24.4	9.8	6.1

CHARACTERISTIC TABLE FOR VARIOUS DECODER MODELS

DECODER MODEL	NUMBER OF ADDRESSES PER DECODER	MAXIMUM NUMBER OF SOLENOIDS PER ADDRESS	MAXIMUM ADDRESSES OPERATING AT ONCE	CURRENT DRAW (mA AT REST PER DECODER)
FD-101	1	1	1	0.5 mA
FD-102	1	2	1	0.5 mA
FD-202	2	2	2	1.0 mA
FD-401[1]	4	1	4	1.0 mA
FD-601[1]	6	1	4	1.0 mA

DESIGN CRITERIA FOR DECODER SYSTEMS

CONDITION	CIRRUS	NIMBUS II	STRATUS II	STRATUS LT
Maximum resistance in critical path	33 ohms	33 ohms	33 ohms	33 ohms
Maximum number of addresses per wire path[2]	250	250	250	200
Maximum number of addresses per LDI	500	500	500	300
Maximum number of addresses per SDI	200	200	200	200
Maximum number of active solenoids per wire path	20	20	20	15
Recommended Interface unit	LDI	LDI	LDI	SDI
Maximum number of active solenoids per recommended interface[3]	40	40	40	15
Active solenoid current draw (mA)				
Golf Black Solenoid	20 mA	20 mA	20 mA	20 mA
Golf Green Coil	20 mA	20 mA	20 mA	20 mA
"B" (white wires)	25 mA	25 mA	25 mA	25 mA
"DV" (black wires)	15 mA	15 mA	15 mA	15 mA
Hybrid system max number of interfaces per system (LDI, SDI)	12	3	2	1

[1] Has LSP-1 surge protection built-in.

[2] A wire path is the leg coming off the LDI, SDI or LTB.

[3] The number of decoders on a large system with long wire runs may reduce the number of active decoders that you will be able to operate at one time before the interface maximum current draw is exceeded and the interface shuts down (disconnects from the field wiring).

[4] Although the LDI can handle a maximum of 500 decoder addresses total. With any number over 380, the number of active decoders you will be able to operate simultaneously may be reduced.

[5] Although the LDI and SDI can supply 1,000 mA and 500 mA respectively, allow 50 mA of safety factor (design 950 mA with a LDI and 450 mA with a SDI)

BASIC DATA FOR DECODER SYSTEM DESIGN

THE BASIC DATA FOR A DECODER SYSTEM IS AS FOLLOWS:	
500 maximum[4]	Decoder addresses per LDI interface unit
200 maximum	Decoder addresses per SDI interface unit
40 maximum	Active solenoids per LDI (with 20 mA current draw each)
15 maximum	Active solenoids per SDI (with 20 mA current draw each)
20 maximum	Active solenoids per two-wire path on LDI (with 20 mA current draw each)
15 maximum	Active solenoids per two-wire path on SDI (with 20 mA draw current each)
9 Volts	Maximum allowable voltage drop per two-wire path
15 mA (total)[5]	For LDI or SDI Lights
0.5 mA each	For each inactive FD-101 or FD-102 decoder
1.0 mA each	For each inactive FD-401, FD-202 or FD-601 decoder
15 mA each	For each active DV solenoid coil with black wires
20 mA each	For each active Golf (green) solenoid coil
25 mA each	For each active B solenoid coil with white wires
LSP-1 Installation	No more than 8 decoders between two LSP-1 surge arrestors or no more than 500 ft., whichever is less. LSP-1 ground grid resistance of 50 ohms or less is recommended.

MAXIMUM WIRE LENGTHS FOR SECONDARY PATH WIRE RUNS

Wire Size	SECONDARY WIRE RUN LENGTHS	
	Meters	Feet
1.5 mm²	100	328
2.0 mm²	133	436
2.5 mm²	166	545
16.0 AWG	88	289
14.0 AWG	139	456
12.0 AWG	220	720

CONTROLLER POWER WIRE SIZING WORKSHEET

	PAR+ES	PAR+ES LINK WITH RADIO	PAR+ES SAT DECODER**	PAR+ES SAT DECODER LINK WITH RADIO**
Input (VAC)	117	117	117	117
Output (VAC)	26.5	26.5	26.5	26.5
Simultaneous Rain Bird Solenoids at 60 Hz (50 Hz)				
Per Controller*	16 (12)	16 (12)	16 (12)	16 (12)
Per Station	4	4	2	2
AMP Draw at Rest***	0.15	0.17	0.235	0.250
1	0.22	0.24	0.250	0.265
2	0.30	0.32	0.258	0.273
3	0.37	0.40	0.264	0.281
4	0.45	0.47	0.272	0.289
5	0.52	0.54	0.280	0.297
6	0.60	0.62	0.288	0.305
7	0.67	0.70	0.296	0.313
8	0.75	0.77	0.304	0.321
9	0.82	0.84	0.312	0.329
10	0.90	0.92	0.320	0.337
11	0.97	0.99	0.328	0.345
12	1.05	1.07	0.336	0.353
13	1.12	1.14	0.344	0.361
14	1.20	1.22	0.352	0.369
15	1.27	1.29	0.360	0.377
16	1.35	1.37	0.368	0.385

FEATURE COMPARISON

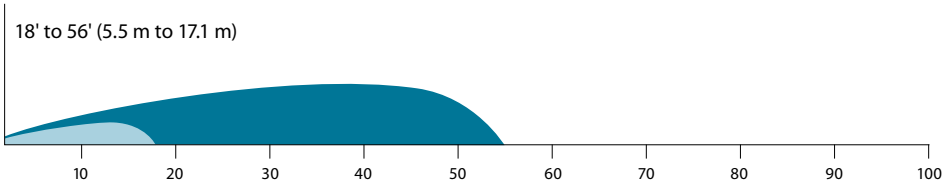
	PAR+ES	PAR+ES SAT DECODER	ESC-1
# Stations	16 – 72 (Increments of 8)	Up to 72 decoder addresses	16, 24, 40
Communication Options	Standalone, Hardwire and Radio	Standalone, Hardwire and Radio	—
Central Control	All Rain Bird Centrals, except GO	All Rain Bird Centrals, except GO	—
Max Output at 60 Hz	5 Amp, 16 solenoids	5 Amp, 16 solenoids	3 Amp, 7 solenoids
# Programs	6 automatic, 2 manual	6 automatic, 2 manual	4 automatic
Program Start Times	12 per program	12 per program	8 per program
Programming Cycle	Weekday, Variable (up to 9)	Weekday, Variable (up to 9)	Even Day, Odd Day, Weekday, Variable (up to 31)
Water Adjust	0-200%, 10%	0-200%, 10%	0 - 300%, 1%
Surge Protection	Premium	Premium	Heavy-Duty
Max Station Run Times	2 Hours	2 Hours	12 Hours
Sensors	Yes	Yes	Yes
Master Valve	Yes	Yes	1 automatic and second set by station

*Includes Master Valve.
**Considering 72 decoders installed.
*** Total AMP Draw in chart is based on 117 VAC input. For 220/240 VAC input controllers, use 50% of amp draw shown in chart.

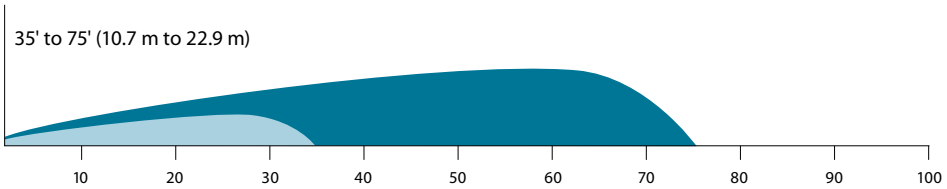
GEAR-DRIVEN ROTORS

Rain Bird® Gear-Driven Rotors are engineered to efficiently manage water, while promoting a lush, highly profitable course, through minimal maintenance requirements, worry-free performance and maximum water distribution uniformity. Trusted by golf course professionals everywhere, particularly those in drought-prone areas, these innovative rotors deliver optimal playing surfaces, high durability and reduced water costs.

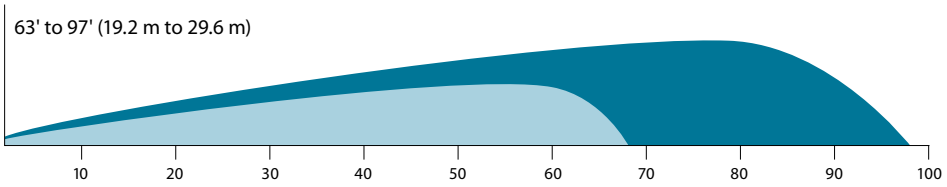
351B Series
Short Throw (pg 41)



700/751 Series (pg 33–36)

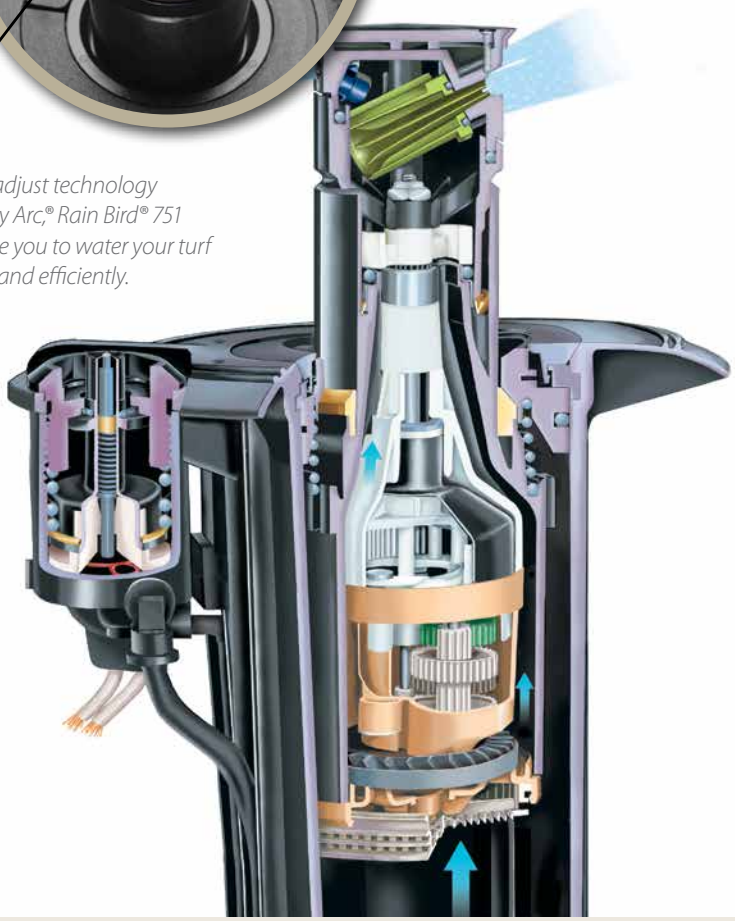


900/950 Series (pg 39–40)



Get more from every rotor with Rapid-Adjust Technology featuring MemoryArc.® Available on Rain Bird® 751 Golf Rotors, this innovative feature allows you to easily adjust watering on greens, fairways or roughs for unmatched versatility and more precise watering.

Thanks to rapid-adjust technology featuring Memory Arc,® Rain Bird® 751 Golf Rotors enable you to water your turf more precisely—and efficiently.



FEATURES AND BENEFITS

Turn-of-a-Screw Flexibility: Rain Bird® 751 golf rotors offer easy, top-adjustable rotation settings that retain the memory of their part-circle arc setting when shifting between full- and part-circle operation. This unique feature is designed to offer quick, dry arc adjustments not just during grow-in, but for the life of the rotor.

Proven Rain Bird Performance: The Rain Bird® 700/751 series features the high efficiency nozzles you've come to expect from the industry leader and delivers the best performance yet from Rain Bird golf rotors. With large droplets that cut through harsh winds and consistent pressure regulation, Rain Bird rotors deliver the even distribution you need to guarantee a healthy playing surface.

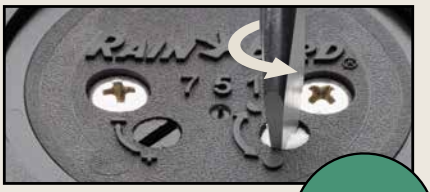
Industry-Leading Durability: Rain Bird 700/751 series golf rotors deliver improved durability. Trust their rugged construction for year after year of reliable, hassle-free performance.

Backward Compatibility: Rain Bird 700/751 series golf rotors offer backward compatibility with every 700 series EAGLE™ Rotor manufactured since 1992. Saving precious time and money is as simple as dropping new Rain Bird 700/751 Series internal assemblies into your existing rotor cases.

Low Cost of Ownership: Rain Bird golf rotors offer a low cost of ownership through a powerful combination of versatility, performance and durability. Install 700 and 751 golf rotors to optimize water consumption, simplify operation and minimize replacement, maintenance and inventory costs.

Rapid-Adjust Technology featuring Memory Arc®

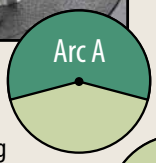
Set primary rotor arc.



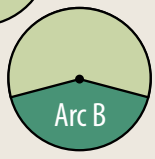
Turn the Full/Part Adjustment Screw for full-circle operation.

Turn to part circle again for either Arc A or Arc B setting.

No need to adjust arc when going between full- and part-circle settings.



or



Versatility with a twist. *Easily shift between three arc settings to selectively water fairways, roughs—or both.*

Rain Bird® 700/751 Series

SPECIFICATIONS

Radius:
Rain Bird® 700 Series: 56' to 79' (17.1 m to 24.1 m)
Rain Bird® 751 Series: 35' to 75' (10.7 m to 22.9 m)

Flow Rate:
700 Series: 16.3 to 43.9 gpm (1.03 to 2.76 l/s) (3.70 to 9.95 m³/h)
751 Series: 7.0 to 37.7 gpm (0.44 to 2.38 l/s) (1.59 to 8.56 m³/h)

Arc:
700 Series: Full-circle 360°
751 Series: Full-circle 360°; Adjustable 30° to 345°

Models:
Full-Circle:
700E: Electric
700IC: Integrated Control
700S/H: Combined use Stopamatic (SAM) or Hydraulic (N.O.)*
700B: Seal-A-Matic™ device
Part-Circle:
751E: Electric
751IC: Integrated Control
751S/H: Combined use Stopamatic (SAM) or Hydraulic (N.O.)*
751B: Seal-A-Matic™ device

Maximum Inlet Pressure:
Models 700/751E and IC: 150 psi (10.3 bars)
Models 700/751S/H and B: 100 psi (6.9 bars)

Pressure Regulation Range: 60 to 100 psi (4.1 to 6.9 bars)

Factory Pressure Settings: 700E/IC and 751E/IC available in 60, 70 and 80 psi (4.1, 4.8 and 5.5 bars)

Inlet Threads:
Models E, IC, S/H: 1.25" (3.2 cm) ACME Female Threaded
Models B: 1" (2.5 cm) ACME Female Threaded

Dimensions:
Body Height:
Models E, IC, S/H: 12.0" (30.5 cm)
Models B: 9.6" (24.5 cm)

Pop-Up Height to Mid-Nozzle:
Models E, IC, S/H, B: 2.6" (6.6 cm)

Top Diameter:
Models E, IC, S/H: 6.25" (15.9 cm)
Models B: 4.25" (10.8 cm)

Rotation Time:
700 Series: 360° in ≤ 180 seconds; 150 seconds nominally
751 Series: 180° in ≤ 90 seconds; 75 seconds nominally

Holdback:
Block: 10' (3.1 m) of elevation
SAM/Hydraulic: 15' (4.6 m) of elevation

Nozzle Trajectory:
Standard: 25°
Wind Tolerant: 12°
Low-Angle: 17°

Maximum Stream Height:
Standard: 17' (5.2 m)
Wind Tolerant: 10' (3.1 m)

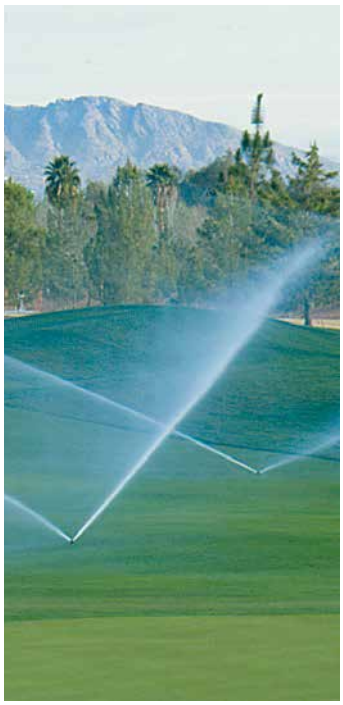
Solenoid: 24 VAC solenoid power requirement:
0.41 amp inrush current (9.8 VA);
60 cycle: 0.25 amp holding current (6.0 VA);
50 cycle: 0.32 amp holding current (7.7 VA)

Surge Resistance: Up to 20KV standard on electric models

Top-Serviceable Rock Screen™ and Replaceable Valve Seat: On models 700E, IC, S/H and 751E, IC, S/H

** N.O. — Normally open*

All data is generated from tests conducted in accordance with ASAE Standard S398.1 for at least 30 minutes in zero-wind conditions. Rain Bird recommends the use of SPACE for Windows,® equivalent program or derived performance data to optimize nozzle selection.



● 700 Series

HOW TO SPECIFY

A – 700 – X – XX – XX

- **Thread Type:** ACME
- **Model:** 700
- **Body/Valve:** E, IC, S/H, B
- **Pressure Regulator:** 60 (4.1), 70 (4.8), 80 (5.5)
- **Nozzle:** 28, 32, 36, 40, 44, 48

● 751 Series

HOW TO SPECIFY

A – 751 – X – XX – XX

- **Thread Type:** ACME
- **Model:** 751
- **Body/Valve:** E, IC, S/H, B
- **Pressure Regulator:** 60 (4.1), 70 (4.8), 80 (5.5)
- **Nozzle:** 20, 22, 28, 32, 36, 40, 44, 48

DUAL SPREADER™ NOZZLES PERFORMANCE DATA: 700 SERIES — U.S.

Base Pressure (psi)	50 Radius (ft)	50 Flow (gpm)	60 Radius (ft)	60 Flow (gpm)	70 Radius (ft)	70 Flow (gpm)	80 Radius (ft)	80 Flow (gpm)	90 Radius (ft)	90 Flow (gpm)	100 Radius (ft)	100 Flow (gpm)
#28 - White	57	18.0	59	19.7	59	21.3	61	22.8	61	24.1	61	25.5
#32 - Blue	61	21.9	63	22.8	65	24.5	65	27.4	67	29	67	29.6
#36 - Yellow	65	23.2	65	25.5	65	27.5	67	29.5	65	31.2	67	32.9
#40 - Orange	65	25.5	67	27.8	71	29.8	71	31.9	73	33.9	73	35.6
#44 - Green	–	–	71	30.7	69	33.0	71	35.2	75	37.5	75	39.5
#48 - Black	–	–	–	–	73	37.0	77	39.4	79	41.8	77	43.8

DUAL SPREADER™ NOZZLES PERFORMANCE DATA: 700 SERIES — METRIC

Base Pressure (bars)	3.4 Radius (m)	3.4 Flow (l/s)	3.4 Flow (m³/h)	4.1 Radius (m)	4.1 Flow (l/s)	4.1 Flow (m³/h)	4.8 Radius (m)	4.8 Flow (l/s)	4.8 Flow (m³/h)	5.5 Radius (m)	5.5 Flow (l/s)	5.5 Flow (m³/h)	6.2 Radius (m)	6.2 Flow (l/s)	6.2 Flow (m³/h)	6.9 Radius (m)	6.9 Flow (l/s)	6.9 Flow (m³/h)
#28 - White	17.4	1.14	4.09	18.0	1.24	4.47	18.0	1.34	4.84	18.6	1.44	5.18	18.6	1.52	5.47	18.6	1.61	5.79
#32 - Blue	18.6	1.38	4.97	19.2	1.44	5.18	19.8	1.55	5.56	19.8	1.73	6.22	20.4	1.83	6.59	20.4	1.87	6.72
#36 - Yellow	19.8	1.46	5.27	19.8	1.61	5.79	19.8	1.73	6.25	20.4	1.86	6.70	19.8	1.97	7.09	20.4	2.08	7.47
#40 - Orange	19.8	1.61	5.79	20.4	1.75	6.31	21.6	1.88	6.77	21.6	2.01	7.25	22.3	2.14	7.70	22.3	2.25	8.09
#44 - Green	–	–	–	21.6	1.94	6.97	21.0	2.08	7.49	21.6	2.22	7.99	22.9	2.37	8.52	22.9	2.49	8.97
#48 - Black	–	–	–	–	–	–	22.3	2.33	8.40	23.5	2.49	8.95	24.1	2.64	9.49	23.5	2.76	9.95

DUAL SPREADER™ NOZZLES PERFORMANCE DATA: 751 SERIES — U.S.

Base Pressure (psi)	50 Radius (ft)	50 Flow (gpm)	60 Radius (ft)	60 Flow (gpm)	70 Radius (ft)	70 Flow (gpm)	80 Radius (ft)	80 Flow (gpm)	90 Radius (ft)	90 Flow (gpm)	100 Radius (ft)	100 Flow (gpm)
#20 - Gray	37	7.0	39	7.8	39	8.4	41	8.9	–	–	–	–
#22 - Red	40	8.3	45	9.5	45	10.2	43	10.8	–	–	–	–
#28 - White	55	15.2	57	16.8	59	18.1	59	19.3	59	20.5	57	21.5
#32 - Blue	59	17.1	61	18.6	61	20	61	21.4	63	22.5	63	23.9
#36 - Yellow	61	19.1	63	20.8	65	22.6	67	24	69	25.5	69	26.5
#40 - Orange	63	21.7	67	23.8	69	25.6	71	27.5	71	28.9	71	30.7
#44 - Green	–	–	65	26.3	69	28.3	71	30.4	71	32.1	73	34.1
#48 - Black	–	–	–	–	69	31.4	73	33.7	75	35.7	73	37.7

DUAL SPREADER™ NOZZLES PERFORMANCE DATA: 751 SERIES — METRIC

Base Pressure (bars)	3.4 Radius (m)	3.4 Flow (l/s)	3.4 Flow (m³/h)	4.1 Radius (m)	4.1 Flow (l/s)	4.1 Flow (m³/h)	4.8 Radius (m)	4.8 Flow (l/s)	4.8 Flow (m³/h)	5.5 Radius (m)	5.5 Flow (l/s)	5.5 Flow (m³/h)	6.2 Radius (m)	6.2 Flow (l/s)	6.2 Flow (m³/h)	6.9 Radius (m)	6.9 Flow (l/s)	6.9 Flow (m³/h)
#20 - Gray	11.3	0.40	1.6	11.8	0.49	1.77	11.9	0.53	1.91	12.5	0.56	2.02	–	–	–	–	–	–
#22 - Red	12.2	0.52	1.89	13.7	0.60	2.16	13.7	0.64	2.32	13.1	0.68	2.45	–	–	–	–	–	–
#28 - White	16.8	0.96	3.45	17.4	1.06	3.82	18.0	1.14	4.11	18.0	1.22	4.38	18.0	1.29	4.66	17.4	1.36	4.88
#32 - Blue	18.0	1.08	3.88	18.6	1.17	4.22	18.6	1.26	4.54	18.6	1.35	4.86	19.2	1.42	5.11	19.2	1.51	5.43
#36 - Yellow	18.6	1.21	4.34	19.2	1.31	4.72	19.8	1.43	5.13	20.4	1.51	5.45	21.0	1.61	5.79	21.0	1.67	6.02
#40 - Orange	19.2	1.37	4.93	20.4	1.50	5.41	21.0	1.62	5.81	21.0	1.73	6.25	21.6	1.82	6.56	21.6	1.94	6.97
#44 - Green	–	–	–	19.8	1.66	5.97	21.0	1.79	6.43	21.6	1.92	6.90	21.6	2.03	7.29	22.3	2.15	7.74
#48 - Black	–	–	–	–	–	–	21.0	1.98	7.13	22.3	2.13	7.65	22.9	2.25	8.11	22.3	2.38	8.56

WIND TOLERANT NOZZLES PERFORMANCE DATA: 700 SERIES — U.S.

Base Pressure (psi)	50 Radius (ft)	50 Flow (gpm)	60 Radius (ft)	60 Flow (gpm)	70 Radius (ft)	70 Flow (gpm)	80 Radius (ft)	80 Flow (gpm)	90 Radius (ft)	90 Flow (gpm)	100 Radius (ft)	100 Flow (gpm)
#16WTN - Gray	–	–	56	16.3	56	17.5	60	18.5	62	20.2	63	21.1
#18WTN - Red	–	–	58	19.0	61	20.9	65	22.3	65	23.2	65	24.2
#22WTN - Black	–	–	–	–	65	27.6	65	34.8	67	38.8	71	40.5

WIND TOLERANT NOZZLES PERFORMANCE DATA: 700 SERIES — METRIC

Base Pressure (bars)	3.4 Radius (m)	3.4 Flow (l/s)	3.4 Flow (m³/h)	4.1 Radius (m)	4.1 Flow (l/s)	4.1 Flow (m³/h)	4.8 Radius (m)	4.8 Flow (l/s)	4.8 Flow (m³/h)	5.5 Radius (m)	5.5 Flow (l/s)	5.5 Flow (m³/h)	6.2 Radius (m)	6.2 Flow (l/s)	6.2 Flow (m³/h)	6.9 Radius (m)	6.9 Flow (l/s)	6.9 Flow (m³/h)
#16WTN - Gray	–	–	–	17.1	1.03	3.70	17.1	1.10	3.97	18.3	1.17	4.20	18.9	1.27	4.59	19.2	1.33	4.79
#18WTN - Red	–	–	–	17.7	1.20	4.32	18.6	1.32	4.75	19.8	1.41	5.06	19.8	1.46	5.27	19.8	1.53	5.50
#22WTN - Black	–	–	–	–	–	–	19.8	1.74	6.27	19.8	2.20	7.90	20.4	2.45	8.81	21.6	2.56	9.20

WIND TOLERANT NOZZLES PERFORMANCE DATA: 751 SERIES — U.S.

Base Pressure (psi)	50 Radius (ft)	50 Flow (gpm)	60 Radius (ft)	60 Flow (gpm)	70 Radius (ft)	70 Flow (gpm)	80 Radius (ft)	80 Flow (gpm)	90 Radius (ft)	90 Flow (gpm)	100 Radius (ft)	100 Flow (gpm)
#16 WTN - Gray	–	–	60	15.7	62	16.7	62	17.8	64	18.8	66	20.4
#18 WTN - Red	–	–	63	18.8	63	20.0	65	21.4	67	22.7	67	24.0
#22 WTN - Black	–	–	–	–	65	27.6	65	35.8	67	37.6	71	41.1

WIND TOLERANT NOZZLES PERFORMANCE DATA: 751 SERIES — METRIC

Base Pressure (bars)	3.4 Radius (m)	3.4 Flow (l/s)	3.4 Flow (m³/h)	4.1 Radius (m)	4.1 Flow (l/s)	4.1 Flow (m³/h)	4.8 Radius (m)	4.8 Flow (l/s)	4.8 Flow (m³/h)	5.5 Radius (m)	5.5 Flow (l/s)	5.5 Flow (m³/h)	6.2 Radius (m)	6.2 Flow (l/s)	6.2 Flow (m³/h)	6.9 Radius (m)	6.9 Flow (l/s)	6.9 Flow (m³/h)
#16 WTN - Gray	–	–	–	18.3	0.99	3.57	18.9	1.05	3.79	18.9	1.12	4.04	19.5	1.19	4.27	20.1	1.29	4.63
#18 WTN - Red	–	–	–	19.2	1.19	4.27	19.2	1.26	4.54	19.8	1.35	4.86	20.4	1.43	5.16	20.4	1.51	5.45
#22 WTN - Black	–	–	–	–	–	–	19.8	1.74	6.27	19.8	2.26	8.13	20.4	2.37	8.54	21.6	2.59	9.33

LOW-ANGLE NOZZLES PERFORMANCE DATA: 700 SERIES — U.S.

Base Pressure (psi)	50 Radius (ft)	50 Flow (gpm)	60 Radius (ft)	60 Flow (gpm)	70 Radius (ft)	70 Flow (gpm)	80 Radius (ft)	80 Flow (gpm)	90 Radius (ft)	90 Flow (gpm)	100 Radius (ft)	100 Flow (gpm)
#32LA - Gray	57	19.5	59	21.6	61	23.5	63	25.5	65	27.4	67	29.1
#36LA - Red	–	–	61	24.2	63	26.3	65	28.4	67	30.9	67	33.1
#44LA - Brown	–	–	–	–	67	34.5	69	36.4	71	38.9	71	41.7

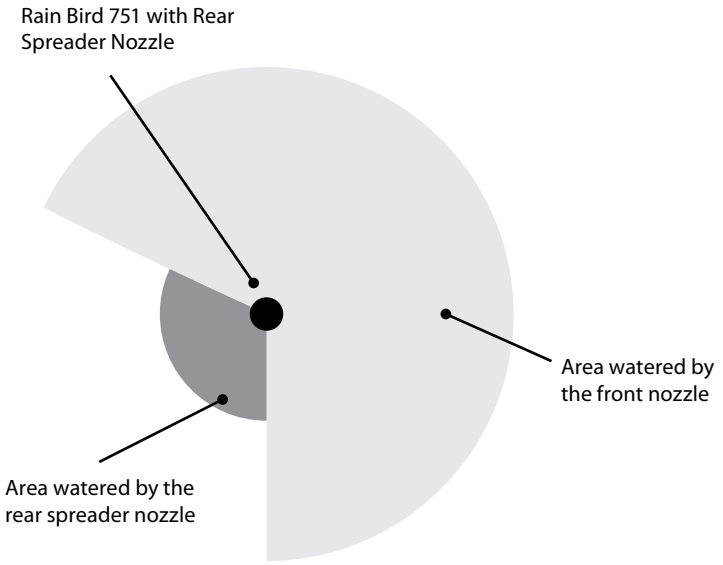
LOW-ANGLE NOZZLES PERFORMANCE DATA: 700 SERIES — METRIC

Base Pressure (bars)	3.5 Radius (m)	3.5 Flow (l/s)	3.5 Flow (m³/h)	4.0 Radius (m)	4.0 Flow (l/s)	4.0 Flow (m³/h)	4.5 Radius (m)	4.5 Flow (l/s)	4.5 Flow (m³/h)	5.0 Radius (m)	5.0 Flow (l/s)	5.0 Flow (m³/h)	5.5 Radius (m)	5.5 Flow (l/s)	5.5 Flow (m³/h)	6.0 Radius (m)	6.0 Flow (l/s)	6.0 Flow (m³/h)	6.5 Radius (m)	6.5 Flow (l/s)	6.5 Flow (m³/h)	6.9 Radius (m)	6.9 Flow (l/s)	6.9 Flow (m³/h)
#32LA - Gray	17.4	1.23	4.43	17.9	1.34	4.81	18.3	1.43	5.13	18.7	1.51	5.45	19.2	1.61	5.78	19.6	1.69	6.09	20.1	1.77	6.39	20.4	1.84	6.61
#36LA - Red	–	–	–	18.4	1.49	5.38	18.9	1.60	5.75	19.4	1.69	6.09	19.8	1.79	6.44	20.2	1.90	6.85	20.4	2.01	7.23	20.4	2.09	7.52
#44LA - Brown	–	–	–	–	–	–	19.8	2.09	7.53	20.6	2.21	7.94	21.0	2.29	8.26	21.5	2.41	8.67	21.6	2.53	9.11	21.6	2.63	9.47

Rear Spreader Nozzle

Typical Installation:

Watering area behind the Rain Bird 751



751 SERIES PERFORMANCE DATA WITH REAR SPREADER NOZZLES — U.S.

Base Pressure (psi)	60			70			80			60			70			80		
SPREADER NOZZLE COLOR	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)
	MAIN NOZZLE #28 – WHI TE									MAIN NOZZLE #32 – BLUE								
Orange	20.00	55.00	25.00	21.40	55.00	23.00	22.80	55.00	23.00	22.10	61.00	29.00	23.40	61.00	29.00	25.20	61.00	29.00
Green	22.90	51.00	47.00	24.00	53.00	45.00	25.60	51.00	47.00	24.60	57.00	47.00	26.60	59.00	45.00	28.40	59.00	45.00
Blue	22.63	50.98	44.98	24.39	50.98	44.98	25.27	52.99	44.98	24.57	58.99	42.98	26.55	58.99	44.98	28.27	60.99	44.98
Black	21.13	52.99	36.98	23.12	52.99	38.98	24.39	50.98	38.98	23.20	58.99	36.98	24.79	56.99	36.98	26.64	58.99	38.98
Red	21.90	53.00	49.00	23.60	55.00	49.00	25.10	55.00	47.00	24.10	55.00	49.00	25.00	57.00	47.00	26.50	57.00	47.00
Blue w/Diffuser	20.90	57.00	33.00	21.50	55.00	33.00	22.90	55.00	33.00	23.20	61.00	31.00	24.90	61.00	31.00	26.30	61.00	31.00
Black w/Diffuser	19.20	54.99	30.97	29.28	56.99	30.97	21.84	54.99	30.97	20.96	56.99	32.97	22.63	56.99	32.97	24.08	56.99	32.97
SPREADER NOZZLE COLOR	MAIN NOZZLE #36 – YELLOW									MAIN NOZZLE #40 – ORANGE								
Orange	23.40	61.00	29.00	25.40	63.00	29.00	27.10	63.00	27.00	27.70	69.00	29.00	29.60	69.00	29.00	31.60	71.00	29.00
Green	26.90	61.00	43.00	29.10	61.00	45.00	30.50	63.00	45.00	30.20	63.00	47.00	32.40	65.00	49.00	34.50	69.00	51.00
Blue	25.93	58.99	40.98	28.00	60.99	38.98	29.76	60.99	38.98	29.68	62.99	40.98	32.10	64.99	40.98	34.25	66.99	40.98
Black	26.42	60.99	36.98	27.78	60.99	34.97	29.54	60.99	36.98	28.97	60.99	36.98	31.22	62.99	36.98	27.21	62.99	30.97
Red	26.10	61.00	45.00	28.20	61.00	43.00	30.20	61.00	43.00	30.40	63.00	47.00	32.80	67.00	45.00	34.70	67.00	45.00
Blue w/Diffuser	24.60	63.00	35.00	26.30	63.00	31.00	27.90	65.00	33.00	28.00	63.00	31.00	30.30	67.00	31.00	32.10	69.00	31.00
Black w/Diffuser	24.48	64.99	34.97	25.67	64.99	34.97	27.12	64.99	34.97	27.21	62.99	30.97	29.46	64.99	30.97	31.30	66.99	30.97

Base Pressure (psi)	60			70			80		
SPREADER NOZZLE COLOR	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)
	MAIN NOZZLE #44 – GREEN								
Orange	29.30	65.00	27.00	31.70	69.00	27.00	33.70	71.00	27.00
Green	32.80	65.00	47.00	35.40	67.00	43.00	37.80	69.00	43.00
Blue	32.27	64.99	38.98	35.00	66.99	38.98	37.16	69.00	38.98
Black	31.79	64.99	34.97	34.25	66.99	34.97	36.50	71.00	32.97
Red	32.30	65.00	45.00	34.90	67.00	45.00	37.10	67.00	33.00
Blue w/Diffuser	30.90	67.00	33.00	33.20	73.00	31.00	35.50	73.00	33.00
Black w/Diffuser	29.06	64.99	32.97	31.22	69.00	28.97	33.37	71.00	30.97

Base Pressure (psi)	70			80			90		
SPREADER NOZZLE COLOR	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)	Flow (gpm)	Main Nozzle Range (ft)	Rear Spreader Range (ft)
	MAIN NOZZLE #48 – BLACK								
Orange	35.00	73.00	29.00	37.60	75.00	29.00	39.70	79.00	29.00
Green	38.30	71.00	45.00	40.70	77.00	45.00	42.80	77.00	47.00
Blue	37.47	71.00	40.98	39.49	75.00	38.98	42.27	75.00	38.98
Black	37.47	75.00	36.98	40.11	77.00	34.97	42.14	78.97	36.98
Red	37.80	73.00	47.00	40.40	73.00	47.00	42.80	77.00	47.00
Blue w/Diffuser	36.00	77.00	31.00	38.30	77.00	31.00	40.60	77.00	31.00
Black w/Diffuser	35.22	73.00	30.97	37.25	73.00	30.97	39.14	77.00	30.97

751 SERIES PERFORMANCE DATA WITH REAR SPREADER NOZZLES — METRIC

Base Pressure (bars)	4.1			4.8			5.5			4.1			4.8			5.5		
	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Tail Nozzle Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)
SPREADER NOZZLE COLOR	MAIN NOZZLE #28 – WHI TE									MAIN NOZZLE #32 – BLUE								
Orange	4.54	16.76	7.62	4.86	16.76	7.01	5.18	16.76	7.01	5.02	18.59	8.84	5.31	18.59	8.84	5.72	18.59	8.84
Green	5.20	15.54	14.33	5.45	16.15	13.72	5.81	15.54	14.33	5.59	17.37	14.33	6.04	17.98	13.72	6.45	17.98	13.72
Blue	5.14	15.54	13.71	5.54	15.54	13.71	5.74	16.15	13.71	5.58	17.98	13.10	6.03	17.98	13.71	6.42	18.59	13.71
Black	4.80	16.15	11.27	5.25	16.15	11.88	5.54	15.54	11.88	5.27	17.98	11.27	5.63	17.37	11.27	6.05	17.98	11.88
Red	4.97	16.15	14.94	5.36	16.76	14.94	5.70	16.76	14.33	5.47	16.76	14.94	5.68	17.37	14.33	6.02	17.37	14.33
Blue w/Diffuser	4.75	17.37	10.06	4.88	16.76	10.06	5.20	16.76	10.06	5.27	18.59	9.45	5.66	18.59	9.45	5.97	18.59	9.45
Black w/Diffuser	4.36	16.76	9.44	6.65	17.37	9.44	4.96	16.76	9.44	4.76	17.37	10.05	5.14	17.37	10.05	5.47	17.37	10.05
SPREADER NOZZLE COLOR	MAIN NOZZLE #36 – YELLOW									MAIN NOZZLE #40 – ORANGE								
Orange	5.31	18.59	8.84	5.77	19.2	8.84	6.16	19.2	8.23	6.29	21.03	8.84	6.72	21.03	8.84	7.18	21.64	8.84
Green	6.11	18.59	13.11	6.61	18.59	13.72	6.93	19.2	13.72	6.86	19.2	14.33	7.36	19.81	14.94	7.84	21.03	15.54
Blue	5.89	17.98	12.49	6.36	18.59	11.88	6.76	18.59	11.88	6.74	19.20	12.49	7.29	19.81	12.49	7.78	20.42	12.49
Black	6.00	18.59	11.27	6.31	18.59	10.66	6.71	18.59	11.27	6.58	18.59	11.27	7.09	19.20	11.27	6.18	19.20	9.44
Red	5.93	18.59	13.72	6.40	18.59	13.11	6.86	18.59	13.11	6.90	19.20	14.33	7.45	20.42	13.72	7.88	20.42	13.72
Blue w/Diffuser	5.59	19.20	10.67	5.97	19.20	9.45	6.34	19.81	10.06	6.36	19.20	9.45	6.88	20.42	9.45	7.29	21.03	9.45
Black w/Diffuser	5.56	19.81	10.66	5.83	19.81	10.66	6.16	19.81	10.66	6.18	19.20	9.44	6.69	19.81	9.44	7.11	20.42	9.44

MAIN NOZZLE #44 – GREEN

Base Pressure (bars)	4.1			4.8			5.5		
SPREADER NOZZLE COLOR	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)
Orange	6.65	19.81	8.23	7.20	21.03	8.23	7.65	21.64	8.23
Green	7.45	19.81	14.33	8.04	20.42	13.11	8.59	21.03	13.11
Blue	7.33	19.81	11.88	7.95	20.42	11.88	8.44	21.03	11.88
Black	7.22	19.81	10.66	7.78	20.42	10.66	8.29	21.64	10.05
Red	7.34	19.81	13.72	7.93	20.42	13.72	8.43	20.42	10.06
Blue w/Diffuser	7.02	20.42	10.06	7.54	22.25	9.45	8.06	22.25	10.06
Black w/Diffuser	6.60	19.81	10.05	7.09	21.03	8.83	7.58	21.64	9.44

MAIN NOZZLE #48 – BLACK

Base Pressure (bars)	4.8			5.5			6.2		
SPREADER NOZZLE COLOR	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)	Flow (m^3/h)	Main Nozzle Range (m)	Rear Spreader Range (m)
Orange	7.95	22.25	8.84	8.54	22.86	8.84	9.02	24.08	8.84
Green	8.70	21.64	13.72	9.24	23.47	13.72	9.72	23.47	14.33
Blue	8.51	21.64	12.49	8.97	22.86	11.88	9.60	22.86	11.88
Black	8.51	22.86	11.27	9.11	23.47	10.66	9.57	24.07	11.27
Red	8.59	22.25	14.33	9.18	22.25	14.33	9.72	23.47	14.33
Blue w/Diffuser	8.18	23.47	9.45	8.70	23.47	9.45	9.22	23.47	9.45
Black w/Diffuser	8.00	22.25	9.44	8.46	22.25	9.44	8.89	23.47	9.44

EAGLE™ 900 Series

SPECIFICATIONS

Radius: 63' to 97' (19.2 m to 29.6 m)

Flow Rate: 21.4 to 57.1 gpm (1.35 to 3.60 l/s) (4.85 to 12.97 m^3/h)

Arc: Full-circle, 360°

Models:
Full-Circle:
EAGLE 900E: Electric
EAGLE 900 IC: Integrated Control
EAGLE 900S/H: Combined use Stopamatic (SAM) or Hydraulic (N.O.)*

Maximum Inlet Pressure:
Models 900E/IC: 150 psi (10.3 bars)
Models 900S/H: 100 psi (6.9 bars)

Pressure Regulation Range:
60 to 100 psi (4.1 to 6.9 bars)

Factory Pressure Settings:
900E/IC and 950E/IC available in 70 and 80 psi (4.8 and 5.5 bars)

Dimensions:
Body Height: 13.4" (34.0 cm)

Pop-Up Height to Mid-Nozzle: 2.25" (5.7 cm)

Top Diameter: 7" (17.8 cm)

Nozzle Trajectory: 25°

Inlet Threads: 1.5" (3.8 cm) (15/21) ACME Female Threaded

Holdback: SAM/Hydraulic 15' (4.6 m) elevation

Rotation Time: 360° in ≤ 240 seconds; 210 seconds nominally

Maximum Stream Height: 20' (6.1 m)

Solenoid: 24 VAC solenoid power requirement: 0.41 amp inrush current (9.8 VA); **60 cycle:** 0.25 amp holding current (6.0 VA); **50 cycle:** 0.32 amp holding current (7.7 VA).

Surge Resistance: Up to 20KV standard on electric models

Top-Serviceable Rock Screen™ and Replaceable Valve Seat: All 900 and 950 models

All data is generated from tests conducted in accordance with ASAE Standard S398.1 for at least 30 minutes in zero-wind conditions. Rain Bird recommends the use of SPACE for Windows,® equivalent program or derived performance data to optimize nozzle selection.

** N.O. — Normally open*

● EAGLE™ 900 Series

HOW TO SPECIFY

AT – 900 – X – XX – XX

- **AT** — Thread Type: AT
- **900** — Model: 900
- **X** — Body/Valve: E, IC, S/H
- **XX** — Pressure Regulator: 70 (4.8), 80 (5.5)
- **XX** — Nozzle: 44, 48, 52, 56, 60, 64

EAGLE 900 SERIES PERFORMANCE DATA — U.S.

HIGH PERFORMANCE NOZZLES

Base Pressure (psi)	#44 BLUE Radius (ft)	#44 BLUE Flow (gpm)	#48 YELLOW Radius (ft)	#48 YELLOW Flow (gpm)	#52 ORANGE Radius (ft)	#52 ORANGE Flow (gpm)	#56 GREEN Radius (ft)	#56 GREEN Flow (gpm)	#60 BLACK Radius (ft)	#60 BLACK Flow (gpm)	#64 RED Radius (ft)	#64 RED Flow (gpm)
60	63	21.4	73	28.9	75	31.9	—	—	—	—	—	—
70	67	23.5	73	31.9	79	34.6	83	40.7	87	43.2	91	47.2
80	71	24.7	75	34.1	81	37.1	85	43.5	91	46.4	93	51.0
90	71	26.5	77	35.0	81	39.5	87	46.4	91	49.5	95	54.0
100	73	27.9	77	36.2	83	41.8	89	49.1	91	52.2	97	57.1

EAGLE 900 SERIES PERFORMANCE DATA — METRIC

HIGH PERFORMANCE NOZZLES

Base Pressure (bars)	#44 BLUE Radius (m)	#44 BLUE Flow (l/s)	#44 BLUE Flow (m^3/h)	#48 YELLOW Radius (m)	#48 YELLOW Flow (l/s)	#48 YELLOW Flow (m^3/h)	#52 ORANGE Radius (m)	#52 ORANGE Flow (l/s)	#52 ORANGE Flow (m^3/h)	#56 GREEN Radius (m)	#56 GREEN Flow (l/s)	#56 GREEN Flow (m^3/h)	#60 BLACK Radius (m)	#60 BLACK Flow (l/s)	#60 BLACK Flow (m^3/h)	#64 RED Radius (m)	#64 RED Flow (l/s)	#64 RED Flow (m^3/h)
4.1	19.2	1.35	4.85	22.3	1.82	6.56	22.9	2.01	7.25	—	—	—	—	—	—	—	—	—
4.5	19.8	1.42	5.11	22.3	1.89	6.81	23.5	2.10	7.57	25.0	2.48	8.94	26.2	2.63	9.47	27.4	2.88	10.35
5.0	20.7	1.50	5.40	22.4	2.00	7.22	24.2	2.22	8.00	25.5	2.61	9.40	26.8	2.78	10.00	27.9	3.04	10.94
5.5	21.6	1.55	5.59	22.8	2.14	7.72	24.7	2.34	8.41	25.9	2.74	9.87	27.7	2.92	10.52	28.3	3.21	11.56
6.0	21.6	1.64	5.90	23.3	2.19	7.88	24.7	2.45	8.81	26.3	2.87	10.34	27.7	3.20	11.86	28.8	3.35	12.06
6.5	21.9	1.71	6.16	23.5	2.24	8.06	24.9	2.55	9.19	26.8	3.00	10.80	27.7	3.20	11.86	29.2	3.49	12.57
6.9	22.3	1.76	6.35	23.5	2.28	8.22	25.3	2.64	9.49	27.1	3.10	11.15	27.7	3.29	11.86	29.6	3.60	12.97

EAGLE™ 950 Series

SPECIFICATIONS

Radius: 70' to 92' (21.3 m to 28.0 m)

Flow Rate: 19.5 to 59.4 gpm (1.23 to 3.75 l/s) (4.43 to 13.49 m^3)

Arc: 40° to 345°

Models:
Part-Circle:
EAGLE 950E: Electric
EAGLE 950 IC: Integrated Control
EAGLE 950S/H: Combined use Stopamatic (SAM) or Hydraulic (N.O.)*

Maximum Inlet Pressure:
Models 950E/IC: 150 psi (10.3 bars)
Models 950S/H: 100 psi (6.9 bars)

Pressure Regulation Range:
60 to 100 psi (4.1 to 6.9 bars)

Factory Pressure Settings:
900E/IC and 950E/IC available in 70 and 80 psi (4.8 and 5.5 bars)

Dimensions:
Body Height: 13.4" (34.0 cm)

Pop-Up Height to Mid-Nozzle: 2.25" (5.7 cm)

Top Diameter: 7" (17.8 cm)

Nozzle Trajectory: 25°

Inlet Threads: 1.5" (3.8 cm) (15/21) ACME Female Threaded

Holdback: SAM/Hydraulic 15' (4.6 m) elevation

Rotation Time: 180° in ≤ 120 seconds; 105 seconds nominally

Maximum Stream Height: 20' (6.1 m)

Solenoid: 24 VAC solenoid power requirement: 0.41 amp inrush current (9.8 VA); **60 cycle:** 0.25 amp holding current (6.0 VA); **50 cycle:** 0.32 amp holding current (7.7 VA).

Surge Resistance: Up to 20KV standard on electric models

Top-Serviceable Rock Screen™ and Replaceable Valve Seat: All 900 and 950 models

All data is generated from tests conducted in accordance with ASAE Standard S398.1 for at least 30 minutes in zero-wind conditions. Rain Bird recommends the use of SPACE for Windows,® equivalent program or derived performance data to optimize nozzle selection.

** N.O. — Normally open*

● **EAGLE™ 950 Series**

HOW TO SPECIFY

AT – 950 – X – XX – XX

- **Thread Type:** AT
- **Model:** 950
- **Body/Valve:** E, IC, S/H
- **Pressure Regulator:** 60 (4.1), 70 (4.8), 80 (5.5)
- **Nozzle:** 18, 20, 22, 24, 26, 28, 30, 32

EAGLE 950 SERIES PERFORMANCE DATA — U.S.

nozzles

Base Pressure (psi)	#18 WHITE-C Radius (ft)	#18 WHITE-C Flow (gpm)	#20 GRAY-C Radius (ft)	#20 GRAY-C Flow (gpm)	#22 BLUE-C Radius (ft)	#22 BLUE-C Flow (gpm)	#24 YELLOW-C Radius (ft)	#24 YELLOW-C Flow (gpm)	#26 ORANGE Radius (ft)	#26 ORANGE Flow (gpm)	#28 GREEN Radius (ft)	#28 GREEN Flow (gpm)	#30 BLACK Radius (ft)	#30 BLACK Flow (gpm)	#32 BROWN Radius (ft)	#32 BROWN Flow (gpm)
60	70	19.5	72	23.0	74	26.5	76	30.8	78	36.0	—	—	—	—	—	—
70	72	21.3	74	25.1	76	28.8	80	33.5	82	38.7	84	42.9	84	47.3	84	50.4
80	74	22.9	76	27.0	80	30.9	84	36.0	84	41.5	86	47.3	86	50.4	85	53.1
90	75	24.4	78	28.7	82	32.9	88	38.4	86	43.4	89	48.5	90	52.9	88	55.6
100	76	25.8	80	300.5	84	34.6	90	40.5	88	46.7	91	52.2	92	55.8	92	59.4

EAGLE 950 SERIES PERFORMANCE DATA — METRIC

NOZZLES

Base Pressure (bars)	#18 WHITE-C Radius (m)	#18 WHITE-C Flow (l/s)	#18 WHITE-C Flow (m^3/h)	#20 GRAY-C Radius (m)	#20 GRAY-C Flow (l/s)	#20 GRAY-C Flow (m^3/h)	#22 BLUE-C Radius (m)	#22 BLUE-C Flow (l/s)	#22 BLUE-C Flow (m^3/h)	#24 YELLOW-C Radius (m)	#24 YELLOW-C Flow (l/s)	#24 YELLOW-C Flow (m^3/h)	#26 ORANGE Radius (m)	#26 ORANGE Flow (l/s)	#26 ORANGE Flow (m^3/h)	#28 GREEN Radius (m)	#28 GREEN Flow (l/s)	#28 GREEN Flow (m^3/h)	#30 BLACK Radius (m)	#30 BLACK Flow (l/s)	#30 BLACK Flow (m^3/h)	#32 BROWN Radius (m)	#32 BROWN Flow (l/s)	#32 BROWN Flow (m^3/h)
4.1	21.3	1.23	4.43	21.9	1.45	5.22	22.6	1.67	6.02	23.2	1.94	7.00	23.8	2.27	8.18	—	—	—	—	—	—	—	—	—
4.5	21.7	1.29	4.64	22.3	1.52	5.48	22.9	1.75	6.29	23.8	2.03	7.32	24.4	2.36	8.50	25.2	2.62	9.44	25.2	2.90	—	25.3	3.10	11.17
5.0	22.1	1.37	4.93	22.7	1.61	5.81	23.5	1.85	6.66	24.7	2.15	7.75	25.1	2.49	8.95	25.8	2.78	10.00	25.8	3.03	10.92	25.7	3.22	11.60
5.5	22.5	1.44	5.19	23.2	1.70	6.12	24.4	1.95	7.01	25.6	2.27	8.16	25.6	2.61	9.41	26.2	2.98	10.72	26.2	3.18	11.43	25.9	3.35	12.05
6.0	22.8	1.51	5.44	23.6	1.78	6.40	24.8	2.04	7.34	26.5	2.38	8.56	26.0	2.70	9.73	26.9	3.04	10.93	27.1	3.29	11.85	26.6	3.46	12.46
6.5	23.0	1.58	5.68	24.0	1.86	6.69	25.3	2.12	7.64	27.1	2.48	8.93	26.5	2.83	10.18	27.4	3.16	11.37	27.7	3.42	12.30	27.3	3.61	13.00
6.9	23.2	1.63	5.86	24.4	1.92	6.93	25.6	2.18	7.86	27.4	2.56	9.20	26.8	2.95	10.61	27.7	3.29	11.86	28.0	3.52	12.67	28.0	3.75	13.49

EAGLE™ 351B Series

SPECIFICATIONS

Radius: 18' to 56' (5.5 m to 17.1 m)

Arc: 360° in full-circle mode, adjustable from 50° to 330° in part-circle mode

Flow Rate: 1.8 to 15.5 gpm (0.11 to 0.98 l/s)

Models:
EAGLE™ 351B: Seal-A-Matic™ device

Maximum Inlet Pressure: 100 psi (6.9 bar)

Recommended Operating Pressure: 60 psi (4.1 bar), 70 psi (4.8 bar), 80 psi (5.5 bar)

Flow:
Full-Circle Mode: 360° ≤ 180 seconds; 120 seconds nominally
Part-Circle Mode: 180° ≤ 90 seconds; 60 seconds nominally

Inlet Threads: 1" (2.5 cm) ACME

Holdback: 10' (3.1 m) of elevation

Nozzle Trajectory: 17° and 25°

Maximum Stream Height: 13' (4.0 m)

Dimensions:
Body Height: 9.6" (24.5 cm)
Top Diameter: 4.25" (10.8 cm)
Pop-Up Height to Mid-Nozzle: 3.25" (8.3 cm)

● EAGLE™ 351B Series

HOW TO SPECIFY

AT – 351 – B – XX(X)

- **AT** — Thread Type: AT
- **351** — Model: 351
- **B** — Body/Valve: B
- **XX(X)** — Nozzle**

Low Flow	18S	22S
	26S	30S
	36S	
High Flow	18M†	26M†
	30M†	36M†
Long Throw	40	44
	48	54

EAGLE 351B SERIES PERFORMANCE DATA — U.S.

BASE PRESSURE

	Nozzle	60 PSI Radius (ft)	60 PSI Flow (gpm)	70 PSI Radius (ft)	70 PSI Flow (gpm)	80 PSI Radius (ft)	80 PSI Flow (gpm)	90 PSI Radius (ft)	90 PSI Flow (gpm)
LOW FLOW	18S White	18	1.8	20	1.9	20	2.0	22	2.2
	22S Dark Gray	22	2.2	22	2.4	24	2.5	26	2.7
	26S Dark Orange	24	2.6	24	2.8	26	3.1	26	3.2
	30S Light Green	30	3.0	30	3.1	32	3.2	32	3.4
	36S Brown	34	3.6	34	3.8	34	4.2	36	4.4
HIGH FLOW	18M Ivory	20	4.0	22	4.2	22	4.4	24	4.7
	26M Medium Orange	24	5.6	24	6.0	26	6.5	26	6.9
	30M Green	30	5.7	30	6.2	32	6.6	32	7.1
	36M Light Brown	34	7.1	34	7.8	34	8.4	36	8.9
LONG THROW	40 Orange	40	2.1	40	2.3	42	2.4	42	2.5
	44 Red	44	3.5	46	3.6	46	4.1	46	4.3
	48 Blue	48	5.8	48	6.4	48	6.8	48	7.0
	54 Beige	50*	12.4*	54*	13.5*	56*	14.6*	56*	15.5*

EAGLE 351B SERIES PERFORMANCE DATA — METRIC

BASE PRESSURE

	Nozzle	4.1 BAR Radius (m)	4.1 BAR Flow (lps)	4.1 BAR Flow (m³/h)	4.8 BAR Radius (m)	4.8 BAR Flow (lps)	4.8 BAR Flow (m³/h)	5.5 BAR Radius (m)	5.5 BAR Flow (lps)	5.5 BAR Flow (m³/h)	6.2 BAR Radius (m)	6.2 BAR Flow (lps)	6.2 BAR Flow (m³/h)
LOW FLOW	18S White	5.5	0.11	0.41	6.1	0.12	0.43	6.1	0.13	0.45	6.7	0.14	0.50
	22S Dark Gray	6.7	0.14	0.50	6.7	0.15	0.55	7.3	0.16	0.57	7.9	0.17	0.61
	26S Dark Orange	7.3	0.16	0.60	7.3	0.18	0.64	7.9	0.20	0.70	7.9	0.20	0.73
	30S Light Green	9.1	0.19	0.68	9.1	0.20	0.70	9.8	0.20	0.73	9.8	0.21	0.77
	36S Brown	10.4	0.23	0.82	10.4	0.24	0.86	10.4	0.26	0.95	11.0	0.28	1.00
HIGH FLOW	18M† Ivory	6.1	0.25	0.91	6.1	0.26	0.95	6.7	0.28	1.00	7.3	0.30	1.07
	26M† Medium Orange	7.3	0.35	1.27	7.3	0.38	1.36	7.9	0.41	1.48	7.9	0.44	1.57
	30M† Green	9.1	0.36	1.30	9.1	0.39	1.41	9.8	0.42	1.50	9.8	0.45	1.61
	36M† Light Brown	10.4	0.45	1.61	10.4	0.49	1.77	10.4	0.53	1.91	11.0	0.56	2.02
LONG THROW	40 Orange	12.2	0.13	0.48	12.2	0.15	0.52	12.8	0.15	0.55	12.8	0.16	0.57
	44 Red	13.4	0.22	0.80	14.0	0.23	0.82	14.0	0.26	0.93	14.0	0.27	0.98
	48 Blue	14.6	0.37	1.32	14.6	0.40	1.45	14.6	0.43	1.55	14.6	0.44	1.60
	54 Beige	15.2*	0.78*	2.82*	16.5*	0.85*	3.07*	17.1*	0.92*	3.32*	17.1*	0.98*	3.52*

*For best results, recommended for use in triangular spacing only. †Matched precipitation nozzles.

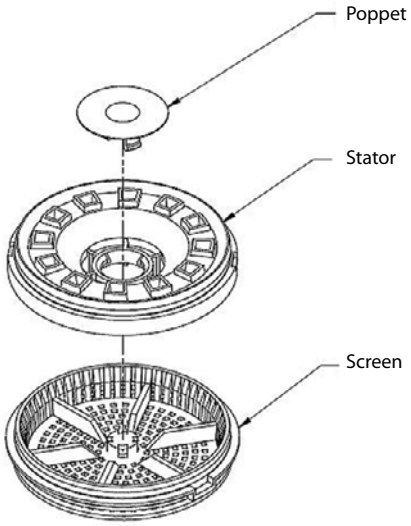
Data reflects no pressure regulation. For a block rotor, it is the pressure at the inlet to the rotor casing after the pressure had been regulated through a valve. All data is generated from tests conducted in accordance with ASAE Standard S398.1 for at least 30 minutes, in zero-wind conditions. Rain Bird recommends the use of SPACE for Windows,® equivalent programming or derived performance data to optimize nozzle selection.

****Nozzle Shipping:** (**Standard Nozzle Installed**/*Included Smaller and Larger Nozzles*): **22S**/*18S, 26S* **30S**/*26S, 36S* **30M**†/*18M,*† *26M,*† *36M*† **36S**/*40, 44* **48**/*44, 54*

GOLF ROTOR STATOR CONFIGURATION

NOZZLE	PRESSURE SETTINGS PSI (BARS) 60 (4,1)	70 (4,8)	80 (5,5)	100 (6,9)	ALL SAM/HYD AND BLOCK
700					
White #28	SPC	SPC	SPC	SPC	SPC
Blue #32	SPO	SPO	SPO	SPO	SPO
Yellow #36	SPO	SPO	SPO	SPO	SPO
Orange #40	SNP	SNP	SNP	SNP	SNP
Green #44	SNP	SNP	SNP	SNP	SNP
Black #48	N/R	SNP	SPR	SPR	SNP
751					
Gray #20	S4	S4	S4	S4	S4
Red #22	S8	S8	S8	S8	S8
White #28	SPC	SPC	SPC	SPC	SPC
Blue #32	SPO	SPO	SPO	SPO	SPO
Yellow #36	SPO	SPO	SPO	SPO	SPO
Orange #40	SNP	SNP	SNP	SNP	SNP
Green #44	SNP	SNP	SNP	SNP	SNP
Black #48	SNP	SPR	SPR	SPR	.SNP
900					
Blue #44	SPC	SPC	SPC	SPC	SPC
Yellow #48	SPC	SPC	SPC	SPC	SPC
Orange #52	SPC	SPO	SPO	SPO	SPO
Green #56	N/R	SNP	SNP	SNP	SNP
Black #60	N/R	SNP	SPR	SPR	SPR
Brown #64	N/R	SPR	SPR	SPR	SPR
950					
White #18C	SPC	SPC	SPC	SPC	SPC
Gray #20C	SPC	SPC	SPC	SPC	SPC
Blue #22C	SPC	SPC	SPC	SPC	SPC
Yellow #24C	SPC	SPC	SPO	SPO	SPO
Orange #26	SPO	SPO	SPO	SPO	SPO
Green #28	N/R	SNP	SPR	SPR	SPR
Black #30	N/R	SNP	SPR	SPR	SPR
Brown #32	N/R	SNP	SPR	SPR	SPR

SPC = Stator Poppet Closed
SPO = Stator Poppet Open
SNP = Stator No Poppet
SPR = Spacer
SO = Screen Only
S4 = Stator with 4 holes
S8 = Stator with 8 holes
N/R = Not a recommended pressure and nozzle combination



Swing Joints

Looking to enhance the performance of your golf course irrigation system? Rain Bird® swing joints are the perfect solution. Featuring superior flow characteristics and excellent structural integrity, these swing joints are designed to deliver the performance you expect from Rain Bird while saving you money. They are available in a wide range of configurations. Rain Bird swing joints are the perfect complement to our golf series rotors.

SPECIFICATIONS

Diameters: 1" (2.5 cm), 1.25" (3.2 cm) and 1.5" (3.8 cm)

Lay Arm Lengths: 8" (20.3 cm), 12" (30.5 cm) and 18" (45.7 cm)

Inlet Type: NPT, BSP, ACME, spigot and socket

Outlet Thread Type: NPT, BSP or ACME

Enlarging NPT, BSP or ACME Outlets: Available on 1" (2.5 cm) and 1.25" (3.2 cm) swing joints for connections to many rotors with 1 ¼" (3.2 cm) and 1 ½" (3.8 cm) inlet sizes respectively (no additional adapters required)

Inlet Configurations: Standard side or top-mount connections

Outlet Configuration: Single-top or triple-top

Pressure Rating: 315 psi (21.7 bar) at 73˚F (22.8˚C)

Reducing ACME Inlet: Available on 1 ¼" (3.2 cm) diameter swing joints for connection to a 1 ½" ACME service tee

Multiple Inlet/Outlet Configurations: Available with standard and triple top configurations for added rotor positioning flexibility. Also available are models for top mount or side mount to lateral lines.

- **Superior Flow Characteristics.** An innovative swept elbow design* reduces pressure loss by up to 50 percent over other swing joints.
- **Excellent Structural Integrity.** Reduces the costs associated with fatigue-related failures.
- **Double O-ring Protection.** Provides a better seal to ensure that joints are kept clean and can be repositioned easily.
- **Modified ACME Outlet.** Improves safety by losing seal engagement before losing thread engagement during rotor removal.
- **Color-coding and Distinct Size Markings.** Reduce costs by eliminating errors and improving installation efficiency with quick size identification at the job site.
- **Oversized Threaded Inlets.** Make hand-tightening and blind installations (underwater) easier. This also reduces the risk of potential damage caused by over-tightening with a wrench.
- **Extended Warranty.** When used with Rain Bird golf rotors, extends rotor and swing joint warranty to five years.

**Patent pending*

ALSO AVAILABLE

NPT and BSP ACME Adapters

If you currently have NPT or BSP swing joints, you can now enjoy the benefits of ACME-threaded rotors by utilizing a Rain Bird® NPT-ACME or BSP-ACME side of the adapter. Just screw the adapter into the inlet on the ACME case, and then screw the rotor with the adapter onto the NPT or BSP swing joint until it is snug. Available for 1", 1 ¼", and 1 ½" swing joints, the adapter adds only about 1 ⅜" to the installed height of the rotor, and is rated at the same operating pressures as Rain Bird® Swing Joints.

● **Swing Joints**

HOW TO SPECIFY

J – X – X – X – 00 – X – X

Configuration
0 = Standard
1 = Triple Top

Length

	Pipe	Lay Arm
A =	1"	8"
B =	1"	12"
C =	1"	18"
D =	1 ¼"	8"
E =	1 ¼"	12"
F =	1 ¼"	18"
G =	1 ½"	8"
H =	1 ½"	12"
I =	1 ½"	18"

Configuration
0 = Standard
1 = Top Mount

Inlet Style
1 = NPT
2 = BSP
3 = ACME
4 = Spigot
5 = Socket
R = Reducing ACME Inlet††

Outlet Style
1 = NPT
2 = ACME
3 = Enlarging NPT†
4 = Enlarging BSP†
5 = Enlarging ACME†

● **NPT or BSP to ACME Adapter**

†Enlarging outlet available only on 1" and 1 ¼" diameter models

††Reducing inlet available on 1 ¼" diameter models

VALVES

Rain Bird® Valves are ruggedly reliable and expertly engineered to provide an elevated standard of product integrity that is unmatched in the industry. Constructed of industrial-strength glass-filled nylon or classic brass, Rain Bird Valves are designed to withstand the harshest environments, and the lasting, trouble-free performance continues to earn the trust of golf course professionals worldwide.

100-PESB/PESB-R, 150-PESB/PESB-R and 200-PESB/PESB-R

SPECIFICATIONS

Models:

100-PESB: 1" (2.5 cm) (26/34)
100-PESB-R: 1" (2.5 cm) (26/34)
150-PESB: 1 ½" (3.8 cm) (40/49)
150-PESB-R: 1 ½" (3.8 cm) (40/49)
200-PESB: 2" (5.1 cm) (50/60)
200-PESB-R: 2" (5.1 cm) (50/60)
100-PESB-R-WK: 1" (2.5 cm) (26/34) Conversion Kit
150-PESB-R-WK: 1 ½" (3.8 cm) (40/49) Conversion Kit
200-PESB-R-WK: 2" (5.1 cm) (50/60) Conversion Kit

Valve and PRS-D module must be ordered separately. See page 48 for more information on the PRS-D option.

For non-U.S. applications it is necessary to specify NPT or BSP thread type.

Flow: 0.25 to 200 gpm (0.06 to 45.5 m³/h); (1.2 to 757 l/m)

Flow with PRS-D: 5 to 200 gpm (1.1 to 45.4 m³/h); (19.2 to 757 l/m)

Pressure: 20 to 200 psi (1.38 to 13.8 bar)

Pressure with PRS-D: Up to 100 psi (6.90 bar)
The PRS-D option adds 2" (5.1 cm) to valve height.

Electrical Specifications:

Power: 24 VAC 50/60 Hz (cycles/sec) solenoid

Inrush Current: 0.41 A (9.84 VA) at 60 Hz

Holding Current: 0.28 A (6.72 VA) at 60 Hz

Coil Resistance: 30 to 39 ohms

● PESB

● PESB-R

Dimensions:

100-PESB/PESB-R (1"):
Height: 6 ½" (16.5 cm)
Length: 4" (10.2 cm)
Width: 4" (10.2 cm)

150-PESB /PESB-R (1 ½"):
Height: 8" (20.3 cm)
Length: 6" (15.2 cm)
Width: 6" (15.2 cm)

200-PESB /PESB-R (2"):
Height: 8" (20.3 cm)
Length: 6" (15.2 cm)
Width: 6" (15.2 cm)

Temperature: 150°F (66°C) maximum

HOW TO SPECIFY

XXX – XXXX-X – XXX-X

Size	Model	Optional Feature
100	PESB	PRS-D
150	PESB-R	ICM
200		

Also available in IC configuration. Please see page 22 on how to specify.

PESB/PESB-R SERIES VALVES — U.S.

PRESSURE LOSS* (PSI)

Flow (gpm)	100-PESB / PESB-R 1"	150-PESB / PESB-R 1½"	200-PESB / PESB-R 2"
0.25	0.8 / 1.6	—	—
0.5	1.0 / 3.0	—	—
1	1.3 / 1.8	—	—
5	1.7 / 2.9	—	—
10	1.8 / 2.9	—	—
20	2.9 / 2.6	3.9 / 3.5	—
30	5.6 / 5.8	3.6 / 3.1	—
40	10.0 / 10.2	3.5 / 2.3	—
50	15.6 / 16.0	3.6 / 2.1	4.8 / 3.7
75	—	5.4 / 4.3	4.5 / 3.3
100	—	9.6 / 7.5	5.2 / 4.7
125	—	14.6 / 11.9	8.2 / 8.6
150	—	21.2 / 17.0	11.8 / 12.6
175	—	—	15.5 / 14.8
200	—	—	19.5 / 18.9

1. Rain Bird recommends flow rates in the supply line not to exceed 7 ½ ft/sec (2.29 m/s) in order to reduce the effects of water hammer.
2. For flows below 5 gpm (1.14 m³/h, 19.2 l/m), Rain Bird recommends use of upstream filtration to prevent debris from collecting below the diaphragm.
3. For flows below 10 gpm (2.27 m³/h, 37.8 l/m), Rain Bird recommends that the flow control stem be turned down two full turns from the fully open position.
4. PRS-D recommended for use in shaded area only.

PESB/PESB-R SERIES VALVES — METRIC

PRESSURE LOSS* (BAR)

Flow (m³/h)	Flow (l/m)	100-PESB / PESB-R 2.5 cm	150-PESB / PESB-R 3.8 cm	200-PESB / PESB-R 5.1 cm
0.06	1	0.06 / 0.11	—	—
0.3	5	0.09 / 0.13	—	—
0.6	10	0.10 / 0.15	—	—
1.2	20	0.12 / 0.20	—	—
3	50	0.15 / 0.19	—	—
6	100	0.32 / 0.32	0.26 / 0.22	—
9	150	0.68 / 0.69	0.24 / 0.16	—
12	200	—	0.26 / 0.16	0.33 / 0.25
15	250	—	0.33 / 0.24	0.32 / 0.24
18	300	—	0.42 / 0.33	0.32 / 0.25
21	350	—	0.57 / 0.45	0.34 / 0.30
24	400	—	0.74 / 0.59	0.41 / 0.38
27	450	—	0.92 / 0.75	0.51 / 0.53
30	500	—	1.14 / 0.91	0.64 / 0.67
33	550	—	1.38 / 1.10	0.77 / 0.82
36	600	—	—	0.90 / 0.92
39	650	—	—	1.04 / 1.00
42	700	—	—	1.18 / 1.13
45	757	—	—	1.34 / 1.30

*Loss values are with flow control fully open using the tan solenoid retainer.

100-EFB-CP-R, 125-EFB-CP-R, 150-EFB-CP-R and 200-EFB-CP-R

SPECIFICATIONS

Models:
100-EFB-CP-R: 1" (2.5 cm)
125-EFB-CP-R: 1 ¼" (3.2 cm)
150-EFB-CP-R: 1 ½" (3.8 cm)
200-EFB-CP-R: 2" (5.1 cm) (Brass)

Valve and PRS-D module must be ordered separately. See page 50 for more information on the PRS-D option.

For non-U.S. applications it is necessary to specify NPT or BSP thread type.

Flow with or without PRS-D: 5 to 200 gpm (19.2 to 757 l/m)

Pressure: 15 to 200 psi (1.0 to 13.8 bar)

Pressure with PRS-D: 15 to 100 psi (1.0 to 7.0 bar)

Pressure Requirements using PRS-D: 15 psi (1.0 bar) inlet pressure above desired outlet pressure
Note: The PRS-D option adds 2" (5.1 cm) to valve height.

Electrical Specifications:
Power: 24 VAC
50/60 Hz (cycles/sec) solenoid

Inrush current: 0.41 A (9.84 VA) at 60 Hz

Holding current: 0.28 A (6.72 VA) at 60 Hz

Coil resistance: 30 to 39 ohms

Dimensions:
100-EFB-CP-R (1"):
Height: 6" (15.2 cm)
Length: 4 ½" (11.4 cm)
Width: 3 ¼" (8.3 cm)

125-EFB-CP-R (1 ¼"):
Height: 5 ¾" (14.6 cm)
Length: 5" (12.7 cm)
Width: 3 ¼" (8.3 cm)

150-EFB-CP-R (1 ½"):
Height: 6 ½" (16.5 cm)
Length: 5 ½" (14.0 cm)
Width: 4 ½" (11.4 cm)

200-EFB-CP-R (2"):
Height: 7" (17.8 cm)
Length: 6 ¾" (17.1 cm)
Width: 5 ¾" (14.6 cm)

Temperature: 150°F (66°C) maximum

● **100-EFB-CP-R**

HOW TO SPECIFY

XXX – EFB–CP-R – XXX-X

Size	Model	Optional Feature
100	EFB-CP-R	PRS-D
125		ICM
150		
200		

Also available in IC configuration. Please see page 22 on how to specify.

NEW RELCAIMED STANDARD:
Features chlorine-resistant EPDM diaphragm for applications using reclaimed water.

EFB-CP-R SERIES VALVES — U.S.

PRESSURE LOSS* (PSI)

Flow (gpm)	100-EFB-CP-R 1"	125-EFB-CP-R 1¼"	150-EFB-CP-R 1½"	200-EFB-CP-R 2"
5	0.2	—	—	—
10	0.7	—	—	—
15	1.2	—	—	—
20	2.1	1.4	2.3	0.5
30	5.0	2.3	2.9	0.6
40	8.2	4.1	2.0	0.8
50	13.0	6.8	3.3	1.1
60	—	9.8	4.6	1.8
80	—	16.5	7.5	2.4
100	—	—	11.8	3.8
120	—	—	16.6	5.9
140	—	—	—	7.8
160	—	—	—	10.0
180	—	—	—	12.5
200	—	—	—	15.8

1. Rain Bird recommends flow rates in the supply line not to exceed 7 ½ ft/sec (2.29 m/s) in order to reduce the effects of water hammer.
2. For flows below 5 gpm (1.14 m³/h, 19.2 l/m), Rain Bird recommends use of upstream filtration to prevent debris from collecting below the diaphragm.
3. For flows below 10 gpm (2.27 m³/h, 37.8 l/m), Rain Bird recommends that the flow control stem be turned down two full turns from the fully open position.
4. PRS-D recommended for use in shaded area only.

EFB-CP-R SERIES VALVES — METRIC

PRESSURE LOSS* (BAR)

Flow (m³/h)	Flow (l/m)	100-EFB-CP-R 2.5 cm	125-EFB-CP-R 3.1 cm	150-EFB-CP-R 3.8 cm	200-EFB-CP-R 5.1 cm
1	19	0.01	—	—	—
3	50	0.07	—	—	—
6	100	0.27	0.14	0.19	0.04
9	150	0.56	0.28	0.14	0.05
12	200	—	0.53	0.25	0.09
15	250	—	0.82	0.38	0.14
18	300	—	1.12	0.51	0.16
21	350	—	—	0.70	0.23
24	400	—	—	0.91	0.30
27	450	—	—	1.13	0.40
30	500	—	—	—	0.49
33	550	—	—	—	0.58
36	600	—	—	—	0.68
39	650	—	—	—	0.79
42	700	—	—	—	0.92
45	757	—	—	—	1.09

*Loss values are with flow control fully open using the tan solenoid retainer.

300-BPE and 300-BPES Brass Valves

SPECIFICATIONS

Models:
300-BPE: 3" (7.6 cm) (89/90)
300-BPES: 3" (7.6 cm) (80/90)

Valve and PRS-D module must be ordered separately. See page 50 for more information on the PRS-D option.

For non-U.S. applications it is necessary to specify NPT or BSP thread type.

Flow with or without PRS-D: 60 to 300 gpm (13.6 to 68.1 m³/h); (227 to 1136 l/m)

Pressure: 20 to 200 psi (1.4 to 13.8 bar)

Pressure with PRS-D: Up to 100 psi (6.9 bar)

Pressure Requirements using PRS-D: 15 psi (1.0 bar) inlet pressure above desired outlet pressure

Note: The PRS-D option adds 2" (5.1 cm) to valve height.

Dimensions:
300-BPE (3"):
Height: 13 5/8" (34.6 cm)
Length: 8" (20.32 cm)
Width: 7" (17.78 cm)

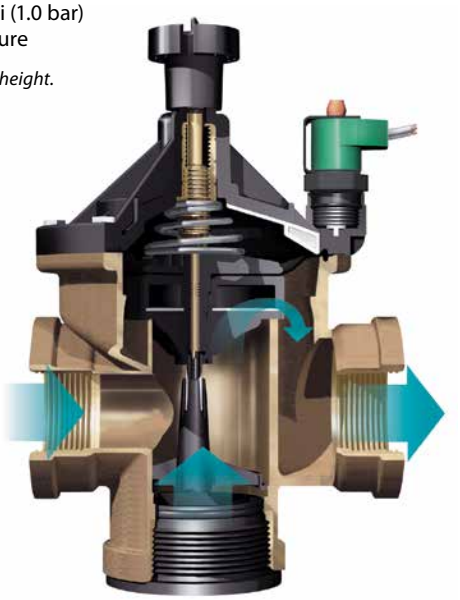
Temperature: 110°F (43° C) maximum

Electrical Specifications:
Power: 24 VAC 50/60 Hz (cycles/sec) solenoid

Inrush current: 0.41 A (9.84 VA) at 60 Hz

Holding current: 0.28 A (6.72 VA) at 60 Hz

Coil resistance: 28 ohms, nominal



● **300-BPES**

HOW TO SPECIFY

XXX – BPE(X) – XXX-X

- **Size** 300
- **Model** BPE, BPES
- **Optional Feature** PRS-D, ICM

Also available in IC configuration. Please see page 22 on how to specify.

BPE 3" VALVES — U.S.

PRESSURE LOSS* (PSI)

Flow (gpm)	GLOBE	ANGLE
60	6.6	6.8
80	5.1	5.9
100	3.2	3.5
120	1.8	1.8
140	1.8	2.1
160	2.0	2.1
180	2.2	2.0
200	2.7	2.5
250	4.0	3.4
300	4.9	4.5

*Loss values are with flow control fully open using the tan solenoid retainer.

BPES 7,6 cm VALVES — METRIC

PRESSURE LOSS* (BAR)

Flow (m³/h)	Flow (l/m)	GLOBE 2.5 cm	ANGLE 3.8 cm
13.6	227	0.46	0.47
24	400	0.19	0.21
36	600	0.14	0.14
48	800	0.21	0.19
60	1000	0.29	0.26
68	1136	0.34	0.31

RECOMMENDATIONS
Rain Bird recommends flow rates in the supply line not to exceed 7½ ft/sec (2.29 m/s) in order to reduce the effects of water hammer.

Quick Coupling Valves

SPECIFICATIONS

Models:

3RC: ¾" (1.9 cm) (20/27) Rubber cover, one-piece body

33DRC: ¾" (1.9 cm) (20/27) Double track key lug, rubber cover, two-piece body

33DLRC: ¾" (1.9 cm) (20/27) Double track key lug, locking rubber cover, two-piece body

33DNP: ¾" (1.9 cm) (20/27) Non-potable, purple locking rubber cover, two-piece body

44RC: 1" (2.5 cm) (26/34) Rubber cover, two-piece body

44LRC: 1" (2.5 cm) (26/34) Locking rubber cover, two-piece body

44NP: 1" (2.5 cm) (26/34) Non-potable, purple locking rubber cover, two-piece body

5RC: 1" (2.5 cm) (26/34)* Rubber cover, one-piece body

5LRC: 1" (2.5 cm) (26/34)* Locking rubber cover, one-piece body

5NP: 1" (2.5 cm) (26/34) Non-potable, purple locking rubber cover, one-piece body

7: 1 ½" (3.8 cm) (40/49)* Metal cover, one-piece body

**Available in BSP model.*

Flow:

Models 3RC, 33DRC, 33DLRC, 33DNP, 44RC, 44LRC, 44NP, 5RC, 5LRC, 5NP, 7: 10 to 125 gpm (2.27 to 28.39 m^3/h; 37.8 to 473 l/m)

Models 33DNP, 44NP, 5NP: 10 to 70 gpm (2.27 to 15.89 m^3/h; 37.8 to 265 l/m)

Pressure: 5 to 125 psi (0.4 to 8.6 bar)

Height:

3RC: 4.3" (10.8 cm)

33DRC: 4.4" (11.1 cm)

33DLRC: 4.6" (11.8 cm)

33DNP: 4.4" (11.1 cm)

44RC: 6.0" (15.2 cm)

44LRC: 6.0" (15.2 cm)

44NP: 6.0" (15.2 cm)

5RC: 5.5" (14.0 cm)

5LRC: 5.5" (14.0 cm)

5NP: 5.5" (14.0 cm)

7: 5.8" (14.6 cm)

● Quick Coupling Valves

HOW TO SPECIFY

XX – XXXX

Model	Cover
33	RC
44	DRC
5	DLRC
7	LRC
	DNP
	NP

QUICK COUPLING VALVES — U.S.

VALVE PRESSURE LOSS (PSI)

Flow (gpm)	3RC 0.75"	33DRC 33DLRC 33DNP 0.75"	44RC 44LRC 44NP 1"	5RC 5LRC 5NP 1"	7 1.50"
10	1.8	2.0	—	—	—
15	4.7	4.3	2.2	—	—
20	7.2	7.6	4.4	—	—
30	—	—	11.5	4.1	—
40	—	——	—	7.3	—
50	—	—	—	11.0	1.7
60	—	—	—	15.7	2.5
70	—	—	—	21.5	3.6
80	—	—	—	—	4.9
90	—	—	—	—	8.4
100	—	—	—	—	14.0

QUICK COUPLING VALVES — METRIC

VALVE PRESSURE LOSS (BAR)

Flow (m^3/h)	Flow (l/m)	3RC 1.9 cm	33DRC 33DLRC 33DNP 1.9 cm	44RC 44LRC 44NP 2.5 cm	5RC 5LRC 5NP 2.5 cm	7 3.8 cm
2.3	38	0.12	0.12	—	—	—
4	67	0.41	0.42	0.23	—	—
5	83	0.57	0.62	0.40	—	—
6	100	—	—	0.62	—	—
7	117	—	—	0.83	0.30	—
8	133	—	—	—	0.40	—
9	150	—	—	—	0.50	—
10	167	—	—	—	0.61	—
12	200	—	—	—	0.85	0.13
14	233	—	—	—	1.15	0.18
16	267	—	—	—	1.50	0.25
22	367	—	—	—	—	0.54
28	473	—	—	—	—	0.97

QUICK COUPLING VALVE KEYS

TOP PIPE THREADS

VALVE	KEY	MALE		FEMALE	
3RC	33DK	¾"	19 mm	½"	13 mm
33DRC	33DK	¾"	19 mm	½"	13 mm
33NP	33DK	¾"	19 mm	½"	13 mm
44NP	44K	1"	25 mm	¾"	19 mm
44RC	44K	1"	25 mm	¾"	19 mm
5RC	55K-1	1"	25 mm	—	—
5NP	55K-1	1"	25 mm	—	—
7	7K	1½"	38 mm	—	—

● Quick Coupling Valve Keys

55K-1

Pressure Regulating Module

The PRS-Dial is an excellent means of regulating outlet pressure at the valve regardless of incoming pressure fluctuations. The visible scale makes adjustment quick and easy. The regulator fits all Rain Bird® PGA, PEB, PESB, PESB-R, GB, EFB-CP, BPE and BPES series valves.

Regulates and maintains constant outlet pressure between 15 and 100 psi (1.04 to 6.9 bar) within ±3 psi (±0.21 bar).

Adjustment knob with detents permits fine-tune setting in ⅓ psi (0.02 bar) increments. Dial cartridge makes installation and adjustment quick, easy and accurate.

FEATURES

- Improved spike reduction capabilities reduce water hammer.
- Ergonomic design with snap-tight cover to prevent vandalism.
- Waterproof dial cartridge eliminates fogging and binding.
- Dial cartridge retrofits into all existing PRS-B units.
- Schrader valve connects pressure hose gauge, ordered separately.
- Easy field installation — PRS-Dial threads underneath the solenoid and adapter.
- Corrosion-resistant glass-filled nylon for rugged performance.

OPERATING RANGE

Pressure: Up to 100 psi (6.9 bar)*

Regulation: 15 to 100 psi (1.04 to 6.9 bar)

Accuracy: ±3 psi (±0.21 bar)

Flow: Refer to chart

**While the PRS-Dial unit can withstand pressures up to 200 psi (13.8 bar), accurate pressure regulation can be maintained only up to 100 psi (6.9 bar).*

MODELS

- PRS-D

APPLICATION INFORMATION

- Proper operation requires inlet pressure to be a minimum of 15 psi (1.04 bar) higher than desired outlet pressure.
- For areas with very high pressure or uneven terrain, install sprinklers with PRS pressure regulating stems and/or SAM check valves.
- When inlet pressure exceeds 100 psi (6.9 bar), a pressure regulating master valve or inline pressure regulator is required.
- Rain Bird does not recommend using the pressure regulating module for applications outside the recommended flow ranges.
- To reduce the effects of water hammer, Rain Bird recommends flow rates in the supply line not to exceed 7½ ft/sec (2.29 m/s).
- For flows below 10 gpm (2.27 m3/h, 37.8 l/m), Rain Bird recommends the flow control stem be turned down two full turns from the fully open position.
- The PRS-D option adds an additional 2" (5.1 cm) to valve height.

VALVE FLOW RANGES* — U.S.

MODEL	GPM
100-PGA	5–40
150-PGA	30–100
200-PGA	40–150
100-PEB	5–50
150-PEB	20–150
200-PEB	75–200
100-PESB/PESB-R	5–50
150-PESB/PESB-R	20–150
200-PESB/PESB-R	75–200
100-GB	5–50
125-GB	20–80
150-GB	20–120
200-GB	20–200
100-EFB-CP-R	5–50
125-EFB-CP-R	20–80
150-EFB-CP-R	20–120
200-EFB-CP-R	20–200
300-BPE	60–300
300-BPES	60–300

**The PRS-Dial regulates only up to 100 psi (6.9 bar).*

VALVE FLOW RANGES* — METRIC

MODEL	M³/H	L/M
100-PGA	1.14–9.08	19.2–15.1
150-PGA	6.81–22.70	113–378
200-PGA	9.08–34.05	151–568
100-PEB	1.14–11.35	19.2–189
150-PEB	4.54–34.05	76–568
200-PEB	17.03–45.40	284–757
100-PESB/PESB-R	1.14–11.35	19.2–189
150-PESB/PESB-R	4.54–34.05	76–568
200-PESB/PESB-R	17.03–45.40	284–757
100-GB	1.14–11.35	19.2–189
125-GB	4.54–18.16	76–302
150-GB	4.54–31.78	76–529
200-GB	4.54–45.40	76–757
100-EFB-CP-R	1.14–11.35	19.2–189
125-EFB-CP-R	4.54–18.16	76–302
150-EFB-CP-R	4.54–31.78	76–529
200-EFB-CP-R	4.54–45.40	76–757
300-BPE	13.62–68.10	227–1.136
300-BPES	13.62–68.10	227–1.136

ACCESSORIES

Rain Bird accessories efficiently and reliably work around the golf course, making it easier to enhance appearance and playability, while optimizing water use and minimizing labor and maintenance costs. From the versatile hose-end nozzle line to our highly durable service tools, we deliver the quality accessories you need to stay within budget and keep your course in ideal playing condition.

ALGAE CONTROL SYSTEM

The Rain Bird Algae Control System (ACS) is an environmentally safe algae control system that uses state-of-the-art ultrasonic technology to kill algae without harming other aquatic life such as plants or fish.

HOSE REELS

Rain Bird Hose Reels are durably constructed and feature an ergonomic, easy-to-use design, so crews can water faster and more efficiently, which saves valuable time.

UNDERGROUND HOSE REELS

Rain Bird Underground Hose Reels are the best solution to economically and efficiently syringe greens, while reducing turf wear and minimizing interruptions of play.

HOSE-END NOZZLES

Rain Bird Hose-End Nozzles offer different flow rates for different applications. Fully adjustable spray patterns allow you to meet challenges of all shapes and sizes.

DB SERIES WIRE CONNECT0R

Rain Bird DB Series Wire Connector is the only connector you'll need. Easy and secure connections made every time with direct-bury silicone-filled tubes with strain relief.

Algae Control System (ACS)

Clean your water without chemicals.

COST SAVINGS

- Average return on investment (ROI) is 2 years
- Eliminate costly chemical applications
- Reduce labor costs
- Easy to use and maintain

ULTRASONIC TECHNOLOGY

- ACS installs just beneath the water surface
- Ultrasonic waves fan out to inhibit the growth and spread of algae
- Users can expect results in as few as 3-4 weeks

ENVIRONMENTALLY SAFE

- Uses no chemicals
- Safe for fish, frogs, turtles and all types of aquatic plants
- No EPA Certifications required

BACKED BY RAIN BIRD

- Industry-leading 3-year warranty
- Easy to use and maintain

Before

After

TECHNICAL SPECIFICATIONS

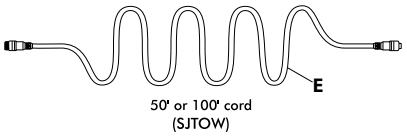
MODELS	POWER INPUT		UL APPROVED POWER SUPPLY	NSF CERTIFICATION	RANGE*	COVERAGE*
RBACS400	US 120V AC, 60 Hz, 60 W	EU/UK 240V AC, 50 Hz, 60 W	RBAC-PSUP / RBAC-PSUPR	NSF/ANSI 61	400 ft/121.92 m	up to 2 acres
RBACS400AC	US 24V AC, 1 Amps Max**	EU/UK 24V AC, 1 Amps Max	—	NSF/ANSI 61	400 ft/121.92 m	
RBACS400DC	US 24V DC, 1 Amps Max***	EU/UK 24V DC, 1 Amps Max	—	NSF/ANSI 61	400 ft/121.92 m	
RBACS500	US 120V AC, 60 Hz, 60 W	EU/UK 240V AC, 50 Hz, 60 W	RBAC-PSUP / RBAC-PSUPR	NSF/ANSI 61	500 ft/154 m	up to 6 acres
RBACS500AC	US 24V AC, 1 Amps Max**	EU/UK 24V AC, 1 Amps Max	—	NSF/ANSI 61	500 ft/154 m	
RBACS500DC	US 24V DC, 1 Amps Max***	EU/UK 24V DC, 1 Amps Max	—	NSF/ANSI 61	500 ft/154 m	
RBACS600	US 120V AC, 60 Hz, 60 W	EU/UK 240V AC, 50 Hz, 60 W	RBAC-PSUP / RBAC-PSUPR	NSF/ANSI 61	600 ft/182 m	up to 8 acres
RBACS600AC	US 24V AC, 1 Amps Max**	EU/UK 24V AC, 1 Amps Max	—	NSF/ANSI 61	600 ft/182 m	
RBACS500DC	US 24V DC, 1 Amps Max***	EU/UK 24V DC, 1 Amps Max	—	NSF/ANSI 61	600 ft/182 m	

* Range and coverage depends on location and conditions.
** 24 volt AC units are compatible with any 24 volt AC low voltage lighting or irrigation power source.
*** 24 Volt DC units are compatible with any 24 volt DC power source.
The Rain Bird Solar Power System, which includes two batteries, may be purchased separately

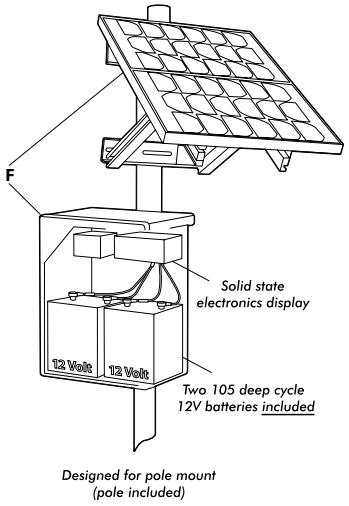
ACS PARTS AND DIMENSIONS

A. Transducer	**Length:** 8" **Diameter:** 3" **Height:** 9" **Cord Length:** 50'
B. Power Supply Box	**Depth:** 2.5" **Length:** 7.75" **Width:** 4.5" **Cord Length:** 6' (US & EU); 5' (UK)
C. Float* (optional with RBACS100 and RBACS200)	15" x 15" x 1.5" with four (4) 0.75" tie down holes and two (2) 2" x 3.5" slots for stakes
D. Float Shackle*	**Length:** 1.5", stainless steel
E. 50' or 100' cord (purchase separately)	50' or 100' transducer extension cord (SJTOW) with waterproof connectors
F. Solar Power System (purchase separately)	Includes solar panel, control box, wiring, pole, mounting brackets and two batteries. *Note: systems are sized for specific site*
G. RBACSMETER dB Meter (purchase separately)	For measuring strength of ultrasonic signal. Runs on two 9 volt batteries. **Length:** 8.5" **Width:** 5.5" **Height:** 3.5"
H. Sled Mount Kit (purchase separately)	For use in lined water sites (includes one sled base; two mounting poles; and two brass sliding-bolts)

TRANSDUCER EXTENSION CORD



SOLAR UNIT

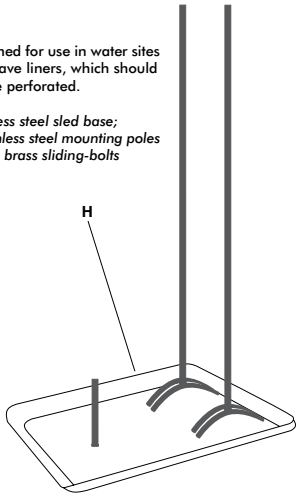


Designed for pole mount (pole included)

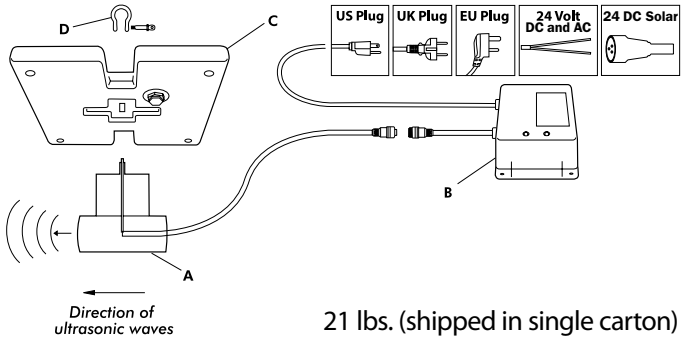
SLED MOUNT KIT

Designed for use in water sites that have liners, which should not be perforated.

Stainless steel sled base; 2 stainless steel mounting poles with 2 brass sliding-bolts

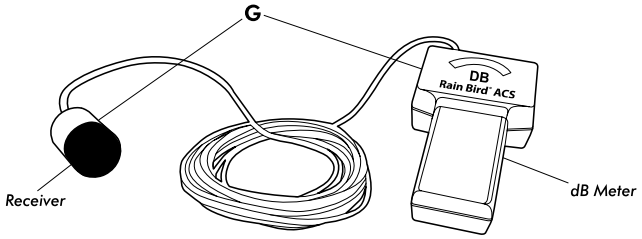


RBACS400 • RBACS500 • RBACS600



21 lbs. (shipped in single carton)

RBACSMETER dB METER



Illustrations not drawn to scale

ACCESSORIES

Hose Reels

Rain Bird® Hose Reels make watering with hoses faster, safer and more efficient, saving your crews valuable time and money. Top-quality materials and construction combine with an ergonomic, easy-to-use design. Our full line can meet virtually any need, in both mounted and trailer models.

BENEFITS

Efficiency — Hose reels let you put the hose where you need it, when you need it — improves efficiency and reduces clutter.

Economy — Tests prove hoses that are properly stored on a reel will last five (5) to seven (7) times longer; reduces downtime and replacement costs.

Ergonomics — Hose reels make handling easier and more comfortable for workers over the course of a long day. Provides low hose tension during pullout and controlled return speed.

Safety — Hose reels keep hose out of the way when not in use. Eliminates tripping and safety problems.

MODELS

Heavy-Duty Hose Reel

Designed for heavy-duty applications requiring long hose lengths.

- Adjustable spool rotation eliminates hose backlash when retracting.
- Zinc-plated swivel with VITON® "O" ring seals.
- Permanently lubricated dual main bearings.
- Motor mounting at either end of the reel.
- All bolted construction — no welds.
- Lock pin prevents spool rotation when the reel is not in use.
- Vibration-proof self-locking fasteners ensure assembly integrity.
- Available in hand crank or motor drive models. Manual driven reels are easily converted to power driven reels.
- Includes 10' (3.0 m) connecting hose only.

Spring Driven Reel

Incorporate contemporary engineering and construction for the ultimate in trouble-free performance. Ideal for applications with critical space requirements.

- Guide is field adjustable for wall, ceiling or truck mounting positions.
- Heavy-duty brackets eliminate bending due to angular hose pull.
- Banded drive springs give smooth, automatic hose retrieval.
- All reels are permanently factory lubricated.
- Reliable latch will maintain the desired working length of hose. Our mechanism assures a positive latch or unlatch of the hose.
- Nylon guide rollers reduce hose drag and abrasion.
- Includes air/water hose only.

Poly Hose Reel

Lightweight and easy to handle, meets the needs for continuous, problem-free operation. Highly resistant to acids and alkalis.

- Spring retraction.
- Corrosion proof and virtually maintenance free.
- Tough, U.V.-stabilized outer case with a simple and reliable latch mechanism.
- Spring tension easily adjusted.
- Pivoting wall bracket included.
- Includes air/water and 4' (1.2 m) connecting hose.

Composite Hose Reel

Hybrid design incorporates industrial grade steel with engineered composite components. Ideal for applications that are less demanding.

- Base and arm feature heavy gauge steel stampings with reinforced ribs for structural integrity.
- Glass-filled composite spool and spring case contain industrial grade drive spring.
- Latch mechanism is mounted on arm to ensure hose latch-out will not occur.
- Long-lasting torsion spring and swivel ensures maximum life.
- Includes air/water hose only.

Electric Cord Reel

Compact, electric cord reels are ideal for indoor applications where space is critical.

- Spring retractable with latch.
- Designed for wall, ceiling or bench mounting.
- Features adjustable cord stop.

Towable Hose Reel Trailer

Ergonomic design and rugged construction make hose handling easier, quicker and more efficient.

- Easily attaches to most off-road golf work vehicles or carts with clevis pin hitch.
- 40" x 40" (102 cm x 102 cm) heavy gauge steel bed is predrilled for heavy-duty hose reels.
- Dual-tapered automotive style bearings and solid steel axle for smooth, reliable operation.
- Pneumatic tires and high quality wheels are recessed under trailer bed to eliminate snagging of trees and shrubs.
- Extra long 32" (81 cm) trailer tongue allows for sharper turns and easier back-up.
- ***For off-road use only. No riders.***

● Heavy-Duty Hose Reel

● Spring Driven Hose Reel

● Poly Hose Reel

● Composite Hose Reel

● Electric Cord Reel

Underground Hose Reel

Rain Bird's underground hose reel is the best solution for accessing greens. The underground hose reel makes syringing turf economical and efficient while cutting down on turf wear.

Hand-watering greens allows for a more direct and targeted application of water, especially during times of extreme heat or dry conditions. An underground hose reel leads to less interruption for golfers and maintains the course's professional appearance. Grounds crews can move between areas without dragging a hose, which saves time, reduces employee fatigue and most importantly cuts down on turf wear.

The underground hose reel is easy to install, use and maintain. Three hose lengths (50, 75 or 100 feet) allow enough flexibility for watering or syringing any area.

BENEFITS

- Enhanced ability to preserve the conditions of golf courses by reducing course wear and tear, and turf damage from driving carts and dragging hoses across the playing surface.
- Less interruption and inconvenience for golfers.
- More professional look for golf courses; makes the course more playable by being less obtrusive than hoses left next to a fairway or near a green.
- Maximizes labor efficiency by making the job of hand watering easier and less burdensome for greenskeepers. It saves time, reduces employee fatigue and takes the monotony out of the job.
- Hand watering complements sprinkler watering and will provide a targeted water distribution to the green. Efficiently manage, preserve and protect turf from extreme exposures.
- Provides the resources to react timely in urgent situations such as extreme heat stress, dry conditions and possible hydraulic oil leaks.
- Irrigation system can be pressurized to act as a blower for leaves and other debris on greens: this will save time and allow for a much more effective mowing process (system must be hooked-up to a compressor and the water blown out).

FEATURES

6" Diameter Cover: Provides quick access to water hose, yet nearly out-of-sight. Hose reel and enclosures sit just nine inches below grade level.

Brass Ball Valve: Allows system to remain fully charged for quick on/off water flow.

Bumper-Stop and Roller: Bumper-stop maintains proper length of hose in riser.

High Quality PVC Hose: Industrial grade PVC hose is specially blended for irrigation use.

Drainage Opening: The housing is open at the bottom to allow for drainage.

Anti-Jump Brackets: Anti-jump arms prevent the hose from slipping off the reel. Rollers insure smooth pulling action while guiding the hose onto the reel.

Corrosion-Resistant: Individual components are powder-coated, stainless steel or aluminum to handle adverse conditions. Corrosion-resistant, stainless steel drive spring ensures long life.

Two-Piece Reel Enclosure: Rugged, high density polyethylene housing unit provides long-lasting permanent protection.

Ratchet Lock: A locking mechanism engages every three feet to maintain desired hose length outside unit.

Stainless Steel Cover: Corrosion-resistant cover allows quick and easy access to reel for maintenance.

Spring Retractable Hose Reel Includes: Hose with 1" (2.5 cm) or ¾" (1.9 cm) male hose thread, 5' (1.5 m) inlet hose with NPTF swivel fitting connection and latch ratchet.

Specially Designed Hose: Can remain pressurized at a normal operating pressure of 125 psi.

● Towable Hose Reel Trailer

● Underground Hose Reel

HOSE REEL DIMENSIONS

MODEL	HOSE I.D.		HOSE O.D.		CAPACITY		WEIGHT WITHOUT HOSE		WEIGHT WITH HOSE		PRESSURE	
	in	mm	in	mm	ft	m	lb	kg	lb	kg	psi	Bar
HEAVY-DUTY												
H100-075	0.75	19.0	1.188	30.2	100	31.0	42	19	—	—	1000	69
H175-075	0.75	19.0	1.188	30.2	175	54.0	54	25	—	—	1000	69
H100-100	1.00	25.4	1.500	38.1	100	30.0	58	26	—	—	300	21
H100-100M	1.00	25.4	1.500	38.1	100	30.0	75	34	—	—	300	21
SPRING DRIVEN												
S050-038	0.375	10.0	0.640	16.0	50	15.0	—	—	37	17	300	21
S035-058	0.625	15.9	0.940	23.9	35	10.7	—	—	75	34	250	18
S025-075	0.75	19.0	1.188	31.0	25	8.0	—	—	52	24	250	18
S050-075	0.75	19.0	1.188	31.0	50	15.0	—	—	89	41	250	17
POLY												
P050-050	0.50	13	0.781	20.0	50	15.0	—	—	21.5	10	138	10
COMPOSITE												
C050-038	0.375	10	0.640	16	50	15	—	—	26.1	12	300	21
TRAILER												
T4040	Trailer includes Model H100-100 Hand Rewind Hose Reel, Less Hose											
T4040M	Trailer includes Model H100-100M Motor Drive Hose Reel, Less Hose											
UNDERGROUND												
HR4066	0.625	16	0.94	24	100	30			159	72	125	9
HR4063	0.750	19	1.188	30	75	23	—	—	159	72	125	9
HR4064	1.000	25	1.500	38	50	15	—	—	159	72	125	9

Hose-End Nozzles

When you're syringing, hand watering or simply hosing down equipment, don't just go with the flow — customize it for every application with new Rain Bird® hose-end nozzles. Each nozzle comes in a different flow rate for different applications. Spray patterns are fully adjustable to meet demanding job sites like golf courses and athletic fields. Quick Connect couplers let you switch easily so you're always ready with the right nozzle for each situation.

BENEFITS

- Variety of nozzle options provides improved flow control for the right application
- Quick Connect couplers allow you to switch between nozzles in seconds
- Adjustable spray patterns deliver the right water distribution for each application
- Powder-coated aluminum construction for added durability
- Durable rubber bumper made to last
- Manufactured in the U.S.A.

MODELS

RAIN BIRD PART#	DESCRIPTION
NZ0100HF	High-flow Nozzle with 1" (25mm) inlet NPSH
NZ0100MF	Mid-flow Nozzle with 1" (25mm) inlet NPSH
NZ0075MF	Mid-flow Nozzle with 0.75" (19mm) inlet GHT
NZ0100LF	Low-flow Nozzle with 1" (25mm) inlet NPSH
NZM100	1" (25mm) Male Quick Connect Coupler NPSH
NZF100	1" (25mm) Female Quick Connect Coupler NPSH
NZF100BSP	1" (25mm) Female Quick Connect Coupler BSP Hose
NZF075	0.75" (19mm) Female Quick Connect Coupler GHT
NZF075BSP	0.75" (19mm) Female Quick Connect Coupler BSP Hose

NPSH – National Pipe Straight Hose Thread
GHT – Garden Hose Thread
BSP – British Standard Pipe Hose Thread

SPECIFICATIONS

Nozzle Inlet Threads:

1" (25mm) in high-flow, mid-flow and low-flow models (NPSH)

0.75" (19mm) in mid-flow model (GHT)

Quick Connect Coupler Threads:

1" (25mm) (NPSH) male outlet

1" (25mm) (NPSH) female inlet

1" (25mm) (BSP) female inlet

0.75" (19mm) (GHT) female inlet

0.75" (19mm) (BSP) female inlet

FLOW RATES*

RAIN BIRD PART#	DESCRIPTION	MAX FLOW RATE*	OPTIMAL FLOW RATE
NZ0100HF	High-flow Nozzle with 1" (25mm) inlet NPSH	98 gpm (6.1 lps)**	20/60 gpm (1.3/3.8 lps)
NZ0100MF	Mid-flow Nozzle with 1" (25mm) inlet NPSH	57 gpm (3.6 lps)	35 gpm (2.2 lps)
NZ0075MF	Mid-flow Nozzle with 0.75" (19mm) inlet GHT	57 gpm (3.6 lps)	35 gpm (2.2 lps)
NZ0100LF	Low-flow Nozzle with 1" (25mm) inlet NPSH	54 gpm (3.4 lps)	10/24 gpm (0.6/1.5 lps)

*Max flow rate based on flow at 100 psi. Flow rates will vary based on inlet pressure and friction loss through hose.

**Use only with 1" ID hose.

● Hose-End Nozzles

HOW TO SPECIFY

NOZZLES

NZ – XXXX – XX

- **NZ** — **Model** Nozzle
- **XXXX** — **Inlet** 0100 = 1" 0075 = ¾"
- **XX** — **Flow** HF = High Flow MF = Medium Flow LF = Low Flow

COUPLERS

NZ – X – XXX – (BSP)

- **NZ** — **Model** Nozzle
- **X** — **Threading** M = Male F = Female
- **XXX** — **Inlet** 0100 = 1" 0075 = ¾"
- **(BSP)** — **Optional** For BSP Thread

Quickly and easily change nozzles for the right application.

DB Series Wire Connector

CONNECTIONS MADE EASY

Install Faster

When your installation crew is making countless wire connections on a jobsite, why slow them down with unnecessary work steps? Use Rain Bird® DB series wire connectors to get the job done faster.

Reduce Inventory

This is the only wire connector you'll need! It is ideal for use on two-wire decoder control systems.

- Use for standard controllers, valve boxes and soil moisture sensors.
- Wire combinations ranging from 22ga to 6ga.
- Use on connections from 24 VAC to 600 VAC.
- UL 486D certified for direct burial.

Avoid Call Backs

Locating and repairing a corroded wire splice costs your business time and money. Avoid unnecessary service call backs. Use Rain Bird DB series wire connectors for reliable connections.

- The strain relief ensures wires are secure and won't pull apart.
- Waterproof silicone sealant protects against corrosion.
- U.V.-material ensures product performance does not degrade even after long periods of exposure to sunlight.

FEATURES AND BENEFITS

- Direct-bury silicone-filled tube with strain relief
- UL 486D listed and 600V rated waterproof and corrosion-proof
- Patent pending snap-fit lid provides strain relief
- UV- and impact-resistant
- Excellent for above-ground or direct-bury applications
- Pre-filled with silicone that never hardens
- Includes Tan Wing or Red/Yellow Nut Connector
- Wire Range: Red/Yellow #6 – #22; Tan #10 – #22
- Perfect for Two-Wire Decoder Systems, Field Controller or Integrated Control Systems

● DB Series

HOW TO SPECIFY

DB	–	XX	–	XXXX
Model		**Wire Connector**		**Pack**
DB Series		RY		50
		T		100
				1,000

Service Tools

Rain Bird offers a full line of quality tools for the service and maintenance of Rain Bird Golf Rotors. Constructed of heavy-duty metal alloys and durable plastic, these tools are lightweight and easy to use.

D02203
Snap-Ring Pliers 900/950/1100/1150

D02236
Snap-Ring Pliers 700/750/500/550

B41700
Valve Insertion Tool 900/950/1100/1150

B41710
Valve Insertion Tool 700/750/500/550

B41720
EAGLE™ Selector Service Tool/Key

D02237
Installation Socket for
Top-Serviceable Rock Screen

D05205
Universal Hose Adapter

D02215
7" Selector Valve Key

D02221
18" Selector Valve Key

Y05100
351B Rotor Tool

232693S
351B Hold-up Tool

PUMPS AND FILTRATION

Rain Bird applies its industry-leading irrigation expertise to the design and manufacture of pump stations and filtration products. By doing so, Rain Bird is the only irrigation manufacturer able to provide totally integrated irrigation solutions, Reservoir to Rotor. Rain Bird's solutions reliably and dependably deliver a more playable course, while lowering operational costs.

Unequaled Quality and Performance

REMOTE PUMP STATION ACCESS

Rain Bird's user interface is a network ready design that allows for remote access via PC, laptop, tablet, smart phone, or any web-enabled mobile device. These devices are simple to navigate, properly formats to the screen of the device being used and allows for complete control and monitoring of your golf Pump Station. This remote accessibility provides Rain Bird customers the confidence to control their pumping systems when they are away from the course.

ELECTRICAL DESIGN

Rain Bird® pump stations are built to UL508A standards and use the industry's best surge suppression reducing the risk of electronic component damage that could lead to inconvenient and costly downtime. This design includes full heavy-duty circuit breaker integration providing the ultimate protection with the best serviceability.

BACKUP PRESSURE REGULATION

Every station comes with an engineered design and properly sized pressure relief valve to provide automatic pressure regulation in the event of a failed VFD or stuck contactor.

VFD PER MOTOR (VPM) OPTION

Rain Bird offers the industry's most comprehensive package upon request, including a VFD for each main motor on a multi-pump station. This option offers superior motor protection along with no mechanical switching components. It also provides a level of efficient backup pressure regulation that a pressure relief valve or butterfly valve cannot deliver.

DURABLE POLYESTER POWDER-COATING

Rain Bird's in-house sandblasting system assures all exterior surfaces of the pump station are prepared to specification standards and allowing for the best coating adhesion. The polyester powder-coat Rain Bird applies is far more durable than competitive solvent-based multi-layer coatings. In fact, Rain Bird's powder-coating process scores a 10 out of 10 on an ASTM corrosion test provided by Sherwin Williams. Other industry pump stations scored four (4) out of 10 on the very same test. In addition the powder-coating process is considered very environmentally friendly.

ENGINEERED PUMP STATION SKID DESIGN

Using 3D modeling, the channel steel skid frame is engineered for strength and rigidity. This engineered design reduces the vibration and eliminates the requirement for bulky oversized pumping plates which present a hazard. The deck is the industry's strongest and longest-lasting by providing the professional grade smooth steel plate continuously welded. In addition, Rain Bird follows specifications of all station components such as the proper flow meter flume requirements. No detail is overlooked on this engineered solution.

ADVANCED CONTROLS

With the industry's leading touch screens, Rain Bird continues to innovate by offering the largest screen as a standard. Beyond being network ready, this interface offers up to 20 years of historical memory capability, and USB backup. With features such as filtration integration, water feature control, lake level control, pump lockouts, auto set point adjustment per pump, motor starts protection, and many many more, Rain Bird has been driving pump station innovation in the Golf Industry for the last decade.

REAL-TIME SYSTEM INTEGRATION

Rain Bird pump stations have Pump Manager 2 and Smart Pump™ technology at the central control, so you can configure your system to automatically monitor and self-adjust to changing conditions. This seamless integration by Rain Bird improves your system's overall performance by reducing watering windows and minimizing energy use.

PUMP AND MOTOR OPTIONS

Rain Bird provides solutions to meet the customer requirements rather than providing the solutions to meet factory requirements. As an example Rain Bird offers cast iron discharge heads as a standard for golf irrigation pump stations. With superior flow characteristics and having 12 times the required tensile strength for a typical golf pumping system, it is the obvious choice for the application. Rain Bird offers various levels of efficiency rated motors when the situation demands something other than the standard.

AIR RELIEF

Rain Bird provides air relief on each pump. Individual air relief valves allow for the maximum amount of air to be removed from the pump columns and not enter into the irrigation system.

USER CONTROLS

Rain Bird Pump Stations have set the bar with simple, large-icon touchscreen controls in nine (9) different languages. In addition, they have the simplest user interface manual control switch design. Each pump has its own lighted three position Manual, Off, or Auto position switch. Even the most basic users are able to control a Rain Bird pump station safely, simultaneously offering the industry's only PLC and touchscreen integrated switch design which gives the user full automatic control if the touch screen were to be damaged or fails.

PUMP STATION PLATFORMS QUICK REFERENCE GUIDE

LP SERIES

HES1

- One horizontal end suction pump
- 5 to 10 HP motor with VFD
- Up to 100 psi (6.9 bar)
- Up to 200 gpm (12.6 lps, 45.4 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display

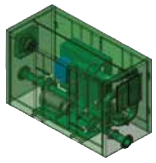
VM1

- One vertical multistage pump
- 1 to 2 HP motor with VFD
- Up to 50 psi (3.5 bar)
- Up to 60 gpm (362.8 lps, 13.6 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display

D SERIES

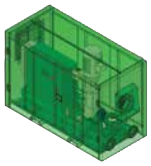
HES1

- One horizontal end suction pump
- 5 to 20 HP motor with VFD
- Up to 130 psi (9.0 bar)
- Up to 350 gpm (22.1 lps, 79.5 m³/h)
- Powder-coated steel enclosure
- Monochrome touch-panel display



VM1

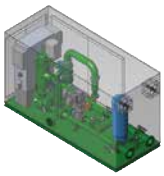
- One vertical multistage pump
- 3 to 15 HP motor with VFD
- Up to 115 psi (7.9 bar)
- Up to 200 gpm (12.6 lps, 45.4 m³/h)
- Powder-coated steel enclosure
- Monochrome touch-panel display



M SERIES

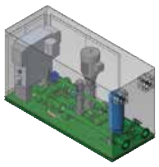
HES1

- One horizontal end suction pump
- 20 to 50 HP motor with VFD
- Up to 120 psi (8.3 bar)
- Up to 600 gpm (37.9 lps, 136 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display



VM1

- One vertical multistage pump
- 15 to 60 HP motor with VFD
- Up to 155 psi (10.7 bar)
- Up to 500 gpm (31.5 lps, 114 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display



COMPACT DECK

VT1

- 25 to 75 HP motors with VFD
- Up to 140 psi (9.7 bar)
- Up to 500 gpm (31.5 lps, 114 m³/h)
- Color touch-panel display

VT2

- 25 to 75 HP motors with VFD
- Up to 140 psi (9.7 bar)
- Up to 1600 gpm (101 lps, 363 m³/h)
- Color touch-panel display

LARGE DECK

VT2

- Large Deck to accommodate optional integrated filtration
- 25 to 75 HP motors with VFD
- Up to 140 psi (9.7 bar)
- Up to 1600 gpm (101 lps, 363 m³/h)
- Color touch-panel display

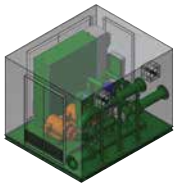
VT3

- Large Deck to accommodate optional integrated filtration
- 40 to 75 HP motors with VFD
- Up to 140 psi (9.7 bar)
- Up to 2400 gpm (151 lps, 545 m³/h)
- Color touch-panel display

PUMP STATION PLATFORMS

HES2

- Two horizontal end suction pumps
- 20 to 60 HP motors with VFD
- Up to 124 psi (8.6 bar)
- Up to 1200 gpm (76 lps, 273 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display



VM2

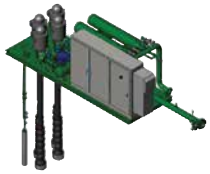
- Two vertical multistage pumps
- 25 to 60 HP motor with VFD
- Up to 150 psi (10.3 bar)
- Up to 1000 gpm (63.1 lps, 227 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display

HES3

- Three horizontal end suction pumps
- 20 to 60 HP motors with VFD
- Up to 124 psi (8.6 bar)
- Up to 1800 gpm (114 lps, 409 m³/h)
- Aluminum Enclosure
- Monochrome touch-panel display

VT4-LARGE

- Large Deck to accommodate optional integrated filtration
- 40 to 75 HP motors with VFD
- Up to 140 psi (9.7 bar)
- Up to 3000 gpm (189 lps, 681 m³/h)
- Color touch-panel display



PANEL ONLY

- Controls 1-6 pumps, up to 100 HP each
- VFD or VPM
- Flow meter and pressure transducer included.

Self-Cleaning Pump Suction Screen

Keep Debris Out of Your Pumping and Irrigation System

No matter the source of your irrigation water, you need to clean the water of trash and debris that could block flow, damage the pump station or clog irrigation equipment.

Rain Bird's galvanized, Self-Cleaning Pump Suction Screen removes large trash and debris from water sources, saving time and money in energy, pumping efficiency and maintenance costs. With a heavy 12 or 24 mesh stainless steel screen, this model will increase your pump efficiency for many years to come.

The pump suction screen is attached to the end of the pump suction line. All water must pass through the screen before entering the pump intake pipe. A small, side-stream from the pump discharge plumbing drives two spray bars that continually rotate, jetting water at the screen and blasting debris away.

Made to last, Rain Bird®'s Self-Cleaning Pump Suction Screen's all-metal construction has a removable screen drum. There are no exterior moving parts that can break down or need repair. The unit is completely corrosion resistant and will not collapse under normal operation.

For added flexibility, Rain Bird's Self-Cleaning Pump Suction Screen can be installed at any angle without affecting operation. It also has a standard flanged connection (other connections are available upon request). The included "Y Strainer" — essential on the water jet supply line — provides easy access for cleaning and prevents the spray nozzles from plugging.

HOW TO SPECIFY

PSSXXX(X) – XX – G

Desination
G = Golf

Mesh
Blank = 12 Mesh
24 = 24 Mesh

Models

PSS600	PSS1700	PSS3000
PSS800	PSS2000	PSS3500
PSS1000	PSS2400	PSS4000
PSS1400		

SELF-CLEANING PUMP SUCTION SCREEN PERFORMANCE DATA

Model Number	Flow US gpm	Flow m3/Hour	Screen Length (in)	Total Length (in)	Screen Diameter (in)	Flange Size (in)	Return Inlet Pipe Size (in)	Operating Pressure (min - max psi)	Weight Lbs.	Cleaning Spray (gpm)
12 MESH FILTER										
PSS400-G	550	124.9	15	28.8	16	6	1.5	40-100	57	20
PSS600-G	750	170.3	16	32.5	24	8	1.5	40-100	101	20
PSS800-G	950	215.7	18	34.5	24	10	1.5	45-100	108	20
PSS1000-G	1350	306.5	23	39.5	24	10	1.5	50-100	116	24
PSS1400-G	1650	374.6	26	42.5	24	12	1.5	55-100	128	24
PSS1700-G	1950	442.7	28	44.5	26	12	1.5	55-100	148	24
PSS2000-G	2350	533.5	32	48.5	26	14	1.5	60-100	160	24
PSS2400-G	2600	590.2	35	52.5	30	16	1.5	65-100	223	28
PSS3000-G	3000	681.0	40	57.5	30	16	1.5	40-65	236	44
PSS3500-G	3500	794.5	40	59.5	36	18	1.5	40-65	283	44
PSS4000-G	4000	908.0	40	63.5	42	18	1.5	40-65	358	44
24 MESH FILTER										
PSS40024-G	400	90.8	15	28.8	16	6	1.5	40-100	57	20
PSS60024-G	525	119.2	16	32.5	24	8	1.5	40-100	101	20
PSS80024-G	700	158.9	18	34.5	24	10	1.5	45-100	108	20
PSS100024-G	950	215.7	23	39.5	24	10	1.5	50-100	116	24
PSS140024-G	1200	272.4	26	42.5	24	12	1.5	55-100	128	24
PSS170024-G	1400	317.8	28	44.5	26	12	1.5	55-100	148	24
PSS200024-G	1650	374.6	32	48.5	26	14	1.5	60-100	160	24
PSS240024-G	1800	408.6	35	52.5	30	16	1.5	65-100	223	28
PSS300024-G	2075	471.0	40	57.5	30	16	1.5	40-65	236	44
PSS350024-G	2420	549.3	40	59.5	36	18	1.5	40-65	283	44
PSS400024-G	2765	627.7	40	63.5	42	18	1.5	40-65	358	44

"I & G Series" Hydraulic Suction Scanning Filter

Rain Bird®'s Hydraulic Suction Scanning Filters provide worry-free 300 micron (standard) filtered water quality. The bodies of standard "I & G" filters are made from high-grade, low-carbon steel and are protected by a durable polyester epoxy powder-coating, both inside and out. Powered by source line water pressure, the filter's backwashing system produces high velocity reverse water flow to clean the screen of trapped contaminants. Suspended solids accumulate on the inner surface of screen, building up a filter layer and creating a pressure differential. Once the pressure differential reaches a preset level a rinse cycle is initiated by the controller. The process takes a matter of seconds, without interruption of system flow. Standard wire mesh screens are supported to virtually eliminate the possibility of screen collapse, even under the most challenging conditions. All Rain Bird® "I & G Series" filters are also available in Stainless Steel construction for the most demanding water quality applications. Models are available as a filter unit only, or as a filter assembly including bypass plumbing. (Note: G Series has a fine screen only, while I Series has a coarse and fine screen).

The standard Rain Bird automatic control system is based on a differential pressure switch and a solenoid actuated flush valve. The filtration system is automatically monitored and controlled either on elapsed time (since the last cleaning cycle) or pressure differential, when the differential pressure exceeds 7 psi (user definable).

Optional SS screen sizes available for 50, 80, 100, 150 or 200 micron.

(shown as filter only)
HS-G-03-LE-G

(shown as filter only)
HS-I-08-PE-G

"I-SERIES" SUCTION SCANNING FILTER PERFORMANCE DATA

Powder-Coated Carbon Steel Model Number	Stainless Steel Model Number	Maximum Flow US gpm	m3/Hour	Max Pressure (psi)	Inlet / Outlet Flange Size (in)	Flush Line Size (in)	Minimum Inlet Pressure During Rinse Cycle (psi)
FILTER ONLY							
HS-I-06-PE-G	HS-I-06-PE-S-G	650	147.6	150	6	4	30
HS-I-08-PS-G	HS-I-08-PS-S-G	1200	272.6	150	8	4	30
HS-I-08-PE-G	HS-I-08-PE-S-G	1500	340.7	150	8	4	30
HS-I-10-PS-G	HS-I-10-PS-S-G	1750	397.5	150	10	4	30
HS-I-10-PE-G	HS-I-10-PE-S-G	2000	454.3	150	10	4	30
HS-I-12-PS-G	HS-I-12-PS-S-G	2500	567.9	150	12	4	30
FILTER ASSEMBLY WITH BYPASS MANIFOLD							
HS-I-06-PE-B-G	HS-I-06-PE-S-B-G	650	147.6	150	6	4	30
HS-I-08-PS-B-G	HS-I-08-PS-S-B-G	1200	272.6	150	8	4	30
HS-I-08-PE-B-G	HS-I-08-PE-S-B-G	1500	340.7	150	8	4	30
HS-I-10-PS-B-G	HS-I-10-PS-S-B-G	1750	397.5	150	10	4	30
HS-I-10-PE-B-G	HS-I-10-PE-S-B-G	2000	454.3	150	10	4	30
HS-I-12-PS-B-G	HS-I-12-PS-S-B-G	2500	567.9	150	12	4	30
DS-I-08-PE-B-G	DS-I-08-PE-S-B-G	3000	681.5	150	12	4	30
DS-I-10-PS-B-G	DS-I-10-PS-S-B-G	3500	795.0	150	12	4	30
DS-I-10-PE-B-G	DS-I-10-PE-S-B-G	4000	908.6	150	14	4	30
DS-I-12-PS-B-G	DS-I-12-PS-S-B-G	5000	1135.8	150	14	4	30

"G-SERIES" SUCTION SCANNING FILTER PERFORMANCE DATA

Powder-Coated Carbon Steel Model Number	Stainless Steel Model Number	Maximum Flow US gpm	m^3/Hour	Max Pressure (psi)	Inlet / Outlet Flange Size (in)	Flush Line Size (in)	Minimum Inlet Pressure During Rinse Cycle (psi)
FILTER ONLY							
HS-G-06-LS-G	HS-G-06-LS-S-G	650	147.6	150	6	3	30
HS-G-06-LE-G	HS-G-06-LE-S-G	850	193.1	150	6	3	30
HS-G-08-LS-G	HS-G-08-LS-S-G	1300	295.3	150	8	3	30
HS-G-10-LS-G	HS-G-10-LS-S-G	1750	397.5	150	10	3	30
FILTER ASSEMBLY WITH BYPASS MANIFOLD							
HS-G-06-LS-B-G	HS-G-06-LS-S-B-G	650	147.6	150	6	3	30
HS-G-06-LE-B-G	HS-G-06-LE-S-B-G	850	193.1	150	6	3	30
HS-G-08-LS-B-G	HS-G-08-LS-S-B-G	1300	295.3	150	8	3	30
HS-G-10-LS-B-G	HS-G-10-LS-S-B-G	1750	397.5	150	10	3	30
DS-G-060-LE-B-G	DS-G-06-LE-S-B-G	1700	386.2	150	10	3	30
DS-G-080-LS-B-G	DS-G-08-LS-S-B-G	2600	590.6	150	10	3	30
DS-G-100-LS-B-G	DS-G-10-LS-S-B-G	3500	795.0	150	12	3	30

** Filter flow is based on 200 micron and above filtration of clear irrigation water. Appropriate flow de-rating is required for excessive debris loads (silt, organics, algae, etc.), reclaim water and finer screens. Contact Rain Bird for filter selection assistance for these applications.*

"E-Series" Electric Suction Scanning Filter

High Performance Precision Scanning

Rain Bird®'s "E-Series" Suction Scanning Filter provides worry-free high-flow rate 300 micron (standard) filtered water quality. Powered by source line water pressure and an electrical drive motor, the filter's backwash system produces a concentrated high velocity reverse water flow to precisely clean the screen of entrapped contaminants. Unique to this design, Rain Bird has eliminated potentially troublesome limit switches (for reversing the drive mechanism) and implemented a reversing mechanism that is simple and higher reliability than other units on the market today.

Operation

Dirty water enters the inlet flange and passes through the coarse screen. The water then flows to the inside of the multi-layer fine screen, filtering suspended solids that are too large to pass through the screen. Clean, filtered water then leaves the filter through the outlet flange. Suspended solids accumulate on the inner surface of the fine screen, restricting the filter and creating an increasing pressure differential at which intiate a cleaning cycle. The controller opens the rinse valve which quickly drops the pressure in the rinse chamber. Water moves from the nozzle opening, through the dirt collector, into the flush chamber and out the rinse valve. Self-adjusting nozzles allow each nozzle to lightly contact the screen surface. The drive assembly slowly rotates the dirt collector in a tight, spiral motion at a fixed speed to clean the screen. The reversing mechanism allows the dirt collector to oscillate back and forth as long as the uni-directional motor is operating. There are no limit switches to fail or multiple motor starters in the control box. The controller stops the drive assembly when the screen is clean and closes the rinse valve, completing the cleaning cycle without interruption of system flow.

Monitoring and Controls

The standard Rain Bird control system consists of a programmable logic controller, a differential pressure switch, electric drive motor, and a solenoid-actuated flush valve. The differential pressure switch monitors inlet and outlet pressures and comes factory preset. The housing-mounted solenoid actuated flush valve and electric drive motor are activated by the controller when the differential pressure exceeds 7 psi. The system is automatically monitored and controlled either on elapsed time or pressure differential (user definable). If timed cleaning cycles are utilized, the system will automatically default to a backwash if a 7 psi differential pressure is reached before the next timed cleaning cycle. Standard Rain Bird automatic controls are available for 115 VAC and 230 VAC, 50 / 60 Hz (user-configurable) single phase power.

NOTE: "E-Series" filters integrated with a Rain Bird Pump Station utilize 115 VAC solenoids.

Construction

Rain Bird "E-Series" filters are built for years of durable, trouble-free service. The housing and covers of standard filters are made from thick wall high-grade, low-carbon steel. All exposed surfaces, both inside and out, are polyester powder-coated over a zinc phosphate primer coat. Easy maintenance access to the the internal components of the filter is through a removable front cover with handles that is secured to the front end of the filter housing. All wetted components are constructed of either engineered plastics or non-corrosive metals. All Rain Bird "E-Series" filters are also available in Stainless Steel construction for the most demanding water quality applications.

SPECIFICATIONS

- Available as filter only (no bypass plumbing) or as a complete assembly with bypass plumbing and valves for easy installation
- Heavy-duty, durable, SS multi-layer sintered screens supplied standard
- Standard SS multi-layer sintered screens are supplied as 300 micron
- Optional SS screen sizes available for 50, 80, 100, 150 or 200 micron
- Standard flow rates from 200 to 4,000 gpm
- Standard maximum operating pressure of 150 psi (higher pressures optionally available)
- Filtered, clean water backwashing initiated automatically by time or pressure differential via integrated Rain Bird controller
- Flanged inlet and outlet standard. Grooved inlet and outlet configuration optionally available

See chart below for all standard models available. Consult factory for options and custom configurations.

"E-Series" Electric Scanning Filter

"E-SERIES" SUCTION SCANNING FILTER PERFORMANCE DATA

Powder Coated Carbon Steel Model Number	Stainless Steel Model Number	Maximum Flow US gpm	m^3/Hour	Max Pressure (psi)	Inlet / Outlet Flange Size (in)	Flush Line Size (in)	Minimum Inlet Pressure During Rinse Cycle (psi)
FILTER ONLY							
ES-E-04-PS-G	ES-E-04-PS-S-G	425	96.5	150	4	3	30
ES-E-08-PM-G	ES-E-08-PM-S-G	1050	238.5	150	8	3	30
ES-E-08-PS-G	ES-E-08-PS-S-G	1500	340.7	150	8	4	30
ES-E-10-PS-G	ES-E-10-PS-S-G	2000	454.3	150	10	4	30
FILTER ASSEMBLY WITH BYPASS MANIFOLD							
ES-E-04-PS-B-G	ES-E-04-PS-S-B-G	425	96.5	150	4	3	30
ES-E-08-PM-B-G	ES-E-08-PM-S-B-G	1050	238.5	150	8	3	30
ES-E-08-PS-B-G	ES-E-08-PS-S-B-G	1500	340.7	150	8	4	30
ES-E-10-PS-B-G	ES-E-10-PS-S-B-G	2000	454.3	150	10	4	30
DS-E-08-PM-B-G	DS-E-08-PM-S-B-G	2100	477.0	150	10	4	30
DS-E-08-PS-B-G	DS-E-08-PS-S-B-G	3000	681.5	150	12	4	30
DS-E-10-PS-B-G	DS-E-10-PS-S-B-G	4000	908.6	150	14	4	30

** Filter flow is based on 200 micron and above filtration of clear irrigation water. Appropriate flow de-rating is required for excessive debris loads (silt, organics, algae, etc.), reclaim water and finer screens. Contact Rain Bird for filter selection assistance for these applications.*

Automatic Backwashing Screen Filter

High Performance with Fewer Moving Parts

Rain Bird®'s Automatic Backwashing Screen Filter provides worry free high-flow rate 250 micron (standard) filtered water quality. Powered by source line water pressure, the filter's patented backwashing valve system produces a reverse flow to flush the system of entrapped contaminants. During the brief backwashing cycle, a portion of the clean water produced by the system is diverted to the filter unit undergoing backwashing. This reverse flow of filtered water frees contaminants from the wedge-wire filter screens. Each filter canister is sequentially backwashed until the entire system is cleaned, allowing irrigation continue through the backwash cycle. Models are available as a filter unit only, or as a filter assembly including bypass plumbing and valves for fast and easy installation on site.

Automatic Monitoring

This filtration system is automatically monitored either on elapsed time (since the last backwashing) or pressure differential. This dual monitoring offers the user the flexibility to assure that filter operation is maintained with high efficiency, low pressure drop and consistent high quality water production. Rain Bird automatic controls are available for A/C power, D/C power and solar power applications.

Long-Lasting Construction

The Automatic Backwashing Screen Filter is built for years of durable, trouble-free service. The filter canisters are constructed of carbon steel, which is fusion epoxy lined as a standard feature. The carbon steel manifolds and the cast iron backwash valve are also fusion epoxy lined. The stainless steel filter screens are of a low maintenance design and require only periodic maintenance to maintain the filter element. In addition to the automatic backwashing cycle, the filter canisters and screens have no internal moving parts to wear out, break down or replace. And, the high strength stainless steel canisters are constructed with a 400 psi burst strength. A patented backwash valve features stainless steel valve trim and a field replaceable polyurethane valve sealing element. The backwash valves also feature external lubrication fittings for easy field service.

SPECIFICATIONS

- Available as filter only (no bypass plumbing) or as a complete assembly with bypass plumbing and valves for easy installation
- Heavy-duty, durable, wedge-wire screen filtration element
- Flow rates from 250 to 4,000 gpm
- Standard maximum operating pressure: 150 psi (higher pressures optionally available)
- Standard, stainless steel wedge-wire screens are supplied as 60 mesh (250 micron)
- Optional screen sizes available for 40 (420 micron), 80 (175 micron), 100 (150 micron) or 150 mesh (100 micron)
- Vertical configuration designed for limited space applications
- Large screen area provides long runs between backwash cycles
- Filtered, clean water backwashing automatically initiated by time or pressure differential
- Flanged inlet and outlet standard. Grooved inlet and outlet configuration optionally available
- Optional solar package and DC latching solenoid available. Solar package includes a solar panel, battery pack, metering system, wiring harness and enclosure box
- No moving parts inside the filter canister to wear out

(shown as filter only)

Rain Bird's automatic dual-monitoring system triggers the backwashing cycle, which quickly clears contaminants from the filter screens and maintains peak operating efficiency

HOW TO SPECIFY

BSF10 – X – X – G

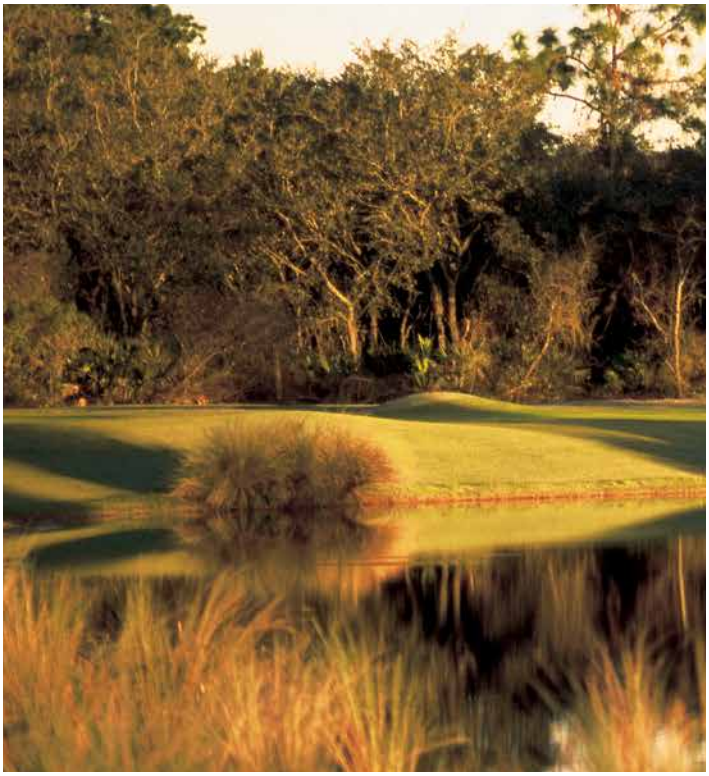
- **BSF10** — **Golf Models** BSF10
- **X** — **Tanks** 2 to 8
- **X** — **Optional Configuration** Blank = none, B = Bypass Manifold
- **G** — **Desination** G = Golf

AUTOMATIC BACKWASHING SCREEN FILTER PERFORMANCE DATA

Model Number	Maximum Flow (US gpm)	m^3/Hour	Max Pressure (psi)	Inlet / Outlet Flange Size (in)	Flush Line Size (in)
FILTER ONLY					
BSF10-2-G	1000	227.2	150	8	4
BSF10-3-G	1500	340.7	150	8	4
BSF10-4-G	2000	454.3	150	10	4
BSF10-5-G	2500	567.9	150	10	4
BSF10-6-G	3000	681.5	150	12	4
BSF10-7-G	3500	567.9	150	12	4
BSF10-8-G	4000	908.6	150	14	4
FILTER ASSEMBLY WITH BYPASS MANIFOLD					
BSF10-2-B-G	1000	227.2	150	8	4
BSF10-3-B-G	1500	340.7	150	8	4
BSF10-4-B-G	2000	454.3	150	10	4
BSF10-5-B-G	2500	567.9	150	10	4
BSF10-6-B-G	3000	681.5	150	12	4
BSF10-7-B-G	3500	567.9	150	12	4
BSF10-8-B-G	4000	908.6	150	14	4

Filter flow is based on 250 micron filtration and above of clear irrigation water. Appropriate flow de-rating is required for excessive debris loads (silt, organics, algae, etc.), reclaim water and finer screens. Contact Rain Bird for filter selection assistance for these applications.

SERVICES



Rain Bird's® Global Service Plans provide Central Control end-users with comprehensive service and support benefits essential to maintaining a healthy irrigation system. The Board Exchange Program offers a variety of circuit boards with next business day delivery service at discounted rates.

GSP Standard Service Plans For Active and Expired GSP Members

All GSP Standard service plans include:

- **Toll-Free Remote Technical Support.** 8 a.m. to 5 p.m. local business hours, Monday – Friday, normal business days. Get answers, instruction, or assistance from a team of industry certified GSP Engineers to help you maximize your central control system's features and capabilities. Save time and solve irrigation problems while you're on the green with a toll-free call to Rain Bird's GSP Team. Bilingual support is also available.
- **Remotely Secured Database Back-Up Service.** Securely store your Rain Bird irrigation files with GSP and reduce or even eliminate the time needed to reprogram system settings and schedules should a loss of data occur.
- **GSP Newsletters and Webinars.** Enhance your knowledge of central control features, learn tips, tricks, and programming short cuts. These features are only available to GSP members.
- **Free Software Service Packs and Point Releases.** Keep your central control software current with the latest enhancements at no extra charge.
- **Customer Satisfaction Policy.** Extend the life of your irrigation system without purchasing new equipment. The GSP warranty covers the Rain Bird irrigation computer, ICI, MIM,™ MIM-X, The FREEDOM System™ repeater, MDI,™ LDI, SDI and the Line Termination Box.
- **Next Business Day Hardware Replacement.** If any Rain Bird central control hardware component covered under the GSP warranty becomes inoperable, a loaner will be delivered to your course the next business day.
- **24-Hour Emergency Paging Service.*** We're available weekends and holidays to help you solve your emergency irrigation issues.
- **High Speed GoToAssist® and Symantec™ pcAnywhere™ Remote System Diagnostics.** GSP Engineers can remotely access your central control computer when issues can't be resolved over the phone and get your irrigation system functioning properly.
- **Annual Water Window Efficiency Audit.** Upon request, our expert team will remotely conduct a WWE audit of your system and help you adjust your system programs for optimal performance.
- **Rain Bird Central Control Certified Start-Up.**
- **Annual and monthly payments available.**
- **20% Board Exchange Program Discount.**
- **Central Control Software Upgrade Discounts.**

NEW FEATURES OF STANDARD GSP PLANS

- **Complimentary MI Series™ Mobile Controller.** Remote access to your central control computer is now as convenient as the Internet, with mobile control. This software runs on your central control computer to provide remote control via a web-enabled smart phone or tablet. Receive access to one Advance and one Professional license while you remain a current GSP Member.

To get more information about the features and benefits of GSP, visit www.rainbird.com/gsp.

UPGRADE YOUR STANDARD GSP PLAN TO A GSP PLUS PLAN

Remote Access Kit. With a GSP customized tablet, you can manage your Rain Bird central control irrigation system from any Internet-friendly location. Includes a 2-year protection plan and case. Just add GSP Plus to any Standard GSP Plan when you renew. If you are a current member, you can qualify to upgrade at any time.

HOW TO ORDER

GSP PLUS **001385**

GSP STANDARD PLAN OPTIONS

STANDARD GSP PLANS (PAYMENT & TERM OPTIONS)	CURRENT GSP MEMBERS (NO COMPUTER OPTIONS)*	CURRENT GSP MEMBERS (WITH COMPUTER OPTIONS)*	EXPIRED GSP MEMBERS (WITH COMPUTER OPTIONS)*
1 Year – Single Payment	001318	—	—
1 Year – Monthly Payment	001339	—	—
3 Year – Single Payment	001332	H49504	H49503
3 Year – Annual Payment	001333	H49504A	H49503A
3 Year – Monthly Payment	001334	H49504M	H49503M
5 Year – Single Payment	—	H49506	H49505
5 Year – Annual Payment	—	H49506A	H49505A
5 Year – Monthly Payment	—	H49506M	H49505M

**GSP Members, current or expired, must renew with computer if current computer is 5 years old or greater*

Why GSP? Why Now?

WHAT IS $7 A DAY WORTH TO YOU?

- Improved course playability
- Expert advice, answers to your questions, hardware protection and software upgrades for the single most imporatant course management tool you have: your irrigation system
- Increased budget control and labor savings

PROTECT YOUR INVESTMENT

- Maintain desired playability with the most effective use of water and power
- Minimize system downtime
- Get expert advice on grounding requirements and electrical component protection
- Eliminate over irrigated turf by utilizing advanced software features like ET-based irrigation and Temporary Station Adjust
- Write more accurate and site specific programs using map-based programming
- Help manage turfgrass diseases more effectively

MAXIMIZE SYSTEM LIFE

- Learn to easily maximize your water window efficiency
- Use your irrigation system more efficiently
- Ready access to periodic system maintenance schedules
- Increase the life of your system and maximize pump station efficiency with advanced hydraulic management features like Rain Bird Smart Pump™ and Flo-Manager®
- Get suggestions on the best methods to maintain your rotor performance

CONTROL YOUR BUDGET

- Fixed periodic expense, with monthly and annual payment options
- No cost to repair or replace covered central control components unless damaged by surge or lightning
- Significant discounts to repair or replace surge or lightning damaged components, or components not covered under GSP
- Next business day delivery of covered central control components at no charge

To get more information:

- *Call your Rain Bird Distributor or call us at (866) GSP-XPRT. Check out our website: www.rainbird.com/gsp*

Board Exchange Program

The Rain Bird Board Exchange Program is designed to meet your needs for a fast and reliable source of replacement circuit boards for your Rain Bird Golf products, when a "downtime" situation demands action.

The program allows for replacement of inoperable circuit boards with reconditioned Rain Bird Golf circuit boards at a substantially discounted price. One call to your local Rain Bird Golf Distributor will ensure a replacement board is delivered the next business day to get your system back up and running properly.

PROGRAM FEATURES

- Guaranteed stock on all current production boards
- Next business day delivery included
- Six-month warranty on all replacement boards
- Low, fixed prices with no membership fee and no minimum order quantity
- Limited availability of obsolete boards

FAST SERVICE/EASY INSTALLATION

When speed is essential to prevent damage to your golf course and to your reputation, you can depend on Rain Bird. Every order is shipped via next business day service to nearly anywhere in the United States, and includes a return shipping label to conveniently return the old board to Rain Bird.

SELECTION

We stock an extensive array of replacement circuit boards for all current Rain Bird Golf central control products, as well as many obsolete boards.

PRICING

All boards are discounted with fixed prices so you know the cost of replacement board in advance. Pricing includes next business day delivery service, and return shipping. GSP members receive an additional 20% discount on replacement boards.

QUALITY

Turning to the manufacturer of the original part ensures that you receive the best quality replacement boards available. Our reconditioned boards are factory certified, and carry a six-month no hassle warranty to give you peace of mind that your system will function properly. All boards are reconditioned with original Rain Bird quality parts, tested, and have all the same engineering and firmware improvements of a new board.

SUPPORT

We know our products and we make every effort to meet your needs. With the finest distributor network in the golf industry, we are prepared to provide you with the best service available. If necessary, you can always contact your Rain Bird Golf Distributor for assistance with installing replacement boards.GSP members can also receive assistance from a Rain Bird GSP Engineer by calling toll free, (866) GSP-XPRT.

LANDSCAPE SOLUTIONS

Properly maintained clubhouse grounds and landscapes enhance the environment upon which the game is played, and create positive impressions that encourage repeat rounds or an increase in memberships. Rain Bird offers a number of landscape irrigation solutions — from sprays and nozzles to low-volume drip and root watering systems — that manage water responsibly, while promoting the growth of healthy, stress-free plants and grass areas. For a complete listing of landscape products, please consult the Rain Bird Landscape Irrigation Products–2014 Catalog.

RD1800™ Series Spray Heads

4", 6", 12" (10.2 cm; 15.2 cm; 30.5 cm)

- Designed for use with all Rain Bird plastic spray head nozzles – Rotary Nozzles, U-Series, MPR, VAN, HE-VAN and SQ Series
- Parts resistant to corrosion in treated recycled water containing chlorine and other chemicals
- Strong stainless steel spring provides reliable stem retraction and withstands corrosion
- Exclusive co-molded, pressure-activated Triple-Blade Wiper Seal ensures a positive seal without excess "flow-by", which enables more heads to be installed on the same valve.
- Debris pockets in the base of the spray body prevent recirculation of harmful debris during operation.
- Reinforced ratchet mechanism allows easy nozzle pattern alignment without tools, withstands chemicals and prevents pattern misalignment over time.
- Pre-installed 1800 Pop-Top™ flush plug blocks debris from entering after flushing and allows for easy nozzle installation.
- UV-resistant plastic and stainless steel parts, assure long product life.
- All sprinkler components are removable from the top without special tools, for quick and easy flushing and maintenance.
- Side inlets featured on non Seal-A-Matic™ (SAM) models only.
- Five-year trade warranty.

Spacing: 2.5 to 24 feet (0.8 to 7.3 m)

Pressure: SAM Models: 15 to 100 psi (1.0 to 6.9 bar)
All Other Models: 15 to 70 psi (1.0 to 4.8 bar)

MODELS

4" MODELS	
RD-04-NP	RD-04-S-P30-F
RD-04-S	RD-04-S-P30-F-N
RD-04-S-NP	RD-04-S-P45-F
RD-04-S-P30	RD-04-S-P45FN
6" MODELS	
RD-06	RD-06-S-P30-F
RD-06-NP	RD-06-S-P30-F-N
RD-06-S	RD-06-S-P45-F
RD-06-S-NP	RD-06-S-P45-F-N
RD-06-S-P30	
12" MODELS	
RD-12	RD-12-S-P30-F
RD-12-NP	RD-12-S-P30-F-N
RD-12-S	RD-12-S-P45-F
RD-12-S-NP	RD-12-S-P45-FN
RD-12-S-P30	

SPECIFICATIONS

Flow-by: SAM Models: 0 at 15 psi (1.0 bar) or greater; 0.5 gpm (0.1 m^3/h; 0.03 l/s) otherwise

All Other Models: 0 at 10 psi (0.7 bar) or greater; 0.5 gpm (0.1 m^3/h; 0.03 l/s) otherwise

- ½" (15/21) NPT female threaded inlet
- **Models and height:**
  - **RD-04:** 6" (15 cm) body height; 4" pop-up height (10.2 cm)
  - **RD-06:** 9 3/8" (24 cm) body height; 6" pop-up height (15.2 cm)
  - **RD-12:** 16" (40 cm) body height; 12" pop-up height (30.5 cm)
  - **Exposed surface diameter:** 2 ¼" (5.7 cm)

RD1800™ SAM Series

4", 6", 12" (10.2 cm, 15.2 cm, 30.5 cm)

- Built-in Seal-A-Matic™ (SAM) check valve. Eliminates the need for under-the-head check valves. No parts to be installed at the site
- Stronger retract spring to accommodate elevation changes up to 14' (4.2 m). One of the strongest springs in the industry
- Prevents drainage from spray heads at lower elevations. Stops water waste. Ends landscape damage due to flooding and erosion

FEATURES

- Incorporates all RD1800™ series features
- Ideal for use in areas with changing elevations
- Retains water in lateral pipes which reduces wear on system components by minimizing water hammer during start-up
- "SAM" printed on the cap for easy identification and maintenance

RD1800™ SAM PRS Series

4", 6", 12" (10.2 cm, 15.2 cm, 30.5 cm)

- Incorporates all RD1800 series SAM and PRS features
- Meets the needs of all spray areas, regardless of changing elevation or water pressures
- "SAM-PRS" stamped on the cap for easy identification and maintenance

● RD 1800 Series

HOW TO SPECIFY

RDXX – X – Nozzle

Model
RD-04
RD-06
RD-12

Nozzle
See Rotary Nozzle, U-Series, MPR, VAN, HE-VAN and SQ Nozzle Specifications

Optional Feature
S: SAM
P30: 30 psi (2.1 bar) PRS
P45: 45 psi (3.1 bar) PRS
F: Flow Shield™
NP: Non-Potable Water indication

LANDSCAPE SOLUTIONS

Performance data derived from tests that conform with ASAE Standards; ASAE S398.1, Procedure for Sprinkler Testing and Performance Reporting.

Exclusive Flow-Shield™ Technology

Exclusive Flow-Shield™ Technology provides up to 90% reduction in water loss when a nozzle is removed, preventing potentially costly and unacceptable run-off.

Patented Pressure Regulator

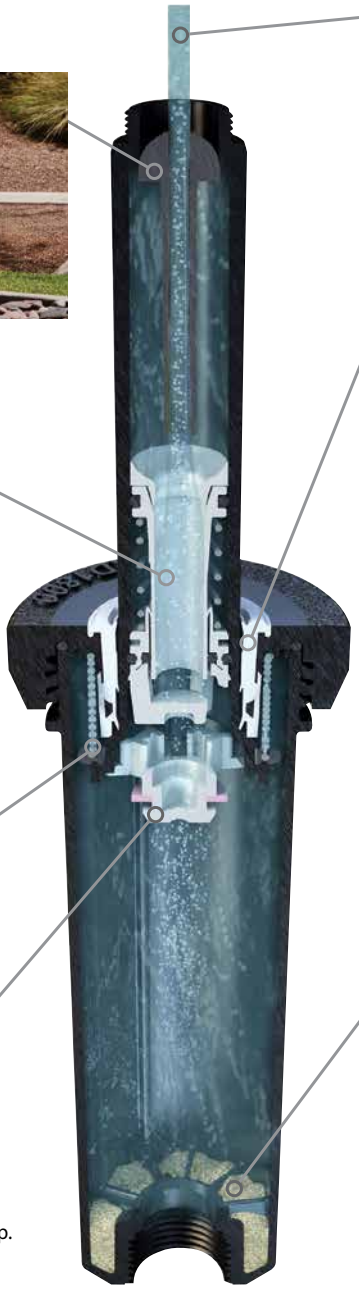
The RD1800's patented pressure regulator increases nozzle efficiency by up to 50% in high pressure applications.

Reinforced Ratchet Mechanism

The RD1800's ratchet mechanism was designed to improve ease of use and consistency, hold its setting over time, withstand years of chlorine exposure and provide greater debris resistance.

Seal-A-Matic™ (SAM) Check Valve

Exclusive to Rain Bird, the SAM check valve holds back up to 14 feet of head and helps eliminate low head drainage, erosion, run-off and water hammer at start-up.



Low-Flow Service Indication Stream

Exclusive Flow-Shield Technology delivers a low-flow service indication stream when a nozzle is removed. As a result, system performance is maintained, water is saved and you don't have to wait until you have brown grass or dead plants to notice something's wrong.

Triple-Blade Wiper Seal

The RD1800™ series features an exclusive Triple-Blade Wiper Seal. The top seal flushes during pop-up and wipes the stem clean during retraction, preventing external debris from entering. During operation, the primary seal combines with the stem's surface to eliminate flow-by. The exclusive third blade provides another line of defense, in case the primary seal is damaged.

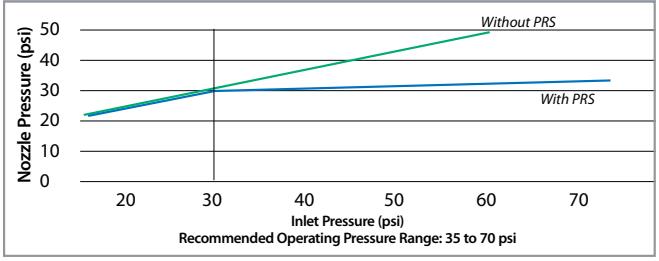
Reclaimed Water Resistance

The RD1800 Series is designed with reclaimed water resistant materials such as EPPM and Polyester. These materials resist degradation caused by chlorine in reclaimed water, ensuring a longer life.

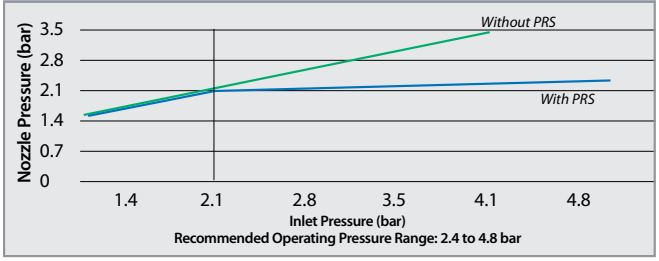
Unique Debris Pockets

With each system start-up, the RD1800's unique debris pockets hold grit in place—removing it from circulation and preventing long-term damage.

RD1800-PRS PERFORMANCE



RD1800-PRS PERFORMANCE METRIC



Rotary Nozzles

- Low precipitation rate of 0.60 in/hr (15.2 mm/hr) reduces run-off and erosion.
- With approximately 60% less flow than conventional spray nozzles, rotary nozzles allow more heads per zone, reducing overall system complexity and cost.
- Multiple, rotating streams uniformly distribute water throughout the 13' to 24' radius range.

FEATURES

A Spray Nozzle with Rain Curtain Performance

- Large droplets for consistent performance.
- Effective close-in watering.
- Even distribution over the entire radius.

Installation and Maintenance

- Designed for use on Rain Bird® Spray bodies.
- Color-coded radius reduction screws for easy identification.
- Stainless steel radius reduction screw allows reduction down to 13' on the R13-18 and to 17' on the R17-24 to accommodate varying landscape needs.
- Maintains highly efficient performance throughout the 20–55 psi pressure range, with no misting or fogging at high pressures.

Design Solutions

- Matched precipitation rate across radii and pattern simplify the design process.
- Matched precipitation rate with Rain Bird 5000/5000 Plus MPR rotor nozzles allow MPR irrigation designs from 13' to 35'.

Durability

- Rubber collar keeps out large debris particles while enabling small ones to exit easily to keep deflector clean and clear of debris.
- Screen mesh size prevents large debris from entering nozzle through spray.
- Three-year trade warranty.

OPERATING RANGE

Pressure range: 20-55 psi (1.4 to 3.8 bar)

Spacing: 13' to 24' (4.0 m to 7.3 m)

Above spacing based on zero wind conditions.
Recommend spacing 13' – 22' (4.0 m to 6.8 m).

MODELS

- There are three different patterns available which are available in two radius ranges*:
  - » 13' to 18' (4.0 m to 5.5 m)
  - » 17' to 24' (5.2 m to 7.3 m)

*See tables on following page

● Rotary Nozzle

HOW TO SPECIFY

XXXX – SAM – RXX – XX

Model
1802
1803
1804
1806
1812

Optional Feature
SAM

Nozzle
Rotary Nozzle

Pattern
F = Full
H = ½
Q = ¼

Radius Range
13'–18' (4.0–5.5 m)
17' –24' (5.2–7.3 m)

Note: Specify sprinkler bodies and nozzles separately. Installation on Rain Bird 1800®-SAM Spray Heads recommended in sandy environments.

R13–18 SERIES (BLACK)

U.S.						METRIC				
				■	▲				■	▲
Arc	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr)	Precip (in/hr)	Pressure (bar)	Radius (m)	Flow (l/m)	Precip (mm/h)	Precip (mm/h)
R13-18F	20	13	1.31	0.75	0.86	1.4	4.0	4.95	19	22
	25	14	1.46	0.67	0.77	1.7	4.3	5.53	18	21
	30	16	1.60	0.61	0.70	2.1	4.8	6.06	15	18
	35	16	1.73	0.61	0.70	2.4	5.0	6.54	15	18
	40	17	1.85	0.61	0.70	2.8	5.2	6.99	15	18
	45	18	1.96	0.61	0.70	3.1	5.4	7.42	15	18
	50	18	2.07	0.61	0.70	3.4	5.5	7.82	15	18
	55	18	2.17	0.61	0.70	3.8	5.6	8.20	15	18
R13-18H	20	13	0.65	0.75	0.86	1.4	4.0	2.47	19	22
	25	14	0.73	0.67	0.77	1.7	4.3	2.76	18	21
	30	16	0.80	0.61	0.70	2.1	4.8	3.03	15	18
	35	16	0.86	0.61	0.70	2.4	5.0	3.27	15	18
	40	17	0.92	0.61	0.70	2.8	5.2	3.50	15	18
	45	18	0.98	0.61	0.70	3.1	5.4	3.71	15	18
	50	18	1.03	0.61	0.70	3.4	5.5	3.91	15	18
	55	18	1.08	0.61	0.70	3.8	5.6	4.10	15	18
R13-18Q	20	13	0.33	0.75	0.86	1.4	4.0	1.24	19	22
	25	14	0.37	0.67	0.77	1.7	4.3	1.38	18	21
	30	16	0.40	0.61	0.70	2.1	4.8	1.51	15	18
	35	16	0.43	0.61	0.70	2.4	5.0	1.64	15	18
	40	17	0.46	0.61	0.70	2.8	5.2	1.75	15	18
	45	18	0.49	0.61	0.70	3.1	5.4	1.85	15	18
	50	18	0.52	0.61	0.70	3.4	5.5	1.95	15	18
	55	18	0.54	0.61	0.70	3.8	5.6	2.05	15	18

R17–24 SERIES (YELLOW)

U.S.						METRIC				
				■	▲				■	▲
Arc	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr)	Precip (in/hr)	Pressure (bar)	Radius (m)	Flow (l/m)	Precip (mm/h)	Precip (mm/h)
R17-24F	20	17	2.45	0.79	0.92	1.4	5.2	9.27	20	23
	25	19	2.74	0.71	0.82	1.7	5.8	10.37	18	21
	30	21	3.00	0.65	0.75	2.1	6.4	11.36	16	19
	35	22	3.24	0.65	0.75	2.4	6.7	12.26	16	19
	40	23	3.46	0.65	0.75	2.8	6.9	13.10	16	19
	45	23	3.67	0.65	0.75	3.1	7.1	13.89	16	19
	50	24	3.87	0.65	0.75	3.4	7.3	14.65	16	19
	55	24	4.06	0.65	0.75	3.8	7.4	15.37	16	19
R17-24H	20	17	1.22	0.79	0.92	1.4	5.2	4.62	20	23
	25	19	1.37	0.71	0.82	1.7	5.8	519	18	21
	30	21	1.50	0.65	0.75	2.1	6.4	5.68	16	19
	35	22	1.62	0.65	0.75	2.4	6.7	6.17	16	19
	40	23	1.73	0.65	0.75	2.8	6.9	6.55	16	19
	45	23	1.84	0.65	0.75	3.1	7.1	6.97	16	19
	50	24	1.94	0.65	0.75	3.4	7.3	7.34	16	19
	55	24	2.03	0.65	0.75	3.8	7.4	7.68	16	19
R17-24Q	20	17	0.61	0.79	0.92	1.4	5.2	2.31	20	23
	25	19	0.68	0.71	0.82	1.7	5.8	2.57	18	21
	30	21	0.75	0.65	0.75	2.1	6.4	2.84	16	19
	35	22	0.81	0.65	0.75	2.4	6.7	3.07	16	19
	40	23	0.87	0.65	0.75	2.8	6.9	3.29	16	19
	45	23	0.92	0.65	0.75	3.1	7.1	3.48	16	19
	50	24	0.97	0.65	0.75	3.4	7.3	3.67	16	19
	55	24	1.02	0.65	0.75	3.8	7.4	3.86	16	19

HE-VAN Series Nozzles

NEW

High-Efficiency Variable Arc Spray Nozzles

- Easy arc adjustment from 0° to 360° with a simple twist of the center collar to increase or decrease arc setting
- ExactEdge™ takes the guesswork out of arc adjustment. As you turn the nozzle to the desired arc setting, you'll feel it lock into place for a clean, consistent edge every time
- Patent pending Flow Control Technology provides superior close-in watering and uniform coverage across the entire pattern

- 12' and 15' models
- 8' and 10' models

FEATURES

- Thicker streams and large water droplets for greater wind resistance
- Matched precipitation rates with Rain Bird® MPR and U-Series nozzles
- A strong top deflector to minimize nozzle damage due to normal wear and tear
- No special tools required
- Stainless steel adjustment screw to adjust flow and radius, up to a 25% reduction in radius
- Shipped with blue filter screens (0.02 x 0.02) to maintain precise radius adjustment and prevent clogging
- Fits on all Rain Bird® 1800® series spray heads, UNI-Spray™ series spray heads and Rain Bird shrub adapters

Rain Bird® HE-VAN Efficiency Ratings[1]

- Rain Bird® HE-VAN Nozzles deliver an average DULQ of 70%, more than a 40% improvement over typical variable arc spray nozzles
- Rain Bird® HE-VAN Nozzles deliver a SC ≤ 1.6, which is 35% lower than the typical variable arc spray nozzle

OPERATING RANGE

Radius:[2]

HE-VAN-08: 6 to 8 feet (1.8 to 2.4 m)

HE-VAN-10: 8 to 10 feet (2.4 to 3.0 m)

HE-VAN-12: 9 to 12 feet (2.7 to 3.7 m)

HE-VAN-15: 12 to 15 feet (3.7 to 4.6 m)

Pressure: 15 to 30 psi (1.0 to 2.1 bar)

Optimum Pressure: 30 psi (2.1 bar)[3]

MODELS

- HE-VAN-08
- HE-VAN-10
- HE-VAN-12
- HE-VAN-15

[1]Distribution Uniformity (DU_{LQ}): DU in irrigation is a measure of how uniformly water is applied to the area being watered. DU_{LQ} is calculated by taking the volume in the lowest quarter of catch can measurements and dividing it by the average volume of all catch can measurements. Scheduling Coefficient (SC): SC is a measure of how long a zone must be run in order to provide adequate water to the driest spot.

[2]These ranges are based on proper pressure at nozzle

[3]Rain Bird recommends using 1800 PRS Spray Bodies to maintain optimum nozzle performance in higher pressure situations

HOW TO SPECIFY

HE – VAN – XX

Model
High Efficiency Nozzle

Feature
VAN: Variable Arc

Radius Range
08: 6–8 ft
10: 8–10 ft
12: 9–12 ft
15: 12–15 ft

8 SERIES HE-VAN — U.S.

24° TRAJECTORY

Nozzle	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr) ■	Precip (in/hr) ▲
360° Arc	15	5	0.83	3.19	3.68
	20	6	0.96	2.56	2.95
	25	7	1.07	2.10	2.42
	30	8	1.17	1.76	2.03
270° Arc	15	5	0.62	3.19	3.68
	20	6	0.72	2.56	2.95
	25	7	0.80	2.10	2.42
	30	8	0.88	1.76	2.03
180° Arc	15	5	0.41	3.19	3.68
	20	6	0.48	2.56	2.95
	25	7	0.53	2.10	2.42
	30	8	0.59	1.76	2.03
90° Arc	15	5	0.21	3.19	3.68
	20	6	0.24	2.56	2.95
	25	7	0.27	2.10	2.42
	30	8	0.29	1.76	2.03

10 SERIES HE-VAN — U.S.

27° TRAJECTORY

Nozzle	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr) ■	Precip (in/hr) ▲
360° Arc	15	7	1.26	2.48	2.86
	20	8	1.46	2.19	2.53
	25	9	1.63	1.94	2.24
	30	10	1.78	1.72	1.98
270° Arc	15	7	0.95	2.48	2.86
	20	8	1.09	2.19	2.53
	25	9	1.22	1.94	2.24
	30	10	1.34	1.72	1.98
180° Arc	15	7	0.63	2.48	2.86
	20	8	0.73	2.19	2.53
	25	9	0.81	1.94	2.24
	30	10	0.89	1.72	1.98
90° Arc	15	7	0.32	2.48	2.86
	20	8	0.36	2.9	2.53
	25	9	0.41	1.94	2.24
	30	10	0.45	1.72	1.98

8 SERIES HE-VAN — METRIC

24° TRAJECTORY

Nozzle	Pressure (Bar)	Radius (m)	Flow (m^3/h)	Flow (l/m)	Precip (mm/h) ■	Precip (mm/h) ▲
360° Arc	1.03	1.52	0.19	3.14	82	95
	1.38	1.83	0.22	3.62	66	76
	1.72	2.13	0.25	4.05	54	62
	2.07	2.44	0.27	4.43	45	52
270° Arc	1.03	1.52	0.14	2.35	82	95
	1.38	1.83	0.16	2.72	66	76
	1.72	2.13	0.18	3.04	54	62
	2.07	2.44	0.20	3.33	45	52
180° Arc	1.03	1.52	0.10	1.57	82	95
	1.38	1.83	0.11	1.81	66	76
	1.72	2.13	0.12	2.02	54	62
	2.07	2.44	0.13	2.22	45	52
90° Arc	1.03	1.52	0.05	0.78	82	95
	1.38	1.83	0.05	0.91	66	76
	1.72	2.13	0.06	1.01	54	62
	2.07	2.44	0.07	1.11	45	52

10 SERIES HE-VAN — METRIC

27° TRAJECTORY

Nozzle	Pressure (Bar)	Radius (m)	Flow (m^3/h)	Flow (l/m)	Precip (mm/h) ■	Precip (mm/h) ▲
360° Arc	1.03	2.13	0.29	4.78	64	74
	1.38	2.44	0.34	5.52	56	65
	1.72	2.74	0.37	6.17	50	57
	2.07	3.05	0.41	6.76	44	51
270° Arc	1.03	2.13	0.22	3.59	64	74
	1.38	2.44	0.25	4.14	56	65
	1.72	2.74	0.28	4.63	50	57
	2.07	3.05	0.31	5.07	44	51
180° Arc	1.03	2.13	0.15	2.39	64	74
	1.38	2.44	0.17	2.76	56	65
	1.72	2.74	0.19	3.09	50	57
	2.07	3.05	0.21	3.38	44	51
90° Arc	1.03	2.13	0.07	1.20	64	74
	1.38	2.44	0.08	1.38	56	65
	1.72	2.74	0.09	1.54	50	57
	2.07	3.05	0.10	1.69	44	51

NOTE: Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum.

■ Square spacing based on 50% diameter of throw. ▲ Triangular spacing based on 50% diameter of throw. Performance data taken in zero wind conditions.

12 SERIES HE-VAN — U.S.

23° TRAJECTORY

Nozzle	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr) ■	Precip (in/hr) ▲
360° Arc	15	9	1.67	1.99	2.30
	20	10	1.93	1.86	2.15
	25	11	2.16	1.72	1.99
	30	12	2.37	1.58	1.83
270° Arc	15	9	1.25	1.99	2.30
	20	10	1.45	1.86	2.15
	25	11	1.62	1.72	1.99
	30	12	1.77	1.58	1.83
180° Arc	15	9	0.84	1.99	2.30
	20	10	0.97	1.86	2.15
	25	11	1.08	1.72	1.99
	30	12	1.18	1.58	1.83
90° Arc	15	9	0.42	1.99	2.30
	20	10	0.48	1.86	2.15
	25	11	0.54	1.72	1.99
	30	12	0.59	1.58	1.83

15 SERIES HE-VAN — U.S.

25° TRAJECTORY

Nozzle	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr) ■	Precip (in/hr) ▲
360° Arc	15	11	2.62	2.08	2.40
	20	12	3.02	2.02	2.33
	25	14	3.38	1.66	1.92
	30	15	3.70	1.58	1.83
270° Arc	15	11	1.96	2.08	2.40
	20	12	2.27	2.02	2.33
	25	14	2.53	1.66	1.92
	30	15	2.78	1.58	1.83
180° Arc	15	11	1.31	2.08	2.40
	20	12	1.51	2.02	2.33
	25	14	1.69	1.66	1.92
	30	15	1.85	1.58	1.83
90° Arc	15	11	0.65	2.08	2.40
	20	12	0.76	2.02	2.33
	25	14	0.84	1.66	1.92
	30	15	0.93	1.58	1.83

12 SERIES HE-VAN — METRIC

23° TRAJECTORY

Nozzle	Pressure (Bar)	Radius (m)	Flow (m^3/h)	Flow (l/m)	Precip (mm/h) ■	Precip (mm/h) ▲
360° Arc	1.0	2.7	0.38	6.33	50.5	58.3
	1.4	3.0	0.44	7.31	47.3	54.6
	1.7	3.4	0.49	8.18	43.7	50.4
	2.1	3.7	0.54	8.96	40.2	46.4
270° Arc	1.0	2.7	0.28	4.75	50.5	58.3
	1.4	3.0	0.33	5.48	47.3	54.6
	1.7	3.4	0.37	6.16	43.7	50.4
	2.1	3.7	0.40	6.72	40.2	46.4
180° Arc	1.0	2.7	0.19	3.17	50.5	58.3
	1.4	3.0	0.22	3.66	47.3	54.6
	1.7	3.4	0.25	4.09	43.7	50.4
	2.1	3.7	0.27	4.48	40.2	46.4
90° Arc	1.0	2.7	0.09	1.58	50.5	58.3
	1.4	3.0	0.11	1.83	47.3	54.6
	1.7	3.4	0.12	2.04	43.7	50.4
	2.1	3.7	0.13	2.24	40.2	46.4

15 SERIES HE-VAN — METRIC

25° TRAJECTORY

Nozzle	Pressure (Bar)	Radius (m)	Flow (m^3/h)	Flow (l/m)	Precip (mm/h) ■	Precip (mm/h) ▲
360° Arc	1.0	3.4	0.59	9.91	52.9	61.1
	1.4	3.7	0.69	11.44	51.3	59.3
	1.7	4.3	0.77	12.79	42.2	48.7
	2.1	4.6	0.84	14.01	40.2	46.5
270° Arc	1.0	3.4	0.45	7.43	52.9	61.1
	1.4	3.7	0.51	8.58	51.3	59.3
	1.7	4.3	0.58	9.59	42.2	48.7
	2.1	4.6	0.63	10.51	40.2	46.5
180° Arc	1.0	3.4	0.30	4.95	52.9	61.1
	1.4	3.7	0.34	5.72	51.3	59.3
	1.7	4.3	0.38	6.39	42.2	48.7
	2.1	4.6	0.42	7.00	40.2	46.5
90° Arc	1.0	3.4	0.15	2.48	52.9	61.1
	1.4	3.7	0.17	2.86	51.3	59.3
	1.7	4.3	0.19	3.20	42.2	48.7
	2.1	4.6	0.21	3.50	40.2	46.5

NOTE: Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum.

■ Square spacing based on 50% diameter of throw. ▲ Triangular spacing based on 50% diameter of throw. Performance data taken in zero wind conditions.

R-VAN Series Nozzles

NEW

Variable arc rotary nozzles let you quickly adjust arc and radius by hand

- Hand-adjustable arc and radius — no special tools required.
- Low precipitation rate reduces run-off and the potential for erosion.
- High uniformity, thick, wind-resistant streams and larger water droplets ensure efficient performance, even in adverse conditions.

FEATURES

- Adjustable arc from 45° to 270°
- Meet tight watering windows — R-VAN's optimum precipitation rate strikes the perfect balance between rate of application and infiltration
- Color coded for easy identification of R-VAN model
- Compatible with all models of Rain Bird spray bodies in addition to a wide variety of risers and adapters
- Installing with Rain Bird® 5000 series rotor matched precipitation rate (MPR) nozzles allows for MPR irrigation designs from 13' to 35' (4.0 m 10.7 m)
- Three year trade warranty

OPERATING RANGE

Pressure Range: 20 to 55 psi (1.4 to 3.8 bar)

Recommended Operating Pressure: 45 psi (3.1 bar)

Spacing: 13' to 24' (4.0 to 7.3m)

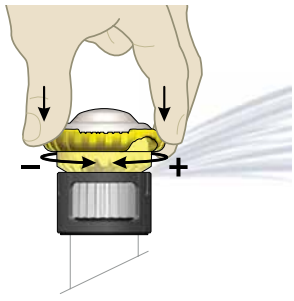
Adjustments: Arc and radius should be adjusted while water is running

MODELS

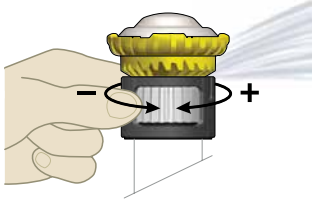
R-VAN1318
Black Rotary Deflector
13' to 18' (4.0 to 5.5m) radius
45º to 270º arc

R-VAN1724
Yellow Rotary Deflector
17' to 24' (5.2 to 7.3m) radius
45º to 270º arc

- **R-VAN Series Nozzles**



Arc Adjustment



Radius Adjustment

NOTES: Single row applications are not recommended. Operation of radius below minimum radius (per model) is not recommended. Installation on Rain Bird 1800SAM-P45 spray bodies recommended in sandy environments. Performance data derived from tests that conform with ASABE Standards; ASABE S398.1.

HOW TO SPECIFY

R–VAN – XXXX

Model
Adjustable Rotary Nozzle

Radius Range
1318: 13' to 18'
1724: 17' to 24'

R-VAN 1318 (BLACK)

	U.S.					METRIC				
				■	▲				■	▲
Arc	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr)	Precip (in/hr)	Pressure (bar)	Radius (m)	Flow (l/m)	Precip (mm/h)	Precip (mm/h)
270° Arc	20	13	0.95	0.72	0.83	1.4	4.0	3.60	18	21
	25	14	1.12	0.69	0.80	1.7	4.3	4.24	18	20
	30	16	1.26	0.65	0.75	2.1	4.9	4.77	17	19
	35	16	1.35	0.64	0.74	2.4	4.9	5.11	16	19
	40	17	1.42	0.63	0.73	2.8	5.2	5.38	16	18
	45	17	1.51	0.64	0.73	3.1	5.2	5.72	16	18
	50	18	1.57	0.60	0.69	3.4	5.5	5.94	15	18
	55	18	1.62	0.60	0.69	3.8	5.5	6.13	15	18
180° Arc	20	13	0.75	0.72	0.83	1.4	4.0	2.84	18	21
	25	14	0.83	0.69	0.80	1.7	4.3	3.14	18	20
	30	16	0.85	0.65	0.75	2.1	4.9	3.22	17	19
	35	16	0.91	0.64	0.74	2.4	4.9	3.44	16	19
	40	17	0.98	0.63	0.73	2.8	5.2	3.71	16	18
	45	17	1.01	0.64	0.73	3.1	5.2	3.82	16	18
	50	18	1.07	0.60	0.69	3.4	5.5	4.05	15	18
	55	18	1.09	0.60	0.69	3.8	5.5	4.13	15	18
90° Arc	20	13	0.37	0.72	0.83	1.4	4.0	1.40	18	21
	25	14	0.39	0.69	0.80	1.7	4.3	1.48	18	20
	30	16	0.42	0.65	0.75	2.1	4.9	1.59	17	19
	35	16	0.47	0.64	0.74	2.4	4.9	1.78	16	19
	40	17	0.50	0.63	0.73	2.8	5.2	1.89	16	18
	45	17	0.50	0.64	0.73	3.1	5.2	1.89	16	18
	50	18	0.54	0.60	0.69	3.4	5.5	2.04	15	18
	55	18	0.58	0.60	0.69	3.8	5.5	2.20	15	18

R-VAN1724 (YELLOW)

	U.S.					METRIC				
				■	▲				■	▲
Arc	Pressure (psi)	Radius (ft)	Flow (gpm)	Precip (in/hr)	Precip (in/hr)	Pressure (bar)	Radius (m)	Flow (l/m)	Precip (mm/h)	Precip (mm/h)
270° Arc	20	17	1.77	0.76	0.88	1.4	5.2	6.70	19	22
	25	19	1.99	0.72	0.83	1.7	5.8	7.53	18	21
	30	21	2.26	0.70	0.81	2.1	6.4	8.56	18	21
	35	22	2.39	0.66	0.76	2.4	6.7	9.05	17	19
	40	23	2.55	0.63	0.73	2.8	7.0	9.65	16	18
	45	23	2.73	0.64	0.73	3.1	7.0	10.33	16	18
	50	24	2.76	0.61	0.70	3.4	7.3	10.45	15	18
	55	24	2.80	0.16	0.70	3.8	7.3	10.60	15	18
180° Arc	20	17	1.24	0.76	0.88	1.4	5.2	4.69	19	22
	25	19	1.30	0.72	0.83	1.7	5.8	4.92	18	21
	30	21	1.41	0.70	0.81	2.1	6.4	5.34	18	21
	35	22	1.55	0.66	0.76	2.4	6.7	5.87	17	19
	40	23	1.69	0.63	0.73	2.8	7.0	6.40	16	18
	45	23	1.83	0.64	0.73	3.1	7.0	6.93	16	18
	50	24	1.91	0.61	0.70	3.4	7.3	7.23	15	18
	55	24	1.98	0.61	0.70	3.8	7.3	7.50	15	18
90° Arc	20	17	0.59	0.76	0.88	1.4	5.2	2.23	19	22
	25	19	0.67	0.72	0.83	1.7	5.8	2.54	18	21
	30	21	0.73	0.70	0.81	2.1	6.4	2.76	18	21
	35	22	0.78	0.66	0.76	2.4	6.7	2.95	17	19
	40	23	0.85	0.63	0.73	2.8	7.0	3.22	16	18
	45	23	0.91	0.64	0.73	3.1	7.0	3.44	16	18
	50	24	0.98	0.61	0.70	3.4	7.3	3.71	15	18
	55	24	1.05	0.61	0.70	3.8	7.3	3.97	15	18

Note: Radius refers to recommended spacing to achieve optimal precipitation rate and distribution uniformity with head to head spacing. Performance data taken in zero wind conditions.

■ Square spacing based on 50% diameter of throw. ▲ Triangular spacing based on 50% diameter of throw.

RWS (Root Watering Series)

Root watering system promotes deep root growth and healthy tree development.

- Deep root watering and aeration accelrates growth and ensures tree health.
- Subsurface aeration and irrigation prevents tree and shrub transplant shock.
- Highest efficiency solution for tree irrigation — up to 95% emission uniformity with minimal wind, evaporation, or edge control losses.

FEATURES AND BENEFITS

- Aesthetically designed subsurface bubbler contributes to a landscape's natural appearance.
- Locking grate at grade deters vandals, protects the emission device and reduces risk of injury.
- Helps prevent shallow root growth and costly damage to hardscape.
- Self-contained and factory-assembled units for assured reliability.
- Variety of models available to accommodate design flexibility.

For the RWS Model:

- 4" (10 cm) retaining cap and vandal-resistant locking grate tops a 36" (91 cm) semi-rigid mesh tube.
- Factory installed swing assemblies (exluding RWS) with a 1401 (0.25 gpm; 0.95 l/m), 1402 (0.5 gpm; 1.9 l/m), or 1404 (1.00 gpm; 3.8 l/m) bubbler on a fixed riser makes connecting to lateral lines easy.
- Optional check valve included to keep the lines from draining.
- Optional sand sock is ideal for use in sandy soil.

For the RWS-Mini:

- 4" (10.2 cm) retaining cap and vandal resistant locking grate tops a 18" (46 cm) semi-rigid mesh tube.
- Factory-installed ½" (1 cm) spiral barb elbow with a 1401 or 1402 bubbler makes connecting to lateral lines easy.
- Optional check valve included to keep the lines from draining.
- Optional sand sock is ideal for use in sandy soil.

For the RWS-Supplemental:

- 2" (5.1 cm) snap-on cap and base cap enclose a 10" (25 cm) semi-rigid mesh tube.
- Factory installed ½" (1 cm) spiral barb elbow with 1401 bubbler makes connecting to lateral lines easy.
- Optional check valve included to keep the lines from draining.
- Perfect for shrubs.

● Root Watering System

HOW TO SPECIFY

RWS – X – X – X – XXXX

- **Model** RWS
- **Other Size** M = Mini, S = Supplemental
- **Bubbler** B = Bubbler pre-installed
- **Optional** C = Check Valve
- **Bubbler Model** 1401, 1402, 1404

RWS-Sock

Designed to fit over the RWS and RWS-Mini units. Ideal for use in sandy soil, it will deter fine soil from infiltrating the RWS canister.

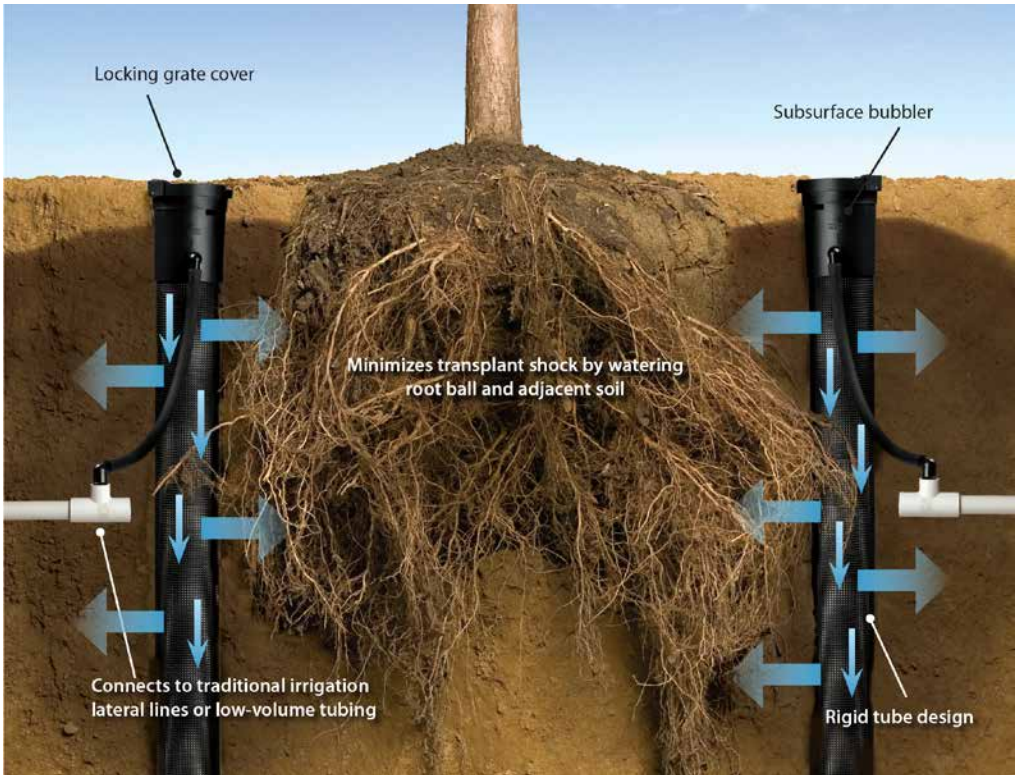
RWS integrated collar and locking grate retainer.

DIMENSIONS

- **Root Watering:** 4" (10 cm) diameter x 36" (91 cm) length
- **Root Watering-Mini:** 4" (10 cm) diameter x 18" (46 cm) length
- **Root Watering-Supplemental:** 2" (5 cm) diameter x 10" (25 cm) length

RWS MODELS/SPECIFICATIONS

MODEL	BUBBLER	CHECK VALVE	SWING ASSEMBLY with ½" (1.3 cm) (15/21) M NPT Inlet	SPIRAL BARB ELBOW with ½" (1.3 cm) (15/21) M NPT inlet
ROOT WATERING (36" (91 cm) length with 4" (10 cm) vandal-resistant locking grate)				
RWS-B-C-1401	0.25 gpm (0.95 lpm)	Yes	Yes	–
RWS-B-1401	0.25 gpm (0.95 lpm)	–	Yes	–
RWS-B-X-1401	0.25 gpm (0.95 lpm)	–	Yes (18")	–
RWS-B-C-1402	0.50 gpm (1.90 lpm)	Yes	Yes	–
RWS-B-1402	0.50 gpm (1.90 lpm)	–	Yes	–
RWS-B-C-1404	1.00 gpm (3.80 lpm)	Yes	Yes	–
ROOT WATERING-MINI (18" (46 cm) length with 4" (10 cm) vandal-resistant locking grate)				
RWS-M-B-C-1041	0.25 gpm (0.95 lpm)	Yes	–	Yes
RWS-M-B-1401	0.25 gpm (0.95 lpm)	–	–	Yes
RWS-M-B-C-1402	0.50 gpm (1.90 lpm)	Yes	–	Yes
RWS-M-B-1402	0.50 gpm (1.90 lpm)	–	–	Yes
ROOT WATERING-SUPPLEMENTAL (10" (25 cm) length with 2" (5 cm) snap-on cap and base)				
RWS-S-B-C-1401	0.25 gpm (0.95 lpm)	Yes	–	Yes
RWS-S-B-1401	0.25 gpm (0.95 lpm)	–	–	Yes
ROOT WATERING-ACCESSORIES				
RWS-SOCK (Root Watering Sand Sock) (6 per bag)				
WS-GRATE-P (Root Watering Series Purple Grate for RWS and RWS Mini)				



XFS Copper-Colored Sub-Surface Dripline with Copper Shield™ Technology

Rain Bird's patent-pending XFS sub-surface dripline with Copper Shield™ Technology protects the emitter from root intrusion, creating a long-lasting, low maintenance sub-surface drip irrigation system for use under turf grass all shrub and groundcover areas.

Ideal for small, narrow and tight planting areas near clubhouses, parking lot mediums, walkways and cart paths, bunker facings and under turf grass. Also perfect for installation on greens and driving ranges.

Accepts Rain Bird Easy Fit Compression Fittings, XFF Dripline Barbed Insert Fittings and other 17 mm barbed insert fittings.

FEATURES

Simple

- Rain Bird's low-profile emitter design reduces in-line pressure loss, allowing longer lateral runs, simplifying design and reducing installation time.
- Variety of emitter flow rates, emitter spacing and coil lengths provide maximum design flexibility for either sub-surface turf, or on-surface shrub and groundcover applications.

Reliable

- XFS sub-surface dripline emitters are protected from root intrusion by Rain Bird's patent-pending Copper Shield Technology resulting in a system that does not require maintenance or replacement of chemicals to prevent root intrusion.
- The pressure-compensating emitter design provides a consistent flow over the entire lateral length ensuring higher uniformity for increased reliability in the pressure range of 8.5 to 60 psi.

Durable

- Dual-layered tubing (copper over black) provides unmatched resistance to chemicals, algae growth and UV damage.
- Grit Tolerant: Rain Bird's proprietary emitter design resists clogging by use of an extra-wide flow path combined with a self-flushing action.

OPERATING RANGE

Pressure: 8.5 to 60 psi (0.58 to 4.14 bar)

Flow rates: 0.6 and 0.9 gph (2.3 l/hr and 3.5 l/hr)

Temperature:

Water: Up to 100°F (37.8° C)

Ambient: Up to 125°F (51.7° C)

Required Filtration: 120 mesh

SPECIFICATIONS

Dimensions:

OD: 0.634" (16mm)

ID: 0.536" (13.6mm)

Thickness: 0.049" (1.2mm)

Spacing: 12", 18", 24"
(30.5 cm, 45.7 cm, 61.0 cm)

Coils: 100' and 500' (30.5 m and 152.4 m)

Coil Color: Copper

XFS Dripline offers increased flexibility for easy installation

● **XFS Sub-Surface Dripline**

HOW TO SPECIFY

XFS – X – XX – XX – XXX

Model
XFS
Sub-Surface
Dripline

Optional
P = Purple
over black

Flow Rate
06 = 0.61 gph (2.1 l/h)
09 = 0.92 gph (3.5 l/h)

Emitter Spacing
12 = 12" (30.5 cm)
18 = 18" (45.7 cm)
24 = 24" (61.0 cm)

Tubing Length
100 = 100' (30.5 m)
500 = 500' (152.4 m)

Large-Capacity Filters

Large capacity and low maintenance with a solid build

- High flow rate disc filtration units are ideal for use with ponds and other water features
- Provides extra large filtration capacity for residential, commercial, and municipal applications
- Durable filters can be easily removed for cleaning, significantly reducing cleaning time

FEATURES

- Disc filters can decompress for easy cleaning
- Available with 120 mesh Stainless Steel Screen Filters or 120 mesh disc filters
- Auxiliary connection with a threaded cap can be drilled to allow draining or depressurization
- Larger filters for higher flow and lower maintenance

OPERATING RANGE

1" Model:

Maximum Flow: Up to 26 gpm (6 m3/hr)

Filtering Surface (disc): 28 in² (180cm²)

1.5" Models:

Maximum Flow: Up to 88 gpm (20 m³/hr)

Filtering Surface (disc): 83 in² (535 cm²)

Filtering Surface (screen): 76 in² (490 cm²)

2" Models:

Maximum Flow: Up to 110 gpm (25 m³/hr)

Filtering Surface (disc): 81 in² (525 cm²)

Filtering Surface (screen): 75 in² (485 cm²)

Maximum Pressure: 116 psi (8 bar)

Maximum Temperature: Up to 140° F (60° C)

MODELS

LCRBY100D: 1" large-capacity disc filter

LCRBY150S: 1.5" large-capacity screen filter

LCRBY150D: 1.5 large-capacity disc filter

LCRBY200S: 2" large-capacity screen filter

LCRBY200D: 2" large-capacity disc filter

SPARE PARTS

- **SMFC120MS:** ¾" – 1" SCRN CART LG CAP 120M
- **SMFC120MD:** ¾" – 1" DISC CART LG CAP 120M
- **LGFC120MS: 1 ½"** – 2" SCRN CRT LG CAP 120M
- **LGFC120MD: 1 ½"** – 2" DISC CRT LG CAP 120M

NEW

● **LCRBY200D**

SPECIFICATIONS

Inlet / Outlet Size:

1" Models: 1" NPT

1.5" Models: 1.5" NPT

2" Models: 2" NPT

FILTRATION

- Screen Filter*: 120 Mesh (130 Micron)
- Plastic Filter Discs: 120 Mesh (130 Micron)

Screen Filter:
The 120 mesh screen filters are easy to clean and provide reliable filtration.

Plastic Filter Discs:
These filters are made up of over a hundred grooved discs that allow water to pass while trapping debris. Less maintenance required due to large surface area.

Disc and Screen Filters

** Screen not available in 1" model*

PRESSURE LOSS CHARACTERISTICS — DISC FILTER

U.S.				METRIC			
Flow (gpm)	1" Filter (psi)	1.5" Filter (psi)	2" Filter (psi)	Flow (l/m)	2.5 cm Filter (bar)	3.8 cm Filter (bar)	5.1 cm Filter (bar)
5	0.60	0.08	0.10	18.93	0.04	0.01	0.01
11	1.16	0.18	0.10	41.67	0.08	0.01	0.01
22	2.61	0.40	0.10	83.33	0.18	0.03	0.01
33	4.35	0.73	0.24	125.00	0.30	0.05	0.02
44	–	1.05	0.40	166.67	–	0.07	0.03
55	–	1.50	0.60	208.33	–	0.10	0.04
66	–	2.18	0.82	250.00	–	0.15	0.06
77	–	3.10	1.10	291.67	–	0.21	0.08
88	–	3.95	1.60	333.33	–	0.27	0.11
99	–	–	2.03	375.00	–	–	0.14
110	–	–	2.47	416.67	–	–	0.17

Disc Filter

PRESSURE LOSS CHARACTERISTICS — SCREEN FILTER

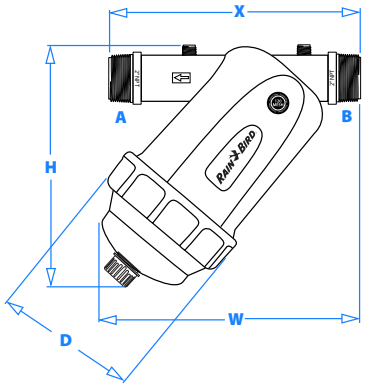
U.S.				METRIC			
Flow (gpm)	1" Filter (psi)	1.5" Filter (psi)	2" Filter (psi)	Flow (l/m)	2.5 cm Filter (bar)	3.8 cm Filter (bar)	5.1 cm Filter (bar)
5	0.80	0.00	0.00	18.93	0.06	0.00	0.00
11	1.74	0.00	0.00	41.67	0.12	0.00	0.00
22	2.90	0.50	0.20	83.33	0.20	0.03	0.01
33	4.06	0.95	0.25	125.00	0.28	0.07	0.02
44	–	1.45	0.44	166.67	–	0.10	0.03
55	1.89	0.60	0.60	208.33	–	0.13	0.04
66	–	2.32	0.87	250.00	–	0.16	0.06
77	–	2.76	1.16	291.67	–	0.19	0.08
88	–	3.19	1.45	333.33	–	0.22	0.10
99	–	–	1.89	375.00	–	–	0.13
110	–	–	2.32	416.67	–	–	0.16

Screen Filter

FILTER HOUSING DIMENSIONS

Model	A, B	H	W	X	D
1" (2.5 cm)	1" NPT	6.81"	7.48"	6.22"	3.27"
1.5" (2.5 cm)	1.5" NPT	9.53"	10.25"	9.92"	5.67"
2" (5.1 cm)	2" NPT	9.76"	10.63"	10.51"	5.67"

Letters correspond to diagram on right.



VB Series Valve Boxes

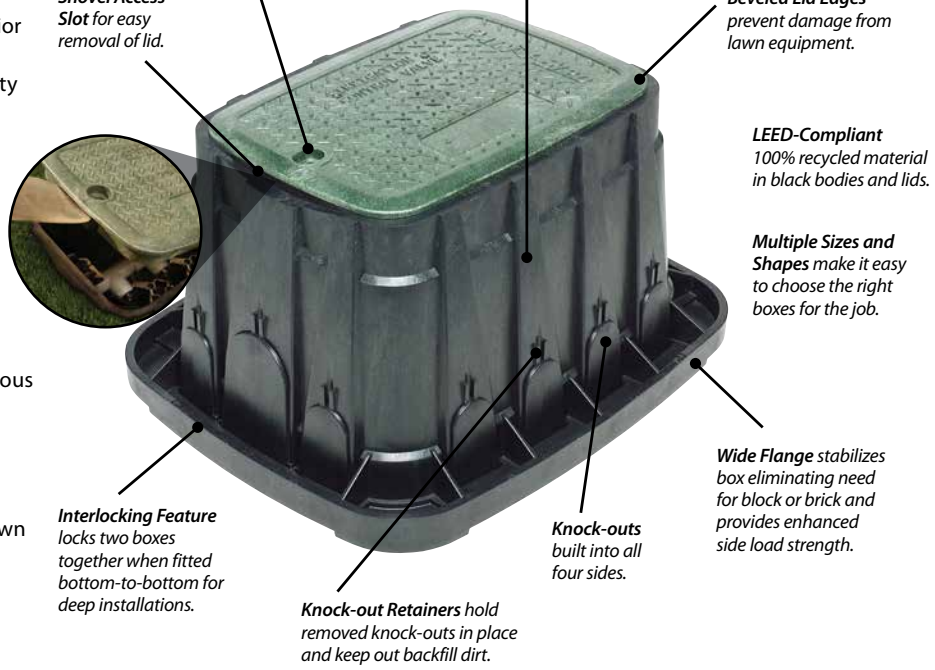
A rich set of industry-leading features that ensure strength, durability and fast installations save you time, money and reduce the need for unscheduled service calls.

- Wide flange with corrugated structure provides superior box strength for better valve protection.
- Unique shovel access slot provides superior accessibility for service.
- Earth-friendly LEED-compliant material made of 100% recycled materials (black boxes and black lids only).
- Unique pipe hole knockout provides faster and easier installation.

FEATURES AND BENEFITS

These features apply to the Standard, Jumbo, Super Jumbo, Maxi Jumbo, and 7" and 10" Round Valve Boxes:

- Unique bolt hole knock-out design in lid keeps hazardous insects and pests out of the box.
- Shovel access on body allows for easy lid removal.
- Knock-out retainers securely hold removed knock-outs above the pipe, keeping dirt out during backfill.
- Beveled lid edges help prevent damage to lids from lawn equipment.
- Interlocking bottoms allow boxes to mate securely together bottom-to-bottom for deep installations.
- Lid marking area provides dedicated location for valve identification.



A variety of valve box sizes and shapes make it easy to choose the right box for the job. Black body and black lids made of 100% recycled materials.

DIMENSIONS AND ACCOMMODATIONS

	 7" ROUND SERIES (VB-7RND)	 10" ROUND SERIES (VB-10RND)	 STANDARD RECTANGULAR SERIES (VB-STD)	 JUMBO RECTANGULAR SERIES (VB-JMB)	 SUPER JUMBO RECTANGULAR SERIES (VB-SPR)	 MAXI JUMBO RECTANGULAR SERIES (VB-MAX)
EXTERNAL DIMENSIONS	6.4" Top Diam x 9.0" H x 9.8" Bottom Diam (16.3 cm x 22.9 cm x 24.9 cm)	10.25" Top Diam x 10.0" H x 13.75" Bottom Diam (26.0 cm x 25.4 cm x 34.9 cm)	21.8" L x 16.6" W x 12.0" H (55.4 cm x 42.2 cm x 30.5 cm)	26.3" L x 19.8" W x 12.1" H (66.8 cm x 50.3 cm x 30.7 cm)	31.1" L x 23.8" W x 15.0" H (84.1 cm x 60.5 cm x 38.1 cm)	40.3" L x 27.1" W x 18.0" H (102.4 cm x 68.8 cm x 45.7 cm)
ACCOMMODATIONS	Four equally spaced knock-outs accommodate up to a 2" (5.0 cm) diameter pipe.	Four equally spaced knock-outs accommodate up to a 2" (5.0 cm) diameter pipe. (Extension does not have knock-outs.)	Two large center knock-outs accommodate up to a 3 ½" (8.9 cm) diameter pipe and twelve knock-outs accommodate up to 2" (5.0 cm) diameter pipe.	Two large center knock-outs accommodate up to a 3 ½" (8.9 cm) diameter pipe.	Sixteen knock-outs accommodate up to a 3 ½" (8.9 cm) diameter pipe. Includes two stainless steel bolts and clips to securely fasten the lid to the body.	Sixteen knock-outs accommodate up to a 3 ½" (8.9 cm) diameter pipe. Includes two stainless steel bolts and clips to securely fasten the lid to the body.

	 STANDARD 6" (VB-STD-6EXT)	 JUMBO 6" (VB-JMB-6EXT)
VALVE BOX EXTENSIONS		
EXTERNAL DIMENSIONS	20.0" L x 14.75" W x 6.75" H (50.8 cm x 37.5 cm x 17.1 cm)	24.4" L x 17.9" W x 6.75" H (62.0 cm x 45.5 cm x 17.1 cm)

VALVE BOX LIDS

Green – Traditional Soils
Purple – Non-potable Water
Black – Recyclable Material

INTERLOCKING BOTTOMS

Patented feature for deep installations.
All boxes mate securely together.

TECHNICAL INFORMATION

This section includes conversion factors, equivalents and formulas as they apply to golf course irrigation. The information is arranged by category to simplify and speed the process when making accurate calculations.

AREAS

6.452 Sq. Centimeters	1 Sq. Inch
144 Sq. Inches	1 Sq. Foot
9 Sq. Feet	1 Sq. Yard
43,560 Sq. Feet	1 Acre
1 Acre	43,560 Sq. Feet
1 Acre	4,840 Sq. Yards
1 Acre	160 Sq. Rods
1 Sq. Rod	272.25 Sq. Feet
1 Sq. Rod	30.25 Sq. Yards
640 Acres	1 Sq. Mile
640 Acres	1 Section
Area of a Circle	Radius Squared x 3.1416
Area of a Square	One Side Squared
Area of a Triangle	½ Base x Altitude
Area of a Rectangle	Length x Width
Area of a Parallelogram	Base x Altitude

LINEAL MEASUREMENTS

1 Centimeter	0.3937 Inches
1 Cubit	18 Inches
1 Meter	39.37 Inches
1 Rod	16.5 Feet
1 Rod	5.5 Yards
1 Chain	4 Rods
1 Chain	66 Feet
320 Rods	1 Mile
5280 Feet	1 Mile
Circumference of Circle	Diam. x 3.1416

VOLUME

1728 Cubic Inches	1 Cubic Foot
231 Cubic Inches	1 Gallon
27 Cubic Feet	1 Cubic Yard
1 Cubic Foot	7.48052 Gallons (U.S.)
1 Cubic Yard	202 Gallons (U.S.)
16 Drams	1 Ounce
32 Ounces	1 Quart
4 Quarts	1 Gallon
1 Gallon	3.785 Liters
1 Gallon	0.00379 Cu. Meters
1 Gallon	0.833 Imperial Gal.
27,154 Gallons	1 Acre Inch
325,851 Gallons	1 Acre Foot
1,000,000 Gallons	3.0689 Acre Feet
1 Acre Foot	43,560 Cubic Feet
Volume of a Cube	Area of Base x Height
Volume of a Pyramid	½ Area of Base x Height
Volume of a Sphere	Diam. Cubed x 0.5236

MASS/WEIGHT

1 kg	2.204 lbs
1 lb	454 g = 7000 grains
1 slug	14.5 kg
1 stone	14 lb

WEIGHTS

1 U.S. Gallon (Water)	8.3357 lbs.
1 Cu. Foot (Water)	62.3554 lbs.
1 Imperial Gallon	10.0 lbs.
1 Liter	2.2 lbs.
Earth, in Place Undisturbed	100 lbs./cu.ft.
Earth, Dry and Loose	82-90 lbs./cu.ft.
Earth, Moist	75-100 lbs./cu.ft.
Sand, Dry	90-106 lbs./cu.ft.
Shale or Red Rock	162 lbs./cu.ft.
Limestone	160-163 lbs./cu.ft.
Base Gravel	12.0 lbs./sq. ft./inch Thick in Place
Asphalt	12.5 lbs./sq. ft./inch Thick in Place
Sack Cement	94 lbs.
Concrete (Plain)	140 lbs./cu.ft.
Concrete (Reinforced)	150 lbs./cu.ft.

PRESSURES

1 Atmosphere	29.921 Inches of Hg @ 32˚ F
1 Atmosphere	33.94 Ft. of Water @ 62˚ F
1 Atmosphere	14.6963 lbs./Sq. Inch
1 Pound per Square Inch	2.31 Feet of Head
1 Foot of Water	0.433 lbs./Sq. Inch
1 Kilogram/Sq. Centimeter	14.22 lbs./Sq. Inch
1 Foot of Water	62.3554 lbs./Sq. Foot
1 Bar	14.5 lbs./Sq. Inch

FLOWS

1 Gallon/Minute (U.S.)	0.002228 cu. ft./Second
1 Gallon/Minute (U.S.)	0.13368 cu. ft./Minute
1 Gallon/Minute (U.S.)	8.0208 cu. ft./Hour
1 Gallon/Minute (U.S.)	0.06309 Liters/Second
1 Gallon/Minute (U.S.)	3.78533 Liters/Minute
1 Gallon/Minute (U.S.)	0.0044192 Acre Ft./24 Hrs.
1 Gallon/Minute (U.S.)	0.22712 cu. Meters/Hr.
1 Cubic Ft. per Second	448.83 gpm
1 Liter per Second	15.85 gpm
1 Cubic Meter per Minute	264 gpm
1 Acre Inch per Hour	452.57 gpm
1 Acre Foot per Day	226.3 gpm
1,000,000 Gallons per Day	694.4 gpm
1 Cubic Ft. per Second	0.992 Acre Inches/Hr.

POWER

1 Horsepower	33,000 Ft. lbs./Minute
1 Horsepower	746 Watts
1 Horsepower	0.746 Kilowatts

TEMPERATURE

F	(1.8 x C) + 32
C	(F/1.8) - 32

DESIGN FORMULAS

PRECIPITATION RATE (IN/HR)

$$\text{Square} = \frac{96.3 \times GPM \times 360}{S \times S \times \text{Sprinkler Arc}}$$

$$\text{Triangular} = \frac{96.3 \times GPM \times 360}{S \times S \times 0.866 \times \text{Sprinkler Arc}}$$

$$\text{Single Row} = \frac{96.3 \times GPM}{S \times 0.8 \text{ Diameter}}$$

S= Spacing

RUN-TIME

$$\text{Run-Time} = \frac{\text{Desired Application} \times 60}{\text{Precipitation Rate}}$$

VELOCITY

$$V = \frac{0.480 \times Q}{(ID)^2}$$

Where:
V = Velocity in feet per second
Q = Gallons per minute
ID = Inside diameter of pipe

POWER FORMULAS

HORSE POWER

1 hp = 550 foot pounds per second
= 746 watts or 0.746 kW
= 1 second foot of water falling 8.8'

$$\text{Water HP} = \frac{GPM \times TDH}{3960}$$

Where:
GPM = Gallons per minute
TDH = Total dynamic head

$$\text{Brake HP} = \frac{GPM \times TDH}{3960 \times E}$$

Where:
GPM = Gallons per minute
TDH = Total dynamic head
E = Pump efficiency

1 kilowatt (kW) = 1000 watts
= 1,341 HP
= 735.5 foot pounds per second

ELECTRICAL POWER

$$3\phi \text{ KVA} = \frac{1.732 \times FLA \times Voltage}{1000}$$

$$1\phi \text{ KVA} = \frac{FLA \times Voltage}{1000}$$

Ohm's Law: V = IR

Where:
V = Voltage in Volts
I = Current in Amperes
R = Resistance in ohms

Amp Calculation
Amps = Watts / Volts

PUMP LAWS (AFFINITY LAWS)

$RPM_2 / RPM_1 = Flow_2 / Flow_1$
$(RPM_2 / RPM_1)^2 = Pressure_2 / Pressure_1$
$(RPM_2 / RPM_1)^3 = Power_2 / Power_1$

Example: An irrigation pump operating at 1800 RPM and producing 600 gpm at 120 psi is switched to 3600 RPM:

RPM_2 / RPM_1 = $Flow_2 / Flow_1$
= 3600 RPM / 1800 RPM
= $Flow_2$ / 600 gpm = 1200 gpm

$(RPM_2 / RPM_1)^2$ = $Pressure_2 / Pressure_1$
= $(3600 \text{ RPM} / 1800 \text{ RPM})^2$
= $Pressure_2$/120 psi = 480 psi

$(RPM_2 / RPM_1)^3$ = $Power_2 / Power_1$
= $(3600 \text{ RPM} / 1800 \text{ RPM})^3$
= $Power_2$ / 60 HP = 480 HP

ELECTRIC FORMULAS FOR CALCULATING AMPERES, HORSEPOWER, KILOWATTS AND KVA

ALTERNATING CURRENT

TO FIND:	SINGLE PHASE	TWO PHASE - FOUR PHASE WIRE	THREE PHASE
Amperes when "HP" is Known	$\frac{HP \times 746}{E \times \%EFF \times PF}$	$\frac{HP \times 746}{E \times \%EFF \times PF \times 2}$	$\frac{HP \times 746}{E \times \%EFF \times PF \times 1.73}$
Amperes when "KW" is Known	$\frac{KW \times 1000}{E \times PF}$	$\frac{KW \times 1000}{E \times PF \times 2}$	$\frac{KW \times 1000}{E \times PF \times 1.73}$
Amperes when "KVA" is Known	$\frac{KVA \times 1000}{E}$	$\frac{KVA \times 1000}{E \times 2}$	$\frac{KVA \times 1000}{E \times 1.73}$
Kilowatts	$\frac{E \times I \times PF}{1000}$	$\frac{E \times I \times PF \times 2}{1000}$	$\frac{E \times I \times PF \times 1.73}{1000}$
Kilovolt - Amperes "KVA"	$\frac{E \times I}{1000}$	$\frac{E \times I \times 2}{1000}$	$\frac{E \times I \times 1.73}{1000}$
Horsepower	$\frac{E \times I \times \%EFF \times PF}{746}$	$\frac{E \times I \times \%EFF \times PF \times 2}{746}$	$\frac{E \times I \times \%EFF \times PF \times 1.73}{746}$

Where:
Power Factor (PF) = $\frac{\text{Power Used (Watts)}}{\text{Apparent Power}}$ or $\frac{KW}{KVA}$

Percent Efficiency (%EFF) = $\frac{\text{Output (Watts)}}{\text{Input (Watts)}}$

E = Volts
I = Amperes
W = Watts

CONDUCTOR PROPERTIES FOR INSULATED ANNEALED COPPER DIRECT CURRENT RESISTANCE — OHMS PER 1000 FEET

COPPER AWG	TEMPERATURE (°F/°C) 167/75	149/65	77/25	68/20	CROSS SECTIONAL AREA (CIRCULAR MILS)
18 Solid	7.77	7.519	6.515	6.390	1,620
18 Stranded	7.95	7.693	6.666	6.538	1,620
16 Solid	4.89	4.732	4.100	4.021	2,580
16 Stranded	4.99	4.829	4.184	4.104	2,580
14 Solid	3.07	2.971	2.574	2.525	4,110
14 Stranded	3.14	3.039	2.633	2.582	4,110
12 Solid	1.93	1.868	1.618	1.587	6,530
12 Stranded	1.98	1.916	1.660	1.628	6,530
10 Solid	1.21	1.171	1.015	0.995	10,380
10 Stranded	1.24	1.200	1.040	1.020	10,380
8 Solid	0.764	0.739	0.641	0.628	16,510
8 Stranded	0.778	0.753	0.652	0.640	16,510
6 Stranded	0.491	0.475	0.412	0.404	26,240
4 Stranded	0.308	0.298	0.258	0.253	41,740
2 Stranded	0.194	0.188	0.163	0.160	66,360
1/0 Stranded	0.122	0.118	0.102	0.100	105,600
2/0 Stranded	0.097	0.094	0.081	0.080	133,100

Source: 2008 Edition of National Electric Code (NFPA 70), Chapter 9, Table 8.
System designer must use resistance values which correlate to temperatures and applications for each specific project.

FULL LOAD AMPERAGE (FLA)

MOTOR HP	SINGLE PHASE A-C		THREE PHASE A-C INDUCTION TYPE SQUIRREL CAGE & WOUND ROTOR		
	115 VOLTS	230 VOLTS**	230 VOLTS**	460 VOLTS	575 VOLTS
1/2	9.8	4.9	2.2	1.1	0.9
3/4	13.8	6.9	3.2	1.6	1.3
1	16	8	4.2	2.1	1.7
1 1/2	20	10	6.0	3.0	2.4
2	24	12	6.8	3.4	2.7
3	34	17	9.6	4.8	3.9
5	56	28	15.2	7.6	6.1
7 1/2	80	40	22	11	9
10	100	50	28	14	11
15			42	21	17
20			54	27	22
25			68	34	27
30			80	40	32
40			104	52	41
50			130	65	52
60			154	77	62
75			192	96	77
100			240	120	96
125			296	148	118
150			350	175	140
200			456	228	182
250			558	279	223

**For 208V applications, increase the 230V FLA by 10%

To calculate the FLA of a pump motor operating on a VFD, multiple the nominal FLA by 1.24

To estimate FLA station, multiply the largest load by 1.25 and then add this to remaining component FLAs.

Example: a 460V 2 x 50HP pump station with a 5HP PM pump would have an FLA of 173.4 Amps.

173.4 Amps = 1.24 x 1.25 x 65A + 65A + 7.6A

HORSEPOWER TO KILOWATTS

HORSEPOWER	KILOWATT	HORSEPOWER	KILOWATT
1	0.746	25	18.7
3	2.2	30	22.4
5	3.7	40	29.8
10	7.5	50	37.3
15	11.2	60	44.8
20	14.9	75	56.0

PE 4710 IPS HDPE DR 13.5 (161 PSI) PIPE

VELOCITY IN FEET PER SECOND — FRICTION LOSS IN PSI PER 100 FEET (C = 150)

NOMINAL SIZE (ID)	2" (2.002)		3" (2.950)		4" (3.793)		6" (5.585)		8" (7.271)		10" (9.062)		12" (10.748)		14" (11.801)		16" (13.487)		18" (15.173)	
FLOW (gpm)	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS
2	0.20	0.01	0.09	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.41	0.02	0.19	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.61	0.04	0.28	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.81	0.07	0.38	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.02	0.10	0.47	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.22	0.14	0.56	0.02	0.34	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.43	0.19	0.66	0.03	0.40	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.63	0.25	0.75	0.04	0.45	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	1.83	0.31	0.84	0.05	0.51	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	2.04	0.37	0.94	0.06	0.57	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	2.24	0.44	1.03	0.07	0.62	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	2.44	0.52	1.13	0.08	0.68	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	2.65	0.61	1.22	0.09	0.74	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	2.85	0.70	1.31	0.11	0.79	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	3.05	0.79	1.41	0.12	0.85	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	3.56	1.05	1.64	0.16	0.99	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	4.07	1.35	1.88	0.20	1.13	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	4.58	1.67	2.11	0.25	1.28	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	5.09	2.04	2.34	0.31	1.42	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	5.60	2.43	2.58	0.37	1.56	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	6.11	2.85	2.81	0.43	1.70	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	6.62	3.31	3.05	0.50	1.84	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	7.13	3.80	3.28	0.58	1.99	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	7.63	4.31	3.52	0.65	2.13	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	8.14	4.86	3.75	0.74	2.27	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	8.65	5.44	3.99	0.82	2.41	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	9.16	6.04	4.22	0.92	2.55	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100			4.69	1.11	2.84	0.33	1.31	0.05	0.77	0.01	0.50	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110			5.16	1.33	3.12	0.39	1.44	0.06	0.85	0.02	0.55	0.01	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120			5.63	1.56	3.40	0.46	1.57	0.07	0.93	0.02	0.60	0.01	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130			6.09	1.81	3.69	0.53	1.70	0.08	1.00	0.02	0.65	0.01	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140			6.56	2.08	3.97	0.61	1.83	0.09	1.08	0.03	0.70	0.01	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150			7.03	2.36	4.25	0.69	1.96	0.11	1.16	0.03	0.75	0.01	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160			7.50	2.66	4.54	0.78	2.09	0.12	1.23	0.03	0.79	0.01	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170			7.97	2.98	4.82	0.88	2.22	0.13	1.31	0.04	0.84	0.01	0.60	0.01	0.00	0.00	0.00	0.00	0.00	0.00
180			8.44	3.31	5.10	0.97	2.35	0.15	1.39	0.04	0.89	0.01	0.64	0.01	0.00	0.00	0.00	0.00	0.00	0.00
190			8.91	3.66	5.39	1.08	2.49	0.16	1.47	0.05	0.94	0.02	0.67	0.01	0.00	0.00	0.00	0.00	0.00	0.00
200			9.38	4.02	5.67	1.18	2.62	0.18	1.54	0.05	0.99	0.02	0.71	0.01	0.00	0.00	0.00	0.00	0.00	0.00
225			10.55	5.00	6.38	1.47	2.94	0.22	1.74	0.06	1.12	0.02	0.79	0.01	0.00	0.00	0.00	0.00	0.00	0.00
250			11.72	6.08	7.09	1.79	3.27	0.27	1.93	0.08	1.24	0.03	0.88	0.01	0.00	0.00	0.00	0.00	0.00	0.00
275			12.89	7.25	7.80	2.13	3.60	0.32	2.12	0.09	1.37	0.03	0.97	0.01	0.00	0.00	0.00	0.00	0.00	0.00
300			14.06	8.52	8.51	2.51	3.92	0.38	2.32	0.11	1.49	0.04	1.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00
325			15.24	9.88	9.22	2.91	4.25	0.44	2.51	0.12	1.61	0.04	1.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00
350			16.41	11.34	9.93	3.34	4.58	0.51	2.70	0.14	1.74	0.05	1.24	0.02	0.00	0.00	0.00	0.00	0.00	0.00
375				12.88	10.63	3.79	4.91	0.58	2.89	0.16	1.86	0.05	1.32	0.02	0.00	0.00	0.00	0.00	0.00	0.00
400				14.52	11.34	4.27	5.23	0.65	3.09	0.18	1.99	0.06	1.41	0.03	0.00	0.00	0.00	0.00	0.00	0.00
425				16.24	12.05	4.78	5.56	0.73	3.28	0.20	2.11	0.07	1.50	0.03	0.00	0.00	0.00	0.00	0.00	0.00
450				18.06	12.76	5.31	5.89	0.81	3.47	0.22	2.24	0.08	1.59	0.03	0.00	0.00	0.00	0.00	0.00	0.00
475				19.96	13.47	5.87	6.21	0.89	3.67	0.25	2.36	0.08	1.68	0.04	0.00	0.00	0.00	0.00	0.00	0.00
500					14.18	6.46	6.54	0.98	3.86	0.27	2.48	0.09	1.77	0.04	0.00	0.00	0.00	0.00	0.00	0.00
550					15.60	7.71	7.19	1.17	4.24	0.32	2.73	0.11	1.94	0.05	0.00	0.00	0.00	0.00	0.00	0.00
600					17.02	9.05	7.85	1.38	4.63	0.38	2.98	0.13	2.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00
650					18.43	10.50	8.50	1.60	5.02	0.44	3.23	0.15	2.30	0.07	0.00	0.00	0.00	0.00	0.00	0.00
700					19.85	12.05	9.16	1.83	5.40	0.51	3.48	0.17	2.47	0.08	0.00	0.00	0.00	0.00	0.00	0.00
750					21.27	13.69	9.81	2.08	5.79	0.58	3.73	0.20	2.65	0.09	0.00	0.00	0.00	0.00	0.00	0.00
800									6.17	0.65	3.97	0.22	2.83	0.10	2.34	0.06	1.79	0.03	1.42	0.02
850									6.56	0.73	4.22	0.25	3.00	0.11	2.49	0.07	1.91	0.04	1.51	0.02
900									6.95	0.81	4.47	0.28	3.18	0.12	2.64	0.08	2.02	0.04	1.59	0.02
950									7.33	0.89	4.72	0.31	3.36	0.13	2.78	0.08	2.13	0.04	1.68	0.02
1000									7.72	0.98	4.97	0.34	3.53	0.15	2.93	0.09	2.24	0.05	1.77	0.03
1050									8.10	1.08	5.22	0.37	3.71	0.16	3.08	0.10	2.36	0.05	1.86	0.03
1100									8.49	1.17	5.47	0.40	3.89	0.18	3.22	0.11	2.47	0.06	1.95	0.03
1150									8.88	1.27	5.71	0.44	4.06	0.19	3.37	0.12	2.58	0.06	2.04	0.04
1200									9.26	1.38	5.96	0.47	4.24	0.21	3.52	0.13	2.69	0.07	2.13	0.04
1250									9.65	1.49	6.21	0.51	4.41	0.22	3.66	0.14	2.80	0.07	2.22	0.04
1300									10.03	1.60	6.46	0.55	4.59	0.24	3.81	0.15	2.92	0.08	2.30	0.04
1350									10.42	1.71	6.71	0.59	4.77	0.26	3.96	0.16	3.03	0.08	2.39	0.05
1400									10.80	1.83	6.96	0.63	4.94	0.27	4.10	0.17	3.14	0.09	2.48	0.05
1450									11.19	1.96	7.20	0.67	5.12	0.29	4.25	0.19	3.25	0.10	2.57	0.05
1500									11.58	2.08	7.45	0.71	5.30	0.31	4.39	0.20	3.36	0.10	2.66	0.06
1550											7.70	0.76	5.47	0.33	4.54	0.21	3.48	0.11	2.75	0.06
1600											7.95	0.80	5.65	0.35	4.69	0.22	3.59	0.12	2.84	0.07
1650											8.20	0.85	5.83	0.37	4.83	0.24	3.70	0.12	2.92	0.07
1700											8.45	0.90	6.00	0.39	4.98	0.25	3.81	0.13	3.01	0.07
1750											8.69	0.95	6.18	0.41	5.13	0.26	3.93	0.14	3.10	0.08
1800											8.94	1.00	6.36	0.44	5.27	0.28	4.04	0.14	3.19	0.08
1900											9.44	1.11	6.71	0.48	5.57	0.31	4.26	0.16	3.37	0.09
2000											9.94	1.22	7.06	0.53	5.86	0.34	4.49	0.18	3.54	0.10
2100											10.43	1.33	7.42	0.58	6.15	0.37	4.71	0.19	3.72	0.11
2200											10.93	1.45	7.77	0.63	6.45	0.40	4.93	0.21	3.90	0.12
2300											11.43	1.57	8.12	0.69	6.74	0.44	5.16	0.23	4.08	0.13
2400											11.92	1.70	8.48	0.74	7.03	0.47	5.38	0.25	4.25	0.14
2500											12.42	1.84	8.83	0.80	7.32	0.51	5.61	0.27	4.43	0.15

Use caution at these velocities.

SDR 21 (CLASS 200) PVC PIPE

VELOCITY IN FEET PER SECOND — FRICTION LOSS IN PSI PER 100 FEET (C = 150)

NOMINAL SIZE (ID)	1" (1.189)		1¼" (1.502)		1½" (1.720)		2" (2.149)		2½" (2.601)		3" (3.166)		4" (4.072)		6" (5.993)		8" (7.805)		10" (9.728)		12" (11.538)	
FLOW (gpm)	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS	VEL	LOSS
2	0.58	0.07	0.36	0.02	0.28	0.01	0.18	0.00	0.12	0.00	0.08	0.00	0.05	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00
4	1.15	0.24	0.72	0.08	0.55	0.04	0.35	0.01	0.24	0.01	0.16	0.00	0.10	0.00	0.05	0.00	0.03	0.00	0.02	0.00	0.01	0.00
6	1.73	0.51	1.09	0.16	0.83	0.08	0.53	0.03	0.36	0.01	0.24	0.00	0.15	0.00	0.07	0.00	0.04	0.00	0.03	0.00	0.02	0.00
8	2.31	0.86	1.45	0.28	1.10	0.14	0.71	0.05	0.48	0.02	0.33	0.01	0.20	0.00	0.09	0.00	0.05	0.00	0.03	0.00	0.02	0.00
10	2.89	1.30	1.81	0.42	1.38	0.22	0.88	0.07	0.60	0.03	0.41	0.01	0.25	0.00	0.11	0.00	0.07	0.00	0.04	0.00	0.03	0.00
12	3.46	1.83	2.17	0.59	1.65	0.30	1.06	0.10	0.72	0.04	0.49	0.02	0.30	0.00	0.14	0.00	0.08	0.00	0.05	0.00	0.04	0.00
14	4.04	2.43	2.53	0.78	1.93	0.40	1.24	0.14	0.84	0.05	0.57	0.02	0.34	0.01	0.16	0.00	0.09	0.00	0.06	0.00	0.04	0.00
16	4.62	3.11	2.89	1.00	2.21	0.52	1.41	0.17	0.96	0.07	0.65	0.03	0.39	0.01	0.18	0.00	0.11	0.00	0.07	0.00	0.05	0.00
18	5.19	3.87	3.26	1.24	2.48	0.64	1.59	0.22	1.09	0.09	0.73	0.03	0.44	0.01	0.20	0.00	0.12	0.00	0.08	0.00	0.06	0.00
20	5.77	4.71	3.62	1.51	2.76	0.78	1.77	0.26	1.21	0.10	0.81	0.04	0.49	0.01	0.23	0.00	0.13	0.00	0.09	0.00	0.06	0.00
22	6.35	5.62	3.98	1.80	3.03	0.93	1.94	0.32	1.33	0.12	0.90	0.05	0.54	0.01	0.25	0.00	0.15	0.00	0.09	0.00	0.07	0.00
24	6.93	6.60	4.34	2.12	3.31	1.09	2.12	0.37	1.45	0.15	0.98	0.06	0.59	0.02	0.27	0.00	0.16	0.00	0.10	0.00	0.07	0.00
26	7.50	7.65	4.70	2.45	3.59	1.27	2.30	0.43	1.57	0.17	1.06	0.07	0.64	0.02	0.30	0.00	0.17	0.00	0.11	0.00	0.08	0.00
28	8.08	8.78	5.06	2.82	3.86	1.46	2.47	0.49	1.69	0.19	1.14	0.07	0.69	0.02	0.32	0.00	0.19	0.00	0.12	0.00	0.09	0.00
30	8.66	9.97	5.43	3.20	4.14	1.65	2.65	0.56	1.81	0.22	1.22	0.08	0.74	0.02	0.34	0.00	0.20	0.00	0.13	0.00	0.09	0.00
35	10.10	13.27	6.33	4.26	4.83	2.20	3.09	0.74	2.11	0.29	1.42	0.11	0.86	0.03	0.40	0.01	0.23	0.00	0.15	0.00	0.11	0.00
40	11.54	16.99	7.23	5.45	5.52	2.82	3.53	0.95	2.41	0.38	1.63	0.14	0.98	0.04	0.45	0.01	0.27	0.00	0.17	0.00	0.12	0.00
45			8.14	6.78	6.21	3.51	3.98	1.19	2.71	0.47	1.83	0.18	1.11	0.05	0.51	0.01	0.30	0.00	0.19	0.00	0.14	0.00
50			9.04	8.24	6.90	4.26	4.42	1.44	3.02	0.57	2.04	0.22	1.23	0.06	0.57	0.01	0.33	0.00	0.22	0.00	0.15	0.00
55			9.95	9.83	7.59	5.08	4.86	1.72	3.32	0.68	2.24	0.26	1.35	0.08	0.62	0.01	0.37	0.00	0.24	0.00	0.17	0.00
60			10.85	11.55	8.27	5.97	5.30	2.02	3.62	0.80	2.44	0.31	1.48	0.09	0.68	0.01	0.40	0.00	0.26	0.00	0.18	0.00
65			11.76	13.39	8.96	6.93	5.74	2.34	3.92	0.93	2.65	0.36	1.60	0.10	0.74	0.02	0.44	0.00	0.28	0.00	0.20	0.00
70					9.65	7.95	6.18	2.69	4.22	1.06	2.85	0.41	1.72	0.12	0.80	0.02	0.47	0.01	0.30	0.00	0.21	0.00
75					10.34	9.03	6.63	3.05	4.52	1.21	3.05	0.46	1.85	0.14	0.85	0.02	0.50	0.01	0.32	0.00	0.23	0.00
80					11.03	10.17	7.07	3.44	4.82	1.36	3.26	0.52	1.97	0.15	0.91	0.02	0.54	0.01	0.34	0.00	0.25	0.00
85					11.72	11.38	7.51	3.85	5.13	1.52	3.46	0.58	2.09	0.17	0.97	0.03	0.57	0.01	0.37	0.00	0.26	0.00
90							7.95	4.28	5.43	1.69	3.66	0.65	2.21	0.19	1.02	0.03	0.60	0.01	0.39	0.00	0.28	0.00
100							8.83	5.20	6.03	2.06	4.07	0.79	2.46	0.23	1.14	0.04	0.67	0.01	0.43	0.00	0.31	0.00
110							9.72	6.21	6.63	2.45	4.48	0.94	2.71	0.28	1.25	0.04	0.74	0.01	0.47	0.00	0.34	0.00
120							10.60	7.30	7.24	2.88	4.88	1.11	2.95	0.33	1.36	0.05	0.80	0.01	0.52	0.00	0.37	0.00
130									7.84	3.34	5.29	1.28	3.20	0.38	1.48	0.06	0.87	0.02	0.56	0.01	0.40	0.00
140									8.44	3.83	5.70	1.47	3.44	0.43	1.59	0.07	0.94	0.02	0.60	0.01	0.43	0.00
150									9.05	4.36	6.11	1.67	3.69	0.49	1.70	0.08	1.00	0.02	0.65	0.01	0.46	0.00
160									9.65	4.91	6.51	1.89	3.94	0.55	1.82	0.08	1.07	0.02	0.69	0.01	0.49	0.00
170									10.25	5.49	6.92	2.11	4.18	0.62	1.93	0.09	1.14	0.03	0.73	0.01	0.52	0.00
180											7.33	2.35	4.43	0.69	2.04	0.11	1.21	0.03	0.78	0.01	0.55	0.00
190											7.73	2.59	4.68	0.76	2.16	0.12	1.27	0.03	0.82	0.01	0.58	0.00
200											8.14	2.85	4.92	0.84	2.27	0.13	1.34	0.04	0.86	0.01	0.61	0.01
225											9.16	3.55	5.54	1.04	2.56	0.16	1.51	0.04	0.97	0.02	0.69	0.01
250											10.18	4.31	6.15	1.27	2.84	0.19	1.67	0.05	1.08	0.02	0.77	0.01
275													6.77	1.51	3.12	0.23	1.84	0.06	1.19	0.02	0.84	0.01
300													7.38	1.78	3.41	0.27	2.01	0.07	1.29	0.03	0.92	0.01
325													8.00	2.06	3.69	0.31	2.18	0.09	1.40	0.03	1.00	0.01
350													8.61	2.36	3.98	0.36	2.34	0.10	1.51	0.03	1.07	0.01
375													9.23	2.68	4.26	0.41	2.51	0.11	1.62	0.04	1.15	0.02
400													9.84	3.03	4.54	0.46	2.68	0.13	1.72	0.04	1.23	0.02
425													10.46	3.38	4.83	0.52	2.85	0.14	1.83	0.05	1.30	0.02
450															5.11	0.57	3.01	0.16	1.94	0.05	1.38	0.02
475															5.40	0.63	3.18	0.18	2.05	0.06	1.46	0.03
500															5.68	0.70	3.35	0.19	2.16	0.07	1.53	0.03
550															6.25	0.83	3.68	0.23	2.37	0.08	1.69	0.03
600															6.82	0.98	4.02	0.27	2.59	0.09	1.84	0.04
650															7.38	1.13	4.35	0.31	2.80	0.11	1.99	0.05
700															7.95	1.30	4.69	0.36	3.02	0.12	2.15	0.05
750															8.52	1.48	5.02	0.41	3.23	0.14	2.30	0.06
800															9.09	1.67	5.36	0.46	3.45	0.16	2.45	0.07
850															9.66	1.86	5.69	0.52	3.66	0.18	2.61	0.08
900															10.22	2.07	6.03	0.57	3.88	0.20	2.76	0.09
950																	6.36	0.63	4.10	0.22	2.91	0.09
1000																	6.70	0.70	4.31	0.24	3.06	0.10
1050																	7.03	0.76	4.53	0.26	3.22	0.11
1100																	7.37	0.83	4.74	0.28	3.37	0.12
1150																	7.70	0.90	4.96	0.31	3.52	0.13
1200																	8.04	0.98	5.17	0.33	3.68	0.15
1250																	8.37	1.05	5.39	0.36	3.83	0.16
1300																	8.71	1.13	5.60	0.39	3.98	0.17
1350																	9.04	1.21	5.82	0.42	4.14	0.18
1400																	9.38	1.30	6.04	0.44	4.29	0.19
1450																	9.71	1.39	6.25	0.47	4.44	0.21
1500																	10.05	1.48	6.47	0.51	4.60	0.22
1550																			6.68	0.54	4.75	0.23
1600																			6.90	0.57	4.90	0.25
1650																			7.11	0.60	5.06	0.26
1700																			7.33	0.64	5.21	0.28
1750																			7.54	0.67	5.36	0.29
1800																			7.76	0.71	5.52	0.31
1900																			8.19	0.78	5.82	0.34
2000																			8.62	0.86	6.13	0.38
2100																			9.05	0.94	6.44	0.41
2200																			9.48	1.03	6.74	0.45
2300																			9.92	1.11	7.05	0.49
2400																			10.35	1.21	7.36	0.53
2500																			10.78	1.30	7.66	0.57

Use caution at these velocities.

PRESSURE CONVERSION

psi	FEET	METER	BAR	kPa
1	2.3090	0.7038	0.0689	6.8948
80	185	56	5.5	552
85	196	60	5.9	586
90	208	63	6.2	621
95	219	67	6.6	655
100	231	70	6.9	689
105	242	74	7.2	724
110	254	77	7.6	758
115	266	81	7.9	793
120	277	84	8.3	827
125	289	88	8.6	862
130	300	91	9.0	896
135	312	95	9.3	931
140	323	99	9.7	965
150	346	106	10.3	1034
160	369	113	11.0	1103
170	393	120	11.7	1172
180	416	127	12.4	1241
190	439	134	13.1	1310
200	462	141	13.8	1379

FLOW RATE CONVERSION

gpm	ft³/s	m³/h	l/s	acre-ft/day
1	0.0022	0.2271	0.0002	0.004419
100	0.22	22.7	6.3	0.442
250	0.56	56.8	15.8	1.105
500	1.11	113.6	31.5	2.210
750	1.67	170.3	47.3	3.314
1000	2.23	227.1	63.1	4.419
1500	3.34	340.7	94.6	6.629
2000	4.46	454.2	126.2	8.838
2500	5.57	567.8	157.7	11.048
3000	6.68	681.4	189.3	13.258
3500	7.80	794.9	220.8	15.467
4000	8.91	908.5	252.4	17.677
4500	10.03	1022.1	283.9	19.886
5000	11.14	1135.6	315.5	22.096
6000	13.37	1362.7	378.5	26.515
7000	15.60	1589.9	441.6	30.934
8000	17.82	1817.0	504.7	35.353
9000	20.05	2044.1	567.8	39.773
10000	22.28	2271.2	630.9	44.192

LAKE INTAKE BOX SCREEN SIZING

FLOW RATE IN gpm	BOX SCREEN SIZE
0 - 500	18" square
501 - 1000	24" square
1001 - 1800	30" square
1801 - 2800	36" square
2801 - 4000	42" square
4001 - 5000	48" square
5001 - 7000	54" square
7001 - 8500	60" square
8501 - 10000	66" square

Based on screen velocities of less than 0.5 feet per second

WET WELL INTAKE PIPE SIZING

FLOW RATE IN gpm	LENGTH OF PIPE IN FEET				NOMINAL IPS PIPE DIAMETER
	50'	100'	200'	300'	
0 - 500	12"	12"	12"	14"	
501 - 1000	18"	18"	18"	18"	
1001 - 1500	24"	24"	24"	24"	
1501 - 2000	26"	26"	26"	26"	
2001 - 2500	28"	28"	28"	28"	
2501 - 3000	30"	30"	30"	30"	
3001 - 3500	32"	32"	32"	32"	
3501 - 4000	34"	34"	34"	34"	
4001 - 5000	36"	36"	36"	36"	

The nominal IPS pipe diameters listed in this chart assume a total equivalent pipe length as listed for friction loss calculations. A recommended internal pipe water velocity of up to 1.5 feet per second and/or a draw down of 1 inch or less is used to develop this conservative intake sizing table. Consult a Rain Bird engineer for values ranging outside of this chart.

WET WELL OPEN AREA SIZING

SIZE	SHAPE	NUMBER OF PUMPS
36" DIA	ROUND	1 - Vertical Turbine
48" DIA	ROUND	1 or 2 - Vertical Turbines
60" DIA	ROUND	1 or 2 - Vertical Turbines
72" DIA	ROUND	1 to 3 - Vertical Turbines
84" DIA	ROUND	1 to 5 - Vertical Turbines
96" DIA	ROUND	1 to 6 - Vertical Turbines
6' X 8'	RECTANGULAR	1 to 7 - Vertical Turbines

MICRON TO MESH CONVERSION

MICRON	U.S. MESH	INCHES
2000	10	0.0787
1680	12	0.0661
1410	14	0.0555
1190	16	0.0469
1000	18	0.0394
841	20	0.0331
707	25	0.028
595	30	0.0232
500	35	0.0197
420	40	0.0165
354	45	0.0138
297	50	0.0117
250	60	0.0098
210	70	0.0083
177	80	0.007
149	100	0.0059
125	120	0.0049
105	140	0.0041
88	170	0.0035
74	200	0.0029
63	230	0.0024
53	270	0.0021
44	325	0.0017
37	400	0.0015

INTEGRATED CONTROL SYSTEM™ WIRE PATH DESIGN

Recommended to Load Balance Wire Path.
- Do not utilize the full system capacity of 750 ICMs on one wire path. Instead, leave room to expand the system and add sensing capability in the future.

The wire distance is the "trunk length" of the wire path.
- The trunk length is the "longest single run of wire" needed for accommodating the installed ICMs.

Branches can be added to the trunk wire.
- Branches do not increase the maximum number of ICMs on the wire path.

WIRE DISTANCE IN METERS (M)

NO. OF UNITS	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	3,750	4,000	4,250	4,500
50	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
100	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
150	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
200	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
250	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
300	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
350	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²
400	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²
450	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²
500	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²
550	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²
600	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²
650	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²
700	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	5.0 mm²
750	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	2.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	3.0 mm²	5.0 mm²	5.0 mm²

WIRE DISTANCE IN FEET (FT.)

NO. OF UNITS	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000
50	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
100	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
150	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
200	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
250	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
300	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
350	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG
400	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG
450	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG
500	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG
550	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG	12 AWG
600	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG
650	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG
700	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG	10 AWG
750	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	14 AWG	12 AWG	12 AWG	12 AWG	12 AWG	12 AWG	10 AWG	10 AWG

WATER VELOCITY TABLE

	INTERNAL PIPE DIAMETER																						
gpm	2"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
10	1.0	0.3	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20	2.0	0.5	0.2	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	3.1	0.8	0.3	0.2	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40	4.1	1.0	0.5	0.3	0.2	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	5.1	1.3	0.6	0.3	0.2	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	6.1	1.5	0.7	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—
70	7.2	1.8	0.8	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—
80	8.2	2.0	0.9	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—	—
90	9.2	2.3	1.0	0.6	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—	—
100	10.2	2.6	1.1	0.6	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—	—	—	—
150	15.3	3.8	1.7	1.0	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	—	—	—	—	—	—	—
200	20.4	5.1	2.3	1.3	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	—	—	—	—
250	25.5	6.4	2.8	1.6	1.0	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	—	—
300	30.7	7.7	3.4	1.9	1.2	0.9	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
350	35.8	8.9	4.0	2.2	1.4	1.0	0.7	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
400	40.9	10.2	4.5	2.6	1.6	1.1	0.8	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450	46.0	11.5	5.1	2.9	1.8	1.3	0.9	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
500	51.1	12.8	5.7	3.2	2.0	1.4	1.0	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
600	61.3	15.3	6.8	3.8	2.5	1.7	1.3	1.0	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
700	71.5	17.9	7.9	4.5	2.9	2.0	1.5	1.1	0.9	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
800	81.7	20.4	9.1	5.1	3.3	2.3	1.7	1.3	1.0	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1
900	92.0	23.0	10.2	5.7	3.7	2.6	1.9	1.4	1.1	0.9	0.8	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
1000	102.2	25.5	11.4	6.4	4.1	2.8	2.1	1.6	1.3	1.0	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2
1250	127.7	31.9	14.2	8.0	5.1	3.5	2.6	2.0	1.6	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2
1500	153.3	38.3	17.0	9.6	6.1	4.3	3.1	2.4	1.9	1.5	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3
1750	178.8	44.7	19.9	11.2	7.2	5.0	3.6	2.8	2.2	1.8	1.5	1.2	1.1	0.9	0.8	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.3
2000	204.4	51.1	22.7	12.8	8.2	5.7	4.2	3.2	2.5	2.0	1.7	1.4	1.2	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4
2500	255.4	63.9	28.4	16.0	10.2	7.1	5.2	4.0	3.2	2.6	2.1	1.8	1.5	1.3	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.4
3000	306.5	76.6	34.1	19.2	12.3	8.5	6.3	4.8	3.8	3.1	2.5	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.8	0.8	0.7	0.6	0.6	0.5
3500	357.6	89.4	39.7	22.4	14.3	9.9	7.3	5.6	4.4	3.6	3.0	2.5	2.1	1.8	1.6	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.6
4000	408.7	102.2	45.4	25.5	16.3	11.4	8.3	6.4	5.0	4.1	3.4	2.8	2.4	2.1	1.8	1.6	1.4	1.3	1.1	1.0	0.9	0.8	0.8	0.7
4500	459.8	114.9	51.1	28.7	18.4	12.8	9.4	7.2	5.7	4.6	3.8	3.2	2.7	2.3	2.0	1.8	1.6	1.4	1.3	1.1	1.0	0.9	0.9	0.8
5000	510.9	127.7	56.8	31.9	20.4	14.2	10.4	8.0	6.3	5.1	4.2	3.5	3.0	2.6	2.3	2.0	1.8	1.6	1.4	1.3	1.2	1.1	1.0	0.9
5500	562.0	140.5	62.4	35.1	22.5	15.6	11.5	8.8	6.9	5.6	4.6	3.9	3.3	2.9	2.5	2.2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0
6000	613.1	153.3	68.1	38.3	24.5	17.0	12.5	9.6	7.6	6.1	5.1	4.3	3.6	3.1	2.7	2.4	2.1	1.9	1.7	1.5	1.4	1.3	1.2	1.1

Main line pipe diameter under standard practice is sized to achieve < 5 feet-per-second water velocity.
Wet-well intake pipe diameter under standard practice is sized to achieve < 1.5 feet-per-second water velocity.
Velocities listed are based on the actual internal diameter fo the pipe. Verify internal diameter based on class or type of pipe being used.

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. 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.

I. Landscape Irrigation Products

1800 Series Pop-Up Spray Heads, U-Series Nozzles, Brass MPR Nozzles, A-8S and PA-8S-PRS Shrub Adapters, and 1300 and 1400 Bubblers, 5000 Series Rotors, 5500 Series Rotors, 7005/8005 Rotors, Falcon® 6504 Series Rotors, PEB and PESB Plastic Valves – 5 Years

All other Landscape Irrigation products – 3 years

II. Golf Products

Golf Rotors: EAGLE™ Series and EAGLE IC™ Series, Rain Bird Series and Rain Bird IC™ Golf rotors – 3 years.

Swing Joints – 5 years

Brass Remote Control Valves and Brass Quick Coupling and Keys – 3 years

Filtration system controllers – 3 years

LINK™ Radios – 3 years

TSM-3 SDI12 Soil Sensor (ISS) – 5-years

Hose Reels – 2 years

Algae Control System — 3 years

All other golf products – 1 year

III. Agricultural Products

LF Series Sprinklers – 5 years

Other Impact Sprinklers – 2 years

All other AG products – 1 year

IV. Pump Stations

Rain Bird guarantees that its pump station will be free of manufacturer defects for one year from date of authorized start-up but not beyond sixteen months from date of invoice.

Start-up or service by other than Rain Bird Authorized personnel will void these terms and conditions. Provided that all installation, start-up and operation responsibilities have been properly executed, Rain Bird will replace or repair, at Rain Bird's option, any part found to be defective under normal recommended use during this period. Repairs performed and parts used at Rain Bird's expense must be authorized by Rain Bird prior to repairs being performed. Upon request, Rain Bird shall provide advice on trouble-shooting a defect during the effective period of this Customer Satisfaction Policy. However, no service, replacement or repair under this Customer Satisfaction Policy will be rendered while the customer is in default of any payments due to Rain Bird.

Rain Bird will not accept responsibility for costs associated with the removal, replacement, or repair of equipment in difficult-to access locations. Difficult-to-access locations include (but are not limited to) locations where any of the following are required:

1) Cranes larger than 15 tons
2) Divers
3) Barges
4) Helicopters
5) Dredging
6) Roof removal or other such construction/deconstruction requirements
7) Any other unusual means or requirements

Such extraordinary cost shall be the responsibility of the customer, regardless of the reason requiring removal of the equipment from service.

The terms and conditions of this Customer Satisfaction Policy do not cover damage caused by or resulting from the following:

1) Misapplication, abuse, or failure to conduct routine maintenance (to include winterization / winter lay-up procedures).
2) Pumping of liquids other than fresh water as defined by the U.S. Environmental Protection Agency, unless the pump station is specifically designed to do so.
3) Use of free chlorine or other strong biocides.
4) Exposure to electrolysis, erosion, or abrasion.
5) Presence of destructive gases or chemicals.
6) Over voltage or low voltage.
7) Electrical phase loss or reversal.
8) Exposure to incoming power lacking circuit breaker or fused protection.
9) Non-WYE configured power supplies such as open delta, phase converters, or other forms of unbalanced three phase power supplies.
10) Improper electrical grounding.
11) Using the control panel as a service disconnect.
12) Lightening or other Act of Nature.
13) Failure of pump packing seal (unless the failure occurs on initial start-up).
14) Use of a power source other than what is specified on original quotation.

The foregoing terms and conditions constitute Rain Bird's entire Customer Satisfaction Policy. Rain Bird does not offer any other or additional warranty, with respect to the pumping system or its components. Rain Bird makes no implied warranty, with respect to fitness for a particular purpose or merchantability of the pumping system or its components. Components manufactured by others (as noted on the Pump Station Quotation) are covered solely by and to the extent of the warranty, if any, offered by the manufacturer. Rain Bird shall not be liable to the customer or any other person or entity for any liability, loss, or damage caused or alleged to be caused, directly or indirectly, by the pump system. Rain Bird shall not be responsible for incidental, consequential, collateral or indirect damages or loss of profit or damages related to the customer's business operations, nor for those caused by Acts of Nature. In no case and under no circumstances shall Rain Bird's liability exceed the Rain Bird Corp's net sale price of the pump system.

Laws concerning customer warranties and disclaimers vary from state to state, and therefore some of the foregoing limitations may not apply to you.

V. All Other Products - 1 year