

# 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 new IC System,™ Rain Bird offers a full range of solutions. Choose Rain Bird field control for enjoy easy irrigation scheduling, adjustment and maintenance.



## Integrated Control System Rotors and Valves

Now, Integrated Control Technology is built into the rotor and valve for easy, streamlined control. The new Rain Bird® IC System™ connects central control directly to the rotor or valve. No field controllers, 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 26.5 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.

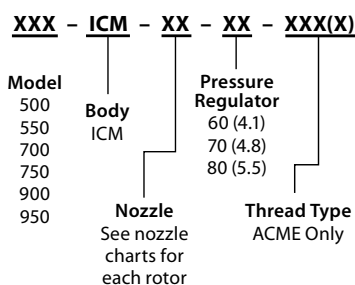
**Golf Course Aesthetics** – Since the IC System control is designed to be entirely below ground, the golf course vistas are clear of irrigation components as envisioned by the golf course designer.

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.

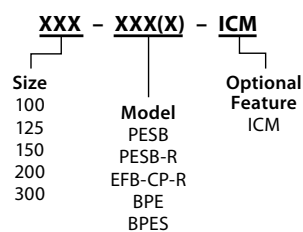
**Central Control “Smart Features”** – With the IC Series System, you have the ability to utilize all of Rain Bird’s central control “Smart Features” including: Rain Watch, Minimum ET,™ Smart Weather,™ Smart Pump,™ and Superior Monitoring of system operation.

### HOW TO SPECIFY

#### ICM Rotors\*



#### Valves\*\*



\* For exact combinations of Rotors (Nozzles and Pressure Regulator) see pages 28–36 for correct model.

\*\* For exact combinations of Valves (Size), see pages 40–46 for correct model.



● IC System™ NEW

## SPECIFICATIONS

**System Capacity\*:** 750 ICMs per Output Wire Path, 1500 ICMs per Output Driver Board, 3000 ICMs per IC Interface (ICI), up to 24,000 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:** 26.5 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 45 Ohms every 500 feet (150 meters) or 15 ICMs whichever is less. The Central Control is to be grounded with less than 5 Ohms of resistance

**Compliance:** CE, FCC

**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 EAGLE™ 500, 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:** 2 Outputs per IC Driver Board and Up to 4 total per ICI and Multiple Branches Per Wire Path

The easy-to-program, central control-ready Rain Bird® PAR+ES Controller features 72-Station capability, unlimited programs with central control, premium surge protection, 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. Factory-configured to receive commands via cellular phone (MI Series Mobile Controller\*) or UHF radio (FREEDOM System).

- » Dynamic FloManager®
- » Smart Pump™
- » Smart Sensor
- » Smart Weather™
- » RainWatch

**Choice of Pedestal Colors** — Available in gray and green.

**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 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 as many stations as necessary. 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 8 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 days or up to every nine days.

**Simplified Installation** — One 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 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 45).

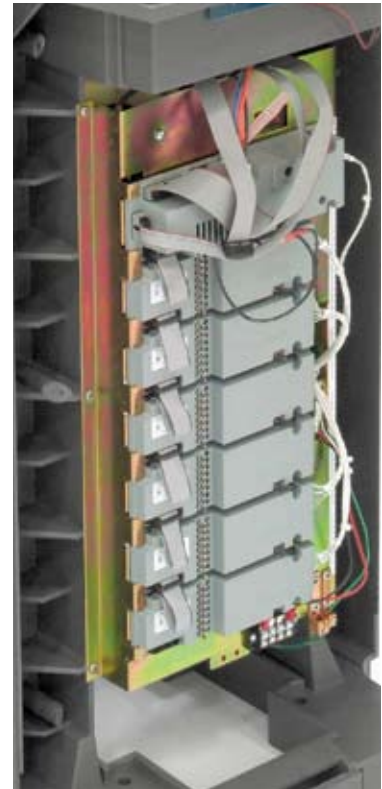
**The flexible PAR+ES can be ordered in the following configurations:**

- 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.

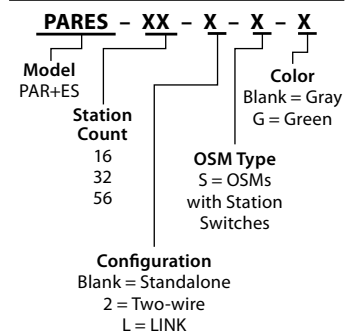
Buy only the control you need today and increase your operating capabilities or change your communication method at any time.

\*Software required



● PAR+ES

### HOW TO SPECIFY



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:** 34 3/4" (88 cm)

**Depth:** 21" (53.4 cm)

**Programs:** No limit with Rain Bird Central Control Systems. Six (6) automatic (8 start times each) and two (2) manual in standalone mode

**Water Budget:** 0 to 200% in 10% increments

**Station Runtimes:** 1 to 120 minutes, in 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<sup>1</sup> or wireless<sup>1,2</sup>. 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 copy paste function speeds programming process.

**Central Control Ready** — Works with any Rain Bird Central Control System. Compatible with FloManager®, 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:** 1 to 120 minutes, in 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 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

<sup>1</sup>Requires interface module not included.

<sup>2</sup>Requires additional transformer.

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. Connect a decoder to the nearest wire path.
  - » Uses up to 90 percent fewer wires than conventional hardwire systems.
  - » Built-in diagnostic tools.
  - » Compatible with all Rain Bird Golf Decoders (i.e. 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.
3. 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:** No limit with Rain Bird Central Control Systems. Six (6) automatic (12 start times each) and two (2) manual in standalone mode

**Water Budget:** 0 – 200% in 10% increments

**Station Runtimes:** 1 – 120 minutes, in 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

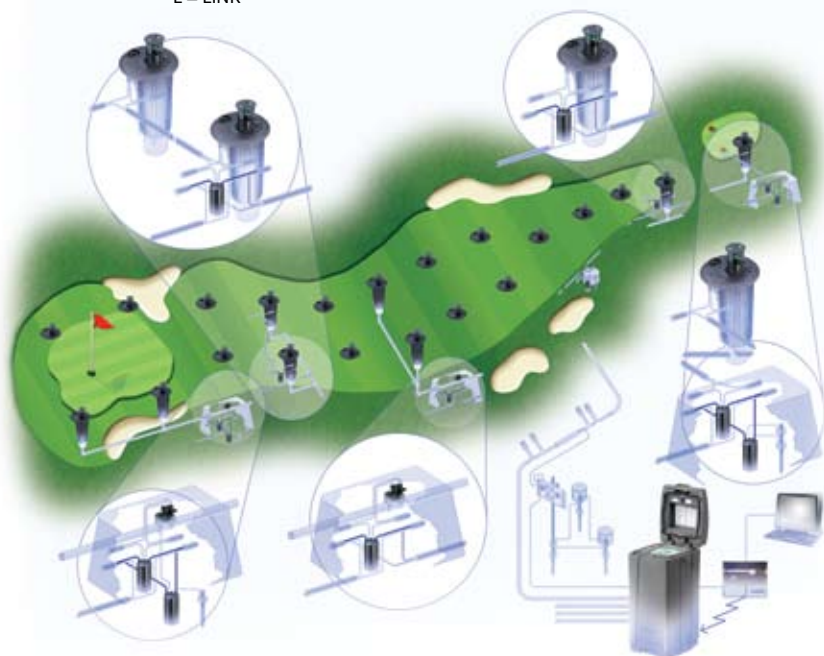
### ● PAR+ES Decoder Controller

#### HOW TO SPECIFY

**PARES - DEC - X - 72**

**Model**  
PAR+ES

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



Decoder Controller

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 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 FloManager®
- » Smart Pump™
- » Smart Sensor™
- » Smart Weather™
- » RainWatch

**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 14-gauge wires per station.

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

**Irrigation Control** — Two master valve terminals, one programmable by station.

**Easy Programming** — ODD day watering. EVEN day watering. Variable day cycle from 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** — No schedule limit when operated with Rain Bird Central Control Systems. Four (4) independent programs with 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.
- ESC-1 satellite with LINK (wireless) module in a plastic pedestal.

### SPECIFICATIONS

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

**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)

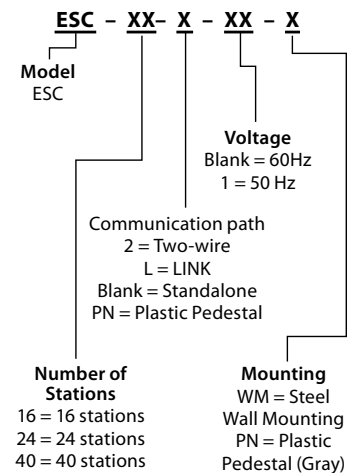
**Height:** 34 ¾" (88 cm)

**Depth:** 21" (53.4 cm)



● ESC-1

### HOW TO SPECIFY



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

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 control feature to operate controllers and decoders 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, even on a mobile phone. 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. Rain Bird's FREEDOM-Pad™ II unit can be used in conjunction with the FREEDOM radio to bring system adjustment and control to the palm of your hand.

### 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.



### ● 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 mm <sup>2</sup>	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 <sup>1</sup>	4	1	4	1.0 mA
FD-601	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 <sup>2</sup>	250	250	250	200
Maximum number of addresses per MDI/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
Interface unit	LDI/MDI	LDI/MDI	LDI/MDI	SDI
Maximum number of active solenoids per interface <sup>3</sup>	40	40	30	15
Active solenoid current draw (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, MDI)	8	3	2	1

<sup>1</sup>Has LSP-1 surge protection built-in.

<sup>2</sup>A wire path is the leg coming off the LDI, SDI or LTB.

<sup>3</sup>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).

<sup>4</sup>Although the MDI and 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.

<sup>5</sup>Although the SDI can supply 500 mA, to allow some safety factor, design to 450 mA.

5 Ohms or less — Most effective central control grounding grid resistance.  
50 Ohms or less — Most effective LSP-1 grounding grid resistance.

### BASIC DATA FOR DECODER SYSTEM DESIGN

THE BASIC DATA FOR A DECODER SYSTEM IS AS FOLLOWS:

500 maximum <sup>4</sup>	Decoder addresses per MDI/LDI interface unit
200 maximum	Decoder addresses per SDI interface unit
40 maximum	Active solenoids per LDI or MDI (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 or MDI (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) <sup>5</sup>	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 mm <sup>2</sup>	100	328
2.0 mm <sup>2</sup>	133	436
2.5 mm <sup>2</sup>	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**	ESC-1	ESC-1 LINK WITH RADIO
Input (VAC)**	117	117	117	117	117	117
Output (VAC)	26.5	26.5	26.5	26.5	26.5	26.5
Maximum Rain Bird Solenoids at 60 Hz (50 Hz)						
Per Clock	16 (12)	16 (12)	16 (12)	16 (12)	9	9
Per Station	4	4	2	2	2	2
AMP Draw at Rest	0.15	0.17	0.235	0.250	0.18	0.20
1	0.22	0.24	0.250	0.265	0.30	0.32
2	0.30	0.32	0.258	0.273	0.42	0.44
3	0.37	0.40	0.264	0.281	0.54	0.56
4	0.45	0.47	0.272	0.289	0.66	0.68
5	0.52	0.54	0.280	0.297	0.78	0.80
6	0.60	0.62	0.288	0.305	0.90	0.92
7	0.67	0.70	0.296	0.313	1.02	1.04
8	0.75	0.77	0.304	0.321	1.14	1.16
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, 8	Up to 72 decoder addresses	16, 24, 40
Communication Options	Standalone, Hardwire and Radio	Standalone, Hardwire and Radio	Standalone, Hardwire and Radio
Central Control	All RB Centrals	All RB Centrals	All RB Centrals
Max Output at 60 Hz	5 Amp, 16 solenoids	5 Amp, 16 solenoids	3 Amp, 9 solenoids
# Programs	6 automatic, 2 manual	8 automatic, 1 manual, 48 individual station schedules	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 31)	Even Day, Odd Day, Weekday, Variable (up to 31)
Water Adjust	0–200%, 10%	0–200%, 5%	0–300%, 1%
Surge Protection	Premium	Premium	Heavy-Duty
Pedestal Options	Large Plastic Pedestal	Large Plastic Pedestal	Large Plastic Pedestal
Pedestal Color Options	Gray or Green	Gray or Green	Gray
Max Station Run Times	2 Hours	4 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.

NOTE: 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.