

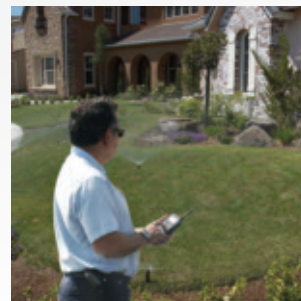
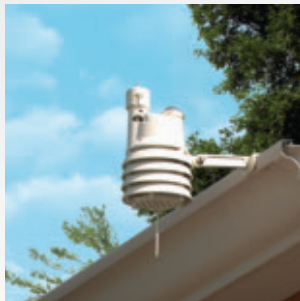
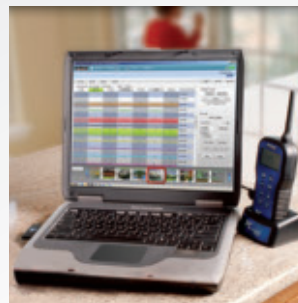
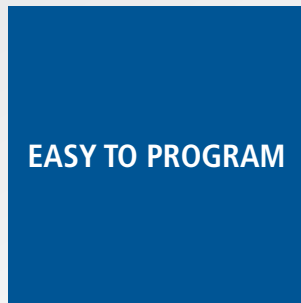
**Irritrol®**

Get more done™

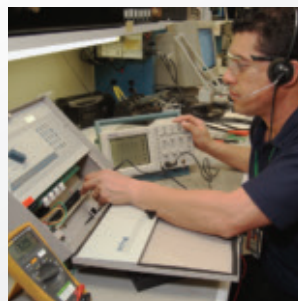
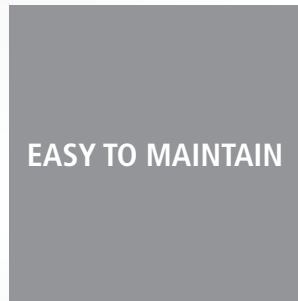
EASY TO INSTALL



EASY TO PROGRAM



EASY TO MAINTAIN



OVER 40 YEARS  
OF DEPENDABILITY



**PROFESSIONAL IRRIGATION PRODUCTS**

**2010-2011**

# A LEGACY OF QUALITY WITH PROFITS YOU'LL APPRECIATE.

RESIDENTIAL CONTROLLERS



EASY TO PROGRAM

VALVES



OVER 40 YEARS OF  
DEPENDABILITY

SPRAY HEADS



DURABLE, COMPATIBLE  
AND RETROFITABLE

ROTORS



EASY TO ADJUST

COMMERCIAL CONTROLLERS



COMMERCIAL GRADE  
HIGH STATION COUNT

Designed with the contractor in mind, our products are easy to install, easy to adjust and easy to program. From controllers to valves to rotors to spray heads, our products are simple and reliable...install them and rest easy!

**Irritrol**<sup>®</sup>

Get more done™

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At Irritrol, we recognize the importance of effective water management in the irrigation industry and have been working hard to produce products that promote the responsible use of water. To help you easily identify these products, we have developed a **Water Saver®** icon to indicate the products and features in our line-up that incorporate significant water savings.







AT-A-GLANCE				
	MC-E	SENTAR II™	RAIN MASTER™ EAGLE™	RAIN MASTER™ TWICE™2-WIRE
	pgs 22-23	pgs 26-27	pgs 28-29	pgs 30-31
ET-BASED WATER SAVINGS	Climate Logic™ Option		●	●
CENTRAL CONTROL			●	●
WEATHER STATION INTERFACE	●		●	●
MAXIMUM STATIONS	48	36	36	36
NUMBER OF PROGRAMS	8	4	4	4
NUMBER OF START TIMES	48	5	5	5
MAXIMUM STATION RUNTIME	24 hrs	9:59 hh:mm	9:59 hh:mm	9:59 hh:mm
INTER-STATION DELAY TIME	●	1-255 Sec	1-255 Sec	1-255 Sec
ODD/EVEN DAY WATERING	●		●	Eagle
WATER BUDGET (%)	0-255%	0-300%	0-300%	0-300%
CYCLE AND SOAK PROGRAMMING		●	●	●
SKIP DAY PROGRAMMING OPTION	●	●	●	●
PROGRAMMABLE RAIN DELAY		1-7 Days	1-7 Days	1-7 Days
RAIN/FREEZE SENSOR INPUT	●	1	1	1
AUDIBLE MALFUNCTION ALARM	●	●	●	●
STATION HIGH FLOW MONITORING/ALERT	●	●	●	●
MAIN LINE FLOW MONITORING/ALERT	●	●	●	●
STATION NO FLOW ALERT			●	Eagle
RAIN SENSOR BY PROGRAM		●	●	●
BATTERY REQUIREMENTS	None	None	None	None
BUILT-IN REMOTE INTERFACE	●	●	●	●
TWICE-2 WIRE COMPATIBLE				Sentar II & Eagle

# PC CONTROL SERIES COMPUTER-CONTROLLED

**12 STATION  
OUTDOOR/INDOOR**



The first of its kind, Irritrol's computer-controlled residential controller increases the professional installer's sales, installation and service productivity while providing the highest level of end-user convenience.

## KEY FEATURES & BENEFITS

### PC-COMPATIBLE SCHEDULING SOFTWARE

User-friendly software that is precise, flexible, and intuitive with its computer interface

### 2-WAY HANDHELD REMOTE WITH DESKTOP STAND

Provides the convenience of wirelessly programming the controller in the garage from the desk in the user's home office or den.

### SCHEDULING ADVISOR™

Saves water by adjusting the irrigation schedule when you send it out for the online weather forecast

### INTERNET COMPATIBILITY

Allows the owner to send schedules as email attachments. The installer or Irritrol Tech Support can alter the program and return it to the client

### 12-STATION CONTROLLER WITH 2-WAY RADIO MODULE

Acknowledges the receipt of a new program, stores it in memory and automatically runs it according to schedule. Controller installation and field wire hookup are the same as a conventional controller

### SELECTABLE PERSONAL ID NUMBER (PIN)

Unique, selectable number for each system's security prevents overlapping instructions from another PC Control system and reduces the chance of unauthorized program entry

### SYSTEM EXPANDABILITY UP TO 48 STATIONS

To meet the need for larger systems, 12-station indoor or outdoor "add-on" controllers within range of the 2-way radio modules can be added. The system sees station #1 on the second controller as zone #13

### LANDSCAPE LIGHTING CONTROL

Allows up to 3 zones to be designated to run relays for control of landscape lighting. (Controller does not supply main power to the lighting.) SR-1 Pump Start Relay is recommended

### CONTRACTOR SETTINGS DEFAULT

With a click of the mouse, the owner can reactivate the installer's original program

## NOW AVAILABLE IN BOTH INDOOR AND OUTDOOR MODELS



Indoor model



Outdoor model

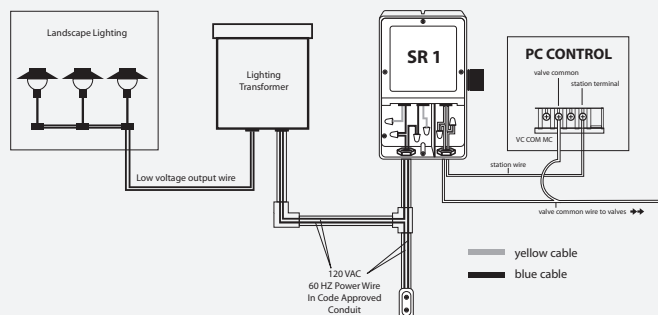
## EASY SYSTEM EXPANSION UP TO 48 STATIONS



36-stations shown here with wireless rain sensor (RS1000) or controllers can be spaced throughout the property

## CONTROL LANDSCAPE LIGHTING, TOO!

### WIRING DIAGRAM FOR LANDSCAPE LIGHTING ZONE



## OPERATING SPECIFICATIONS

- Station run time: up to 24 hours (in hour and minute increments)
- Start times: 10 per zone per day (120 total)
- Watering day schedules selectable per zone: Any days-of-the-week watering, interval watering (selectable in 1-day increments) from daily to once every 30 days and Odd or Even date watering
- Day exclusion option for setting "non-water" days
- Optional rain sensor for multi-controller systems: Connect sensor to controller #1
- Rain sensor assignable per station
- Optional pump start relay for multiple controller systems: connect relay to controller #1 (for pump control)
- PIN number range: selectable from 0001 to 9999
- Range of two-way remote: 1,000' line-of-sight, less when obstructed.
- Customized semi-automatic programs

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60HZ
- Transformer output: 24 V ac (30VA)
- Maximum output per station: 24 V ac, .4 amp
- Maximum total output: 24 V ac, 1 amp (including master valve)

## MODELS

Model	Description
PC-12-INT-PAK	12-Stn. indoor controller, remote, disk
PC-12-ADD-INT	12-Stn. add-on controller (indoor)
PC-12-EXT-PAK	12-Stn. outdoor controller, remote, disk
PC-12-ADD-EXT	12-Stn. add-on controller (outdoor)
PC-R	Remote, stand, USB cord and disk

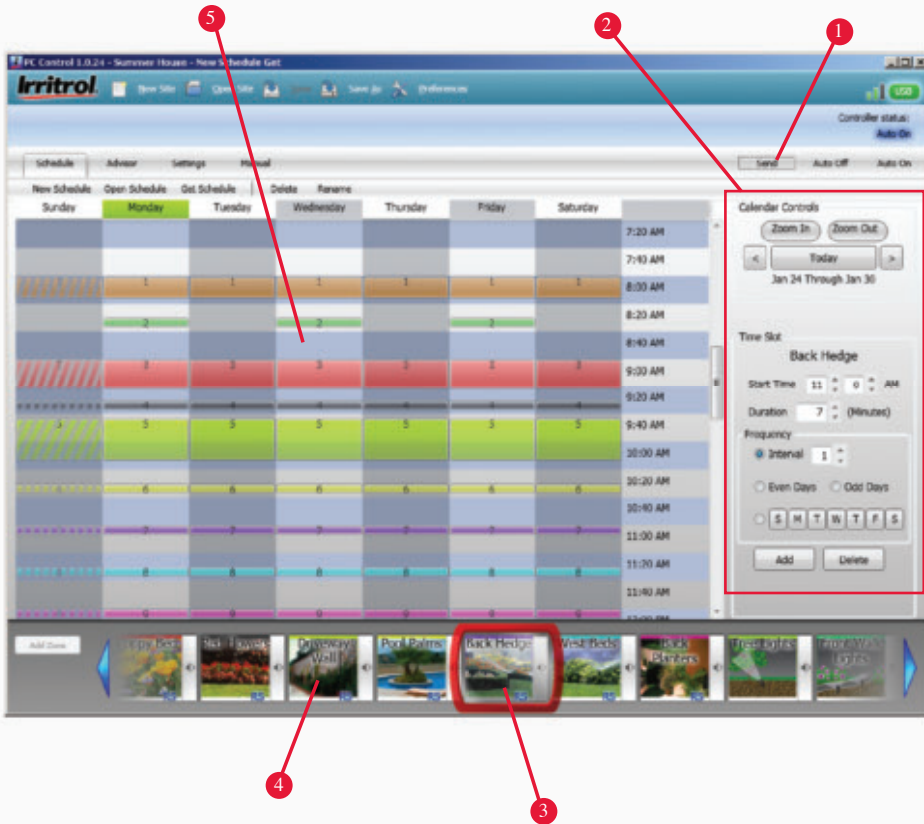
## DIMENSIONS

- Outdoor: H: 13", W: 7", D: 4 1/4"
- Indoor: H: 12 1/8", W: 6 1/8", D: 3"

## SYSTEM REQUIREMENTS

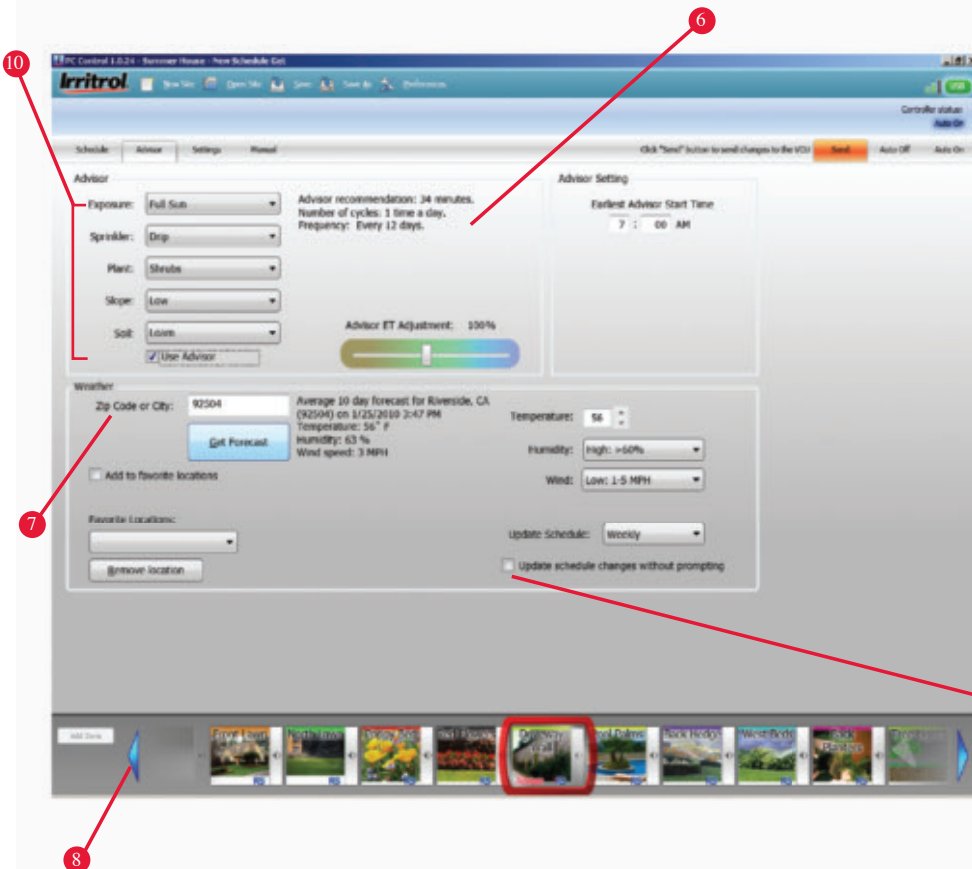
- Windows-compatible PC
- Windows XP Home Edition, XP Professional or 2003, Vista or Windows 7
- Available USB 1.0 (or greater) port
- 900 MHz CPU
- 64 MB RAM and CD-ROM drive
- 20MB free hard disk space
- 1024 x 768 64k color display/monitor (800 x 600 minimum)
- Keyboard and pointing device (mouse)
- Internet connectivity (high speed)

## EXPERIENCE THE SIMPLICITY OF PC CONTROL.



- 1 Send my changes to the controller
- 2 "Back Hedge" watering schedule:
  - Start: 11:00 am
  - Run: 7 minutes
  - Day interval "1" (every day)
  - Odd or even water day option
  - Week day watering option
- 3 Current zone selection "Back hedge"
- 4 Zone buttons with digital photos of each zone
- 5 Scheduling calendar:
  - Shows each zone's
    - Water days
    - Start time
    - Watering duration
  - Drag and drop zones on the calendar with your cursor

## SCHEDULING ADVISOR™



- 6 Receives a recommended watering program each time you send out for a weather forecast
- 7 Enter zip code and send for the online weather forecast
- 8 Move zone buttons for selection
- 9 Automatically update-my schedule using forecast just received
- 10 Enter site-specific information for each zone

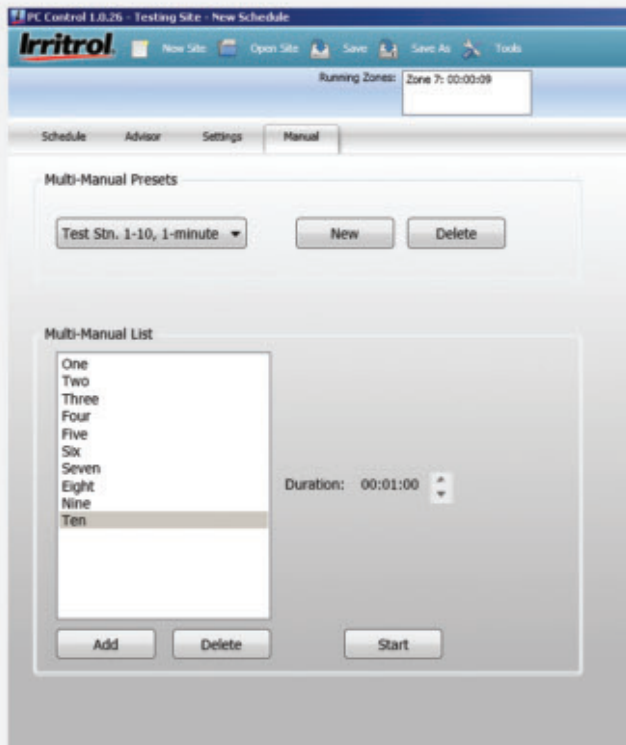


## EASY MAINTENANCE USING HAND-HELD REMOTE



Easy system maintenance or troubleshooting using the convenient hand-held remote. Make on-site schedule changes with your laptop and remote without garage access.

## CUSTOMIZE YOUR SEMIAUTOMATIC PROGRAMS



Above, the owner has created a semiautomatic program (available at any time in the drop down box) that will run the irrigation zones for 1 minute each.

## OPTIONAL ACCESSORIES

- SR-1 pump start relay
- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor

## LATEST SOFTWARE UPDATE

- Software version: On HELP page click on UPDATES for latest version of software
- Send schedules over the Internet as attachments
- Diagnostic circuit breaker alerts user to short circuits
- Available as a FREE online upgrade

## SPECIFYING INFORMATION

MODEL	STATIONS	CONFIGURATION	OPTIONS
PC - PC Control Controller	12 - 12 Station	EXT - Outdoor INT - Indoor	ADD - Add-on controller PAK - Includes remote and disk

Example: A PC Control 12 station, outdoor model = **PC-12-EXT-PAK**



PC-12-INT-PAK  
(includes transformer)



# SMART DIAL™ SERIES E.T.-BASED

6, 9, 12 AND 24 STATION\*  
OUTDOOR/INDOOR



The Irritrol® Smart Dial controller saves water and reduces irrigation runoff by automatically reprogramming itself based on local Evapotranspiration (ET). Using the ET Everywhere™ Data Service, the Smart Dial controller receives a paging signal with the local ET value from an orbiting satellite each evening. The controller then adjusts its irrigation programming to replace the amount of water lost through the previous day's ET. The Smart Dial adjusts each zone to apply only the water needed, regardless of whether spray heads, rotors, stream rotors or drip components are used in the zone. The power of ET Everywhere, combined with the WeatherTRAK® scheduling engine, puts the Smart Dial controller on the cutting edge of environmental sensitivity and water savings.

## KEY FEATURES & BENEFITS

### WEATHERTRAK-ENABLED INTERFACE

Allows each zone to be programmed based on site-specific information (plant material, type of irrigation head installed, sun exposure, topography and soil type)

### WEATHERTRAK SCHEDULING ENGINE

Saves water by reprogramming itself based on local weather "real-time" data downloaded daily via satellite to reduce over watering and runoff on residential and commercial landscape sites

### SNAP-IN, SMART DIAL FRONT PANEL MODULES (AVAILABLE SEPARATELY) FOR 6, 9 OR 12 STATION MODELS

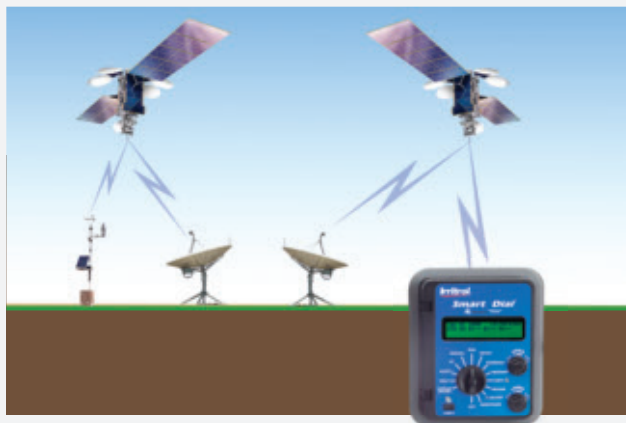
Allow fast and easy on-site conversion of existing Rain Dial® and Rain Dial Plus timers to WeatherTRAK-enabled controllers

### LOOP-UP TABLES IN SOFTWARE

Initiates irrigation even if daily ET page is not received by using last download and loop-up tables in software

\* 24 station available in outdoor only

## HOW ET EVERYWHERE™ WORKS



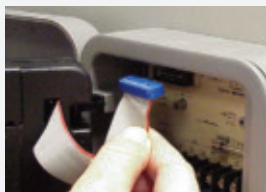
The ET Everywhere data service utilizes daily data from over 20,000 weather stations across the country, processes the information and then sends that information to the controller. Smart Dial's scheduling engine then uses that information to automatically reprogram the controller based on each zone's site-specific information.

## EASILY CONVERT EXISTING RAIN DIAL® CONTROLLERS TO SMART TECHNOLOGY WITH SMART DIAL MODULES

With available Smart Dial modules, retrofitting a Rain Dial or Rain Dial Plus controller to Smart Dial technology is as easy as...



**1**  
Unplug the ribbon cable and simply snap out Rain Dial module  
No rewiring necessary!



**2**  
Then, snap in Smart Dial module and connect cable in existing Rain Dial box



**3**  
Call toll free to activate service.  
Upgrade complete!

## SPECIFYING INFORMATION

SD - XXX - XXX

MODEL	NUMBER OF STATIONS	CONFIGURATION
SD - SMART DIAL	600 - 6 Station 900 - 9 Station 1200 - 12 Station 2400 - 24 Station	EXT - Outdoor INT - Indoor MOD - Module

Example: A Smart Dial 6 station, outdoor model = **SD600-EXT**

## ADDED FEATURES

- Non-volatile program memory
- Programmable to a particular watering window of time
- Copy button for simplified programming
- Communication and programming conflict alerts
- Sensor hookup with bypass switch compatible with the RainSensor™ Series
- Programmable master valve/pump start circuit by station
- Manual program and manual station operation
- Program review
- Simple diagnostics and help button
- Agency compliant, FCC approved and CIT certified
- Five-year warranty

## OPERATING SPECIFICATIONS

- Number of programs: 2
- Station run times: 1 min. to 99 minutes
- Start times: variable, depending upon E.T. (1 start/day)
- Watering schedule: 7-day weekly calendar by month, odd/even date, 1-7 day interval (skip day)
- E.T.% Adjustable: -50% through +25% of programmed time in 5% increments (with auto split of long run times)

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60 Hz
- Transformer output: 24 V ac, 60 Hz
- Maximum output per station: 24 V ac, .5 amp
- Maximum output to valves: 24 V ac, 1.0 amp, 1.25 amps in 24 station model (including pump/MV)
- UL and CUL listed
- Valve test detects "Open" and "Short"

## MODELS

Model	Description
SD600-EXT	6 -Station, Outdoor
SD900-EXT	9 -Station, Outdoor
SD1200-EXT	12 -Station, Outdoor
SD2400-EXT	24 -Station, Outdoor
SD600-INT	6 -Station, Indoor
SD900-INT	9 -Station, Indoor
SD1200-INT	12 -Station, Indoor
SD600-MOD	Module assembly, 6 -Station
SD900-MOD	Module assembly, 9 -Station
SD1200-MOD	Module assembly, 12 -Station

## DIMENSIONS

- **Outdoor:** H: 7 3/4", W: 10 3/4", D: 4"
- **Indoor:** H: 7 3/4", W: 7", D: 3 3/4"
- **24 Station:** H: 8 1/2", W: 10 1/2", D: 5"

## OPTIONAL ACCESSORIES

- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- SR-1 pump start relay
- SD-ANT external antenna kit



**W**e've upgraded these popular, long-standing controllers with a host of new features. The Irritrol<sup>®</sup> Rain Dial-R now offers exceptional scheduling for speed of programming and maintenance. Additional features include rain sensor compatibility and more pump control for water well and booster pump applications. And best of all, the new Rain Dial-R programs just like the original—use only the features you need!

## KEY FEATURES & BENEFITS

### REMOTE CONTROL READY

Compatible with CMR-KIT and KSR-KIT-K remote kits

### RAIN SENSOR READY

Sensor bypass switch and terminal for sensor hookup

### THREE INDEPENDENT PROGRAMS

Programming flexibility to meet the needs of a wide variety of plant material on the landscape site

### THREE WATER DAY CHOICES

- Any day of the week, skip days or odd/even dates
- Skip days and odd/even dates have day exclusion option

### WATER BUDGETING

For quick changes to the watering durations of all stations on a program at one time or pre-set a change in water budget for each month.

### 365-DAY CALENDAR FOR ODD/EVEN DATE WATERING

Meets the odd/even date watering mandates often used for landscape water reductions

### WATER WELL RECOVERY (DELAY BETWEEN STATIONS)

Option of pump circuit ON or OFF during delay

### MASTER VALVE/PUMP START CIRCUIT ASSIGNABLE PER STATION

Stations requiring a booster pump can be supplied while other stations can run on street water pressure

### TEST ALL STATIONS PROGRAM

Allows a quick test of all stations from lowest to highest number

### CLEAR/ERASE MEMORY BY PROGRAM

Saves time by quickly erasing only the program desired

### PROGRAM STACK OR OVERLAP OPTION

Allows three programs/stations on at once or restricts operations to no overlapping station runs

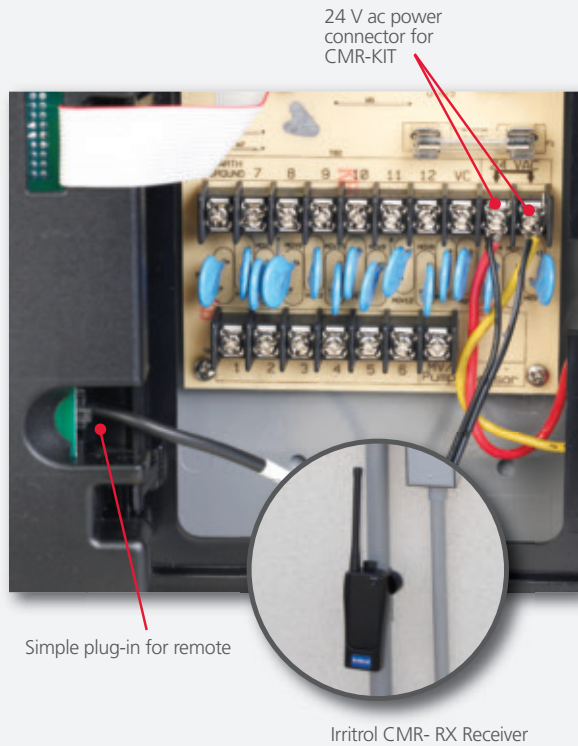
### SNAP-OUT FACE PANELS

6, 9 and 12-station models all have 12-station terminal boards allowing interchangeable front panels to change station number

### MANUAL STATION ADVANCE

During automatic, semi-automatic and station test cycles, allows quick advancement of operation up through the stations

## REMOTE CONTROL COMPATIBLE



Irritrol's Commercial Maintenance Control (CMR-KIT) plugs into the new Rain Dial-R face panel and connects to 24-Volt AC terminals.

For 1-person maintenance and trouble shooting, the CMR-KIT can operate individual stations on the Rain Dial-R from a range up to 1½ miles.

## SPECIFYING INFORMATION

MODEL	NUMBER OF STATIONS	CONFIGURATION	
<b>RD</b> - RAIN DIAL	<b>600</b> - 6 Station <b>900</b> - 9 Station <b>1200</b> - 12 Station	<b>EXT</b> - Outdoor <b>INT</b> - Indoor <b>MOD</b> - Module	<b>R</b> - Rain sensor ready
Example: A Rain Dial 6 station, outdoor model = <b>RD600-EXT-R</b>			

## ADDED FEATURES

- Automatic, semi-automatic and manual operation
- Weather-resistant plastic, key-lock cabinet with an internal transformer (outdoor models)
- Durable plastic cabinet with an external transformer (indoor models)
- Electrical surge protection (on both input and output lines) resists damage from lightning storms and power surges
- Self-diagnostic circuit breaker
- Rain sensor terminal
- Wall-mountable
- Five-year warranty

## OPERATING SPECIFICATIONS

- Station run times: 1-59 minutes in 1-minute increments or 1-5.9 hours in .1-hour (6 minute) increments
- Start times: 3 per program per day for 9 starts total
- Watering schedules per program:
  - Any day of the week
  - Skip days from 1 to 31 days between irrigation days
  - Odd or even date watering

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120V ac, 60Hz (220/240V ac, 50Hz available internationally)
- Transformer output: 24V ac, 1.25 amps
- Maximum output per station: 24V ac, .5 amps
- Maximum output to valves: 24V ac, 1.0 amps (including master valve/pump start circuit)
- Battery backup for "armchair" programming and keeping current time and date: 9-volt alkaline (not included)
- UL and CSA listed

## MODELS

Model	Description
RD600-EXT-R	6 -Station, Outdoor
RD900-EXT-R	9 -Station, Outdoor
RD1200-EXT-R	12 -Station, Outdoor
RD600-INT-R	6 -Station, Indoor
RD900-INT-R	9 -Station, Indoor
RD1200-INT-R	12 -Station, Indoor
RD6-MOD-R	Module assembly, 6 -Station
RD9-MOD-R	Module assembly, 9 -Station
RD12-MOD-R	Module assembly, 12 -Station

## DIMENSIONS

- **Outdoor:** H: 7 ¾", W: 10 ¾", D: 4"
- **Indoor:** H: 7 ¾", W: 7", D: 3 ¾"

## OPTIONAL ACCESSORIES

- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- SR-1 pump start relay
- CMR-KIT remote system
- R102-5476 20x16 pin cable
- CL-100-Wireless weather system
- R-100-KIT remote control



# TOTAL CONTROL-R<sup>®</sup> SERIES

6, 9, 12, 15, 18 AND 24 STATION\*  
OUTDOOR/INDOOR



The Irritrol<sup>®</sup> Total Control-R family of models is proof that advanced design controllers don't have to be complicated. Developed to meet a wide variety of watering requirements, the easy-to-program Total Control Series is available in models ranging from 6 to 24 stations. Programming flexibility is provided by four independent programs, 16 total start times and a 365-day calendar for odd/even day scheduling

## KEY FEATURES & BENEFITS

### NEW "R" MODELS ARE REMOTE-READY

For Irritrol's commercial maintenance remote (CMR-KIT)

### FOUR INDEPENDENT PROGRAMS OFFER CONCURRENT OPERATION CAPABILITY

For scheduling flexibility

### SEVEN-DAY CALENDAR, ODD/EVEN DAY OR DAY-INTERVAL OPTIONS FROM ONE TO 30 DAYS

Provides the flexibility to meet water restrictions or plant watering requirements

### PROGRAMMABLE MASTER VALVE ON/OFF PER PROGRAM

Provides the flexibility of running some programs with a booster pump and some without

### NON-VOLATILE MEMORY

Holds program during power failures for reliable operation

### SNAP-OUT FACE PANELS

Allows easy removal of control module without disturbing valve wiring for servicing and hassle-free station upgrade (from 6 to 9 or 9 to 12 and from 15 to 18 or 18 to 24)

### FLEXIBLE STATION RUN AND START TIMES

Meet a broad range of watering requirements

### 6-, 9- AND 12-STATION MODELS HAVE 12-STATION TERMINAL BOARDS; 15-, 18- AND 24-STATION MODELS HAVE 24-STATION TERMINAL BOARDS

Allows for station count increase simply by changing face panel module

### SENSOR HOOKUP WITH BYPASS SWITCH COMPATIBLE WITH IRRITROL'S RAINSENSOR™ SERIES

Saves water by shutting off the system during rainfall

\*15-, 18- and 24-station controllers are available in outdoor models only



## ADDED FEATURES

- User-friendly, 10-position programming dial and large, easy-to-read display
- Excluded-day option, when used with the odd/even date option, allows selection of specific day(s) not to water
- 365-day calendar for odd/even day programming
- Start time stacking within each program
- Programmable "Rain Off" up to seven days
- Automatic, semi-automatic, manual and timed-manual operation
- Self-diagnostic circuit breaker
- Electrical surge protection (on both input and output lines)
- Durable plastic cabinet with an external transformer (indoor models)
- Wall-mountable
- Five-year warranty

## REMOTE READY!

New remote-ready Total Control-R front panels (sold separately) are available to retrofit older Total Control "-B" models to be compatible with the CMR-KIT.



Easy plug-in connection to the back of timing module and 24 V ac connection to transformer terminal

## SPECIFYING INFORMATION

MODEL	STATIONS	CONFIGURATION	
TC - TOTAL CONTROL	6 - 6 Station 9 - 9 Station 12 - 12 Station 15 - 15 Station 18 - 18 Station 24 - 24 Station	EX - Outdoor IN - Indoor MOD - Module	R - Remote control ready
Example: A Total Control 12 station, outdoor model = <b>TC-12EX-R</b>			

## OPERATING SPECIFICATIONS

- Station run times: 1 minute to 10 hours in 1-minute increments
- Start times: 16 total starts assignable to any program
- Water budgeting: 10-200% in 10% increments

## ELECTRICAL SPECIFICATIONS

- Electronic circuit breaker: 1.25 amps minimum holding
- Maximum output per station: 24 V ac, .5 amp
- Maximum output to valves: 24 V ac, 1.25 amps (including master valve)
- Battery backup: 9-volt alkaline battery (not included)
- UL and CSA listed (6-, 9-, 12-, 15-, and 18-station models)
- UL and CUL listed (24-station model)
- **Outdoor**
  - Transformer input: 120 V ac, 60 Hz (220/240 V ac, 50 Hz)
  - Transformer output: 24 V ac, 1.67 amps
- **Indoor**
  - Transformer input: 120 V ac, 60 Hz (220/240 V ac, 50 Hz)
  - Transformer output: 24 V ac, 1.25 amps

## MODELS

Model	Description
TC-6EX-R	6 -Station Outdoor
TC-9EX-R	9 -Station Outdoor
TC-12EX-R	12 -Station Outdoor
TC-15EX-R	15 -Station Outdoor
TC-18EX-R	18 -Station Outdoor
TC-24EX-R	24 -Station Outdoor
TC-6IN-R	6 -Station Indoor
TC-9IN-R	9 -Station Indoor
TC-12IN-R	12 -Station Indoor
TC-6MOD-R	Module assembly, 6 -Station
TC-9MOD-R	Module assembly, 9 -Station
TC-12MOD-R	Module assembly, 12 -Station
TC-15MOD-R	Module assembly, 15 -Station
TC-18MOD-R	Module assembly, 18 -Station
TC-24MOD-R	Module assembly, 24 -Station

## DIMENSIONS

- **Outdoor:** H: 8 1/2", W: 10 1/2", D: 5"
- **Indoor:** H: 7 1/2", W: 9 1/2", D: 4 1/4"

## OPTIONAL ACCESSORIES

- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- SR-1 pump start relay
- CMR-KIT remote system
- CL-100-Wireless weather system
- R-100-KIT remote control

# CLIMATE LOGIC™

## WIRELESS WEATHER SENSING SYSTEM



**F**or simple, water saving, weather-following, automatic irrigation control, Irritrol® introduces the Climate Logic weather system. Consisting of two components; a wireless transmitting weather sensor for installation outdoors and a receiver module to attach to the Irritrol controller, the system monitors weather data, transmits them to the module then alters the controller's Program "A" to "follow the weather". As for compatibility, the Climate Logic weather system works with the Rain Dial®-R, the Total Control®-R, KwikDial® and MC-E controllers.

## KEY FEATURES & BENEFITS

### **BUILT IN RADIOS**

For easy, wireless installation with less labor than wired systems

### **TEMPERATURE SENSOR FOR MONITORING AIR TEMP**

Shuts system off in cold weather

### **RAIN SENSOR**

Adjustable for amount of precipitation to shut off system

### **SOLAR SENSOR**

Monitors the amount of the landscape site's sun exposure

### **RECEIVER MODULE**

- Connects to the controller with a single plug-in cord. No bundle of wires to individually attach
- Converts today's data from the weather sensor to percent of the hottest month's watering time to apply
- Appropriately alters the controller's Program A water budget

### **OPTIONAL REMOTE CONTROL**

Uses the same receiver module. Climate Logic owners do not need to purchase a separate receiver.

COMPATIBLE WITH IRRITROL® RAIN DIAL®-R AND IRRITROL TOTAL CONTROL®-R CONTROLLERS AND MORE



CLIMATE LOGIC™ KIT (CL-100-WIRELESS) INCLUDES



CL-M1 Receiver module

CL-W1 Weather sensor/transmitter

CMR-ADP Cable adapter

SPECIFYING INFORMATION

CL - XXX - WIRELES

MODEL	CONNECTION
CL -Climate Logic	100 - Receiver and transmitter kit

Example: a wireless system with sensor & module = **CL-100-Wireless**

OPERATING SPECIFICATIONS

- 1,000 line of sight signal range
- Compatible with the following Irritrol controllers
  - Rain Dial-R series and earlier Rain Dial (Blue)
  - Total Control-R series
  - Kwik Dial Series (with adapter cable CMR-ADP)
  - MC-E Controllers (with adapter cable CMR-ADP)
- One weather sensor can communicate with multiple receiver modules

MODELS

Model	Description
CL-100-Wireless	Wireless weather sensor and module
CL-W1	Wireless weather sensor
CL-M1	Wireless receiver module
CL-R1	Remote control (transmitter only)
CL-MR	Mini-receiver (receiver only)
R-100-KIT	Mini remote kit (transmitter & receiver)

OPTIONAL ACCESSORIES

- Cable adapter CMR-ADP

R-100-KIT:REMOTE CONTROL INCLUDES



CL-R1 Remote transmitter

CL-MR Mini-receiver

CMR-ADP Cable adapter



**K**wikDial®, the ideal residential controller from Irritrol®, offers a unique combination of sophisticated features and simple operation. Excellent scheduling flexibility is provided by its automatic, semi-automatic and manual operations, a wide range of watering intervals, and the ability to make percentage changes to watering duration for seasonal adjustments. Peace of mind is ensured by the controller's electrical surge protection, a self-diagnostic, electronic circuit breaker and built-in memory that maintains time, date and programming information for 24 hours in the absence of AC power.

## KEY FEATURES & BENEFITS

### THREE INDEPENDENT PROGRAMS

Allows differing watering days, station run times and station assignments

### MULTIPLE WATERING DAY OPTIONS

Provides flexibility to meet water restrictions and diverse plant requirements:

- Days-of-the-week watering
- Odd/even date watering with 31st day skip
- Repeating-day-interval watering (every day, every 2nd day, every 3rd day, etc., up to once every 31 days)
- Excluded-day option, when used with the odd/even day or day-interval

### COMPATIBLE WITH KWIKSTART™ HAND-HELD REMOTE SYSTEM

Provides convenient remote station start/pause/resume/off capability (KSR-KIT-K) for supplemental watering or inspection

### SELF-DIAGNOSTIC, ELECTRONIC CIRCUIT BREAKER

Identifies and overrides an electrical "short" in a valve or in valve wiring and continues to water operable stations

### FULL FAMILY OF INDOOR AND OUTDOOR MODELS

Ensures a product to match any landscape

### SENSOR HOOKUP WITH BYPASS SWITCH COMPATIBLE WITH IRRITROL'S RAISENSOR™ SERIES

Saves water by shutting off the system during rain

### PROGRAM STACKING FEATURE

Prevents program overlap

### ELECTRICAL SURGE PROTECTION (ON BOTH INPUT AND OUTPUT LINES)

Resists damage from lightning storms and power surges



## FLEXIBLE WATER DAY AND START TIME OPTIONS



- 1 Any-day-of-the-week watering
- 2 Odd/Even day watering
- 3 Day interval watering from 1-31 days
- 4 Up to 3-starts per day per program

## SPECIFYING INFORMATION

MODEL	NUMBER OF STATIONS	CONFIGURATION
<b>KD</b> - KWIKDIAL	4 - 4 Station 6 - 6 Station 9 - 9 Station 12 - 12 Station	<b>EXT</b> - Outdoor <b>INT</b> - Indoor
Example: A KwikDial 9 station, outdoor model = <b>KD9-EXT</b>		

## ADDED FEATURES

- Automatic, semi-automatic (manual program) and manual station(s) operation
- Programmable "Rain Off" up to seven days
- One dial and four push buttons for ease of programming
- Large LCD displays status of programs scheduled to run each day
- Multiple language capabilities (English, French, German, Italian and Spanish)
- Built-in memory maintains real time and programming information for a minimum of 24 hours in the absence of AC power (no battery required)
- "All stations" test program
- Water budgeting feature for each program (0-200% in 10% increments)
- Weather-resistant plastic case with internal transformer (outdoor model) and provision on door for a padlock
- Durable plastic case with plug-in transformer (indoor model)
- Three-year warranty

## OPERATING SPECIFICATIONS

- Station run times: 1-240 minutes (4 hours) in 1-minute increments
- Start times: 3 per program for up to 9 daily starts

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60HZ (220/240 V ac, 50 Hz)
- Transformer output: 24 V ac, .830 amps
- Maximum output per station: 24 V ac, .4 amp
- Maximum total output: 24 V ac, .8 amp (including master valve)
- Capacity: One station valve plus a master valve (or 24 V ac pump start relay) on at a time
- UL and CUL listed

## MODELS

Model	Description
KD4-EXT	4 -Station Outdoor
KD6-EXT	6 -Station Outdoor
KD9-EXT	9 -Station Outdoor
KD12-EXT	12 -Station Outdoor
KD4-INT	4 -Station Indoor
KD6-INT	6 -Station Indoor
KD9-INT	9 -Station Indoor
KD12-INT	12 -Station Indoor

## DIMENSIONS

- Outdoor: H: 9", W: 6 7/8", D: 4"
- Indoor: H: 8 7/8", W: 6 1/8", D: 3"

## OPTIONAL ACCESSORIES

- KwikStart remote kit (KSR-KIT-K)
- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- CMR-KIT remote system
- SR-1 pump start relay
- CL-100-Wireless weather system
- R-100-KIT remote control



# JUNIOR DC™ SERIES

**1 AND 4 STATION  
OUTDOOR/INDOOR**



**W**hen AC power is a problem, the JUNIOR DC battery-operated controllers are the solution! Whether for temporary operations like irrigation system wire repairs or permanent applications where AC power to the valves is expensive or impractical, the JUNIOR DC controllers can handle the job. And because valve boxes occasionally flood, these valve-mounted controllers are waterproof! For water savings, JUNIOR DC controllers are compatible with wired rain sensors.

## KEY FEATURES & BENEFITS

### **BATTERY-OPERATED**

Provides automatic irrigation in areas without A.C. power

### **WATERPROOF (IP68)**

To survive the occasional flooded valve box

### **VALVE MOUNT OR WALL MOUNT OPTION**

Mount right on the D.C. solenoid or wall mount up to 900' away

### **1- AND 4-STATION MODELS**

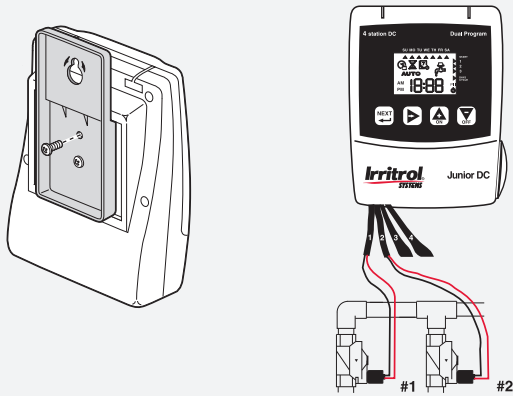
For temporary power to one valve or permanent power to a system without A.C.

### **COMPATIBLE WITH WIRED RAIN SENSOR**

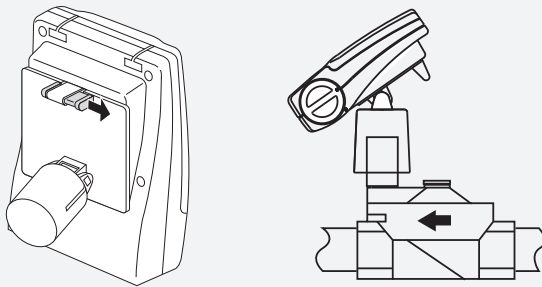
Saves water by preventing irrigation during a downpour

### **USE IRRITROL DCL, DC LATCHING SOLENOID**

## JUNIOR DC™ WALL INSTALLATION



## JUNIOR DC VALVE MOUNTED



## SPECIFYING INFORMATION

MODEL	CONNECTION
JRDC - Junior DC	1 - 1 station 4 - 4 station

Example: A 4 station Junior DC controller = **JRDC-4**

## ADDED FEATURES

- Battery operated
- Waterproof tested (IP68)
- Compatible with wired rain sensors
- 1-station and 4-station models
- Valve-mounted on the solenoid or wall-mounted
- Two independent programs
- Program Stacking (prevents overlapping operations)
- Program erase and Total Erase functions
- "Off" setting for rainy weather
- Low Battery indicator
- 2-year warranty

## OPERATING SPECIFICATIONS

- 3 Start Times per program
- Watering Time: 1-155 minutes (in 1-minute increments)
- Water Budgeting (10% to 200%)
- 7-day "select day" watering schedule or day intervals from 1-14 days

## ELECTRICAL SPECIFICATIONS

- Uses one, 9-volt, Alkaline battery
- Output to solenoid is a DC pulse
- Use with Irritrol "DCL", DC, latching solenoids and Irritrol valves
- cULus listed
- Maximum wire length to DCL: 660' to 960' depending on wire gauge (see below)

Wire Size	Maximum Wire Length
#18	660 feet
#16	800 feet
#14	960 feet

## MODELS

Model	Description
JRDC-1	1-station
JRDC-4	4-station

## DIMENSIONS

- **1 station:** H: 1 1/2", W: 1 3/4", D: 3 3/4"
- **4 stations:** H: 1 1/2", W: 1", D: 3"

## OPTIONAL ACCESSORIES

- RS500 wired rain sensor



The Irritrol® Junior Max (JR Max™) controllers combine simplicity and affordability with a host of modern irrigation control features ideal for residential landscape applications. Built for today's water use challenges, the JR Max offers a 365-day calendar for optional odd or even date watering as well as any-day-of-the-week and repeating day interval water day capabilities. This irrigation flexibility is further enhanced by three programs, up to seven start times per day and station timing from 1 minute up to 4 hours. Program "C" even has a "looping cycle" for "grow in" periods for sod, seed or misting applications.

## KEY FEATURES & BENEFITS

### THREE INDEPENDENT PROGRAMS WITH START-TIME STACKING

Provide the convenience of three controllers in one

### PROGRAM "C" CAN BE SET TO A LOOPING FUNCTION

Provides continuous moisture for "grow in" (Loop can also be set in seconds)

### SELF-GUIDED PROGRAMMING

Simplifies programming by prompting the user through irrigation scheduling

### MULTIPLE WATERING DAY OPTIONS

Provides flexibility to meet water restriction requirements:

- 365-day calendar for true odd/even watering
- Odd/even date watering with 31st day skip
- 7-day calendar or up to 14 day intervals

### PROGRAM REVIEW FEATURE

Ensures quick programming check and operation review

### RUGGED, LOCKABLE, WEATHER-RESISTANT CABINET ON OUTDOOR MODELS

For installation flexibility

## AVAILABLE IN INDOOR AND LOCKING OUTDOOR MODELS



6-station, Indoor model (JRMAX-6-120) with flip-up cover



8-station, outdoor model (JRMAX-8-120-EXT) with locking door

## SPECIFYING INFORMATION

JRMAX - X - 120 - XXX

MODEL	NUMBER OF STATIONS	CONFIGURATION
JRMAX - JR MAX	4 - 4 Station 6 - 6 Station 8 - 8 Station	EXT - Outdoor

Example: A JR MAX controller, 8 station, 120V input, outdoor model = **JRMAX-8-120-EXT**

## ADDED FEATURES

- Automatic, semi-automatic (to manually start preset programs) and multi-manual start operation
- Sensor port standard
- Built-in rain delay option
- "Armchair" programming allows programming without AC power
- Programmable master valve per program
- Electronic fuse protection
- Real-time battery backup maintains accurate time in the absence of AC power—a 9-volt battery (not included) must be installed for proper operation even under AC power.
- On-board coin cell battery maintains program up to five years
- Automatic safety backup program
- Multiple language capabilities (English, French and Spanish)
- Flip cover protects large LCD display (indoor models)
- Two-year warranty

## OPERATING SPECIFICATIONS

- Station run times: 1 minute to 4 hours in 1-minute increments
- Start times: 3 starts for programs A and B, one start for program C in regular mode, unlimited starts in looping mode
- Watering schedule: calendar, interval, odd/even
- Water budgeting: 0-200% in 10% increments

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V a c, 60 Hz – plug-in transformer; usETLc listed
- Transformer output: 24 V ac, 500 mA
- Maximum output per station: 24 V ac, .25 amp
- Maximum total output: 24 V ac, .5 amp
- Capacity: one station valve plus a master valve

## MODELS

Model	Description
JRMAX-4-120-EXT	4 -Station, outdoor mount
JRMAX-6-120-EXT	6 -Station, outdoor mount
JRMAX-8-120-EXT	8 -Station, outdoor mount
JRMAX-4-120	4 -Station, indoor mount
JRMAX-6-120	6 -Station, indoor mount
JRMAX-8-120	8 -Station, indoor mount

## DIMENSIONS

- **Outdoor:** H: 7 7/8", W: 6 3/4", D: 3 5/8"
- **Indoor:** H: 4 7/16", W: 5 7/16", D: 1 5/8"

## OPTIONAL ACCESSORIES

- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- DCL solenoid option



# MC-E SERIES

4, 6, 8, 12, 18, 24, 30, 36, 42 AND 48 STATION  
OUTDOOR/INDOOR



**W**e've taken the industry standard for commercial irrigation control and made it better. The Irritrol® MC-E, in its rugged, lockable, vandal-proof steel cabinet, now boasts a modernized feature set that includes: the scheduling versatility of 8 independent programs, state-of-the-art flow monitoring, program looping, and a second master valve option. We've also added a 48-station model to the family. From small to large landscapes, the new MC-E has got what it takes to meet the growing demands of today's commercial irrigation applications.

## KEY FEATURES & BENEFITS

### **EIGHT INDEPENDENT PROGRAMS**

Flexible scheduling for widely varied landscapes

### **FLOW MONITORING WITH DIAGNOSTICS AND 3 TYPES OF ALARMS (requires station #2 for a N/O master valve circuit)**

Protects the system and saves water by detecting, reporting and handling high flow and unscheduled flow events

### **MODELS WITH STATION COUNTS FROM 4 UP TO 48**

Provides irrigation control for any size project

### **COMMERCIAL-GRADE, HEAVY-DUTY, LOCKABLE, WEATHER RESISTANT CABINETS AND PEDESTALS**

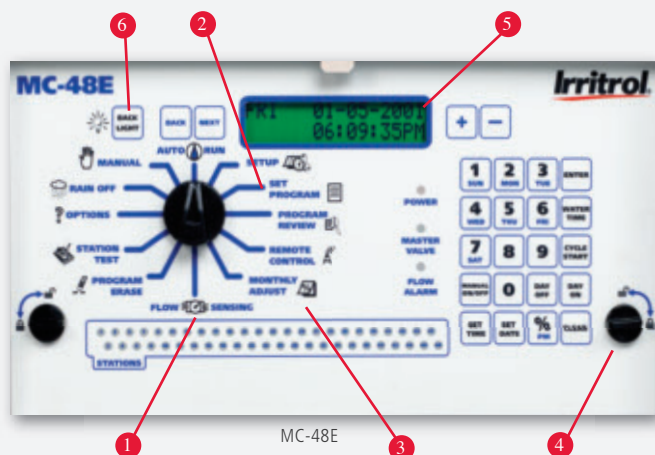
For long service life in demanding commercial and "heavy turf" applications

### **BACKWARD COMPATIBLE FACE PANEL TO EXISTING MC PLUS-B CABINETS ON SITE**

Allows field upgrades to the new MC-E while leaving cabinet/pedestal in place



## ADDED FEATURES



- 1 Flow monitoring and diagnostics
- 2 Eight independent programs
- 3 Monthly water budget
- 4 Quick-disconnect face panel
- 5 32-character, dot matrix LCD display
- 6 LCD backlight

## SPECIFYING INFORMATION

MODEL	NUMBER OF STATIONS
MC - MC Series	4 - 4 Station 6 - 6 Station 8 - 8 Station 12 - 12 Station 18 - 18 Station 24 - 24 Station 30 - 30 Station 36 - 36 Station 42 - 42 Station 48 - 48 Station

Example: A 24 station MC-E controller = **MC-24E**

## ADDED FEATURES

- Backlit, 2-line, 32 character, dot matrix LCD display
- Settable, monthly water budget
- Terminals for flow sensor, stop sensor and start sensor
- Password protection option for programming schedules
- 2nd master valve/pump start option
- Optional remote alarm to warn of an undesirable flow event
- "Super Cap" to maintain time/date up to 48 hours (no battery required)
- Looping option per program (Start Time, Stop Time & Delay between loops)
  - Pump/MV option of ON or OFF during delay
- Programmable event day off (up to 10)
- Flow sensing based on Rain Master® or Data Industrial PVC-TEE mounted flow sensor models & sizes
- Quick disconnect face panel
- Five-year warranty

## OPERATING SPECIFICATIONS

- Watering day cycles per program:
  - Any days of the week
  - Odd or Even date watering
  - Day intervals from 1- 60 days
- Station run times:
  - 0-59 seconds in 1-second increments
  - 1 minute to 24 hours in 1-minute increments
- Global water budget & monthly water budget:
  - 0% to 255% in 1%-increments

## ELECTRICAL SPECIFICATIONS

- Transformer input: 120V ac, 60 Hz
- Transformer output: 24V ac, 2.08 amps (50 VA)
- Maximum output per station: 24V ac, 1.24 amps
- Maximum output to valves: 24V ac, 1.68 amps (including master valve)

## MODELS

Model	Description
MC-4E	4 -Station, wall mount, fits P-2B Pedestal
MC-6E	6 -Station, wall mount, fits P-2B Pedestal
MC-8E	8 -Station, wall mount, fits P-2B Pedestal
MC-12E	12 -Station, wall mount, fits P-2B Pedestal
MC-18E	18 -Station, wall mount, fits P-6B Pedestal
MC-24E	24 -Station, wall mount, fits P-6B Pedestal
MC-30E	30 -Station, wall mount, fits P-6B Pedestal
MC-36E	36 -Station, wall mount, fits P-6B Pedestal
MC-42E	42 -Station, wall mount, fits P-6B Pedestal
MC-48E	48 -Station, wall mount, fits P-6B Pedestal

## DIMENSIONS

- **4-12 Station:** H: 9 3/4", W: 10 1/2", D: 4 1/4"
- **18-48 Station:** H: 12", W: 14 1/4", D: 4 3/4"

## OPTIONAL ACCESSORIES

- RS1000 wireless rain sensor
- RFS1000 wireless rain/freeze sensor
- RS500 wired rain sensor
- Pedestal mounts (P-2B: 4- to 12-station models; P-6B: 18- to 48-station models)
- SR-1 pump start relay
- CMR-KIT (Commercial Maintenance Remote)
- PVC-TEE flow sensors
- CL-100-Wireless weather system
- R-100-KIT remote control



**D**esigned to control commercial irrigation systems with no A.C. power, the Irritrol<sup>®</sup> IBOC<sup>®</sup> Plus controller operates with a battery or it's optional SPC-2 solar power converter. For dependable performance in commercial applications, the IBOC Plus features a steel cabinet and key/lock door as well as an optional steel locking pedestal for free-standing installations.

## KEY FEATURES & BENEFITS

### **BATTERY, 6V DC POWER OR OPTIONAL SOLAR POWER**

Provides operation in areas with no AC power

### **COMMERCIAL-GRADE, LOCKABLE STEEL CABINETS AND PEDESTALS**

For vandal resistance and longer service life

### **THREE INDEPENDENT PROGRAMS**

Offer concurrent operation capability and scheduling flexibility

### **ODD/EVEN DAY CALENDAR WITH DAY EXCLUSION; SEVEN-DAY CALENDAR; OR ONE TO 62 SKIP DAYS**

To match water restrictions and varied plant water requirements

### **NON-VOLATILE MEMORY**

Retains all program data for reliable operation

### **PROGRAM CYCLE LOOPING**

Provides continuous program repeat operation within a selectable watering window for "grow in" periods

### **SOLAR OPTION**

**Solar power converter can be mounted up to 80 feet from IBOC Plus (SPC-2 option, sold separately)**

Simple mounting on top of any IBOC Plus controller model or mounted up to 80 feet from the controller

**Maintenance-free gel cell battery:** (3-year life) inside solar converter

**Solar load ratio:** 6-to-1 (provides full power to IBOC Plus with only two hours of direct sunlight per day)

**Output:** 25-27 V dc/50mA

**Solar amp/hrs. per day:** 600mA, typical

**Load amp/hrs. per day:** 100mA, typical

**Operation temperature:** -22°F to +140°F (-30°C to +60°C)

**Storage temperature:** -40°F to +185°F (-40°C to +85°C)

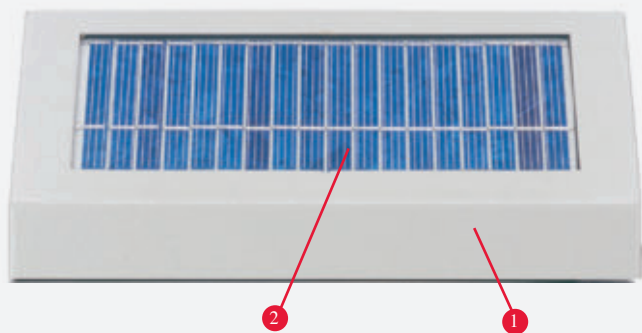
**SOLAR POWER CONVERTER REMOTE MOUNTING WIRE SIZING**

Wire size (Awg)	16	14	12
Distance (ft.)	30	50	80

**CONTROLLERS TO VALVES**

Wire size (Awg)	20	18	16	14	12
Distance (ft.)	400	600	1000	1600	2400

**OPTIONAL SOLAR POWER CONVERTER (SPC-2)**



- 1 Vandal-resistant, metal housing
- 2 Internal maintenance-free gel-cell battery

**SPECIFYING INFORMATION**

IBOC - XXPLUS

MODEL	NUMBER OF STATIONS
IBOC - IBOC PLUS	4 - 4 Station Plus
	8 - 8 Station Plus
	12 - 12 Station Plus
Example: An IBOC 12 station = <b>IBOC-12PLUS</b>	

**ADDED FEATURES**

- Programmable "Rain Delay" postpones automatic operation for up to 30 days
- Program review and erase
- Large, easy-to-read LCD displays English or Spanish
- One- to 10-minute programmable test cycle
- Fully programmable manual cycle acts like a fourth temporary program
- Selectable, programmable master valve
- 365-day calendar with automatic leap year adjustment
- Start-time stacking within each program
- Station stacking for up to three stations plus master valve at one time
- Enhanced lightning protection
- Electronic circuit breaker detection for open and shorted conditions
- Battery capacity displayed in remaining percentage
- Optional rain sensor input selectable by program
- Five-year warranty

**OPERATING SPECIFICATIONS**

- Station run times: 1-minute to 23 hours, 59 minutes
- Start times: 8 per program for up to 24 daily starts
- Watering schedule: 7-day calendar, odd/even day with day exclusion or 1-62 skip days
- Water budgeting: 10-200% in 10% increments

**ELECTRICAL SPECIFICATIONS**

- Powered by one 6-volt alkaline battery (not included) or one SPC-2 (solar power converter) sold separately
- Output: 24 V dc latching
- Master valve output 24 V dc latching
- Rain sensor input selectable per program
- Irritrol®, Hardie® and Richdel® valves must be converted from AC with 24 V dc latching solenoids (DCL)
- Maximum operating pressure: 120 psi

**MODELS**

Model	Description
IBOC-4PLUS	4 -Station, fits P-2B Pedestal
IBOC-8PLUS	8 -Station, fits P-2B Pedestal
IBOC-12PLUS	12 -Station, fits P-2B Pedestal

**DIMENSIONS**

- **IBOC Plus:** H: 9 1/4", W: 10 3/4", D: 5 1/4"
- **SPC-2:** H: 4 9/16", W: 10 3/4", D: 3 3/8"

**OPTIONAL ACCESSORIES**

- RS500 wired rain sensor
- P-2B standard pedestal
- SPC-2 Solar power converter (includes batteries)
- DCL DC latching solenoid

# SENTAR II

6, 12, 18, 24, 30 AND 36 STATIONS  
OUTDOOR/INDOOR



The Sentar II™ has long been noted as the “workhorse” of irrigation controllers. It offers advanced control features for a fraction of the cost of similar models. Designed with the irrigation manager in mind, the Sentar II protects landscapes by offering 4 fully independent programs each with 5 start times, full flow sensing control and cycle and soak programming.

## KEY FEATURES & BENEFITS

### FOUR INDEPENDENT PROGRAMS

Five start times for a total of 20 possible start times per day

### COMMERCIAL-GRADE, LOCKABLE STEEL & STAINLESS STEEL CABINETS AND PEDESTALS

For vandal resistance and longer service life

### CYCLE AND SOAK

To eliminate runoff and conserve water

### ODD/EVEN-DAY CALENDAR WITH DAY EXCLUSION; SEVEN-DAY CALENDAR

To match water restrictions and varied plant water requirements

### NON-VOLATILE MEMORY

Retains all program data for reliable operation

### PROGRAMMABLE STACKING


Or no stacking of programs selects programs to run one after the other (stack mode) or at the same time (no stack mode).

### BUILT-IN REMOTE JACK

For use with Pro Max™ remotes and optional permanent mount receiver



## ADDED FEATURES

- Flow sensing allows for total flow control and break detection (requires flow sensor) 
- Watering time(s) for each station can be set from 1 minute to 9 hrs 59 mins in 1 minute increments
- Quick Stations allow for rapid programming of a block of stations with the same watering time
- Water days for each program may be based on seven day week or a skip-by-day routine allowing a program to skip from 1 to 30 days between watering
- Programmable rain shut down allows the selection of the number of days the controller will stay off (in rain shut down mode) before it goes back into the automatic mode
- A "real time" clock holds the actual time during power outages without batteries
- The Review feature brings all the information for a given program(s) to the displays with simple push of the Review Button.
- Multiple displays provide a truly simple way of programming and information recall
- Manually activated system check/syringe cycle to sequentially run stations for a user selectable time from 1 minute to 9 minutes
- Manually activated program cycle to run a program independent of its programmed start time and water days
- Manually activated station cycle to run a single station for a selected time.
- Automatic field wire fault detection enables the controller to sense a short in the field wire and instantly turn off that station, report the fault and move to the next programmed station. No fuses or reset button to be concerned with
- Rain Switch (auto-off) turns off all stations without disturbing the program(s)
- Heavy-duty 18-gauge jet coat, powder coated steel enclosure for outdoor or indoor use
- Two convenient-sized enclosures for easy installation of field wires.
- Extra heavy-duty lightning and surge protected models available for areas where lightning is a concern
- Percentage key allows the user to increase or decrease all station run times on a percentage basis in 1% increments from 0% to 300% by program
- Five-year warranty

## OPERATING SPECIFICATIONS

- Programmable master valve/pump allows the master valve or pump to go on by program.
- Programmable timer delay between stations establishes a time delay from 1 second to 256 seconds (4 minutes 16 seconds) to allow slow-closing valves to completely shut off.
- Programmable security code allows entry of a 1-4 digit number as a security code to prevent access by unauthorized personnel.
- Programmable sensor to enable or disable sensor operation for each program.
- Programmable alarm to either enable or disable an audible alarm in the event of a field wire fault.

## ELECTRICAL SPECIFICATIONS

- Input power required: 105-130 V ac, 50/60 Hz, .5 amp maximum, .1 amp idle
- Output power: 24 V ac 1.5 amps maximum total output (36VA) 1 amp per station or master valve
- UL, CUL and FCC Approved

## DIMENSIONS

- **SE Series:** 10" x 13" x 4 1/2"
- **SE-B & SB Series:** 17 1/2" x 13" x 4 1/2"
- **RMPED-1:** 16" x 34" x 16"

## OPTIONAL ACCESSORIES

- PMRKIT: Permanent mount receiver kit for use with Pro Max remote
- RMPED-1: Outdoor pedestal for all RME controllers

## SPECIFYING INFORMATION

MODEL	# OF STATIONS	OPTIONAL ENCLOSURE TYPE	OPTIONAL SURGE PROTECTION
RME6SE	6	B, SB, SPED	T
RME12SE	12	B, SB, SPED	T
RME18SE	18	B, SB, SPED	T
RME24SE	24	B, SB, SPED	T
RME30SE	30	B, SB, SPED	T
RME36SE	36	B, SB, SPED	T

**B** = Large painted wall mount

**SB** = Large stainless wall mount

**SPED** = Stainless steel large enclosure pedestal

EXAMPLE: A 24-station Sentar II with a large stainless wall mount option and surge protection would be specified as **RME36SE-SB-T**

# RAIN MASTER™ EAGLE™

6, 12, 18, 24, 30 and 36 STATIONS  
OUTDOOR/INDOOR



The Rain Master Eagle™ combines classic controller programming with cutting edge features, including an optional weather station. Optimized for simplicity, the Eagle is ideal for use by ground maintenance personnel and landscape managers that require a fully automated, “Smart” ET weather-based irrigation controller.

## KEY FEATURES & BENEFITS

### FOUR INDEPENDENT PROGRAMS

With five selectable start times for a total of 20 possible irrigation cycles per day

### WATER DAYS FOR EACH PROGRAM

Can be based on a seven-day cycle, a skip-by-day cycle or odd/even water days

### PROGRAMMABLE MASTER VALVE

To utilize and control a master valve on a per program basis

### CONFIGURABLE MASTER VALVE TYPE

To select either a normally open master valve or a normally closed master valve

### EVAPOTRANSPIRATION (ET) BASED SCHEDULING

Maximizes water saving and irrigation efficiency

### FLOW SENSING AND CONTROL

Monitors system flow and shuts off master valve when high flow occurs

**NOTE: LOOK FOR THE NEW RAIN MASTER EAGLE PLUS COMING SUMMER 2010**

## ADDED FEATURES

### Water Saving Features

- Programmable pump start independent of the master valve on a per program basis
- Programmable stacking / non-stacking program operation
- Percentage adjustment on a per program basis to allow an increase or decrease of all station runtimes within that program
- Programmable rain shut off in order to delay the start of irrigation after a rain storm
- Manual rain switch (automatic watering – no watering).
- Connectivity for any one of the following: rain, moisture or freeze sensor device
- Selectable cycle and soak irrigation programming or conventional programming on a per-program basis
- Limited five-year warranty

### Diagnostic and Fault Detection

- Automatic field wire fault detection enables the controller to sense a short in the field wire and instantly turn off that station
- Non-volatile memory to retain the program(s) and controller information during power outages or seasonal shut downs
- Intelligent resumption of program execution after power outages to ensure that program starts are not lost

### Flow Capabilities

- Automatic detection of main line water breaks
- Automatic detection of unscheduled or no flow water conditions
- Automatic high flow station alarm
- Controller utilizes automatic LEARN mode for setting individual station flow limits
- Intelligent flow-limit processing for concurrent station operation.
- Water usage meter indicates total water used by the controller

## GFC OPTIONAL



Ground fault circuit with safety power off

## OPERATING SPECIFICATIONS

- Four independently controllable irrigation programs with five selectable start times for a total of 20 possible irrigation cycles per day
- Water days for each program can be based on a seven-day cycle, a skip-by-day cycle or odd/even water days
- Programmable master valve to utilize and control a master valve on a per program basis.
- Configurable master valve type to select either a normally open master valve or a normally closed master valve
- Programmable pump independent of the master valve on a per program basis
- Programmable stacking or non-stacking operation of the programs

## ELECTRICAL SPECIFICATIONS

- Input power required: 105-130 V ac, 50/60 Hz, 5 amp maximum, 1 amp idle
- Output power required: 24 V ac 1.5 amps maximum total output or (36 VA) 1 amp per station or master valve
- UL, CUL, and FCC approved

## DIMENSIONS

- **Station EG model:**  
H: 10", W: 13", D: 4½"
- **Station EG-B & SB model:**  
H: 17½", W: 13", D: 4½"
- **Station SPED model:**  
H: 34", W: 16", D: 16"

## OPTIONAL ACCESSORIES

- RM-WETHR-ETRS: Weather station for direct ET measurements
- Flow sensor
- Built-in remote control capability with Pro Max™ Remote
- Heavy-duty lightning protection

## SPECIFYING INFORMATION

MODEL	# OF STATIONS	OPTIONAL ENCLOSURE TYPE	*OPTIONAL SURGE PROTECTION
RME6EG	6	B, SB, SPED	T
RME12EG	12	B, SB, SPED	T
RME18EG	18	B, SB, SPED	T
RME24EG	24	B, SB, SPED	T
RME30EG	30	B, SB, SPED	T
RME36EG	36	B, SB, SPED	T

*B = Large painted wall mount*

*SB = Large stainless wall mount*

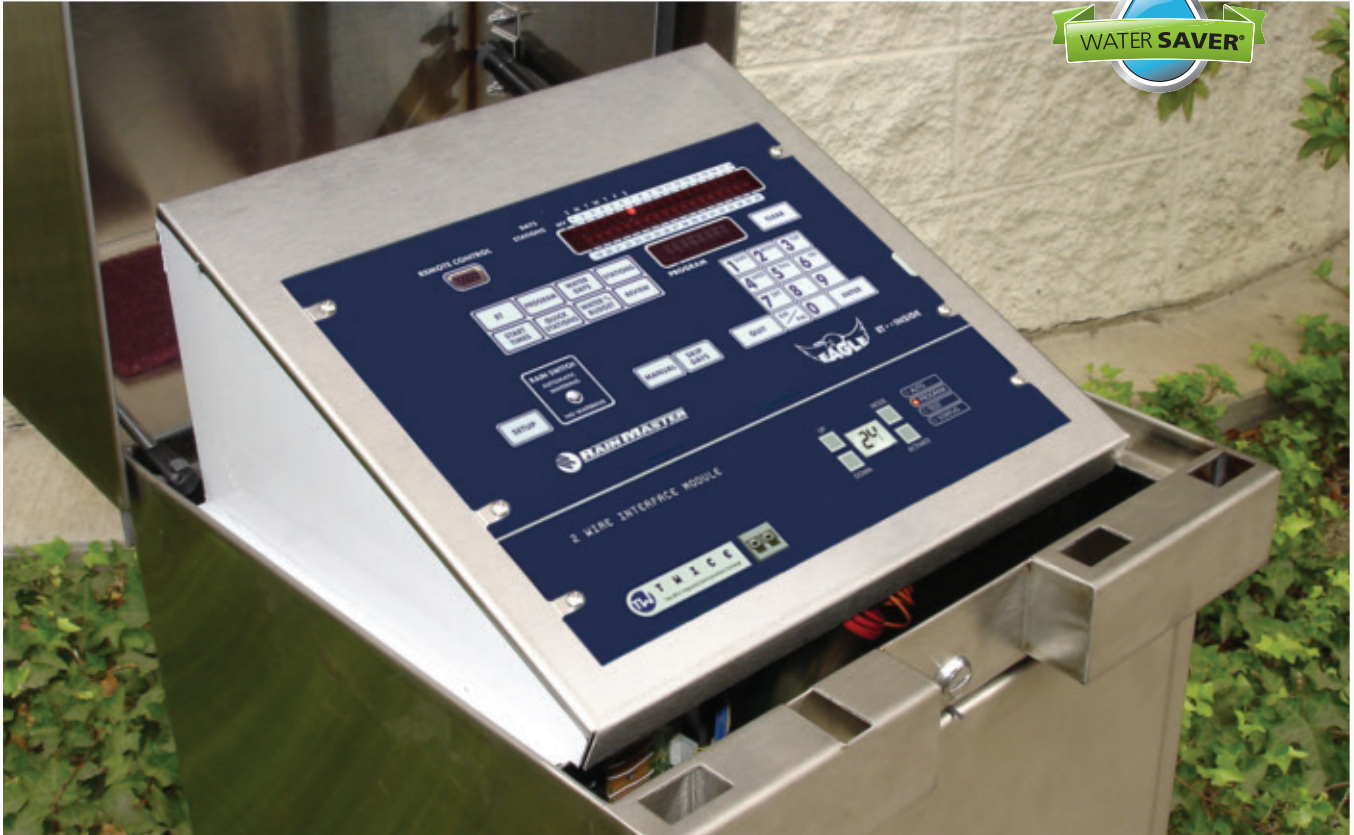
*SPED = Stainless steel large enclosure pedestal*

*EXAMPLE: A 24-station Rain Master™ Eagle™ with a large stainless wall mount option and surge protection would be specified as **RME36EG-SB-T***



# RAIN MASTER™ TWICE 2-WIRE

UP TO 36 STATIONS  
OUTDOOR/INDOOR



Unlike other two-wire systems, the Irritrol® Rain Master 2-wire protocol provides a two-way communication link between the controller, decoders and valves. This provides the means for testing and diagnostic capabilities within the two-wire path. The simplicity of the two-wire field installation, coupled with the enhanced capability of the Rain Master 'E' series controllers, sets a new precedent for two-wire control within the irrigation industry.

## KEY FEATURES & BENEFITS

**EVAPOTRANSPIRATION (ET) BASED SCHEDULING**   
Maximizes water saving and irrigation efficiency (Eagle controller only)

**FLOW SENSING AND CONTROL**   
Monitors system flow and shuts off master valve when high flow occurs

**TWO-WIRE INTERFACE MODULE**  
Provides two-wire capability for any Sentar II, Eagle or Eagle-i controller

**DECODER TWO-WAY COMMUNICATION**  
Provides troubleshooting diagnostics to retain system integrity

**PROGRAMMABLE DECODERS**  
Provides flexibility in programming decoder identification

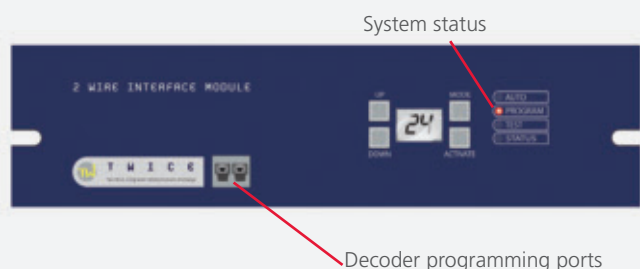


## ADDED FEATURES

### Water Saving Features:

- Programmable pump start independent of the master valve on a per program basis
- Programmable stacking / non-stacking program operation
- Percentage adjustment on a per program basis to allow an increase or decrease of all station runtimes within that program
- Programmable rain shut off in order to delay the start of irrigation after a rain storm
- Manual rain switch (automatic watering – no watering)
- Connectivity for any one of the following: rain, moisture or freeze sensor device
- Selectable cycle and soak irrigation programming or conventional programming on a per-program basis
- Limited five-year warranty

## MODULE FEATURES



## SPECIFYING INFORMATION

MODEL	CONTROLLER TYPE	# OF STATIONS	OPTIONAL ENCLOSURE TYPE
Sentar II:TW	SE	36	B, SB, SPED
Eagle:TW	EG	36	B, SB, SPED

**B** = Large painted wall mount

**SB** = Large stainless wall mount

**SPED** = Stainless steel large enclosure pedestal

EXAMPLE: A 36-station TWICE 2-Wire with a large stainless wall mount option would be specified as **TW-EG36-SB**

## DECODERS

- Easy-to-read LED status indication for every command
- LED also displays valve activation and diagnostic reporting
- Trouble shooting capabilities:
  - LED decoder "active" indication
  - LED valve power "on" indication
  - Two-way communication verification
- Each decoder has a unique address (programmable at the interface module)
- Decoders will automatically shut off if communication is lost
- A short automatically shuts down any valve
- Valves can be operated up to 100' radius of the decoder

## OPERATING SPECIFICATIONS

- Four independently controllable irrigation programs with five selectable start times for a total of 20 possible irrigation cycles per day
- Water Days for each program can be based on a seven-day cycle, a skip-by-day cycle or odd-even water days (Eagle only)
- Programmable master valve to utilize and control a master valve on a per program basis.
- Configurable master valve type to select either a normally open master valve or a normally closed master valve
- Programmable pump independent of the master valve on a per program basis
- Programmable stacking or non-stacking operation of the programs

## ELECTRICAL SPECIFICATIONS

- Input power required: 105-130 V ac, 50/60 Hz, 5 amp maximum, 1 amp idle
- Output power required: 24 V ac, 1.5 amps maximum total output or (36 VA) 1 amp per station or master valve
- UL, CUL, and FCC approved

## MODELS

Model	Description
TW-SE36	Sentar II controller -6-36 decoder
TW-EG36-SB	Sentar II controller -6-36 decoder, with stainless wall mount
TW-EG36	Eagle controller -6-36 decoder
TW-EG36-SB	Eagle controller -6-36 decoder with large stainless wall mount
TW-EG36-SPED	Eagle controller -6-36 decoder with stainless wall mount
TW-EG36-UPED	Eagle controller -6-36
TW-D-1	Decoder operates 1 24 V ac
TW-D-2	Decoder operates 2 24 V ac
TW-D-4	Decoder operates 4 24 V ac

## DIMENSIONS

- **Station TW model:** H: 10" W: 13" D: 4.5"
- **Station TW-B & SE model:** H: 17.5" W: 13" D: 4.5"
- **Station TW-SPED model:** H: 34" W: 16" D: 16"

## OPTIONAL ACCESSORIES

- TW-LA-1 lighting arrestor used every 600 feet
- TW-SPLICE-14 gauge water tight connectors
- TW-CAB-14 gauge (red/black) Polycoated (blue) wire

# IBOC<sup>®</sup> 300-9V BATTERY POWERED



A highly reliable, battery-operated, valve-mounted controller designed to provide automatic valve operation in areas where a hardwire connection is impractical or for temporary operation of a valve when field wiring is cut or broken.

## KEY FEATURES & BENEFITS

### REMOTELY PROGRAMMABLE WITH THE RCP8 PLUS (SOLD SEPARATELY)

Allows convenient reprogramming via handheld remote

### BATTERY-POWERED UNIT FEATURES LOW POWER CONSUMPTION

For application without AC power

### USES STANDARD 9V DC BATTERY

Readily available (not included)



IBOC300-9V



BAT9VDC

## 1 STATION OUTDOOR

### ADDED FEATURES

- Three start times per program
- Seven-day calendar or interval programming
- True odd/even programming with automatic 31st day skip
- Programmable "Rain Off" up to seven days
- Programmable address allows easy programming of multiple units in a single valve box
- Modular design allows for easy field programming
- Water-resistant construction provides reliable operation
- Retains program up to two minutes during battery replacement
- International icons with English captions
- Default program option allows for quick setup – simply plug in battery and setup is complete
- LED lights verify program input and operation
- Fits all Irritrol irrigation valves with internal manual bleed – requires VA12 adapter (included)
- Low-profile design fits in valve boxes
- Infrared programming overrides any manual program settings
- One-year battery life with typical operation
- Two-year controller warranty

### OPERATING SPECIFICATIONS

- Station run times: 1 minute to 23 hours, 59 minutes
- Default program: 15 minutes of irrigation per day
- Four irrigation cycle options: once per day, twice per day, once per two days and once per seven days (when programmed manually)
- Pressure limit: 150 psi
- Operating temperature: 33° to 140°F
- BAT9VDC battery housing for IBOC300-9V (included with controllers and available separately; 9-volt alkaline battery not included)

### MODELS

<u>Model</u>	<u>Description</u>
IBOC300-9V	1-Station, remote controlled

### DIMENSIONS

- **IBOC300-9V:** H: 3", W: 2 1/2", D: 1 1/2"

### OPTIONAL ACCESSORIES

- VA12 - Adapter for Irritrol<sup>®</sup> valve
- BAT9VDC - Case for 9V, less battery

# RCP8+ REMOTE CONTROLLER

Provides remote wireless programming for the IBOC300-9V.



## FEATURES

- Holds up to eight independent programs for multi-valve installations (one program per valve; no limit to number of valves that can share a program)
- Multi-language LCD display prompts user through programming steps
- One-button operation to upload and download programs
- Infrared transmission of program to IBOC300-9V from up to 10 feet away and at a 12-inch minimum distance

## SPECIFICATIONS

- Weight: 6.2 oz.
- Electrical supply: 4 AAA batteries (not supplied)
- LCD screen: 2 lines x 8 columns;  $\frac{5}{8}$ " x  $1\frac{3}{4}$ "
- 10-key pad
- One-year warranty

## DIMENSIONS

- H:  $8\frac{1}{2}$ ", W:  $2\frac{3}{8}$ ", D:  $1\frac{1}{8}$ "

# PEDESTALS

Durable weather-resistant and key locking metal pedestals provide vandal-resistant, free-standing controller mounts.



## FEATURES

### PEDESTAL – P-2B

#### **FOR MC-E:**

- 4- to 12-station models

#### **FOR IBOC PLUS:**

- All station models

### PEDESTAL – P-6B

#### **FOR MC-E:**

- 18- to 48-station models

## DIMENSIONS

- **Pedestal P-2B:**  
H:  $27\frac{5}{8}$ ", W:  $10\frac{3}{4}$ ", D:  $3\frac{1}{4}$ ", WT: 11 lbs
- **Pedestal P-6B:**  
H: 35", W:  $14\frac{1}{4}$ ", D:  $4\frac{1}{16}$ ", WT: 21 lbs

# **RAINSENSOR™** SERIES RAIN AND FREEZE SENSORS

**WIRED/WIRELESS SENSORS**



**T**aking water management to the next level, the proven Irritrol® RainSensor™ Series makes watering in the rain a mistake of the past. The reliable wireless and wired rain sensors conserve water by preventing irrigation during or after sufficient rainfall, while the wireless rain/freeze sensor also helps reduce vegetation damage and icing conditions when the temperature drops below a predetermined set point. With its compact design and host of convenient features, the RainSensor Series is the perfect complement to any standard controller.

## KEY FEATURES & BENEFITS

### **WIRELESS MODELS**

Require less labor for the installer

### **CONSTANT COMMUNICATION BETWEEN TRANSMITTER AND RECEIVER**

Assures that even after a controller power outage, the controller is continually updated with the sensor's "wet" or "dry" status

### **VERSATILE MOUNTING OPTIONS**

Requires no special tools – Quick-Clip™ gutter bracket and ½" conduit adapter included

### **SIGNAL STRENGTH INDICATOR**

Ensures correct installation, communication link and signal integrity (wireless models)

### **SMART BYPASS™ FOR EASY SYSTEM OVERRIDE**

Allows for temporary deactivation while automatically resetting on next activation (wireless models)

### **FULLY ADJUSTABLE SHUTOFF POINTS**

From 1/8" to 3/4" of accumulated rainfall

### **DRY-OUT RATE ADJUSTMENT FOR RESET DELAY**

Allows for setting the ideal dryout time

### **PATENTED WIRELESS TECHNOLOGY**

Unsurpassed by the competition



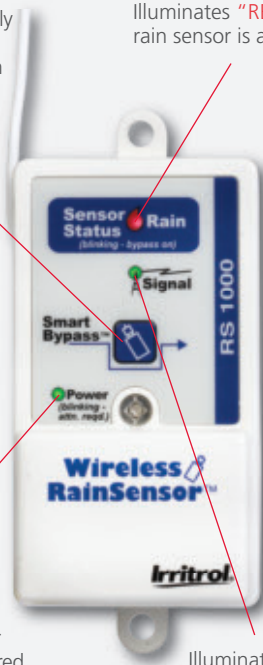
## PATENTED WIRELESS TECHNOLOGY

Press once to temporarily deactivate rain sensor; automatically resets on next activation

Illuminates "RED" when the rain sensor is activated

Blinking light alerts user when attention is required, e.g., need batteries replaced, no communication

Illuminates "GREEN" to ensure a good signal



## SPECIFYING INFORMATION

MODEL	CONNECTION
RS - Rain Sensor	500 - Wired
RFS - Rain/Freeze Sensor	1000 - Wireless

Example: A wireless rain/freezing sensor = **RFS1000**

## ADDED FEATURES

### RS1000/RFS1000

- Compatible with nearly all controllers
- Visual sensor status and alert indicators verify consistent operation
- Slide/snap-on cover provides additional protection to weather-proof receiver from the elements
- Power failure memory protection
- Three-year warranty

### RFS1000

- Rain and freeze sensors fully integrated into one unit
- Highly accurate 41°F digital activation point

### RS500

- Compatible with virtually all controllers
- 25-foot cable (UV-resistant, white jacket included) provides installation flexibility
- Easy, tool-free conversion to normally open operation
- Five-year warranty

## OPERATING SPECIFICATIONS

- Sensor type: industry-standard hygroscopic discs
- Rain sensitivity: adjustable nominal 1/8" to 3/4"
- Operating temperature: -20°F to 120°F
- Housing material: UV-resistant engineered polymer
- Wireless only features:
  - Transmission range: over 300 feet line-of-sight
  - Battery: Two CR2032 3V cells, 5-year life (typical)

## ELECTRICAL SPECIFICATIONS

- Receiver power: 22-28 V ac/V dc, 100mA (to be used with Class 2, UL-approved (transformer))
- Load rating: normally open or normally closed — 3A @ 24 V ac
- UL Listed, FCC, CE, IC

## MODELS

Model	Description
RS1000	Wireless rain sensor
RFS1000	Wireless rain/freezing sensor
RS500	Wired rain sensor

## DIMENSIONS

- **Transmitter:** H: 1 1/2", W: 1 3/4", D: 3 3/4"
- **Receiver:** H: 1 1/2", W: 1", D: 3"

## OPTIONAL ACCESSORIES

- RS1000-RX rain receiver for multiple controllers
- RFS1000-RX rain/freezing receiver for multiple controllers
- RSCAP cap/disc/spindle assembly
- RSBATT-TX battery pack (includes 2 batteries)



The Irritrol® CMR-KIT portable remote control system saves labor, time and money on irrigation system maintenance and troubleshooting. Designed as a 1-person maintenance kit, the long range CMR (up to 1.5 miles) is easy to use and rugged enough for almost any residential and commercial application. The kit also includes an AC recharging unit for the NIMH batteries (not included), and all the components come in a handy carrying case.

## KEY FEATURES & BENEFITS

### COMPLETE REMOTE CONTROL KIT IN A CARRYING CASE

Includes transmitter, receiver, circular mount connector and cable assembly, 110Vac charger (for the transmitter) and user's guide in one convenient and portable case (batteries not included)

### UP TO 1.5 MILES RANGE (LINE-OF-SIGHT) AND TYPICALLY ½ MILE IN URBAN AREAS

Provides operating range for larger projects

### PROGRAMMABLE ADDRESSES UP TO 999

Allows transmission of commands to specific controllers even though others are within range in permanent mount applications

### REMOTELY CONTROLS UP TO 99 STATIONS

Ready for future, larger station-count controllers

### QUICK CONNECT/DISCONNECT SYSTEM

Allows receiver to be easily moved from one controller to another

### REQUIRES RECHARGEABLE NIMH BATTERY PACK (NOT INCLUDED) AND INCLUDES 110V AC CHARGER

Allows recharging for the transmitter to save on battery purchases

**CMR-KIT INCLUDES:**



**SPECIFYING INFORMATION**

CMR - XXX

MODEL	DESCRIPTION
CMR - Maintenance Remote	KIT - Complete kit TX - Transmitter RX - Receiver CC - Circular connector

**ADDED FEATURES**

- Large, easy-to-read LCD display
- Easy-to-use keypad
- Receiver indicator light for "power" and "valid" signal
- Settable station limit on the transmitter
- Two-year warranty

**OPERATING SPECIFICATIONS**

- Commands available:
  - Turn transmitter On or Off
  - Turn station On or Off
  - Move to next or previous station (manual advance)
  - Pause or un-pause current station's operation
  - Start 2-minute test run for all stations in sequence

**ELECTRICAL AND RADIO FREQUENCY SPECIFICATIONS**

- Receiver frequency: MURS designated channels (151.82MHz, 151.88MHz, 151.94MHz, 154.57MHz, 154.6MHz)
- Receiver operates on 24V ac power from the controller
- No FCC license required
- Receiver input: 22-26V ac with a current draw of <75mA AC
- Communication range: up to 1.5 miles (line-of-sight)
- Transmitter operation:
  - 4 AA NiMH batteries required (Alkaline batteries included)
  - Detects and avoids busy channels
  - FM modulation (VHF)

**MODELS**

Model	Description
CMR-KIT	Commercial maintenance remote kit with case
CMR-TX*	Transmitter
CMR-RX*	Receiver
CMR-CC*	Circular connector/cable/bracket

**DIMENSIONS**

- **Transmitter:** H: 12", W: 2 3/4", D: 1 1/2"
- **Receiver:** H: 12", W: 2 3/4", D: 1 1/2"
- **Carrying case:** H: 10 1/2", W: 14", D: 3 1/8"

**OPTIONAL ACCESSORIES**

- CMR-ANT antenna
- CMR-CHG\* wall charger

**COMPATIBLE WITH**

- Rain Dial® -R Series, KwikDial® Series, MC-E Series and Total Control®-R Series

\* Also sold separately

# SR-1 PUMP START RELAY



With a lockable, vandal- and weather-resistant case, the Irritrol® SR-1 can be mounted indoors or outdoors to provide reliable switching control for pumps or other electrical devices from the controller.

## KEY FEATURES & BENEFITS

### ELECTRICAL RELAYS FOR BOTH LOW VOLTAGE (24V AC) CONTROL SWITCHING AND HIGH VOLTAGE (120V AC OR 240V AC) MAIN POWER CONTACTS

- Allows remote pump switching using 24V ac output from an irrigation controller's master valve/pump start circuit
- Opens and closes main power contacts for pumps (1HP at 120V ac 1 Phase or 2HP at 250V ac 1 Phase)
- Note: 2HP at 120V ac will exceed maximum amp rating.

### HIGHLY EFFICIENT 0.1 AMP OPERATING REQUIREMENT

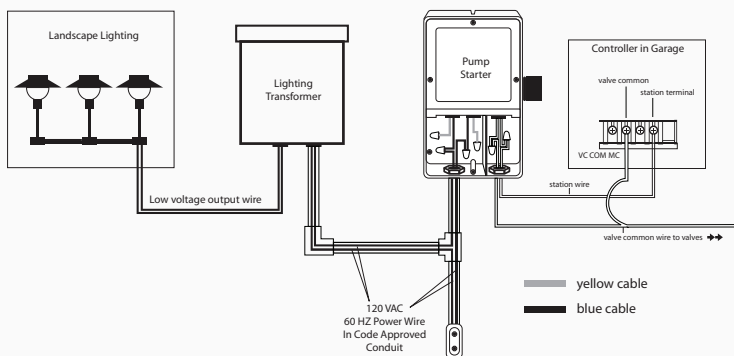
Draws less holding power than most solenoid valves

### CAN ALSO BE USED WITH THE IRRITROL PC CONTROL SYSTEM FOR SWITCHING CONTROL OF LOW VOLTAGE LANDSCAPE LIGHTING

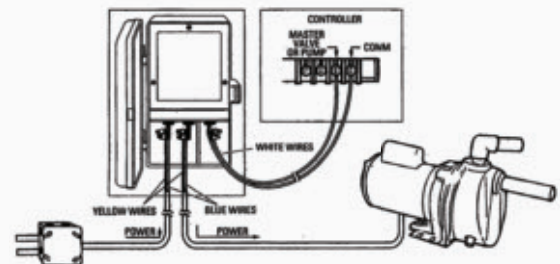
Saves the expense of an extra timer and puts irrigation and landscape lighting control in one location on the owner's computer

## WIRING DIAGRAMS

### SR-1 AS A LANDSCAPE LIGHTING RELAY



### SR-1 AS A PUMP START RELAY



## ADDED FEATURES

- Enclosed, weather-resistant case
  - Allows the flexibility of indoor or outdoor mounting
- Five-year warranty

## ELECTRICAL RATINGS

- Contacts: Up to 1 HP at 120V ac, 1 Phase  
Up to 2 HP at 250V ac, 1 Phase (20A at 250V ac)
- Coil: 24V ac, 3VA (19V ac Min, 30V ac Max)
- Coil Draw: 0.1Amp

## DIMENSIONS

- H: 9 1/2", W: 6 1/4", D: 3 3/4"



# KWIKSTART™ REMOTE CONTROL SYSTEM



Compatible with KwikDial® and the Rain Dial®-R controllers, KwikStart allows a single person to easily perform system troubleshooting and maintenance activities.

## KEY FEATURES & BENEFITS

### REMOTE START, MANUAL ADVANCE, PAUSE, RESUME AND SHUTOFF OF INDIVIDUAL VALVES

Allows remote operation while out in the yard or garden

### PRESET TRANSMITTER OPERATES UP TO 12 CONTROLLER STATIONS, ADJUSTABLE FROM 1 TO 64 STATIONS

For added versatility

### TRANSMITTER OPERATING RANGE/LINE OF SITE IS APPROXIMATELY 160' TO 300'

To meet most residential applications

### EIGHT DIP SWITCHES IN TRANSMITTER AND RECEIVER FOR SETTING ADDRESS

Unique address prevents operation by other nearby remotes

## ADDED FEATURES

- Transmitter power source: 9-volt alkaline battery (supplied)
- Receiver power source 5 V dc @ 10 mA (supplied from controller)
- Each component of the KSR-KIT-K is also available separately
- Preset station run time: 10 minutes
- Operating temperature: +14°F to +140°F
- One-year warranty

## MODELS

Model	Description
KSR-KIT-K	Remote Control System for KwikDial, Rain Dial-R, Total Control-R and MC-E
KSR-T*	Transmitter
KSR-R*	Receiver
KSR-ADP*	Adapter
KSR-CA03*	Standard 3' cable assembly
KSR-CA25*	Optional 25' cable assembly

\* Also sold separately

## COMPATIBLE WITH

- Rain Dial-R Series, KwikDial Series, MC-E Series and Total Control-R Series

## SPECIFYING INFORMATION

KSR - X

MODEL	DESCRIPTION
KSR - Kwikstart Remote	KIT - Complete kit for Rain Dial Plus KIT-K - Complete kit for KwikDial and Rain Dial-R T - Transmitter R - Receiver CA03 - 3' cable assembly CA25 - 25' cable assembly



**T**he Pro Max™ Remote Control System is designed to eliminate valuable time and energy spent walking back and forth between the controller and the field. It makes light work of system checkouts and service work, providing field personnel with complete control over any 24V irrigation controller. Controllers may be operated remotely from watering zone sites allowing immediate evaluation of the irrigation configuration and performance. Using the hand-held battery operated Pro Max Transmitter from a remote zone location, the operator may turn on a single station or any number of stations with the push of a button. An access code feature allows independent control of multiple receivers permanently installed in up to 999 controllers.

## KEY FEATURES & BENEFITS

### **COMPLETE REMOTE CONTROL KIT IN A CARRYING CASE**

Includes transmitter, receiver, connector & cable assembly and a user's guide in one convenient, portable case

### **OPERATES WITH SEVERAL SERIES OF IRRITROL & OTHER MANUFACTURERS' 24V CONTROLLERS (PROMAX-UA VERSION ONLY)**

Allows maintenance control for a wide variety of controllers

### **UP TO 1 MILE RANGE (LINE-OF-SIGHT)**

Provides operating range for larger projects

### **ADDRESSES UP TO 999 INDIVIDUAL CONTROLLERS**

Allows transmitter of commands to specific controllers even though others are within range in permanent mount applications

### **REMOTELY CONTROLS UP TO 48 STATIONS**

Permanent mount or portable models available

### **QUICK CONNECTION/DISCONNECTION SYSTEM**

Allows receiver to be easily moved from one controller to another

## ADDED FEATURES

- Independent control of master valve and/or pump
- Single or multi-station capability for testing system hydraulics
- Timed station operation selectable from 1 to 60 minutes.
- Turn a program on or off (when used with RME Sentar II)
- Small, compact receiver for permanent internal mount
- Detects (provides an audible alert) and protects against field wiring short circuits
- Receiver has built-in safety default to automatically turn station off after 60 minutes
- Audible transmitter and receiver tones verify proper Pro Max operation at all times
- Audible alarm warns of low power condition
- No fuses required
- Limited two-year warranty

## PROMAX-UA



PROMAX-UA

### Includes:

- Transmitter
- Receiver
- Connector cables for any 24V controller up to 32 stations
- Carrying case
- Antennas

## OPERATING SPECIFICATIONS

### PRO MAX Receiver

- Operating frequency: 154.600 MHz
- Sensitivity: 0.4 microvolt typical
- Operating temperature range: 0 to 60 degrees celsius
- Storage temperature range: -20 to 70 degrees celsius
- Humidity range: 0 to 90% non-condensing

### PRO MAX Transmitter

- Operating frequency: 154.600 MHz
- Modulation type: frequency modulation
- Frequency stability: 0.05%
- Operating temperature range: 0 to 60 degrees celsius
- Storage temperature range: -20 to 70 degrees celsius
- Humidity range: 0 to 90% non-condensing

## ELECTRICAL SPECIFICATIONS

### PRO MAX Receiver

- Power source: 22–32 V ac 50/60 Hz

### PRO MAX Transmitter

- Battery: CR-P2 lithium 6V (user replaceable)
- Battery life expectancy: 1 season (typical)

## MODELS

Model	Description
PROMAX-UA	Complete remote kit
PM-XMT R	Hand-held transmitter

## DIMENSIONS

- **PRO MAX Receiver**  
L: 6 1/4", W: 3 1/4", H: 1 1/16"
- **PRO MAX Transmitter**  
L: 3", W: 1 3/8", H: 5 1/2" (less antenna)

## OPTIONAL ACCESSORIES

- PMRKIT: Permanent mount receiver kit
- Hi-Gain antenna
- PM-UADAPT: Universal cables

# FLOW SENSORS



BRASS FLOW SENSOR



PLASTIC FLOW SENSOR



IMPELLER FLOW SENSOR ADAPTER

**F**low sensors can be used in conjunction with Sentar II™ or Rain Master™ Eagle™ controllers to automatically detect main line breaks and flow limits on a main line or per station basis. Should a break or leak occur, the flow sensor will indicate to the controller to shut down the master valve to prevent significant landscape damage. The Sentar II, Rain Master Eagle or Rain Master TWICE™ 2-Wire notifies the operator of a problem with an audible alert and text message in the display.

## KEY FEATURES & BENEFITS

### BRASS FLOW SENSOR ADAPTER

Sizes 1" thru 2.5". Flow ranges from 2 GPM to 160 GPM, NPT connections, rated up to 400 psi

### PLASTIC FLOW SENSOR ADAPTER

Sizes 1.5" thru 4". Flow ranges from 5 GPM to 500 GPM, Schedule 80 PVC "slip" glue connections, rated up to 100 psi

### IMPELLER FLOW SENSOR ADAPTER

For all pipe materials and sizes up to 40" in diameter. Mounts in a 2" NPT threaded outlet (NPT) or pipe saddle (not included). Must be field-calibrated onsite. Flow may be set from 2 GPM to 500 GPM – call factory for specific settings. 400psi maximum operating pressure



## FLOW SENSORS SELECTION CHART

FLOW SENSOR MODEL	PIPE CONNECTION SIZE	SUGGESTED OPERATING RANGE	MAXIMUM WATER PRESSURE	K VALUE	OFFSET VALUE	BODY MATERIAL	CONNECTION TYPE
FS-B100	1"	2-40 GPM	400 psi	109	27	Bronze	NPT female
FS-B125	1 ¼"	3-60 GPM	400 psi	209	32	Bronze	NPT female
FS-B150	1 ½"	4-80 GPM	400 psi	291	24	Bronze	NPT female
FS-B200	2"	10-100 GPM	200 psi	750	0	Bronze	NTP female with copper male adapter
FS-B250	2 ½"	16-160 GPM	200 psi	1021	370	Bronze	NTP female
FS-150	1 ½"	5-100 GPM	100 psi @ 68F	457	0	PVC	Slip
FS-200	2"	10-200 GPM	100 psi @ 68F	776	104	PVC	Slip
FS-300	3"	20-300 GPM	100 psi @ 68F	2268	483	PVC	Slip
FS-400	4"	40-500 GPM	100 psi @ 68F	3752	834	PVC	Slip
FS-INSERT-B	3 to 40 inches	Varies, call factory	400 psi	Varies, call factory		Requires pipe saddle with 2" female NPT	







## WHY USE A FLOW SENSOR?







A \$500 flow sensor could have prevented \$250,000 damage

# VALVES

Installing valves is hard work. But luckily, Irritrol® valves are reliable and easy to maintain. Our valves have been the industry standard for more than 40 years. We were the first to bring PVC, jar-top, and glass-filled nylon valves to irrigation. And we continue to lead the way with dependable products that make you more productive.

AT-A-GLANCE RESIDENTIAL VALVES							
		2400/2600 SERIES	205 SERIES	2500 SERIES	2700 SERIES	311A SERIES	2623/300 SERIES
		pgs 46-47	pgs 48-49	pgs 50-51	pgs 52-53	pgs 54-55	pgs 56-57
OPERATION	MANUAL				●		
	ELECTRIC	●	●	●	●	●	●
SIZE	3/4"			●	●	●	●
	1"	●	●	●	●	●	●
CONFIGURATION	ANGLE	2600 only					
	GLOBE	2400 only	●	●			
	H-BODY				●	●	
INLET/OUTLET	THREADED	●	●	●	●	●	
	SLIP	2400 only	●	●			
	MALE X MALE	2400 only					
	MALE X BARB	2400 only					
MANUAL FLOW CONTROL	STANDARD				●	●	●
	OPTIONAL	●	●	●			
CONSTRUCTION	PVC	●	●	●	●	●	2623 only
	GLASS-FILLED NYLON					●	300 only
ANTI-SIPHON					●	●	
PRESSURE REGULATING (OMNIREG®)						●	●
INTERNAL BLEED		●		●	●	●	●
EXTERNAL BLEED (FLUSH)		●	●	●	●	●	●

AT-A-GLANCE COMMERCIAL VALVES					
		200B SERIES	700 SERIES	100 SERIES	100-S SERIES
		pgs 58-59	pgs 60-61	pgs 62-63	pgs 64-65
OPERATION	MANUAL				
	ELECTRIC	●	●	●	●
SIZE	3/4"		●		
	1"	●	●	●	●
	1 1/2"	●	●	●	●
	2"	●	●	●	●
	3"			●	●
CONFIGURATION	ANGLE	●		●	●
	GLOBE	●	●	●	●
	H-BODY				
INLET/OUTLET	THREADED	●	●	●	●
MANUAL FLOW CONTROL	STANDARD	●	except 3/4"	●	●
	OPTIONAL				
CONSTRUCTION	PVC	●			
	GLASS-FILLED NYLON		●	●	●
PRESSURE REGULATING (OMNIREG®)		●	●	●	●
INTERNAL BLEED		●	●	●	●
EXTERNAL BLEED (FLUSH)		●		●	●
ANTI-CONTAMINATION				102 only	
CONTINUOUS SCRUBBING FEATURE					●

# 2400 | 2600 SERIES ELECTRIC GLOBE/ANGLE

1" PLASTIC MODELS



The Irritrol® 2400 Series globe and 2600 Series angle valves are popular with users because of the convenience of their threaded bonnets, the reliability of their double-beaded diaphragm and the durability of their heavy-duty, corrosion- and UV-resistant PVC construction. Fast and easy to install and service, these 1-inch residential plastic valves offer an encapsulated solenoid, internal/external bleed, an optional flow control feature, and are available in multiple configurations.

## KEY FEATURES & BENEFITS

### **THREADED BONNET DESIGN**

Allows easy servicing without removal from the system

### **RUGGED, DOUBLE-BEADED SANTOPRENE® DIAPHRAGM**

Ensures a leak-proof seal

### **INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Allows for manual operation

### **FULL STAINLESS-STEEL METERING SYSTEM**

Allows for consistent valve operation

### **HEAVY-DUTY, CORROSION AND UV-RESISTANT PVC, GLASS-FILLED POLYPROPYLENE AND STAINLESS STEEL CONSTRUCTION**

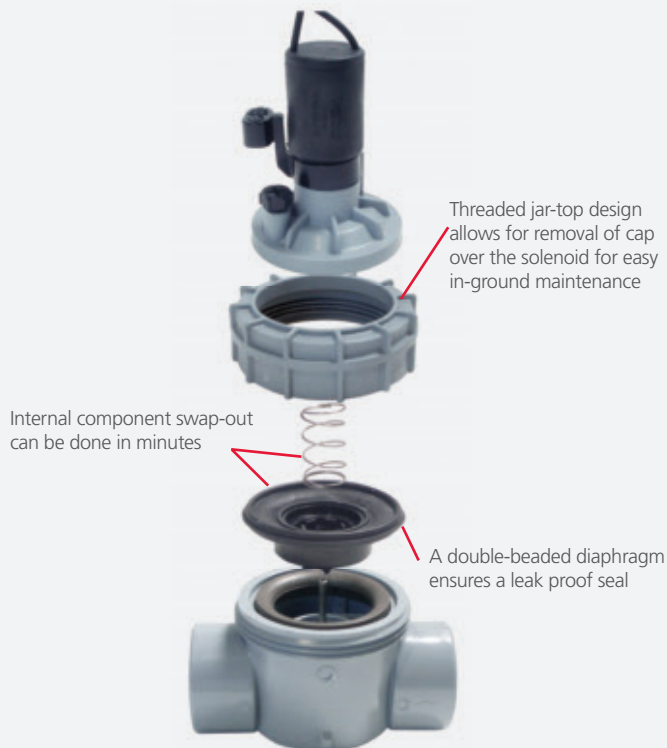
Durable, long-term performance

### **AVAILABLE IN MULTIPLE CONFIGURATIONS—FEMALE NPT, SLIP, MALE X MALE AND MALE X BARB**

Will handle all regional installation variances (2600 available with NPT threads only)



## VALVE SERVICING MADE EASY



## FRICITION LOSS DATA

MODEL	SIZE	Flow Rate - GPM						
		.25	2	5	10	15	20	30
2400 Series	1"	5.00	4.60	3.50	4.00	2.97	3.26	6.20
2600 Series	1"	5.00	4.60	3.34	2.15	1.78	1.90	3.85

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
 2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

2400 - X - F - X

MODEL	CONFIGURATION	FEATURE	BODY OPTIONS
2400 - 2400 globe valve	S - Slip Connection T - NPT Threads	F - Flow Control	B - Male x Barb M - Male x Male

Example: A 2400 globe valve with slip connection and flow control = **2400SF**

2600 - T - F

MODEL	CONFIGURATION	FEATURE
2600 - 2600 angle valve	T - NPT Threads	F - Flow Control

Example: A 2600 angle valve with NPT threads and flow control = **2600TF**

## ADDED FEATURES

- Buna-N valve seat seal
- Floating bleed tube allows thermal expansion without affecting performance
- Encapsulated injection-molded solenoid with a captive hex plunger
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: .25-30 GPM
- Pressure range: 10-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
2400S	1" globe slip connection valve
2400SF	1" globe slip connection with flow control
2400T	1" globe NPT threaded connection
2400TF	1" globe NPT threaded connection with flow control
2400T-B	1" globe male x barb connection
2400TF-B	1" globe male x barb connection with flow control
2400T-M	1" globe male x male connection
2400TF-M	1" globe male x male connection with flow control
2600T	1" angle NPT threaded connection
2600TF	1" angle NPT threaded connection with flow control

## DIMENSIONS

- **2400:** H: 5 1/8", W: 3", L: 4"
- **2600:** H: 6 1/2" W: 3" L: 3 3/4"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery operated "on valve" controller
  - Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
  - DC latching solenoid (DCL)
- Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Threaded bonnet wrench (2400-45)



\* Optional accessories are field-installable.  
 Must specify separately if required.



The Irritrol® 205 Series 1-inch plastic valve is the irrigation industry's time-tested leader for dependable operation in potable and dirty water applications. With a proven track record of success in a wide range of environments, these debris-tolerant valves are available with flow control as an optional feature. Constructed of heavy-duty, corrosion- and UV-resistant PVC, the 205 Series features a high-flow, low-friction-loss-design that has a pressure range of 10-150 psi and flow range of .25-30 GPM. A manual bleed and a rugged, nylon-reinforced Buna-N diaphragm add to this valve's wide popularity.

## KEY FEATURES & BENEFITS

### HEAVY-DUTY, CORROSION- AND UV-RESISTANT PVC CONSTRUCTION

Proven durability

### HIGH-FLOW, LOW FRICTION LOSS DESIGN

More efficient system design and low-flow capability

### RUGGED, NYLON-REINFORCED BUNA-N DIAPHRAGM

Ensures a leak-proof seal

### AVAILABLE IN FEMALE NPT OR SLIP CONFIGURATIONS (NO MALE PIPE ADAPTER REQUIRED)

Will handle all regional installation variances

### OPTIONAL FLOW CONTROL

Allows precise adjustment and manual shutoff

## OVER 40 YEARS OF DEPENDABILITY



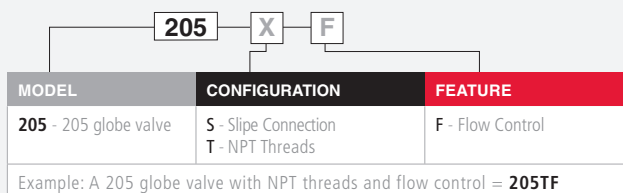
A flat fiber washer diaphragm allows the 205 to work in a wide flow range as well as easily handle debris

## FRICTION LOSS DATA

MODEL	SIZE	Flow Rate - GPM						
		.25	2	5	10	15	20	30
205 Series	1"	5.40	3.82	3.00	2.20	1.90	3.10	5.10

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
 2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION



## ADDED FEATURES

- Buna-N valve seat seal
- Manual external bleed
- Debris-tolerant design
- Encapsulated injection-molded solenoid with a captive hex plunger
- Removable, tamper-resistant flow control handle
- Easily serviced without removal from the system
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 0.25-30 GPM
- Pressure range: 10-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
205S	1" slip connection
205SF	1" slip connection with flow control
205T	1" NPT threaded connection
205TF	1" NPT threaded connection with flow control

## DIMENSIONS

- H: 5 1/8", W: 2 3/4", L: 5"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)

*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*

\* Optional accessories are field-installable.  
 Must specify separately if required.





The Irritrol® 2500 Series is a classic example of making a great valve even better. Irritrol has taken its proven 205 Series of valves to the next level by adding a full menu of features including a patented “floating metering system” for consistent performance in dirty water applications and a rugged, double-beaded diaphragm for long-term performance with no leakage. The 2500’s manual internal bleed enables the valve to be opened without filling the valve box with water. And servicing is made easy and efficient with captured screws.

## KEY FEATURES & BENEFITS

### **PATENTED “FLOATING METERING SYSTEM”**

Allows this valve to easily handle dirty water

### **HIGH-FLOW, LOW FRICTION LOSS DESIGN COMBINED WITH LOW-FLOW CAPABILITY**

Can handle a wide range of applications

### **RUGGED, DOUBLE-BEADED SANTOPRENE® DIAPHRAGM**

Ensures a leak-proof seal

### **INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Allows for manual operation

### **FULL STAINLESS-STEEL METERING SYSTEM**

Allows for consistent valve operation

### **HEAVY-DUTY, CORROSION AND UV-RESISTANT PVC AND STAINLESS STEEL CONSTRUCTION**

Proven durability

### **AVAILABLE IN FEMALE NPT OR SLIP CONFIGURATIONS (NO MALE PIPE ADAPTER REQUIRED)**

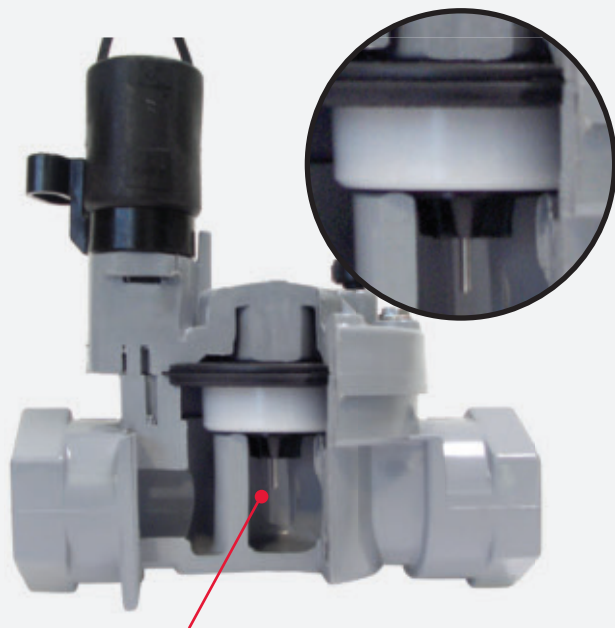
Will handle all regional installation variances

### **SELF-ALIGNING BONNET**

Permits fast and easy servicing without removal from the system



## IDEAL FOR DIRTY WATER APPLICATIONS



Debris-tolerant, patented “floating metering system” makes this valve ideal for wells and dirty water applications

## FRICTION LOSS DATA

MODEL	SIZE	Flow Rate - GPM						
		.25	2	5	10	15	20	30
2500 Series	1"	5.40	3.82	3.00	2.20	1.90	3.10	5.10
2507 Series	3/4"	2.75	3.40	3.85	4.00	2.40	3.98	6.19

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

<p>2500 — X — F</p>		
MODEL	CONFIGURATION	FEATURE
2500 - 2500 globe valve	S - Slip Connection T - NPT Threads	F - Flow Control
Example: A 2500 globe valve with NPT threads and flow control = <b>2500TF</b>		

<p>2507 — T — F</p>		
MODEL	CONFIGURATION	FEATURE
2507 - 2507 globe valve	T - NPT Threads	F - Flow Control
Example: A 3/4" 2507 globe valve with NPT threads and flow control = <b>2507TF</b>		

## ADDED FEATURES

- Buna-N valve seat seal
- Debris-tolerant design
- Optional flow control allows precise adjustment and manual shutoff
- Encapsulated injection-molded solenoid with a captive hex plunger
- Removable, tamper-resistant flow control handle
- Easily serviced without removal from the system
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 0.25-30 GPM
- Pressure range: 10-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
2500S	1" slip connection
2500SF	1" slip connection with flow control
2500T	1" NPT threaded connection
2500TF	1" NPT threaded connection with flow control
2507TF	3/4" NPT threaded connection with flow control

## DIMENSIONS

- **2500:** H: 5 1/8", W: 2 3/4", L: 5"
- **2507:** H: 5 1/8", W: 2 3/4", L: 5"

## OPTIONAL ACCESSORIES \*

- IBOC300-9V battery-operated “on valve” controller
  - Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
  - DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- \* Optional accessories are field-installable. Must specify separately if required.



The Irritrol® anti-siphon 2700 Series valves offer optimum performance, reliability and ease-of-use for a wide variety of residential applications. Featuring anti-siphon capability, this family of plastic valves also features flow control for precise flow adjustment, manual shutoff and a built-in atmospheric vacuum breaker to eliminate back siphonage. Available in electric and manual models, these ¾-inch and 1-inch valves also feature a flow range from .25 to 30 GPM and a pressure range from 10 to 150 psi.

## KEY FEATURES & BENEFITS

**RUGGED, DOUBLE-BEADED SANTOPRENE® DIAPHRAGM**

Ensures a leak-proof seal

**INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Allows for manual operation

**FULL STAINLESS-STEEL METERING SYSTEM (DPR MODELS)**

Consistent valve operation

**PATENTED "FLOATING METERING SYSTEM" (APR MODELS)**

Consistent valve operation

**HEAVY-DUTY, CORROSION- AND UV-RESISTANT PVC,  
GLASS-FILLED POLYPROPYLENE (DPR MODELS ONLY) AND  
STAINLESS STEEL CONSTRUCTION**

Durable, long-term performance

**SELF-ALIGNING BONNET WITH CAPTURED  
HEX/PHILLIPS SCREWS**

Permits fast and easy servicing without removal from the system (APR models)

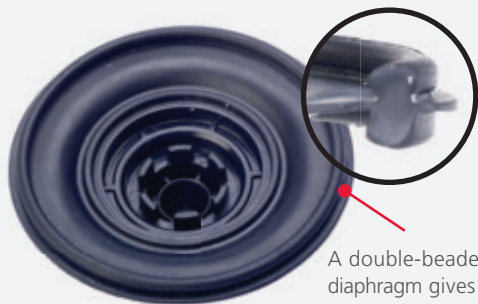
**THREADED BONNET DESIGN**

Allows easy servicing without removal from the system (DPR models)

**PATENTED, TAMPER-RESISTANT FLOW-CONTROL MECHANISM**

Allows for precise water flow (DPR models)

## DOUBLE-BEADED DIAPHRAGM



A double-beaded Santoprene® diaphragm gives you the security that your valve will continue to operate without leaks, time after time

## FRICTION LOSS DATA

MODEL	SIZE	Flow Rate - GPM				
		5	10	15	20	25
2706PR	¾"	1	3	5		
2709PR	1"	1	1	2	4	6

MODEL	SIZE	Flow Rate - GPM						
		.25	2	5	10	15	20	30
2711APR & DPR	¾"	5.0	5.8	4.14	4.11	4.72	7.60	
2713APR & DPR	1"	5.0	5.5	2.03	3.10	2.22	3.72	8.01

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

270 X PR

MODEL	SIZE	TYPE
270 - 2700 manual valve	6 - ¾" size 9 - 1" size	PR - anti-siphon

Example: A 2700 manual ¾", anti-siphon valve = **2706PR**

271 X X PR

MODEL	SIZE	OPTION	TYPE
271 - 2700 electric valve	1 - ¾" size 3 - 1" size	A - stainless screws D - threaded bonnet	PR - anti-siphon

Example: A 2700 electric 1" anti-siphon valve with stainless screws = **2713APR**

Note: Anti-siphon valve to be mounted above ground at least 6" above highest sprinkler head (consult local codes).

## ADDED FEATURES

- Buna-N valve seat seal
- Flow control for precise adjustment and manual shutoff
- Gravity-type anti-siphon poppet
- Encapsulated injection-molded solenoid with a captive hex plunger
- Removable, ergonomic, tamper-resistant flow-control handle (APR models)
- Electric H-body with atmospheric vacuum breaker
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: .25-30 GPM
- Pressure range: 10-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp
- Meets listing standards of ASSE, IAPMO and CSA

## MODELS

Model	Description
2711APR	¾" electric, flow control, stainless screw bonnet
2713APR	1" electric, flow control, stainless screw bonnet
2711DPR	¾" electric, flow control, threaded bonnet
2713DPR	1" electric, flow control, threaded bonnet
2706PR	¾" manual
2709PR	1" manual

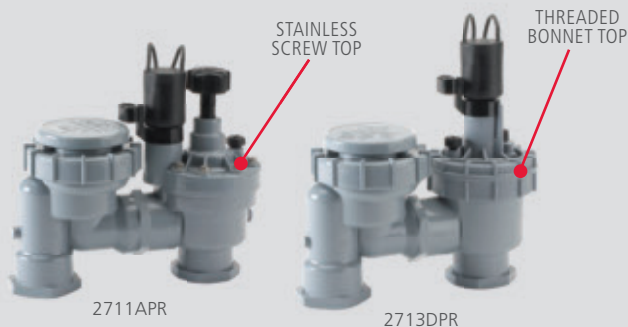
## DIMENSIONS

- **2706:** H: 4 7/8", W: 2 5/8", L: 5 3/4"
- **2709:** H: 5 1/16", W: 3 1/8", L: 6 1/4"
- **2711:** H: 5 5/8", W: 3", L: 6 1/4"
- **2713:** H: 6", W: 3", L: 6 7/8"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- Recycled-water solenoid kit (RW60-Kit); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Threaded bonnet wrench (2400-45) for DPR models

\* Optional accessories are field-installable. Must specify separately if required.







The Irritrol® 311 Series offers a comprehensive package of performance-enhancing features. Beginning with the reliability of a leak-proof, double-beaded, nylon-reinforced Buna-N diaphragm, the strength of glass-filled nylon and the expanded range of a maximum working pressure rating of 150 psi, the 311 Series' list of features easily outdistances the competition. Compatibility with the OmniReg® modular pressure regulator make them the industry's only anti-siphon valves with a pressure regulation option. Additional features include an upgraded bonnet design, a self-cleaning metering system for dirty water applications and a captive plunger solenoid. Plus, the actuator module is removable as a single unit with the diaphragm and internal components held in place, which means no more lost diaphragm screws and springs during installation.

## KEY FEATURES & BENEFITS

### UPPER BODY AND AIR-VENT CAP CONSTRUCTED OF GLASS-FILLED NYLON

Provides long-term performance

### RUGGED, DOUBLE-BEADED NYLON-REINFORCED BUNA-N DIAPHRAGM

Ensures a leak-proof seal

### INTERNAL AND EXTERNAL BLEED (FLUSH MODE)

Manual operation

### ACCEPTS OMNIREG MODULAR PRESSURE REGULATOR

Ensures consistent performance

### EXTERNALLY REMOVABLE SELF-CLEANING METERING SYSTEM

Ensures consistent performance in recycled-water applications



## PREMIER ANTI-SIPHON VALVES

An externally removable self-cleaning metering system makes this valve ideal for wells and dirty water



Bonnet made of glass-filled nylon for added durability

Built-in atmospheric vacuum breaker keeps drinking water safe

## FRICTION LOSS DATA

MODEL	SIZE	Flow Rate - GPM							
		1	5	10	15	20	25	30	
311A-.75	¾"	5.5	6.0	8.0	9.0	11.0			
311A-1	1"	5.5	6.0	7.5	8.5	10.0	13.0	18.5	

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

<b>311A</b> - <b>XX</b>	
MODEL	SIZE
<b>311A</b> - 311 electric anti-siphon valve	.75 - ¾" size 1 - 1" size
Example: A 311 electric anti-siphon 1" valve = <b>311A-1</b>	

Note: Anti-siphon valve to be mounted above ground at least 6" above highest sprinkler head (consult local codes).

## ADDED FEATURES

- Flow control allows precise adjustment and manual shutoff
- Lower body constructed of heavy-duty, corrosion- and UV-resistant PVC
- Buna-N valve seat seal
- All stainless steel hardware and springs
- Unique three-way stainless steel bonnet screws with threaded-brass inserts
- Encapsulated injection-molded solenoid with a captive hex plunger
- Removable, tamper-resistant flow control handle
- Meets listing requirements of IAPMO-UPC and City of Los Angeles
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 1-30 GPM
- Pressure range: 10-150 psi
- Operating temperature: up to 130° F

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
311A-.75	¾" flow control, internal bleed
311A-1	1" flow control, internal bleed

## DIMENSIONS

- **311A-.75:** H: 8 ½", W: 3 ⅝", L: 6"
- **311A-1:** H: 8 ½", W: 3 ⅝", L: 6"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- OmniReg® 5-30 psi regulator (OMR-30)
- OmniReg 5-100 psi regulator (OMR-100)
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.

# 2623DPR | 300 SERIES ELECTRIC VALVE ADAPTERS

3/4" AND 1" PLASTIC MODELS



**T**hese electric anti-siphon valve adapters feature outstanding durability for consistent, dependable performance in all types of applications. Plus, having all of the internal components captured in a single unit means converting manual valves to electric doesn't get any easier.

## KEY FEATURES & BENEFITS

### **2623DPR SERIES**

**CONVERTS CHAMPION® BRASS ANTI-SIPHON VALVES TO ELECTRIC OPERATION**

Automatic system function

**INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Allows for manual operation

**RUGGED, DOUBLE-BEADED SANTOPRENE® DIAPHRAGM**

Provides a leak-proof seal

**HEAVY-DUTY, CORROSION- AND UV-RESISTANT PVC AND STAINLESS STEEL CONSTRUCTION**

For long-term reliability

### **300 SERIES**

**CONVERTS 3/4-INCH AND 1-INCH CHAMPION BRASS ANTI-SIPHON VALVES (MODELS 300-.75 AND 300-1) AND 1-INCH IRRITROL MANUAL VALVES TO ELECTRIC OPERATION**

Automatic system function

**INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Allows for manual operation

**RUGGED, DOUBLE-BEADED NYLON-REINFORCED BUNA-N DIAPHRAGM**

Provides a leak-proof seal

**EXTERNALLY REMOVABLE SELF-CLEANING METERING SYSTEM**

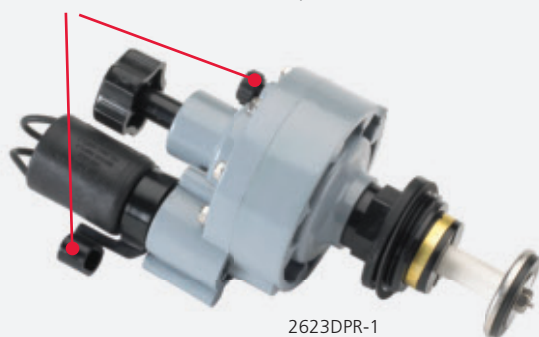
Ensures consistent performance in recycled-water applications

**TOUGH, GLASS-REINFORCED NYLON, STAINLESS STEEL AND BRASS CONSTRUCTION**

Provides proven durability

## SINGLE PIECE ADAPTERS MAKE CONVERSIONS SIMPLE

Internal and external bleed for manual operation



2623DPR-1

Externally removable self-cleaning metering system ensures consistent operation



Constructed of tough glass-filled nylon to handle system surges

300-.75

## SPECIFYING INFORMATION

**2623DPR** - **XX**

MODEL	SIZE
<b>2623DPR</b> - 2623DPR PVC valve adapter	.75 - 3/4" size 1 - 1" size

Example: A 2623DPR, 1" PVC valve adapter = **2623DPR-1**

**300** - **XX**

MODEL	SIZE
<b>300</b> - 300 glass-reinforced nylon valve adapter	.75 - 3/4" size 1 - 1" size

Example: A 300, 1" glass-reinforced nylon valve adapter = **300-1**

*Note: Anti-siphon valve to be mounted above ground at least 6" above highest sprinkler head (consult local codes).*

## ADDED FEATURES

- Ergonomic flow control allows precise flow adjustment and manual shutoff
- Buna-N valve seat seal
- Encapsulated injection-molded solenoid with a captive hex plunger
- Accepts OmniReg® modular pressure regulator
- Five-year warranty

### 2623DPR Series Only

- Slow-closing design
- Full stainless steel metering system
- Hex/Phillips screws
- Easy installation
- Compact design

### 300 Series Only

- Unique three-way stainless steel bonnet screws with threaded-brass inserts

## OPERATING SPECIFICATIONS

- Pressure range: 10-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
2623DPR-.75	3/4" PVC valve adapter
2623DPR-1	1" PVC valve adapter
300-.75	3/4" glass-reinforced nylon valve adapter
300-1	1" glass-reinforced nylon valve adapter

## DIMENSIONS

- **2623DPR Series:** H: 6 3/4", W: 2 7/8"
- **300 Series:** H: 7 1/4", W: 4"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- OmniReg 5-30 psi regulator (OMR-30)
- OmniReg 5-100 psi regulator (OMR-100)
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.





The Irritrol® 200B Series globe/angle valves have built their popularity on a proven record of reliability and a reputation for offering valuable features at an affordable price. Available in 1-, 1 1/2 - and 2-inch models, the 200B Series provides manual internal and external bleed, heavy-duty, UV-resistant PVC construction, stainless steel hardware, a double-beaded diaphragm and a captive solenoid plunger.

## KEY FEATURES & BENEFITS

### HEAVY-DUTY, CORROSION- AND UV-RESISTANT PVC CONSTRUCTION WITH STAINLESS STEEL SPRING AND HARDWARE

Provides consistent operation

### SLOW-CLOSING DESIGN

Reduces water hammer and resulting stress on the system

### RUGGED, DOUBLE-BEADED SANTOPRENE® DIAPHRAGM

Ensures a leak-proof seal

### INTERNAL AND EXTERNAL BLEED (FLUSH MODE)

Allows for manual operation

### ACCEPTS OMNIREG® MODULAR PRESSURE REGULATOR

Ensures consistent performance

### HIGH-STRENGTH RIBBED BONNET AND BOTTOM INLET

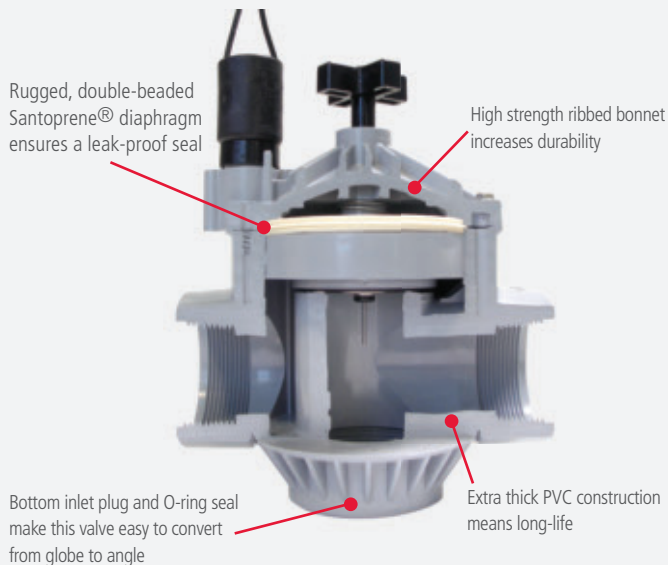
Increases durability

### UNIQUE THREE-WAY STAINLESS STEEL BONNET

Screws accept Phillips, flat-blade and hex-driver tools for easy servicing without removal from the system



## DURABLE HEAVY-DUTY CONSTRUCTION



## FRICITION LOSS DATA

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM													
			5	10	15	20	30	40	50	60	80	100	120			
214B	1"	G	3.36	2.60	1.82	2.35	5.40									
		A	3.09	2.20	1.48	1.98	4.00									
216B	1 1/2"	G				3.04	2.66	2.33	2.97	4.14	5.62					
		A				2.76	2.24	1.99	2.30	3.10	4.42					
217B	2"	G				2.00	1.93	1.73	1.55	1.68	2.99	4.85	6.31			
		A				2.00	1.93	1.73	1.55	1.59	2.15	3.27	4.88			

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
 2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

<span style="border: 1px solid black; padding: 2px;">21</span> - <span style="border: 1px solid black; padding: 2px;">XB</span>	
MODEL	SIZE
21 - 200B Series electric valve	4 - 1" size 6 - 1 1/2" size 7 - 2" size
Example: A 200B Series 1" electric valve = <b>214B</b>	

## ADDED FEATURES

- Flow control allows precise adjustment and manual shutoff
- Buna-N valve seat seal
- Unique threaded inlet plug O-ring seal prevents leaks
- Encapsulated injection-molded solenoid with a captive hex plunger
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 5-120 GPM
- Pressure range: 20-150 psi

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
214B	1" NPT threads, flow control
216B	1 1/2" NPT threads, flow control
217B	2" NPT threads, flow control

## DIMENSIONS

- **214B:** H: 6 1/2", W: 2 1/2", L: 4 1/2"
- **216B:** H: 7 3/4", W: 4 1/4", L: 5 1/2"
- **217B:** H: 8 3/4", W: 5 3/8", L: 6 1/4"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- OmniReg® 5-30 psi regulator (OMR-30)
- OmniReg 5-100 psi regulator (OMR-100)
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable.  
 Must specify separately if required.



**F**eaturing a straight-through flow path that dramatically reduces pressure loss, the Irritrol® UltraFlow Series of plastic valves leads the industry in long-term performance and reliability. With a flow range from .1 to 180 GPM and a self-cleaning, 150-mesh stainless steel filter screen, these unique valves are ideal for a multitude of potable and dirty water applications. A glass-reinforced nylon body and bonnet, stainless steel spring and hardware, and a rugged, nylon-reinforced Buna-N diaphragm add an extra dimension of toughness to this very durable family of valves.

## KEY FEATURES & BENEFITS

### UNIQUE STRAIGHT-THROUGH FLOW PATH

Provides extremely low friction loss

### SLOW-CLOSING DESIGN

Reduces water hammer and resulting stress on the system

### TOUGH GLASS-REINFORCED NYLON, STAINLESS STEEL AND BRASS CONSTRUCTION

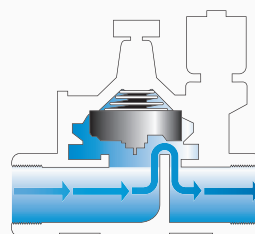
Provides durability and long life

### HIGH AND LOW-FLOW OPERATION

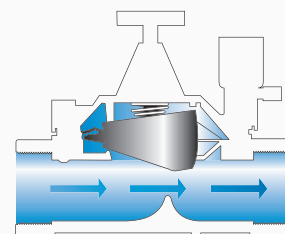
Ensures consistent performance in a variety of applications

### SELF-FLUSHING, 150-MESH, STAINLESS STEEL FILTER SCREEN ON 1-, 1 1/2- AND 2-INCH MODELS

Provides consistent operation



Conventional flow path



The UltraFlow Series straight-through flow path

## ULTRA-FLOW® TECHNOLOGY



Self-flushing, 150 mesh stainless steel filter screen provides consistent operation

Straight-through flow path provides a wide flow range with minimal friction loss

## FRICTION LOSS DATA

MODEL	SIZE	Flow Rate - GPM								
		0.1	2	5	10	15	20	30	40	50
700B-.75	¾"	0.38	0.38	0.86	1.22	2.03	3.27	6.75		
700-1	1"	2.20	1.59	1.80	2.41	2.23	1.84	3.22	5.58	8.59

MODEL	SIZE	Flow Rate - GPM											
		15	20	30	40	50	60	80	100	120	140	160	180
700-1.5	1½"	0.19	0.36	0.69	1.13	1.49	2.13	3.85	6.06	8.72	11.89		
700-2	2"			0.64	0.83	0.98	1.17	2.07	3.06	3.96	5.21	6.50	8.23

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

700 - XX	
MODEL	SIZE
700 - 700 UltraFlow electric valve	B-.75 - ¾" size 1 - 1" size 1.5 - 1½" size 2 - 2" size
Example: A 700 UltraFlow electric 1" valve = <b>700-1</b>	

## ADDED FEATURES

- Manual internal bleed
- Wide flow range
- Flow control allows precise flow adjustment and manual shutoff (not available on ¾-inch model)
- Compact, low-profile design
- Rugged nylon-reinforced Buna-N diaphragm provides leak-proof seal
- Buna-N valve seat seal
- Encapsulated injection-molded solenoid with a captive hex plunger
- Unique three-way stainless steel bonnet screws with threaded brass inserts accept Phillips, flat-blade and hex-driver tools
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: .1-180 GPM (700B-.75 & 700-1 can operate at .1 GPM)
- Pressure range: 10-150 psi (700-2 not recommended under 20 psi)

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
700B-.75	¾" internal bleed flow control
700-1	1" internal bleed flow control
700-1.5	1½" internal bleed flow control
700-2	2" internal bleed flow control

## DIMENSIONS

- **700B-.75:** H: 4 ½", W: 1 9/10", D: 3 2/5"
- **700-1:** H: 4 ½", W: 3", D: 4 3/5"
- **700-1.5:** H: 5 ½", W: 4 3/8", D: 6 ¼"
- **700-2:** H: 7", W: 5 ½", D: 8"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery operated "on valve" controller
- OmniReg® 5-30 psi regulator (OMR-30)
- OmniReg 5-100 psi regulator (OMR-100)
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.



**100** SERIES ELECTRIC  
GLOBE/ANGLE  
CENTURY PLUS & 102 ANTI-CONTAMINATION MODEL

**1", 1 1/2", 2" AND 3" PLASTIC MODELS**



The Irritrol® 100 Series (Century PLUS) is an excellent example of a good valve getting better. Tracing its origin to the highly popular Century Series, the 100 Series delivers reliable performance with a host of enhanced features. Offered in a globe/angle configuration with sizes ranging from one to three inches, the 100 Series features a pressure range of 10- 220 psi, optional modular pressure regulation, stainless steel metering, internal and external bleed, a nylon-reinforced Buna-N double-beaded diaphragm and an anti-contamination design for dirty water applications (available on all 102 Models).

## KEY FEATURES & BENEFITS

**TOUGH, GLASS-REINFORCED NYLON, STAINLESS STEEL AND BRASS CONSTRUCTION**

Withstands high temperatures and system surges under pressure for long-term reliability

**220 PSI PRESSURE RATING**

Prevents water hammer and system damage in high-pressure installations

**INTERNAL AND EXTERNAL BLEED (FLUSH MODE)**

Manual operation

**EXTERNALLY REMOVABLE SELF-CLEANING METERING SYSTEM**

Provides consistent performance in recycled-water applications

**ACCEPTS OMNIREG® MODULAR PRESSURE REGULATOR**

Ensures consistent performance

**102 ANTI-CONTAMINATION MODELS\***

**150-MESH EXTERNAL CONTROL WATER FILTER AND THREE-WAY SOLENOID**

Provides non-continuous metering for recycled water applications

**SELECTABLE NORMALLY OPEN OR NORMALLY CLOSED MODE (FACTORY SET AT NORMALLY CLOSED)**

Provides flexibility (102 only)

**CONTROL WATER FILTER**

Allows easy external service

\*Not compatible with IBOC®300-9V, OmniReg and DC Latching Solenoid



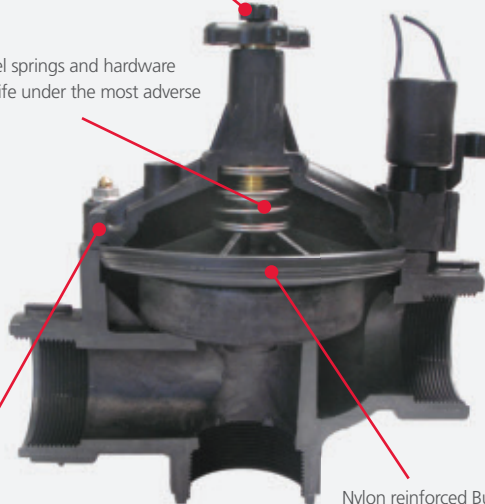
102P1



## TOUGHEST UNDER PRESSURE

Self-cleaning/easy maintenance, each cycle cleans internal orifices. All parts are easily accessible without removing the valve from the system

Stainless steel springs and hardware assure long life under the most adverse conditions



Internally molded studs provide positive bonnet attachment

Nylon reinforced Buna-N diaphragm provides a leak-proof seal

## FRICTION LOSS DATA

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM					
			5	10	20	30	40	50
100P1	1"	G	6.30	4.20	3.20	4.10	7.20	10.90
102P1		A	6.30	4.20	3.10	2.70	4.80	7.90

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM								
			30	40	50	60	70	80	90	100	110
100P1.5	1 1/2"	G	1.60	2.30	3.60	5.20	7.00	9.20	11.70	14.40	17.50
102P1.5		A	1.30	1.60	2.80	4.00	5.50	7.10	9.00	11.00	13.30

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM								
			80	90	100	110	120	130	140	150	175
100P2	2"	G	2.10	2.70	3.30	4.00	4.80	5.60	6.50	7.50	8.60
102P2		A	1.20	1.60	2.00	2.40	2.80	3.30	3.90	4.40	5.00

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM						
			150	175	200	225	250	275	300
100P3/ 102P3	3"	G	2.50	3.00	4.10	5.30	6.70	8.30	10.10
		A	1.90	2.40	3.30	4.30	5.50	6.90	8.50

1) Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.  
2) See friction loss charts on pages 98 through 115 for details.

## SPECIFYING INFORMATION

MODEL	SIZE
<b>100P</b> - 100 internal bleed and flow control valve	1 - 1" size 1.5 - 1 1/2" size
<b>102P</b> - 102 anti-contamination filter valve	2 - 2" size 3 - 3" size

Example: A 100P 1" valve with internal bleed and flow control = **100P1**

## ADDED FEATURES

- Flow control allows precise flow adjustment and manual shutoff
- Buna-N valve seat seal
- Encapsulated injection-molded solenoid with a captive hex plunger
- Positive O-ring seal on inlet plug prevents leaks without damaging seal threads
- Molded-in and anchored studs allow positive bonnet attachment and removal
- Brass flow control stem on 2- and 3-inch models
- Easily serviced without removal from the system
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 5-300 GPM
- Pressure range: 10-220 psi; 10-100 psi (102 models)

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp (102 models: .48 amp)
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp (102 models: .24 amp)

## MODELS

Model	Description
100P1	1" internal bleed, flow control
100P1.5	1 1/2" internal bleed, flow control
100P2	2" internal bleed, flow control
100P3	3" internal bleed, flow control
102P1	1" anti-contamination filter
102P1.5	1 1/2" anti-contamination filter
102P2	2" anti-contamination filter
102P3	3" anti-contamination filter

## DIMENSIONS

- **100P1:** H: 6 3/4", W: 3 5/8", D: 4 3/4"
- **102P1:** H: 7 1/2", W: 5", D: 4 3/4"
- **100P1.5:** H: 7 1/4", W: 3 5/8", D: 4 3/4"
- **102P1.5:** H: 7 1/2", W: 5", D: 4 3/4"
- **100P2:** H: 9 1/2", W: 6 1/8", D: 7 3/4"
- **102P2:** H: 10 1/4", W: 7 1/2", D: 7 3/4"
- **100P3:** H: 10 3/4", W: 6 1/8", D: 8 1/4"
- **102P3:** H: 11 1/2", W: 7 1/2", D: 8 1/2"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
- OmniReg® 5-30 psi regulator (OMR-30)
- OmniReg 5-100 psi regulator (OMR-100)
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.

# 100-S SERIES

ELECTRIC  
GLOBE/ANGLE

CENTURY PLUS SCRUBBER VALVE

1", 1 1/2", 2" AND 3" PLASTIC MODELS



Constructed of heavy-duty, glass-reinforced nylon, high grade stainless steel, brass and EPDM rubber materials, the 100 Series scrubber valves resist clogging and feature a patent-pending continuous scrubbing mechanism to actively fight dirt, algae and other particles from disrupting the functionality of the valve. The 100 Series scrubber valves are true dirty water irrigation valves, able to handle the harsh chemicals found in dirty water systems, such as chlorines, chloramines and water treated with ozones.

## KEY FEATURES & BENEFITS

### CONTINUOUS SCRUBBING FEATURE

Actively cleans the metering device for consistent valve operation

### TOUGH, GLASS-REINFORCED NYLON, STAINLESS STEEL AND BRASS CONSTRUCTION

Withstands high temperatures and system surges under pressure for long-term reliability

### FABRIC-REINFORCED EPDM DIAPHRAGM AND EPDM SEAT SEAL

Designed to operate in virtually all water applications

### RUGGED INTERNAL PLASTIC AND STAINLESS STEEL PARTS

Scrubber fan, nut and metering system chlorine and chemical resistant

### COMPLETELY SERVICEABLE AND RETROFITTABLE

Diaphragm assembly may be replaced or retrofitted to previous models

### 220 PSI PRESSURE RATING

Prevents water hammer and system damage in high-pressure installations

### INTERNAL AND EXTERNAL BLEED (FLUSH MODE)

Manual operation

### EXTERNALLY REMOVABLE SELF-CLEANING METERING SYSTEM

Provides consistent performance in recycled-water applications

### ACCEPTS OMNIREG® MODULAR PRESSURE REGULATOR

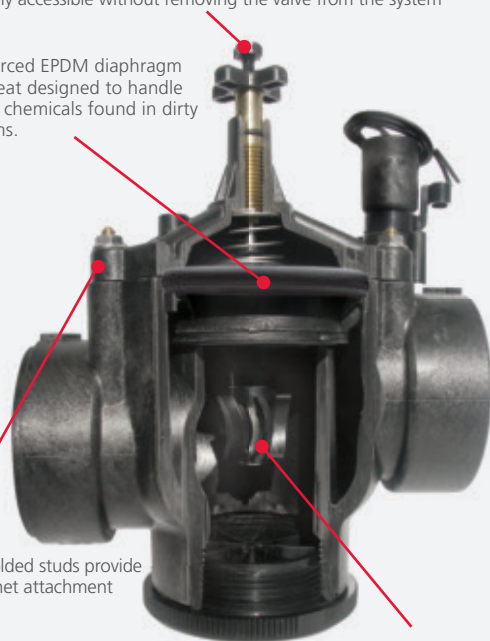
Ensures consistent performance

## NEXT GENERATION SCRUBBER VALVE

Self-cleaning/easy maintenance, each cycle cleans internal orifices. All parts are easily accessible without removing the valve from the system

Fabric-reinforced EPDM diaphragm and EPDM seat designed to handle the harshest chemicals found in dirty water systems.

Internally molded studs provide positive bonnet attachment



Continuous scrubbing turbine actively cleans the metering device for consistent valve operation in dirty water applications.

### FRICTION LOSS DATA

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM					
			5	10	20	30	40	50
100P1-S	1"	G	4.80	4.20	4.50	5.68	10.50	17.10
		A	4.00	3.85	4.10	5.50	8.10	15.50

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM								
			30	40	50	60	70	80	90	100	110
100P1.5-S	1 1/2"	G	2.35	3.55	5.57	7.59	10.50	13.35	16.45	20.70	21.76
		A	2.15	3.10	4.50	6.70	8.70	11.50	14.50	18.00	20.50

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM								
			80	90	100	110	120	130	140	150	175
100P2-S	2"	G	3.54	4.45	5.40	6.68	8.04	9.26	10.95	12.21	15.65
		A	2.80	3.80	4.50	5.50	6.30	7.60	8.70	10.30	13.10

MODEL	SIZE	GLOBE ANGLE	Flow Rate - GPM						
			150	175	200	225	250	275	300
100P3-S	3"	G	2.97	4.04	5.37	6.35	7.99	9.35	11.26
		A	2.55	3.10	4.50	5.40	7.10	8.40	10.15

1) See friction loss charts on pages 98 through 115 for details.

### SPECIFYING INFORMATION

100P	XX-S
<b>MODEL</b>	<b>SIZE</b>
100P - 100 internal bleed and flow control valve	1 - 1" size 1.5 - 1 1/2" size 2 - 2" size 3 - 3" size
Example: A 100P 1" scrubber valve with internal bleed and flow control = <b>100P1-S</b>	

## ADDED FEATURES

- Flow control allows precise flow adjustment and manual shutoff
- EPDM valve seat seal
- Encapsulated injection-molded solenoid with a captive hex plunger
- Positive O-ring seal on inlet plug prevents leaks without damaging seal threads
- Molded-in and anchored studs allow positive bonnet attachment and removal
- Brass flow control stem on 2- and 3-inch models
- Easily serviced without removal from the system
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 5-300 GPM
- Pressure range: 10-220 psi (2" and 3" minimum pressure 20 psi)

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp (102 models: .48 amp)
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp (102 models: .24 amp)

## MODELS

Model	Description
100P1-S	1" internal bleed, scrubber valve
100P1.5-S	1 1/2" internal bleed, scrubber valve
100P2-S	2" internal bleed, scrubber valve
100P3-S	3" internal bleed, scrubber valve
100P2-S-KIT	2" scrubber diaphragm kit
100P3-S-KIT	3" scrubber diaphragm kit

## DIMENSIONS

- **100P1-S:** H: 6 3/4", W: 3 5/8", D: 4 3/4"
- **100P1.5-S:** H: 7 1/4", W: 3 5/8", D: 4 3/4"
- **100P2-S:** H: 9 1/2", W: 6 1/8", D: 7 3/4"
- **100P3-S:** H: 10 3/4", W: 6 1/8", D: 8 1/4"

## OPTIONAL ACCESSORIES\*

- IBOC300-9V battery-operated "on valve" controller
  - OmniReg® 5-30 psi regulator (OMR-30)
  - OmniReg 5-100 psi regulator (OMR-100)
  - Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
  - DC latching solenoid (DCL)
- Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.



# DRIP ZONE VALVE KITS ELECTRIC

**3/4" AND 1" WITH OR WITHOUT AVB**



**N**ot all drip zone kits are created equal, and with Irritrol® drip zone kits, you'll know why. Featuring the industry's most recognized valves that have long been a standard for more than 40 years, these all-inclusive kits come complete with all the necessary components you need for a drip zone. Coupled with the added reliability of the industry's most popular valves, these kits include a Y-filter, pressure regulator and all the essential fittings to make a complete drip zone.

## KEY FEATURES & BENEFITS

### COMPLETE WITH IRRITROL CONTROL VALVE

Over 40 years of industry-recognized dependability

### IRRITROL Y-FILTER WITH A 150 MESH STAINLESS STEEL FILTER SCREEN

Proven performance for worry-free operation

### PRESSURE REGULATOR

Provides consistent outlet pressure levels suitable for drip irrigation

### AVAILABLE IN 9 VALVE CONFIGURATIONS IN 3/4" AND 1"

Multiple configurations to handle all installation variances

### ALSO AVAILABLE IN "LESS VALVE" CONFIGURATIONS

Allows for installation versatility





## FRICITION LOSS DATA

Flow Rate - GPM

MODEL	GPM (Flow)	0.25	5	8	15	20
2711APRDK-LF	Friction loss (psi)	3	5	5	n/a	n/a
	Min. Inlet (psi)	30	32	32	34	39
2711APRDK-MF	Friction loss (psi)	3	5	5	7	13
	Min. Inlet (psi)	30	32	32	34	39
2713APRDK-LF	Friction loss (psi)	3	5	5	n/a	n/a
	Min. Inlet (psi)	30	32	32	34	39
2713APRDK-MF	Friction loss (psi)	3	5	5	5	8
	Min. Inlet (psi)	30	32	32	32	35
2500DK-1-LF	Friction loss (psi)	3	3	3	n/a	n/a
	Min. Inlet (psi)	30	30	30	32	34
2500DK-1-MF	Friction loss (psi)	3	3	3	4.5	7
	Min. Inlet (psi)	30	30	30	32	34
2507DK-LF	Friction loss (psi)	3	5	5	n/a	n/a
	Min. Inlet (psi)	30	32	32	34	39
2507DK-MF	Friction loss (psi)	3	5	5	7	13
	Min. Inlet (psi)	30	32	32	34	39
700DK-1-LF	Friction loss (psi)	3	3	3	n/a	n/a
	Min. Inlet (psi)	30	30	30	32	34
700DK-1-MF	Friction loss (psi)	3	3	3	4.5	7
	Min. Inlet (psi)	30	30	30	32	34
700DK-075-LF	Friction loss (psi)	3	3	3	n/a	n/a
	Min. Inlet (psi)	30	30	30	32	34

## SPECIFYING INFORMATION

XXXXXXXX - DK - XXX - XX

MODEL	KIT	VALVE SIZE	FLOW RATE
700 - 700 Series Valve	DK - Drip Zone Kit	1 - 1"	LF - Low Flow
2500 - 2500 Series Valve		075 - 3/4"	MF - Medium Flow
2507 - 2507 Series Valve			
2711APR - 2711 Series Valve			
2713APR - 2713 Series Valve			

Example: A drip zone kit with a 700 Series UltraFlow, 1" commercial valve (0.1-8 gpm) = **700DK-1-LF**

DK - LV - XX

MODEL	LESS VALVE	FLOW RATE
DK - Drip Zone Kit	LV - Less Valve	LF - Low Flow MF - Medium Flow

## ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

## MODELS

Model	Description
700DK-1-LF	1" 700 UltraFlow Inline Valve, Filter, Low Flow Regulator & Fittings
700DK-1-MF	1" 700 UltraFlow Inline Valve, Filter, Medium Flow Regulator & Fittings
700DK-075-LF	3/4" 700 UltraFlow Inline Valve, Filter, Low Flow Regulator & Fittings
2500DK-1-LF	1" 2500 Valve, Filter, Low Flow Regulator & Fittings
2500DK-1-MF	1" 2500 Valve, Filter, Medium Flow Regulator & Fittings
2507DK-LF	3/4" 2507 Valve, Filter, Low Flow Regulator and Fittings
2507DK-MF	3/4" 2507 Valve, Filter, Medium Flow Regulator and Fittings
2711APRDK-LF	3/4" 2711APR Valve, AVB, Filter, Low Flow Regulator & Fittings
2711APRDK-MF	3/4" 2711APR Valve, AVB, Filter, Medium Flow Regulator & Fittings
2713APRDK-LF	1" 2713APR Valve, AVB, Filter, Low Flow Regulator & Fittings
2713APRDK-MF	1" 2713APR Valve, AVB, Filter, Medium Flow Regulator & Fittings
DK-LV-LF	Low Flow Regulator & Fittings
DK-LV-MF	Medium Flow Regulator & Fittings

## OPTIONAL ACCESSORIES \*

- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (DCL)  
*Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.*
- Weatherproof gauge (SPK-100)

\* Optional accessories are field-installable. Must specify separately if required.

MODEL	2711APRDK-LF	2711APRDK-MF	2713APRDK-LF	2713APRDK-MF	2500DK-1-LF	2500DK-1-MF	2507DK-LF	2507DK-MF	700DK-1-LF	700DK-1-MF	700DK-075-LF
Connection Size	3/4"	3/4"	1"	1"	1"	1"	3/4"	3/4"	1"	1"	3/4"
Control Valve Solenoid	24V ac, Inrush: 0.4 amps, 11.5 V a, Holding 0.20 amps, 5.75 V a										
Minimum Flow Rate	0.25 GPM	2 GPM	0.25 GPM	2 GPM	0.1 GPM	2 GPM	0.25 GPM	2 GPM	0.1 GPM	2 GPM	0.25 GPM
Maximum Flow Rate	8 GPM	20 GPM	8 GPM	20 GPM	8 GPM	20 GPM	8 GPM	20 GPM	8 GPM	20 GPM	8 GPM
Maximum Pressure	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi
Y-Filter Degree of Filtration	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh	150 mesh
Regulator-Preset Pressure	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi	25 psi
Thread Connection-Upstream	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT	Female NPT
Thread Connection-Downstream	Female NPT	Female NPT	Male NPT	Female NPT	Male NPT	Female NPT	Female NPT	Female NPT	Male NPT	Female NPT	Female NPT
Minimum Number of Emitters:											
0.5 GPH	30	240	30	240	12	240	30	240	12	240	30
1 GPH	15	120	15	120	6	120	15	120	6	120	15
2 GPH	8	60	8	60	3	60	8	60	3	60	8
Maximum Number of Emitters:											
0.5 GPH	960	2400	960	2400	960	2400	960	2400	960	2400	960
1 GPH	490	1200	490	1200	490	1200	490	1200	490	1200	490
2 GPH	240	600	240	600	240	600	240	600	240	600	240

Note: Consult your local plumbing code for backflow prevention requirements.

\* AVB = Atmospheric Vacuum Breaker (Anti-siphon Valve)



This pressure-regulating device enables the user to quickly and accurately set the exact downstream pressure required for any application.

## KEY FEATURES & BENEFITS

### MAINTAINS CONSTANT DOWNSTREAM PRESSURE, REGARDLESS OF WIDELY VARYING INLET PRESSURE

For consistent operation of heads

### ONE MODEL FITS ALL HEAVY-DUTY COMMERCIAL 100 SERIES (CENTURY PLUS), 700 SERIES (ULTRAFLOW), 200B AND 311A SERIES VALVES\*

Streamlines inventory requirements

### REQUIRES ONLY 1 GPM TO OPERATE

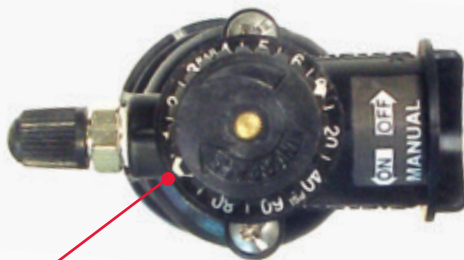
Ideal for low-flow applications

### "DROP IN" INSTALLATION IS FAST AND EASY, REQUIRING TIGHTENING OF ONLY TWO CAPTURE SCREWS

For reduced labor time

\* Compatible with Century PLUS (excluding anti-contamination models), 700 UltraFlow® (1", 1½" and 2" and 311A manufactured after 1/11/96; 700 UltraFlow (¾") manufactured after 5/4/96; and 200B manufactured after 12/1/98.

## EASILY KEEP DOWNSTREAM PRESSURE CONSTANT



Simply turn the dial to the desired pressure

## ADDED FEATURES

- Clearly marked dial settings permit precise control of downstream pressure
- Desired pressure may be set with water on or off
- Delivers an accuracy of  $\pm 3$  psi
- Low-profile design permits use in applications with limited space
- Schrader valve test port is easily accessible for in-line use
- Manufactured of heavy-duty, corrosion-resistant glass-filled nylon
- Easily serviced internal module
- Stainless steel and brass hardware
- Vandal cap to avoid unauthorized use
- Five-year warranty

## OPERATING SPECIFICATIONS

- Flow range: 1 to 300 GPM
- Inlet pressure range: Up to 200 psi
- Pressure regulation:  
OMR-30: 5 to 30 psi, OMR-100: 5 to 100 psi
- Inlet pressure to be 10 psi greater than outlet pressure

## MODELS

Model	Description
OMR-30	Modular regulator 5-30 psi
OMR-100	Modular regulator 5-100 psi
OMR-DS	Downstream sensing kit

## SPECIFYING INFORMATION

MODEL	DESCRIPTION
OMR - Modular regulator	30 - 5-30 psi 100 - 5-100 psi DS - Downstream sensing kit**

Example: A regulator to regulate from 5-30 psi = **OMR-30**

\*\* This accessory may be used with either the OMR-30 or OMR-100 models to sense downstream pressure

# ACCESSORIES



**R811-24VACG**

- Captive hex plunger feature
- 24 V ac, .40 amp inrush, .20 amp holding



**RW60-KIT**

- Purple solenoid with purple warning tag
- Captive hex plunger feature
- 24 V ac, .40 amp inrush, .20 amp holding



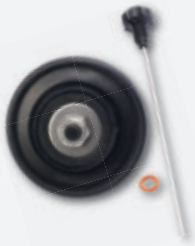
**DCL SOLENOID**

DC latching solenoid for Hardie®, Richdel® and Irritrol® valves used with IBOC® and IBOC® Plus Series controllers



**SPK-100**

100 psi weatherproof gauge (fits OmniReg and all Hardie and Richdel® pressure regulators)



**SPK-HR1**

Prepackaged repair kit includes diaphragm assembly, O-ring, metering rod and fasteners (bulk 24 per)



**R205KIT**

Prepackaged repair kit for 205 Series non-flow control valves. Includes diaphragm assembly, bonnet assembly, fasteners and spring



**R205TFKIT**

Prepackaged repair kit for 205 Series flow control valves. Includes diaphragm assembly, bonnet assembly, fasteners and spring



**2400-45**

Threaded nut-ring wrench speeds assembly and service of 2400, 2600, 2711DPR and 2713DPR valves



**SPK-700-X**

Prepackaged repair kit for UltraFlow® Series valves includes diaphragm assembly, support ring, seat seal, O-rings and fasteners (bulk 24 per; repair instructions and parts breakdown included)



**SPK-100-X**

Prepackaged repair kit for Century Series valves includes diaphragm assembly, O-ring, metering rod and fasteners (bulk 24 per; repair instructions and parts breakdown included)



**R100PX**

Prepackaged repair kit for Century PLUS Series valves includes diaphragm assembly, O-rings, metering rod and fastening nuts (bulk 24 per; repair instructions and parts breakdown included)



**100P-S-KIT**

100 (Century) Series Scrubber valve diaphragm assembly kit. Complete with scrubbing turbine, EPDM diaphragm, EPDM seat seal and 316SS Filter. Available in 2" and 3", fully assembled and ready to drop in a century series valve.

SPK-700-X	
MODEL	SIZE
SPK-700-.75	3/4"
SPK-700B-.75	3/4"
SPK-700-1	1"
SPK-700-1.5	1 1/2"
SPK-700-2	2"

SPK-100-X	
MODEL	SIZE
SPK-100-1	1"
SPK-100-1.5	1 1/2"
SPK-100-2	2"
SPK-100-3	3"





R100P-X	
MODEL	SIZE
R100P1	1"
R100P1.5	1 1/2"
R100P2	1"
R100P3	1"

100P-X-S-KIT	
MODEL	SIZE
100P2	2"
100P3	3"

# ROTORS

With taller pop-up heights and automatic arc return, Irritrol® rotors stand tall in the yard and in the industry. Add to that, easy installation and adjustment features and you can see why durable Irritrol rotors are rapidly becoming the contractor's choice.



AT-A-GLANCE					
		<b>430R</b>	<b>450R</b>	<b>550R</b>	<b>PLATINUM SPORT</b>
		pgs 72-73	pgs 74-75	pgs 76-77	pgs 78-79
APPLICATION	TURF	●	●	●	●
	SHRUBS/ GROUND COVER			●	
	SLOPES	●	●	●	
	RUBBER COVER FOR ATHLETIC FIELDS		●	●	●
FEATURES	FULL/PART CIRCLE IN ONE SPRINKLER	●	●	●	●
	RADIUS	20' – 35'	22' – 52'	25' – 50'	49' – 79'
	INLET SIZE	1/2"	3/4"	3/4"	1"
	PRESSURE RATING	30 – 50 psi	30 – 70 psi	25 – 65 psi	40 – 100 psi
	STAINLESS STEEL RISER				●
	CHECK VALVE			●	●
	RECYCLED WATER OPTION			●	●
	SHRUB			●	
	HIGH POP			●	
	AUTOMATIC RETURN				●
	POP-UP HEIGHT	4"	4"	5"	5"
	WARRANTY	2 Years	2 Years	5 Years	5 Years



**R**apidly becoming a contractor favorite, the 430R rotor from Irritrol® offers everything you would expect from a 1/2" rotor. When your application calls for more than ordinary spray heads, but not enough for large rotors, we offer the 430R. With a familiar arc setting and the ability to quick check the left and right stops, the 430R is sure to save time on installation.

## KEY FEATURES & BENEFITS

### **FAMILIAR TOP ADJUSTMENT, WET OR DRY**

For fast convenient installation

### **REVERSING FULL- AND PART-CIRCLE OPERATION**

Allows you to adjust the rotor from 40° to 360°

### **PRESSURE-ACTIVATED WIPER SEAL**

Reduces flow-by at pop-up and eliminates leaking. Ideal for low flow applications

### **WIDE SELECTION OF NOZZLES**

5 interchangeable nozzles to cover varying flow requirements

### **POSITIVE LEFT AND RIGHT STOPS (FIXED RIGHT STOP)**

Reduces set-up time by allowing you to quick check the arc

### **STAINLESS STEEL ADJUSTMENT SCREW**

Allows up to 25% radius reduction

### **RATCHETING RISER**

For easy arc adjustment

### **1/2" INLET**

Covers smaller radius requirements

## PERFORMANCE DATA

### 430R Rotor

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
0.75	30	20	0.80	0.39	0.44
	40	21	0.90	0.39	0.45
	50	22	1.00	0.40	0.46
1.0	30	26	1.00	0.28	0.33
	40	27	1.10	0.29	0.34
	50	28	1.30	0.32	0.37
1.5	30	29	1.30	0.30	0.34
	40	30	1.50	0.32	0.37
	50	31	1.70	0.34	0.39
2.0	30	30	1.70	0.36	0.42
	40	31	2.00	0.40	0.46
	50	31	2.30	0.46	0.53
3.0	30	34	2.60	0.43	0.50
	40	35	3.00	0.47	0.54
	50	35	3.40	0.53	0.65

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

Note: Data collected in zero wind conditions

## OPERATING SPECIFICATIONS

- Inlet: ½" female-threaded NPT
- Adjustable arc range: 40° to 360°
- Flow range: .8 – 3.4 GPM
- Recommended operating pressure: 30 – 50 psi
- Maximum operating pressure: 60 psi
- Overall height (retracted): 6"
- Radius: 20' to 35'
- Standard nozzle trajectory: 25°
- 5 interchangeable nozzles
- Riser height: 4"
- Two-year warranty

## MODELS

Model	Description
430R	½" inlet with 4" pop-up

## SPECIFYING INFORMATION

430R		
MODEL	INLET	POP-UP HEIGHT
430R - Gear-driven rotor	½" Female Threaded NPT	4" Height
Example: 430R rotor, ½" female threaded, 4" height = <b>430R</b>		

## EASY TO ADJUST



430R Rotor

### NO SPECIAL TOOLS REQUIRED

All arc adjustments made from the top with a standard screwdriver reduces set up time



The 450R rotor from Irritrol® was designed with the contractor in mind. With an industry recognized top arc adjustment, and the ability to quick check the arc setting, there's no training necessary when setting this rotor. All this, along with superior water efficient nozzle technology, makes this rotor the choice for professional contractors.

## KEY FEATURES & BENEFITS

### FAMILIAR TOP ADJUSTMENT, WET OR DRY

For fast convenient installation

### REVERSING FULL- AND PART-CIRCLE OPERATION

Allows you to adjust the rotor from 40° to 360°

### NON-FLUSHING WIPER SEAL

Reduces leaks caused by debris trapped under seal. Ideal for low flow applications

### 3/4" INLET

Replaces all standard rotors

### UNIVERSAL ADJUSTMENT TOOL

Common to most rotors in the industry

### STANDARD RUBBER COVER

Provides added protection against debris and keeps playing areas safe

### WIDE SELECTION OF NOZZLES

8 Standard and 4 Low Angle nozzles included with each rotor to handle a wide range of applications

### POSITIVE LEFT AND RIGHT STOPS (FIXED RIGHT STOP)

Reduces set-up time by allowing you to quick check the arc



## PERFORMANCE DATA

### 450R Rotor - Standard Nozzle

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
0.50	30	28	0.50	0.12	0.14
	40	29	0.60	0.14	0.16
	50	29	0.70	0.16	0.19
	60	30	0.80	0.17	0.20
0.75	30	29	0.70	0.16	0.19
	40	30	0.80	0.17	0.20
	50	30	0.90	0.19	0.22
	60	31	1.00	0.20	0.23
1.0	30	30	0.90	0.19	0.22
	40	31	1.00	0.20	0.23
	50	31	1.20	0.24	0.28
	60	32	1.30	0.24	0.28
2.0	30	32	1.20	0.23	0.26
	40	33	1.40	0.25	0.29
	50	34	1.60	0.27	0.31
	60	34	1.80	0.30	0.35
3.0	30	36	2.00	0.30	0.34
	40	38	2.40	0.32	0.37
	50	40	2.70	0.32	0.38
	60	40	2.90	0.35	0.40
4.0	30	36	2.60	0.39	0.45
	40	40	3.00	0.36	0.42
	50	42	3.40	0.37	0.43
	60	42	3.70	0.40	0.47
6.0	30	38	4.20	0.56	0.65
	40	43	4.90	0.51	0.59
	50	46	5.50	0.50	0.58
	60	47	6.00	0.52	0.60
8.0	30	40	4.80	0.58	0.67
	40	45	6.00	0.57	0.66
	50	48	6.80	0.57	0.66
	60	49	7.60	0.61	0.70

### 450R Rotor - Low Angle Nozzle

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
1.0 LA	30	22	1.20	0.48	0.55
	40	24	1.70	0.57	0.66
	50	26	1.80	0.51	0.59
	60	28	2.00	0.49	0.57
3.0 LA	30	29	3.00	0.69	0.79
	40	32	3.10	0.58	0.67
	50	35	3.50	0.55	0.64
	60	37	3.80	0.53	0.62
4.0 LA	30	31	3.40	0.68	0.79
	40	34	3.90	0.65	0.75
	50	37	4.40	0.62	0.71
	60	38	4.70	0.63	0.72
6.0 LA	30	34	5.20	0.87	1.00
	40	38	6.50	0.87	1.00
	50	42	7.30	0.80	0.92
	60	44	8.00	0.80	0.92

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

Note: Data collected in zero wind conditions

## OPERATING SPECIFICATIONS

- Inlet: 3/4" female-threaded NPT
- Adjustable arc range: 40° to 360°
- Flow range: .5 – 8.0 GPM
- Recommended operating pressure: 30 – 70 psi
- Precipitation rate: .12 to .49 inches per hour
- Overall height (retracted): 7 3/8"
- Recommended spacing: 25' to 45'
- Radius: 22' to 52'
- Standard nozzle trajectory: 25°
- Low angle nozzle trajectory: 11°
- 8 standard and 4 low angle nozzles included
- Riser height: 4"
- Two-year warranty

## MODELS

Model	Description
450R	3/4" inlet with 4" pop-up

## SPECIFYING INFORMATION

450R		
MODEL	INLET	POP-UP HEIGHT
450R - Gear-driven rotor	3/4" FemaleThreaded NPT	4" Height

Example: 450R rotor, 3/4" female threaded, 4" height = **450R**

## FAMILIAR TOP ADJUSTMENT



450R Rotor



Familiar top arc adjustments eliminate the need for training



The new Irritrol® 550R rotor delivers basic simplicity and dependable action all in one rotor. With its proven 3/4" gear-driven design, 50' of watering radius and a full 5" pop-up, this rotor just gets more done. Installation is made simple with Irritrol's familiar top arc adjustment and all-in-one full- and part-circle operation from 40 to 360 degrees. And, with the ability to quick check the arc with positive left and right stops, set-up time is further reduced. The 550R comes with a wide selection of nozzles (8 standard and 4 low angle nozzles) making it the ideal rotor for your everyday installations.

## KEY FEATURES & BENEFITS

### FAMILIAR TOP ADJUSTMENT, WET OR DRY

For fast convenient installation

### REVERSING FULL- AND PART-CIRCLE OPERATION

Allows you to adjust the rotor from 40° to 360°

### NON-FLUSHING WIPER SEAL

Reduces leaks caused by debris trapped under seal

### 3/4" INLET

Replaces all standard rotors

### ALL ADJUSTMENTS MADE WITH A STANDARD SCREWDRIVER

No special tools required

### STANDARD RUBBER COVER

Provides added protection against debris and keeps playing areas safe

### WIDE SELECTION OF NOZZLES

8 Standard and 4 Low Angle nozzles included with each rotor to handle a wide range of applications

### POSITIVE LEFT AND RIGHT STOPS (FIXED LEFT STOP)

Reduces set-up time by allowing you to quick check the arc

### OPTIONAL CHECK VALVE HOLDS UP TO 7' OF ELEVATION CHANGE

Eliminates water waste

## PERFORMANCE DATA

### 550R Rotor - Standard Nozzle

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
1.5	25	33	1.15	0.20	0.23
	35	34	1.38	0.23	0.27
	45	35	1.59	0.25	0.29
	55	35	1.74	0.27	0.32
2.0	25	35	1.45	0.23	0.26
	35	36	1.80	0.27	0.31
	45	37	2.12	0.30	0.34
	55	37	2.30	0.32	0.37
2.5	25	36	1.75	0.28	0.32
	35	36	2.20	0.33	0.38
	45	37	2.55	0.36	0.41
	55	37	2.80	0.39	0.45
3.0	25	37	2.58	0.36	0.42
	25	35	1.75	0.28	0.32
	35	36	2.20	0.33	0.38
	45	37	2.55	0.36	0.41
4.0	25	39	3.75	0.47	0.55
	35	41	4.50	0.52	0.60
	45	43	5.10	0.53	0.61
	55	45	5.75	0.55	0.63
5.0	25	43	5.10	0.53	0.61
	35	43	5.20	0.45	0.63
	45	44	6.05	0.60	0.69
	55	47	6.65	0.58	0.67
6.0	25	48	7.25	0.61	0.70
	25	36	5.75	0.85	0.99
	35	43	7.10	0.74	0.85
	45	50	8.05	0.62	0.72
8.0	25	50	8.95	0.69	0.80
	35	50	9.70	0.75	0.86

### 550R Rotor - Low Angle Nozzle

Nozzle	Pressure psi	36Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
1.0 LA	25	25	0.74	0.23	0.26
	35	28	0.94	0.23	0.27
	45	29	1.03	0.23	0.27
	55	29	1.14	0.26	0.30
1.5 LA	25	27	1.10	0.29	0.34
	35	30	1.35	0.29	0.33
	45	31	1.52	0.30	0.35
	55	31	1.75	0.35	0.40
2.0 LA	25	29	1.40	0.32	0.37
	35	31	1.72	0.34	0.40
	45	32	2.05	0.39	0.45
	55	33	2.25	0.40	0.46
3.0 LA	25	33	2.45	0.43	0.50
	25	29	2.20	0.50	0.58
	35	33	2.60	0.46	0.53
	45	35	3.05	0.48	0.55
3.0 LA	55	36	3.40	0.51	0.58
	65	36	3.70	0.55	0.63

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

Note: Data collected in zero wind conditions

## OPERATING SPECIFICATIONS

- Inlet: 3/4" female-threaded NPT
- Adjustable arc range: 40° to 360°
- Flow range: .76 – 9.63 gpm
- Recommended operating pressure: 45 psi
- Precipitation rate: .20 – 1.01 inches per hour
- Overall height (retracted): 7 3/8"
- Radius: 25' – 50'
- Pressure range: 25 to 65 psi
- Standard nozzle trajectory: 25°
- Low angle nozzle trajectory: 12°
- 8 standard and 4 low angle nozzles included  
*(unit comes with 3.0 nozzle pre-installed)*
- Riser height: 5"
- Five-year warranty

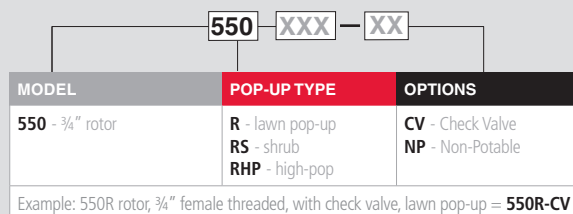
## MODELS

Model	Description
550R	3/4" inlet, 5" lawn pop-up
550RS	3/4" inlet, shrub
550RHP	3/4" inlet, 12" high-pop
550R-CV	3/4" inlet, 5" lawn pop-up w/check valve
550R-NP	3/4" inlet, 5" high-pop w/non-potable cover

## OPTIONAL ACCESSORIES

- Recycled-water indicator cover (purple)
- Field-installable check valve

## SPECIFYING INFORMATION



## SAVE VALUABLE SET-UP TIME





# PLATINUM SPORT SERIES POP-UP ROTOR

**1" GEAR-DRIVEN ROTOR**



**T**he Irritrol® Platinum Sport Series rotor is designed for reliable performance and superior coverage in light commercial and commercial applications. A full 5 ¾-inch pop-up height provides superior coverage in tall grass, while full- and part-circle operation in one unit reduces inventory requirements and increases convenience. Add to this a choice of seven nozzle sizes and it's easy to see why the Platinum Sport Series is quickly becoming an industry favorite.

## KEY FEATURES & BENEFITS

### **FULL 5-INCH POP-UP HEIGHT TO NOZZLE**

Provides interference-free operation in tall grass

### **REVERSIBLE CHECK VALVE**

Eliminates low-head drainage

### **STANDARD RUBBER COVER**

Provides added protection against debris and keeps playing areas safe

### **ARCVIEW ARC INDICATOR**

Simplifies adjustments

### **ADJUSTABLE PART-CIRCLE AND UNIDIRECTIONAL FULL-CIRCLE COVERAGE IN ONE UNIT (45°-360°)**

Reduces inventory requirements

### **AUTOMATIC ARC RETURN**

Protects against tampering and vandalism

### **WATER-LUBRICATED GEAR DRIVE ASSEMBLY**

Enhances reliability

### **TOP ADJUST, WET OR DRY**

For fast, convenient installation

### **OPTIONAL STAINLESS STEEL RISER**

Helps to deter vandalism and provides longer life



## PERFORMANCE DATA

### Platinum Sport Rotor

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. ■ in/h	Precip. ▲ in/h
7	50	49	7.4	0.59	0.69
	60	50	8.1	0.62	0.72
	70	51	8.8	0.65	0.75
	80	53	9.4	0.64	0.74
	90	53	10.3	0.71	0.82
	100	55	10.7	0.68	0.79
9	50	51	8.3	0.61	0.71
	60	52	8.7	0.62	0.72
	70	53	9.4	0.64	0.74
	80	54	9.9	0.65	0.75
	90	55	10.9	0.69	0.80
	100	56	11.5	0.71	0.82
12	50	51	11.6	0.86	0.99
	60	53	12.7	0.87	1.00
	70	54	13.8	0.91	1.05
	80	55	14.7	0.94	1.08
	90	56	15.6	0.96	1.11
	100	57	16.5	0.98	1.13
16	50	56	15.1	0.93	1.07
	60	59	16.2	0.90	1.03
	70	61	17.5	0.91	1.05
	80	61	18.8	0.97	1.12
	90	63	20.0	0.97	1.12
	100	63	21.1	1.02	1.18
20	50	58	17.5	1.00	1.16
	60	61	19.5	1.01	1.16
	70	61	20.6	1.07	1.23
	80	65	22.2	1.01	1.17
	90	67	23.6	1.01	1.17
	100	67	24.8	1.06	1.23
24	50	60	17.5	0.94	1.08
	60	63	19.3	0.94	1.09
	70	65	20.7	0.94	1.09
	80	67	22.3	0.96	1.10
	90	67	23.8	1.02	1.18
	100	71	25.3	0.97	1.12
27	50	65	23.4	1.07	1.23
	60	73	23.6	0.85	0.98
	70	75	25.8	0.88	1.02
	80	77	27.4	0.89	1.03
	90	78	29.1	0.92	1.06
	100	79	30.6	0.94	1.06

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

Note: Data collected in zero wind conditions



Nozzle Tree & Tool

## ADDED FEATURES

- Threaded cap-retained riser assembly
- Variable reversing stator
- Seven nozzle sizes (7-27 GPM)
- Small 2.2-inch exposed surface diameter
- Optional recycled-water indicator cover
- Nozzle support/breakup screw
- Riser pull-up feature on top of nozzle base
- Adjustment/pull up tool supplied
- Locking cap screw
- Five-year warranty

## OPERATING SPECIFICATIONS

- Precipitation rate: .30 -.55 inches per hour
- Radius: 49'-79'
- Flow rate: 7.4-30.6 GPM
- Recommended operating pressure range: 40-100 psi
- Optimum operating pressure: 70 psi
- Inlet size: 1" threaded NPT or 1" BSP
- Nozzle trajectory: 25°
- Arc adjustment: 45°-360° (unidirectional at 360°)

## DIMENSIONS

- Pop-up height to nozzle: 5"
- Body height: 8.8"
- Rubber cover diameter: 2.2"
- Body diameter: 2.7"

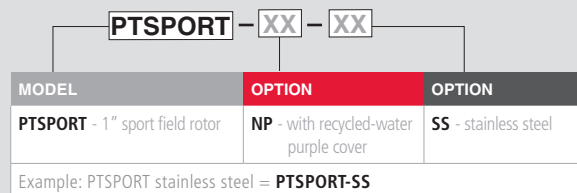
## MODELS

Model	Description
PTSPORT	1" inlet sport field rotor
PTSPORT-SS	1" inlet, stainless steel sport field rotor
PTSPORT-NP	1" inlet sport field rotor w/recycled purple cover
PTSPORT-NP-SS	1" inlet stainless steel with recycle purple cover

## OPTIONAL ACCESSORIES

- Recycled-water indicator cover (purple)

## SPECIFYING INFORMATION








## INDICATOR FEATURE

Top arc indicator allows you to see the arc setting, saving valuable set up time



# SPRAY HEADS & NOZZLES

Quite simply—our spray heads pop up, do their job, then disappear. Just like they're supposed to. And they do it year after year, season after season. Durable construction makes Irritrol® spray heads extremely reliable. And their design makes them easy to install and use.

AT-A-GLANCE						
		I-PRO SERIES	SL SERIES	I-PRO NOZZLES	PRO-VAN NOZZLES	SPECIALTY NOZZLES
		pgs 82-83	pgs 84-85	pgs 86-87	pgs 88-89	pgs 87
POP-UP HEIGHT	2"		●			
	3"	●				
	4"	●	●			
	6"	●	●			
	12"	●				
FEATURES	SIDE INLET	● (6" and 12" models)				
	CHECK VALVE OPTION	●	● (Field-installable)			
	PRESSURE REGULATOR OPTION	● (Excluding 3" model)				
	PRE-INSTALLED NOZZLE OPTION		● (Excluding 2 & 6" models)			
	RECYCLED WATER OPTION	● (Field-installable)				
RADIUS				5', 8', 10', 12', 15'	8', 10', 12', 15', 17'	Specialty
ARC				1/4, 1/3, 1/2, 2/3, 3/4, Full*	Adjustable	9-EST, 9-CST, 9-SST, 15-EST, 15-CST, 15-SST
FLOW RANGE				.06-4.75 GPM	.53-4.60 GPM	.41-1.35 GPM
RECOMMENDED OPERATING PRESSURE				20-50 psi	20-50 psi	20-40 psi

\* 2/3 and 3/4 arcs not available in 5', 8' and 10' nozzles



Irritrol's new I-PRO™ Series spray heads combine a pressure-activated wiper seal and advanced formula lubricant that virtually eliminates troublesome stick ups. Add a unique tapered lip design that prevents debris from entering the body and you have a spray head with superior performance. It's rugged and reliable with a textured body style for a non-slip grip and even easier installation. I-PRO offers a 4", 6" and 12" replacement spray head that allows a complete retrofit without having to purchase the body – it even fits the Rain Bird® 1800® Series body. Available in four pop-up heights with side inlet, pressure regulation and check valve options, the I-PRO Series fits most landscape applications.

## KEY FEATURES & BENEFITS

### **PRESSURE-ACTIVATED SEAL WITH LUBRICANT ADDITIVE**

Cleans debris from stem, reduces flow-by during pop-up and prevents leaking between cap and body. Extra lubricant additive further eliminates stick-ups

### **PRE-INSTALLED IN-RISER PRESSURE REGULATOR (OPTIONAL)**

Maintains optimum nozzle performance at 30 psi and eliminates misting in varying pressure applications

### **PRE-INSTALLED CHECK VALVE (OPTIONAL)**

Prevents low-head drainage, eliminating flood or erosion damage by keeping water in lateral pipes in elevation changes up to 14'

### **RETROFITTABLE RISER**

Fits Rain Bird 1800 Series body

### **STURDY AND ROBUST, TEXTURED BODY**

Provides for easy installation with a non-slip grip

### **SIDE AND BOTTOM INLETS ON 6" AND 12" MODELS**

**(6" ALSO AVAILABLE IN NON-SIDE INLET)**

Reduces installation time

### **HEAVY-DUTY, STAINLESS STEEL RETRACTION SPRING**

Ensures positive pop-down

### **MALE-THREADED RISER**

Compatible with any female-threaded nozzle in the industry

### **PRE-INSTALLED FLUSH PLUG**

Makes system flushing a breeze and allows for easy nozzle installation

### **RATCHETING RISER**

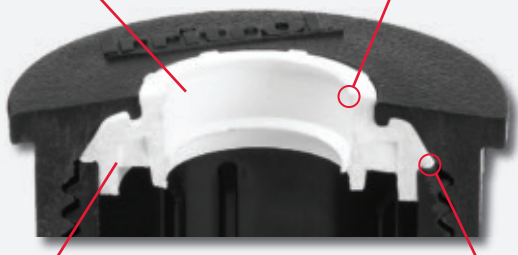
Two-piece mechanism permits easy arc adjustment in the field while sprinkler is operating



## SUPERIOR PERFORMING WIPER SEAL

Additional lubricant additive further eliminates stick-ups

Tapered lip design prevents the intrusion of debris



Pressure-activated lip seal ensures a positive seal around the riser and reduces "flow-by"

Lip creates positive seal to prevent body to cap leaks

## REPLACEMENT SPRAY AVAILABLE (4", 6" AND 12" ONLY)

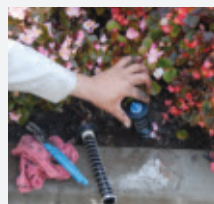
Why pay for a body you're just going to throw away? I-PRO offers a 4", 6" and 12" replacement spray head that is everything but the body! Ideal for maintenance, this spray head also fits right in the can of the Rain Bird® 1800 Series for an easy retrofit. With features that are contractor-driven and field-proven, the I-PRO Series is sure to save you time and money.



Easily retrofits to Rain Bird 1800 Series



Remove the "guts" of 1806 spray head



Drop in I-PRO replacement and retrofit is complete

## COMPLETE FAMILY OFFERING

Available in four pop-up heights with side inlet, pressure regulation and check valve options, I-PRO is a spray series for most landscape applications.



## SPECIFYING INFORMATION

MODEL	HEIGHT	SIDE INLET	OPTIONS
I-PRO - I-PRO pop-up spray head series	300 - 3" 400 - 4" 400R - 4", less body 600 - 6" 600R - 6", less body 1200 - 12" 1200R - 12", less body	SI - Side inlet	CV - Pre-installed check valve PR - Pre-installed pressure regulator PR-CV - Pre-installed pressure regulator and check valve
Example: An I-PRO Series sprinkler with a 6" pop-up height, side inlet, pressure regulation option and check valve = <b>I-PRO600-SI-PR-CV</b>			

## SPECIFICATIONS

- Inlet size: 1/2" female NPT threads
- Exposed diameter: 2 1/4"
- Body diameter: 1 5/8"
- Body height:
  - I-PRO300: 4 7/8"
  - I-PRO400: 5 5/8"
  - I-PRO600: 9 1/4"
  - I-PRO1200: 16"
- Side inlet: 4 3/8" from center of side inlet to top of cap
- Recommended working pressure:
  - Standard: 20-50 psi (max 75 psi)
  - CV: 25-50 psi (max 75 psi)
  - PR: 30-70 psi (max 75 psi)
- Precipitation rate:
  - Spacing: 4' - 15'
  - Flow-by: 0 at 10 psi or greater; .1 GPM otherwise
- Five-year warranty

## MODELS

Model	Description
I-PRO300	3" Pop-Up
I-PRO400	4" Pop-Up
I-PRO400-CV	4" Pop-Up w/Check Valve
I-PRO400-PR	4" Pop-Up w/Pressure Regulator
I-PRO400-PR-CV	4" Pop-Up w/Pressure Regulator and Check Valve
I-PRO600	6" Pop-Up
I-PRO600-CV	6" Pop-Up w/Check Valve
I-PRO600-PR	6" Pop-Up w/Pressure Regulator
I-PRO600-PR-CV	6" Pop-Up w/Pressure Regulator and Check Valve
I-PRO600-SI	6" Pop-Up w/Side Inlet
I-PRO600-SI-PR	6" Pop-Up w/Side Inlet and Pressure Regulator
I-PRO1200-SI	12" Pop-Up w/Side Inlet
I-PRO1200-SI-CV	12" Pop-Up w/Side Inlet and Check Valve
I-PRO1200-SI-PR	12" Pop-Up w/Side Inlet and Pressure Regulator
I-PRO1200-SI-PR-CV	12" Pop-Up w/Side Inlet, Pressure Regulator and Check Valve
I-PRO400R	4" Pop-Up Replacement
I-PRO400R-CV	4" Pop-Up Replacement w/Check Valve
I-PRO400R-PR	4" Pop-Up Replacement w/Pressure Regulator
I-PRO400R-PR-CV	4" Pop-Up Replacement w/Pressure Regulator and Check Valve
I-PRO600R	6" Pop-Up Replacement
I-PRO600R-CV	6" Pop-Up Replacement w/Check Valve
I-PRO600R-PR	6" Pop-Up Replacement w/Pressure Regulator
I-PRO600R-PR-CV	6" Pop-Up Replacement w/Pressure Regulator and Check Valve
I-PRO1200R	12" Pop-Up Replacement
I-PRO1200R-CV	12" Pop-Up Replacement w/Check Valve
I-PRO1200R-PR	12" Pop-Up Replacement w/Pressure Regulator
I-PRO1200R-PR-CV	12" Pop-Up Replacement w/Pressure Regulator and Check Valve

## OPTIONAL ACCESSORIES

- Recycled-water indicator cap (I-PRO-NPC)
- Field-installable check valve (I-PRO-CV)



The Irritrol® SL Series family of spray heads offers contractors exceptional flexibility, convenience and reliability at an affordable price. Ideal for residential and light commercial applications, the SL Series features a compact, slimline body with 2-, 4- and 6-inch pop-up heights. For added convenience and flexibility, the 4-inch SL Series models may be ordered with or without pre-installed Irritrol Pro-VAN Nozzles. In addition, a field-installable check valve is available to prevent low-head drainage.

## KEY FEATURES & BENEFITS

**PRE-INSTALLED PLASTIC VARIABLE ARC NOZZLES (PRO-VAN)  
AVAILABLE IN FOUR RADII – 10', 12', 15' AND 17'**

To reduce set and labor time (pre-installed nozzles not offered in 2" and 6" models)

**COMPACT, SLIMLINE BODY**

Makes installation simple

**PRESSURE-ACTIVATED SEAL**

Reduces flow-by during pop-up and keeps debris away from stem during retraction

**HEAVY-DUTY, STAINLESS STEEL RETRACTION SPRING**

Ensures positive pop-down

**MALE-THREADED RISER**

Compatible with all female-threaded nozzles

**RATCHETING RISER**

Permits easy arc adjustment in the field while sprinkler is operating

## COMPLETE FAMILY OFFERING



\*2" and 6" spray head bodies sold without pre-installed nozzles



### SL-CV (SL CHECK VALVE)

For protection against low-head drainage. Also reduces water waste and erosion.

## SPECIFYING INFORMATION

MODEL	HEIGHT	VAN NOZZLE RADIUS
SL - SL pop-up spray head series	2 - 2" height 4 - 4" height 6 - 6" height	00 - without nozzle 10 - 10' radius 12 - 12' radius 15 - 15' radius 17 - 17' radius

Example: A SL Series sprinkler with a 4" pop-up height and 15' nozzle = **SL415**

## ADDED FEATURES

- Adjustable arc patterns from 0° to 360° add flexibility
- Debris labels on models without nozzles ensure easy flushing
- One-piece molded body adds durability
- Removable nozzle, screen and internal components make flushing and servicing easy
- Small diameter cover ensures more attractive landscaping
- Three-year warranty

## SPECIFICATIONS

- Recommended working pressure: 20-50 psi
- Precipitation rate: .97 –4.69 inches per hour
- Spacing:
  - 10' VAN: 8'-13'
  - 12' VAN: 9'-14'
  - 15' VAN: 12'-17'
  - 17' VAN: 13'-18'
- Flow-by: 0 at 10 psi or greater; .5 GPM otherwise
- Inlet size: 1/2" female NPT threads
- Exposed diameter: 1 1/4"
- Body height:
  - SL200: 4 1/8"
  - SL400: 6 1/8"
  - SL600: 8 3/8"

## MODELS

Model	Description
SL200	2" Pop-Up w/o nozzle
SL400	4" Pop-Up w/o nozzle
SL410	4" Pop-Up with 10' Pro-VAN nozzle
SL412	4" Pop-Up with 12' Pro-VAN nozzle
SL415	4" Pop-Up with 15' Pro-VAN nozzle
SL417	4" Pop-Up with 17' Pro-VAN nozzle
SL600	6" Pop-Up w/o nozzle

## OPTIONAL ACCESSORIES

- Field-installable check valve (SL-CV) holds back up to 7 feet of elevation change and prevents low-head drainage



# I-PRO™ NOZZLES SERIES

## MPR NOZZLES



Irritrol's new I-PRO™ nozzles with Matched Precipitation Rate are designed to simplify your design process while delivering the precision performance you've come to expect. An I-PRO MPR nozzle ensures even water distribution within an arc family allowing for accurate control of precipitation rate, radius and flow. Run-off and over-watering are both dramatically reduced. And compared to the competition, these I-PRO nozzles give an equal to or lower on-average precipitation and flow rate adding greater irrigation efficiency. Color-coded on top for quick radius identification, users will be able to easily verify proper nozzle installation – whether the system is on or off. Available in 5 radius sizes and 6 arc settings\*, I-PRO nozzles are female-threaded and include a ribbed-edge design for a non-slip grip. Compatible with all Irritrol spray heads as well as any male-threaded riser in the industry, Irritrol's newest nozzle series are just the right nozzles to get the job done.

## KEY FEATURES & BENEFITS

### MATCHED PRECIPITATION RATES

Ensures even water distribution within each family

### LOW-FLOW RATES

Allow for more sprinklers to be installed on the same zone

### COLOR-CODED TOP

For quick and easy radius identification

### FEMALE-THREADED

Compatible with any male-threaded riser in the industry

### RIBBED-EDGE DESIGN

Provides for a non-slip grip



\*5', 8' and 10' nozzles are not available in TT and TQ arc settings



## PERFORMANCE DATA

### 5' Series with 0° Trajectory

Nozzle	Pressure psi	Radius ft.	GPM	Precip. in/h	Precip. ▲ in/h
IPN-5F	20	4	0.27	1.62	1.87
	30	5	<b>0.41</b>	<b>1.58</b>	<b>1.82</b>
	40	6	0.49	1.30	1.50
	50	6	0.57	1.53	1.77
IPN-5H	20	4	0.11	1.27	1.46
	30	5	<b>0.20</b>	<b>1.54</b>	<b>1.78</b>
	40	6	0.24	1.29	1.49
IPN-5T	20	4	0.08	1.37	1.58
	30	5	<b>0.13</b>	<b>1.50</b>	<b>1.73</b>
	40	6	0.17	1.39	1.61
IPN-5Q	20	4	0.06	1.34	1.54
	30	5	<b>0.10</b>	<b>1.54</b>	<b>1.78</b>
	40	6	0.13	1.43	1.65
	50	6	0.17	1.78	2.06

### 8' Series with 5° Trajectory

Nozzle	Pressure psi	Radius ft.	GPM	Precip. in/h	Precip. ▲ in/h
IPN-8F	20	7	0.77	1.51	1.75
	30	8	<b>1.04</b>	<b>1.56</b>	<b>1.81</b>
	40	9	1.21	1.43	1.66
	50	9	1.35	1.61	1.86
	20	7	0.38	1.51	1.75
IPN-8H	30	8	<b>0.52</b>	<b>1.56</b>	<b>1.81</b>
	40	9	0.60	1.43	1.66
	50	9	0.68	1.61	1.86
	20	7	0.26	1.54	1.77
IPN-8T	30	8	<b>0.34</b>	<b>1.53</b>	<b>1.77</b>
	40	9	0.41	1.45	1.68
	50	9	0.45	1.62	1.87
IPN-8Q	20	7	0.18	1.45	1.67
	30	8	<b>0.26</b>	<b>1.56</b>	<b>1.81</b>
	40	9	0.28	1.34	1.55
50	9	0.31	1.49	1.72	

### 10' Series with 12° Trajectory

Nozzle	Pressure psi	Radius ft.	GPM	Precip. in/h	Precip. ▲ in/h
IPN-10F	20	9	1.22	1.45	1.68
	30	10	<b>1.64</b>	<b>1.58</b>	<b>1.82</b>
	40	11	1.77	1.41	1.63
	50	12	2.04	1.36	1.57
IPN-10H	20	9	0.68	1.63	1.88
	30	10	<b>0.81</b>	<b>1.56</b>	<b>1.80</b>
	40	11	0.97	1.54	1.78
IPN-10T	20	9	0.43	1.53	1.76
	30	10	<b>0.53</b>	<b>1.53</b>	<b>1.77</b>
	40	11	0.66	1.58	1.83
IPN-10Q	20	9	0.30	1.43	1.65
	30	10	<b>0.40</b>	<b>1.54</b>	<b>1.78</b>
	40	11	0.50	1.59	1.84
50	12	0.60	1.60	1.85	

### 12' Series with 23° Trajectory

Nozzle	Pressure psi	Radius ft.	GPM	Precip. in/h	Precip. ▲ in/h
IPN-12F	20	11	1.74	1.38	1.60
	30	12	<b>2.28</b>	<b>1.52</b>	<b>1.76</b>
	40	13	2.45	1.39	1.61
	50	13	2.81	1.60	1.85
IPN-12TQ	20	11	1.17	1.23	1.42
	30	12	<b>1.72</b>	<b>1.53</b>	<b>1.77</b>
	40	13	1.83	1.39	1.60
IPN-12TT	20	11	1.20	1.43	1.65
	30	12	<b>1.55</b>	<b>1.55</b>	<b>1.79</b>
	40	13	1.74	1.49	1.72
IPN-12H	20	11	1.00	1.59	1.84
	30	12	<b>1.15</b>	<b>1.54</b>	<b>1.78</b>
	40	13	1.37	1.56	1.80
IPN-12T	20	11	0.59	1.42	1.64
	30	12	<b>0.75</b>	<b>1.50</b>	<b>1.74</b>
	40	13	0.91	1.55	1.79
IPN-12Q	20	11	0.46	1.45	1.68
	30	12	<b>0.57</b>	<b>1.52</b>	<b>1.76</b>
	40	13	0.68	1.56	1.80
50	13	0.72	1.64	1.89	

### 15' Series with 27° Trajectory

Nozzle	Pressure psi	Radius ft.	GPM	Precip. in/h	Precip. ▲ in/h
IPN-15F	20	14	2.95	1.45	1.67
	30	15	<b>3.73</b>	<b>1.60</b>	<b>1.84</b>
	40	16	4.35	1.64	1.89
	50	16	4.75	1.78	2.06
IPN-15TQ	20	14	2.23	1.46	1.68
	30	15	<b>2.76</b>	<b>1.57</b>	<b>1.81</b>
	40	16	3.18	1.59	1.84
IPN-15TT	20	14	1.95	1.44	1.66
	30	15	<b>2.41</b>	<b>1.55</b>	<b>1.79</b>
	40	16	2.91	1.64	1.90
IPN-15H	20	14	1.51	1.48	1.71
	30	15	<b>1.82</b>	<b>1.56</b>	<b>1.80</b>
	40	16	2.23	1.68	1.93
IPN-15T	20	14	1.03	1.51	1.75
	30	15	<b>1.19</b>	<b>1.53</b>	<b>1.76</b>
	40	16	1.41	1.59	1.83
IPN-15Q	20	14	0.73	1.43	1.65
	30	15	<b>0.91</b>	<b>1.56</b>	<b>1.80</b>
	40	16	1.11	1.67	1.93
50	16	1.32	1.98	2.29	

■ Square spacing based on 50% diameter of throw  
▲ Triangle spacing based on 50% diameter of throw

## Specialty Nozzles

### 9' Series with 20° Trajectory

Nozzle	Pressure psi	W x L ft.	Flow GPM
IPN-9EST	20	3 x 8	0.41
	30	<b>4 x 9</b>	<b>0.45</b>
	40	5 x 10	0.48
IPN-9CST	20	3 x 16	0.85
	30	<b>4 x 18</b>	<b>0.90</b>
IPN-9SST	20	3 x 16	0.85
	30	<b>4 x 18</b>	<b>0.90</b>
	40	5 x 20	0.97

### 15' Series with 21° Trajectory

Nozzle	Pressure psi	W x L ft.	Flow GPM
IPN-15EST	20	3 x 14	0.52
	30	<b>4 x 15</b>	<b>0.61</b>
	40	5 x 17	0.70
IPN-15CST	20	3 x 28	1.10
	30	<b>4 x 30</b>	<b>1.21</b>
IPN-15SST	20	3 x 28	1.10
	30	<b>4 x 30</b>	<b>1.21</b>
40	5 x 32	1.35	

## ADDED FEATURES

- Stainless steel radius adjustment screw allows for up to 25% in-field reduction
- Five-year warranty

## SPECIFICATIONS

- Flow rate: .06-4.75 GPM
- Recommended operating pressure range: 20-50 psi
- Maximum operating pressure range: 75 psi

## MODELS

Model	Description
IPN-5F	360° Arc
IPN-5H	180° Arc
IPN-5T	120° Arc
IPN-5Q	90° Arc
IPN-8F	360° Arc
IPN-8H	180° Arc
IPN-8T	120° Arc
IPN-8Q	90° Arc
IPN-10F	360° Arc
IPN-10H	180° Arc
IPN-10T	120° Arc
IPN-10Q	90° Arc
IPN-12F	360° Arc
IPN-12TQ	270° Arc
IPN-12TT	240° Arc
IPN-12H	180° Arc
IPN-12T	120° Arc
IPN-12Q	90° Arc
IPN-15F	360° Arc
IPN-15TQ	270° Arc
IPN-15TT	240° Arc
IPN-15H	180° Arc
IPN-15T	120° Arc
IPN-15Q	90° Arc

- IPN-9EST End strip, 4' x 9'
- IPN-9CST Center strip, 4' x 18'
- IPN-9SST Side strip, 4' x 18'
- IPN-15EST End strip, 4' x 15'
- IPN-15CST Center strip, 4' x 30'
- IPN-15SST Side strip, 4' x 18'

## SPECIFYING INFORMATION

IPN - XX - XXX

MODEL	RADIUS	ARC
IPN - I-PRO Nozzles Series	5 - 5'	Q - 90°
	8 - 8'	T - 120°
	9 - 9' *	H - 180°
	10 - 10'	TT - 240°
	12 - 12'	TQ - 270°
	15 - 15'	F - 360°
	EST - end strip	
	CST - center strip	
	SST - side strip	

Example: An I-PRO Series nozzle with a spray of 15', 180° arc = **IPN-15H**

**Note:** 5', 8' and 10' nozzles are not available in TT and TQ arc settings.

\* Specialty only



Featuring an exclusive “Smart Grip” head design that requires no tools, Irritrol® Pro-VAN nozzles provide the industry’s easiest 0° to 360° arc adjustment—even when wet—while ensuring precision adjustment for pinpoint coverage. No more dry spots on the lawn. No more wasted water on sidewalks or driveways. Pro-VANs are available in five radii, from 8 to 17 feet, and each allows for up to a 25 percent radius reduction for even further fine tuning. Plus, because each nozzle is compatible with all Irritrol spray heads, as well as any male-threaded riser in the industry, nozzle inventory can be dramatically reduced. Additional features include a visible left-stop arrow at the top of the nozzle to ensure setting accuracy and color-coding for easy radius identification.

## KEY FEATURES & BENEFITS

### FULLY ADJUSTABLE ARC FOR ALL NOZZLE SIZES – FROM 0° TO 360°

Reduces inventory by meeting the needs of any size or shape landscape

### PRECISION ADJUSTMENT

Eliminates dry spots on lawns and reduces water waste on sidewalks, etc.

### EXCLUSIVE “SMART GRIP” HEAD DESIGN

Requires no tools and provides the industry’s easiest arc adjustment – even when wet

### COMPATIBLE WITH ANY MALE-THREADED RISER IN THE INDUSTRY

Reduces inventory requirements

### VISIBLE LEFT-STOP ARROW ON TOP OF NOZZLE

Ensures setting accuracy

## PERFORMANCE DATA

### 8' Series with 5° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h	Precip. in/h
360°	20	8	1.72	2.59	2.99
	30	8	<b>2.13</b>	<b>3.20</b>	<b>3.70</b>
	40	9	2.48	3.73	4.31
	50	9	2.78	4.18	4.83
270°	20	8	1.36	2.73	3.15
	30	9	<b>1.65</b>	<b>3.31</b>	<b>3.82</b>
	40	9	1.89	3.79	4.38
180°	20	9	0.87	2.62	3.02
	30	9	<b>1.07</b>	<b>3.22</b>	<b>3.72</b>
	40	9	1.23	3.70	4.27
90°	20	9	1.38	4.15	4.79
	30	10	<b>0.64</b>	<b>3.85</b>	<b>4.45</b>
	40	10	0.72	4.33	5.00
50	10	0.78	4.69	5.42	

### 10' Series with 10° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h	Precip. in/h
360°	20	10	1.98	1.91	2.20
	30	10	<b>2.41</b>	<b>2.32</b>	<b>2.68</b>
	40	11	3.19	3.07	3.55
	50	12	3.59	3.46	3.99
270°	20	10	1.60	2.05	2.37
	30	11	<b>1.95</b>	<b>2.50</b>	<b>2.88</b>
	40	12	2.26	2.89	3.34
180°	20	10	1.13	2.18	2.51
	30	11	<b>1.38</b>	<b>2.66</b>	<b>3.07</b>
	40	12	1.58	3.04	3.51
90°	20	11	1.77	3.41	3.93
	30	12	<b>0.77</b>	<b>2.96</b>	<b>3.42</b>
	40	12	0.89	3.43	3.96
50	13	1.00	3.85	4.45	

### 12' Series with 15° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h	Precip. in/h
360°	20	11	2.26	1.51	1.74
	30	12	<b>2.79</b>	<b>1.86</b>	<b>2.15</b>
	40	13	3.20	2.14	2.47
	50	13	3.62	2.42	2.79
270°	20	11	1.85	1.65	1.90
	30	12	<b>2.29</b>	<b>2.04</b>	<b>2.36</b>
	40	13	2.64	2.35	2.72
180°	20	11	1.33	1.78	2.05
	30	12	<b>1.63</b>	<b>2.18</b>	<b>2.52</b>
	40	13	1.89	2.53	2.92
90°	20	14	2.12	2.83	3.27
	30	13	<b>0.93</b>	<b>2.49</b>	<b>2.87</b>
	40	14	1.06	2.83	3.27
50	14	1.21	3.24	3.74	

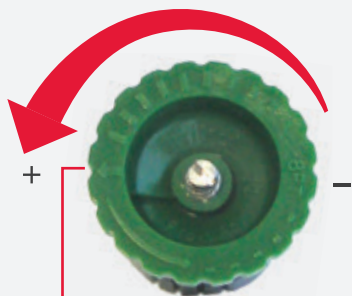
### 15' Series with 20° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h	Precip. in/h
360°	20	14	2.76	1.18	1.36
	30	15	<b>3.35</b>	<b>1.43</b>	<b>1.65</b>
	40	15	3.87	1.66	1.91
	50	16	4.31	1.84	2.13
270°	20	14	2.36	1.35	1.55
	30	15	<b>2.89</b>	<b>1.65</b>	<b>1.90</b>
	40	16	3.30	1.88	2.17
180°	20	14	1.70	1.45	1.68
	30	16	<b>2.09</b>	<b>1.79</b>	<b>2.06</b>
	40	16	2.42	2.07	2.39
90°	20	17	2.71	2.32	2.68
	30	16	<b>1.20</b>	<b>2.05</b>	<b>2.37</b>
	40	17	1.40	2.40	2.77
50	17	1.56	2.67	3.08	

### 17' Series with 26° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h	Precip. in/h
360°	20	14	2.90	0.97	1.12
	30	16	<b>3.60</b>	<b>1.20</b>	<b>1.38</b>
	40	17	4.10	1.37	1.58
	50	17	4.60	1.53	1.77
270°	20	14	2.50	1.11	1.28
	30	16	<b>3.10</b>	<b>1.38</b>	<b>1.59</b>
	40	17	3.60	1.60	1.85
180°	20	15	1.90	1.27	1.46
	30	17	<b>2.40</b>	<b>1.60</b>	<b>1.85</b>
	40	17	2.70	1.80	2.08
90°	20	18	3.00	2.00	2.31
	30	17	<b>1.50</b>	<b>2.00</b>	<b>2.31</b>
	40	18	1.70	2.26	2.62
50	18	1.90	2.53	2.92	

- Square spacing based on 50% diameter of throw
- ▲ Triangle spacing based on 50% diameter of throw



Top-visible arrow quickly indicates left edge of arc setting when adjusted

## ADDED FEATURES

- Color-coded for easy radius identification
- Pre-assembled at 0°
- Stainless steel radius adjustment screw allows for up to 25% radius reduction
- Five-year warranty

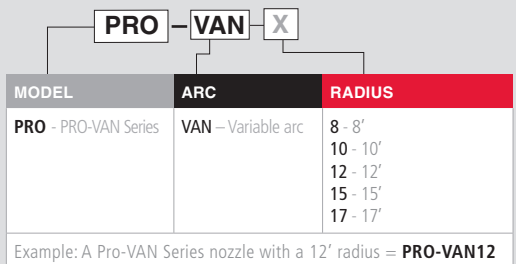
## SPECIFICATIONS

- Flow rate: 0.53 - 4.60 GPM
- Recommended operating pressure range: 20-50 psi
- Maximum operation range: 75 psi

## MODELS

Model	Description
PRO-VAN8	8' variable arc pattern
PRO-VAN10	10' variable arc pattern
PRO-VAN12	12' variable arc pattern
PRO-VAN15	15' variable arc pattern
PRO-VAN17	17' variable arc pattern

## SPECIFYING INFORMATION



## AVAILABLE IN 5 DIFFERENT RADII



# 533 BUBBLER



**D**esigned for localized watering of flower beds, roses, shrub areas and ground covers, Irritrol's 533 Bubbler is the only hand-adjustable flood bubbler that shuts down to a true zero flow.

## KEY FEATURES & BENEFITS

### **SIMPLE TWIST TOP FLOW ADJUSTMENT**

Easily adjusts by hand with no tools needed!

### **TRUE ZERO FLOW SHUT-OFF**

Allows for temporary maintenance needs

### **FULLY ADJUSTABLE ARC AND FLOW RATE**

For flexibility in precise watering needs

### **HEAVY-DUTY ABS MATERIAL**

Provides durability and long-lasting life

## SPECIFICATIONS

- Recommended working pressure: 20-40 psi
- Flow rate: 1.36-5.90 GPM
- Maximum operation pressure: 75 psi
- Inlet size: 1/2" female NPT threads
- Five-year warranty

## DIMENSIONS

- H: 1 1/8"
- Top diameter: 1 1/16"

## PERFORMANCE DATA

	90° Adjustment	180° Adjustment	270° Adjustment	360° Adjustment
psi	GPM	GPM	GPM	GPM
15	1.36	2.37	2.85	2.97
20	1.56	2.75	3.31	3.45
25	1.77	3.04	3.71	3.86
30	1.93	3.36	4.05	4.32
35	2.01	3.59	4.37	5.51
40	2.25	3.84	4.70	5.90



533 Bubbler



# HS100

## (SHRUB ADAPTER)

Designed for use with all Irritrol spray head nozzles in shrub and other low traffic areas.



HS100

### FEATURES

- Threads directly onto riser
- UV-treated for above-ground mount
- Manufactured of heavy-duty ABS
- Accepts all Irritrol nozzles and any other female-threaded nozzle
- Five-year warranty

### SPECIFICATIONS

- Inlet size: 1/2" female NPT threads.

# I-PRO-NPC

## (RECYCLED-WATER CAP)

Purple cap assembly (includes seal) replaces standard spray cap on I-PRO Series to easily identify non-potable water systems.



I-PRO-NPC

### FEATURES

- Threads onto all I-PRO Series spray head bodies as well as Rain Bird® 1800® Series bodies
- UV-resistant
- Manufactured of heavy-duty ABS material

# I-PRO-CV

## (I-PRO CHECK VALVE)

For use in I-PRO Series spray heads for protection against low-head drainage. Also reduces water waste and erosion.



I-PRO-CV

### FEATURES

- Field-installable
- Holds back up to 10' of elevation change
- One-piece molded plastic
- Manufactured of durable Alcryn® material

# SUPER BLUE FLEX™



## BLUE FLEX PIPE



EHF1295-010-D  
Flex pipe ½" 100', coil

**W**ith a strong product heritage and proven years of performance, this tubing is designed to simplify spray head installation making it ideal for challenging landscapes and hard-to-reach areas.

## KEY FEATURES & BENEFITS

### **DURABLE PREMIUM GRADE VIRGIN LINEAR, LOW-DENSITY POLYETHYLENE**

Achieves higher psi strength and performance over time vs. competitive products

### **HIGHLY FLEXIBLE**

For ease of use

### **EASILY UNWINDS FROM CENTER OF COIL**

For added convenience

## ADDED FEATURES

- Coils are shrink-wrapped for ease of handling
- Low-density design protects tubing from landscape
- Five-year warranty

## SPECIFICATIONS

- Maximum working pressure: 120 psi at 100° F
- Inside diameter: .49"
- Outside diameter: .68"
- Wall thickness: .095"
- Nominal size: .50"
- Coil size: 100'

# BLUE FLEX ASSEMBLIES



**A**vailable in two popular lengths, these sturdy, flexible assemblies protect spray head risers and pipes from breaking when hit or run over by equipment.

## KEY FEATURES & BENEFITS

### STANDARD 8-INCH LENGTH

Provides greater flexibility and strength than competitors' 6-inch models

### PRE-ASSEMBLED

Saves time and money

### TAPE-FREE FITTING INSTALLATION

Makes installation faster and easier

### FEWER THREADED JOINTS

Minimizes leaks

## ADDED FEATURES

- Easily adjusts sprinkler head to required grade
- Compatible for below-grade installation
- Five-year warranty

## SPECIFICATIONS

- Operating pressure range: 25-75 psi
- Maximum operating pressure: 85 psi
- Pressure-tested to 120 psi

## MODELS

Model	Description
B-FLEX8-05	8" x 1/2" male x 1/2" street ell
B-FLEX12-05	12" x 1/2" male x 1/2" street ell
B-FLEX8-0575	8" x 1/2" male x 3/4" street ell
B-FLEX12-0575	12" x 1/2" male x 3/4" street ell

## SPECIFYING INFORMATION

MODEL	LENGTH	FITTING
<b>B-FLEX</b> - Blue Flex swing assembly	8 - 8" 12 - 12"	<b>05</b> - 1/2" male x 1/2" street ell <b>0575</b> - 1/2" male x 3/4" street ell

Example: A 12" swing assembly with 3/4" street elbow = **B-FLEX12-0575**

## SUPER BLUE FLEX ASSEMBLY FRICTION LOSS DATA

MODELS	GPM FLOW						
	1	2	3	4	5	6	7
B-FLEX8-05	0.04	0.11	0.27	0.47	0.85	1.22	1.78
B-FLEX12-05	0.05	0.15	0.36	0.62	1.13	1.62	2.37
B-FLEX8-0575	0.05	0.14	0.31	0.60	1.07	1.65	2.29
B-FLEX12-0575	0.06	0.18	0.41	0.80	1.42	2.20	3.05

# BLUE FLEX FITTINGS



**U**sed with Super Blue Flex™ pipe for installation of spray head risers. Ideal for use in high-traffic areas.

## MODELS

- FFP-T 1/2" barbed tee
- FFP-75EM 3/4" male x 1/2" barb elbow
- FFP-50EM 1/2" male x 1/2" barb elbow
- FFP-C 1/2" barbed coupler
- Five-year warranty

# RESOURCES

We are here to help. From friction loss tables to wire sizing, we have all the stats you need to keep working hard.





# COMMUNICATIONS DIRECTORY

## IRRITROL HEADQUARTERS

**Phone:** 800-634-TURF (8873)

**Fax:** 800-862-8676

**Website:** [www.irritrol.com](http://www.irritrol.com)

## ORDER SERVICES

**Phone:** 800-883-1234

**Fax:** 800-883-5432

**email:** [orderservices@irritrol.com](mailto:orderservices@irritrol.com)

## CUSTOMER RESOURCE CENTER

At your service to provide literature, promotional and product information, and branch support, as well as answer any questions regarding doing business with Irritrol.

**Phone:** 800-634-TURF (8873)

**Fax:** 800-862-8676

**email:** [customer.resource.center@irritrol.com](mailto:customer.resource.center@irritrol.com)

## TECHNICAL SUPPORT

**Phone:** 800-634-TURF (8873)

**email:** [irrigationsupport@irritrol.com](mailto:irrigationsupport@irritrol.com)

## CONTROLLER REPAIR

**Phone:** 800-899-2058

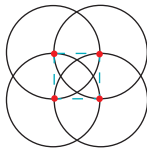
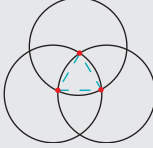
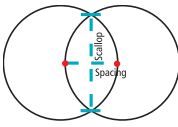
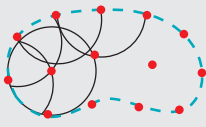
## RAINMASTER PRODUCT LINE

**Phone:** 800-777-1477

## FORMULAS

To Calculate:	U.S.	METRIC
<b>Precipitation Rates</b>		
Equilateral Triangular Spacing	P.R.= (in/hr) $\frac{(\text{gpm of 360}) \times 96.25}{(\text{Head spacing})^2 \times .866}$	P.R.= (mm/hr) $\frac{\text{m}^3/\text{hr of 360} \times 1000}{\text{m}^2 \times .866}$
Square/Rectangular Spacing	P.R.= (in/hr) $\frac{(\text{gpm of 360}) \times 96.25}{\text{Head spacing} \times \text{row spacing}}$	P.R.= (mm/hr) $\frac{\text{m}^3/\text{hr of 360} \times 1000}{\text{Head spacing} \times \text{row spacing}}$
Square/Rectangular Spacing for Specific Arc	P.R.= (in/hr) $\frac{(34650 \times \text{gpm (for any arc)})}{\text{Degrees of arc} \times \text{head spacing} \times \text{row spacing}}$	P.R.= (mm/hr) $\frac{\text{m}^3/\text{hr (for any arc)} \times 1000}{\text{Degrees of arc} \times \text{head spacing} \times \text{row spacing}}$
	H.P.= gpm x ft. of Head $\frac{3,900 \times \text{pump efficiency}}{(\text{expressed as a decimal})}$	
<b>Station Run Time</b>		
	S.R.T.= (min/wk) $\frac{\text{Total weekly req'd (inch/wk)} \times 60 \text{ (min/hr)}}{\text{Precipitation rate (in/hr)}}$	S.R.T.= (min/wk) $\frac{\text{Total weekly req'd (inch/wk)} \times 60 \text{ (min/hr)}}{\text{Precipitation rate (mm/hr)}}$
<b>Pipe Velocity</b>		
	V= (ft/sec) $\frac{0.4085 \times \text{Flow (GPM)}}{(\text{Inside pipe diameter in inches})^2}$	V= (m/sec) $\frac{1273.24 \times \text{Flow (l/sec)}}{(\text{Inside pipe diameter in millimeters})^2}$
<b>Scheduling Coefficient</b>		
	S.C.= $\frac{\text{Average precipitation rate (in/hr)}}{\text{Lowest precipitation rate (in/hr)}}$	S.C.= $\frac{\text{Average precipitation rate (mm/hr)}}{\text{Lowest precipitation rate (mm/hr)}}$
<b>Slope</b>		
	S = $\frac{\text{Rise (measure of length)}}{\text{Run (measure of length)}}$	

## SPRINKLER SPACING AND PRECIPITATION RATE FORMULAS

<p>Square-spaced sprinklers in pattern:</p> $\frac{\text{GPM of full circle} \times 96.3}{(\text{spacing})^2}$		<p>Square Spacing</p> <ul style="list-style-type: none"> <li>- No wind — 55% of diameter</li> <li>- 4 mph wind — 50% of diameter</li> <li>- 8 mph wind — 45% of diameter</li> </ul>
<p>Triangular-spaced sprinklers in pattern:</p> $\frac{\text{GPM of full circle} \times 96.3}{(\text{spacing})^2 (0.866)}$		<p>Triangular Spacing</p> <ul style="list-style-type: none"> <li>- No wind — 50% of diameter</li> <li>- 4 mph wind — 55% of diameter</li> <li>- 8 mph wind — 50% of diameter</li> </ul>
<p>Single row:</p> $\frac{\text{GPM of full circle} \times 96.3}{(\text{spacing}) (\text{scallop})}$		<p>Single-Row Spacing</p> <ul style="list-style-type: none"> <li>- No wind — 50% of diameter</li> <li>- 4 mph wind — 50% of diameter</li> <li>- 8 mph wind — 45% of diameter</li> </ul>
<p>Area and flow:</p> $\frac{\text{Total GPM of zone} \times 96.3}{\text{Total irrigated square feet of zone}}$		

Irritrol does not recommend designing for 0 mph wind conditions. Design in consideration of the worst wind conditions.

CONVERSION FACTORS

To Convert:	From	To	Multiply by
<b>AREA</b>	acres	feet <sup>2</sup>	43,560
	acres	meters <sup>2</sup>	4046.8
	meters <sup>2</sup>	feet <sup>2</sup>	10.764
	feet <sup>2</sup>	inches <sup>2</sup>	144
	inches <sup>2</sup>	centimeters <sup>2</sup>	6.452
	hectares	meters <sup>2</sup>	10,000
	hectares	acres	2.471
<b>POWER</b>	kilowatts	horsepower	1.3410
<b>FLOW</b>	feet <sup>3</sup> /minute	meters <sup>3</sup> /second	0.0004719
	feet <sup>3</sup> /second	meters <sup>3</sup> /second	.02832
	yards <sup>3</sup> /minute	meters <sup>3</sup> /second	.01274
	gallons/minute	meters <sup>3</sup> /hour	.22716
	gallons/minute	liters/minutes	3.7854
	gallons/minute	liters/second	.06309
	meters <sup>3</sup> /hour	liters/minute	16.645
	meters <sup>3</sup> /hour	liters/second	.2774
liters/minute	liters/second	60	
<b>LENGTH</b>	feet	inches	12
	inches	centimeters	2.540
	feet	meters	.30481
	kilometers	miles	.6214
	miles	feet	5,280
	miles	meters	1609.34
<b>PRESSURE</b>	millimeters	inch	.03937
	psi	kilopascals	6.89476
	psi	bars	.068948
	Bars	kilopascals	100
<b>VELOCITY</b>	psi	feet of head	2.31
	feet/second	meters/second	.3048
<b>VOLUME</b>	feet <sup>3</sup>	gallons	7.481
	feet <sup>3</sup>	liters	28.32
	meters <sup>3</sup>	feet <sup>3</sup>	35.31
	meters <sup>3</sup>	yard <sup>3</sup>	1.3087
	yards <sup>3</sup>	feet <sup>3</sup>	27
	yards <sup>3</sup>	gallons	202
	acres/feet	feet <sup>3</sup>	43,560
	gallons	meters <sup>3</sup>	.003785
	gallons	liters	3.785
	imperial gallons	gallons	1.833

FRICTION LOSS FORMULAS

**Friction Loss Tables are based upon the following:**

**Hazen-Williams Equation:**

$$H_f = (0.2083) (100 / C)^{1.852} (Q^{1.852} / D^{4.866})$$

(The result is multiplied by .433 to give psi loss for 100 feet of pipe)

**The velocity values were derived using the following:**

$$V = (0.408 \times Q_{gpm}) / d^2$$

(The average inside diameter of OD controlled pipe was based upon subtracting two times the minimum wall thickness plus one-half of the wall thickness tolerance from the outside diameter.)

- Pressure ratings for plastic pipes are based on 23° C or 73.4° F
- Head loss decreases (increases) approximately 1% for every 3 degrees F above (below) the reference temperature (73.4° F)











**FRICION LOSS CHARACTERISTICS**

**POLYETHYLENE (PE) PLASTIC PIPE ID CONTROLLED**

**Size:** ½" thru 4"      **Flow:** 1 thru 500GPM  
**PE 3408    ASTM D-2239    C=140    PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)**

size	½"		¾"		1"		1¼"		1½"		2"		2½"		3"		4"	
Avg.ID	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	1.05	0.49	0.60	0.12	0.37	0.04	0.21	0.01	0.16	0.00								
2	2.11	1.76	1.20	0.45	0.74	0.14	0.43	0.04	0.31	0.02	0.19	0.01						
3	3.16	3.73	1.80	0.95	1.11	0.29	0.64	0.08	0.47	0.04	0.29	0.01						
4	4.22	6.35	2.40	1.62	1.48	0.50	0.86	0.13	0.63	0.06	0.38	0.02	0.27	0.01				
5	5.27	9.60	3.00	2.44	1.85	0.76	1.07	0.20	0.79	0.09	0.48	0.03	0.33	0.01				
6	6.33	13.46	3.61	3.43	2.22	1.06	1.29	0.28	0.94	0.13	0.57	0.04	0.40	0.02	0.26	0.01		
7	7.38	17.91	4.21	4.56	2.60	1.41	1.50	0.37	1.10	0.18	0.67	0.05	0.47	0.02	0.30	0.01		
8	8.44	22.93	4.81	5.84	2.97	1.80	1.71	0.47	1.26	0.22	0.76	0.07	0.54	0.03	0.35	0.01		
9	9.49	28.52	5.41	7.26	3.34	2.24	1.93	0.59	1.42	0.28	0.86	0.08	0.60	0.03	0.39	0.01		
10	10.55	34.67	6.01	8.82	3.71	2.73	2.14	0.72	1.57	0.34	0.95	0.10	0.67	0.04	0.43	0.01		
12			7.21	12.37	4.45	3.82	2.57	1.01	1.89	0.48	1.15	0.14	0.80	0.06	0.52	0.02		
14			8.41	16.45	5.19	5.08	3.00	1.34	2.20	0.63	1.34	0.19	0.94	0.08	0.61	0.03		
16			9.61	21.07	5.93	6.51	3.43	1.71	2.52	0.81	1.53	0.24	1.07	0.10	0.69	0.04	0.40	0.01
18			10.82	26.21	6.67	8.10	3.86	2.13	2.83	1.01	1.72	0.30	1.20	0.13	0.78	0.04	0.45	0.01
20			12.02	31.85	7.42	9.84	4.28	2.59	3.15	1.22	1.91	0.36	1.34	0.15	0.87	0.05	0.50	0.01
22					8.16	11.74	4.71	3.09	3.46	1.46	2.10	0.43	1.47	0.18	0.95	0.06	0.55	0.02
24					8.90	13.79	5.14	3.63	3.78	1.72	2.29	0.51	1.61	0.21	1.04	0.07	0.60	0.02
26					9.64	16.00	5.57	4.21	4.09	1.99	2.48	0.59	1.74	0.25	1.13	0.09	0.65	0.02
28					10.38	18.35	6.00	4.83	4.41	2.28	2.67	0.68	1.87	0.28	1.21	0.10	0.70	0.03
30					11.12	20.85	6.43	5.49	4.72	2.59	2.86	0.77	2.01	0.32	1.30	0.11	0.76	0.03
32					11.86	23.50	6.86	6.19	5.04	2.92	3.06	0.87	2.14	0.36	1.39	0.13	0.81	0.03
34					12.61	26.29	7.28	6.92	5.35	3.27	3.25	0.97	2.28	0.41	1.47	0.14	0.86	0.04
36							7.71	7.69	5.67	3.63	3.44	1.08	2.41	0.45	1.56	0.16	0.91	0.04
38							8.14	8.50	5.98	4.02	3.63	1.19	2.54	0.50	1.65	0.17	0.96	0.05
40							8.57	9.35	6.30	4.42	3.82	1.31	2.68	0.55	1.73	0.19	1.01	0.05
42							9.00	10.24	6.61	4.83	4.01	1.43	2.81	0.60	1.82	0.21	1.06	0.06
44							9.43	11.16	6.93	5.27	4.20	1.56	2.94	0.66	1.91	0.23	1.11	0.06
46							9.86	12.12	7.24	5.72	4.39	1.70	3.08	0.71	1.99	0.25	1.16	0.07
48							10.28	13.11	7.56	6.19	4.58	1.84	3.21	0.77	2.08	0.27	1.21	0.07
50							10.71	14.14	7.87	6.68	4.77	1.98	3.35	0.83	2.17	0.29	1.26	0.08
55							11.78	16.87	8.66	7.97	5.25	2.36	3.68	0.99	2.38	0.35	1.38	0.09
60							12.85	19.82	9.44	9.36	5.73	2.77	4.02	1.17	2.60	0.41	1.51	0.11
65									10.23	10.86	6.21	3.22	4.35	1.36	2.82	0.47	1.64	0.13
70									11.02	12.45	6.68	3.69	4.69	1.55	3.03	0.54	1.76	0.14
75									11.81	14.15	7.16	4.19	5.02	1.77	3.25	0.61	1.89	0.16
80									12.59	15.95	7.64	4.73	5.35	1.99	3.47	0.69	2.01	0.18
85									13.38	17.84	8.12	5.29	5.69	2.23	3.68	0.77	2.14	0.21
90											8.59	5.88	6.02	2.48	3.90	0.86	2.27	0.23
95											9.07	6.50	6.36	2.74	4.12	0.95	2.39	0.25
100											9.55	7.15	6.69	3.01	4.33	1.05	2.52	0.28
110											10.50	8.53	7.36	3.59	4.77	1.25	2.77	0.33
120											11.46	10.02	8.03	4.22	5.20	1.47	3.02	0.39
130											12.41	11.62	8.70	4.89	5.63	1.70	3.27	0.45
140											13.37	13.33	9.37	5.61	6.07	1.95	3.52	0.52
150													10.04	6.38	6.50	2.22	3.78	0.59
160													10.71	7.19	6.94	2.50	4.03	0.67
170													11.38	8.04	7.37	2.79	4.28	0.74
180													12.05	8.94	7.80	3.11	4.53	0.83
190													12.72	9.88	8.24	3.43	4.78	0.92
200													13.39	10.87	8.67	3.78	5.03	1.01
220															9.54	4.50	5.54	1.20
240															10.40	5.29	6.04	1.41
260															11.27	6.14	6.54	1.64
280															12.14	7.04	7.05	1.88
300															13.00	8.00	7.55	2.13
320															13.87	9.02	8.05	2.40
340																	8.56	2.69
360																	9.06	2.99
380																	9.57	3.30
400																	10.07	3.63
420																	10.57	3.98
440																	11.08	4.33
460																	11.58	4.71
480																	12.08	5.09
500																	12.59	5.49

Shaded area represents velocities over 5 fps.  
 Use with caution.

See pg 93 for friction loss formulas



FRICITION LOSS CHARACTERISTICS

TYPE 'K' COPPER TUBING

Size: 1/2" thru 3" Flow: 1 thru 600GPM  
 ASTM B 88 C=140 PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	
Avg.ID	0.527	0.652	0.745	0.995	1.245	1.481	1.959	2.435	2.907	
Pipe OD	0.625	0.750	0.875	1.125	1.375	1.625	2.125	2.625	3.125	
Avg Wall	0.049	0.049	0.065	0.065	0.065	0.072	0.083	0.095	0.109	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	1.47	1.09	0.96	0.39	0.74	0.20	0.41	0.05	0.26	0.02
2	2.94	3.94	1.92	1.40	1.47	0.73	0.82	0.18	0.53	0.06
3	4.41	8.35	2.88	2.97	2.21	1.55	1.24	0.38	0.79	0.13
4	5.88	14.23	3.84	5.05	2.94	2.64	1.65	0.65	1.05	0.22
5	7.35	21.51	4.80	7.64	3.68	3.99	2.06	0.98	1.32	0.33
6	8.81	30.15	5.76	10.70	4.41	5.59	2.47	1.37	1.58	0.46
7	10.28	40.12	6.72	14.24	5.15	7.44	2.88	1.82	1.84	0.61
8	11.75	51.37	7.68	18.24	5.88	9.53	3.30	2.33	2.11	0.78
9	13.22	63.90	8.64	22.68	6.62	11.85	3.71	2.90	2.37	0.97
10	14.69	77.66	9.60	27.57	7.35	14.41	4.12	3.52	2.63	1.18
12			11.52	38.64	8.82	20.20	4.95	4.94	3.16	1.66
14			13.44	51.41	10.29	26.87	5.77	6.57	3.69	2.21
16			15.36	65.83	11.76	34.41	6.59	8.42	4.21	2.83
18			17.28	81.88	13.23	42.80	7.42	10.47	4.74	3.52
20					14.70	52.02	8.24	12.72	5.26	4.28
22					16.17	62.06	9.07	15.18	5.79	5.10
24					17.64	72.91	9.89	17.84	6.32	5.99
26							10.71	20.69	6.84	6.95
28							11.54	23.73	7.37	7.97
30							12.36	26.96	7.90	9.06
32							13.19	30.39	8.42	10.21
34							14.01	34.00	8.95	11.42
36							14.84	37.79	9.48	12.70
38							15.66	41.77	10.00	14.04
40							16.48	45.94	10.53	15.43
42							17.31	50.28	11.06	16.89
44									11.58	18.41
46									12.11	19.99
48									12.63	21.63
50									13.16	23.33
55									14.48	27.84
60									15.79	32.70
65									17.11	37.93
70									18.43	43.51
75									13.95	21.24
80									14.88	23.94
85									15.81	26.79
90									16.74	29.78
95									17.67	32.91
100									18.60	36.19
110									11.69	11.07
120									12.76	13.01
130									13.82	15.08
140									14.88	17.30
150									15.95	19.66
160									17.01	22.16
170									18.07	24.79
180										12.39
190										13.07
200										13.76
220										15.14
240										16.51
260										17.89
280										19.27
300										21.68
320										
340										
360										
380										
400										
420										
440										
460										
480										
500										

Shaded area represents velocities over 7 fps. Use with caution, where water hammer is a concern.

See pg 93 for friction loss formulas

FRICITION LOSS

**FRICION LOSS CHARACTERISTICS**

**TYPE 'L' COPPER TUBING**

**Size:** 1/2" thru 3"      **Flow:** 1 thru 500GPM  
**C=140 PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)**

size	1/2"		5/8"		3/4"		1"		1"		1 1/2"		2"		2 1/2"		3"	
Avg.ID	0.545	0.666	0.785	1.025	1.265	1.505	1.985	2.465	2.945									
Pipe OD	0.625	0.750	0.875	1.125	1.375	1.625	2.125	2.625	3.125									
Avg Wall	0.040	0.042	0.045	0.050	0.055	0.060	0.070	0.080	0.090									
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	1.37	0.93	0.92	0.35	0.66	0.16	0.39	0.04	0.25	0.02								
2	2.75	3.35	1.84	1.26	1.32	0.57	0.78	0.15	0.51	0.06								
3	4.12	7.09	2.76	2.67	1.99	1.20	1.17	0.33	0.76	0.12								
4	5.49	12.09	3.68	4.56	2.65	2.05	1.55	0.56	1.02	0.20								
5	6.87	18.27	4.60	6.89	3.31	3.09	1.94	0.85	1.27	0.30								
6	8.24	25.61	5.52	9.65	3.97	4.34	2.33	1.18	1.53	0.43	1.08	0.18						
7	9.62	34.07	6.44	12.84	4.63	5.77	2.72	1.58	1.78	0.57	1.26	0.24						
8	10.99	43.63	7.36	16.45	5.30	7.39	3.11	2.02	2.04	0.72	1.44	0.31						
9	12.36	54.26	8.28	20.45	5.96	9.19	3.50	2.51	2.29	0.90	1.62	0.39						
10	13.74	65.95	9.20	24.86	6.62	11.17	3.88	3.05	2.55	1.10	1.80	0.47						
12			11.04	34.85	7.95	15.66	4.66	4.28	3.06	1.54	2.16	0.66	1.24	0.17				
14			12.88	46.36	9.27	20.83	5.44	5.69	3.57	2.04	2.52	0.88	1.45	0.23				
16			14.72	59.37	10.59	26.68	6.21	7.28	4.08	2.62	2.88	1.12	1.66	0.29				
18			16.56	73.84	11.92	33.18	6.99	9.06	4.59	3.25	3.24	1.40	1.86	0.36				
20					13.24	40.33	7.77	11.01	5.10	3.96	3.60	1.70	2.07	0.44				
22					14.57	48.11	8.54	13.14	5.61	4.72	3.96	2.03	2.28	0.53	1.48	0.18	1.03	0.08
24					15.89	56.53	9.32	15.44	6.12	5.55	4.32	2.38	2.49	0.62	1.61	0.22	1.13	0.09
26							10.10	17.90	6.63	6.43	4.68	2.76	2.69	0.72	1.75	0.25	1.22	0.11
28							10.87	20.54	7.14	7.38	5.04	3.17	2.90	0.82	1.88	0.29	1.32	0.12
30							11.65	23.33	7.65	8.38	5.40	3.60	3.11	0.94	2.01	0.33	1.41	0.14
32							12.43	26.30	8.16	9.45	5.76	4.06	3.31	1.05	2.15	0.37	1.51	0.15
34							13.20	29.42	8.67	10.57	6.12	4.54	3.52	1.18	2.28	0.41	1.60	0.17
36							13.98	32.71	9.18	11.75	6.48	5.05	3.73	1.31	2.42	0.46	1.69	0.19
38							14.76	36.15	9.69	12.99	6.84	5.58	3.93	1.45	2.55	0.51	1.79	0.21
40							15.53	39.75	10.20	14.28	7.21	6.13	4.14	1.59	2.69	0.56	1.88	0.23
42							16.31	43.51	10.71	15.63	7.57	6.71	4.35	1.75	2.82	0.61	1.98	0.26
44									11.22	17.04	7.93	7.32	4.56	1.90	2.95	0.66	2.07	0.28
46									11.73	18.50	8.29	7.94	4.76	2.07	3.09	0.72	2.16	0.30
48									12.24	20.02	8.65	8.60	4.97	2.24	3.22	0.78	2.26	0.33
50									12.75	21.59	9.01	9.27	5.18	2.41	3.36	0.84	2.35	0.35
55									14.02	25.76	9.91	11.06	5.70	2.88	3.69	1.00	2.59	0.42
60									15.30	30.26	10.81	13.00	6.21	3.38	4.03	1.18	2.82	0.50
65									16.57	35.10	11.71	15.07	6.73	3.92	4.36	1.37	3.06	0.57
70									17.85	40.26	12.61	17.29	7.25	4.50	4.70	1.57	3.29	0.66
75											13.51	19.65	7.77	5.11	5.04	1.78	3.53	0.75
80											14.41	22.14	8.28	5.76	5.37	2.01	3.76	0.84
85											15.31	24.77	8.80	6.44	5.71	2.25	4.00	0.94
90											16.21	27.54	9.32	7.16	6.04	2.50	4.23	1.05
95											17.11	30.44	9.84	7.91	6.38	2.76	4.47	1.16
100											18.01	33.47	10.35	8.70	6.71	3.03	4.70	1.28
110													11.39	10.38	7.39	3.62	5.17	1.52
120													12.43	12.20	8.06	4.25	5.65	1.79
130													13.46	14.15	8.73	4.93	6.12	2.07
140													14.50	16.23	9.40	5.66	6.59	2.38
150													15.53	18.44	10.07	6.43	7.06	2.70
160													16.57	20.78	10.74	7.24	7.53	3.05
170													17.60	23.25	11.41	8.11	8.00	3.41
180															12.09	9.01	8.47	3.79
190															12.76	9.96	8.94	4.19
200															13.43	10.95	9.41	4.61
220															14.77	13.07	10.35	5.50
240															16.12	15.35	11.29	6.46
260															17.46	17.80	12.23	7.49
280															18.80	20.42	13.17	8.59
300																	14.11	9.76
320																	15.05	11.00
340																	15.99	12.31
360																	16.94	13.69
380																	17.88	15.13
400																		
420																		
440																		
460																		
480																		
500																		

Shaded area represents velocities over 7 fps.  
 Use with caution, where water hammer is a concern.

See pg 93 for friction loss formulas







# FRICTION LOSS CHARACTERISTICS

## HDPE DR 9 200 PSI (IPS SIZE, OD CONTROLLED)

Size: 3" thru 18"

Flow: 50 thru 4000GPM

ANSI/ASAE S376.3 PE3408, ASTM D2239 C=150

PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	3"		4"		6"		8"		10"		12"		14"		16"		18"																						
Avg.ID	2.674	3.440	5.065	6.593	8.218	9.746	10.700	12.230	13.760	Pipe OD	3.500	4.500	6.625	8.625	10.750	12.750	14.000	16.000	18.000	Avg Wall	0.413	0.530	0.780	1.016	1.266	1.502	1.650	1.885	2.120	Min Wall	0.389	0.500	0.736	0.958	1.194	1.417	1.556	1.778	2.000
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss																					
50	2.85	0.50	1.72	0.15	0.80	0.02																																	
60	3.42	0.70	2.07	0.20	0.95	0.03																																	
70	3.99	0.93	2.41	0.27	1.11	0.04																																	
80	4.56	1.19	2.76	0.35	1.27	0.05																																	
90	5.14	1.48	3.10	0.43	1.43	0.07																																	
100	5.71	1.80	3.45	0.53	1.59	0.08	0.94	0.02																															
120	6.85	2.52	4.14	0.74	1.91	0.11	1.13	0.03																															
140	7.99	3.35	4.83	0.98	2.23	0.15	1.31	0.04																															
160	9.13	4.29	5.52	1.26	2.54	0.19	1.50	0.05	0.97	0.02																													
180			6.21	1.57	2.86	0.24	1.69	0.07	1.09	0.02																													
200			6.90	1.90	3.18	0.29	1.88	0.08	1.21	0.03																													
220			7.59	2.27	3.50	0.35	2.06	0.10	1.33	0.03																													
240			8.27	2.67	3.82	0.41	2.25	0.11	1.45	0.04	1.03	0.02																											
260			8.96	3.10	4.13	0.47	2.44	0.13	1.57	0.04	1.12	0.02																											
280			9.65	3.55	4.45	0.54	2.63	0.15	1.69	0.05	1.20	0.02																											
300					4.77	0.61	2.82	0.17	1.81	0.06	1.29	0.03	1.07	0.02																									
320					5.09	0.69	3.00	0.19	1.93	0.07	1.37	0.03	1.14	0.02																									
340					5.41	0.77	3.19	0.21	2.05	0.07	1.46	0.03	1.21	0.02																									
360					5.73	0.86	3.38	0.24	2.17	0.08	1.55	0.04	1.28	0.02																									
380					6.04	0.95	3.57	0.26	2.30	0.09	1.63	0.04	1.35	0.02																									
400					6.36	1.05	3.75	0.29	2.42	0.10	1.72	0.04	1.43	0.03																									
450					7.16	1.30	4.22	0.36	2.72	0.12	1.93	0.05	1.60	0.03	1.23	0.02																							
500					7.95	1.58	4.69	0.44	3.02	0.15	2.15	0.07	1.78	0.04	1.36	0.02																							
550					8.75	1.89	5.16	0.52	3.32	0.18	2.36	0.08	1.96	0.05	1.50	0.03																							
600					9.54	2.22	5.63	0.61	3.62	0.21	2.58	0.09	2.14	0.06	1.64	0.03	1.29	0.02																					
650							6.10	0.71	3.93	0.24	2.79	0.11	2.32	0.07	1.77	0.04	1.40	0.02																					
700							6.57	0.82	4.23	0.28	3.01	0.12	2.49	0.08	1.91	0.04	1.51	0.02																					
750							7.04	0.93	4.53	0.32	3.22	0.14	2.67	0.09	2.05	0.05	1.62	0.03																					
800							7.51	1.05	4.83	0.36	3.44	0.16	2.85	0.10	2.18	0.05	1.72	0.03																					
850							7.98	1.17	5.14	0.40	3.65	0.17	3.03	0.11	2.32	0.06	1.83	0.03																					
900							8.45	1.30	5.44	0.45	3.87	0.19	3.21	0.12	2.45	0.06	1.94	0.04																					
950							8.92	1.44	5.74	0.49	4.08	0.21	3.39	0.14	2.59	0.07	2.05	0.04																					
1000							9.39	1.58	6.04	0.54	4.30	0.24	3.56	0.15	2.73	0.08	2.15	0.04																					
1050							9.86	1.73	6.34	0.59	4.51	0.26	3.74	0.16	2.86	0.09	2.26	0.05																					
1100									6.65	0.65	4.72	0.28	3.92	0.18	3.00	0.09	2.37	0.05																					
1150									6.95	0.70	4.94	0.31	4.10	0.19	3.14	0.10	2.48	0.06																					
1200									7.25	0.76	5.15	0.33	4.28	0.21	3.27	0.11	2.59	0.06																					
1250									7.55	0.82	5.37	0.36	4.45	0.23	3.41	0.12	2.69	0.07																					
1300									7.85	0.88	5.58	0.38	4.63	0.24	3.55	0.13	2.80	0.07																					
1350									8.16	0.94	5.80	0.41	4.81	0.26	3.68	0.14	2.91	0.08																					
1400									8.46	1.01	6.01	0.44	4.99	0.28	3.82	0.15	3.02	0.08																					
1450									8.76	1.08	6.23	0.47	5.17	0.30	3.96	0.16	3.12	0.09																					
1500									9.06	1.15	6.44	0.50	5.35	0.32	4.09	0.17	3.23	0.09																					
1550									9.36	1.22	6.66	0.53	5.52	0.34	4.23	0.18	3.34	0.10																					
1600									9.67	1.29	6.87	0.56	5.70	0.36	4.36	0.19	3.45	0.11																					
1650									9.97	1.37	7.09	0.60	5.88	0.38	4.50	0.20	3.56	0.11																					
1700											7.30	0.63	6.06	0.40	4.64	0.21	3.66	0.12																					
1750											7.52	0.67	6.24	0.42	4.77	0.22	3.77	0.12																					
1800											7.73	0.70	6.41	0.45	4.91	0.23	3.88	0.13																					
1900											8.16	0.78	6.77	0.49	5.18	0.26	4.09	0.14																					
2000											8.59	0.85	7.13	0.54	5.46	0.28	4.31	0.16																					
2100											9.02	0.93	7.48	0.59	5.73	0.31	4.53	0.17																					
2200											9.45	1.02	7.84	0.65	6.00	0.34	4.74	0.19																					
2300											9.88	1.10	8.20	0.70	6.27	0.37	4.96	0.21																					
2400													8.55	0.76	6.55	0.40	5.17	0.22																					
2500													8.91	0.82	6.82	0.43	5.39	0.24																					
2600													9.27	0.88	7.09	0.46	5.60	0.26																					
2700													9.62	0.94	7.36	0.49	5.82	0.28																					
2800													9.98	1.01	7.64	0.53	6.03	0.30																					
2900															7.91	0.56	6.25	0.32																					
3000															8.18	0.60	6.46	0.34																					
3300															9.00	0.71	7.11	0.40																					
3600															9.82	0.84	7.76	0.47																					
3900																	8.40	0.55																					
4000																	8.62	0.57																					

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas

FRICTION LOSS

# FRICION LOSS CHARACTERISTICS

## HDPE DR 11 160 PSI (IPS SIZE, OD CONTROLLED)

Size: 3" thru 18"

Flow: 50 thru 4000GPM

ANSI/ASAE S376.3 PE3408, ASTM D2239 C=150

PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	3"		4"		6"		8"		10"		12"		14"		16"		18"	
Avg.ID	2.826	3.632	5.349	6.963	8.678	10.292	11.300	12.914	14.532									
Pipe OD	3.500	4.500	6.625	8.625	10.750	12.750	14.000	16.000	18.000									
Avg Wall	0.337	0.434	0.638	0.831	1.036	1.229	1.350	1.543	1.734									
Min Wall	0.318	0.409	0.602	0.784	0.977	1.159	1.273	1.455	1.636									
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
50	2.55	0.38	1.55	0.11	0.71	0.02												
60	3.07	0.53	1.86	0.16	0.86	0.02												
70	3.58	0.71	2.17	0.21	1.00	0.03												
80	4.09	0.91	2.47	0.27	1.14	0.04												
90	4.60	1.13	2.78	0.33	1.28	0.05												
100	5.11	1.37	3.09	0.40	1.43	0.06	0.84	0.02										
120	6.13	1.92	3.71	0.57	1.71	0.09	1.01	0.02										
140	7.15	2.56	4.33	0.76	2.00	0.11	1.18	0.03										
160	8.17	3.28	4.95	0.97	2.28	0.15	1.35	0.04										
180	9.20	4.08	5.57	1.20	2.57	0.18	1.51	0.05										
200	10.22	4.96	6.19	1.46	2.85	0.22	1.68	0.06	1.08	0.02	0.77	0.01						
220	11.24	5.91	6.80	1.74	3.14	0.27	1.85	0.07	1.19	0.03	0.85	0.01						
240	12.26	6.95	7.42	2.05	3.42	0.31	2.02	0.09	1.30	0.03	0.92	0.01						
260			8.04	2.38	3.71	0.36	2.19	0.10	1.41	0.03	1.00	0.01						
280			8.66	2.73	3.99	0.41	2.36	0.11	1.52	0.04	1.08	0.02						
300			9.28	3.10	4.28	0.47	2.52	0.13	1.63	0.04	1.16	0.02						
320			9.90	3.49	4.56	0.53	2.69	0.15	1.73	0.05	1.23	0.02						
340			10.52	3.91	4.85	0.59	2.86	0.16	1.84	0.06	1.31	0.02	1.09	0.02				
360			11.13	4.34	5.13	0.66	3.03	0.18	1.95	0.06	1.39	0.03	1.15	0.02				
380					5.42	0.73	3.20	0.20	2.06	0.07	1.46	0.03	1.21	0.02				
400					5.70	0.80	3.37	0.22	2.17	0.08	1.54	0.03	1.28	0.02				
450					6.42	1.00	3.79	0.28	2.44	0.09	1.73	0.04	1.44	0.03				
500					7.13	1.21	4.21	0.34	2.71	0.12	1.93	0.05	1.60	0.03	1.22	0.02		
550					7.84	1.45	4.63	0.40	2.98	0.14	2.12	0.06	1.76	0.04	1.35	0.02		
600					8.56	1.70	5.05	0.47	3.25	0.16	2.31	0.07	1.92	0.04	1.47	0.02		
650					9.27	1.97	5.47	0.55	3.52	0.19	2.50	0.08	2.08	0.05	1.59	0.03		
700					9.98	2.26	5.89	0.63	3.79	0.21	2.70	0.09	2.24	0.06	1.71	0.03	1.35	0.02
750					10.69	2.57	6.31	0.71	4.06	0.24	2.89	0.11	2.40	0.07	1.83	0.04	1.45	0.02
800							6.73	0.80	4.33	0.27	3.08	0.12	2.56	0.08	1.96	0.04	1.55	0.02
850							7.15	0.90	4.61	0.31	3.27	0.13	2.72	0.09	2.08	0.04	1.64	0.03
900							7.57	1.00	4.88	0.34	3.47	0.15	2.88	0.09	2.20	0.05	1.74	0.03
950							7.99	1.10	5.15	0.38	3.66	0.16	3.04	0.10	2.32	0.05	1.84	0.03
1000							8.42	1.21	5.42	0.42	3.85	0.18	3.20	0.12	2.45	0.06	1.93	0.03
1050							8.84	1.33	5.69	0.45	4.04	0.20	3.36	0.13	2.57	0.07	2.03	0.04
1100							9.26	1.45	5.96	0.50	4.24	0.22	3.51	0.14	2.69	0.07	2.13	0.04
1150							9.68	1.57	6.23	0.54	4.43	0.23	3.67	0.15	2.81	0.08	2.22	0.04
1200							10.10	1.70	6.50	0.58	4.62	0.25	3.83	0.16	2.94	0.08	2.32	0.05
1250							10.52	1.83	6.77	0.63	4.81	0.27	3.99	0.17	3.06	0.09	2.42	0.05
1300									7.04	0.68	5.01	0.29	4.15	0.19	3.18	0.10	2.51	0.05
1350									7.31	0.72	5.20	0.32	4.31	0.20	3.30	0.10	2.61	0.06
1400									7.58	0.78	5.39	0.34	4.47	0.21	3.43	0.11	2.70	0.06
1450									7.86	0.83	5.59	0.36	4.63	0.23	3.55	0.12	2.80	0.07
1500									8.13	0.88	5.78	0.38	4.79	0.24	3.67	0.13	2.90	0.07
1550									8.40	0.94	5.97	0.41	4.95	0.26	3.79	0.14	2.99	0.08
1600									8.67	0.99	6.16	0.43	5.11	0.27	3.91	0.14	3.09	0.08
1650									8.94	1.05	6.36	0.46	5.27	0.29	4.04	0.15	3.19	0.09
1700									9.21	1.11	6.55	0.48	5.43	0.31	4.16	0.16	3.28	0.09
1750									9.48	1.17	6.74	0.51	5.59	0.32	4.28	0.17	3.38	0.10
1800									9.75	1.23	6.93	0.54	5.75	0.34	4.40	0.18	3.48	0.10
1900									10.29	1.36	7.32	0.59	6.07	0.38	4.65	0.20	3.67	0.11
2000											7.70	0.65	6.39	0.42	4.89	0.22	3.86	0.12
2100											8.09	0.72	6.71	0.45	5.14	0.24	4.06	0.13
2200											8.47	0.78	7.03	0.50	5.38	0.26	4.25	0.15
2300											8.86	0.85	7.35	0.54	5.63	0.28	4.44	0.16
2400													7.67	0.58	5.87	0.30	4.64	0.17
2500													7.99	0.63	6.12	0.33	4.83	0.18
2600													8.31	0.68	6.36	0.35	5.02	0.20
2700													8.63	0.72	6.61	0.38	5.22	0.21
2800													8.95	0.77	6.85	0.40	5.41	0.23
2900															7.09	0.43	5.60	0.24
3000															7.34	0.46	5.80	0.26
3300															8.07	0.55	6.38	0.31
3600															8.81	0.64	6.96	0.36
3900																	7.53	0.42
4000																	7.73	0.44

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas

# FRICTION LOSS CHARACTERISTICS

## HDPE DR 13.5 128 PSI (IPS SIZE, OD CONTROLLED)

Size: 3" thru 18"

Flow: 1 thru 4000GPM

ANSI/ASAE S376.2 PE3408, ASTM D2239 C=150

PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	3"		4"		6"		8"		10"		12"		14"		16"		18"																						
Avg.ID	2.950	3.794	5.583	7.269	9.062	10.748	11.802	13.488	15.174	Pipe OD	3.500	4.500	6.625	8.625	10.750	12.750	14.000	16.000	18.000	Avg Wall	0.275	0.353	0.521	0.678	0.844	1.001	1.099	1.256	1.413	Min Wall	0.259	0.333	0.491	0.639	0.796	0.944	1.037	1.185	1.333
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss																					
50	2.34	0.31	1.42	0.09	0.65	0.01																																	
60	2.81	0.43	1.70	0.13	0.79	0.02																																	
70	3.28	0.58	1.98	0.17	0.92	0.03																																	
80	3.75	0.74	2.27	0.22	1.05	0.03																																	
90	4.22	0.92	2.55	0.27	1.18	0.04																																	
100	4.69	1.11	2.83	0.33	1.31	0.05	0.77	0.01																															
120	5.63	1.56	3.40	0.46	1.57	0.07	0.93	0.02																															
140	6.56	2.08	3.97	0.61	1.83	0.09	1.08	0.03																															
160	7.50	2.66	4.54	0.78	2.09	0.12	1.24	0.03																															
180	8.44	3.31	5.10	0.97	2.36	0.15	1.39	0.04																															
200			5.67	1.18	2.62	0.18	1.54	0.05	0.99	0.02	0.71	0.01																											
220			6.24	1.41	2.88	0.22	1.70	0.06	1.09	0.02	0.78	0.01																											
240			6.80	1.66	3.14	0.25	1.85	0.07	1.19	0.02	0.85	0.01																											
260			7.37	1.92	3.40	0.29	2.01	0.08	1.29	0.03	0.92	0.01																											
280			7.94	2.20	3.67	0.34	2.16	0.09	1.39	0.03	0.99	0.01																											
300					3.93	0.38	2.32	0.11	1.49	0.04	1.06	0.02																											
320					4.19	0.43	2.47	0.12	1.59	0.04	1.13	0.02																											
340					4.45	0.48	2.63	0.13	1.69	0.05	1.20	0.02	1.00	0.01																									
360					4.71	0.54	2.78	0.15	1.79	0.05	1.27	0.02	1.05	0.01																									
380					4.97	0.59	2.93	0.16	1.89	0.06	1.34	0.02	1.11	0.02																									
400					5.24	0.65	3.09	0.18	1.99	0.06	1.41	0.03	1.17	0.02																									
450					5.89	0.81	3.47	0.22	2.24	0.08	1.59	0.03	1.32	0.02																									
500					6.54	0.98	3.86	0.27	2.48	0.09	1.77	0.04	1.46	0.03	1.12	0.01																							
550					7.20	1.17	4.25	0.33	2.73	0.11	1.94	0.05	1.61	0.03	1.23	0.02																							
600					7.85	1.38	4.63	0.38	2.98	0.13	2.12	0.06	1.76	0.04	1.35	0.02																							
650					8.51	1.60	5.02	0.44	3.23	0.15	2.30	0.07	1.90	0.04	1.46	0.02																							
700							5.41	0.51	3.48	0.17	2.47	0.08	2.05	0.05	1.57	0.03	1.24	0.01																					
750							5.79	0.58	3.73	0.20	2.65	0.09	2.20	0.05	1.68	0.03	1.33	0.02																					
800							6.18	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							7.34	0.90	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							8.11	1.08	5.22	0.37	3.71	0.16	3.08	0.10	2.35	0.05	1.86	0.03																					
1100									5.47	0.40	3.89	0.18	3.22	0.11	2.47	0.06	1.95	0.03																					
1150									5.71	0.44	4.06	0.19	3.37	0.12	2.58	0.06	2.04	0.04																					
1200									5.96	0.47	4.24	0.21	3.52	0.13	2.69	0.07	2.13	0.04																					
1250									6.21	0.51	4.41	0.22	3.66	0.14	2.80	0.07	2.21	0.04																					
1300									6.46	0.55	4.59	0.24	3.81	0.15	2.92	0.08	2.30	0.04																					
1350									6.71	0.59	4.77	0.26	3.95	0.16	3.03	0.08	2.39	0.05																					
1400									6.96	0.63	4.94	0.27	4.10	0.17	3.14	0.09	2.48	0.05																					
1450									7.20	0.67	5.12	0.29	4.25	0.19	3.25	0.10	2.57	0.05																					
1500									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											6.00	0.39	4.98	0.25	3.81	0.13	3.01	0.07																					
1750											6.18	0.41	5.13	0.26	3.92	0.14	3.10	0.08																					
1800											6.36	0.44	5.27	0.28	4.04	0.14	3.19	0.08																					
1900											6.71	0.48	5.57	0.31	4.26	0.16	3.37	0.09																					
2000											7.06	0.53	5.86	0.34	4.49	0.18	3.54	0.10																					
2100											7.42	0.58	6.15	0.37	4.71	0.19	3.72	0.11																					
2200											7.77	0.63	6.44	0.40	4.93	0.21	3.90	0.12																					
2300											8.12	0.69	6.74	0.44	5.16	0.23	4.08	0.13																					
2400													7.03	0.47	5.38	0.25	4.25	0.14																					
2500													7.32	0.51	5.61	0.27	4.43	0.15																					
2600													7.62	0.55	5.83	0.29	4.61	0.16																					
2700													7.91	0.59	6.06	0.31	4.78	0.17																					
2800													8.20	0.63	6.28	0.33	4.96	0.18																					
2900															6.50	0.35	5.14	0.20																					
3000															6.73	0.37	5.32	0.21																					
3300															7.40	0.44	5.85	0.25																					
3600															8.07	0.52	6.38	0.29																					
3900																	6.91	0.34																					
4000																	7.09	0.36																					

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas

FRICTION LOSS

# FRICION LOSS CHARACTERISTICS

## C900 DR 18 CLASS 150 (C.I.O.D.)

Size: 4" thru 12"  
AWWA C900 ASTM D1784 C=150

Flow: 25 thru 8500GPM  
PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	4"		6"		8"		10"		12"	
Avg.ID	4.234		6.088		7.984		9.792		11.646	
Pipe OD	4.800		6.900		9.050		11.100		13.200	
Avg Wall	0.283		0.406		0.533		0.654		0.777	
Min Wall	0.267		0.383		0.503		0.617		0.733	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
25	0.57	0.01	0.28	0.00	0.16	0.00	0.11	0.00	0.08	0.00
50	1.14	0.05	0.55	0.01	0.32	0.00	0.21	0.00	0.15	0.00
75	1.71	0.11	0.83	0.02	0.48	0.01	0.32	0.00	0.23	0.00
100	2.28	0.19	1.10	0.03	0.64	0.01	0.43	0.00	0.30	0.00
125	2.84	0.29	1.38	0.05	0.80	0.01	0.53	0.00	0.38	0.00
150	3.41	0.41	1.65	0.07	0.96	0.02	0.64	0.01	0.45	0.00
175	3.98	0.54	1.93	0.09	1.12	0.02	0.74	0.01	0.53	0.00
200	4.55	0.69	2.20	0.12	1.28	0.03	0.85	0.01	0.60	0.01
225	5.12	0.86	2.48	0.15	1.44	0.04	0.96	0.01	0.68	0.01
250	5.69	1.05	2.75	0.18	1.60	0.05	1.06	0.02	0.75	0.01
275	6.26	1.25	3.03	0.21	1.76	0.06	1.17	0.02	0.83	0.01
300	6.83	1.47	3.30	0.25	1.92	0.07	1.28	0.02	0.90	0.01
325	7.40	1.70	3.58	0.29	2.08	0.08	1.38	0.03	0.98	0.01
350	7.97	1.95	3.85	0.33	2.24	0.09	1.49	0.03	1.05	0.01
375	8.53	2.22	4.13	0.38	2.40	0.10	1.60	0.04	1.13	0.02
400	9.10	2.50	4.40	0.43	2.56	0.11	1.70	0.04	1.20	0.02
450			4.95	0.53	2.88	0.14	1.91	0.05	1.35	0.02
500			5.50	0.65	3.20	0.17	2.13	0.06	1.50	0.03
550			6.05	0.77	3.52	0.21	2.34	0.08	1.65	0.03
600			6.60	0.91	3.84	0.24	2.55	0.09	1.80	0.04
700			7.71	1.20	4.48	0.32	2.98	0.12	2.11	0.05
800			8.81	1.54	5.12	0.41	3.40	0.15	2.41	0.07
900			9.91	1.92	5.76	0.51	3.83	0.19	2.71	0.08
1000					6.40	0.62	4.26	0.23	3.01	0.10
1100					7.04	0.74	4.68	0.28	3.31	0.12
1200					7.68	0.87	5.11	0.32	3.61	0.14
1300					8.32	1.01	5.53	0.38	3.91	0.16
1400					8.96	1.16	5.96	0.43	4.21	0.19
1500					9.60	1.32	6.38	0.49	4.51	0.21
1600					10.24	1.49	6.81	0.55	4.81	0.24
1700							7.23	0.62	5.11	0.27
1800							7.66	0.69	5.41	0.29
1900							8.08	0.76	5.72	0.33
2000							8.51	0.83	6.02	0.36
2100							8.94	0.91	6.32	0.39
2200							9.36	0.99	6.62	0.43
2300									6.92	0.46
2400									7.22	0.50
2500									7.52	0.54
2600									7.82	0.58
2700									8.12	0.63
2800										
2900										
3000										
3100										
3200										
3300										
3400										
3500										
3600										
3800										
3900										
4000										
4200										
4400										
4600										
4800										
5000										
5500										
6000										
6500										
7000										
7500										
8000										
8500										

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas



## FRICTION LOSS CHARACTERISTICS

### C900 DR 25 CLASS 100 (C.I.O.D.)

Size: 4" thru 12"  
AWWA C900 ASTM D1784 C=150

Flow: 25 thru 8500GPM  
PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	4"		6"		8"		10"		12"	
Avg.ID	4.392		6.314		8.282		10.158		12.080	
Pipe OD	4.800		6.900		9.050		11.100		13.200	
Avg Wall	0.204		0.293		0.384		0.471		0.560	
Min Wall	0.192		0.276		0.362		0.444		0.528	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
25	0.53	0.01	0.26	0.00	0.15	0.00	0.10	0.00	0.07	0.00
50	1.06	0.04	0.51	0.01	0.30	0.00	0.20	0.00	0.14	0.00
75	1.59	0.09	0.77	0.02	0.45	0.00	0.30	0.00	0.21	0.00
100	2.12	0.16	1.02	0.03	0.59	0.01	0.40	0.00	0.28	0.00
125	2.64	0.24	1.28	0.04	0.74	0.01	0.49	0.00	0.35	0.00
150	3.17	0.34	1.54	0.06	0.89	0.02	0.59	0.01	0.42	0.00
175	3.70	0.45	1.79	0.08	1.04	0.02	0.69	0.01	0.49	0.00
200	4.23	0.58	2.05	0.10	1.19	0.03	0.79	0.01	0.56	0.00
225	4.76	0.72	2.30	0.12	1.34	0.03	0.89	0.01	0.63	0.01
250	5.29	0.88	2.56	0.15	1.49	0.04	0.99	0.01	0.70	0.01
275	5.82	1.05	2.81	0.18	1.64	0.05	1.09	0.02	0.77	0.01
300	6.35	1.23	3.07	0.21	1.78	0.06	1.19	0.02	0.84	0.01
325	6.87	1.43	3.33	0.24	1.93	0.07	1.29	0.02	0.91	0.01
350	7.40	1.63	3.58	0.28	2.08	0.07	1.38	0.03	0.98	0.01
375			3.84	0.32	2.23	0.08	1.48	0.03	1.05	0.01
400			4.09	0.36	2.38	0.10	1.58	0.04	1.12	0.02
450			4.61	0.45	2.68	0.12	1.78	0.04	1.26	0.02
500			5.12	0.54	2.97	0.14	1.98	0.05	1.40	0.02
550			5.63	0.65	3.27	0.17	2.17	0.06	1.54	0.03
600			6.14	0.76	3.57	0.20	2.37	0.08	1.68	0.03
700			7.16	1.01	4.16	0.27	2.77	0.10	1.96	0.04
800			8.19	1.29	4.76	0.35	3.16	0.13	2.24	0.05
900			9.21	1.61	5.35	0.43	3.56	0.16	2.52	0.07
1000			10.23	1.95	5.95	0.52	3.95	0.19	2.80	0.08
1100					6.54	0.62	4.35	0.23	3.08	0.10
1200					7.14	0.73	4.74	0.27	3.36	0.12
1300					7.73	0.85	5.14	0.31	3.63	0.14
1400					8.33	0.97	5.54	0.36	3.91	0.16
1500					8.92	1.11	5.93	0.41	4.19	0.18
1600					9.52	1.25	6.33	0.46	4.47	0.20
1700							6.72	0.52	4.75	0.22
1800							7.12	0.57	5.03	0.25
1900							7.51	0.63	5.31	0.27
2000							7.91	0.70	5.59	0.30
2100							8.30	0.76	5.87	0.33
2200							8.70	0.83	6.15	0.36
2300									6.43	0.39
2400									6.71	0.42
2500									6.99	0.45
2600									7.27	0.49
2700									7.55	0.52
2800									7.83	0.56
2900									8.11	0.60
3000									8.39	0.64
3100									8.67	0.68
3200										
3300										
3400										
3500										
3600										
3800										
3900										
4000										
4200										
4400										
4600	Shaded area represents velocities over 5 fps.									
4800	Use with caution.									
5000										
5500										
6000										
6500										
7000										
7500										
8000										
8500										

See pg 93 for friction loss formulas

# FRICION LOSS CHARACTERISTICS

## PVC CLASS 200 IPS PLASTIC PIPE

Size: 6" thru 18"

Flow: 20 thru 4700GPM

ANSI/ASAE S376.2

ASTM 2241 SDR21 C=150

PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	6"		8"		10"		12"		14"		16"		18"	
Avg.ID	5.955		7.755		9.666		11.464		12.588		14.384		15.246	
Pipe OD	6.625		8.625		10.750		12.750		14.000		16.000		18.000	
Avg Wall	0.335		0.435		0.542		0.643		0.706		0.808		1.377	
Min Wall	0.316		0.410		0.511		0.606		0.666		0.762		0.857	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
20	0.23	0.00	0.14	0.00	0.09	0.00	0.06	0.00	0.05	0.00	0.04	0.00	0.04	0.00
40	0.46	0.01	0.27	0.00	0.17	0.00	0.12	0.00	0.10	0.00	0.08	0.00	0.07	0.00
60	0.69	0.01	0.41	0.00	0.26	0.00	0.19	0.00	0.15	0.00	0.12	0.00	0.11	0.00
80	0.92	0.02	0.54	0.01	0.35	0.00	0.25	0.00	0.21	0.00	0.16	0.00	0.14	0.00
100	1.15	0.04	0.68	0.01	0.44	0.00	0.31	0.00	0.26	0.00	0.20	0.00	0.18	0.00
150	1.73	0.08	1.02	0.02	0.66	0.01	0.47	0.00	0.39	0.00	0.30	0.00	0.26	0.00
200	2.30	0.13	1.36	0.04	0.87	0.01	0.62	0.01	0.51	0.00	0.39	0.00	0.35	0.00
250	2.88	0.20	1.70	0.06	1.09	0.02	0.78	0.01	0.64	0.01	0.49	0.00	0.44	0.00
300	3.45	0.28	2.04	0.08	1.31	0.03	0.93	0.01	0.77	0.01	0.59	0.00	0.53	0.00
350	4.03	0.37	2.37	0.10	1.53	0.04	1.09	0.02	0.90	0.01	0.69	0.01	0.61	0.00
400	4.60	0.48	2.71	0.13	1.75	0.05	1.24	0.02	1.03	0.01	0.79	0.01	0.70	0.00
450	5.18	0.59	3.05	0.16	1.97	0.06	1.40	0.02	1.16	0.02	0.89	0.01	0.79	0.01
500	5.75	0.72	3.39	0.20	2.18	0.07	1.55	0.03	1.29	0.02	0.99	0.01	0.88	0.01
550	6.33	0.86	3.73	0.24	2.40	0.08	1.71	0.04	1.42	0.02	1.08	0.01	0.97	0.01
600	6.90	1.01	4.07	0.28	2.62	0.10	1.86	0.04	1.54	0.03	1.18	0.01	1.05	0.01
650	7.48	1.17	4.41	0.32	2.84	0.11	2.02	0.05	1.67	0.03	1.28	0.02	1.14	0.01
700	8.05	1.34	4.75	0.37	3.06	0.13	2.17	0.06	1.80	0.04	1.38	0.02	1.23	0.01
750	8.63	1.52	5.09	0.42	3.28	0.14	2.33	0.06	1.93	0.04	1.48	0.02	1.32	0.02
800	9.20	1.72	5.43	0.48	3.49	0.16	2.48	0.07	2.06	0.04	1.58	0.02	1.40	0.02
850	9.78	1.92	5.77	0.53	3.71	0.18	2.64	0.08	2.19	0.05	1.68	0.03	1.49	0.02
900			6.11	0.59	3.93	0.20	2.79	0.09	2.32	0.06	1.77	0.03	1.58	0.02
950			6.44	0.65	4.15	0.22	2.95	0.10	2.45	0.06	1.87	0.03	1.67	0.02
1000			6.78	0.72	4.37	0.25	3.10	0.11	2.57	0.07	1.97	0.04	1.76	0.03
1050			7.12	0.79	4.59	0.27	3.26	0.12	2.70	0.07	2.07	0.04	1.84	0.03
1100			7.46	0.86	4.80	0.29	3.41	0.13	2.83	0.08	2.17	0.04	1.93	0.03
1150					5.02	0.32	3.57	0.14	2.96	0.09	2.27	0.05	2.02	0.03
1200					5.24	0.34	3.73	0.15	3.09	0.10	2.37	0.05	2.11	0.04
1250					5.46	0.37	3.88	0.16	3.22	0.10	2.46	0.05	2.19	0.04
1300					5.68	0.40	4.04	0.17	3.35	0.11	2.56	0.06	2.28	0.04
1350					5.90	0.43	4.19	0.19	3.48	0.12	2.66	0.06	2.37	0.05
1400					6.11	0.46	4.35	0.20	3.60	0.13	2.76	0.07	2.46	0.05
1450					6.33	0.49	4.50	0.21	3.73	0.14	2.86	0.07	2.55	0.05
1500					6.55	0.52	4.66	0.23	3.86	0.14	2.96	0.08	2.63	0.06
1600					6.99	0.59	4.97	0.26	4.12	0.16	3.16	0.08	2.81	0.06
1700					7.42	0.66	5.28	0.29	4.38	0.18	3.35	0.09	2.98	0.07
1800							5.59	0.32	4.63	0.20	3.55	0.11	3.16	0.08
1900							5.90	0.35	4.89	0.22	3.75	0.12	3.34	0.09
2000							6.21	0.39	5.15	0.25	3.94	0.13	3.51	0.10
2100							6.52	0.42	5.41	0.27	4.14	0.14	3.69	0.11
2200							6.83	0.46	5.66	0.29	4.34	0.15	3.86	0.12
2300							7.14	0.50	5.92	0.32	4.54	0.17	4.04	0.13
2400							7.45	0.54	6.18	0.34	4.73	0.18	4.21	0.14
2500							7.76	0.59	6.44	0.37	4.93	0.19	4.39	0.15
2600							8.07	0.63	6.69	0.40	5.13	0.21	4.56	0.16
2700							8.38	0.67	6.95	0.43	5.32	0.22	4.74	0.17
2800							8.69	0.72	7.21	0.46	5.52	0.24	4.91	0.18
2900							9.00	0.77	7.47	0.49	5.72	0.26	5.09	0.19
3000							9.31	0.82	7.72	0.52	5.92	0.27	5.27	0.20
3100							9.62	0.87	7.98	0.55	6.11	0.29	5.44	0.22
3200							9.93	0.92	8.24	0.59	6.31	0.31	5.62	0.23
3300									8.50	0.62	6.51	0.32	5.79	0.24
3400									8.75	0.66	6.70	0.34	5.97	0.26
3500									9.01	0.69	6.90	0.36	6.14	0.27
3600									9.27	0.73	7.10	0.38	6.32	0.29
3700									9.53	0.77	7.30	0.40	6.49	0.30
3800											7.49	0.42	6.67	0.32
3900											7.69	0.44	6.85	0.33
4000											7.89	0.46	7.02	0.35
4100											8.09	0.48	7.20	0.37
4200											8.28	0.51	7.37	0.38
4300													7.55	0.40
4400													7.72	0.42
4500													7.90	0.43
4600													8.07	0.45
4700													8.25	0.47

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas

**FRICION LOSS CHARACTERISTICS**

**PVC SCHEDULE 40 IPS PLASTIC PIPE**

**Size: 4" thru 12"      Flow: 10 thru 3000GPM**  
**ASTM D1785    C=150      PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)**

size	4"		6"		8"		10"		12"	
Avg.ID	3.998		6.031		7.942		9.976		11.889	
Pipe OD	4.500		6.625		8.625		10.750		12.750	
Avg Wall	0.251		0.297		0.342		0.387		0.431	
Min Wall	0.237		0.280		0.322		0.365		0.406	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
10	0.26	0.00	0.11	0.00	0.06	0.00	0.04	0.00	0.03	0.00
20	0.51	0.01	0.22	0.00	0.13	0.00	0.08	0.00	0.06	0.00
30	0.77	0.03	0.34	0.00	0.19	0.00	0.12	0.00	0.09	0.00
40	1.02	0.05	0.45	0.01	0.26	0.00	0.16	0.00	0.12	0.00
50	1.28	0.07	0.56	0.01	0.32	0.00	0.20	0.00	0.14	0.00
60	1.53	0.10	0.67	0.01	0.39	0.00	0.25	0.00	0.17	0.00
70	1.79	0.13	0.79	0.02	0.45	0.00	0.29	0.00	0.20	0.00
80	2.04	0.17	0.90	0.02	0.52	0.01	0.33	0.00	0.23	0.00
90	2.30	0.21	1.01	0.03	0.58	0.01	0.37	0.00	0.26	0.00
100	2.55	0.25	1.12	0.03	0.65	0.01	0.41	0.00	0.29	0.00
120	3.06	0.36	1.35	0.05	0.78	0.01	0.49	0.00	0.35	0.00
140	3.57	0.47	1.57	0.06	0.91	0.02	0.57	0.01	0.40	0.00
160	4.08	0.61	1.79	0.08	1.03	0.02	0.66	0.01	0.46	0.00
180	4.59	0.75	2.02	0.10	1.16	0.03	0.74	0.01	0.52	0.00
200	5.11	0.92	2.24	0.12	1.29	0.03	0.82	0.01	0.58	0.00
225	5.74	1.14	2.52	0.15	1.46	0.04	0.92	0.01	0.65	0.01
250	6.38	1.39	2.80	0.19	1.62	0.05	1.02	0.02	0.72	0.01
275	7.02	1.65	3.08	0.22	1.78	0.06	1.13	0.02	0.79	0.01
300	7.66	1.94	3.37	0.26	1.94	0.07	1.23	0.02	0.87	0.01
325	8.30	2.25	3.65	0.30	2.10	0.08	1.33	0.03	0.94	0.01
350	8.93	2.58	3.93	0.35	2.26	0.09	1.43	0.03	1.01	0.01
375			4.21	0.40	2.43	0.10	1.54	0.03	1.08	0.01
400			4.49	0.45	2.59	0.12	1.64	0.04	1.15	0.02
425			4.77	0.50	2.75	0.13	1.74	0.04	1.23	0.02
450			5.05	0.56	2.91	0.15	1.84	0.05	1.30	0.02
475			5.33	0.62	3.07	0.16	1.95	0.05	1.37	0.02
500			5.61	0.68	3.23	0.18	2.05	0.06	1.44	0.02
550			6.17	0.81	3.56	0.21	2.25	0.07	1.59	0.03
600			6.73	0.95	3.88	0.25	2.46	0.08	1.73	0.03
650			7.29	1.10	4.20	0.29	2.66	0.09	1.88	0.04
700			7.85	1.26	4.53	0.33	2.87	0.11	2.02	0.05
750					4.85	0.38	3.07	0.12	2.16	0.05
800					5.17	0.42	3.28	0.14	2.31	0.06
850					5.50	0.47	3.48	0.16	2.45	0.07
900					5.82	0.53	3.69	0.17	2.60	0.07
950					6.15	0.58	3.89	0.19	2.74	0.08
1000					6.47	0.64	4.10	0.21	2.89	0.09
1050					6.79	0.70	4.30	0.23	3.03	0.10
1150					7.44	0.83	4.71	0.27	3.32	0.12
1200					7.76	0.90	4.92	0.30	3.46	0.13
1250							5.12	0.32	3.61	0.14
1300							5.33	0.34	3.75	0.15
1350							5.53	0.37	3.90	0.16
1400							5.74	0.39	4.04	0.17
1500							6.15	0.45	4.33	0.19
1550							6.35	0.47	4.47	0.20
1600							6.56	0.50	4.62	0.21
1650							6.76	0.53	4.76	0.23
1700							6.97	0.56	4.91	0.24
1750							7.17	0.59	5.05	0.25
1800									5.20	0.27
1850									5.34	0.28
1900									5.48	0.29
1950									5.63	0.31
2000									5.77	0.32
2100									6.06	0.35
2200									6.35	0.39
2300									6.64	0.42
2400									6.93	0.45
2500									7.22	0.49
2600										
2700										
2800										
2900										
3000										

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas

FRICION LOSS

# FRICION LOSS CHARACTERISTICS

## PVC SCHEDULE 80 IPS PLASTIC PIPE

Size: 4" thru 12"

Flow: 10 thru 3000GPM

ASTM D1785

C=150

PSI LOSS PER 100 FEET OF PIPE (PSI/100 FT)

size	4"		6"		8"		10"		12"	
Avg.ID	3.786		5.709		7.565		9.493		11.294	
Pipe OD	4.500		6.625		8.625		10.750		12.750	
Avg Wall	0.357		0.458		0.530		0.629		0.728	
Min Wall	0.337		0.432		0.500		0.593		0.687	
Flow GPM	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
10	0.28	0.00	0.13	0.00	0.07	0.00	0.05	0.00	0.03	0.00
20	0.57	0.02	0.25	0.00	0.14	0.00	0.09	0.00	0.06	0.00
30	0.85	0.04	0.38	0.00	0.21	0.00	0.14	0.00	0.10	0.00
40	1.14	0.06	0.50	0.01	0.29	0.00	0.18	0.00	0.13	0.00
50	1.42	0.09	0.63	0.01	0.36	0.00	0.23	0.00	0.16	0.00
60	1.71	0.13	0.75	0.02	0.43	0.00	0.27	0.00	0.19	0.00
70	1.99	0.17	0.88	0.02	0.50	0.01	0.32	0.00	0.22	0.00
80	2.28	0.22	1.00	0.03	0.57	0.01	0.36	0.00	0.26	0.00
90	2.56	0.27	1.13	0.04	0.64	0.01	0.41	0.00	0.29	0.00
100	2.85	0.33	1.25	0.04	0.71	0.01	0.45	0.00	0.32	0.00
120	3.42	0.46	1.50	0.06	0.86	0.02	0.54	0.01	0.38	0.00
140	3.98	0.62	1.75	0.08	1.00	0.02	0.63	0.01	0.45	0.00
160	4.55	0.79	2.00	0.11	1.14	0.03	0.72	0.01	0.51	0.00
180	5.12	0.98	2.25	0.13	1.28	0.03	0.81	0.01	0.58	0.00
200	5.69	1.19	2.50	0.16	1.43	0.04	0.91	0.01	0.64	0.01
225	6.40	1.49	2.82	0.20	1.60	0.05	1.02	0.02	0.72	0.01
250	7.12	1.81	3.13	0.24	1.78	0.06	1.13	0.02	0.80	0.01
275	7.83	2.15	3.44	0.29	1.96	0.07	1.25	0.02	0.88	0.01
300	8.54	2.53	3.76	0.34	2.14	0.09	1.36	0.03	0.96	0.01
325	9.25	2.94	4.07	0.40	2.32	0.10	1.47	0.03	1.04	0.01
350	9.96	3.37	4.38	0.46	2.50	0.12	1.58	0.04	1.12	0.02
375			4.69	0.52	2.67	0.13	1.70	0.04	1.20	0.02
400			5.01	0.58	2.85	0.15	1.81	0.05	1.28	0.02
425			5.32	0.65	3.03	0.17	1.92	0.06	1.36	0.02
450			5.63	0.73	3.21	0.18	2.04	0.06	1.44	0.03
475			5.95	0.80	3.39	0.20	2.15	0.07	1.52	0.03
500			6.26	0.88	3.56	0.22	2.26	0.07	1.60	0.03
550			6.88	1.05	3.92	0.27	2.49	0.09	1.76	0.04
600			7.51	1.24	4.28	0.31	2.72	0.10	1.92	0.04
650			8.14	1.44	4.63	0.36	2.94	0.12	2.08	0.05
700			8.76	1.65	4.99	0.42	3.17	0.14	2.24	0.06
750					5.35	0.48	3.40	0.16	2.40	0.07
800					5.70	0.54	3.62	0.18	2.56	0.08
850					6.06	0.60	3.85	0.20	2.72	0.09
900					6.42	0.67	4.07	0.22	2.88	0.09
950					6.77	0.74	4.30	0.24	3.04	0.10
1000					7.13	0.81	4.53	0.27	3.20	0.12
1050					7.49	0.89	4.75	0.29	3.36	0.13
1150					8.20	1.05	5.21	0.35	3.68	0.15
1200					8.56	1.14	5.43	0.38	3.84	0.16
1250							5.66	0.41	4.00	0.17
1300							5.89	0.44	4.16	0.19
1350							6.11	0.47	4.32	0.20
1400							6.34	0.50	4.48	0.22
1500							6.79	0.57	4.80	0.24
1550							7.02	0.60	4.96	0.26
1600							7.24	0.64	5.12	0.28
1650							7.47	0.68	5.28	0.29
1700							7.70	0.72	5.44	0.31
1750							7.92	0.76	5.60	0.33
1800									5.76	0.34
1850									5.92	0.36
1900									6.08	0.38
1950									6.24	0.40
2000									6.40	0.42
2100									6.72	0.46
2200									7.04	0.50
2300									7.36	0.54
2400									7.68	0.58
2500									8.00	0.63
2600										
2700										
2800										
2900										
3000										

Shaded area represents velocities over 5 fps.  
Use with caution.

See pg 93 for friction loss formulas



# WATER METER PRESSURE LOSS CHART

## AWWA STANDARD PRESSURE LOSSES (PSI)

### Water Meter Nominal Size

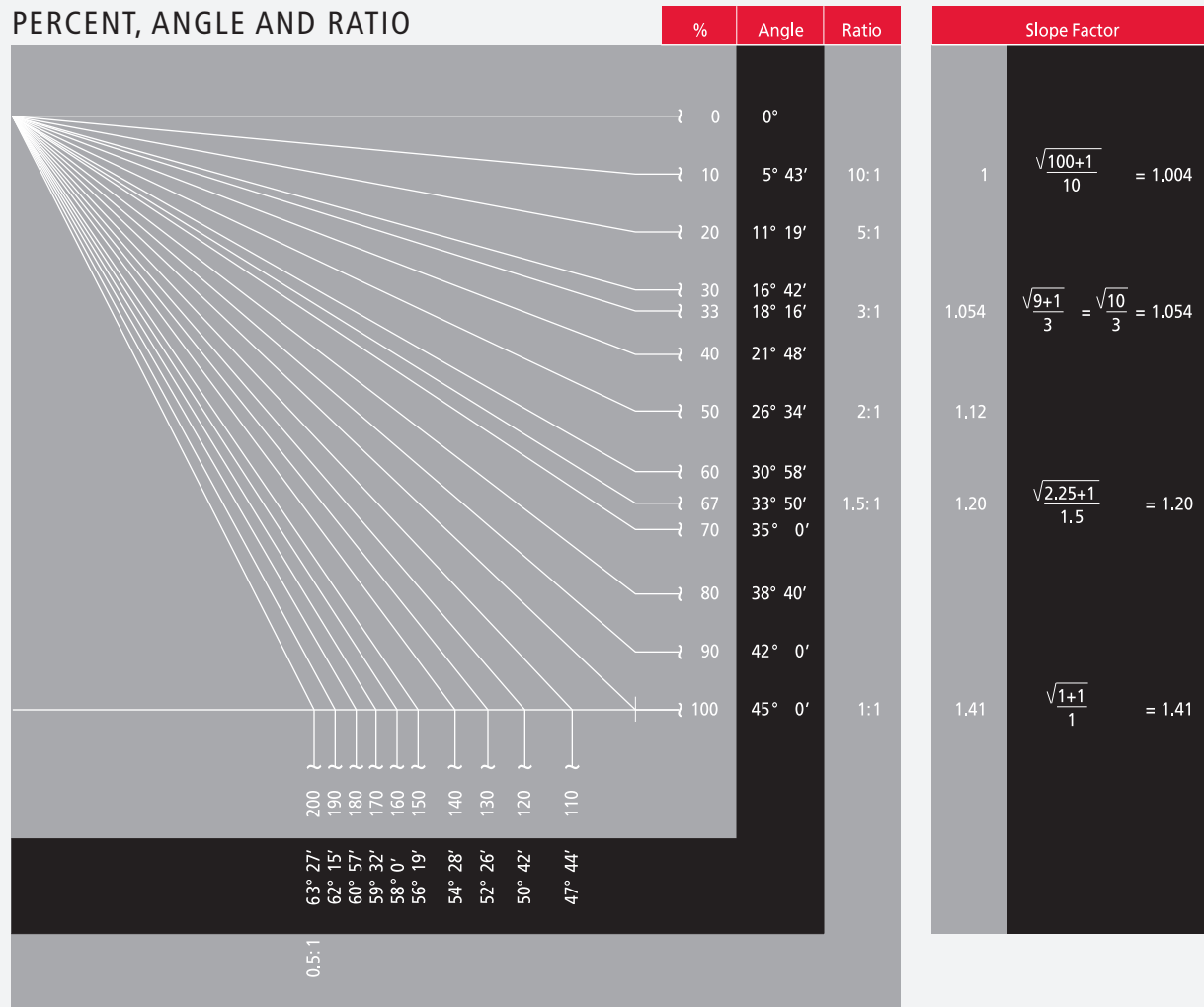
Flow GPM	5/8"	3/4"	1"	1 1/2"	2"	3"	4"	Flow GPM
1	0.2	0.1						1
2	0.3	0.2						2
3	0.4	0.3						3
4	0.6	0.5	0.1					4
5	0.9	0.6	0.2					5
6	1.3	0.7	0.3					6
7	1.8	0.8	0.4					7
8	2.3	1.0	0.5					8
9	3.0	1.3	0.6					9
10	3.7	1.6	0.7					10
11	4.4	1.9	0.8					11
12	5.1	2.2	0.9					12
13	6.1	2.6	1.0					13
14	7.2	3.1	1.1					14
15	8.3	3.6	1.2					15
16	9.4	4.1	1.4	0.4				16
17	10.7	4.6	1.6	0.5				17
18	12.0	5.2	1.8	0.6				18
19	13.4	5.8	2.0	0.7				19
20	15.0	6.5	2.2	0.8				20
22		7.9	2.8	1.0				22
24		9.5	3.4	1.2				24
26		11.2	4.0	1.4				26
28		13.0	4.6	1.6				28
30		15.0	5.3	1.8	0.7			30
32			6.0	2.1	0.8			32
34			6.9	2.4	0.9			34
36			7.8	2.7	1.0			36
38			8.7	3.0	1.2			38
40			9.6	3.3	1.3			40
42			10.6	3.6	1.4			42
44			11.7	3.9	1.5			44
46			12.8	4.2	1.6			46
48			13.9	4.5	1.7			48
50			15.0	4.9	1.9			50
52				5.3	2.1			52
54				5.7	2.2			54
56				6.2	2.3			56
58				6.7	2.5			58
60				7.2	2.7	1.0		60
65				8.3	3.2	1.1		65
70				9.8	3.7	1.3		70
75				11.3	4.3	1.5		75
80				12.8	4.9	1.6	0.7	80
90				16.1	6.2	2.0	0.8	90
100				20.0	7.8	2.5	0.9	100
110					9.5	2.9	1.0	110
120					11.3	3.4	1.2	120
130					13.0	3.9	1.4	130
140					15.1	4.5	1.6	140
150					17.3	5.1	1.8	150
160					20.0	5.8	2.1	160
170						6.5	2.4	170
180						7.2	2.7	180
190						8.0	3.0	190
200						9.0	3.2	200
220						11.0	3.9	220
240						13.0	4.7	240
260						15.0	5.5	260
280						17.3	6.3	280
300						20.0	7.2	300
350							10.0	350
400							13.0	400
450							16.2	450
500							20.0	500
75% of max. meter capacity	15 gpm	22.5 gpm	37.5 gpm	75 gpm	120 gpm	225 gpm	375 gpm	75% of max. meter capacity

Shaded areas exceed 75% of maximum safe meter capacity.

FRICTION LOSS/  
PRESSURE LOSS

# SLOPE IRRIGATION CHART

## PERCENT, ANGLE AND RATIO



## MAXIMUM PRECIPITATION RATES

Soil Texture	Inches Per Hour							
	0 to 5% slope		5 to 8% slope		8 to 12% slope		12% + slope	
	Cover	Bare	Cover	Bare	Cover	Bare	Cover	Bare
Coarse sandy soils	2.00	2.00	2.00	1.50	1.50	1.00	1.00	0.50
Coarse sandy soils over compact subsoils	1.75	1.50	1.25	1.00	1.00	0.75	0.75	0.40
Uniform light sandy loams	1.75	1.00	1.25	0.80	1.00	0.60	0.75	0.40
Light sandy soils over compact subsoils	1.25	0.75	1.00	0.50	0.75	0.40	0.50	0.30
Uniform silt loams	1.00	0.50	0.80	0.40	0.60	0.30	0.40	0.20
Silt loams over compact subsoil	0.60	0.30	0.50	0.25	0.40	0.15	0.30	0.10
Heavy clay or clay loam	0.20	0.15	0.15	0.10	0.12	0.08	0.10	0.06

The maximum PR values listed are as suggested by the United States Department of Agriculture. The values are average and may vary with respect to actual soil condition and condition of ground cover.

## METHOD OF WIRE SIZING FOR ELECTRICAL COMPONENTS OF AN AUTOMATIC IRRIGATION SYSTEM

### Data Needed

- Maximum current draw of the electrical unit (valve or controller) in amperes (I)
- Distance in feet (one way) to the electrical unit (F)
- The allowable voltage drop in the wire without affecting functions of the electrical unit (Vd)

### Steps

1. Calculate the maximum allowable wire resistance per 1000 feet with the following formula:

$$R = \frac{500 \times Vd}{F \times I}$$

where R = allowable wire resistance per 1000 feet.

2. Select the wire size from Chart #2 which has a resistance less than that calculated in the above formula.

**EXAMPLE:** A valve with a minimum operation voltage of 20 volts and inrush current of .30 amps is to be located 2680 ft. from a controller. The controller minimum output voltage is 24V ac.

The allowable voltage drop

$$(Vd) = 24 - 20 = 4 \text{ volts}$$

The distance to valve (F) = 2680 ft.

The current draw (I) = .3 amps

$$R = \frac{500 \times 4}{2680 \times .3} = 2.49 \text{ ohm/1000 ft.}$$

From Chart #2 we find that #14 AWG wire has slightly too much resistance. Therefore, choose #12 AWG copper wire.

The accompanying charts are useful for quick and easy selection of wire sizes for valves with standard and optional solenoids. Chart #3 is set up to provide maximum wire runs given a standard 24V ac valve with a minimum operation voltage of 20 volts and a controller output of 24V ac. Chart #4 is a multiplier factor for determining maximum wire runs for other controller output voltages and optional solenoids.

**EXAMPLE:** Determine maximum wire run to a valve with model 24V ac-D solenoid and controller output voltage of 26 volts and #14 control and ground wire.

From Chart #3 we find a length of 2590 ft. with #14 ground and control wire. From Chart #4 the multiplier factor at 26V ac controller output with a model 24V ac-D solenoid is 4.33. Therefore, the maximum wire distance to the valve is: 4.33 x 2590 feet = 11,215 feet.

\* This assumes control wire and ground wire are the same size.

## MINIMUM OPERATING VOLTAGES AT VARIOUS STATIC PRESSURES (standard 24V ac solenoid)

### CHART 1

Minimum Solenoid Operation Voltage Under Various Line Pressure

Line Pressure	Voltage (Internal Bleed Configuration)	Voltage (External Bleed Configuration)
200 psi	21.1	
175 psi	20.2	
150 psi	19.1	20.0
125 psi	18.2	19.1
100 psi	17.1	18.2
75 psi	16.1	17.3
50 psi	16.0	16.4

### CHART 2

Copper Wire Resistance of Various Sizes

Size AWG	Resistance at 20°C Ohms per 1000 ft.
4	.25
6	.40
8	.64
10	1.02
12	1.62
14	2.57
16	4.10
18	6.51

### CHART 3

Maximum One-Way Distance (ft) Between Controller and Valve (Standard 24V ac Solenoid)\*

Ground Wire	Valve Wire Sizing						
	CONTROL WIRE						
	18	16	14	12	10	8	6
18	1020	1260	1470	1640	1770	1860	1930
16	1260	1630	2000	2330	2610	2810	2960
14	1470	2000	2590	3180	3710	4150	4480
12	1640	2330	3180	4120	5050	5900	6590
10	1770	2610	3710	5050	6540	8030	9380
8	1860	2810	4150	5900	8030	10400	12770
6	1930	2960	4480	6590	9380	12770	16540

\* Solenoid Models: 24V ac, Pressure: 150 psi, Voltage Drop: 4 V, Min Op. Voltage: 20 V, Amperage (peak): 0.3A

## MULTIPLIER FACTOR FOR VARIOUS CONTROLLER OUTPUT VOLTAGES AND OPTIONAL LOW VOLTAGE SOLENOIDS

### CHART 4

Controller Output Voltage	24-VOLT SOLENOID		
	24V ac	24V ac-D	24V DC
28	2.00	5.79	5.45
27	1.75	5.05	4.77
26	1.50	4.33	4.09
25	1.25	3.61	3.41
24	1.00	2.88	2.73
23	.75	2.16	2.05
22	.50	1.44	1.36

### CHART 5

Controller Output Voltage	12-VOLT SOLENOID		
	12V ac	12V ac-D	12V DC
16	.58	2.50	1.96
15	.50	2.08	1.63
14	.41	1.67	1.30
13	.33	1.25	.98
12	.25	.83	.65
11	.17	.42	.33

# METRIC CONVERSIONS – VALVES

## 2400/2600 SERIES FLOW RATE-L/M

Flow	2400		2600	
	Bar	kPa	Bar	kPa
1	0,35	34,5	0,35	31,7
8	0,32	34,5	0,32	31,7
20	0,24	24,1	0,23	23,0
40	0,30	29,5	0,27	27,1
60	0,21	20,5	0,13	12,8
80	0,23	23,3	0,19	19,2
100	0,30	29,5	0,27	27,1
120	0,38	38,4	0,35	35,4

Note: Add “-MT” for BSP thread, 50 Hz configuration, i.e., “2400MT”  
Add “S50H” for slip, 50 Hz configuration, i.e., “2400S50H”

## 205 SERIES FLOW RATE-L/M

Flow	205	
	Bar	kPa
1	0,37	37,2
8	0,24	24,3
20	0,21	20,7
40	0,16	15,9
60	0,14	13,9
80	0,23	22,7
100	0,37	36,9
120	0,52	52,2
140	0,71	70,8

Note: Add “-MT” for BSP thread, 50 Hz configuration, i.e., “205MT”

## 2500 SERIES FLOW RATE-L/M

Flow	2500	
	Bar	kPa
1	0,37	37,2
8	0,24	24,3
20	0,21	20,7
40	0,16	15,9
60	0,14	13,9
80	0,23	22,7
100	0,37	36,9
120	0,52	52,2
140	0,71	70,8

Note: Add “-MT” for BSP thread, 50 Hz configuration, i.e., “2500MT”

## 2700 SERIES FLOW RATE-L/M

Flow	2706PR		2709PR	
	Bar	kPa	Bar	kPa
20	0,06	7,7	<,05	<5
40	0,22	22,2	0,07	7,4
60	0,37	36,8	0,15	15,3
80			0,31	31,0
100			0,45	45,2
Flow	2711APR/DPR		2713APR/DPR	
	Bar	kPa	Bar	kPa
1	0,34	34,5	0,34	34,5
8	0,40	40,0	0,40	40,0
20	0,29	28,5	0,15	14,7
40	0,29	28,5	0,21	21,2
60	0,36	35,9	0,17	17,0
80	0,57	56,9	0,28	28,4
100			0,44	43,7
120			0,61	60,7

## 700 SERIES FLOW RATE-L/M

Flow	700B-.75		700-1		700-1.5		700-2	
	Bar	kPa	Bar	kPa	Bar	kPa	Bar	kPa
0,38			0,15	15,2				
8	0,03	2,6	0,11	11,0				
20	0,06	6,1	0,12	12,5				
40	0,09	8,8	0,13	12,8				
60	0,15	15,4	0,16	15,7	0,02	1,5		
80	0,25	24,8	0,17	16,9	0,03	2,7		
100	0,37	36,9	0,19	19,4	0,04	3,9	0,04	4,4
120	0,51	51,2	0,24	23,9	0,05	5,2	0,05	4,7
140			0,32	31,9	0,07	6,9	0,05	5,3
160			0,43	43,4	0,08	8,3	0,06	6,0
180			0,54	54,3	0,10	9,6	0,07	6,5
200					0,11	11,3	0,07	7,1
250					0,18	18,0	0,10	9,5
300					0,26	26,1	0,14	14,0
350					0,36	35,6	0,16	15,6
400					0,47	46,7	0,26	22,8
450					0,59	59,0	0,27	26,9
500					0,73	73,1	0,32	32,4
550							0,38	38,2
600							0,44	44,1
650							0,51	51,5
700							0,60	60,0

Note: Add “-BSP” for BSP thread, 50 Hz configuration, i.e., “700-1-BSP”

## 311A SERIES FLOW RATE-L/M

Flow	311A-.75	311A-1
	Bar	Bar
4	0,4	0,4
20	0,4	0,4
40	0,6	0,5
60	0,6	0,6
75	0,8	0,7
95		0,9
115		1,3



# METRIC CONVERSIONS - VALVES

## 200B SERIES FLOW RATE-L/M

Flow	214B GLOBE		214B ANGLE		216B GLOBE		216B ANGLE		217B GLOBE		217B ANGLE	
	Bar	kPa	Bar	kPa	Bar	kPa	Bar	kPa	Bar	kPa	Bar	kPa
20	0,23	22,9	0,21	21,0								
40	0,17	17,3	0,15	14,6								
60	0,13	13,2	0,11	10,8								
80	0,19	18,6	0,15	15,2	0,21	20,7	0,19	18,6	0,14	13,7	0,14	13,7
100	0,30	29,7	0,23	22,6	0,19	19,3	0,17	16,7	0,14	13,5	0,14	13,5
150					0,16	16,1	0,14	13,8	0,12	12,0	0,12	12,0
200					0,23	22,8	0,17	17,4	0,11	10,9	0,11	10,8
250					0,32	31,6	0,24	24,1	0,14	14,3	0,12	12,1
300					0,38	38,4	0,30	30,1	0,20	20,3	0,15	14,7
375									0,33	32,9	0,22	22,2
450									0,43	43,0	0,33	33,0

Note: Add "- M" for BSP thread, 50 Hz configuration, i.e., "217B-M"

## 100 SERIES FLOW RATE-L/M

Flow	100-1 GLOBE		100-1 ANGLE	
	Bar	kPa	Bar	kPa
20	0,43	43,4	0,43	43,4
40	0,28	28,3	0,28	28,3
60	0,24	23,6	0,24	23,6
80	0,22	22,1	0,21	20,8
100	0,25	24,8	0,19	19,1
120	0,32	31,8	0,22	21,6
140	0,43	42,6	0,30	29,5
160	0,55	54,6	0,39	38,5
180	0,69	68,6	0,49	49,2
200	0,83	83,4	0,61	60,6

Flow	100-1.5 GLOBE		100-1.5 ANGLE	
	Bar	kPa	Bar	kPa
120	0,12	11,8	0,09	9,2
140	0,14	14,2	0,10	10,1
160	0,17	17,4	0,12	12,2
180	0,22	22,2	0,17	16,8
200	0,28	27,9	0,22	21,8
250	0,43	43,1	0,34	33,6
300	0,62	62,1	0,48	47,9
350	0,85	85,2	0,65	65,4
400	1,11	111,0	0,84	84,5

Flow	100-2 GLOBE		100-2 ANGLE	
	Bar	kPa	Bar	kPa
300	0,14	14,2	0,08	8,10
350	0,20	19,6	0,12	11,7
400	0,25	25,4	0,15	15,4
450	0,32	32,5	0,19	19,0
500	0,40	39,8	0,24	23,6
550	0,48	48,4	0,29	28,8

Flow	100-3 GLOBE		100-3 ANGLE	
	Bar	kPa	Bar	kPa
600	0,18	18,1	0,14	14,1
650	0,20	20,0	0,16	16,0
700	0,23	23,3	0,19	18,8
750	0,28	27,6	0,22	22,2
800	0,32	32,0	0,26	25,8
850	0,36	36,4	0,30	29,5
900	0,41	41,3	0,34	33,7
950	0,47	46,5	0,38	38,3
1000	0,52	52,3	0,43	43,1
1050	0,58	58,3	0,49	48,6
1100	0,65	65,0	0,54	54,4

## DRIP ZONE VALVE KIT FLOW RATE-L/M

MODEL	LPM (Flow)	1	19	30	57	76
2711APRDK-LF	Friction Loss (Bar)	0,21	0,34	0,34	n/a	n/a
	Min. Inlet (kPa)	2,07	2,21	2,21	2,34	2,69
2711APRDK-MF	Friction Loss (Bar)	0,21	0,34	0,34	0,48	0,90
	Min. Inlet (kPa)	2,07	2,21	2,21	2,34	2,69
2713APRDK-LF	Friction Loss (Bar)	0,21	0,34	0,34	n/a	n/a
	Min. Inlet (kPa)	2,07	2,21	2,21	2,34	2,69
2713APRDK-MF	Friction Loss (Bar)	0,21	0,34	0,34	0,34	0,55
	Min. Inlet (kPa)	2,07	2,21	2,21	2,21	2,41
2500DK-1-LF	Friction Loss (Bar)	0,21	0,21	0,21	n/a	n/a
	Min. Inlet (kPa)	2,07	2,07	2,07	2,21	2,34
2500DK-1-MF	Friction Loss (Bar)	0,21	0,21	0,21	0,31	0,48
	Min. Inlet (kPa)	2,07	2,07	2,07	2,21	2,34
700DK-1-LF	Friction Loss (Bar)	0,21	0,21	0,21	n/a	n/a
	Min. Inlet (kPa)	2,07	2,07	2,07	2,21	2,34
700DK-1-MF	Friction Loss (Bar)	0,21	0,21	0,21	0,31	0,48
	Min. Inlet (kPa)	2,07	2,07	2,07	2,21	2,34
700DK-075-LF	Friction Loss (Bar)	0,21	0,21	0,21	n/a	n/a
	Min. Inlet (kPa)	2,07	2,07	2,07	2,21	2,34

Note: Add "- BSP" for BSP thread, 50 Hz configuration, i.e., "100-1-BSP"

# METRIC CONVERSIONS - ROTORS

## 430R PERFORMANCE DATA

### 430R Rotor - Standard Nozzle

Nozzle	Bar	Radius M.	Flow L/M + 10%
0.75	2,0	6,1	3,0
	2,5	6,3	3,3
	3,0	6,5	3,8
	3,5	6,7	4,6
1.0	2,0	7,9	4,2
	2,5	8,1	4,6
	3,0	8,3	5,2
	3,5	8,6	5,7
1.5	2,0	8,8	4,5
	2,5	9,0	5,0
	3,0	9,3	5,6
	3,5	9,5	6,1
2.0	2,0	9,1	5,3
	2,5	9,3	6,0
	3,0	9,4	6,8
	3,5	9,4	7,7
3.0	2,0	10,3	8,7
	2,5	10,6	9,4
	3,0	10,7	10,4
	3,5	10,7	11,5

## 450R PERFORMANCE DATA

### 450R Rotor - Standard Nozzle

Nozzle	Flow L/M	M <sup>3</sup> /H	Bar	kPa	Radius m
0.5	1,9	0,11	2,1	206	8,5
	2,3	0,14	2,8	275	8,8
	2,7	0,15	3,4	344	8,8
	3,0	0,18	4,1	413	9,1
0.75	2,6	0,16	2,1	206	8,8
	3,0	0,18	2,8	275	9,1
	3,4	0,20	3,4	344	9,1
	3,8	0,23	4,1	413	9,4
1	3,4	0,20	2,1	206	9,1
	3,8	0,23	2,8	275	9,4
	4,5	0,27	3,4	344	9,4
	4,9	0,30	4,1	413	9,8
2	4,5	0,27	2,1	206	9,8
	5,3	0,32	2,8	275	10,1
	6,1	0,36	3,4	344	10,4
3	6,8	0,41	4,1	413	10,4
	7,6	0,45	2,1	206	11,0
	9,1	0,55	2,8	275	11,6
4	10,2	0,61	3,4	344	12,2
	11,0	0,66	4,1	413	12,2
	11,0	0,66	4,1	413	12,2
6	9,8	0,59	2,1	206	11,0
	11,4	0,68	2,8	275	12,2
	12,9	0,77	3,4	344	12,8
8	14,0	0,84	4,1	413	12,8
	15,9	0,91	2,1	206	11,6
	18,5	1,11	2,8	275	13,1
8	20,8	1,25	3,4	311	14,0
	22,7	1,36	4,1	413	14,3
	22,7	1,36	2,8	275	13,7
8	25,7	1,54	3,4	344	14,6
	28,8	1,73	4,1	413	14,9
	31,0	1,86	4,8	482	15,5

### 450R Rotor - Low Angle Nozzle

Nozzle	Flow L/M	M <sup>3</sup> /H	Bar	kPa	Radius m
1.0 LA	4,5	0,34	2,0	207	6,7
	6,4	0,39	3,0	275	7,3
	6,8	0,41	3,5	344	7,9
	7,6	0,46	4,0	41	8,5
3.0 LA	11,4	0,68	2,0	207	8,8
	11,7	0,71	3,0	275	9,8
	13,2	0,80	3,5	344	10,7
4.0 LA	14,4	0,87	4,0	413	11,3
	12,9	0,78	2,0	207	9,4
	14,8	0,89	3,0	275	10,4
6.0 LA	16,7	1,00	3,5	344	11,3
	17,8	1,07	4,0	413	11,6
	24,6	1,68	3,0	275	11,6
6.0 LA	27,6	1,66	3,5	344	12,2
	30,3	1,82	4,0	413	12,8
	32,6	1,96	5,0	482	13,4

# METRIC CONVERSIONS - ROTORS

## 550R PERFORMANCE DATA

### 550R Rotor - Standard Nozzle

Nozzle	Pressure Bar	Radius m	Flow m <sup>3</sup> /hr	Flow l/m	Precip. ■ mm/hr	Precip. ▲ mm/hr
1.5	1,7	10,10	0,25	4,2	5	6
	2,0	10,20	0,28	4,8	5	6
	2,5	10,40	0,31	5,4	6	7
	3,0	10,60	0,34	6,0	6	7
	3,5	10,70	0,37	6,0	7	8
	4,0	10,60	0,40	6,6	7	8
2.0	4,5	10,40	0,42	7,2	8	9
	1,7	10,70	0,34	5,4	6	7
	2,0	10,80	0,36	6,0	6	7
	2,5	11,00	0,41	6,6	7	8
	3,0	11,20	0,45	7,8	7	8
	3,5	11,30	0,49	8,4	8	9
2.5	4,0	11,10	0,42	9,0	8	10
	4,5	10,70	0,55	9,0	10	11
	1,7	10,70	0,41	6,6	7	8
	2,0	10,90	0,44	7,2	7	8
	2,5	11,30	0,50	8,4	8	9
	3,0	11,30	0,56	9,6	9	10
3.0	3,5	11,30	0,60	10,2	9	11
	4,0	11,30	0,64	10,8	10	12
	4,5	11,30	0,68	11,4	11	12
	1,7	11,00	0,51	8,4	8	10
	2,0	11,20	0,55	9,0	9	10
	2,5	11,20	0,62	10,2	9	11
4.0	3,0	12,10	0,69	11,4	9	11
	3,5	12,20	0,74	12,6	10	12
	4,0	12,20	0,80	13,2	11	12
	4,5	12,20	0,84	13,8	11	13
	1,7	11,30	0,66	10,8	10	12
	2,0	11,60	0,71	12,0	11	12
5.0	2,5	12,30	0,81	13,2	11	13
	3,0	12,70	0,89	15,0	11	13
	3,5	12,80	0,97	16,2	12	14
	4,0	12,80	1,04	17,4	13	15
	4,5	12,80	1,10	18,0	13	15
	1,7	11,90	0,84	13,8	12	14
6.0	2,0	12,10	0,91	15	12	14
	2,5	12,70	1,03	17,4	13	15
	3,0	13,50	1,13	18,6	12	14
	3,5	13,70	1,23	20,4	13	15
	4,0	13,70	1,32	22,2	14	16
	4,5	13,70	1,40	23,4	15	17
8.0	1,7	11,90	0,97	16,2	14	16
	2,0	12,40	1,05	17,4	14	16
	2,5	13,20	1,21	20,4	14	16
	3,0	13,90	1,34	22,2	14	16
	3,5	14,20	1,45	24,0	14	17
	4,0	14,90	1,55	25,8	15	17
10.0	4,5	14,60	1,64	28,2	15	18
	1,7	11,00	1,34	22,2	22	26
	2,0	11,80	1,45	24,0	21	24
	2,5	13,30	1,63	27,0	19	21
	3,0	14,10	1,79	30,0	18	21
	3,5	14,90	1,93	32,4	18	20
12.0	4,0	15,20	2,06	34,2	18	21
	4,5	15,20	2,19	36,6	19	22

### 550R Rotor - Low Angle Nozzle

Nozzle	Pressure Bar	Radius m	Flow m <sup>3</sup> /hr	Flow l/m	Precip. ■ mm/hr	Precip. ▲ mm/hr
1.0 LA	1,7	7,60	0,17	3,0	6	7
	2,0	8,00	0,18	3,0	6	6
	2,5	8,60	0,20	3,6	5	6
	3,0	8,80	0,22	3,6	6	7
	3,5	8,80	0,24	4,2	6	7
	4,0	8,80	0,26	4,2	7	8
1.5 LA	4,5	8,80	0,27	4,8	7	8
	1,7	8,20	0,26	4,2	8	9
	2,0	8,60	0,28	4,8	8	9
	2,5	9,20	0,32	5,4	8	9
	3,0	9,40	0,35	6,0	8	9
	3,5	9,40	0,38	6,6	9	10
2.0 LA	4,0	9,40	0,41	6,6	9	11
	4,5	9,40	0,44	7,2	10	11
	1,7	8,80	0,33	5,4	9	10
	2,0	9,10	0,36	6,0	9	10
	2,5	9,50	0,41	6,6	9	10
	3,0	9,70	0,45	7,8	10	11
3.0 LA	3,5	9,90	0,49	8,4	10	11
	4,0	10,10	0,52	9,0	10	12
	4,5	10,10	0,56	9,0	11	13
	1,7	8,80	0,51	8,4	13	15
	2,0	9,30	0,55	9,0	13	15
	2,5	10,10	0,62	10,2	12	14
4.0 LA	3,0	10,60	0,68	11,4	12	14
	3,5	10,80	0,74	12,6	3	15
5.0 LA	4,0	11,00	0,80	13,2	13	15
	4,5	11,00	0,84	13,8	14	16

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

Note: Data collected in zero wind conditions

## PLATINUM SPORT PERFORMANCE DATA

### Platinum Sport Rotor - Standard Nozzle

Nozzle	Pressure Bar	Flow L/M +/-10%
7	3.4	1.36
	4.1	1.60
	4.8	1.60
	5.5	1.82
	6.2	1.82
9	6.9	2.04
	3.4	1.60
	4.1	1.82
	4.8	2.04
	5.5	2.04
12	6.2	2.04
	6.9	2.27
	3.4	2.73
	4.1	3.00
	4.8	3.00
16	5.5	3.20
	6.2	3.20
	6.9	3.40
	3.4	3.20
	4.1	3.40
20	4.8	3.40
	5.5	3.63
	6.2	3.63
	6.9	3.86
	3.4	3.86
24	4.1	4.10
	4.8	4.54
	5.5	4.77
	6.2	5.22
	6.9	5.45
27	3.4	4.32
	4.1	4.77
	4.8	5.22
	5.5	5.45
	6.2	5.91
30	6.9	5.91
	3.4	5.22
	4.1	5.45
	4.8	5.91
	5.5	6.13
36	6.2	6.59
	6.9	6.81





## 533 BUBBLER PERFORMANCE DATA

	90° Adjustment	180° Adjustment	270° Adjustment	360° Adjustment
Bar	L/M	L/M	L/M	L/M
1	5,15	8,97	9,65	11,24
1,5	5,91	10,41	12,53	13,06
1,75	6,7	11,51	14,04	14,61
2	7,31	12,79	15,33	16,35
2,5	7,61	13,59	16,54	20,86
2,75	8,52	13,40	17,79	22,33





# METRIC CONVERSIONS – SPRAY NOZZLES

## I-PRO NOZZLE PERFORMANCE





### 5' Series with 0° Trajectory ●

IPN-5	Bar	kPa	kg/cm <sup>2</sup>	Flow l/m	Radius m
IPN-5F 	1,5	150	1,53	1,03	1,3
	2,0	200	2,04	1,39	1,5
	2,5	250	2,55	1,60	1,6
	3,0	300	3,06	1,81	1,7
	3,5	350	3,57	2,03	1,8
IPN-5H 	1,5	150	1,53	0,44	1,3
	2,0	200	2,04	0,69	1,5
	2,5	250	2,55	0,81	1,6
	3,0	300	3,06	0,92	1,7
	3,5	350	3,57	1,03	1,8
IPN-5T 	1,5	150	1,53	0,30	1,3
	2,0	200	2,04	0,44	1,5
	2,5	250	2,55	0,55	1,6
	3,0	300	3,06	0,66	1,7
	3,5	350	3,57	0,77	1,8
IPN-5Q 	1,5	150	1,53	0,22	1,3
	2,0	200	2,04	0,33	1,5
	2,5	250	2,55	0,41	1,6
	3,0	300	3,06	0,49	1,7
	3,5	350	3,57	0,58	1,8







### 8' Series with 5° Trajectory ●

IPN-8	Bar	kPa	kg/cm <sup>2</sup>	Flow l/m	Radius m
IPN-8F 	1,5	150	1,53	2,97	2,2
	2,0	200	2,04	3,69	2,4
	2,5	250	2,55	4,16	2,5
	3,0	300	3,06	4,58	2,6
	3,5	350	3,57	4,96	2,8
IPN-8H 	1,5	150	1,53	1,49	2,3
	2,0	200	2,04	1,84	2,4
	2,5	250	2,55	2,08	2,5
	3,0	300	3,06	2,29	2,6
	3,5	350	3,57	2,48	2,8
IPN-8T 	1,5	150	1,53	0,92	2,2
	2,0	200	2,04	1,11	2,4
	2,5	250	2,55	1,28	2,5
	3,0	300	3,06	1,42	2,6
	3,5	350	3,57	1,53	2,8
IPN-8Q 	1,5	150	1,53	0,69	2,2
	2,0	200	2,04	0,88	2,4
	2,5	250	2,55	0,96	2,5
	3,0	300	3,06	1,02	2,6
	3,5	350	3,57	1,11	2,8







### 10' Series with 12° Trajectory ●

IPN-10	Bar	kPa	kg/cm <sup>2</sup>	Flow L/M	Radius m
IPN-10F 	1,5	150	1,53	4,45	2,7
	2,0	200	2,04	5,50	3,0
	2,5	250	2,55	5,92	3,1
	3,0	300	3,06	6,41	3,3
	3,5	350	3,57	7,07	3,4
IPN-10H 	1,5	150	1,53	2,34	2,8
	2,0	200	2,04	2,65	3,0
	2,5	250	2,55	3,02	3,2
	3,0	300	3,06	3,40	3,4
	3,5	350	3,57	3,79	3,5
IPN-10T 	1,5	150	1,53	1,66	2,8
	2,0	200	2,04	1,93	3,0
	2,5	250	2,55	2,28	3,2
	3,0	300	3,06	2,59	3,5
	3,5	350	3,57	2,87	3,7
IPN-10Q 	1,5	150	1,53	1,20	2,8
	2,0	200	2,04	1,48	3,0
	2,5	250	2,55	1,75	3,2
	3,0	300	3,06	2,03	3,5
	3,5	350	3,57	2,30	3,7

### 12' Series with 23° Trajectory ●

IPN-12	Bar	kPa	kg/cm <sup>2</sup>	Flow l/m	Radius m
IPN-12F 	1,5	150	1,53	6,67	3,4
	2,0	200	2,04	8,09	3,6
	2,5	250	2,55	8,67	3,8
	3,0	300	3,06	9,36	3,9
	3,5	350	3,57	10,32	4,0
IPN-12TQ 	1,5	150	1,53	4,31	3,3
	2,0	200	2,04	5,68	3,6
	2,5	250	2,55	6,10	3,8
	3,0	300	3,06	6,44	3,9
	3,5	350	3,57	6,86	4,0
IPN-12TT 	1,5	150	1,53	4,46	3,4
	2,0	200	2,04	5,36	3,6
	2,5	250	2,55	5,91	3,8
	3,0	300	3,06	6,40	3,9
	3,5	350	3,57	6,86	4,0
IPN-12H 	1,5	150	1,53	3,69	3,4
	2,0	200	2,04	4,07	3,6
	2,5	250	2,55	4,62	3,8
	3,0	300	3,06	5,25	4,1
	3,5	350	3,57	5,94	4,3
IPN-12T 	1,5	150	1,53	2,26	3,4
	2,0	200	2,04	2,67	3,6
	2,5	250	2,55	3,08	3,8
	3,0	300	3,06	3,43	3,9
	3,5	350	3,57	3,70	4,0
IPN-12Q 	1,5	150	1,53	1,58	3,4
	2,0	200	2,04	1,85	3,6
	2,5	250	2,55	2,13	3,8
	3,0	300	3,06	2,31	4,0
	3,5	350	3,57	2,39	4,0

### 15' Series with 27° Trajectory ●

IPN-15	Bar	kPa	kg/cm <sup>2</sup>	Flow l/m	Radius m
IPN-15F 	1,5	150	1,53	11,29	4,1
	2,0	200	2,04	13,34	4,5
	2,5	250	2,55	15,05	4,8
	3,0	300	3,06	16,40	4,9
	3,5	350	3,57	17,45	4,9
IPN-15TQ 	1,5	150	1,53	8,28	4,1
	2,0	200	2,04	9,65	4,5
	2,5	250	2,55	10,79	4,7
	3,0	300	3,06	11,89	4,8
	3,5	350	3,57	12,98	4,9
IPN-15TT 	1,5	150	1,53	7,02	4,3
	2,0	200	2,04	8,17	4,5
	2,5	250	2,55	9,42	4,8
	3,0	300	3,06	10,31	4,9
	3,5	350	3,57	10,80	4,9
IPN-15H 	1,5	150	1,53	5,37	4,1
	2,0	200	2,04	6,14	4,5
	2,5	250	2,55	7,12	4,8
	3,0	300	3,06	7,81	4,9
	3,5	350	3,57	8,13	4,9
IPN-15T 	1,5	150	1,53	3,70	4,2
	2,0	200	2,04	4,11	4,5
	2,5	250	2,55	4,64	4,7
	3,0	300	3,06	5,12	4,7
	3,5	350	3,57	5,53	4,7
IPN-15Q 	1,5	150	1,53	2,69	4,3
	2,0	200	2,04	3,15	4,5
	2,5	250	2,55	3,67	4,8
	3,0	300	3,06	4,19	4,9
	3,5	350	3,57	4,71	4,9

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw



# METRIC CONVERSIONS – SPRAY NOZZLES

## PRO-VAN NOZZLE PERFORMANCE

### 8' Series with 5° Trajectory ●

Pro-VAN 8	Pressure kPa	Radius Bar	Radius Meters	Flow L/M	Precip. ■ cm/h	Precip. ▲ cm/h
360°	137	1,4	2,1	6,51	6,58	9,59
	206	2,1	2,1	8,06	8,13	9,40
	275	2,8	2,7	9,39	9,47	10,95
	345	3,4	2,7	10,52	10,62	12,27
270°	137	1,4	2,1	5,15	6,93	8,00
	206	2,1	2,7	6,25	8,41	9,70
	275	2,8	2,7	7,15	9,63	11,13
	345	3,4	2,7	8,06	10,85	12,52
180°	137	1,4	2,7	3,29	6,65	7,67
	206	2,1	2,7	4,05	8,18	9,45
	275	2,8	2,7	4,66	9,40	10,85
	345	3,4	2,7	5,22	10,54	12,17
90°	137	1,4	2,7	2,00	8,10	9,35
	206	2,1	3,0	2,42	9,78	11,30
	275	2,8	3,0	2,73	11,00	12,70
	345	3,4	3,0	2,95	11,91	13,77

### 10' Series with 10° Trajectory ●

Pro-VAN 10	Pressure kPa	Radius Bar	Radius Meters	Flow L/M	Precip. ■ cm/h	Precip. ▲ cm/h
360°	137	1,4	3,0	7,50	4,85	5,59
	206	2,1	3,0	9,12	5,89	6,81
	275	2,8	3,4	12,08	7,80	9,02
	345	3,4	3,7	13,59	8,79	10,13
270°	137	1,4	3,0	6,06	5,33	6,10
	206	2,1	3,4	7,38	6,35	7,37
	275	2,8	3,7	8,56	7,37	8,38
	345	3,4	3,7	9,54	8,13	9,40
180°	137	1,4	3,0	4,28	5,34	6,35
	206	2,1	3,4	5,22	6,76	7,80
	275	2,8	3,7	5,98	7,72	8,92
	345	3,4	3,7	6,70	8,66	9,98
90°	137	1,4	3,4	2,35	6,07	7,01
	206	2,1	3,7	2,91	7,52	8,69
	275	2,8	3,7	3,37	8,71	10,69
	345	3,4	4,0	3,79	9,80	11,30

### 12' Series with 15° Trajectory ●

Pro-VAN 12	Pressure kPa	Radius Bar	Radius Meters	Flow L/M	Precip. ■ cm/h	Precip. ▲ cm/h
360°	137	1,4	3,4	8,56	3,84	4,42
	206	2,1	3,7	10,56	4,72	5,46
	275	2,8	4,0	12,11	5,44	6,27
	345	3,4	4,0	13,70	6,15	7,09
270°	137	1,4	3,4	7,00	4,20	4,83
	206	2,1	3,7	8,67	5,18	5,99
	275	2,8	4,0	9,99	5,97	6,91
	345	3,4	4,0	11,28	6,76	7,80
180°	137	1,4	3,4	5,03	4,52	5,21
	206	2,1	3,7	6,17	5,54	6,40
	275	2,8	4,0	7,15	6,43	7,42
	345	3,4	4,3	8,03	7,19	8,31
90°	137	1,4	3,7	2,84	5,11	5,89
	206	2,1	4,0	3,52	6,32	7,29
	275	2,8	4,3	4,13	7,19	8,31
	345	3,4	4,3	4,58	8,23	9,50

### 15' Series with 20° Trajectory ●

Pro-VAN 15	Pressure kPa	Radius Bar	Radius Meters	Flow L/M	Precip. ■ cm/h	Precip. ▲ cm/h
360°	137	1,4	4,3	10,45	3,00	3,45
	206	2,1	4,6	12,68	3,63	4,19
	275	2,8	4,6	14,65	4,22	4,85
	345	3,4	4,9	16,32	4,67	5,41
270°	137	1,4	4,3	8,93	3,43	3,94
	206	2,1	4,6	10,83	4,19	4,83
	275	2,8	4,9	12,49	4,78	5,51
	345	3,4	4,9	14,12	5,41	6,25
180°	137	1,4	4,6	6,44	3,68	4,27
	206	2,1	4,9	7,91	4,55	5,23
	275	2,8	4,9	9,16	5,26	6,07
	345	3,4	5,2	1,26	5,89	6,81
90°	137	1,4	4,6	3,75	4,29	4,98
	206	2,1	4,9	5,54	5,21	6,02
	275	2,8	5,2	5,30	6,10	7,04
	345	3,4	5,2	5,91	6,78	7,82

### 17' Series with 26° Trajectory ●

Pro-VAN 17	Pressure kPa	Radius Bar	Radius Meters	Flow L/M	Precip. ■ cm/h	Precip. ▲ cm/h
360°	137	1,4	4,3	10,45	2,46	2,84
	206	2,1	4,9	12,68	3,05	3,51
	275	2,8	5,2	14,65	3,48	4,01
	345	3,4	5,2	16,32	3,89	4,50
270°	137	1,4	4,3	8,93	2,82	3,25
	206	2,1	4,9	10,83	3,51	4,04
	275	2,8	5,2	12,49	4,06	4,70
	345	3,4	5,2	14,12	4,52	5,21
180°	137	1,4	4,6	6,44	3,23	3,71
	206	2,1	5,2	7,91	4,06	4,70
	275	2,8	5,2	9,16	4,57	5,28
	345	3,4	5,5	10,26	5,08	5,89
90°	137	1,4	4,6	3,75	4,06	4,70
	206	2,1	5,2	4,54	5,08	5,89
	275	2,8	5,5	5,30	5,74	6,65
	345	3,4	5,5	5,91	6,43	7,42

1. Precipitation rates based on half-circle operation
2. ■ square spacing based on 50% diameter of throw
3. ▲ triangular spacing based on 50% diameter of throw

## SUPER BLUE FLEX ASSEMBLY FRICTION LOSS DATA

MODELS	DESCRIPTION	L/M Flow				
		5	10	15	20	25
B-FLEX8-05	203mm x 13mm Male x 13mm Street Ell	0,43	1,47	3,19	6,58	10,74
B-FLEX12-05	305mm x 13mm Male x 13mm Street Ell	0,57	1,96	4,21	8,75	14,29
B-FLEX8-0575	203mm x 13mm Male x 20mm Street Ell	0,54	1,72	4,06	8,51	14,04
B-FLEX12-0575	305mm x 13mm Male x 13mm Street Ell	0,68	2,26	5,42	11,31	18,71

# SPECIFICATIONS

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BIDDING SPECS.

## PC CONTROL SERIES

Automatic controller(s) shall be the PC Control Series with 12, 24, 36 or 48 available stations (up to four 12-station controllers in one system) as manufactured under the brand name Irritrol to be installed or wired in accordance with applicable electrical codes and manufacturer's published instructions.

**Operation:** Controller(s) shall be programmable through the use of a personal computer with an interactive graphic user interface (GUI) that utilizes digital photos of the irrigation zones in the owner's yard and/or garden and shall provide week-at-a-glance program visibility as well as point-and-click and drag-and-drop methods of placing and adjusting stations with the computer's mouse and cursor. From the computer, system capabilities shall include but shall not be limited to, establishing, storing and transmitting automatic irrigation programs, running real time status checks and commanding manual operations. The system shall provide 2-way, wireless communication between the personal computer in the owner's home and the controller(s) elsewhere on the property. PIN numbers (from 0001 to 9999) shall be selectable for unique system addresses to prevent interference from similar systems or unauthorized access. The current schedule shall be stored in the controller's non-volatile memory, to allow the computer to be used for other purposes, as well as in the PC's program. A remote control device shall be included and required for system communication and shall be connectable to the PC via a USB cord or used, handheld, for manual commands to the controller while on site. The remote's range shall be up to one thousand (1000) feet line-of-sight.

Through the personal computer, the control system shall be Internet connectable and shall provide access to program updates and help line(s) and shall provide the capability of sending irrigation schedules over the Internet. Also through the PC, the system's Scheduling Advisor™ shall provide a method for retrieving weather forecast information over the Internet and manually applying the information to the irrigation schedule of any selected zone(s).

The schedule for each of the controller's stations shall be independent of the others with, per zone, water day options of any-days-of-the-week,

## SMART DIAL™ SERIES

Automatic controller(s) shall be the Smart Dial Series with 6, 9 or 12 stations in indoor (INT) or outdoor (EXT) model(s) or 24-station outdoor model as manufactured under the brand name of Irritrol to be installed or wired in accordance with manufacturer's published instructions and applicable electrical codes.

**Operation:** Controller shall have the capability of receiving daily downloads of local, weather-related data from an orbiting satellite and shall have the WeatherTRAK® capability of automatically reprogramming its irrigation schedule to closely parallel the changes in the local weather and evapotranspiration rate. The downloaded data shall be supplied for a fee through the subscription service of ET Everywhere™ as supplied by Hydro Point Data Systems. Controller shall have automatic, semi-automatic and manual operation and shall provide a programming interface consisting of a large, 3-line display, a rotary dial, two knobs and a "Copy" button for ease of programming. Controller shall allow the programmer to enter data for each station (zone) to include: type of watering device,

Odd or Even date or day interval watering with a range from "1" (every day) to "30" (water every 30 days) in 1-day increments. Any days of the week shall be selectable as non-water days. Each station shall have ten (10) available start times per day, each of which shall be independently adjustable for duration of running time. Each station's timing range shall be from one (1) minute minimum up to 24 hours. A water budget feature shall be available for adjusting the station run times for the entire system by percentages as well as a "Wetter/Drier" slide adjustment per station. In addition to controlling irrigation, the system shall offer the option of up to three stations for landscape lighting switch control. A designated landscape lighting station shall not respond to a rain sensor, to the Scheduling Advisor™, to Odd/Even date or day interval schedules or to "non-water day" settings.

The PC Control system shall be compatible with a normally-closed rain sensor. In the case of a multiple-controller system, only one sensor is required and shall be connected to the controller designated as number one (#1) in the set up process. Indication of irrigation shutoff via sensor shall be viewable at the PC, at the handheld remote and at the controller. Controller shall have a master valve/pump start circuit assignable to individual stations. Delay between station operations, as selected by the operator, shall be visible on the weekly schedule field.

**Construction:** The system shall consist of a disk with software, the remote control device, its desktop stand and USB cord and either outdoor or indoor controller(s). The remote device and the controller(s) shall be made of durable, impact-resistant plastic.

**Electric:** Transformer input shall be 120 V ac, 60Hz for domestic models and shall have an output of 24 V ac (30VA). The maximum output per station shall be 24 V ac, .4 amp. Maximum total output shall be 24 V ac, 1 amp including the master valve. Station load capacity shall be the master valve circuit, one irrigation zone valve and an additional 0.1 amp for an Irritrol SR-1 relay for landscape light switching. Controller(s) shall have a diagnostic circuit breaker system that shall sense an electrical short circuit in the valve solenoids or field wires, shut off and identify the "shorted" station, and continue to water operable stations as scheduled.

soil type, plant type, solar aspect and slope factor with default and/or adjustable custom settings for each of the site specific values. Controller shall provide the feature of adjustable settings for manual watering of single or multiple stations, station watering time adjustments in 1-minute increments up to 99 minutes as well as time adjustments by percentages, active water day adjustments by weekday (7-day calendar) by month, Odd/Even date or day interval between water days from 1 day (every day watering) up to once every 30 days. Controller shall provide a method for establishing a watering time window in which the irrigation cycles shall automatically occur to avoid irrigation operations crossing into watering restricted time. Controller shall have a non-volatile memory to maintain the program memory in the absence of A.C. power and shall have alert functions for short circuit detection and programming conflicts. Controller shall be compatible with normally closed rain sensors and shall provide screw-terminal connections for two sensor wires and shall provide a sensor bypass switch. Controller shall provide a program review mode, a feature for cycling irrigation and then allowing a "soak in" before an-



other application, a "Help" feature for assisting in programming, a master valve/pump start circuit, a "stacking" function for sequential operation of overlapping programs, and a protection system to reduce the risk of damage from electrical surges through input or output lines.

**Construction:** Outdoor models shall be enclosed in UV and weather-resistant, locking cabinets with built-in transformers. Indoor models shall be enclosed in durable cabinets with external, plug-in type transformers.

## RAIN DIAL®-R SERIES

Automatic controller shall be Rain Dial RD series with 6, 9 or 12 station in the indoor (INT) or the outdoor (EXT) model as manufactured under the brand name Irritrol to be installed and wired in accordance to local/national electrical codes and manufacturer's published instructions.

**Operation:** Controller shall have automatic, semi-automatic and manual operational control. Controller shall have 365-day calendar capability to provide the option of odd or even date watering in addition to "week day" and "skip day" (day interval) watering. The controller shall have three (3) independent programs with the option of running them concurrently or disallowing overlap. Programs shall have three (3) start times each available per day for a total of nine (9) start times per day. Running time per station shall be adjustable across a range of 1 to 59 minutes (in 1-minute increments) and .1 to 5.9 hours in .1 hour (6-minute) increments. Controller shall have non-volatile memory for maintaining the user's program during a power outage and shall maintain time and date and provide "armchair" programming utilizing a 9-volt circuit for a battery. Controller shall provide a master valve/pump start circuit with the following control options: pump assignable per station and delay between stations with the option of the pump circuit on or off during the delay. Controller shall have a water budgeting feature that allows the running time of all stations on a program to be adjusted up or down (in 10% increments)

## TOTAL CONTROL®-R SERIES

Automatic controller(s) shall be model Total Control TC Series with stations 6, 9 or 12 in the indoor (IN-R) or outdoor (EX-R) model or stations 15, 18 or 24 in the outdoor (EX-R) model as manufactured under the brand name of Irritrol to be installed or wired in accordance with manufacturer's published instructions and applicable codes.

**Operation:** Controller shall be electronically controlled and have 4 independent watering programs that can run concurrently with each station's watering time independently variable from 1 minute to 10 hours in 1-minute increments. Controller shall also have programmable watering calendar options of 7-day specific, odd/even date or day interval options of 1 to 30 days. Clock shall have 365-day calendar for true unattended odd/even date programming with automatic leap year compensation. Controller shall have 16 total start times assignable to any program(s). Controller shall have a water budgeting feature that changes all stations within a program by a percentage from 10 to 200% in 10% increments without permanently altering the program. Controller shall have a "Valve Test" terminal. Controller shall have a programmable "Rain Off" up to 7 days. Programs shall be held in non-volatile memory throughout power failures of any duration. Controller shall have real-time battery (alkaline) backup capable of keeping accurate time during power failures up to 90 continuous days. Controller shall have a self-diagnostic electronic circuit breaker with valve-short detection that identifies

**Electrical:** Transformer input shall be 120 V ac 60Hz. Maximum output per station shall be 24 V ac, 0.5 amp per station, 0.375 amps for master valve, 1.0 amps total (1.0 amp, 30 VA at 24 V ac, including 0.375 amps for the master valve /pump start).

at the same time. Controller shall have a self-diagnostic circuit breaker with station wire and valve short circuit protection that identifies and skips a station with an electrical "short" and continues to water operable stations. Controller shall have an "all-stations-test" program allowing a semi-automatic run of all stations in sequence for a settable amount of time and shall have a manual feature for advancing operation up through the stations. Controller shall be compatible with normally closed, wired and wireless rain sensors of the same manufacturer and shall have a sensor bypass switch. Controller shall have a rain delay feature allowing a settable delay in operations from 1 to 9 days after which the watering schedules are automatically resumed. The controller shall have a modular (enclosed) interchangeable front panel design.

**Construction:** Outdoor models shall be enclosed in a weather-resistant, locking case with built-in transformer. Indoor models shall be enclosed in a durable, plastic case with a plug-in style, 24 V ac output transformer.

**Electric:** Transformer input shall be 120V ac, 60Hz (220/240V ac, 50Hz internationally). Maximum output per station shall be 24V ac, 0.5 amps. Maximum total output to the valves shall be 24V ac, 1.0 amp (including master valve). Controller shall have an electrical surge protection system to resist damage from power surges and electrical storms.

and overrides an electrical malfunction. Programming shall be available in automatic, semi-automatic, single station timed manual and true manual operation. All programming shall be accomplished by use of a simple programming dial and selection buttons with a large LCD for ease of programming. Controller shall have start time stacking within each program, a pump start, programmable master valve and sensor hook up. Controller shall have modular design/enclosed electronics and remote control compatibility.

**Construction:** Outdoor controllers shall be enclosed in a weather-resistant plastic case with lock and key. Indoor models shall be enclosed in a plastic cabinet with a 24-volt plug-in transformer.

**Electric:** TC-6EX-R, TC-9EX-R, TC-12EX-R, TC-15EX-R, TC-18EX-R, and TC-24EX-R transformer input shall be 120 V ac, 60Hz (220/240 V ac, 50Hz). Transformer output shall be 24 V ac, 1.67 amps. TC-6IN-R, TC-9IN-R and TC-12IN-R transformer input shall be 120 V ac, 60Hz (220/240 V ac, 50Hz). Transformer output shall be 24 V ac, 1.25 amps. Electronic circuit breaker shall be 1.25 amps minimum holding. Maximum output per station shall be 24 V ac, .5 amp. Maximum operating output to all valves shall be 24 V ac, 1.25 amp (including master valve). Controller shall have two-stage primary and secondary surge protection to resist damage from power surges and electrical storms.

# CLIMATE LOGIC™ WEATHER SYSTEM (CL-100-WIRELESS)

The weather monitoring system shall be the CLIMATE LOGIC™ series as manufactured under the Irritrol brand name and installed with compatible irrigation controllers in accordance with manufacturer's instructions.

**Operation:** The system shall consist of a remote weather sensor/transmitter that wirelessly communicates weather information to a receiver module which is plugged into the irrigation controller. The weather sensor shall have the capability of detecting the amount of rainfall, set by the user, which will initiate shutdown of irrigation. The weather sensor shall also have a device for monitoring solar exposure and another for air temperature. The weather sensor shall be able to transmit the data from each of the above devices to the receiver module for processing. The module shall input the processed information as commands to the irrigation controller. System capabilities shall include, but not be limited to, irrigation system shut down because of rain (precipitation level set by user), irrigation system shut down because of cold weather (temperature level set by user) and adjusting the irrigation controller's water budget percentage to the weather data for appropriate running time lengths for each zone or station. The receiver module shall allow the user to do, but not be limited to, the following: enter the postal zip code or latitude for the irrigation site, to select English or Spanish language support, to select the "dry out" time following system shut down because of rain,

to select the cold weather shutoff temperature, to set the PIN number for reception from an optional remote device, to set a water restriction time, to establish communication with the weather sensor, to observe the outside air temperature, to observe the percentage of the hottest month's water budget currently in use, to observe the signal indicator and to bypass the weather sensor. Setup for the system shall require the controller to be programmed for the hottest time of year for the location and zones or stations be assigned to Program A. After establishment of communication between the module and the weather sensor, the weather sensor must be installed outside where it can receive full sun and unsheltered rain fall. Wireless signal range shall be a maximum of 1,000 feet uninterrupted line of sight. Objects or interference may decrease range. One weather sensor shall be capable of communicating with multiple receiver modules.

**Electrical:** The receiver module shall be powered by the controller. The weather sensor shall be battery powered. Battery shall be easily accessible for replacement.

**Construction:** The weather sensor shall be constructed of a polymer suitable for outdoor mount in full sun. The receiver module shall be so constructed for weather resistance as to be suitable for indoor or outdoor installation.

## KWIKDIAL® SERIES

Automatic controller(s) shall be the KwikDial Series with (4,6,9 or 12) stations in indoor (INT) or outdoor (EXT) model(s) as manufactured under the brand name of Irritrol to be installed or wired in accordance with manufacturer's published instructions and applicable local codes.

**Operation:** Controller shall have automatic, semi-automatic and manual operation. Controller shall have a 365-day calendar and accommodate the following types of water day schedules: day-of-the-week watering, odd or even date watering and any day interval watering from daily (1-day interval) to as little as once every 31 days. In odd and even day watering modes, the controller shall allow specific weekdays to be set as non-watering days (i.e., water on all odd dates but not on Saturdays). The controller shall have 3 independent programs with a "program stacking" feature that stores programs for sequential operation to prevent overlapping program activation. Station capacity shall be one station valve plus a master valve on at the same time. Programs shall have 3 start times per day each for a total availability of 9 daily start times. Each station's watering duration shall be settable, in 1-minute increments, from zero (station off) up to 240 minutes (4 hours). The water budgeting feature shall allow percentage adjustments per individual program from 0% program off up to 200% (double the runtime). Controller shall require neither a battery nor a fuse (to reduce servicing needs) and shall have a diagnostic circuit breaker to identify and override field wire faults. Controller shall have a built-in memory to provide a minimum of 24

hours of time keeping and program retention in the absence of AC power. Controller shall also have electrical surge protection for both input and output lines. Controller shall have manual operations capable of starting an "all stations" test run and of turning off the controller. Controller shall provide terminals for connection to a remotely located rain or soil moisture sensor system and shall have a sensor bypass switch. Controller shall be compatible with an optional remote control system under the same brand name. All programming shall be accomplished by use of a dial and 4 buttons with a large liquid crystal display (LCD). Controller shall have multi-language display capabilities (English, Spanish, French, German and Italian). Controller shall be UL, CUL, CE and C-tick listed.

**Construction:** Outdoor models shall be enclosed in a weather-resistant case, with provision for a user-supplied padlock. Outdoor models shall have an internally mounted transformer that shall supply a 24 V ac output. Indoor models shall have a plug-in-style transformer and shall output 24 V ac.

**Electric:** Transformer input shall be 120 V ac, 60Hz (230/240 V ac, 50Hz for European and Australian models). Maximum output per station shall be 0.4 amp. Maximum total output to valves shall be 24 V ac, 0.80 amp (including master valve). Controller shall have a self-diagnosed electronic circuit breaker system with valve "short" detection that identifies and overrides an electrical malfunction of a valve. Controller shall have an electrical surge protection system to resist damage from power surges and electrical storms.

## JUNIOR DC™ SERIES

The automatic controller shall be Junior DC series with 1 and 4 station models as manufactured under the Irritrol brand name and installed in accordance with local codes and manufacturer's instructions.

**Operation:** Controller shall be battery-operated, requiring no A.C. power, and shall have automatic, semiautomatic and manual operational modes. Two mounting devices shall be provided with each controller: a solenoid bracket for mounting controller directly on the valve solenoid and a wall-mount bracket for controller attachment to a flat surface. Because of its valve-mount option, controller shall be sufficiently waterproof to provide reliable operation down in a valve box, despite occasional flooding. A DC, latching solenoids shall be required on any valve to be operated by controller. Controller shall have two programs with three start times each and a program stacking feature to prevent operational overlap. Watering time per station shall be in a range from 0 to 155 minutes settable in 1-minute increments. Controller shall provide two types of watering day

selections; 7-day "select day" watering or watering day intervals for 1 to 14 days. Controller shall have an OFF setting for system shut down and shall also operate with an optional, normally-closed, wired rain sensor. Controller shall have a water budgeting feature allowing program watering time adjustments, in 10% increments, from 10% of set watering time up to 200%.

**Construction:** Controller shall be constructed from a durable polymer with a O-ring-sealed battery compartment and a flip-down cover to protect its liquid crystal display and programming buttons.

**Electrical:** Controller shall require a user-supplied, 9-volt, alkaline battery for power and its output shall be via DC pulse requiring a DC, latching solenoid on the valve. Maximum wire length between controller and the valve shall be from 660' to 960' depending upon wire size. Controller shall be cULus listed.

## JR MAX™ SERIES

Automatic controller(s) shall be JR MAX outdoor (EXT) or indoor models with 4, 6 or 8 stations as manufactured under the brand name of Irritrol to be installed according to the manufacturer's published specifications and applicable electrical codes.

**Operation:** Controller shall be electronically controlled, have 3 independent watering programs with 3 start times for programs A and B. Program C has one start time as a regular program. The second start time for program C converts it to a looping program. The third start sets the interval of the looping operation. Watering times shall be available from 1 minute to 4 hours. Controller shall have a 365-day calendar for days-of-the-week, interval and true odd/even date programming. Controller shall

have automatic, semi-automatic and manual modes. Controller shall have a 9V ac battery backup and a programmable master valve/pump circuit. Programming shall be accomplished via a 9-position electronic dial with LEDs and selection buttons with user feedback provided by an LCD.

**Construction:** Controller shall be enclosed in a temperature-stabilized ABS plastic case (for indoor installation) and a weather- and UV-resistant, key-lockable case for outdoor models.

**Electric:** Transformer input shall be 120 V ac, 60HZ (220 and 240 V ac, 50HZ). Transformer output shall be 24 V ac, 500 mA and include a resettable electronic fuse. Maximum output-to-valves shall be 24 V ac, .5 amp. A 9-volt battery is required even for AC operation.

## MC-E™ SERIES

Automatic controller(s) shall be the MC-E Series with stations 4, 6, 8, 12, 18, 24, 30, 36, 42 or 48 as manufactured under the brand name of Irritrol to be installed or wired in accordance with manufacturer's published instructions and applicable electrical codes.

**Operation:** Controller shall be electronically controlled and have 8 independent watering programs and can run up to 6 concurrently with each station's watering time independently variable from 1 to 59 seconds, in 1-second increments, or 1 minute to 24 hours in 1-minute increments. Controller shall have watering day options of any-days-of-the-week, Odd or Even date or day intervals from 1 (water every day) up to 60 (water once every two months). Each program shall have up to 8 start times available per water day. Controller shall have a flow sensing feature with the capability of detecting over flow and unscheduled flow conditions. Controller shall shut off the valve or normally open master valve upstream of the unwanted flow event and shall activate an alarm. Controller shall require station #2 as a remote alarm and normally-open master valve circuit.

Controller shall provide for the connection of a flow sensor as well as an interrupt sensor and a start sensor. Each program shall have a "looping" cycle option that shall allow a start time and an end time for the cycle and a delay between loops.

Controller shall utilize a 2-line, 32-character, backlit, dot matrix display for clarity of programming. Controller shall have a monthly water budget program for automatically adjusting the controller's overall watering time to the user's preset monthly schedule throughout the season. Controller shall have a "password" option to restrict programming access to authorized users. Controller shall be convertible to respond to the Toro® brand Sentinel™ central control system. Controller shall have the option for control of a 2nd master valve. Controller face panel/electronics shall be backward compatible to the previous MC Plus-B controller cabinet for upgrades in the field.

**Construction:** Controller shall be enclosed in a rust-resistant, locking steel cabinet. Quick disconnect cables to the terminal strip shall be standard on 18 to 48-station models. Optional pedestal mounts shall be available (P-2B: for 4 to 12-station models; P-6B: 18 to 48-station models).

**Electric:** Transformer input shall be 120V ac, 60Hz. Transformer output shall be 24V ac, 2.08 amps. Maximum output per station shall be 24V ac, 1.0 amps. Maximum operating output to valves shall be 24V ac, 1.68 amps (including master valve). Controller shall have optimum 2-stage primary and secondary surge protection.

## IBOC® PLUS SERIES

Automatic controller(s) shall be IBOC Plus Series with stations (4, 8, or 12) as manufactured under the brand name of Irritrol to be installed or wired in accordance with manufacturer's published instructions and applicable electrical codes. Valves installed must be converted from standard AC solenoid to 24-volt DC latching solenoid (DCL) for Irritrol valves.

**Operation:** Controller shall be powered by one 6-volt lantern battery (not included) or solar powered with optional SPC-2. Battery life shall be a minimum of 1 year. Battery life shall be displayed as a percentage of total life. Controller shall have 3 independent programs with 8 start times per program. Controller shall be able to operate up to 12 standard latching solenoid valves (1 solenoid per station) and 1 master valve/pump start latching relay. Station times shall be 1 minute to 23 hours 59 minutes, in 1-minute increments, displayed as hours and minutes. Controller shall have a 365-day calendar with weekday, interval (1-62), and odd/even scheduling with automatic leap-year adjustment. Controller shall have the capability to exclude specific days from the watering schedule when using odd/even day option. Controller shall have water budgeting (10-200%),

start-time stacking within program, program looping and station stacking. Controller shall have programmable (1-10 minutes) test cycle. Operation will be automatic, semi-automatic and manual operation modes. Manual cycle shall be programmable from 1 to 99 minutes. Controller shall have non-volatile memory to retain program data and programmable rain off (1-30 days). Controller shall have programmable rain sensor hook up and programmable master valve hook up. Electronic circuit breaker shall automatically detect short- and open-circuit conditions on station output. Controller shall have user selectable instruction displayed in either English or Spanish. Maximum operating pressure shall be 120 psi.

Controller to Valves

Wire size (Awg)	20	18	16	14	12
Distance (Ft)	400	600	1000	1600	2400

## IBOC® 300-9V & RCP8 PLUS

Automatic controllers shall be IBOC300-9V individual valve, battery-powered controllers as manufactured under the brand name of Irritrol to be installed in accordance with manufacturer's published instructions.

**Operation:** Each controller operates one valve. Controller is manually programmed or programmed via the Irritrol infrared RCP8 PLUS programmer. Run time from 1 minute to 23 hours and 59 minutes can be set manually as well as a watering interval of every 12 hours, every 24 hours, every 48 hours or every 7 days. Manual set programs are overridden by programs set with the RCP8 PLUS. RCP8 PLUS programming sets the same run time parameters plus the following options: 3 start times per program are available and watering interval can be set to a 7-day calendar, from 1 to 7 days, or even or odd days. Odd-day programming skips the 31st day of each month. A program is downloaded via an infrared signal from the RCP8 PLUS to the IBOC300-9V by setting the IBOC300-9V's address to correspond to the program number. The controller shall have an eight (8) program capacity. A successful download is acknowledged by the IBOC300-9V's three LEDs blinking sequentially. It also is displayed as successful on the RCP8 PLUS's LCD. The RCP8 PLUS can upload any

previously set program in an IBOC300-9V. The upload displays on the RCP8 PLUS's LCD in a blinking mode. Besides the program upload, the IBOC300-9V also reports the change state of its battery with four \*\*\*\* being a fully charged battery down to one \* for a battery that needs to be replaced. The IBOC300-9V's address is also displayed. The program is retained in an EEPROM that maintains the program for two minutes without battery power allowing the removal of a battery and replacement of an active battery. The controller can be installed on the valve adapter in a vertical or horizontal position.

**Construction:** The controller's water-resistant encapsulation shall be of unique resins used in the marine industry. The controller has a low profile allowing it to fit in almost any valve box. The unique technology includes a patented low power latching solenoid that is encapsulated with Marine Industry resins inside the controller. The controller measures 3" L x 2 1/2" W x 1 1/2" H. The controller operates to 150 psi. Operational temperature range is 35°F to 140°F (1°C to 60°C). The controller weighs 5 1/2 oz. and the battery weights 1 1/2 oz. . The 9 V dc water-resistant battery housing accepts standard 9 V dc battery. Battery not supplied.

## RAINSENSOR™ SERIES

Rain/Freeze Sensor(s) shall be the RainSensor Series: Wireless RainSensor, Wireless Rain/Freeze Sensor or Wired RainSensor models as manufactured under the brand name Irritrol.

**Operation:** The rain and freeze sensor shall use hygroscopic fiber discs capable of expanding in the presence of moisture. These expanding discs shall have the capability of triggering a switch that interrupts the common field wire return or activates the sensor within an irrigation control product. This "open" circuit prevents scheduled irrigation programs from initiating until the fiber discs dry and shrink, closing the switch and allowing programmed irrigation schedules to resume. The rain sensor shall have selectable shut-off points based on inches of rainfall with increments from

1/8" to 3/4". These shut-off points may be adjusted at any time based on seasonal weather patterns or specific microclimates. The rain sensor shall be capable of operating with any Irritrol or competitive irrigation control product that interrupts programmed irrigation cycles utilizing normally open and normally closed protocol. The rain sensor and combination rain/freeze sensor shall have the ability to transmit a wireless signal from the rain or rain/freeze sensor to a receiver module that is wired into the controller. The wireless signal utilizes ultra-high frequency radio and does not require FCC licensure or notification, but shall be FCC part 15 approved. The sensor/transmitter shall have the ability to broadcast this signal for a maximum distance equivalent to a line-of-sight transmission of 300 feet.



**Construction:** The sensor transmitter shall be enclosed in a weather-resistant, PVC plastic case that is molded with UV inhibitors to prevent color fading and embrittlement over extended periods of time. The sensor transmitter shall have an internal and replaceable battery that is capable of operating for a period of 3-5 years. The battery shall be of the common, readily available, non-proprietary type. The receiver module operates on a nominal 24 V ac in operating temperatures from -40 to 120°F consistently. The receiver module shall have an 18" length of jacketed 22-gauge color-coded wire for various control product connections. The maximum cable run from a receiver module to a controller shall not exceed limits specified by governing electrical codes. The sensor receiver shall also be enclosed in a weather-resistant, PVC plastic case with a cover of the same material. It shall have the ability to mount directly outside of a controller, then hard-wire into the controller. The sensor receiver shall have a removable cover to expose the signal strength reception from the sensor transmitter, low battery indication of the sensor transmitter, power on (indicating receiver function), and multi-function bypass button primarily used to mechanically override the sensor to resume normal irrigation cycles or manual operation. The sensor receiver shall also have the ability to maintain its status following loss of power to the receiver unit. It shall also incorporate a bypass switch that has the ability to reset automatically such that the sensor receiver cannot be permanently bypassed through operator error.

**Performance:** The sensor transmitter shall be located outdoors on a roof gutter, fence or other location that enables adequate RF

communication between the transmitter and receiver (located directly adjacent to an irrigation controller) of a distance not exceeding 300 feet. Reception levels can be confirmed by reviewing the signal strength indicator on the receiver module to confirm proper functionality. Once installed the rain sensor and rain/freeze sensor shall operate automatically to interrupt and resume programmed irrigation schedules without any additional controller programming or human intervention.

The sensor modules shall also have the ability to adjust the nominal shut-off point in pre-defined increments from  $\frac{1}{8}$ " to  $\frac{3}{4}$ ". The receiver module shall be located directly adjacent to the controller, and mounting directly within metal enclosures may reduce reception quality and correct operation must be confirmed. The receiver module can be located outdoors; again in close proximity to the irrigation controller but at a distance no more than as specified in the appropriate electrical code before voltage loss will impact product performance and consistency. The rain sensor or rain/freeze sensor shall have the ability to bypass or manually override the remote sensor at the receiver module. This module shall also indicate signal strength reception from the transmitter module as well as indicate when the transmitter battery requires replacement. The rain sensor shall also have an illuminated Power LED indicating connectivity to the adjacent control product.

## CMR-KIT™ MAINTENANCE REMOTE

Remote control shall be the CMR-KIT as manufactured under the brand name Irritrol and connected and used in compliance with FCC regulations and manufacturer's published instructions.

**Operation:** Remote control transmitter and receiver shall have an operating range up to 1.5 miles line-of-sight (LOS) with a typical urban range up to  $\frac{1}{2}$  mile. The system shall remotely operate and be compatible with several series of Irritrol brand irrigation controllers for maintenance and troubleshooting applications. The station operations available shall be, but not be limited to, turning a controller station on or off, advancing up or down to operate the adjacent station, pausing and resuming a station's operation and starting a 2-minute test run of all stations in sequence. The remote control system shall be available in an all-in-one kit with carrying case in addition to each component available separately. The remote shall be settable up to 999 addresses to prevent interference or "cross talk"

with other CMR receivers and shall be settable up to 99 stations. The remote system shall utilize a quick connect/disconnect assembly to allow the receiver to be easily moved from one controller to another.

**Construction:** The remote control transmitter and receiver shall be constructed of a durable polymer and shall be resistant to incidental water mist and spray though not waterproof. The wall/conduit mount connector shall include a cover or cap for weather resistance between uses.

**Electrical and RF:** The VHF remote system shall utilize MURS designated frequencies with the ability to detect and avoid busy channels. A dual rate charger shall be connectable to the transmitter to recharge the four (4) AA size NiMH batteries (not included) while still installed. The receiver shall be powered by the controller to which it is connected and shall draw <75mA, AC. The system's modulation shall be FM.

## SR-1 PUMP START RELAY

Pump Start Relay shall be model SR-1 as manufactured under the brand name Irritrol to be installed according to national and local electrical codes and the manufacturer's published specifications.

**Operation:** The pump start relay shall provide contacts for both the low-voltage switching power (24V ac to 30V ac Maximum) from the irrigation controller and for the through-put of the main power for the pump or other electrical device (not to exceed the electrical ratings of the contacts).

**Construction:** The Pump Start Relay shall be housed in a weather-resistant case that provides space within for the low-voltage (switching)

and high voltage (power throughput) wire connections. The case shall be key-lockable for vandal resistance and for electrical safety.

**Electrical:** The Pump Start Relay's power throughput contact ratings shall be

1 HP at 120V ac, 1 Phase or 2 HP at 250V ac, 1 Phase.. At 250V ac, the maximum rating shall be 20A. The Pump Start Relay's coil rating for the low voltage (switching) control shall be 24V ac, 3VA. Coil operating requirements shall be a minimum of 19V ac to a maximum of 30V ac. Coil draw shall be approximately 0.1A

# SOLAR POWER CONVERTER (OPTIONAL)

Solar Power Converter(s) shall be model SPC-2 as manufactured for Irritrol.

**Operation:** Converter shall be able to convert all style IBOC and IBOC Plus controllers to solar power.

**Construction:** Converter shall include vandal-resistant Duravolt™ solar electric module. Converter shall have fully self-contained design to eliminate the need for lantern battery. Solar to load ratio shall be 6-to-1 to provide full power to IBOC Plus with just two hours of direct sunlight per day. Solar amp/hours per day shall be 600mAh, typical. Load amp/hours per day shall be 100mAh, typical. Converter shall be able to be remote mounted up to 80 feet away from IBOC Plus.

Solar Power Converter Remote Operation Wire Sizing Chart

Wire size (Awg)	16	14	12
Distance (Ft)	30	50	80

Converter shall have a two-piece design that uses allen bolts and gaskets to ensure water-resistant and vandal-resistant installation. Design shall be maintenance free and include an internal maintenance-free, gel cell battery with a 3-year life expectancy.

# PROMAX™ REMOTE

Remote Control System shall be the Pro Max™ Series as manufactured under the brand name Irritrol.

The remote system shall be compatible for use with any manufacturers' 24 volt controller, have a compact transmitter with belt clip, Auto-up or Auto-down operation, independent control of master valve and/or pump, single or multi-station on control capability, timed station operation selectable from 1 to 60 minutes, communication and control of up to 999 individual receivers from a single transmitter, program ON/OFF capability when used with the RME Sentar, RME Hawk, or Evolution DX2 controllers and shall have a small, compact receiver for permanent internal mount in the controller, capability to detect and protect against field wiring short circuits and provide an audible alert, automatically reset circuit breakers and require no fuses, have a built-in safety default in its receiver to automatically turn station off after 60 minutes, provide audible transmitter and receiver tones to verify proper operation, include "power miser" circuitry in transmitter to

eliminate down time for battery recharging and instead have a single, easily replaceable, widely available, lithium battery and shall provide audible alarm for low power alert.

**Construction:** The remote system shall have mechanisms to reduce interference and insure reliable communication and shall be of all-metal, water-and mud-resistant construction with shock absorbing bumpers and shall be available in a hard cover carrying case.

## Electrical:

### Input Power

- Receiver, 22-32 V ac, 50/60 Hz
- Universal adapter, 22-32 V ac, 50/60 Hz
- Transmitter, 6 volt lithium battery (user replaceable)

### Output Power

- Receiver/Universal adapter, 24 V ac, 1.5 amps maximum total output (36VA), 1 amp per station or mastervalve/pump

# SENTAR II

Automatic controller(s) shall be the SENTAR II Series with stations 6, 12, 18, 24, 30 or 36 as manufactured under the brand name Irritrol and installed according to the manufactured published specifications and applicable electrical codes.

**Operation:** Flow Sensing allows for total flow control and break detection (requires flow sensor), Cycle and Soak to eliminate runoff and conserve water and four (4) completely independent programs with five (5) start times, for a total of 20 possible start times per day. Watering times shall allow each station to be set from 1 minute to 9 hrs 59 minutes in 1 minute increments. "Quick Stations" to allow rapid programming of a block of stations with the same watering time and Water Days for each program based on a seven day week or a skip-by-day routine allowing a program to skip from 1 to 30 days between watering. Programmable rain shut down to allow the selection of the number of days the controller will stay off (in rain shut down mode) before it goes back into the automatic mode. A "real time" clock to hold the actual time during power outages without batteries. A non-volatile memory shall hold the program(s) indefinitely during power outages or seasonal shutdown. The Review feature brings all the information for a given program (s) to the displays

with simple push of the Review Button. Multiple displays shall provide a simple way of programming and information recall. A manually activated system check/syringe cycle shall sequentially run stations for a user selectable time from 1 minute to 9 minutes. A manually activated program cycle shall run a program independent of its programmed start time and water days. A manually activated station cycle shall run a single station for a selected time. A built-in remote control jack shall be compatible with Rain Master Remotes. Automatic field wire fault detection shall enable the controller to sense a short in the field wire and instantly turn off that station, report the fault and move to the next programmed station. A Rain Switch (auto-off) shall turn off all stations without disturbing the program(s). A percentage key shall allow the user to increase or decrease all station run times on a percentage basis in 1% increments from 0% to 300% by program.

## Construction:

- Heavy-duty 18-gauge jet coat, powder coated steel enclosure for outdoor or indoor use.
- Two convenient sized enclosures for easy installation of field wires.
- Outdoor pedestal mount available for all models.
- Comes with a limited 5-year warranty.

**Electric:**

- Models are available for 120V ac, 50/60 Hz or 220/240 V ac 50/60 Hz power.
- Extra heavy-duty lightning and surge-protected models available for areas where lightning is a concern.
- UL and C-UL listed

**Setup Operation:**

The following features can be easily selected or reconfigured by a single push of a button (SETUP key):

- Programmable master valve/pump allows the master valve or pump to go on by program.
- Programmable stacking or no stacking of programs selects programs to run one after the other (Stack Mode) or at the same time (No Stack Mode).

## RAIN MASTER™ EAGLE

Automatic controller(s) shall be the Rain Master Eagle series with 6,12,18,24,30 or 36 stations as manufactured under the brand name Irritrol and installed and wired in accordance with manufacturer's specifications and applicable electrical codes.

**Operation:** Controller shall be electronically controlled and shall have four (4) independent irrigation programs, with five (5) selectable start times, for a total of 20 possible irrigation cycles per day. Runtime(s) for each station can be set from 1 minute to 9 hrs 59 minutes per station in one-minute increments. Quick Station(s) programming to allow rapid programming of an entire block of stations, with the same runtime. Water days for each program can be based on a seven-day cycle or a skip-by-day cycle which allows a program to skip from 1 to 30 days between watering cycles or set for ODD/EVEN calendar dates. Manually activated system check/syringe cycle to sequentially run each station for a user selectable time with a range from one minute up to nine minutes. Manually activated program cycle to execute a program independently of its programmed start time and water days. Manually activated station cycle to operate a single station for a selectable time from 1 minute to 9 hours 59 minutes. Programmable master valve to utilize and control a master valve on a per program basis. Configurable master valve type to select either a normally open master valve or a normally closed master valve. Programmable pump independent of the master valve on a per program basis. Programmable stacking (non-overlap) or non-stacking (overlapping) operation of the programs. Programmable delay time between stations selectable from 0 to 255 seconds (4 minutes 15 seconds) to allow for complete shut off slow closing valves before the next valve turns on.

Controller's water conservation features shall include flow sensing, flow condition alerts and control. Controller shall be connectable to a Rain Master flow sensor or other flow sensor device. Evapotranspiration (ET) based scheduling, percentage adjustment (from 0 to 300% in 1% increments) per program to allow an increase or decrease of all station runtimes. Programmable rain delay (1-7 days) to delay the start of irrigation after a rain storm. After the delay period the controller shall return to the automatic mode of operation. Manual Rain Switch (Automatic Watering – No Watering) for quickly turning off all irrigation (with 'RAIN OFF' displayed) without disturbing the stored program(s). Connectivity for any one of the following: rain, moisture, or freeze sensor device with per program response to the sensor allowing non-irrigation programs to execute independent of this device. Selectable cycle and soak irrigation programming or conventional programming on a per-program

- Programmable timer delay between stations establishes a time delay from 1 second to 256 seconds (4 minutes 16 seconds) to allow slow-closing valves to completely shut off.
- Programmable security code allows entry of a 1 - 4 digit number as a security code to prevent access by unauthorized personnel.
- Programmable sensor to enable or disable sensor operation for each program.
- Programmable alarm to either enable or disable an audible alarm in the event of a field wire fault.

**Electrical Specifications:**

- Input power required: 105-130 V ac, 50/60 Hz, .5 amp maximum, .1 amp idle
- Output power: 24 V ac, 1.5 amps maximum total output (36VA) 1 amp

basis. Programmable cycle runtime, max cycle time, and soak time on a per station basis with total program run time display. Automatic minimization of the water window by intelligently scheduling station starts when other stations are satisfying their soak time. Controller supports quick station programming in the cycle and soak programming mode. The controller considers all soak delays, optimized program features, water budget percentage and inter-station delays. Re-calculated station run times are executed to the nearest second. Programmable controller security access code to prevent unauthorized use or modifications to be made of the controller's programs. Review key to display all program parameters on a per program basis.

**The controller shall have:** Diagnostic circuit breaker with automatic field wire fault detection enables the controller to sense a short in the field wire, instantly turn off that station, sound an alert and advance to the next station in the program. Built-in self-test program for internal circuitry. Non-volatile memory to retain the program(s) information during power outages. A "real time" clock with non-volatile backup to maintain the actual date and time during power outages. "Brown out" protection circuitry to automatically monitor and reset on-board microprocessor during low power or error conditions. Program Resume function preserves the original water window while ensuring that program starts are not lost during power outages.

Other features shall include the ability to connect to a Rain Master "communications card" (iCentral) to provide Internet connectivity and shall interface with the optional Rain Master Weather Station for direct ET measurements. Built-in remote control capability shall be provided for compatibility with all Rain Master remote control systems.

**Construction:** Controller shall have a variety of enclosure options including: standard cold rolled steel enclosure with power coat paint, extended size cold rolled steel enclosure with station screw terminals, extended size stainless steel enclosure with station screw terminals. All extended size enclosures are available with optional heavy-duty lightning protection.

**6.0 electrical specifications:**

- Input power: 105-130 V ac, 50/60 Hz, ½ Ampere maximum, 0.1 ampere idle
- Output power: 24 V ac, 1.5 amperes maximum total output or 36 V ac maximum total output, 1.0 amp per station or master valve
- UL, C-UL, and FCC approved.
- Limited 5-year warranty.

# RAIN MASTER™ TWICE 2-WIRE

Automatic controller(s) shall be the Rain Master Eagle or Sentar II Two-Wire series as manufactured under the Irritrol brand name and to be installed and connected in accordance with manufacturer's published instructions and applicable codes.

**Operation:** Controller(s) basic operation, programming capability and features for water conservation, convenience, system diagnostics and fault detection, flow sensing and management, Evapotranspiration (E.T) interactivity, agency listings and available options shall be similar to the standard, Rain Master Eagle or Sentar II Controller Series.

**"TWICE™" (TWO-WIRE) capabilities:** Controller shall utilize a two-wire connection path to decoders for connection to the system's valves. The two-wire path shall support a variety of connectivity configurations including: single path, dual path, loop, and grid configurations, and its combinations thereof. The communications along the two-wire path shall be bi-directional between the controller and each decoder. The TWICE interface module shall confirm station ON commands by receiving an appropriate response from the corresponding station decoder. Station decoders shall monitor the electrical current at any solenoid and report any short or open circuit back to the TWICE interface module. The TWICE interface module shall display diagnostic error conditions to the operator. These diagnostic errors shall include: E1 - No station decoder found (cannot communicate from the TWICE module to the designated station decoder) , E2 - Short circuit on the two wire path, E3 - Open circuit of a station solenoid, E4 - Over current due to shorted solenoid, E5 - Station decoder communication error, E6 - High temperature shutdown and E7 – Decoder Programming Failure.

The TWICE Interface module shall allow the user to program the station number into any decoder, to read and display the station number which has been programmed into any decoder, to test the entire two-wire network of decoders and report any error(s) status back to the operator. Errors shall be reported with appropriate error codes as well as with a STATUS diagnostic LED. The TWICE interface shall allow the user to test any single station for proper operation. Any error condition shall be reported in the display. When the station test is successful, the display shall report the firmware version of the decoder followed by the electrical current drawn by the solenoid. The TWICE interface module shall automatically display the STATUS of each valve via a diagnostic LED when operating in the AUTO mode. Stations that are irrigating properly (communicating with the appropriate decoder and having a nominal electrical current draw on it's solenoid) will illuminate the STATUS led with a green color. Otherwise the station has an error and will illuminate the STATUS led with a red color. When no irrigation stations are on, the display will display any station(s) which may have had an error condition. The display will rotate with erred stations until the operator clears them.

Station decoders shall be available in 1, 2 and 4 output varieties. The TWICE interface module shall allow for a maximum of 36 stations plus one master valve. The maximum distance from the controller to any decoder shall be limited to 5,000 feet. This distance assumes usage of Rain Master's two-wire 14 (AWG) gauge cable, RMIS Part No. TW-CAB-14. The maximum distance for the two-wire loop configuration shall not exceed 10,000 feet. The maximum distance between any lightning arrestors/ground rods shall be no more than 600 feet.

## 2400/2600 SERIES

Valve(s) shall be 2400/2600 Series 1" electric globe/angle models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve shall be constructed of heavy-duty, corrosion- and UV-resistant PVC, glass-filled polypropylene and stainless steel material. Valve shall be available in female NPT, slip x slip, male x male and male x barb configurations. Design of valve shall be high flow, low friction loss and shall include optional flow control for precise flow adjustment and manual shut-off. Valve shall have debris-tolerant design to accommodate dirty water conditions. Valve shall have a manual external

and internal bleed capability. Valve shall have a rugged double-beaded Santoprene® diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall be serviceable without needing to be removed from system. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from .25 to 30 GPM.

## 205 SERIES

Valve(s) shall be 205 Series 1" electric globe models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall be available in NPT or welded slip configuration. Design of valve shall be high flow, low friction loss and shall include optional flow control for precise flow adjustment and manual shut-off. Valve shall have debris-tolerant design to accommodate dirty water conditions. Valve shall have a manual external bleed and removable tamper-resistant flow control

handle. Valve shall have a nylon-reinforced Buna-N diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall be serviceable without needing to be removed from system. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from .25 to 30 GPM.



## 2500 SERIES

Valve(s) shall be 2500 Series 1" electric globe models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall be available in NPT or welded slip configuration. Design of valve shall be high flow, low friction loss and shall include optional flow control for precise flow adjustment and manual shut off. Valve shall have debris-tolerant, floating metering system design to accommodate dirty water conditions. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have a removable tamper-resistant flow control handle. Valve

shall have a stainless steel metering system. Valve shall have a rugged, double-beaded Santoprene® diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall have a positive self aligning bonnet with captured screws. Valve shall have a high-strength, ribbed bonnet. Valve shall be serviceable without needing to be removed from system. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from 0.25 to 30 GPM.

## 2700PR SERIES MANUAL

Manual valve(s) shall be 2700 PR Series 3/4" or 1" models as manufactured under the brand name of Irritrol or approved equal. Valve shall meet ASSE, IAPMO, CSA and City of Los Angeles standards.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall have a convenient manual control

handle and a non-rotating Buna-N shut-off seal for longer life. Valve shall have contamination guard to protect valve stem threads.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from .25 GPM to 30 GPM.

## 2700DPR SERIES ANTI-SIPHON

Anti-siphon valve(s) shall be 2700 DPR Series 3/4" or 1" models as manufactured under the brand name of Irritrol or approved equal. Valve shall meet ASSE, IAPMO, CSA and City of Los Angeles listing standards.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall have gravity-type anti-siphon poppet. Valve shall have a hand-tight pipe thread connection. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have a tamper-resistant flow control to adjust downstream flow or for manual shut-off. Valve shall be electric H-body atmospheric Vacuum

breaker. Valve shall have threaded bonnet assembly for quick installation and servicing. Valve shall have a stainless steel metering system. Valve shall have a rugged, double-beaded Santoprene® diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from .25 to 30 GPM. Valves shall be mounted above ground at least 6" above highest sprinkler head (or mounted to meet local codes).

## 2700APR SERIES ANTI-SIPHON

Anti-siphon valve(s) shall be 2700 APR Series 3/4" or 1" models as manufactured under the brand name of Irritrol or approved equal. Valve shall meet ASSE, IAPMO, CSA and City of Los Angeles listing standards.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall have gravity-type anti-siphon poppet. Valve shall have a hand-tight pipe thread connection. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have heavy duty flow control to adjust downstream flow or for manual shutoff. Valve shall be electric H-body atmospheric vacuum breaker. Valve shall have a stainless steel metering system. Valve shall have a rugged, double-beaded Santoprene® diaphragm. Valve shall

have a Buna-N valve seat seal. Valve shall have a positive self aligning bonnet with captured screws. Valve shall have all stainless steel hardware and spring. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding. Valve shall have debris tolerant floating metering system design to accommodate dirty water conditions. Valve shall have a removable tamper-resistant flow control handle. Valve shall have captive screws.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a flow range from .25 GPM to 30 GPM. Valves shall be mounted above ground at least 6" above highest sprinkler head (or mounted to meet local codes).

## 311A SERIES ANTI-SIPHON

Anti-siphon valve(s) shall be 311A Series 3/4" or 1" models as manufactured under the brand name of Irritrol or approved equal. Valve shall meet IAPMO-UPC listing standards.

**Construction:** Valve body shall be constructed of PVC material with stainless steel hardware and spring. Valve shall have a gravity-type anti-siphon poppet with a polypropylene float. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have flow control for precise flow adjustment and manual shut-off. Valve shall be electric H-body atmospheric Vacuum breaker. Valve shall have a double-beaded nylon-reinforced Buna-N diaphragm. Valve shall have a Buna-N

valve seat seal. Valve shall have a self-cleaning and externally removable metering system. Metering system shall be stainless steel. Electric adapter portion of the valve shall be constructed of glass-filled nylon with molded brass inserts in the body for attachment of the bonnet with stainless steel three-way screws. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 150 psi maximum and a recommended flow range from 1 to 30 GPM. Valves shall be mounted above ground at least 6" above highest sprinkler head (or mounted to meet local codes).

## 200B SERIES

Valve(s) shall be 200B Series 1", 1 1/2" or 2" electric globe/angle models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body shall be constructed of corrosion- and UV-resistant PVC material with all stainless steel hardware and spring. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have a high-strength, ribbed bonnet and bottom inlet. Valve shall have a heavy-duty double-beaded diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall be easily serviced without needing to be removed from the system. Valve shall be powered by a 24 V ac solenoid with a captive plunger, .4 amp inrush, and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 20 psi minimum to 150 psi maximum. Valve shall have a recommended flow range from 5 to 120 GPM depending on valve size.

Pressure Regulation (OmniReg™ Modular Option): Outlet pressure regulating range shall be from 5 to 100 psi or 5 to 30 psi dependent on the regulator option. Valve shall have self-modulating type pressure regulator that maintains constant downstream pressure and be accurate to within  $\pm 3$  psi of pressure setting. Inlet pressure shall be 10 psi greater than desired outlet pressure. Valve shall have an internal bleed for manual operation in pressure regulation mode. Valve shall be able to be installed in any position.

## 700 SERIES ULTRAFLOW

Valve(s) shall be 700 Series (UltraFlow) 3/4", 1", 1 1/2" or 2" electric globe models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body and bonnet shall be constructed of glass-reinforced nylon, with stainless steel hardware and spring. Valve shall have a slow-closing design to prevent water hammer. Valve shall have manual operation with internal bleed. Valve shall have a self-flushing, 150-mesh stainless steel control-water filter. Valve shall have a straight-through flow path that results in low pressure loss. A solid brass flow control stem shall be standard. Except 3/4" model, valve shall have a nylon-reinforced double-beaded Buna-N diaphragm. Valve shall have a Buna-N valve seat seal. Body shall have molded brass inserts for positive bonnet attachment.

**Operation:** Valve shall have a working pressure range from 10 to 150 psi and include screen and flow control. Valve shall have a flow range of .1 to 180 GPM depending on valve size.

Pressure Regulation (OmniReg™ Modular Option): Outlet pressure regulating range shall be from 5 to 100 psi or 5 to 30 psi dependent on the regulator option. Valve shall have self-modulating type pressure regulator that maintains constant downstream pressure and be accurate to within  $\pm 3$  psi of pressure setting. Inlet pressure shall be 10 psi greater than desired outlet pressure. Valve shall have an internal bleed for manual operation in pressure regulation mode. Valve shall be able to be installed in any position.

## 100 SERIES CENTURY-PLUS

Valve(s) shall be 100 Series (Century PLUS) 1", 1½", 2" or 3" electric globe/angle models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body shall be of glass-reinforced nylon for superior high temperature and high-pressure strength and shall not be affected by rust or electrolysis. Plug shall be provided for globe or angle configuration sealed with a positive O-ring. Valve shall have slow-closing design to prevent water hammer. Valve shall have electric or manual operation. Manual operation shall have an internal and external bleed. Internal bleed shall have a solenoid bleed lever. External bleed shall be present for flushing. Valve shall have a flow control for downstream flow adjustment and/or manual closing. Valve shall have a nylon-reinforced double-beaded Buna-N diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall have a self-cleaning externally removable metering system. Valve shall be serviceable without needing to be removed from the system. Body shall have molded brass studs anchored for positive bonnet attachment. 2" and 3" models shall have a brass control stem. Valve shall be powered by a 24 V ac captive plunger solenoid, .4 amp inrush and .2 amp holding.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 200 psi maximum and a flow range from 5 to 300 GPM depending on valve size.

## 100-S SERIES CENTURY-PLUS (SCRUBBER)

Valve(s) shall be 100-S Series (Century PLUS) Scrubber 1", 1½", 2" or 3" electric globe/angle models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** Valve body shall be of glass-reinforced nylon for superior high temperature and high-pressure strength and shall not be affected by rust or electrolysis. Plug shall be provided for globe or angle configuration sealed with a positive O-ring. Valve shall have slow-closing design to prevent water hammer. Valve shall have electric or manual operation. Manual operation shall have an internal and external bleed. Internal bleed shall have a solenoid bleed lever. External bleed shall be present for flushing. Valve shall have a flow control for downstream flow adjustment and/or manual closing. Valve shall have a nylon-reinforced EPDM diaphragm. Valve shall have a EPDM valve seat seal. Valve shall have a patent-pending continuous scrubbing mechanism actively remove dirt, algae, and other particles from the filtration area accompany with a self-cleaning externally removable metering system. Valve shall have a self-cleaning externally removable metering system. Valve shall be serviceable without needing to be removed from the system. Body shall have molded brass studs anchored for positive bonnet attachment. 2" and 3" models shall have a brass control stem. Valve shall be powered by a 24 V ac captive plunger solenoid, .4 amp inrush and .2 amp holding.

Anti-contamination (102 models): Valve shall be electric globe/angle with external control-water filter and three-way solenoids. Valve shall have non-continuous metering system for dirty or effluent water applications. Valve shall have a small exchange of control water to allow for minimum filter capacity. Valve shall have externally-serviceable, 150-mesh control-water filter. Valve shall have selectable normally open or normally closed operation (factory set at normally closed). Working pressure range shall be 10 to 100 psi. Not compatible with E2003 DC latching solenoid.

Pressure Regulation (OmniReg™ Modular Option): Outlet pressure regulating range shall be from 5 to 100 psi or 5 to 30 psi dependent on the regulator option. Valve shall have self-modulating type pressure regulator that maintains constant downstream pressure and be accurate to within ±3 psi of pressure setting. Inlet pressure shall be 10 psi greater than desired outlet pressure. Valve shall have an internal bleed for manual operation in pressure regulation mode. Valve shall be able to be installed in any position. Not compatible with E2003 DC latching solenoid.

**Operation:** Valve shall have a working pressure range from 10 psi minimum to 220 psi maximum and a flow range from 5 to 300 GPM depending on valve size.

Anti-contamination (102 models): Valve shall be electric globe/angle with external control-water filter and three-way solenoids. Valve shall have non-continuous metering system for dirty or effluent water applications. Valve shall have a small exchange of control water to allow for minimum filter capacity. Valve shall have externally-serviceable, 150-mesh control-water filter. Valve shall have selectable normally open or normally closed operation (factory set at normally closed). Working pressure range shall be 10 to 100 psi. Not compatible with E2003 DC latching solenoid.

Pressure Regulation (OmniReg™ Modular Option): Outlet pressure regulating range shall be from 5 to 100 psi or 5 to 30 psi dependent on the regulator option. Valve shall have self-modulating type pressure regulator that maintains constant downstream pressure and be accurate to within ±3 psi of pressure setting. Inlet pressure shall be 10 psi greater than desired outlet pressure. Valve shall have an internal bleed for manual operation in pressure regulation mode. Valve shall be able to be installed in any position. Not compatible with E2003 DC latching solenoid.

# DRIP ZONE VALVE KITS

Drip Zone Valve Kit(s) for drip irrigation zones shall include a 2700 Series, 2500 Series or 700 Series valve as manufactured under the brand name of Irritrol or approved equal. The kit shall also include a Y-filter and pressure regulator to meet the flow requirements of the zone.

**Construction: 2700/2500 Series:** Valve body shall be constructed of corrosion- and UV-resistant PVC material. Valve shall have a gravity-type anti-siphon poppet (2700 Series only). Valve shall have a hand-tight pipe thread connection. Valve shall have internal and external bleed for manual operation and flushing. Valve shall have heavy-duty flow control to adjust downstream flow or for manual shutoff. Valve shall be electric H-body atmospheric vacuum breaker (2700 Series only). Valve shall have a full stainless steel metering system. Valve shall have a rugged, double-beaded Santoprene® diaphragm. Valve shall have a Buna-N valve seat seal. Valve shall have a positive self-aligning bonnet with captured screws. Valve shall have all stainless steel hardware and spring. Valve shall be powered by a 24 V ac encapsulated solenoid, .4 amp inrush and .2 amp holding. Valve shall have debris tolerant floating metering system design to accommodate dirty water conditions. Valve shall have a removable tamper-resistant flow control handle. Valve shall have captive screws. **700 Series:** Valve body and bonnet shall be constructed of glass-reinforced nylon, with stainless steel hardware and spring. Valve shall have a slow-closing design to prevent water hammer. Valve shall have manual operation with internal bleed. Valve shall have a self-flushing, 150-mesh stainless steel control-water filter. Valve shall have a straight-through flow path that results in low pressure loss. A solid brass flow control stem shall be standard. Except ¾" model, valve shall have a nylon-rein-

forced double-beaded Buna-N diaphragm. Valve shall have a Buna-N seat seal. Body shall have molded brass inserts for positive bonnet attachment. **Y-Filter:** Y-filter body and cap shall be constructed of nylon. Y-filter locking ring shall be constructed of glass-reinforced nylon. Y-filter O-Ring shall be constructed of Buna-N. Y-filter screen shall be constructed of 150-mesh stainless steel. The mesh screen shall be serviceable for cleaning purposes by unscrewing the cap from the body and removing the filter element. The ¾" body shall have a ¾" male-threaded inlet and outlet. **Pressure Regulator:** The pressure regulator shall have a ¾" female-threaded inlet and a ¾" female-threaded outlet.

**Operation: 2700/2500 Series:** Valve shall have a working pressure range from 10 psi – 150 psi and a flow range from .25 – 30 GPM. Valve (anti-siphon models only) shall be mounted above ground at least 6" above highest sprinkler head (or mounted to meet local codes). **700 Series:** Valve shall have a working pressure range from 10 – 150 psi and a flow range from .1 – 180 GPM depending on valve size. **Y-Filter:** Y-filter shall have a recommended pressure range from 5 – 142 psi. The filter shall have a flow rate of 5 – 80 GPM. **Pressure Regulator:** The pressure regulator shall have a preset outlet pressure of 25 psi. The low-flow pressure regulator model shall have a flow range of .1 – 8 GPM. The medium-flow pressure regulator shall have a flow range of 2 – 20 GPM. The pressure regulator shall always be installed downstream from all shut-off valves.

## 430R SERIES

Rotors shall be 430R gear-driven models as manufactured under the name of Irritrol or approved equal.

**Construction:** The sprinkler shall be of gear-driven rotor type, capable of covering a \_\_\_ foot radius at \_\_\_ psi with a discharge rate of \_\_\_ GPM. Each sprinkler shall be shipped with a nozzle tree consisting of 5 nozzles. The nozzles shall be identified as .75 through 3.0. The nozzles shall be interchangeable. Use of the enclosed tool shall prevent damage to the nozzle when extracting. The nozzles shall discharge between 0.8 GPM and 3.4 GPM, depending on nozzle size and pressure at the base of the nozzle. The sprinkler shall have a radius adjustment screw capable of reducing the radius by up to 25%.

**Performance:** The sprinkler shall be fully adjustable from 40° to 360°. The sprinkler shall be adjustable in both dry and wet conditions. Adjustment shall be accomplished by inserting the 430R key (or standard screwdriver) into the arc adjustment slot and turning until the desired arc is reached. The sprinkler shall have a pop-up height of 4". The sprinkler shall have a ½" NPT inlet. The sprinkler shall be serviceable from the top by unscrewing the cap and removing the internal assembly. The internals shall be removable as one unit capable of being disassembled to the riser and various parts attached to the riser assembly.



## 450R SERIES

Rotors shall be 450R gear-driven models as manufactured under the name of Irritrol or approved equal.

**Construction:** The sprinkler shall be of gear-driven rotor type, capable of covering a \_\_\_ foot radius at \_\_\_ psi with a discharge rate of \_\_\_ GPM. Each sprinkler shall be shipped with a nozzle tree consisting of 13 nozzles (9 standard and 4 low angle; one nozzle may be shipped in the sprinkler). The nozzles shall be identified as .50 through 8 and 1.0 LA through 6.0 LA on the face of the nozzle. The nozzles shall be interchangeable. Use of the enclosed tool shall prevent damage to the nozzle when extracting. The nozzles shall discharge between 0.5 GPM and 10.0 GPM, depending on nozzle size and pressure at the base of the nozzle.

The sprinkler shall have a radius adjustment screw capable of reducing the radius by up to 25%.

**Performance:** The sprinkler shall be fully adjustable from 40° to 360°. The sprinkler shall be adjustable in both dry and wet conditions. Adjustment shall be accomplished by inserting the 450R key into the arc adjustment slot and turning until the desired arc is reached. The sprinkler shall have a pop-up height of 4". The sprinkler shall have a ¾" NPT inlet. The sprinkler shall be serviceable from the top by unscrewing the cap and removing the internal assembly. The internals shall be removable as one unit capable of being disassembled to the riser and various parts attached to the riser assembly.

## 550R SERIES

Rotors shall be 550R gear-driven models as manufactured under the name of Irritrol or approved equal.

**Construction:** The sprinkler shall be of gear-driven rotor type, capable of covering a \_\_\_ foot radius at \_\_\_ psi with a discharge rate of \_\_\_ GPM. Each sprinkler shall be shipped with a nozzle tree consisting of 12 nozzles (8 standard and 4 low angle; one nozzle may be shipped in the sprinkler). The nozzles shall be identified as 1.5 through 8 and 1.0 LA through 3.0 LA on the face of the nozzle. The nozzles shall be interchangeable. Use of the enclosed tool shall prevent damage to the nozzle when extracting. The nozzles shall discharge between 0.76 GPM and 9.63 GPM, depending on nozzle size and pressure at the base of the nozzle. The sprinkler shall have a radius adjustment screw capable of reducing the radius by up to 25%.

**Performance:** The sprinkler shall be fully adjustable from 40° to 360°. The sprinkler shall be adjustable in both dry and wet conditions. Adjustment shall be accomplished by inserting the 550R key (or standard screwdriver) into the arc adjustment slot and turning until the desired arc is reached. The sprinkler shall have a pop-up height of 5". The sprinkler shall have a ¾" NPT inlet. The sprinkler shall be serviceable from the top by unscrewing the cap and removing the internal assembly. The internals shall be removable as one unit capable of being disassembled to the riser and various parts attached to the riser assembly. An optional check valve feature, capable of holding back 7' of elevation change, shall be made available.

## PLATINUM SPORT

Rotors shall be Platinum Sport gear-driven models as manufactured under the name of Irritrol or approved equal.

**Construction:** The sprinkler shall be of a gear-driven rotor type, capable of covering a \_\_\_ foot radius at \_\_\_ psi with a discharge rate of \_\_\_ GPM. Each sprinkler shall be shipped with a nozzle tree consisting of 7 nozzles (one nozzle may be shipped in the sprinkler). The nozzles shall be identified as 7, 9, 12, 16, 20, 24 and 27 on the nozzle tree. The nozzles shall be interchangeable. A tool shall be provided to pull-up the riser for nozzle installation and also for turning the radius reduction screw (allows up to 25% radius reduction). The nozzles shall discharge between 6 GPM and 30 GPM depending on nozzle size and pressure at the base of the nozzle.

**Performance:** The sprinkler shall be fully adjustable from 40° to 360°. The sprinkler shall be adjustable in both dry and wet conditions. Adjustments shall be accomplished by inserting a straight end screwdriver into the arc adjustment slot and turning relative to the

indication on the rubber cover to increase or decrease the arc. The arc pointer will point to the selected arc setting. When set at 360°, the sprinkler will rotate continuously in the direction chosen. The sprinkler comes with a 5" pop-up height to the nozzle. The sprinkler shall have a slip clutch feature that will prevent damage to the internal drive components if someone intentionally tampers with the sprinkler. Further, the sprinkler will have an arc return feature that allows the sprinkler to return to its originally set arc pattern if tampered with. The sprinkler shall have a 1" NPT inlet. The sprinkler shall be serviceable from the top by unscrewing the cap and removing the internal assembly. The internals shall be removable as one unit capable of being disassembled to the riser and various parts attached to the riser assembly. The sprinkler shall have a locking screw in the side of the cap to prevent vandalism. A reversible check valve feature shall be installed in every sprinkler, capable of holding back up to 8' of elevation change.

## I-PRO SERIES

Spray heads shall be I-PRO Series fixed spray models as manufactured under the brand name Irritrol or approved equal.

**Construction:** The sprinkler shall be a fixed-spray type capable of covering a \_\_\_ foot (\_\_\_ meter) radius at \_\_\_psi (\_\_\_Bars). The sprinkler shall offer a series of interchangeable fixed arc I-PRO nozzles in 5', 8', 10', 12' and 15' radii. Each family of nozzles shall be available in  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$  and full-arc configurations except 5', 8', and 10'. All nozzles shall be shipped and installed with a filter screen device. A gray screen shall be provided with the 5' and 8' radii nozzles. A black screen shall be provided with the 10', 12' and 15' radii nozzles. All screens shall be captive to the nozzle when properly installed in the sprinkler head. The sprinkler shall offer a series of interchangeable variable arc nozzles (VANs) in 8', 10', 12', 15' and 17' radii. Each nozzle shall be able to accommodate arcs from 0° to 360°. A white screen shall be provided for all VAN nozzles.

**Performance:** Depending on I-PRO™ nozzle selected and pressure, the sprinkler shall discharge from .06 – 4.75 GPM. Depending on VAN nozzle selected and pressure, the sprinkler shall discharge from .53 – 4.60 GPM. All nozzles shall be balanced with regard to their precipitation rate, whether spaced in a triangular or square radius by up to 25% from the fully open position. The VAN nozzle family shall be color-coded on the base of the nozzle unit. The body shall offer a pop-up height from the properly installed grade to the middle of the nozzle orifice (3", 4", 6" or 12"). The sprinkler shall have a ratcheting riser allowing the installer to orient the spray to the proper area without turning the body once installed. The sprinkler shall have a  $\frac{1}{2}$ " female NPT inlet. An optional check valve and pressure regulator shall be made available. It shall be universal to each sprinkler size and retrofittable to any previously installed sprinklers.

## SL SERIES

Spray heads shall be SL Series fixed spray models as manufactured under the brand name of Irritrol or approved equal.

**Construction:** The sprinkler shall be a fixed-spray type capable of covering a \_\_\_ foot (\_\_\_ meter) radius at \_\_\_psi (\_\_\_Bars). The sprinkler shall offer a series of interchangeable variable arc nozzles (VANs) in 10', 12', 15' and 17' radii. Each nozzle shall be able to accommodate arcs from 0° to 360°. A white screen shall be provided for all VAN nozzles. All screens shall be captive to the nozzle when properly installed in the sprinkler head.

**Performance:** Depending on VAN nozzle selected and pressure, the sprinkler shall discharge from 0.53 – 4.60 GPM. All nozzles shall be balanced with regard to their precipitation rate, whether spaced in a triangular or square spacing plan. All nozzles shall have a radius adjustment screw capable of reducing radius by up to 25% from the fully open position. Each nozzle family shall be color coded on the base of the nozzle unit. The body shall offer a pop-up height from the properly installed grade to the middle of the nozzle orifice (2", 4" or 6"). The sprinkler shall have a ratcheting riser allowing the installer to orient the spray to the proper area without turning the body once installed. The sprinkler shall have a  $\frac{1}{2}$ " female NPT inlet. An optional check valve shall be made available. It shall be universal to each sprinkler size and retrofittable to any previously installed.

## 533 BUBBLER

Bubblers shall be Model 533 as manufactured under the brand name of Irritrol or approved equal.

**Performance:** The bubbler shall have an adjustable flow rate between 0 and 5.9 GPM. Depending on pressure and flow adjustment, the bubbler shall deliver between 0 and 2' radius. The bubbler shall have a  $\frac{1}{2}$ " female NPT inlet for attachment to a standard riser.

# TRADE WARRANTY

**Excluding software and products formerly produced under the Rain Master™ brand name, Irritrol® offers the following coverage to its trade customers:**

For the first year from the date of original sale to the trade customer, "hassle-free" over-the-counter exchange of products found to have original manufacturing defects; and  
For years two through five from the date of original sale to the trade customer, repair or replacement—at our option and without charge—of all parts which are found to have original manufacturing defects, provided the product is returned to the original place of purchase or sent to the Irritrol repair facility at 5825 Jasmine St, Riverside CA 92504, at the customer's expense.

All Rain Master "R M E" Series Controllers have a 5-year (5-yr) warranty; all other Rain Master products have a 2-year (2-yr) warranty. A 3-year (3-yr) warranty applies to the following products: the KwikDial® controller, SL Series spray heads and the Wireless RainSensor®; a 2-year (2-yr) warranty applies to: the IBOC®300-9V valve-mounted controller, the JR Max™ controller, the CMR-KIT, 430R, 450R rotors and drip zone kit filter and pressure regulator; and a 1-year (1-yr) warranty applies to: the KwikStart™ remote control system, RCP8 Plus remote control programmer and Flow Sensors.

All PC related Software, which includes but are not limited to, PC Control, Evolution, AIM, Advanced ET, OASIS, Weather Station, etc, have a 90-day warranty. All computer hardware purchased from Irritrol in conjunction with its PC related software is **NOT** covered by any Irritrol warranty. Computer hardware and its installed operating system(s) is specifically covered by the hardware manufacturer's warranty as provided by the hardware manufacturer.

This warranty does not apply to loss or damage to the product due to improper installation, abuse, alteration, mishandling, accident, or if the product has been serviced by other than Irritrol or its authorized service centers. This warranty is not a consumer warranty and does not extend to anyone other than those trade customers who purchase Irritrol products.

**NOTE: Irritrol is not liable for (i) failure of products not manufactured by Irritrol even though such products may be sold or used in conjunction with Irritrol products; (ii) indirect, incidental or consequential damages, including but not limited to vegetation loss during periods of malfunction or resulting non-use; (iii) any loss or damage (e.g., property damage) resulting from an installer's negligence; or (iv) implied warranties of merchantability or fitness for a particular purpose. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.**

In no event shall Irritrol be liable or in any way responsible, for any damages or defects in the product which were caused by repairs or attempted repairs performed by anyone other than an authorized Irritrol / Rain Master Service dealer or center.

This warranty supersedes all previous warranties and shall be the sole and exclusive warranty granted by Irritrol and shall be the sole and exclusive remedy available to the trade customer. Correction of defects, in the manner and period of time described herein, shall constitute complete fulfillment of all liabilities and responsibilities of Irritrol to the trade customer with respect to the product, and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise.

NOTE: The user is cautioned that changes and modifications made to the equipment without the express written consent of the manufacturer will void this warranty.

SERVICE: Irritrol Technical Services: 1-800 634-8873  
Irritrol Controller Repair: 1-800 899-2058  
Rain Master Product Line: 1-800-777-1477

**Irritrol**<sup>®</sup> *Get more done*<sup>™</sup>

**HEADQUARTERS**

5825 Jasmine St  
Riverside, CA 92504-1183

Tel 800-634-TURF (8873)  
Fax 800-862-8676

**[www.irritrol.com](http://www.irritrol.com)**