

## Integrated Sensor System™ (ISS)

The Rain Bird® Integrated Sensor System™ gives you an accurate snapshot of soil conditions helping you to optimize turf health. It is the only system in the industry to deliver accurate soil sensor readings immediately following installation and true dynamic central control integration. As a result, you'll save more time, water and money with Rain Bird.

### Features and Benefits

- Dynamic integration. Fully automatic.**  
 When paired with a Rain Bird Central Control System, the Integrated Sensor System can automatically adjust sprinkler run times to reach or maintain desired moisture levels, minimizing water consumption, resulting in healthier turf and better playing conditions.
- Intelligent monitoring.**  
 As a standalone system, the ISS analyses soil moisture and calculates water budget recommendations for any golf course.
- Maximum accuracy. Zero calibration.**  
 The ISS uses research-grade soil sensors backed by years of field experience. These sensors have been vetted by multiple academic peer-reviews. The ISS takes highly accurate readings of soil moisture, salinity and temperature immediately following installation and without calibration – for easy installation and immediate accuracy.
- Adjustable soil sensing rate.**  
 With the Rain Bird ISS, the frequency of soil sensing measurements can be adjusted to match course needs.
- Dependable results.**  
 Sensor readings are automatically stored by the data logger on Secure Digital High Capacity (SDHC) storage cards. Data is not lost due to power outages or wireless communication issues.
- Dependable communication.**  
 The ISS uses a proven wireless mesh network which ensures the necessary range of transmission and a secured traffic from the data logger to the Soil Manager™ software.

- Simple installation.**  
 Network devices (data loggers and repeaters) are battery-powered and easy to install. There is no AC power source to worry about.
- Improves turf health, course consistency and playability.**  
 The ISS can help deliver more consistent turf quality, anticipate plant stress, weed germination, pest infestations and other factors. You can use less water to flush salts from the soil profile.

### Specifications

- System capacity: 200 sensors, 20 ISDL-2400 data loggers, 40 ISR-2400 repeaters per ISG-2400 gateway.
- Frequency of sensor readings can be adjusted between 2 and 120 minutes. Sensor sampling rate under 15 minutes will reduce battery life.

### Electrical Input:

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

### Grounding Requirements:

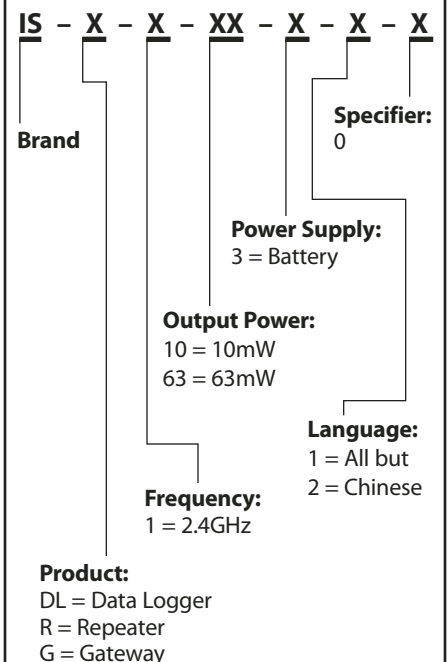
- ISDL-2400 data logger and ISR-2400 repeaters are battery-powered devices and do not have grounding requirements.

### Wireless Network:

- General:
  - 2.4 GHz ISM DSSS (Digital Sequencing Spread Spectrum) unlicensed frequency
  - Power output 10mW and 63mW per country of use regulations



### How to Specify



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

**Sensors:**

- TSM-3 Soil Sensors
  - Sensor shall connect to a Rain Bird ISDL-2400 Wireless Data and provide soil moisture, salinity and temperature readings
  - Sensor shall take accurate readings immediately following installation and without calibration
  - Sensor shall measure and report:
    - Soil temperature
    - Absolute water fraction by volume (WFV) in % with loam calibration
    - 0.1 to 15 dS/m in-soil electro conductivity
    - 1% stable WFV readings over the following conditions:
      - -30°C to 55°C (-22°F to 131°F) (non frozen soil)
      - 0.1 to 4 dS/m EC
  - Robust, long life materials and construction
  - Industry standard SDI-12 interface
  - Shall connect to a data logger through an 18-gauge three-wire cable that is at most 300 feet long. Sensor itself shall have a 25 ft long 18-gauge three-wire cable. Additional cable, not provided, is required to reach 300 feet.
  - Low power operation:
    - 9 to 20 VDC
    - <1 mA typical standby mode
    - 30 mA moisture read mode

**Software:**

- Hardware requirements, same as Rain Bird central:
  - Microsoft Windows XP Professional SP3
  - PC with 300 KHz or higher processor
  - 128 MB of RAM
  - 1.5 GB of available hard disk space
  - Power profile of computer should be configured to not sleep

**Languages:**

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

**Soil Manager: (monitoring with dynamic central integration enabled)**

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

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The Intelligent Use of Water™  
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