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The Wireless RainSensor™ Company

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Toro Wireless Rain Sensor and Freeze Sensor Method of Operation
Details for 433MHz models, radio frequency testing.

Models:

TWRS	Toro Wireless RainSensor
TWRFS	Toro Wireless RainSensor with Freeze Option
TWRS-I	Toro Wireless RainSensor (International)
TWRFS-I	Toro Wireless RainSensor with Freeze Option (International)

The Wireless RainSensor for irrigation systems is a wireless remote rainfall sensor that transmits control signals back to a receiver unit which is interfaced with a landscape sprinkler irrigation system. The Wireless RainSensor is intended to prevent an irrigation system from running during or after rainfall, thus saving water. It allows the irrigation system to resume watering after the absorptive elements in the RainSensor dry out under sunny or dry conditions following a rainfall. The Wireless RainSensor also has an optional freeze sensor available that prevents the irrigation system from watering during freezing or near freezing conditions thus preventing ice conditions – which has safety implications (walkway icing) as well as avoiding vegetation damage.

The Wireless RainSensor transmitter operates at 433MHz. A signal is transmitted for less than 5 seconds every time there is a change in status of either the rainfall activated switch, or if the temperature is detected to change by an amount greater than a pre-set limit. The frequency of signal transmission is dictated solely by changes in external weather conditions, i.e. rainfall and temperature change, and is not manually activated except during user installation and occasional manual system testing. Limits are placed in the software of the device to prevent transmissions occurring too frequently such as may occur during rapid temperature fluctuations, this limit is hard coded into the micro-processor.

The transmitter is powered by two 3V coin cells (CR2032 or equivalent) in series and utilizes an RF transmitter module. A schematic and PCB layout picture is being supplied for reference. The data rate and form is dictated by the micro-processor (the pulse train diagram is also being supplied for reference). The transmitted data comprises of an address code and sensor data.

Special notes on the units supplied for testing:
The transmitter units that are supplied for RF emissions testing have been modified such that they transmit continuously as soon as the batteries are placed in the unit – this is not the normal operation of the transmitter but has been modified to allow for accurate and easy testing. Fresh batteries have also been supplied to allow for appropriate measurements over prolonged testing procedures.