



# LEIT ET WWS Manual

**LEIT-ET-WWS and LEIT ET-WWSE ambient light powered, wireless weather station**

**DIG's LEIT-ET-WWS and LEIT ET-WWSE wireless weather stations are independent, column-mounted weather-measuring instruments powered by ambient light.**

**The LEIT weather stations can gather weather conditions data from the surrounding area and simultaneously transmit the data once every hour during daytime to any LEIT-2ET and/or LEITXRC-ETS controller at a distance of up to 350' (100 m) line of sight. The collected data tracked by the weather station sensors is used to calculate the hourly and daily local microclimate evapotranspiration (ET).**

## **Features**

- Power is provided by an efficient photovoltaic module (PVM) and microelectronic management system fueled by ambient light. No battery or AC power is used.
- Weather data transmit by the weather stations is stored by the controllers and reviewed by the LEIT RC2 and the LEIT Master or Multi-pro handsets.
- The wireless weather stations' instruments include an anemometer, thermometer, hygrometer, rain gauge and solar radiation meter to monitor humidity level, temperature, wind speed, solar-radiation and rainfall.
- The weather station ID number enables any controller in range to differentiate among weather stations transmitting data to it. This feature allows a controller to get information from several points in its range.
- Based on user input and information collected from the weather station sensors, a LEIT-2ET or a LEIT XRC-ETF controller performs the calculations needed to override or adjust the daily scheduled irrigation program, by adjusting the monthly budget to compensate for evapotranspiration (ET).
- The LEIT weather stations utilized ROHS components, CE and FCC certified.
- The LEIT weather stations utilize radio frequency in the ISM band 902-928 MHz (868 international).
- The LEIT weather stations' electronic components and sensors are completely waterproof.
- The rain gauge is a self-emptying, tipping bucket reading rainfall in 0.01inch increments.

- The LEIT weather station's three plate radiation shield is specially designed to protect the sensors from reflected radiated heat.
- The LEIT weather stations communicate with any LEIT ET controllers at a distance of up to 350 feet (100 m) by way of radio communication.
- The LEIT weather stations can provide information to LEIT ET controllers to completely stop irrigation if it is too windy, too cold or raining. This information is provided hourly and daily.
- The weather station function day and night in any weather and in most outdoor locations and transfer information only in daylight.
- The LEIT weather stations can be use on a column mounting or attached to a wall
- Rugged and lightweight plastic construction
- Three years manufacturer's warranty.

#### **Instruments:**

- LEIT-ET-WWS include: anemometer, thermometer, hygrometer, rain collector and solar radiation meter to monitor humidity level, temperature, wind speed, solar-radiation and rainfall.
- LEIT ET-WWSE include: Thermometer, hygrometer, rain collector and solar radiation meter to monitor humidity level, temperature, solar-radiation and rainfall.

#### **Specifications:**

- Pre-assigned ID for each weather station
- Input: 3000-100,000+ lux. Normal operation requires average of 3000 lux
- Wireless transmitter power and frequency specification: -7 dBm @ 920 MHz / 7 dBm @ 870 MHz
- Humidity range and resolution: 1 to 99 % (100% inches Hg)
  - Relative Humidity accuracy: +/- 2% Humidity hysteresis 1.5%
- Temperature resolution and accuracy: -40 to + 257 ° F (-40 to 120C) +/- 1 % resistance tolerance
- Wind speed resolution and accuracy: min speed 0 mph / 0 kph to max speed 30 mph / 49 kph +/- 1%
- Rainfall resolution and accuracy: 0.01 inches accuracy +/- 2% @ 2" per hour
- Solar radiation max equivalent to 100,000 LUX, voltage proportional to  $W/m^2$  +/- 20%
  - Range: 0 – 231  $W/m^2$

**Dimension and connections:**

- Weather station size: W 6.07" x H 9.5" x D 13.65
- Rain Collector size: W 5.13" x H 4.09" (16.5 sq.in)
- Mounting connection: Integrated clamp with 2 screws for 1" mounting column

**About the LEIT ET WWS**

The LEIT ET Sensor features include: microcontroller, radio chip, thermostat (temperature) sensor, humidity sensor, PVM (light radiation), wind sensor and rain gauge.

This LEIT ET sensor will work with the LEIT 2ET controller and the latest handset that have the updated firmware.

**About ET**

ET is an abbreviation for evapotranspiration, which is the process of transferring moisture from the earth to the atmosphere by evaporation of water and transpiration from plants.

ET value is basically the amount of water a microclimate has lost due to its local weather. When the value is taken into conjunction with a specific crop type, we can calculate how much water has been lost due to evapotranspiration, resulting in a highly efficient method of irrigating a crop.

**How the LEIT ET works:**

The LEIT 2 ET Sensor is essentially a separate component from the LEIT –2ET and LEIT XRC ETF system. The LEIT ET sensor will communicate with a LEIT 2ET and LEIT XRC ETF. The LEIT 2 ET Sensor sends information to the LEIT 2 Controller and LEIT XRC ETF. The controllers store the information that can be retrieved and reviewed by the LEIT RC2 handset and the LEIT XRC-ETF

The LEIT 2 handset can connect to a LEIT 2ET controller and allows retrieving of various report data from it archived such as monthly rain measurements, current humidity and temperature and how sunny it is at the location of the LEIT 2 ET sensor. The LEIT 2 Controllers will also set warnings when the LEIT 2 sensor has not sent any information for more than a day when the ET is set to "active."

The LEIT 2 ET sensor communicates with separate LEIT 2ET Controllers by way of radio communication.

The way to operate the LEIT 2 ET sensor is to essentially leave it outside where it can get enough light to power through the PVM and have it within 300 feet of a LEIT 2ET and the LEIT XRC ETF controllers that you want connected. When setting up the LEIT 2ET sensor, there will be some definitions that need to be set using the LEIT RC2 handset such as, crop type, irrigation type, soil type etc. The ET also needs to be set as “active” in order for the LEIT 2ET controller to effectively use the ET information it receives to make the irrigation system more efficient.

There will be no intercommunication between the LEIT ET Sensor and the LEIT 2 Handset. The LEIT ET Sensor use only one-way communication between the LEIT ET sensor and the LEIT 2 Controller. The Sensor will send data one-way to the LEIT 2 Controller once every hour. It will work like the following diagram:



The LEIT ET sensor operates by waking up once every hour and take information measurement to calculate the local microclimate ET. The LEIT Sensor will then send all the different values from each sensor to the LEIT 2 ET controllers or LEIT XRC ETF. The serial ID number will help the LEIT 2ET Controller differentiate between other LEIT ET Sensors in order to take their average to determine more accurate information.

The LEIT 2 handset’s purpose is to setup the LEIT 2 Controller. The ET menu helps determine the slope, irrigation type, initial soil conditions, plant type, flow rate, spacing, soil type and shading conditions. The LEIT 2 handset can also be used to recover ET data from the LEIT 2ET Controller that was sent from the LEIT ET Sensor. In the status report, we can review ET sensor information as well as archived sensor data, much like current month and last month history of how long there was irrigation.

The LEIT 2ET controller is where all the information is collected from the LEIT ET Sensor and actual ET. The LEIT 2 controller stores, archives and reports the sensor data that is sent to the user from the LEIT ET Sensor via the

LEIT 2 Handset. The controller takes into account the ET setup information that was given from the LEIT 2 Handset along with the actual ET values given from the LEIT Sensor to determine the amount to irrigate.

The amount of water that we irrigate will be the regular program that the user has set up, using the LEIT RC2 handset. The ET would adjust the time programmed to irrigate by adjusting the monthly budget on a continual basis for it to catch up with how much ET is lost.

We will take the initial soil condition and from there, use the hourly ET information given to accumulate how much ET was lost due to the microclimate conditions. This information is accumulated until the next time the LEIT 2ET is programmed to irrigate.

#### **LEIT ET WWS Instructions:**

**Step 1:** Take the LEIT ET WWS out of the box and have it charge in the sunlight for 30 minutes to 1 hour, then mounted The LEIT ET WWS on a pole or on the wall in an open area and in the highest location. We recommend the sensor to mounted in no longer then 150' to 200' from a LEIT 2ET or LEIT XRC ETF controllers. When LEIT ET Sensor is fully powered it will send information to a controller in this range that will allows this controller to determining the microclimate in the air.

**Step 2:** Connect to a LEIT 2 ET controller via the LEIT handset.

Through the handset on the LEIT-2 handset or controller menu on the LEIT XRC ETF controller set the ET information for LEIT 2 ET controller with the ET capability following these steps for LEIT 2 ET:

1. Connect to the controller via the controller ID
2. Select the environmental icon (replacing the budget icon) and enter the environmental screen
3. In the environment screen the user have an icon for ET, budget and rain sensor or rain gauge. Select the ET icon and uplink to the controller to upload the ET information
4. If uplink is successful, the user will connect to a screen that show ET inactive
5. Change the inactive to active and download the information to the controller.
6. If successful the next screen appears with 2 valves. Select one of the valves and upload. If successful the next screen appears
7. In the following screens the user will enter the soil type, plant type, slope, shade conditions, irrigation type, flow rate, spacing and initial soil condition

8. Last screen Are You Sure confirm this setup. Connect and update the information and then the second valve appears
9. Repeated the setup for the next valve and for any other controller on the system if needed.

All the information that will consist of the soil type, % of slope, type of irrigation system, crop type, etc. will be useful for calculating the ET of the microclimate surrounding the controller and will be provided by an instruction that will be provided.

#### **Setting the rain sensor to be used via the sensor**

The Rain Sensor option can be used to override the controller programming when it is rainy  
Setting the rain sensor will include setting the amount of rain in inches needed to stop irrigation. This rain sensor will use the information from the rain gauge and will set the level of rain needed to stop irrigation.

Note: If the controller rain sensor connection is used, the rain sensor does not need any further input  
If the sensor rain gauge method used the user will have to input the amount of rain needed to stop irrigation  
be selecting from a suggested amount

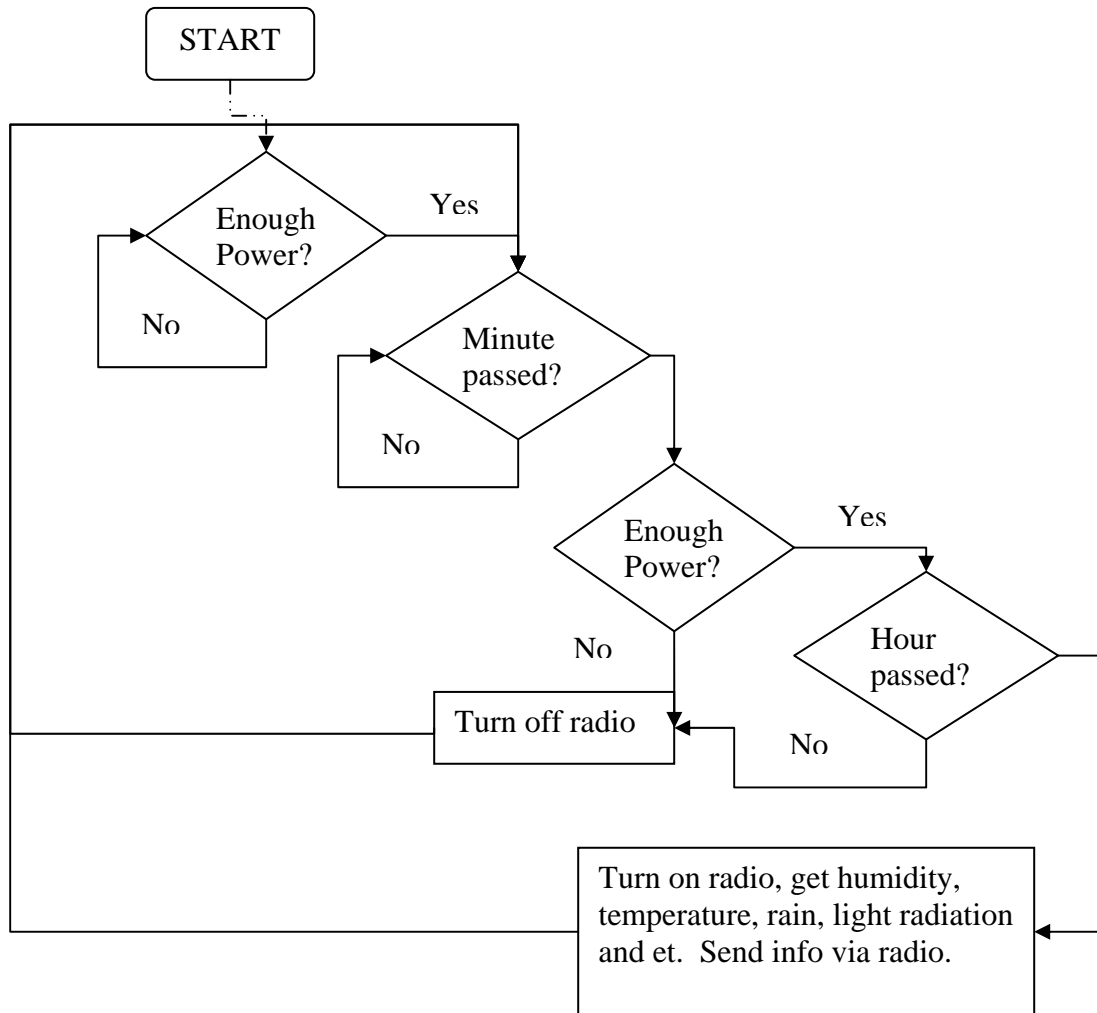
- a. Connect to the controller via the controller ID on the handset
- b. Select the environmental icon (replacing the budget icon) and enter the environmental screen
- c. In the environment screen the user will have an icon for ET, budget rain sensor and rain gauge. Select the Rain Sensor icon and uplink to the controller
- d. If uplink is successful, the user will connect to a screen that show the rain sensor information
- e. If successful the next screen appears with the rain sensor information that needs to be input to stop irrigation. Select the amount in inches (suggested option available) you wish to stop irrigation and upload
- f. After selecting the information download the information to the controller
- g. Last screen with Are You Sure appears to confirm the setup. Connect and update

#### **LEIT ET WWS Scenario:**

- The sensor will be placed outside in the sun
- When there is sufficient ambient light, every hour the Sensor will wake up
- Waking up, the sensor takes the local temperature, humidity, wind speed, and light radiation to calculate the ET value

- The sensor then sends all the previous values along with the Sensor ID, the rain gauge level and the 24 hour accumulated ET value through radio to existing Leit 2 Controllers
- The Leit 2 Controllers within vicinity will take this information and use it
- Prior information that was set on the Leit 2 Handset concerning ET environment of the Leit 2 Controller is used to calculate how much water is necessary to irrigate the existing system
- The ET information sent by the Leit Sensor will be factored into the Leit 2 Controller's calculations that determine how much water is needed to irrigate by keeping a running count until the next scheduled programming time
- The Leit Sensor will thus continue sending ET information on an hourly basis

# LEIT ET WWS Flowchart





## **FCC Information**

### **Radio Frequency Interference Requirements**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **Radio Transmitters (Part 15)**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Changes or modifications not expressly approved by DIG Corporation could void the users authority to operate this equipment.