

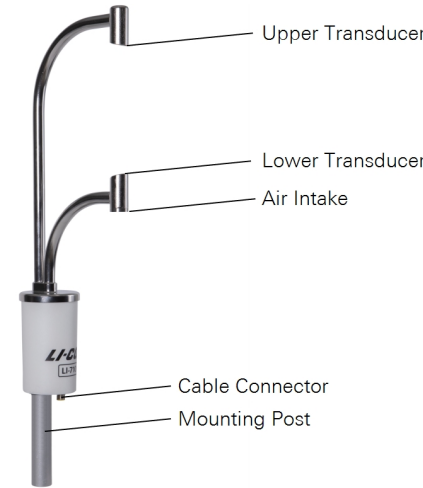
Getting Started

with the LI-710 Evapotranspiration Sensor



What's what

Welcome, and thank you for your purchase of the LI-710 Evapotranspiration Sensor. The LI-710 measures evapotranspiration from surface features using eddy covariance calculations that are optimized for the hardware and sensor configuration. Outputs from the LI-710 are formatted for SDI-12 dataloggers.



Online resources

For the latest operating information, video tutorials, sample programs, and other resources, go to licor.com/710-support.



Instruction Manual

Complete operating instructions for LI-710 Evapotranspiration Sensor.



Sample Programs

Sample programs for several common dataloggers are available.

The LI-710 uses the SDI-12 protocol. In the instruction manual, we describe how to configure a vegetronix.com SDI-to-Serial converter, Campbell Scientific dataloggers, and Sutron 9210 XLite datalogger to read measurements from the LI-710. Other SDI-12 devices may be compatible with the LI-710. Contact LI-COR for more information.

Deployment considerations

The area measured is about 50 to 100 times the installation height (or height above the plant canopy).

- At a height of 2 meters, the area-of-interest will be about 100 to 200 meters.
- At a height of 4 meters, the area-of-interest will be about 200 to 400 meters.

Ideally, deploy the LI-710 in the middle of an area-of-interest. When installed this way, the LI-710 measures the total evapotranspiration from a uniform area around the sensor.

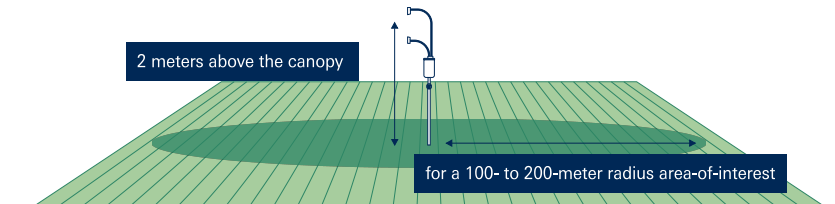


Figure 1. The sensor should be at least 2 meters above a uniform canopy for an area-of-interest of 100 to 200 meters around the LI-710.

2

Deployment considerations

If site conditions require it, the LI-710 can be installed at the edge of an area-of-interest on the side downwind of the predominant wind direction. This is useful if the area-of-interest is small or adjacent to a tree row, for example.

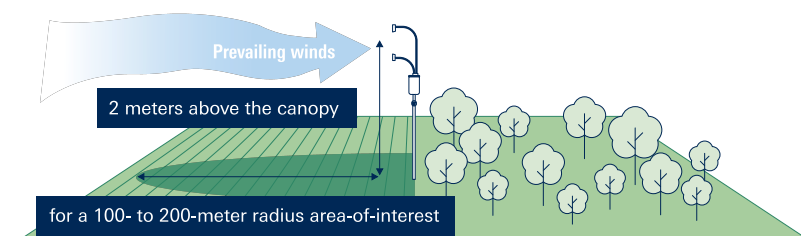


Figure 2. Where the LI-710 cannot be deployed in an area-of-interest, it can be positioned at the edge on the downwind side. At a height of 2 meters above the canopy, assume an area-of-interest of 100 to 200 meters in the upwind direction.

3

Deploying over growing canopies

When deploying over an annual crop or a canopy that is expected to grow vigorously in a season, choose an initial height based on the endpoint - how tall will this canopy be at the end of the season? Add 2 meters to that height to find your ideal initial installation height.

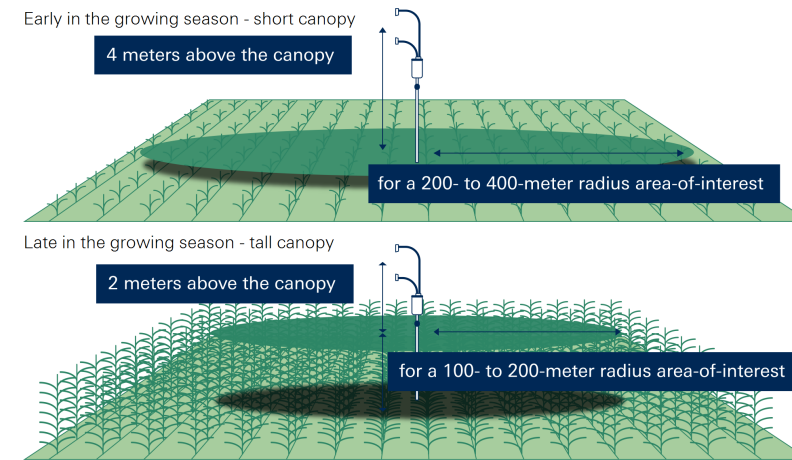


Figure 3. If you expect a 2-meter tall canopy, start with a 4-meter mounting height so that the sensor is 2 meters above canopy at the end of the growing season. Or you can adjust the height as the canopy grows.

4

Deploying over grasslands

Sloped and rolling terrain are suitable, so long as there are no major obstructions near the LI-710. The LI-710 should be around 2 meters above the plant canopy.

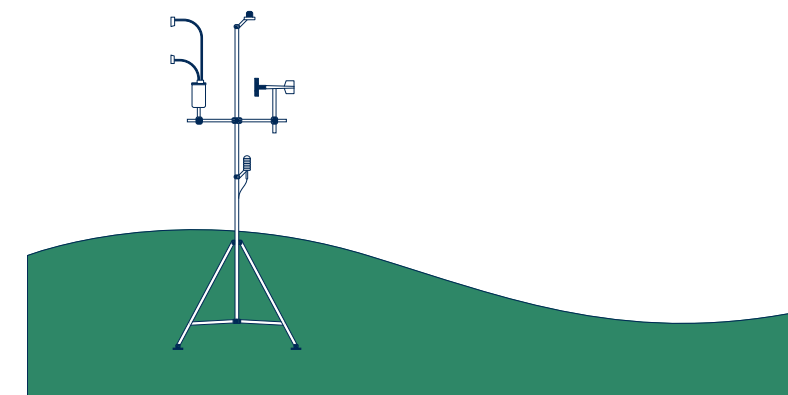


Figure 4. Over a short canopy with rolling terrain, the instrument should be around 2 meters above the top of the plant canopy.

Deploying over orchards, woodlands, or forests

The LI-710 should be between 2 and 4 meters above the top of orchard, woodland, or forest canopies.



Figure 5. The LI-710 should be 2 to 4 meters above the top of orchards, woodland, and forest canopies.

5

6

7

8

Deploying on sloped terrain

You can expect good results **as long as the sensor is within a few degrees of perpendicular to the slope** of the area-of-interest. The grade can range from 0 to 10%.

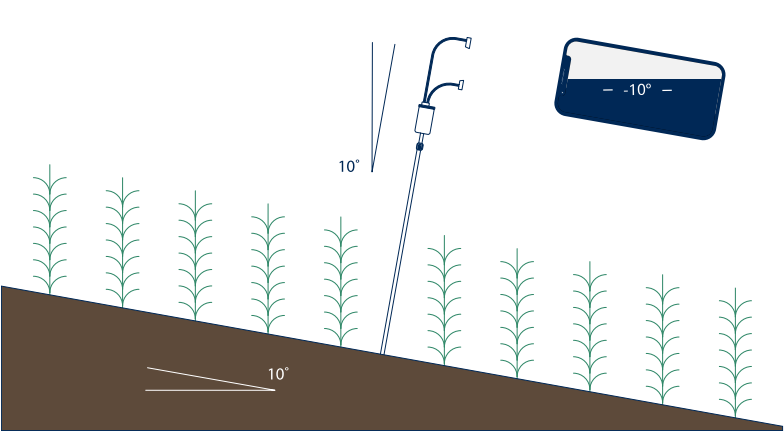


Figure 6. On sloped terrain, install the LI-710 perpendicular to the predominant slope of the area-of-interest. A few degrees of difference is acceptable.

Deploying on level terrain

The **Level** application included with most smart phones is adequate to verify that the LI-710 is perpendicular to the slope.

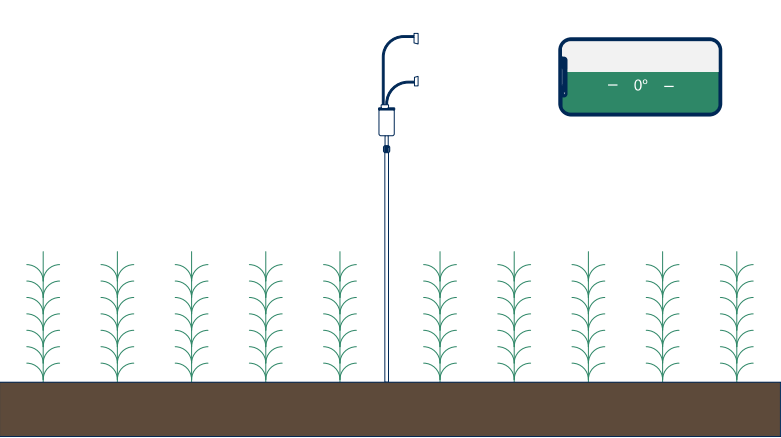
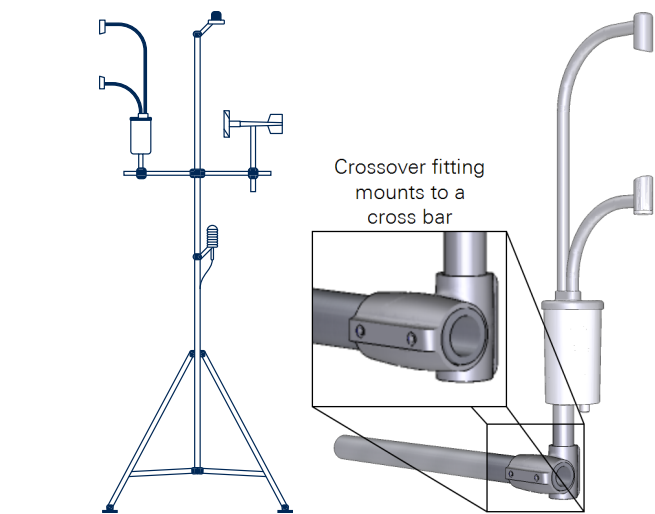


Figure 7. On level ground, install the LI-710 with 0° tilt, although a few degrees of difference is acceptable.

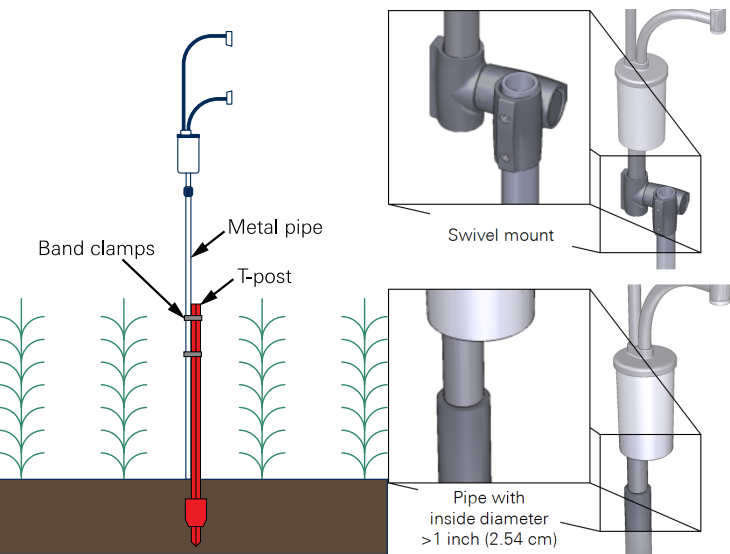
Mounting to a cross bar

Install the LI-710 about 2 meters away from other devices on a sensor platform, if possible. It features a 1" (2.54 cm) diameter mounting post for mounting to a cross bar.



Mounting to a mast

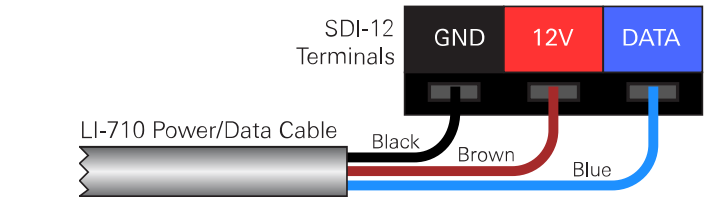
The LI-710 can be attached to a T-post and metal pipe. The pipe should have an inside diameter >1 inch (2.54 cm) for the mounting post and a means to secure the mounting post inside the pipe.



9

Wiring the SDI-12 sensor

The LI-710 is powered over the brown (+9 to 33 VDC) and black (GND) wires. Data are transferred over the blue DATA wire.



- Use the **Trigger** command to start a sampling period every 30 minutes. The LI-710 depends on the data logger to keep time. Measurements will start without the trigger command, but you may observe some drift in the time.
- Use the **Measure** command to query the LI-710. New results are computed 30 minutes after the trigger command is received.

10

Setting the address

The LI-710 is an SDI-12 device. Communication can be carried out with a datalogger with SDI-12 inputs or an SDI-12-to-USB translator. Use these commands to query the LI-710.

- ? – query the sensor address
- I - get information
- A – get or set the sensor address

All LI-710 have an address of 0 by default. You can change it so it doesn't conflict with other sensors that have the same address.

Sending commands in transparent mode

Transparent mode will transmit commands directly to the LI-710.

- To get information, send T ? !.
- To get the most recent measurements in group 0, send T 0R0 !.
- To change the address from 0 to 1, send T 0A1 !.

11

Reading the output

The first reading will be presented after 30 minutes of operation or 30 minutes after the trigger command is received. New results are computed every 30 minutes.

Data are provided in four groups (0 through 3).

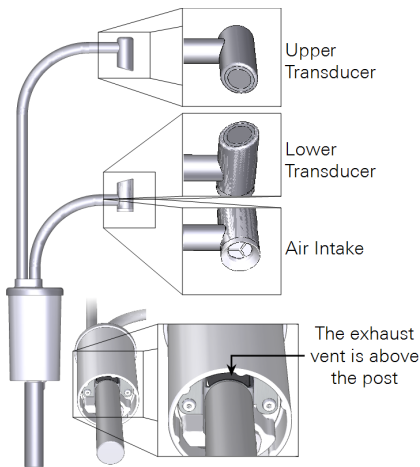
- **Group 0** is the main set of measurements, including evapotranspiration, other flux results, measured parameters, the sequence number, and diagnostic information for the measurement period.
- **Group 1** includes most of the main results, as well as the number of samples included in the measurement.
- **Group 2** includes measurements of environmental characteristics without any flux results.
- **Group 3** includes diagnostic and performance information for the LI-710.

12

Field maintenance

You can conduct a basic check just by looking at the LI-710.

- Check the transducers to be sure they are not covered in bird droppings or dirt. Clean them with a moist cloth and mild detergent if necessary.
- Check the air intake - look for visible obstructions or anything that might interfere with air flow and remove it. Replace the filter if it is dirty.
- Check the exhaust vent - look for insect colonies or nests. Clear anything that might obstruct the air flow.



Refer to the instruction manual for details.

13

14

15