



*We manage heat®*

**Order Number 18909**  
**Installation and Operation Manual**

**ENVIRONMENTAL TECHNOLOGY, INC.**

1850 N Sheridan Street  
South Bend, Indiana 46628  
(574) 233-1202 or (800) 234-4239  
FAX (574) 233-2152 or (888) 234-4238  
[www.networketi.com](http://www.networketi.com)

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## Installation

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**Install in accordance with the requirements of all applicable electrical and building codes and regulations.**

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Before disposing of the packing material, verify the inclusion of items in the packing list. Immediately notify CUSTOMER SERVICE of any discrepancy or shipping damage.

### Packing List

<u>Quantity</u>	<u>Part Number</u>	<u>Description</u>
1	18938	Installation and Operation Manual
1	18909	LCD™–1T Sensor

***Prior to installation, carefully read these instructions through, and familiarize yourself with the various system components, requirements, and area in which the equipment is to be installed. This will help facilitate a smooth installation. Follow all procedures outlined in this manual.***

## Mounting

**Note:** A normal installation sequence for the LCD™–1T sensor consists of: 1) mounting, 2) wiring, and 3) final testing for operation with the Tekmar® 362 Control. The sensor will require access for this final testing. If the sensor cannot be accessed for testing *after* mounting and wiring (such as on a high pole), it should be tested with the Tekmar® 362 Control *before* mounting it in its permanent position.

To execute a pre-test, set up temporary wiring (see “Wiring” section) and perform the test as prescribed in the “Checkout and Operation” section. Do not substitute this pre-testing in place of a final checkout after the LCD™–1T is installed if access is not a problem; follow the normal installation sequence as outlined.

The LCD™–1T is designed for use in hostile environmental conditions over an ambient temperature range of -20°F– 140°F (-28.9°C – 60°C). When selecting a mounting location for the LCD™–1T, observe the following guidelines so: 1) a safety hazard is not created, and 2) the surroundings will not interfere with operation of the unit (i.e., restricting the moisture cup’s access to falling precipitation).

**AVOID** overhead trees, shrubs, wires, eaves, etc., and blowing debris.

**AVOID** mounting the unit below a roof line if located adjacent to a building.

**AVOID** vehicle and foot traffic.

**AVOID** exposure to artificial heat sources, excessive shock and vibration.

The sensor must be mounted securely in an upright position (moisture cup aimed upwards) in a clear and open area. For convenience, the bottom of the sensor housing has a ½” NPT thread for mounting directly to a pipe nipple (see Figure 1). A junction box is used to provide weather sealing of the wire connections. Wrap all threaded conduit connections with teflon tape for weather sealing.

## Wiring

All wiring to the LCD™-1T is NEC Class 2 low voltage. Conduit need not be used for *in-door* routing of wires attached to the sensor. The power and relay extension wires protrude from the bottom of the housing; the (2) # 18 AWG black wires are for 24 VAC power input, and the (2) yellow # 18 AWG wires are relay output for connection to the Tekmar® 362 Control. There is no polarity in either the power or relay connections. The extension wires are joined to customer-supplied wires in the conduit junction box which is located just below the sensor (see Figure 1).

The LCD™-1T operates from a customer-supplied 24 VAC Class 2 power source. The power source requires a minimum rating of 10 VA. If power cannot be derived from the hydronic system, a separate 24 VAC Class 2 transformer must be used. Figure 2 shows a wiring diagram for the sensor. If the wires used in connecting the LCD™-1T to the power source or the 362 Control are less than 250 feet (76.2 m) in length, use #18 AWG stranded wires. For lengths more than 250 feet (76.2 m), but less than 500 feet (152.4 m), use #16 AWG stranded wires. For lengths greater than 500 feet (152.4 m), contact CUSTOMER SERVICE.

**Note: Any customer-supplied wires joining the LCD™-1T to the power source or 362 Control should be color-matched to the extension wires coming out of the sensor (i.e., black to black, yellow to yellow). This will help prevent wiring errors and confusion during installation or troubleshooting.**

## Checkout and Operation

Thoroughly check the system before placing it in service. Our experience shows that installation errors cause the majority of problems. Frequently encountered problems include wiring errors. Simple electrical tests and visual inspections usually identify these problems.

Once the LCD™-1T installation has been properly completed, final testing can begin. Before beginning, make sure that the moisture grid at the bottom of the moisture cup is completely dry. If it is dry, energize the sensor and wait 15 seconds to make sure the 362 Control does not yet initiate operation. Next, saturate the moisture grid with water. The relay contacts inside the LCD™-1T should close and activate the 362 Control within 15 seconds.

After the 362 Control has activated satisfactorily, thoroughly dry the moisture grid. The moisture sensing circuitry is very sensitive; do not leave any moisture droplets between the “fingers” in the moisture grid. Once the moisture grid is dry, the 362 Control should continue to stay active for the next 20 minutes, and then shut off. This preset 20 minute interval is known as the “hold-on time”; the hold-on interval cannot be altered. Once these tests are successfully passed, the LCD™-1T is ready for weather tracking. If problems are encountered during testing, refer to the following section on “Troubleshooting”.

## Troubleshooting

Moisture is present on the moisture grid, and the Tekmar® 362 Control will not initiate operation.

Power is probably not available to the sensor; check the power source connections. Verify the presence of 24 VAC at the power source as well as in the junction box. The integrity of the wiring may have been compromised. If the problem persists with 24

VAC available and power wires are properly connected, the LCD™-1T is probably defective. Contact CUSTOMER SERVICE.

Moisture was present on the moisture grid at the beginning of the test but the grid is now dry, and the Tekmar® 362 Control initiates operation, but will not shut down after the hold-on interval has expired.

The moisture grid may still contain some residual moisture, emulating a precipitation condition. Verify that the moisture grid is *completely* dry; the hold-on timer will not initiate its 20 minute countdown unless all the moisture is first removed/evaporated from the grid. If the 362 Control will not shut down after the grid is dried, remove power from the sensor for one minute, and re-apply power. Saturate the moisture grid, and wait for the 362 Control to initiate. Next, completely dry off the moisture grid, and then wait for the hold-on interval to expire. If the grid is completely dry, and the 362 Control still will not shut down, the LCD™-1T is probably defective. Under these circumstances, a malfunction in the 362 Control is possible, but the likely source of the problem is the sensor. Contact CUSTOMER SERVICE.

Moisture is not present on the moisture grid, and the Tekmar® 362 Control initiates operation when the sensor is energized.

There may be a short circuit in the wiring for the relay; check the wiring from the sensor relay extension wires to the 362 Control. A short in this wiring can emulate a continuously closed relay contact, regardless if the moisture grid is dry. If the problem persists, the wiring checks out ok, and/or disconnecting the relay wiring does not de-activate the 362 Control, a malfunction in the 362 Control is the likely source of the problem.

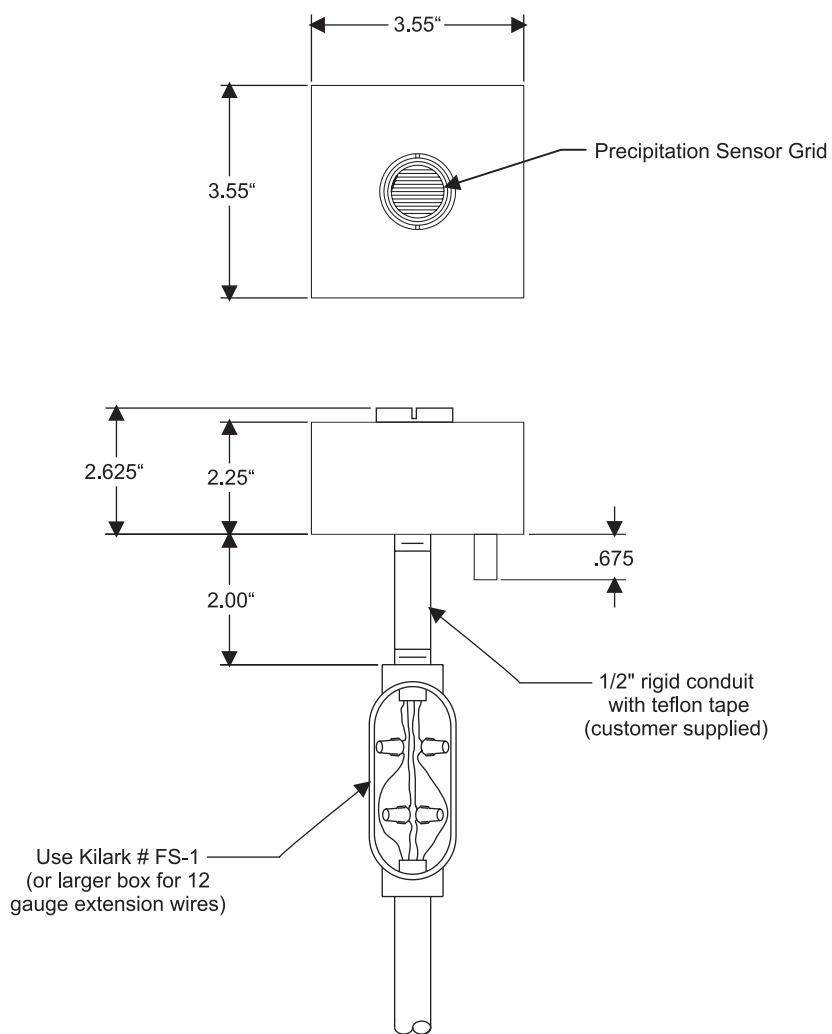
## QUESTIONS AND COMMENTS

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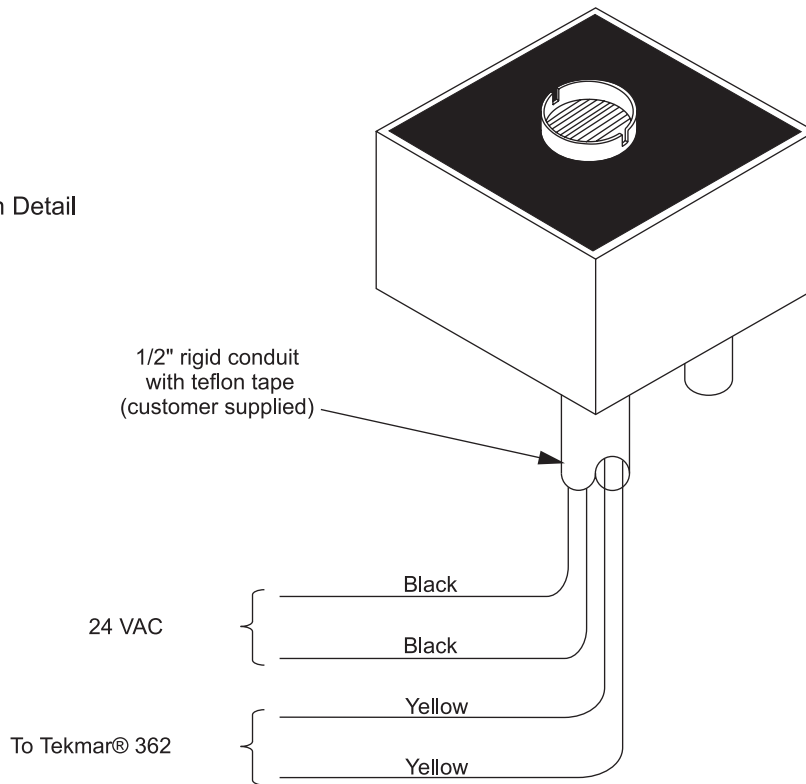
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*Fax: 888.234.4238 (USA and Canada)  
219.233.2152 (elsewhere)*

*E-mail: [helpdesk@networketi.com](mailto:helpdesk@networketi.com)*



LCD-1T Installation Detail  
**Figure 1.**



LCD-1T Wiring Diagram  
**Figure 2.**