ENVIROMUX® Series

Sensor Installation Manual

E-T / TRHM-E7

Temperature/Humidity sensors

E- LDSx-y
Liquid Detection Sensor

E-BCN-R
Beacon

E-SRN-M
Siren

E-M-DCS3
Door Contact Switch

E-TDS
Tamper Switch

E-SRN-BCNL/R-O (Blue and Red available)
IP65 Indoor/Outdoor Piezo Siren with LED
Strobe Beacon

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INTRODUCTION

Many different sensors can be connected to the ENVIROMUX Series Enterprise Environment Monitoring Systems. Series models include E-16D/5D/2D, E-MINI-LXO and E-MICRO-T(RHP).   A complete listing of available sensors and accessories can be found at

http://www.networktechinc.com/environment-monitor-16d.html for the E-16D,

http://www.networktechinc.com/environment-monitor-5d.html for the E-5D,

http://www.networktechinc.com/environment-monitor-2d.html for the E-2D, and   http://www.networktechinc.com/environment-monitoring.html for the E-MINI-LXO.

http://www.networktechinc.com/environment-monitor-micro.html for the E-MICRO-T(RHP)

Manuals for each Environment Monitoring System covering installation and configuration for all features can also be found at these websites.   This manual is only provided to instruct how to connect the various sensors to these systems.

CONNECT SENSORS TO E-MINI-LXO /-MICRO-T(RHP)

E-T or TRHM-E7

For measuring temperature and humidity, the E-MINI-LXO and E-MICRO-T(RHP) uses the E-T-E7 (temperature only), E-TRHM-E7 (combination temperature and humidity sensor).   For high-temperature environments, E-MINI-IND uses the E-T-IND-E7 High Temperature Sensor.

1. Connect either of the temperature / humidity sensors to an available port on the E-MINI-LXO.   Plug the RJ45 connector to either of the two ports marked "TEMPERATURE/HUMIDITY". The E-T/TRHM-E7 sensors can be secured anywhere that the temperature and/or relative humidity need to be sensed.

Note: The E-TRHM-E7 sensor will work with the E-MINI-LXO provided firmware version 2.3 or later is installed,   and with the E-MICRO provided firmware version 1.3 or later is installed.

2. Power-cycle the E-MINI-LXO after the sensor(s) have been plugged-in.

Note: Mounting the sensor in the path of a fan or on a heated surface may affect the accuracy of the sensor's readings.
Note: For best results, use the E-T-IND-E7 with model E-MINI-IND.
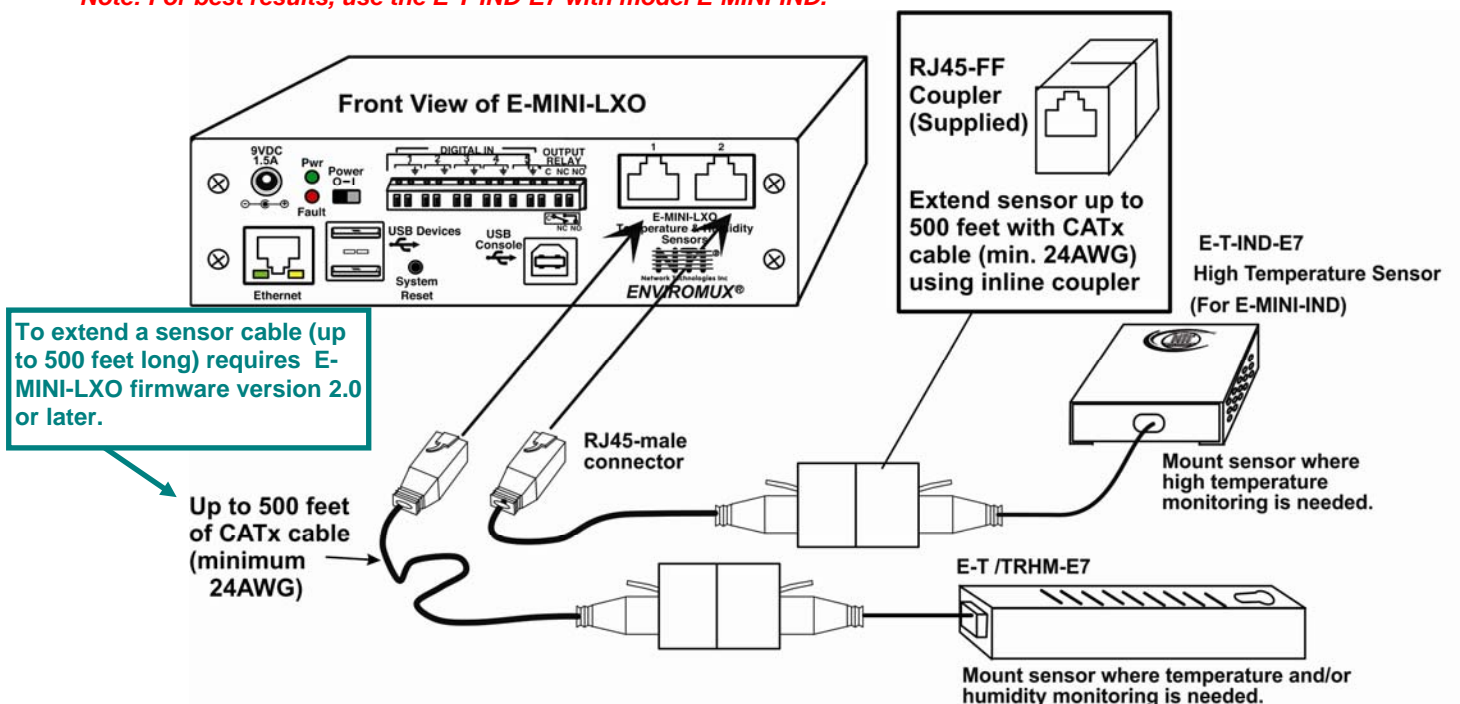
**TEMPERATURE AND HUMIDITY SENSORS FOR E-MINI-LXO AND E-MICRO-T(RHP)**

SENSOR MODEL	OPERATING TEMPERATURE RANGE	HUMIDITY RANGE	ACCURACY
E-T-E7	-4 to 140°F (-20 to 60°C)	n/a	±2.7°F (±1.50°C) for 77 to 140 °F (25 to 60°C) ±3.96°F (±2.2°C) for -4 to 77 °F (-20 to 25°C)
E-TRHM-E7	-4 to 140°F (-20 to 60°C)	0 to 90% RH	±1.44°F (±0.80°C) for -4 to 41°F (-20 to 5°C) ±0.72°F (±0.40°C) for 41 to 140°F (5 to 60°C) 0 to 10% RH, ±5% 0 to 20% RH, ±4% 20 to 80% RH, ±3% 80 to 90%RH, ±4% (at 77°F/25°C)
E-T-IND-E7	32 to 167°F (0 and 75°C)	n/a	±2.25°F (±1.25°C)

Sensor Cable

The CAT5 connection cable between the E-MINI-LXO / E-MICRO-T(RHP) and the RJ45 Sensors is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard.   Wiring is as per the table and drawing below.

RJ45 Sensor Socket Wiring for E-MINI-LXO and E-MICRO-T(RHP):

Signal	Pin	Wire Color	Pair
+5 VDC	1	White/Orange	2
TRIG	2	Orange	2
SCL	3	White/Green	3
GND	4	Blue	1
SDA	5	White/Blue	1
GND	6	Green	3
FREQ	7	White/Brown	4
ID	8	Brown	4
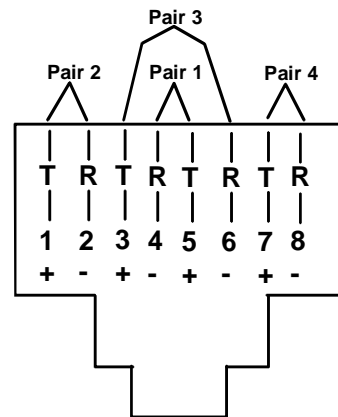
(View Looking into RJ45 Socket)

E-LD

Connect the liquid detection sensor E-LD (E-LDx-y, E-LD-LCx-y, E-CDx-y) to a set of terminals (1-5) marked "DIGITAL IN". The twisted orange sensing cable should be placed flat on the surface (usually the floor) where liquid detection is desired.   If tape is required to hold the sensor in place, be sure to only apply tape to the ends, exposing as much of the sensor as possible.   At least 5/8" of the sensor must be exposed for it to function.   (See Figure 2)
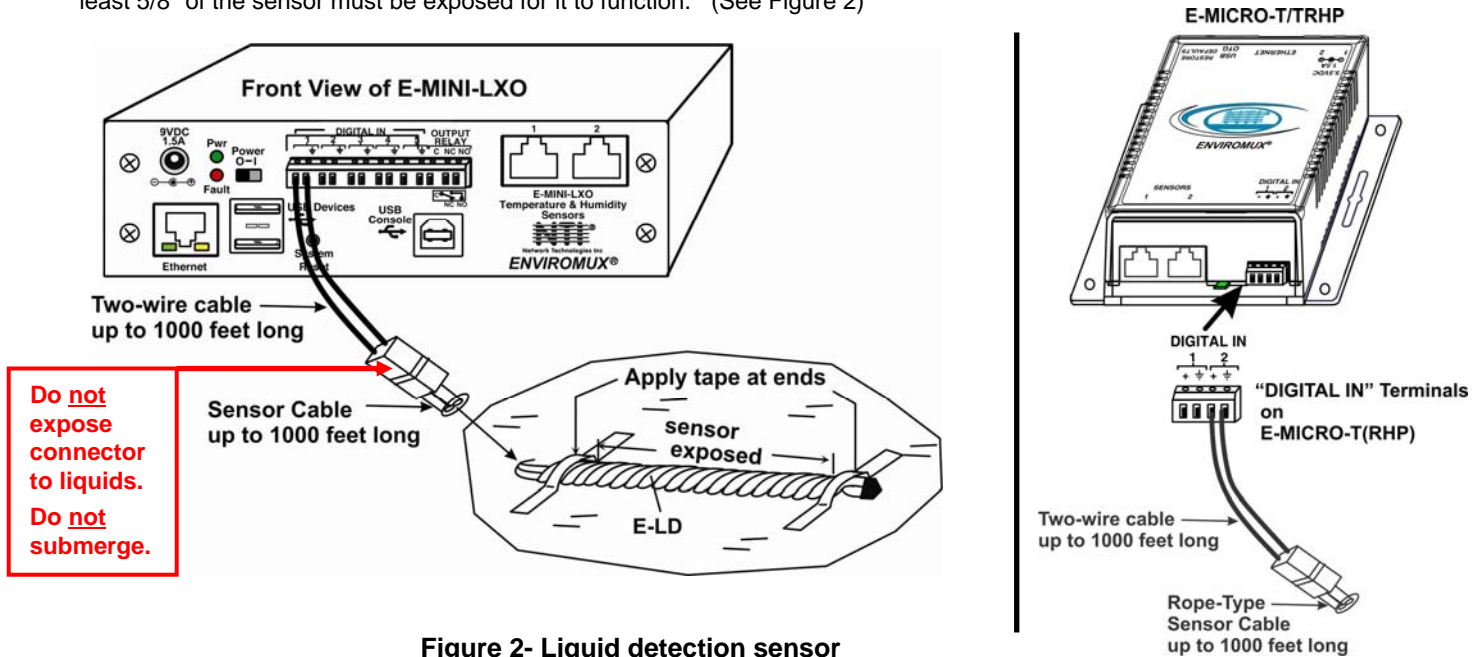

Figure 2- Liquid detection sensor

Note: The connection between the two-wire cable and the sensor cable is not designed for exposure to liquids and cannot be submerged.

After installation of rope style leak detection sensor in its desired location, **it is very important** to test the sensor to verify correct installation.   This applies to **all** rope-style leak detection sensors.

To test the rope style leak detection sensor;
1. Configure the sensor (refer to the ENVIROMUX manual). (Normal Status set to "Open", Sampling Period set to 5 seconds.)
2. Place approximately one table spoon of tap water across the sense cable so that the 2 thin sensing wires are connected by mutual contact with the water. Do NOT use distilled water as water must be conductive.
3. Monitor the sensor (see the ENVIROMUX Summary Page) to see the sensor "Value" change from "Open" (dry) to "Closed" (wet). (How quickly the change occurs is based on the amount of impurities in the water, so allow up to 30 seconds).
4. Dry the exposed area of the sensor and the sensor "Value" should change back to "Open" within 30 seconds.

If the sensor fails to behave in this manner, contact NTI for support.

This completes the testing of the sensor.

Liquid Detection Rope Maintenance

For periodic maintenance, you can clean the rope with isopropyl alcohol without completely removing the rope from its installed location.

1. Remove the section that you want to clean from its self-adhesive clips.
2. Soak the alcohol in a dye-free rag and proceed to wipe it around the rope, squeezing firmly while pulling the rag down the length of the rope.
3. Flip the rag every several feet and re-saturate the rag with alcohol when needed.
4. After cleaning a section of the rope, you can replace it and continue to clean the next section in similar fashion.
5. Replace the rag if it becomes too dirty.

If the rope is still giving you problems after you have cleaned it with isopropyl alcohol or if you think the rope needs a good scrubbing, you can clean it with warm soapy water. You will have to remove the rope from its installed location. It may be helpful to label the sections of the rope or note their locations before you start for an easier re-installation.

1. Gather Dawn dish soap, a large bucket or plastic bin, warm water, soft-bristled scrub brushes, and clean rags.

2. Add dish soap to the bucket of water, approximately 1 cup of detergent to 1 gallon of warm water. To determine if the solution is concentrated enough, place your finger and thumb in the water and rub them together. You should feel a slick/slimy residue. If you do not feel a residue, add more detergent to the water and gently mix to distribute the soap.

3. Submerge a section of the rope in the water. Using a scrub brush or rag, scrub along all sides of the rope with firm pressure.

4. Remove the section of the rope from the soapy solution and rinse it in a bucket of clean, fresh water.

5. Ensure that there are no oily deposits along the length of the rope. If the rope does not appear clean, submerge it in water and scrub again, repeating steps (3) to (5).

6. Hang the clean rope up to dry. Try to point the connectors down, so water cannot pool inside the connectors. The drying process may take 6-8 hours, depending on the room conditions.

7. When the rope is completely dry, reinstall it in its original location.

Contact Sensors

Up to five dry-contact sensors or liquid detection sensors can be connected to the terminals marked "DIGITAL IN". Sensors with 16-26 AWG connection wires that operate on 5V at 10mA maximum current may be used. A contact resistance of 10kΩ or less will be interpreted by the E-MINI-LXO as a closed contact.

Examples of Dry-Contact Sensors for the E-MINI-LXO:

NTI #	Description	NTI #	Description
E-EBS	Emergency Button	E-SDS-PA	Smoke Detection Sensor-Power added
E-IMD-P	Infrared Motion Sensor w/power	E-TDS	Tamper Switch
E-M-DCS3	Door Contact Sensor	E-DCS-PS2	Plunger-Style Door Contact Sensor

To install the dry-contact sensor(s):

A. Attach the positive lead to a terminal corresponding to a "+" marking on the E-MINI-LXO and the ground lead to the next terminal to the right that will correspond to a " ⏚ " marking on the E-MINI-LXO. Tighten the set screw above each contact. Terminal sets are numbered 1-5.

B. Mount the sensors as desired.

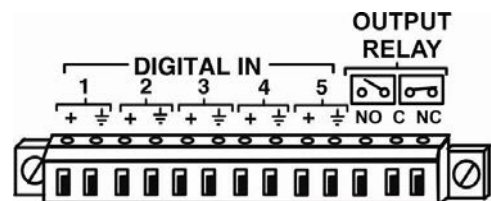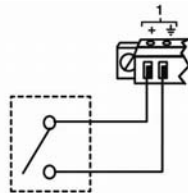Example: Device with potential-free break/make contact relay (i.e. door switch)

Figure 3- Terminal block for dry-contact sensors

Note: The terminal block is removable for easy sensor wire attachment if needed.

Shielded cable must be used to connect to the DIGITAL IN terminals in order to meet CE emission requirements. Connect the drain wire of the shield to the ground (⏚) terminal of the dry contact in addition to the contact return wire.

CONNECT SENSORS TO THE E-XD MODELS

RJ45 Sensors

Several sensors for the E-16D/5D/2D Enterprise Environment Monitoring Systems have RJ45 connection ports. Some of these sensors include E-STS (temperature only), E-STHSB (temperature and humidity), E-STHS-99 (wide range temperature and humidity) and E-LDS (liquid detection). In all cases, the CAT5 cable between the sensor and the ENVIROMUX can be up to 1000 feet in length.

Temperature, Humidity Sensors

Note: It is very important to locate the temperature and/or humidity sensors away from ventilation sources and fans.

Connect each sensor to one of the female connectors labeled "RJ45 Sensors" on the ENVIROMUX.   Male connectors should snap into place. See page 7 for wiring specification and pinout.

> Note: Shielded CAT5 cable is required between the sensor and the ENVIROMUX to maintain CE compliance of the sensor.
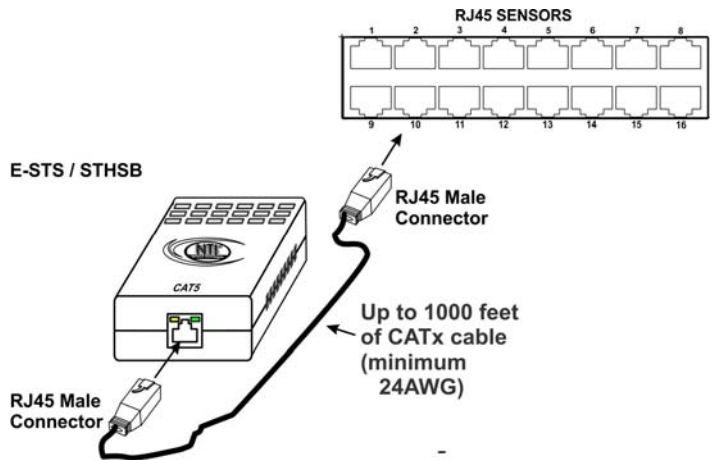
Figure 4- Sensors connected by cables with RJ45 connectors

Application Note:

When connecting temperature and humidity sensors to the ENVIROMUX, the web interface will identify the sensor accordingly for the type of sensor it is.   The status bar and configuration page will enter the maximum and minimum range that this type of sensor can operate at if used with the ENVIROMUX, not necessarily the operating range of the sensor itself.   The various temperature and humidity sensor models offered by NTI have varying ranges of performance capabilities, as indicated in the table on the next page. Be sure to match the sensor installed to the operating range of the environment it will be expected to work in. Using a sensor outside of its intended temperature range may result in damage to the sensor.

Sensor #2.1 Configuration (Type: Temperature Combo)

Figure 5- A portion of the sensor configuration page

Contact Sensors

Some sensors do not have RJ45 connectors on them and instead have terminal blocks.   These can either be connected to the "DIGITAL IN" connectors or they can be terminated and plugged into the remaining RJ45 connectors (see Figure 6).   (The illustration uses CAT5 patch cable to make cable connection easy.)   Examples of these sensors include E-IMD (motion detector), E-IMD-CM (ceiling mount motion detector), E-SDS (smoke detection), and E-GBS (glass break sensor).

Note: For sensors requiring 5VDC power source, substitute the wire connected to pin 4 (see below) instead of pin 7.

When applying CAT5 cables to contact sensors for plug-in to the RJ45 Sensor sockets, the following socket-to-sensor wiring must be followed:

RJ45 Sensor Socket Pinout

Pin #	Pin Name
1	GND
2	SENSE
3	RS485 +
4	+5 VDC
5	TAMPER SWITCH
6	RS485 -
7	+12 VDC
8	GND
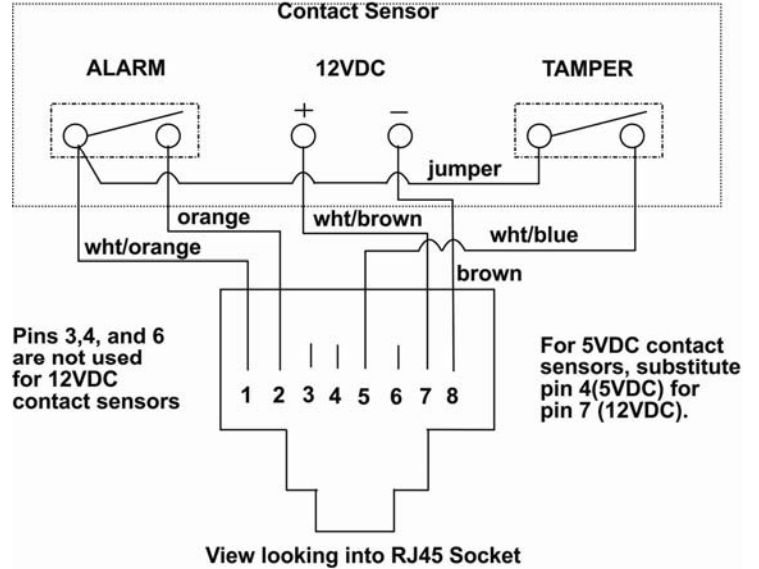
Figure 6- Contact sensor wired to RJ45 socket

Digital In Terminals

To connect contact sensors without using RJ45 connectors, terminal blocks have been provided labeled "DIGITAL IN". Two wire switch-only type sensors can be connected to the plus (+) and minus (-) terminals (E-16D) or the plus (+) and ground (⏚) terminals (E-2D/5D).   If the sensors require a 12V power source to operate, these models include 12V and ground terminals for a power connection. Connect each two-wire or four-wire contact sensor using 16-26 AWG wire.
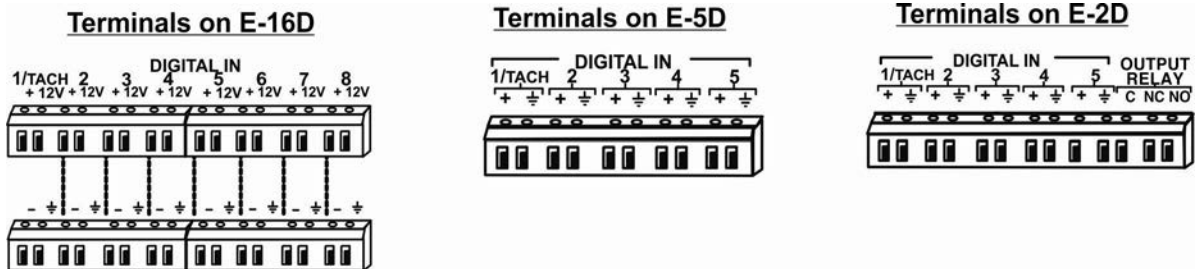

Figure 7- "DIGITAL IN" terminal blocks on ENVIROMUX Systems

FYI: The terminal block is removable for easy sensor wire attachment if needed.
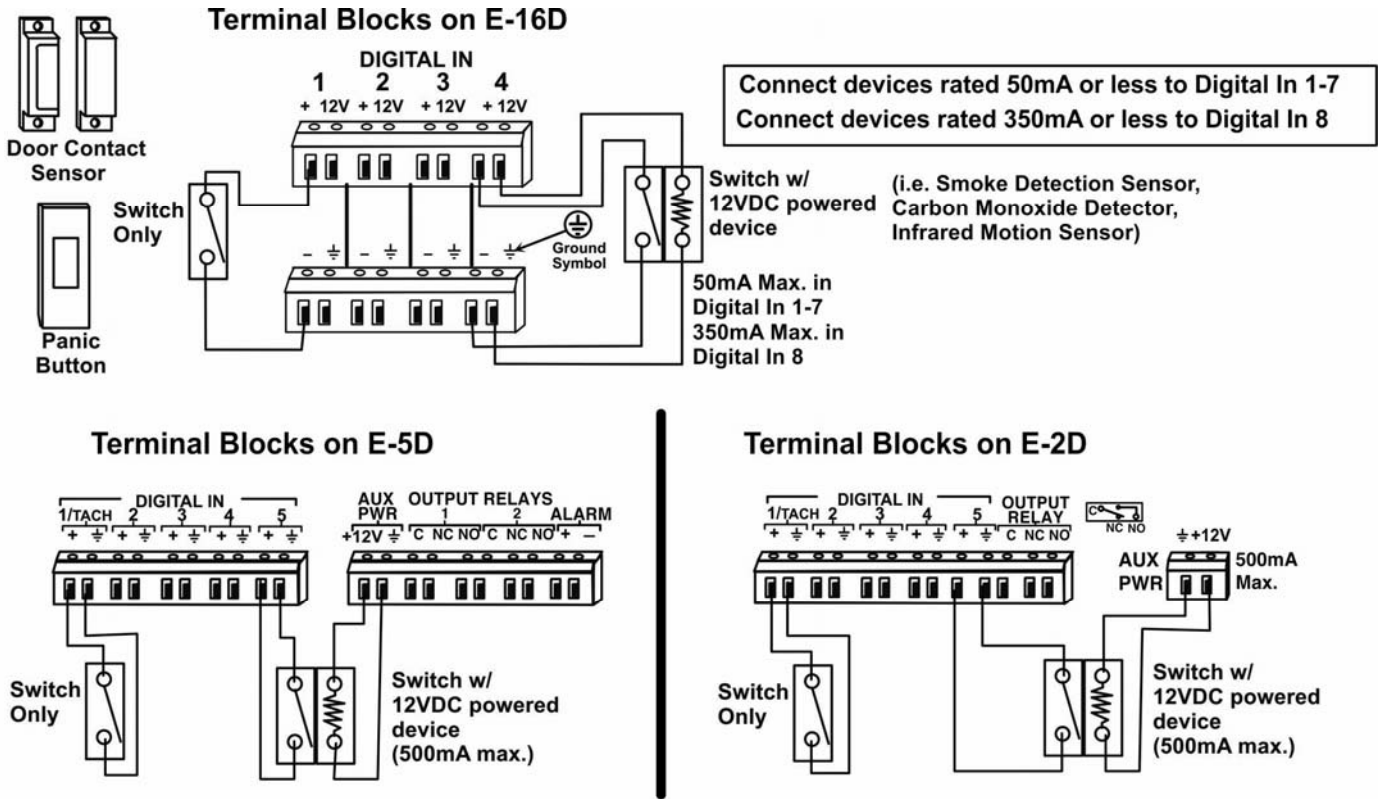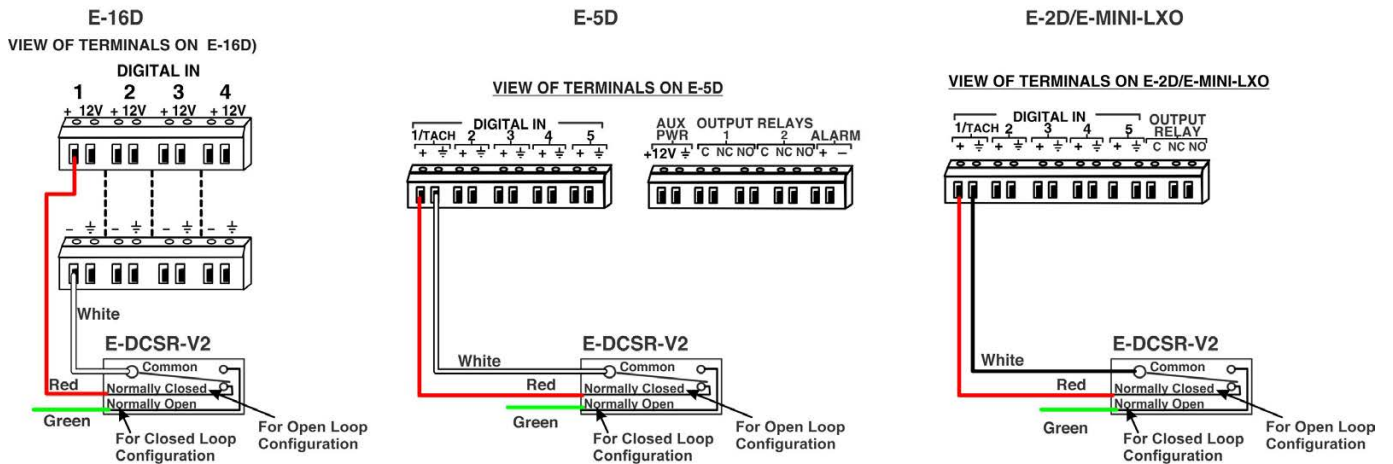
Figure 8- Basic DIGITAL IN Terminal Connections

Examples of devices the are "switch only" type devices are E-DCSR-V2 (Rugged Door Contact Sensor), E-DCSR-UV2 (Rugged Door Contact Sensor with Universal Magnet), or E-LLS-SF-xxCM   (Liquid Level Float Switch).

Wiring Methods for Connecting E-DCSR-V2 to ENVIROMUX Monitoring Systems

Attach Red wire (leave Green wire loose) if configuring the ENVIROMUX to have the "Normal Status" set to "Closed" on the Digital Input sensor configuration page.   Attach Green wire _instead_ if "Normal Status" will be set to "Open".

Liquid Detection Sensors

Liquid Detection Sensors are available for simple connection to **either** the "Digital In" terminals (use model E-LD or E-LD-LC) or the "RJ45 Sensor" ports (use model E-LDS).

Connect the two-wire cable (up to 1000 feet long) from a liquid detection sensor (E-LD shown in Figure 2-upper image) to a set of "DIGITAL IN" contacts.   For added range (up to 1000 more feet), use an E-LDS (shown in Figure 2-lower image) and connect to an "RJ45 Sensor" port.

The twisted orange sensing cable should be placed flat on the surface (usually the floor) where liquid detection is desired.   If tape is required to hold the sensor in place, be sure to only apply tape to the ends, exposing as much of the sensor as possible. At least 5/8" of the sensor must be exposed for it to function.   (See Figure 2)
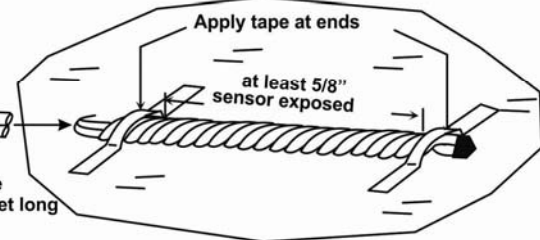

Figure 9- Secure liquid detection sensor with tape

After installation of rope style leak detection sensor in its desired location, **it is very important** to test the sensor to verify correct installation.   This applies to **all** rope-style leak detection sensors (E-LD/ E-LD-LC / E-CD, etc.).

To test the rope style leak detection sensor;

5. Configure the sensor (refer to the ENVIROMUX manual). (Normal Status set to "Open", Sampling Period set to 5 seconds.)
6. Place approximately one table spoon of tap water across the sense cable so that the 2 thin sensing wires are connected by mutual contact with the water. Do NOT use distilled water as water must be conductive.
7. Monitor the sensor (see the ENVIROMUX Summary Page) to see the sensor "Value" change from "Open" (dry) to "Closed" (wet). (How quickly the change occurs is based on the amount of impurities in the water, so allow up to 30 seconds).
8. Dry the exposed area of the sensor and the sensor "Value" should change back to "Open" within 30 seconds.

If the sensor fails to behave in this manner, contact NTI for support.

This completes the testing of the sensor.

Figure 10- Portion of Water Sensor configuration page

BEACON and SIREN Connections

Terminals have been provided for connection of a beacon (E-BCN-R(L)), siren (E-SRN-M, E-BEEP1, etc) , or beacon and siren (E-SRN-BCNL/R-O) to use for visual alerts and audible alerts when configured. Devices such as this can be installed in locations best suited to get attention. All devices must be installed using 16-26 AWG wire.
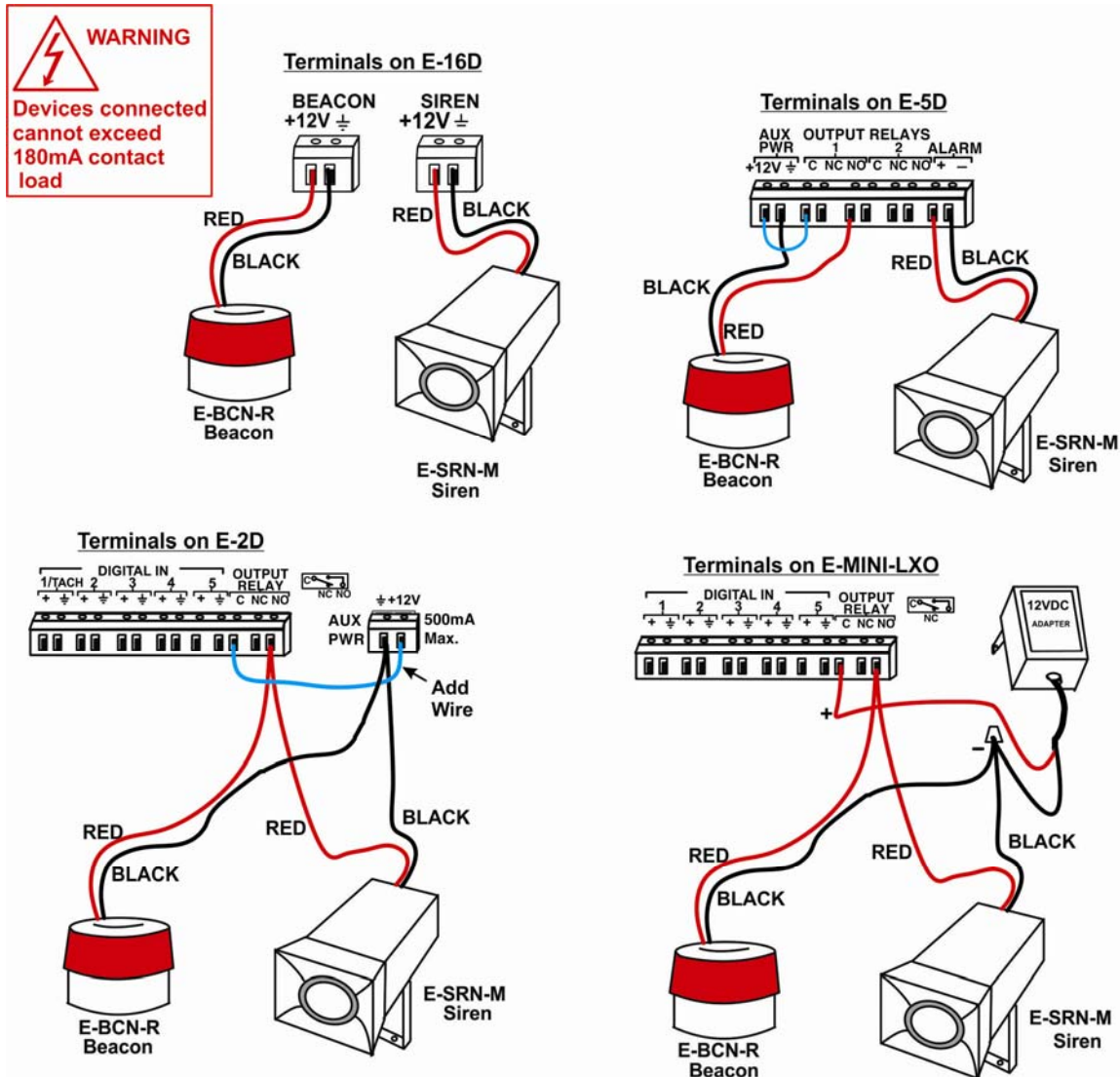

**Figure 11- Connect visual and audible external indicators**

For a complete listing of available sensors and accessories go to the product page for ENVIROMUX Enterprise Environment Monitoring Systems at http://www.networktechinc.com/enviro-monitor.html , and at http://www.networktechinc.com/enviro-mini.html for the E-MINI-LXO. Manuals for each product covering installation and configuration for all features can also be found at these websites.

RJ45 Sensor Cable

The CAT5 connection cable between the ENVIROMUX and connected external sensors is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard. Wiring is as per the table and drawing below. The sensors that connect to "RJ45 Sensor" ports (E-xD) or the "Temperature/Humidity" ports (E-MINI-LXO) are all designed to use cables wired to this standard.

Pin	Wire Color	Pair
1	White/Orange	2
2	Orange	2
3	White/Green	3
4	Blue	1
5	White/Blue	1
6	Green	3
7	White/Brown	4
8	Brown	4
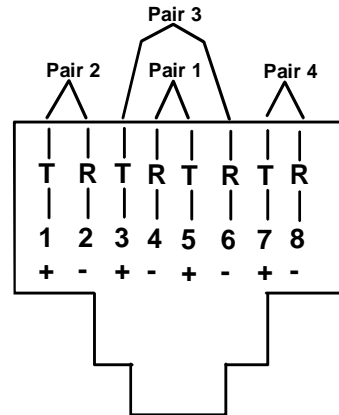
(View Looking into RJ45 Socket)

Liquid Detection False Alert Fix

Problem: Receiving false alert messages from installed ENVIROMUX Liquid Detection sensor E-LDx-y or E-LD-LCx-y.

Cause: Sensor is in environment with significant electrical noise and is picking up this noise and conducting it back to the ENVIROMUX Environment Monitoring System providing a false signal of closure.

Solution: Install a .1uf capacitor (available from NTI) between the two "Digital In" terminals the Liquid Detection sensor is connected to as shown below. (E-MINI-LXO used for example, but this applies to any ENVIROMUX Environment Monitoring System.)

Note: This is to be applied only to installations of Liquid Detection Sensors. Applications with other sensors may cause the ENVIROMUX to malfunction.

CHANGES
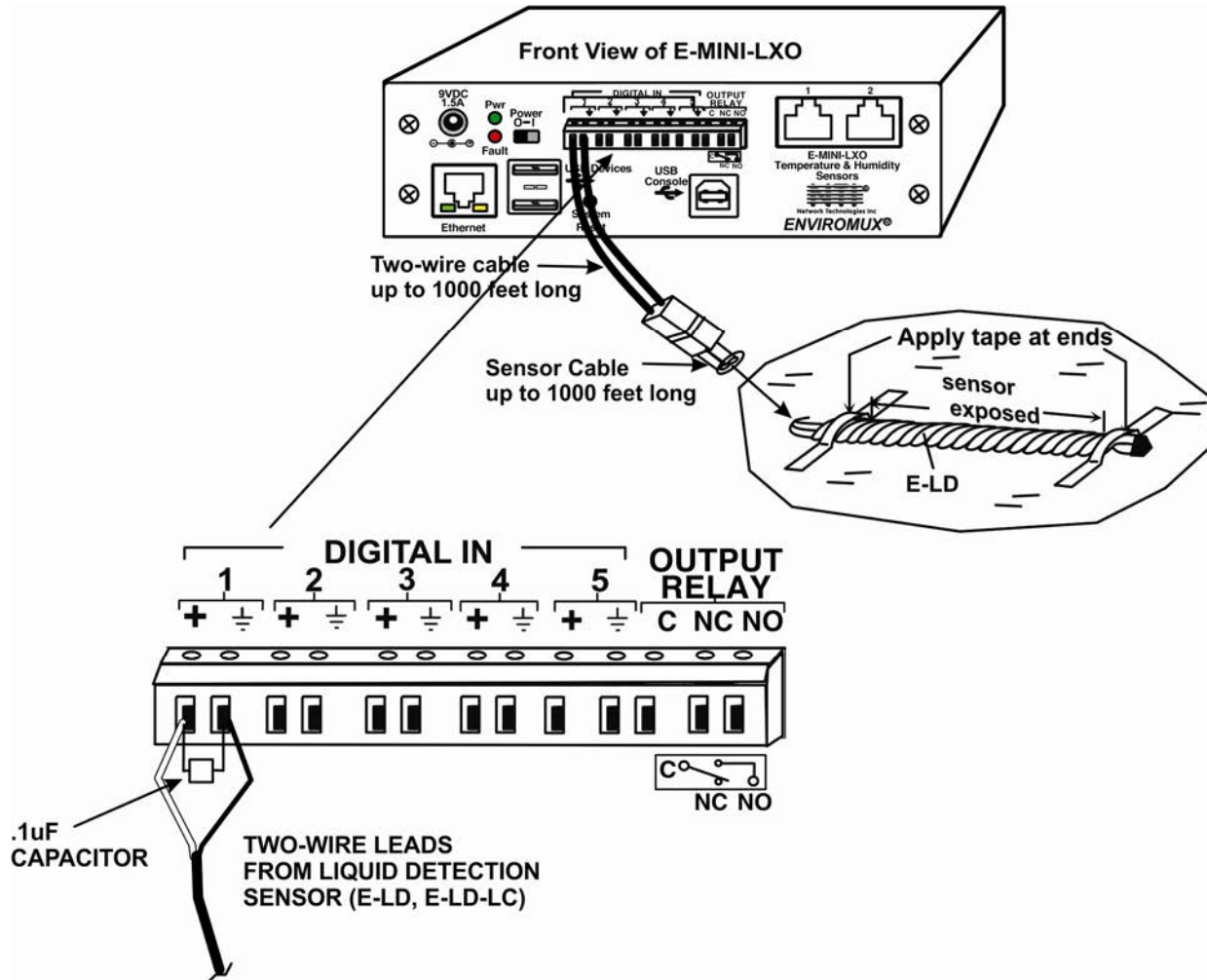
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