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ENVIROMUX® Series

Sensor Installation Manual



ENVIROMUX-T / RH/ TRH(M)-E7
Temperature/Humidity sensors



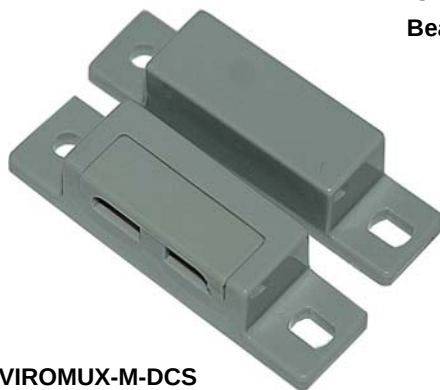
ENVIROMUX- LDSx-y
Liquid Detection Sensor



ENVIROMUX-BCN-R
Beacon



ENVIROMUX-SRN-M
Siren



ENVIROMUX-M-DCS
Door Contact Switch



ENVIROMUX-TDS
Tamper Switch

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INTRODUCTION

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

<http://www.networktechinc.com/enviro-rems.html> for the ENVIROMUX-SEMS-16U,

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

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

<http://www.networktechinc.com/environment-monitor-2d.html> for the ENVIROMUX-2D, and

<http://www.networktechinc.com/environment-monitoring.html> for the ENVIROMUX-MINI-LXO.

<http://www.networktechinc.com/environment-monitor-micro.html> for the ENVIROMUX-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 ENVIROMUX-MINI-LXO /-MICRO-T(RHP)

ENVIROMUX-T, RH, or TRH(M)-E7

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

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

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

2. Power-cycle the ENVIROMUX-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 ENVIROMUX-T-IND-E7 with model ENVIROMUX-MINI-IND.

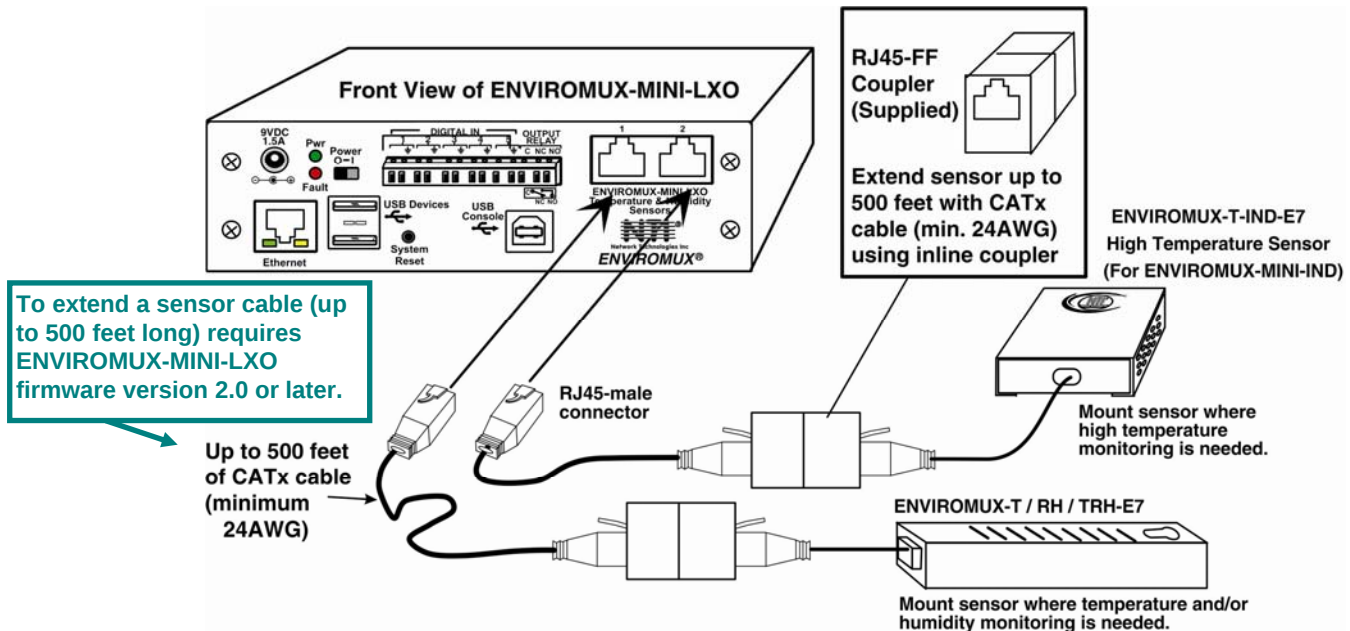


Figure 1- Connect sensors to ENVIROMUX-MINI-LXO

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TEMPERATURE AND HUMIDITY SENSORS FOR ENVIROMUX-MINI-LXO AND ENVIROMUX-MICRO-T(RHP)

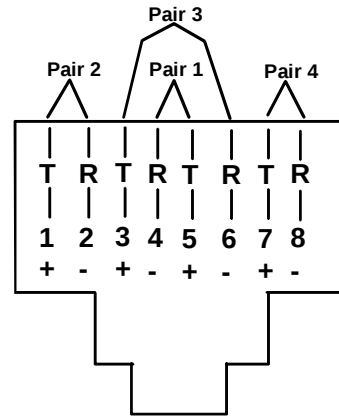
SENSOR MODEL	OPERATING TEMPERATURE RANGE	HUMIDITY RANGE	ACCURACY
ENVIROMUX-T-E7	32 to 104°F (0 to 40°C)	n/a	±1.35°F (±0.75°C).
ENVIROMUX-RH-E7	n/a	20 to 80% RH.	±5% RH
ENVIROMUX-TRH(M)-E7	-4 to 185°F (-20 to 85°C)	0 to 90% RH.	• ±0.90°F (±0.50°C) for -4 to 14°F (-20 to -10°C). • ±0.72°F (±0.40°C) for 14 to 185°F (-10 to 85°C). ±5% RH
ENVIROMUX-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 ENVIROMUX-MINI-LXO / ENVIROMUX-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 ENVIROMUX-MINI-LXO and ENVIROMUX-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)

ENVIROMUX-LD

Connect the liquid detection sensor ENVIROMUX-LD 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)

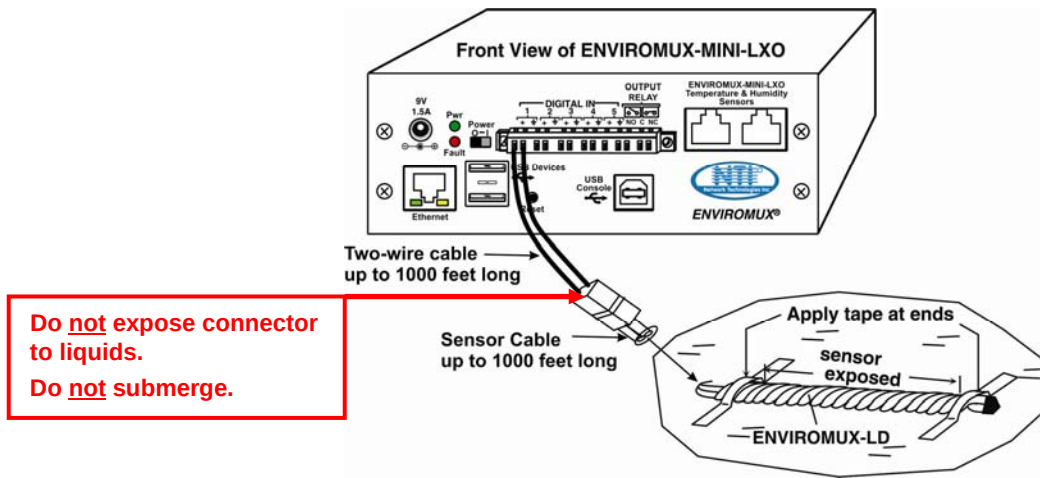


Figure 2- Liquid detection sensor

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

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 ENVIROMUX-MINI-LXO as a closed contact.

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

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

To install the dry-contact sensor(s):

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

B. Mount the sensors as desired.

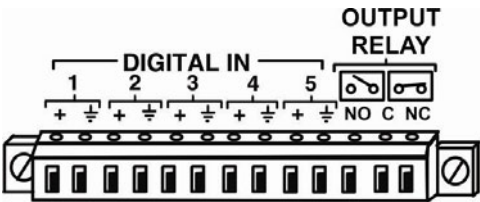
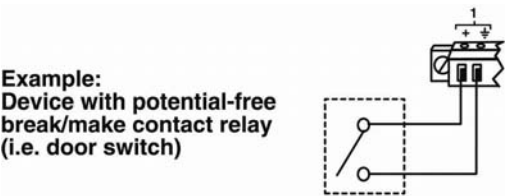


Figure 3- Terminal block for dry-contact sensors

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 ENVIROMUX-XD MODELS

RJ45 Sensors

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

Temperature, Humidity, Noise Level and Light 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.

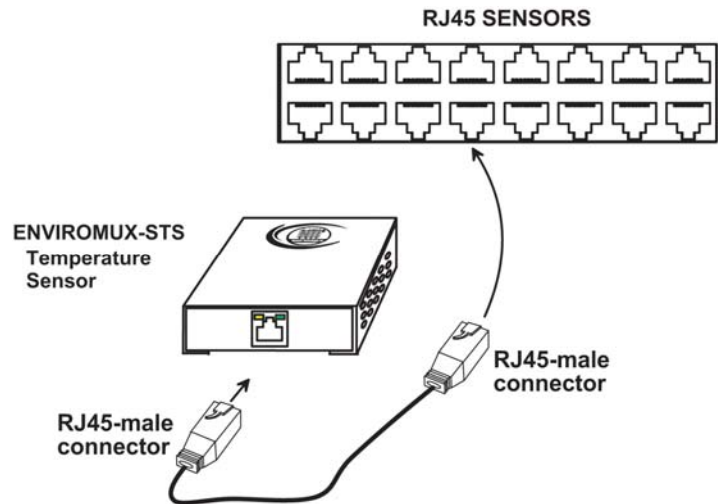


Figure 4- Sensors connected by cables with RJ45 connectors

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)

Sensor Settings	
Description	Sensor #2.1 Descriptive name for the sensor
Group	1 - Select which group the sensor belongs to
Units	Deg. F - Select the units for the sensor
Min. Level	-4.0 Min. supported value for the sensor
Max. Level	185.0 Max. supported value for the sensor

This is the range the ENVIROMUX will display, not necessarily the range the sensor will work within. See specifications for the sensor being installed for the proper operating environment.

Figure 5- A portion of the sensor configuration page

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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 ENVIROMUX-IMD (motion detector), ENVIROMUX-IMD-CM (ceiling mount motion detector), ENVIROMUX-VSS (vibration sensor), ENVIROMUX-SDS (smoke detection), and ENVIROMUX-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

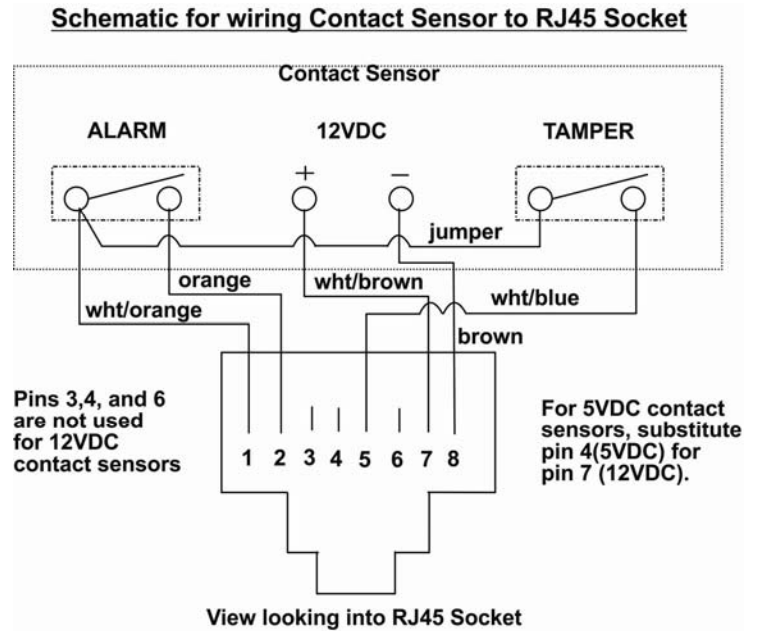
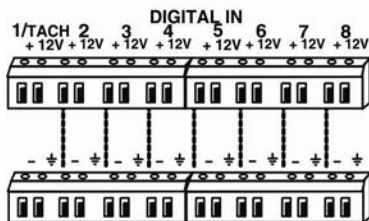


Figure 6- Contact sensor wired to RJ45 socket

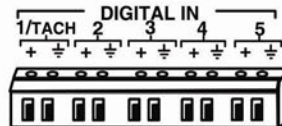
Digital In Terminals

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 (ENVIROMUX-16D) or the plus (+) and ground ($\frac{+}{-}$) terminals (ENVIROMUX-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.

Terminals on ENVIROMUX-16D



Terminals on ENVIROMUX-5D



Terminals on ENVIROMUX-2D

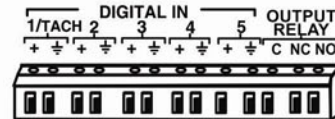


Figure 7- "DIGITAL IN" terminal blocks on ENVIROMUX Systems

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

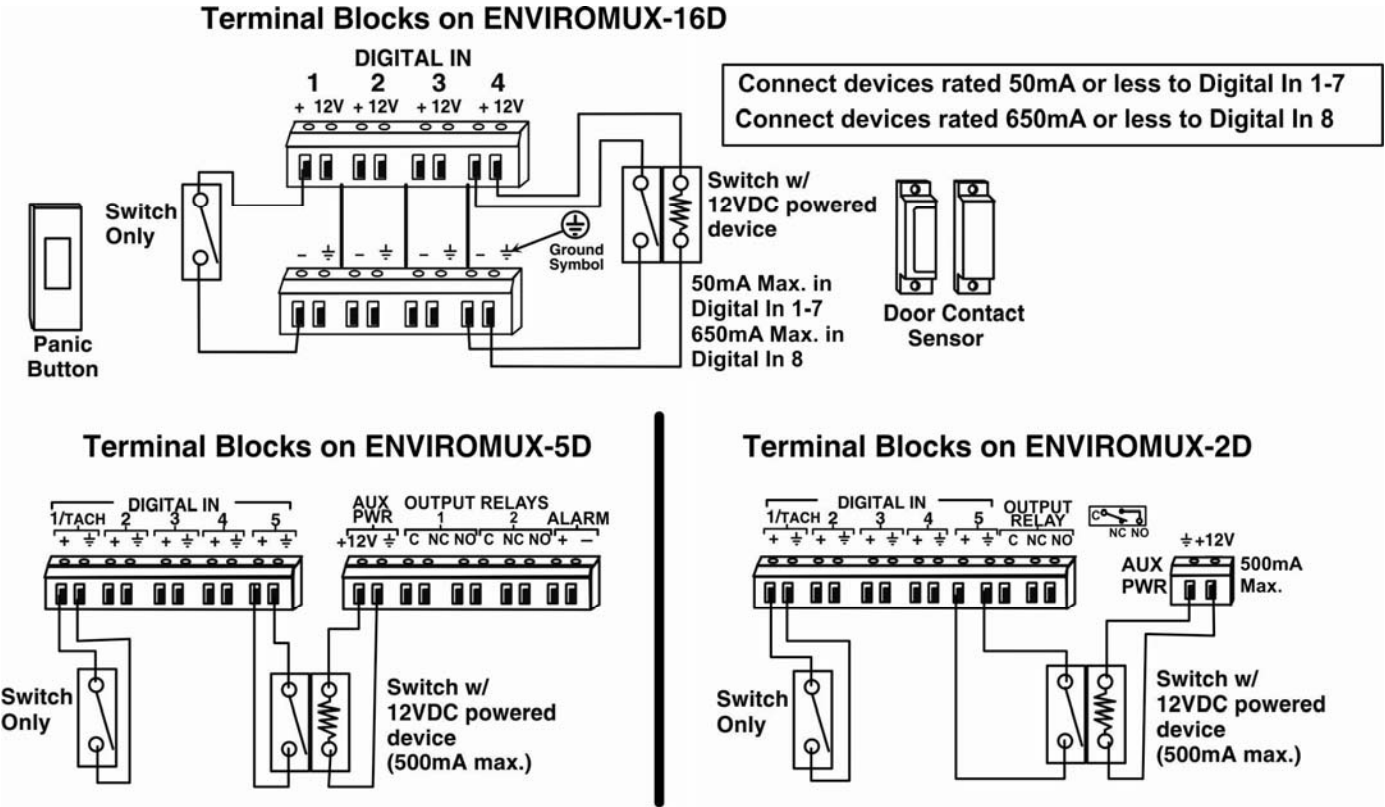


Figure 8- Basic DIGITAL IN Terminal Connections

NTI ENVIROMUX SENSOR INSTALLATION

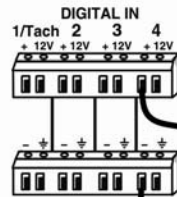
Liquid Detection Sensors

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

Connect the two-wire cable (up to 1000 feet long) from a liquid detection sensor (ENVIROMUX-LD shown in Figure 2-upper image) to a set of “DIGITAL IN” contacts. For added range (up to 1000 more feet), use an ENVIROMUX-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)

Terminals on ENVIROMUX-16D



NOTE: The ENVIROMUX-LD(-LC) can be connected to the DIGITAL IN terminals of the ENVIROMUX-16D on units made 5/31/13 or after. (ENVIROMUX-LD(-LC) is compatible with all ENVIROMUX-5D/-2D units)

NOTE: When installing the ENVIROMUX-LD-LC, it is very important to assure the sensing cable does not cross over itself or cross conductive surfaces to avoid false triggers.

ENVIROMUX-LD or ENVIROMUX-LD-LC

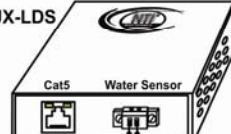
Two-wire cable up to 1000 feet long

Sensor Cable up to 1000 feet long

Apply tape at ends

at least 5/8" sensor exposed

ENVIROMUX-LDS



For added flexibility, install an ENVIROMUX-LDSx-y using CAT5 cable to a port labeled “RJ45 Sensors”. With the ENVIROMUX-LDS, you can use up to 1000 feet of CAT5 cable, 1000 feet of two-wire cable plus 1000 feet of sensor cable.

To “RJ45 Sensors” port on ENVIROMUX-xD (up to 1000 feet long)

Two-wire cable up to 1000 feet long

Sensor Cable up to 1000 feet long

Apply tape at ends

at least 5/8" sensor exposed

Figure 9- Secure liquid detection sensor with tape

To test the ENVIROMUX-LD(S);

1. Configure the sensor. (Normal Status set to “Open”, Sampling Period set to 5 seconds.)
2. Submerge at least ½ inch of the exposed twisted orange wire (not the wrapped end) for up to 30 seconds. Do NOT use distilled water as water must be conductive.
3. Monitor the sensor to see the sensor “Value” change from “Open” (dry) to “Closed” (wet).
4. Dry the exposed area of sensor and the sensor “Value” should change back to “Open” within 30 seconds.

Digital Input Settings	
Description	Water Sensor Descriptive name for the digital input
Group	1 Select which group the digital input belongs to
Normal Status	Open Select the normal status for the digital input
Refresh Rate	5 Sec The refresh rate at which the digital input view is updated

Figure 10- Portion of Water Sensor configuration page

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BEACON and SIREN Connections

Terminals have been provided for connection of a beacon (ENVIROMUX-BCN-R(L)) and siren (ENVIROMUX-SRN-M, ENVIROMUX-BEEP1, etc) 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.

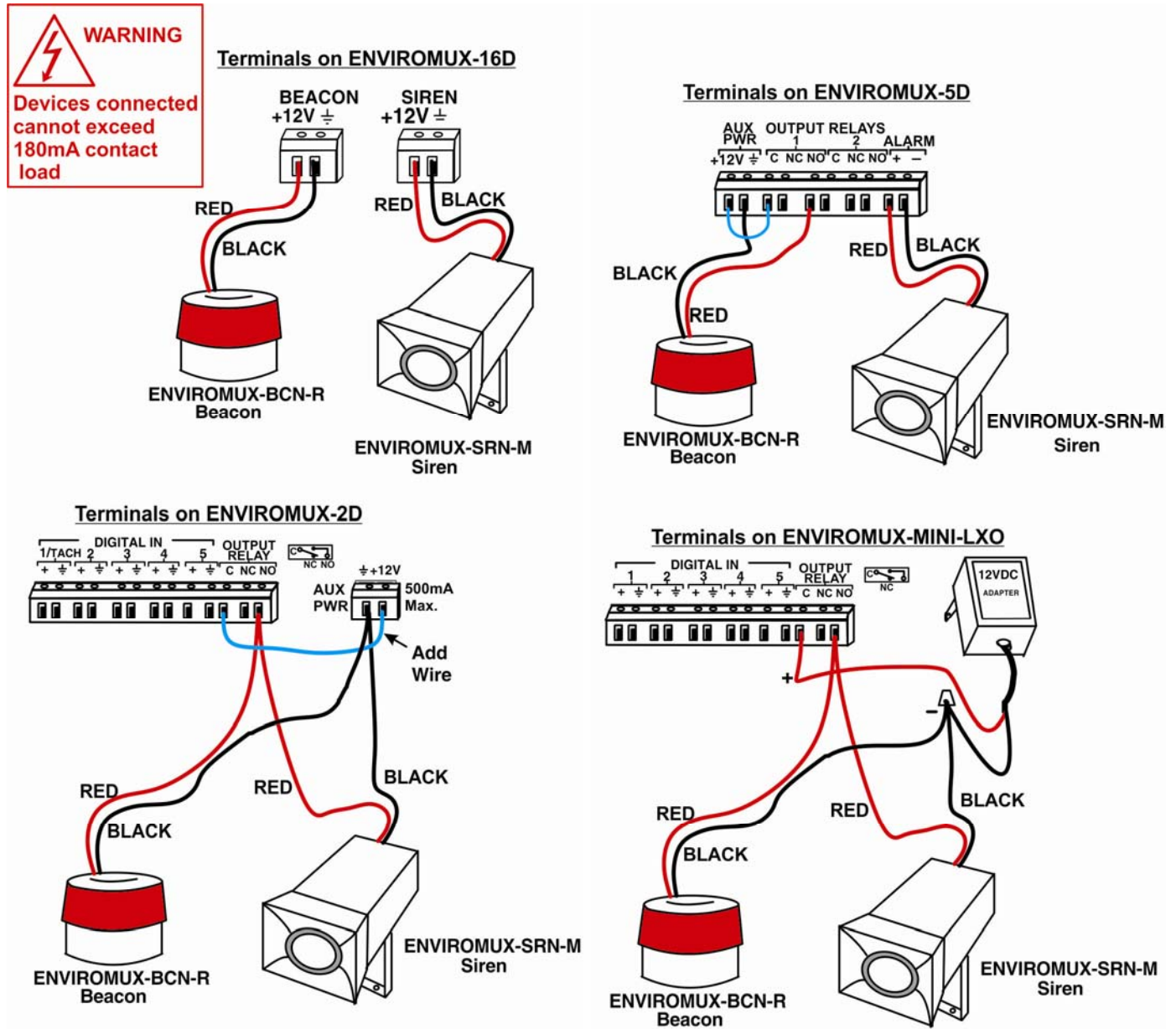


Figure 11- Connect visual and audible external indicators

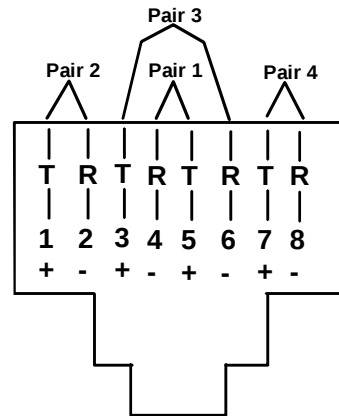
For a complete listing of available sensors and accessories go to the product page for ENVIROMUX Enterprise Environment Monitoring Systems at <http://www.networktechinc.com/enviro-monitor.html>, and at <http://www.networktechinc.com/enviro-mini.html> for the ENVIROMUX-MINI-LXO. Manuals for each product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

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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 (ENVIROMUX-16(u)/xD) or the “Temperature/Humidity” ports (ENVIROMUX-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)

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