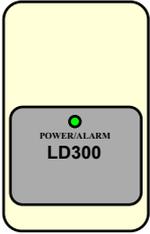


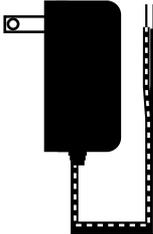
LEAK DETECTION KIT

Quick Setup Guide

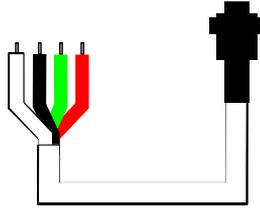
Your *Leak Detection Kit* should include the following items:



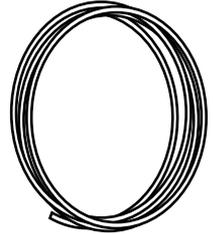
**LD300
Control Box**



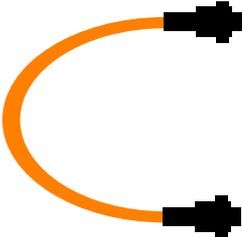
**+5V power
supply**



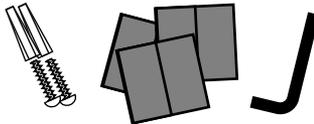
**15ft (3m)
"Leader Cable"**



**50ft (16.7m) of 4-
conductor alarm
wire (to connect
LD300 control box to
monitoring unit)**



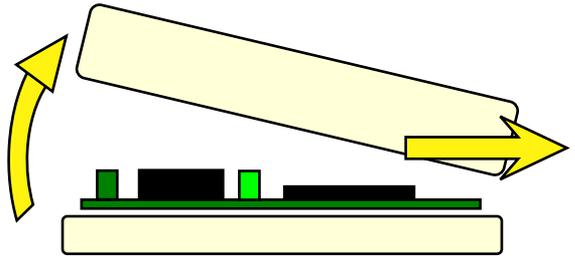
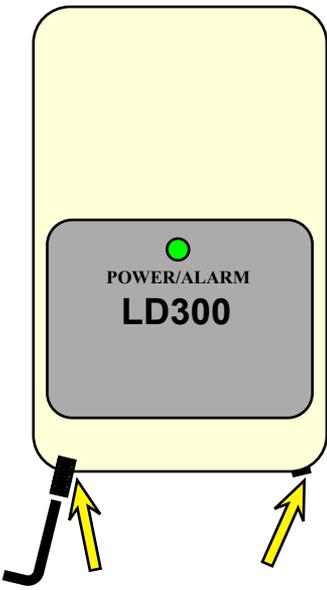
**one or more lengths of
orange "Leak Detection
Cable" (quantity and
length(s) of cable(s) will
depend on which kit and
additional cables, if any,
were ordered.)**



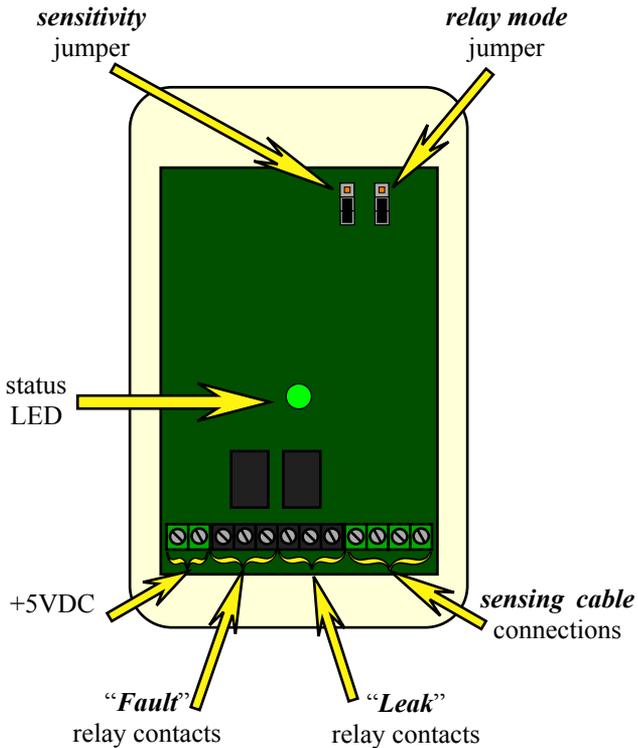
**accessory hardware
includes hex key to open
LD300 control box, wall-
mounting hardware, and self-
adhesive J-clips for securing
the sensing cable(s) in place**



**Terminator Plug
(note: not all kits will
include this; some kits
have one end of the orange
leak-detection cable
permanently terminated,
and do not require a
separate terminator plug)**



use hex key to remove the two setscrews in the bottom corners, then lift and push back the cover to remove it from the control box, as shown here.



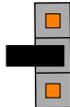
• **SENSITIVITY jumper:**

Adjusts the sensitivity to dampness along the detection cable. The default setting is **low**, which is generally sufficient for detecting spills from broken pipes or overflowing tanks; however, if your particular application involves smaller leaks, such as from an air-conditioner’s drip pan, the **medium** or **high** sensitivity settings may be required instead. Higher sensitivity may also be required if you need to detect leaks of distilled or deionized water, or other fluids which are only weakly conductive. You may need to experiment to find the best setting for your particular requirements. (*Note: if you change this jumper setting, you must power-cycle the LD300 for it to recognize the change.*)



LOW

(alarms on 6" (152mm) of wetted cable)



MEDIUM

(alarms on 2" (51mm) of wetted cable)



HIGH

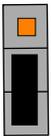
(alarms on 0.5" (13mm) of wetted cable)

• **RELAY MODE jumper:**

Controls the behavior of the output relays when a leak-detection or cable-fault event occurs. In “supervised” mode, both relays are energized when conditions normal, and de-energize when an alert occurs; in “non-supervised” mode, the relays are de-energized when conditions are normal, and energized when an alert occurs. This action is illustrated by the diagrams below: (*Note that the terms “normally open” (NO) and “normally closed” (NC), when describing relay actions, refer to the state of the relay contacts in the relay’s “normal”, i.e. de-energized state, not to “normal” as in normal room conditions!*)

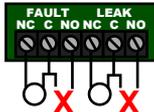
X contact pair is **open**

O contact pair is **closed**



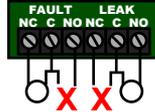
NON-SUPERVISED MODE

(no alarm condition)



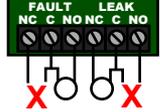
with no alarm condition, both relays are **de-energized**, and the **NC** contact pairs are closed.

leak detected

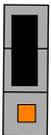


when water is detected on the cable, the **LEAK** relay **energizes**, and its **NO** contact pair closes

cable fault



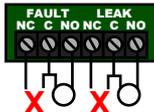
if a cable fault is detected, the **FAULT** relay **energizes**, and its **NO** contact pair closes



SUPERVISED MODE

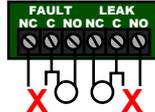
(recommended)

(no alarm condition)



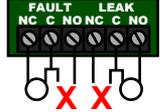
with no alarm condition, both relays are **energized**, and the **NO** contact pairs are closed.

leak detected



when water is detected on the cable, the **LEAK** relay **de-energizes**, and its **NC** contact pair closes

cable fault

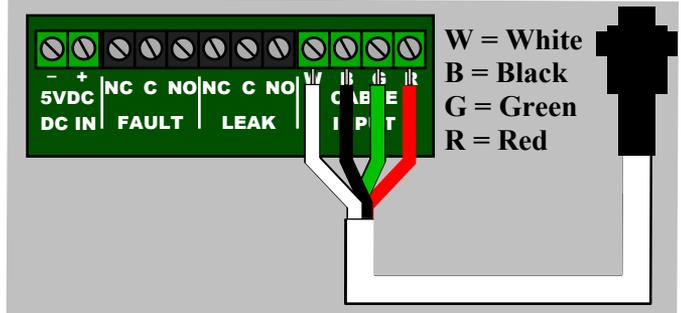


if a cable fault is detected, the **FAULT** relay **de-energizes**, and its **NC** contact pair closes

“Supervised” mode is recommended because if the LD300 loses power, both relays will de-energize, resulting in a simultaneous “leak detection” and “cable fault” event being seen by the monitoring unit which the LD300 is connected to. Since both of these conditions can’t be true at the same time, the simultaneous occurrence of both events indicates that the LD300 is no longer functioning. In “non-supervised” mode, you would not see any relay-state change if the LD300 lost power, and wouldn’t have any way to know the unit was no longer working. (Note: if you change this jumper setting, you must power-cycle the LD300 for it to recognize the change.)

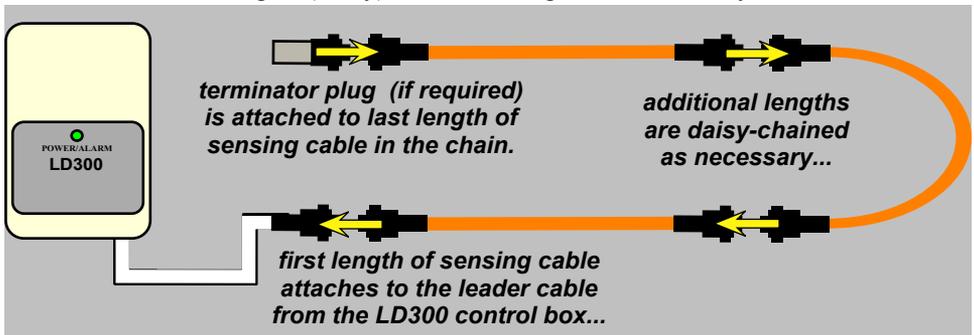
- **Connecting the Leader Cable:**

The “Leader Cable” is a 15-foot (4.57m) white cable with a twist-lock connector at one end and four bare, stripped and tinned wires at the other. To connect the Leader Cable, make sure the four colored wires are stripped so that approx. ¼ inch (7mm) of bare wire is showing, then insert the wires into the appropriate terminals of the *CABLE INPUT* terminal block and tighten the screws to lock the wires into place, as shown here.



- **Connecting the Leak-Detection Cable(s):**

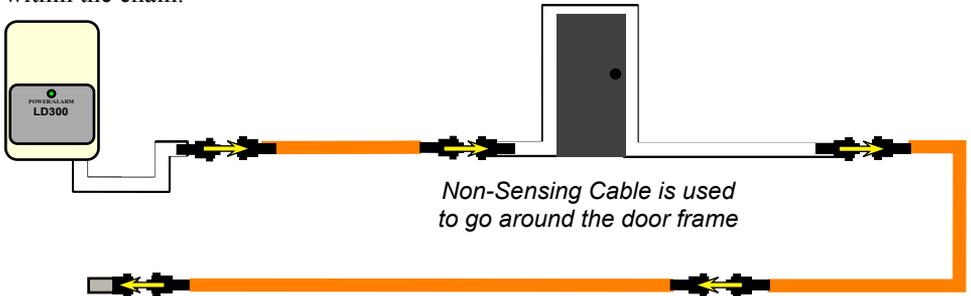
Your leak-detection kit will include one or more lengths of orange Leak-Detection Cable. The cables are designed to be daisy-chained together, so each cable will have a 4-pin male twist-lock plug on one end, and a 4-pin female twist-lock socket on the other. The first length of Leak-Detection Cable connects to the Leader Cable from the LD300 Control Box, and additional lengths (if any) are chained together as necessary.



Some kits are supplied with a cable that is permanently terminated at one end; if your kit is one of these, then the terminated cable must be the last cable in the chain. If your kit does not include a pre-terminated cable, then the Terminator Plug must be attached to the last cable in the chain, as shown here.

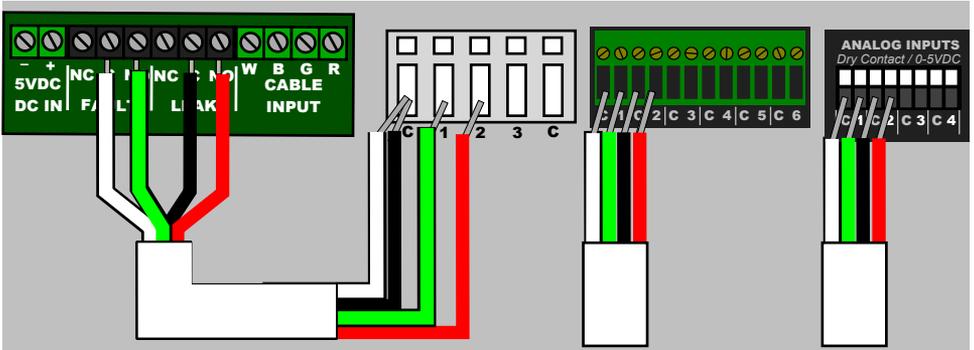
- **“Non-Sensing Cable” (optional):**

Non-Sensing Cable, available as an optional accessory, is an economical way to route around or over non-monitored spaces, such as doorways, or to give greater flexibility in where to mount the control box without wasting Leak Detection Cable across areas where there is no need to actually sense liquids. Non-Sensing Cable can be connected anywhere within the chain.



- **Connecting the relays to a monitoring unit:**

Using the 4-conductor alarm wire supplied with the kit (or any suitable 4-conductor wire), with the *relay mode* jumper in “supervised” mode, connect the signals between the LD300 control box and the monitoring unit’s analog-input terminal block as shown here:

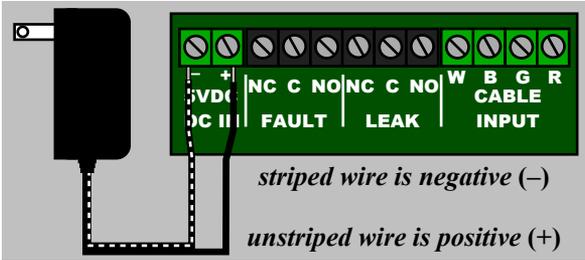


wire color	LD300 Control Box	RSE-series monitors	RSO or GBB-series monitors
white	FAULT C	left C	C
green	FAULT NO	1	1
black	LEAK C	left C	C
red	LEAK NO	2	2

On an RSE-style terminal block, both the white and black wires can be inserted into the same ‘C’ terminal; on the RSO and GBB-series units, each numbered analog input has its own corresponding ‘C’ terminal. (The different terminal-block styles are illustrated above.) Note that the use of inputs #1 and #2 here is merely an example; any of the numbered analog inputs can be used, as long as the red and green wires are connected to different inputs, and those inputs don’t already have other sensors connected to them. You cannot, however, connect both the red and green wires to a single analog input; the “fault” and “leak” signals must be connected to separate inputs for the unit to work properly.

- **Connecting the 5V power supply:**

The LD300 Control Box is powered by a standard 5VDC wall transformer-style power supply. Make sure both wires are stripped so that approx. ¼ inch (7mm) of bare wire is showing, then insert the wires into the appropriate terminals of the **5VDC DC IN** terminal block and tighten the screws to lock the wires into place, as shown here.



CONFIGURING THE MONITORING UNIT'S ANALOG-INPUT AND ALARM THRESHOLD SETTINGS:

(note: these instructions assume that the Leak Detection Kit is connected to an RSE-series or RSO unit with firmware v3.6.1 or higher, or a GBB-series unit with v1.5.1 or higher.)

The first step is to re-name the analog inputs to something more descriptive, to help identify the “cable fault” and “leak” signals when looking at the unit’s logged data or e-mailed alert messages. These names can be changed from the **Display** tab, in the section titled **Analog Sensors**.

If you connected the signals according to the examples above, **Analog 1** will be the “Cable Fault” signal, and **Analog 2** will be the “Leak Detection” signal, so change their **Friendly Names** as shown here, then click **Save Changes**. (The **Min** and **Max** settings can be left at their defaults.) Change the **Friendly Name** settings for the two analog inputs which the signals from the LD300 control box are connected to.

Analog Sensors				
Sensor	Friendly Name	Min	Max	Unit
IO-1	Cable Fault	0.000	99.000	
IO-2	Leak Detection	0.000	99.000	
IO-3	IO-3	0.000	99.000	

Next, go to the **Alarms** tab, and click the **Add New Alarm** button to create a new alarm entry. Choose “**Cable Fault**” from the list of measurements, then set the **trips if** and **threshold** entries to **Above** and **50.0**, as shown here. **Alarm must remain tripped for** should be left at 0; if you wish the unit to repeatedly send alarm messages for as long as the alarm condition persists, set **Repeat Every** as desired. (If not, leave it set to 0 or **No**

GRSE		ID 0160E53110000D
Cable Fault trips if: Above threshold: 50.0	Alarm must remain tripped for 0 (min) before notification Repeat every: No Repeat	<input checked="" type="checkbox"/> E-mail <input checked="" type="checkbox"/> zed@mailinator.com <input checked="" type="checkbox"/> baz@mailinator.com <input type="checkbox"/> (E-mail 3)
Leak Detection (REMOVE ALARM) Temperature (C) Temperature (F) Relative Humidity Dew Point (C) Dew Point (F) Light Level Air Flow Sound Level Cable Fault Leak Detection IO-3	Alarm must remain tripped for 0 (min) before notification Repeat every: No Repeat	<input checked="" type="checkbox"/> E-mail <input checked="" type="checkbox"/> zed@mailinator.com <input checked="" type="checkbox"/> baz@mailinator.com <input type="checkbox"/> (E-mail 3)

Repeat.) Choose the actions you want to occur (e-mails, SNMP traps, relays, etc.) from the checkbox list on the right, then click **Save Changes**.

Then, click **Add New Alarm** again, choose “**Leak Detection**” from the list of measurements, set **trips if** and **threshold** to **Above** and **50**, choose the actions you want, and **Save Changes**. In the example shown here, “baz@mailinator.com” will be notified if a cable fault occurs, while both “zed” and “baz” will be notified if a leak detection occurs.

When conditions are normal, both sets of the control box’s relay contacts will be closed, and the Cable Fault and Leak Detection inputs will read **0**, as shown here.

If water is detected by the sensing cable, the “leak” relay on the control box will de-energize, opening the contacts, and the Leak Detection input will read **99**, as shown here.

GRSE		ID 0160E55311000000
Temperature (F)	80.54 °F	
Relative Humidity	38 %	
Dew Point (F)	52.59 °F	
Light Level	54	0: Dark - 100: Bright
Air Flow	1	20: Still - 100: Rushing
Sound Level	1	0: Quiet - 99: Loud
Cable Fault	0	0: 0V - 99: 5V
Leak Detection	0	0: 0V - 99: 5V
IO-3	99	0: 0V - 99: 5V

If a fault is detected in the sensing cable, the “fault” relay on the control box will de-energize, opening the contacts, and the Cable Fault input will read **99**, as shown here. Examples of a cable fault would include an accidental disconnection of the leader cable from the control box, disconnection of one of the sensing-cable segments, a break or cut in either the leader or sensing cables, or failing to install the terminator plug or pre-terminated sensing cable at the end of the chain.

Sound Level	1
Cable Fault	0
Leak Detection	99
IO-3	99

Sound Level	1
Cable Fault	99
Leak Detection	0
IO-3	99

If the LD300 control box loses power, *both* relays will de-energize, causing the Cable Fault and Leak Detection alarms to occur simultaneously. Since these events *can’t* occur at the same time under normal circumstances (obviously, a faulty cable can’t detect water!), receiving both of these alerts at the same time would indicate that the Leak Detection Kit itself is no longer functioning.

Sound Level	1
Cable Fault	99
Leak Detection	99
IO-3	99

CLEANING THE LEAK-DETECTION CABLES:

If the orange Leak Detection Cables become contaminated by oils, solvents, or conductive residues, it may continue to give a “wet” signal even though the cable and surrounding area appears dry. If this happens, the cable can be cleaned as follows:

Clean the cable with isopropyl alcohol:

Cleaning the cable with alcohol allows you to clean the sensing cable without completely disconnecting and removing it from its installed location. Instead, you’ll remove each section of cable you wish to clean from its J-clips, wipe it down, and reinstall the cable. This method will clean most contaminants from the cable, and is generally sufficient in most cases.

1. Obtain a dye-free heavy cloth rag and a bottle of isopropyl alcohol.
2. Remove the first section of cable to be cleaned from its j-clips.
3. Soak the rag with alcohol.
4. Wrap the rag around the cable and squeeze firmly while pulling the rag down the length of the cable.
5. Flip the rag over every several feet. Re-saturate the rag with alcohol as required.
6. Once you’ve reached the end of the first section of cable, place it back in the J-clips and proceed to the next section.
7. Replace the rag if it becomes too dirty.

Clean the cable with warm, soapy water:

If the cable still gives a false “wet” signal even after you’ve cleaned it with isopropyl alcohol as above, or if the cable appears so dirty that it requires a more intense scrubbing, the cables may be cleaned with warm, soapy water instead. This process requires you to completely remove the cable from its installed location, submerge it in a soap-and-water solution, scrub it with a brush, and hang it to dry for several hours, so it is highly recommended to try the alcohol-cleaning method first.

1. Remove the sensing cable from its installed location. Labeling the sections of cable to note their location for later reinstallation is highly recommended.
2. Add dish soap (such as Dawn™) to a bucket of warm water, using about 1 cup (250ml) of detergent per gallon (4 L) of water.
3. Submerge a section of the cable in the water and, using a scrub brush or rag, scrub along the surface of the cable with firm pressure. Be sure to scrub all sides of the cable.
4. Remove the section of the cable from the soapy solution and rinse it in a bucket of clean, fresh water.
5. Ensure there are no oily deposits along the length of the cable. If the cable does not appear clean, repeat steps 3 and 4.
6. Hang up the cable to dry. Try to point the connectors down, so water cannot pool inside the connectors. The drying process may take 6 - 48 hours, depending on the room conditions.
7. Once the cable is completely dry, reinstall it in its original location.