

# Lead Leak Detection System Ltd.

## LEAD Leak Detection Master Panel – LP-LPM

LP-LPM Quick Start Guide



### Product overview

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The master panel LP-LPM can connect water sensing cable up to 500 meters and 100 units of slave panels (which include LP-LPM or LD-LPD-2RLB). It can stand alone to set the address and the sensitivity of the locating panel LP-LPD-R2LB. Four point-type sensors can be connected to it simultaneously.

Once liquid leakage is detected, the alarm will be triggered and the relay output is energized. The display will show “Alarm” and its location of leak. The alarm events will be stored in the memory. These leakage information can be accessed via RS485, TCP/IP, PLC or BMS system.



### Product Features

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- 4.3-inch TFT-LCD touch screen display
- Four built-in digit input (DI) and one port for the slave
- Can connect up to 100 slave devices (LD-LPD-2RLB or LP-LPM)
- Alarm dry contact and audible output 80dB max. with silence button

- One RS485 Modbus RTU upstream and One RS485 Modbus RTU downstream support
- Password protection
- 500 events log stored and 100 alarm events display
- Automatically detect the slave modules after power on
- All parameters can be set up via web-based environment
- All Alarm can be accessed via the front panel with authorized personnel.

## **Warning and Caution**



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This manual provides two types of safety instructions. Warnings are used to call attention to instructions, which describe steps, which must be taken to avoid conditions, which can lead to a serious fault condition.

Caution is used to call attention to instructions that describe steps that must be taken to avoid conditions that can lead to a malfunction and possible equipment damage.


### *Warnings*

Readers are informed of situations that can result in serious physical injury and/or serious damage to equipment with warning statements highlighted by the following symbols:

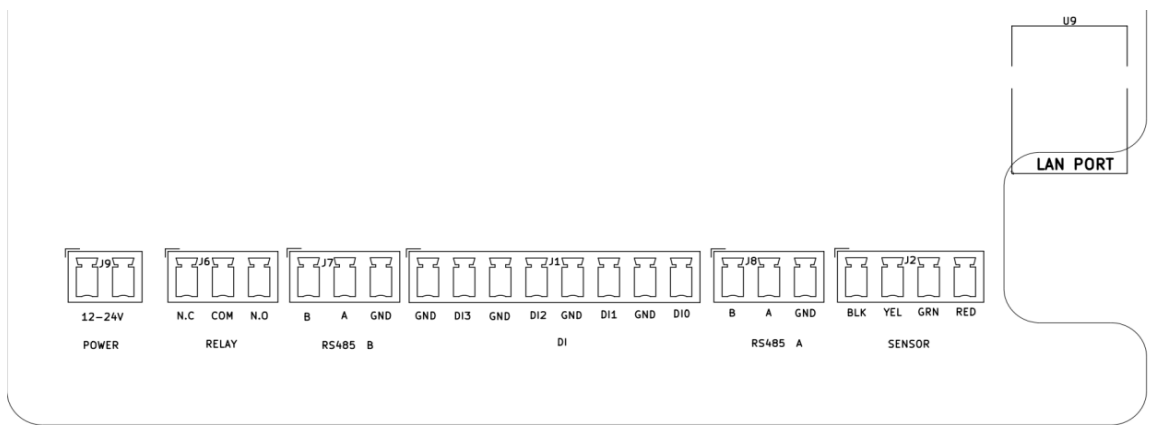
	<p>Dangerous Voltage Warning: warns of situations in which a high voltage can cause physical injury and/or damage equipment. The text next to this symbol describes ways to avoid the danger.</p>
	<p>Electrostatic Discharge Warning: warns of situations in which an electrostatic discharge can damage equipment. The text next to this symbol describes ways to avoid the danger.</p>

### *Cautions*

Readers are informed of situations that can lead to a malfunction and possible equipment damage with caution statements:

	<p>General Caution: identifies situations that can lead to a malfunction and possible equipment damage. The text describes ways to avoid the situation.</p>
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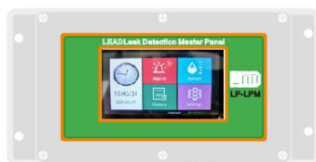
# Connection terminals



Refer to the above terminal from left to Right

- Power: 12-24 DC/ AC
- Relay: one NC and one NO dry contact for water leak
- Communication Port: Modbus RTU 485 for upstream
- Digital input (DI): 4 inputs
- Communication Port: Modbus RTU 485 for slave devices
- Terminals for Sensing cable: connect to 4 wires of sensing cable
- LAN port: interfacing with BMS and network

## 1. System Architecture of LP-LPM



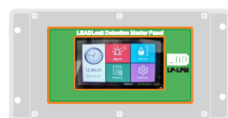
Wiring diagram 1

Sensing cable up to 500m



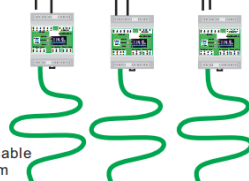
### Stand-alone operation control

Can connect sensing cable up to 500m and 4 units of point type sensor



Sensing cable up to 500m

RS485



Sensing cable up to 500m

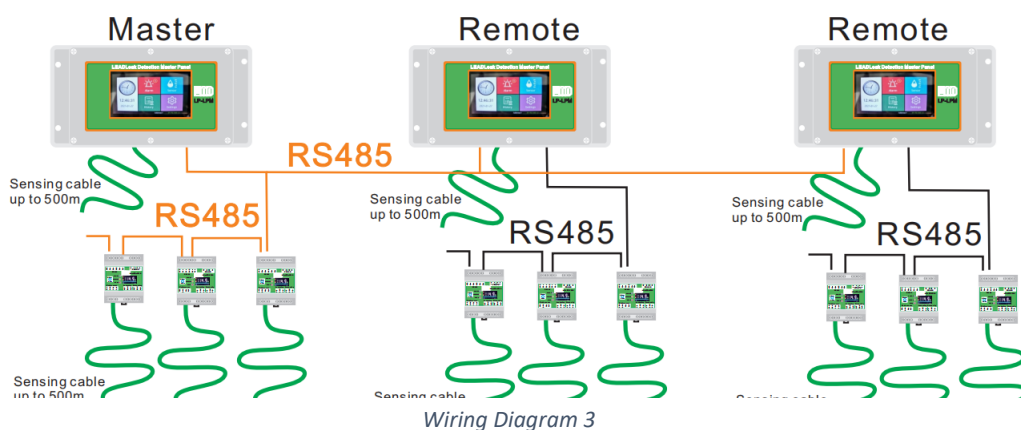
Wiring diagram 2

### Single unit of Master Panel LD-LPM connecting with multiple units of slave devices Locating Panel LP-LDP-2RLB

Connect 500 meters sensing cable, 4 units of point type sensor and multiple units slave panels in which can also support 500 meters sensing cable.

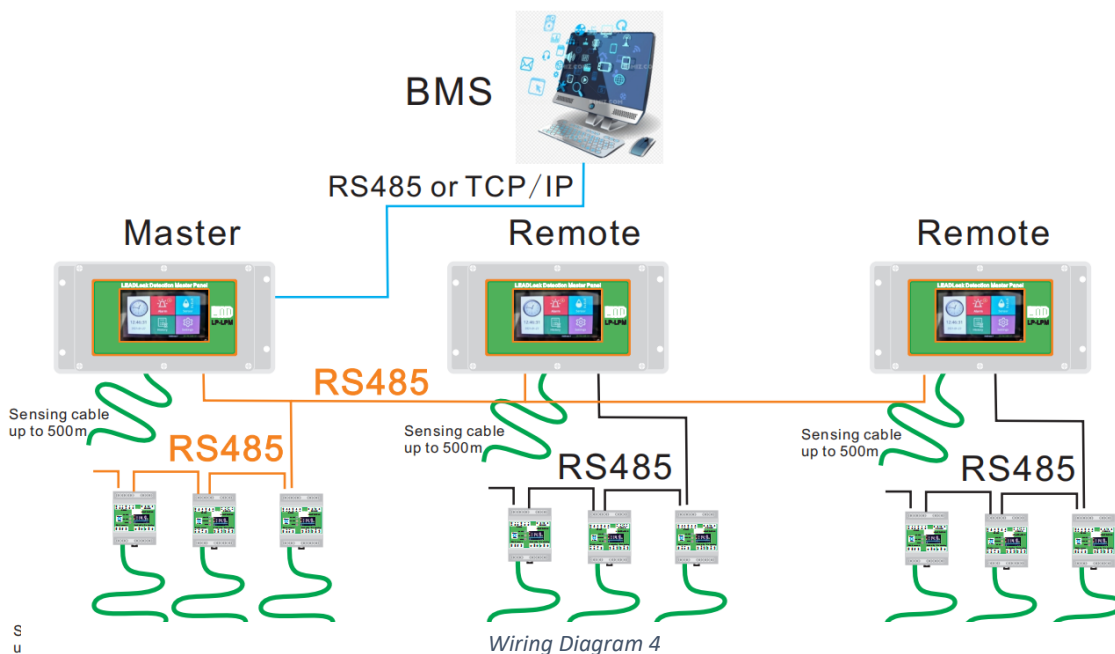
## A single unit of LP-LPM as Master device and other units of LP-LPM as remote devices in which each LP-LPM can also connect multiple units of Locating Panel LP-LDP-2RLB

A single unit LP-LPM acts as Master device that can support up to 500 meters sensing cable and 4 units of pointer type sensor. Master Panel LP-LPM can also connect multiple units of LP-LPM panel as remote terminals. Each remote terminal Master Panel can connect up to 500 meters sensing cable, 4 units of point type sensor and multiple units of Locating Panel LP-LDP-2RLB locating panels as well.

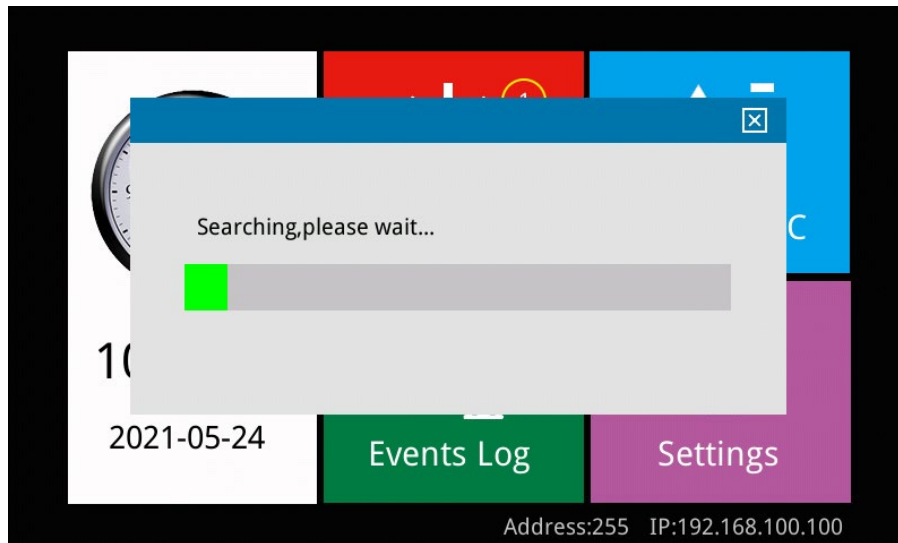


## Interfacing with Terminal PC or BMS (or CMS)

The Master Panel LP-LPM can interface with host PC via TCP/IP or RS485 communication serial port together with service center acting as centralized monitoring management system.



## 2.Set up procedures



Once the Master Panel LP-LPM is powered, it will execute the self-diagnosis checking communication status of slave terminal devices, the status of the sensing cable and RS485 serial port. Please note that the address of all the devices cannot be duplicated.

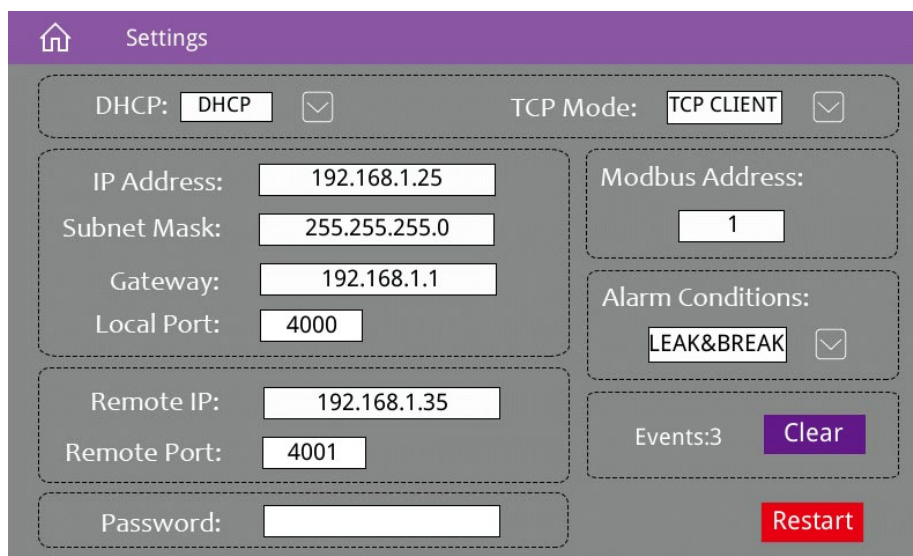


Figure 1

### Settings Page (Figure 1)

- The parameters of LP-LPM can be changed. You can input the password and then go to setting page.
- The password can be assigned and input new password and the press reset. Then the LP-LPM restarts
- In TCP/IP communication, the subnet mask of IP address and Gateway must set the same.

No.	Name	Address	Communication	Length(Meters)
1	DI	0	online	0,0,0,0
2	SC	0	online	7.5
3	LD-LPD-2RLB	1	online	15.0
4	LP-LPM	5	online	None
5	DI	5-0	online	0,0,0,0
6	SC	5-0	online	3.5
7	LD-LPD-2RLB	5-1	online	15.0

Figure 2

### Devices configuration page (Figure 2)

- There are 4 Digit Inputs (DI) in this Panel. DI means the digit input itself. It shows the address no. the status of the communication whether it is online or offline. The status of DI is either “1” or “0”. For example, if there are first two DI are energized, then it will show 1,1,0,0.
- The Name of “Device/SC” means Slave for Master, Locating or non-locating Panel and SC stands for Sensing cable.
- When the sensing cable connects to the Master Panel, it shows the length of sensing cable, address number and the status of communication.

### Sensing cable page (Figure 3)

LD-LPD-2RLB

Address:

Sensitivity Level:  k

Figure 3

- You can set the address number of slave device.
- You can set the sensitivity of the sensing cable.

Devices 1/1 <span style="float: right;">Search</span>				
No.	Name	Address	Communication	Length(Meters)
1	DI	0	online	0,0,0,0
2	SC	0	online	7.5
3	LD-LPD-2RLB	1	online	15.0
4	LP-LPM	5	online	None
5	DI	5-0	online	0,0,0,0
6	SC	5-0	online	3.5
7	LD-LPD-2RLB	5-1	online	15.0

Figure 4

**Devices/slave devices display information**

1	DI	4 Digit input (DI) of LP-LPM
2	Device/SC	Sensing cable connected to the panel
3	Remote	Repeated LP-LPM connected to the Master
4	Device/SC	Locating Panel LP-LDP-2RLB connected to Master
5	DI	4 digits input (DI) of repeated LP-LPM panel
6	Device/SC	Sensing cable connected to repeated LP-LPM panel
7	Device/SC	Locating Panel LP-LDP-2RLB connected to repeated panel
8	Device/SC	Locating Panel LP-LDP-2RLB connected to repeated panel
9	Device/SC	Locating Panel LP-LDP-2RLB connected to repeated panel

**Alarm page**

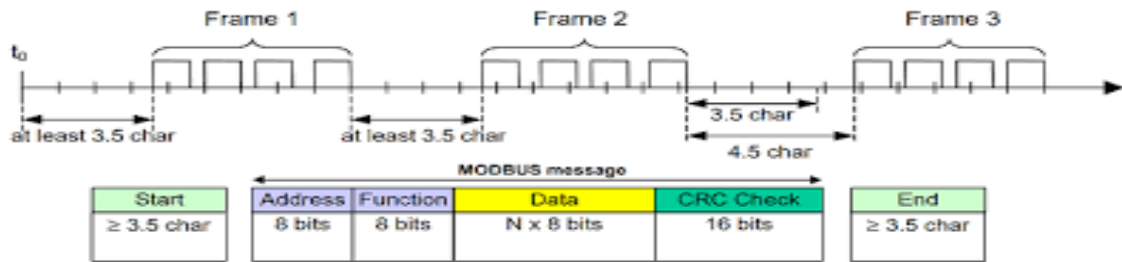
When the water leaks or cable breaks, the alarm will sound and flash as well.

**Events Log page**

All historical alarm records will be saved in the Event Log page with date and time.

# Communication Protocol

The packet of Modbus RTU is as follows:



Modbus address register table:

Register	Meaning	Description
30001	Modules quantity	Contains local switch and local leakage module
30002	Modules 0 (Native DI) parent address	0x0000
30003	Modules 0 (Native DI) address	0x0000
30004	Modules 0 (Native DI) Identifier	0x0001
30005	Modules 0 (Native DI) status	DI status, the lower byte is valid
30006	Modules 0 (Native DI) reserved	Undefined
30007	Modules 0 (Native DI) reserved	Undefined
30008	Module 1 (Water Leakage on the device) parent address	0x0000
30009	Module 1 (Water Leakage on the device) address	0x0000
30010	Module 1 (Water Leakage on the device) identifier	0x0003
30011	Module 1 (Water Leakage on the device) Status	Undefined
30012	Module 1 (Water Leakage on the device) Leakage location	Unit: 0.1m
30013	Module 1 (Water Leakage on the device) Length of sensing line	Unit: 0.1m
30014	Module 2 parent address	0-100
30015	Module 2 Address	1-100
30016	Module 2 Identifier	0x0350 / 0x0333
30017	Module 2 Status	Undefined
30018	Module 2 Leakage location	Unit: 0.1m
30019	Module 2 Length of sensing cable	Unit: 0.1m



## Protocol details

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Parent address: 0 means the module devices connected under this master device, other numbers mean the identifier representing the module(s) connected below the slave device address.

Identifier: Slave device 0x0350, module 0x0333

Status: According to the bit information, as shown in the table below:

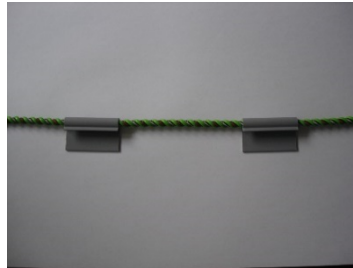
Bit	Description
0	0: No leakage, 1: Leakage
1	0: No disconnection, 2: Cable disconnected
2	Undefined
3	Undefined
4	Undefined
5	Undefined
6	Undefined
7	0: Communication is normal, 1: Communication failure
8	Undefined
9	Undefined
10	Undefined
11	Undefined
12	Undefined
13	Undefined
14	Undefined
15	Undefined

## Maintenance Service

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### 1. Hold Down Clip for Sensing Cable:

- It is recommended to place hold down clip with a spacing of 1m per clip.
- For corner or any bending angle area, use more clips per 1m.



### 2. Troubleshooting

- Liquid leakage is detected when there is no obvious liquid presence. The possible reasons are as follows (it is highly recommended to replace the affected section):
  - a. The sensing cable was badly contaminated by some chemical for unknown reason.
  - b. The sensing cable was coated with glue, epoxy and paint accidentally.
  - c. The 2 black sensing wires are in contact or not isolated properly.
- Use a bright led torch light to identify the location of the physical liquid leakage area which is more visible by naked eye. Some leakage is difficult to be observed due to very small volume of liquid presence and the environment is too dark.
- Cable break is detected where no visible wire cut externally is observed:
  - Check the 4 wires continuity by a multi-meter.
  - Check the 4 connection points of the leader cable to the control panel are secured properly.
- If leak location is not accurate:
  - This may probably due to small amount of liquid still exists at different points on the sensing cable.

- Also, it can be due to some contamination with electrostatic dust, transparent chemical or glue deposited on the cable.
- Check the cable with naked eye and clean the cable with dry cloth.

### **3. Maintenance**

- It is recommended to conduct quarterly check on LEAD leak detection system performance by authorized LEAD distributors/installers.
- During quarterly checking and maintenance:
  - Reset 3L-AP (by pressing “Silence Button” for more than 8 seconds) to check total sensing cable length detected versus the actual sensing cable installed at sites.
  - Conduct check list as per page 14 – 17 (under 14. Testing & Commissioning Check List).
  - Check physically on the sensing cable surface cleanliness and free from any chemical contact.
- For any parts replacement or extension, LEAD local distributors offer ex-stock and will provide an immediate turnaround service to meet the requirements.

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