

# ST312A

Refrigerant  
Leak Detector

Instruction Manual

Ver. 04\_20230209





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# 1. Introduction

Thank you for purchasing the refrigerant leak detector. Read through this instruction manual before operating the unit.

Please also store and retain this instruction manual for future reference.

## 1-1. Features

- LED Tip light
- Mute function
- USB power adaptor
- LED charging Indication
- Low battery indicator
- Rugged flexible probe
- Sensor failure indicator
- 3 adjustable sensitivity levels
- DC 3.7v rechargeable lithium battery
- Extremely sensitive semiconductor sensor
- Multiple colors LCD display for leak level indicator
- Detects R-22, R-32, R-134a, R-410a, R-407c, R-1234yf and etc.
- Automatic adjustment and reset to background
- Microcontroller circuitry that guarantees accuracy and reliability

## 1-2. Applications

- Refrigeration
- Air conditioning
- Laboratory accurate
- Systems engineering
- Semiconductor production
- HVAC
- Automotive service
- Aircraft construction industry

# 2. Safety Information

Read the following safety information carefully before attempting to operate or service the meter.

Only qualified engineer should perform repairs.

## 2-1. Safety symbols



This instrument conforms to the following standards:  
EN61326-1:2021 : Electrical equipment for measurement ,control and laboratory uses equipment EMC test.

IEC61000-4-2 : ESD immunity test.

IEC61000-4-3 : Radiated, radio-frequency ,Electromagnetic field immunity test.

IEC61000-4-8 : Power frequency magnetic field immunity test.

## **RoHS**

Restrict to use of 10 substances within electrical and electronic equipment (EEE), thereby contributing to the protection of human health and the environment.

## **REACH (SVHC)**

The device of used materials contents no following substances that list of proposed REACH substances of very high concern.



The device may not be disposed of with the trash. It promotes the re-use recycling and other forms of recovery of used materials and components, and to improve the environmental performance of all operators (manufacturers, traders, and treatment facilities) involved in the life cycle of products. Dispose of the product appropriately in accordance with the regulations in force in your country.

## **2-2. Warning**

Please read the manual carefully to ensure safe and correct use of this meter before using.

Please re-read if necessary.

Be sure to adhere to the following points to avoid injury.

- Please be aware of this meter is not water-proof product.
- Do not attempt to replace the sensor and LED.
- Do not attempt to repair it yourself if the meter is malfunction.

Only qualified engineer may do it.

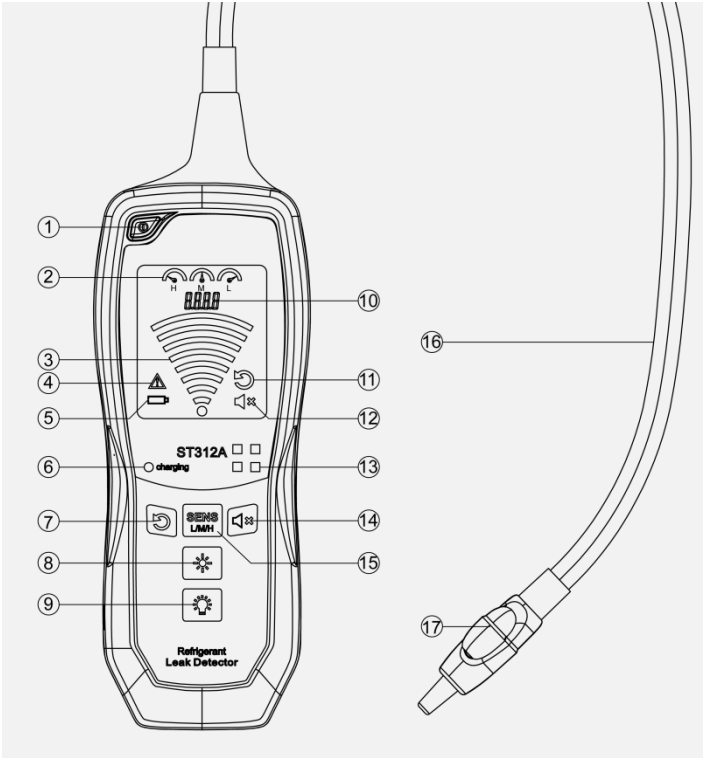
- Do not force to bend the flexible probe over its limit of angle.
- Do not subject the probe tip to impact that could break the inside sensor.
- Do not use the meter in places where flammable or nearby the fire.
- Do not use this meter in environments outside this range: 32°F (0°C) to 122°F (50°C)
- Never use organic solvents to clean the meter. (Such as thinner, benzene, etc.)

### 3. Product Specifications

Model	ST312A
Sensor	Semiconductor
Refrigerants	R-22, R-32, R-134a, R-404a, R-407c, R-410a, R-1234yf and all CFCs, HCFCs and HFCs
Sensitivity levels	High : 0.15 oz/year(4g/year) Medium : 0.25 oz/year(7g/year) Low : 0.5 oz/year(14g/year)
Accuracy	Compatibility with SAE J2791
Calibration	Manually reset to background level
	Automatic reset to background level
Response time	Less than 0.5 second
Warm up time	Approx. 50 seconds
Battery type	3.7V DC, 1960mAh rechargeable lithium battery
Battery life	Max. up to10 hours continuous use after fully charged.
Sensor failure notification	Yes
Audio alarm	Yes(Buzzer)
Fan system	Yes
Auto power off	10 minutes of idle.
Low battery indicator	Yes (Battery Icon)
Tip light	Yes
Flexible probe length	18" (450mm)
Operating temp. and %RH	32°F ~ 122°F(0°C ~ 50°C), < 80%RH
Storage temp. and %RH	14°F ~ 140°F(-10°C ~ 60°C), < 70%RH
Dimensions	7.2"x 2.8"x 1.6" (184 x 70 x 40 mm)
Weight	12 oz.(340g)
Accessories	Included : Quick user's guide, USB cable, Leak test bottle
	Option to buy : Charger, Rubber protector, Hard carrying case.

# 4. General Descriptions

## 4-1. Parts and Control Panel



- |                                |   |
|--------------------------------|---|
| 1. Power Button                | 10. Reset/Back Light Indicator                  |
| 2. Sensitivity Level Indicator | 11. Reset Indicator                             |
| 3. Leak Level Indicator        | 12. Mute Indicator                              |
| 4. Sensor failure Indicator    | 13. Buzzer Output                               |
| 5. Low Battery Indicator       | 14. Mute Button                                 |
| 6. Charging Indication         | 15. Sensitivity Button<br>(High 、 Medium 、 Low) |
| 7. Reset Button                | 16. Flexible Probe                              |
| 8. Tip Light LED ON/OFF Button | 17. Tip Light (Read Section 6-2)                |
| 9. Back Light ON/OFF Button    |   |

## 4-2 Lithium Battery Storage and Care

Operating Temperature and Humidity:

Discharge : 32°F ~ 122°F (0°C ~ 50°C) , less than 80% RH

Charging : 32°F ~ 113°F (0°C ~ 45°C) , less than 80% RH

Storage Humidity : Less than 70% RH

Storage temperature and capacity recovery:

Temperature range / Duration / Capacity recovery

-4°F ~ 140°F (-20°C ~ 60°C) / 1month / 75%

-4°F ~ 113°F (-20°C ~ 45°C) / 3months / 70%

-4°F ~ 77°F (-20°C ~ 25°C) / 1year / 80%

In case of contacting the materials from the battery:

Skin Contact: Washing immediately with water and soap.

Eye Contact : Washing immediately with plenty of water  
for at least 15 minutes.

Get medical attention.

Ingestion : Get medical attention immediately.

Warning:

- When the battery has rust, bad smell or something abnormal at first time-using, do not use and contact your dealer.
- The battery is requested to be stored within a proper temperature range specified in this specification.
- Do not disassemble or reconstruct battery.
- Do not give battery impact or fling it.
- Do not immerse the battery in water or sea water or get it wet.
- Do use the specified charger and observe charging requirement.
- Do not continue to charge battery over specified time.
- Do not charge the battery near a fire or in a hot vehicle or direct sunlight.
- Do not use the battery with conspicuous damage or deformation.
- Charging temperature range is regulated between 32°F ~ 113°F(0°C ~ 45°C).  
Do not charge the battery out of recommended temperature range.  
Charging out of recommended range might cause the generating heat or serious damage of battery.  
And it might cause the deterioration of battery's characteristics and cycle life.
- Do not use or leave batter nearby fire, stove, or heated place.  
The battery may generate heat, smoke, or flame.  
And it might cause the deterioration of battery's characteristics or cycle life.
- Avoid discharging the battery completely, it can damage the performance of the battery.



## 4-3 Charging the Lithium Battery

The detector will automatically turn off if the battery capacity is too low, charging it when the LOW-BATT LED is lit.

It is highly recommended not to use the detector during charging, the battery may be heated and dangerous.

The CHARGING LED be lit red color during charging, it will turn to green when charging is completed.

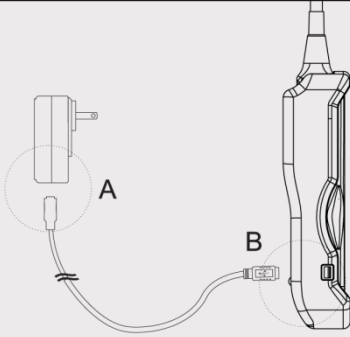
Note: Always charge within the charging environment specifications of 32°F~113°F (0°C~45°C), less than 80% RH.

The lithium battery is charged with AC power via AC adapter and USB cable:

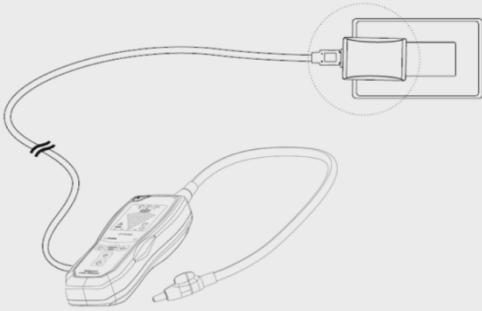
(AC adapter/charger is not include)

1. Use the AC adapter and plug mini B male into the mini B receptacle of the unit (Fig. 1).
2. Plug the AC adapter to the wall jack (Fig. 2).
3. Use the USB cable plug mini B receptacle of the unit and plug A male into PC or Notebook USB port (Fig. 3).

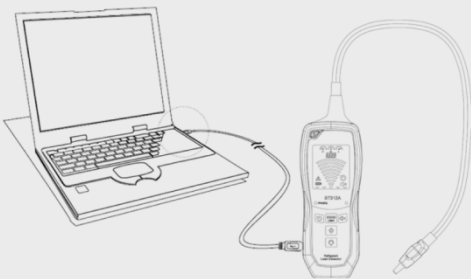
(Fig.1)



(Fig. 2)




(Fig. 3)








# 5. Operating Instructions

## 5-1 Main Function

### 5-1-1 Button Function

-  Power Button
  - Turn ON:  
Press and hold the Power button for 2 seconds to turn the detector on.  
LCD screen will be lit with the start-up buzzer beep (or, no buzzer beep under MUTE mode).
  - Turn OFF:  
Repeat to press and hold the Power button for 2 seconds again to turn the detector off.
  - Warm-Up:  
The detector will automatically start heating the sensor after power-on.  
During the warm-up, the graphical Leak Level will be flashed.  
After the warm-up, the leak level return to the lowest point, and the buzzer beeps every 2 seconds (or, no buzzer beep under MUTE mode).  
At this time the detector is ready to find leaks.

-  Sensitivity Button  
Press the Sensitivity button  to change sensitivity.
  - High, Medium or Low sensitivity level is signed by its respective icons ,  and .


※ **The detector will automatically default to previous sensitivity level after the warm-up.**




## ● RESET Button

The reset mode has 2 kinds, Auto Rest Mode and Manual Rest Mode.

The factory default value is under Auto Rest Mode.

➤ Press and hold the rest button  for 2 seconds to toggle to the Auto/Manual reset mode.

### ◆ Manual reset mode:

The Reset Indicator on screen  disappears

and  will show for 2 secs.

Press the Rest button once to reset to background manually and the Reset Indicator on screen flashes 1 sec. (Only in Manual reset mode.)

### ◆ Auto reset Mode:

The Reset Indicator screen  appears and

 will show for 2 secs.

Under auto reset mode, pressing Rest Button is invalid, since the detector will rest automatically.



## ● MUTE Button

➤ Press the Mute button to toggle the audio alarm on and off.

### ◆ The buzzer alarm is turned off: The MUTE icon



will be appeared.

### ◆ The buzzer alarm is turned on: The MUTE icon



will be off.

※The detector will automatically default to previous MUTE ON/OFF setting after re-start.

- The buzzer alarm is OFF  
Under the MUTE mode, all audible beeps are off.
- The buzzer alarm is ON
  - ◆ Button Tone  
The buzzer gives one beep when any of button is pressed.
  - ◆ Detection Tone  
The buzzer beeps every 2 seconds when no leak activity is found.

The buzzer becomes rapid when leak signal is approaching.

The fast beeps are given, the high density refrigerant is detected.

-  Tip Light LED Button


The tip light is always off after re-start.

Press the Tip Light LED Button to turn on/off the light of probe tip.

-  Backlight ON/OFF Button

- Auto backlight Mode (Power-saving Mode)  
When no leak activity is found and no button is pressed within 30secs, the detector will enter Auto backlight Mode (Power-saving Mode) to shutdown LCD backlight. And the backlight will be activated again after finding leak activity or pressing any buttons.

### ※When detector enters Auto backlight Mode

(Power-saving Mode), pressing  Backlight Button again, the detector will lit up the backlight on screen.

- Manual backlight Mode  
Under Manual backlight mode, pressing Backlight Button to toggle backlight ON/OFF.

The backlight mode has 2 kinds, Auto backlight Mode and Manual backlight Mode. The factory default value is under Auto backlight Mode.

- Press and hold the Backlight Button for 2 seconds to toggle to the Auto/Manual backlight mode.
  - ◆ Manual backlight Mode : pressing and hold Backlight Button for 2 secs, and

Ab 0


will show on screen for 2 secs and the detector has enter Manual backlight Mode.

- ◆ Auto backlight Mode : pressing and hold Backlight Button for 2 secs, and

Ab 1


will show on screen for 2 secs and the detector has enter Auto backlight Mode.

### 5-1-2 Low Battery Indicator

When the LOW-BATT icon  is appeared :  
Read the warning in the section 4-2 carefully and charge the battery by section 4-3.

If the battery capacity is too low, the detector will automatically turn off to protect the lithium battery and electronics.

### 5-1-3 Sensor Failure Indicator


The sensor failure icon  blinks and gives slow beep alarm when sensor was misplaced or failure.

Please replace a new sensor by section 6-2 or contact your dealer.

## 5-2 Start with Auto/Manual Reset Mode

### 5-2-1 Manual Reset Mode Inspection

Reset manually to the background level in clear air, and then inspect the possible leak point for at least 0.5 sec. The detection tone will become more rapid, when getting close to the exact leak point.

Under Manual REST mode, please press  button to rest the detector manually, when the environment(background level) changes dramatically. (For example: Move the detector from indoor to outdoor.)

### 5-2-2 Auto Reset Mode Inspection

1. Turn on the detector and wait until the warm-up is finished. After the warm-up, toggle to high sensitivity level.
2. Open the seal cap of leak test bottle and take it to probe tip for a moment. If the Leak Level Indicator on screen has showed signal detection, the sensor and electronics are working correctly.
3. Slowly move the probe tip to pass each possible point of leak at a rate of no faster than 2 inches (5cm) per second.

Note: It is important to continually move the probe tip.

If held on a leak, the auto reset feature will reset this leak signal to the background level.

4. When the detector discovers a leak source, the Leak Level Indicator will be lit corresponding to the leak level and give beep alarm.
5. Move the probe tip away from the leak source for a moment (more than 2 seconds), then move it back to detect. Repeat to move back and forth, user can find more accurate leakage area.
6. If user want to find exact leak point, user can use Auto Rest Mode to find the leakage area first, and then toggle to manual reset mode. Move the probe tip away from the leak source and reset manually in clear air, then move it back to detect and compare with leak level to pinpoint the exact leak point.  
If the refrigerant leak is large, toggling to lower sensitivity level will make it easier to find the leak point.

**※The manual reset mode can help user to find the leak point more exactly, but it may also easily cause the false-trigger.**

**※The auto reset mode provides user with fast and convenient way to find the leak area, but it is not proper to operate in following condition:**

1. **Detect a small leak in a higher refrigerant contaminated background.**
2. **Detect the leak level at fixed point.**



Warning:

- Keep the detector away organic solvents (such as gases, alcohol).



## 6. Maintenance

### 6-1 Leak Test Bottle

Remember to close the seal cap of leak test bottle to avoid evaporating completely after test.

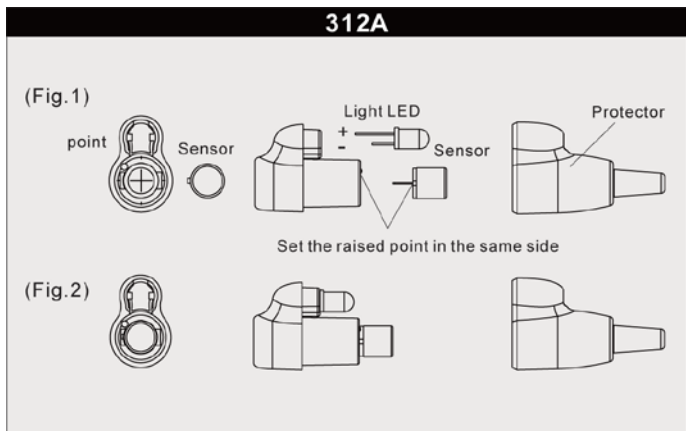
### 6-2 Probe Tip

Replacement of the sensor or Tip Light LED (3V) is shown in the following figure:

Assemble the sensor on the same side as the raised point of the sensor seat.

Note: Turn off the detector before removing sensor.

1. The life of sensor is 1 year (normally use), if the sensors exposed under 100 PPM refrigerant, detection function may be affected.
2. Please mind there is no water drops, dusts in the surface of sensor.



## 6-3 Clean

Clean the Housing:

Never use organic solvents to clean the meter. (Such as thinner, benzene, etc.)



Warning:

The organic solvents might damage the sensor, please avoid the solvents contacts the sensor.

## 6-4 Replacement Parts

- Sensor
- DC 3.7 V rechargeable lithium battery



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