cps®

Leak-Seeker®

Combustible Gas Leak Detector

Model: LSCG

QUICK START GUIDE (English)

Please Read & Understand This Guide Before Use

Important Safety Information Inside.

CE

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1. SAFETY SYMBOLS

In this Quick Start Guide and on the Combustible Gas Leak Detector, safety symbols and signal words are used to communicate important safety information.

SAFETY

WARNING SYMBOLS AND DEFINITIONS	
	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.
⚠ DANGER	Indicates a hazardous situation which, **if not avoided will result in death or serious injury.**
⚠ WARNING	Indicates a hazardous situation which, **if not avoided could result in death or serious injury.**
⚠ CAUTION	Indicates a hazardous situation which, **if not avoided could result in minor or moderate injury.**
NOTICE CAUTION	Addresses practices not related to personal injury.

SETUP

Symbol	Property or Statement
	Read this manual before use.
	**WARNING** marking concerning Risk of Electric Shock
	**WARNING** marking concerning Risk of Eye Injury. Wear ANSI-approved safety goggles with side shields.
	**WARNING** marking concerning Risk of Respiratory Injury. Wear proper respiratory equipment when around combustible gases.
	**WARNING** marking concerning Risk of Fire. Do not smoke while using this device.

OPERATION

IMPORTANT SAFETY INSTRUCTIONS
WARNING: Read ALL Instructions. **WARNING: Failure to follow all instructions listed below may result in fire, serious injury and/or DEATH.** The warnings and precautions discussed in this manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution and factors which cannot be built into this product but must be supplied by the operator. **NOTICE: Save These Instructions.**

2. GENERAL SAFETY RULES

Personal Safety

⚠ DANGER

1. **Stay Alert.** Do not use equipment when tired or under the influence of drugs, alcohol, or medication. Inattention while operating equipment may result in serious personal injury.
2. **Do NOT** overreach. Always maintain proper footing and balance.
3. **Always Wear Eye Protection**
4. **Wear Other Personal Protective Equipment (PPE)** -Such as a dust mask, safety shoes, hard hat or hearing protection matched to the job/environment at hand.

Work Area Safety

⚠ CAUTION

1. Keep work areas clean and well lighted. Cluttered or dark areas can cause accidents.
2. Do not operate equipment in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Equipment can create sparks which may ignite dust or vapors.
3. Keep children and by-standers away while operating equipment. Distractions may cause accidents.

Electrical Safety

⚠ WARNING

1. Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges, refrigerators, etc. Greater risk of electric shock will result if your body is grounded.
2. Do not expose equipment to rain or wet conditions. Water entering equipment will increase the risk of electrical shock.

Equipment Use & Care

⚠ CAUTION

1. **Do NOT** use if the On/Off key does not turn the device On and Off.
2. **Do NOT** device immerse in water.
3. **Do NOT** use aggressive or abrasive cleaning agents or solutions.
4. Clean device with a soft, damp cloth.
5. This device has a permanently installed Lithium-Ion battery and should

NOT be replaced with a disposable or any other type of battery.

6. Use only the provided, original equipment battery charging plug and cord with this device. Accessories suitable for one device may become hazardous if used with other equipment.
7. When this device is not in use, store it away from children in the provided storage case.
8. **Do NOT** allow persons unfamiliar with this device or these instructions to operate this device.
9. Equipment can be dangerous if used by untrained or unqualified users.
10. Maintain all equipment.
11. Use this device and any accessories in accordance with these instructions. Use of this device for operations different from those intended could result in a hazardous situation.
12. Keep this device clean and free of dirt, dust grease, oil, solvents, detergents which may damage the device or the sensor. Use only a soft, damp cloth to clean.

3. SPECIFIC SAFETY INFORMATION

Combustible Gas Leak Detector Safety

⚠ DANGER

DANGER: EXPLOSION RISK! This device is NOT certified as explosion proof for explosive rated environments. It is only for use in normal environments.

DANGER: EXPLOSION RISK! At each start up, only turn this device **ON** in an area known to be free of combustible gases.

DANGER: EXPLOSION RISK! Only charge the enclosed Lithium battery with the provided plug and cord in an area known to be free of combustible gases.

DANGER: EXPLOSION RISK! Only replace the enclosed sensor in an area known to be free of combustible gases.

DANGER: High concentrations of combustible gas can cause explosions, fires, asphyxia, and other hazards that could cause serious personal injury or death.

DANGER: Before beginning work, know and understand the jobsite conditions, along with the characteristics of the gas(es) that are, or may be present on the jobsite. Use proper precautions to avoid hazardous conditions.

⚠WARNING

WARNING: This section contains important safety information specific to this device. To reduce the risk of fire, explosion, or other serious personal injury, please read, follow, and understand these precautions before using this LSCG Combustible Gas Leak Detector.

WARNING: Start-up of this device in an area containing combustible gas could result in incorrect calibration and lower than actual readings. This could result in combustible gases **NOT** being detected.

WARNING: This device is **NOT** for use as Personal Protective Equipment (PPE).

WARNING: This device is **NOT** insulated. Avoid contact with areas where energized conductive elements may be present. Turn OFF power to such areas before starting measurements.

WARNING: Do **NOT** use equipment in the vicinity of spilled or open containers of gasoline or other flammable substances.

WARNING: AVOID breathing combustible gas or mist. Breathing high concentration levels may cause heart arrhythmia, loss of consciousness, or suffocation. Exposure may irritate eyes, nose, throat and skin. Please read manufacturer's Material Safety Data Sheet for further safety information on gases or vapors.

WARNING: Ensure all safety devices are functioning properly before operating.

WARNING: Do NOT probe moving machinery which could engage and harm the meter and/or user.

⚠WARNING

Please give special attention to DANGER, WARNING and CAUTION statements. Failure to follow warnings and instructions may result in electric shock, fire, or serious injury.

THIS DEVICE IS RECOMMENDED FOR USE BY PROFESSIONALLY TRAINED AND CERTIFIED OPERATORS ONLY. MOST STATES, COUNTRIES, ETC., MAY REQUIRE USER TO BE LICENSED. PLEASE CHECK WITH YOUR LOCAL GOVERNMENT AGENCY.

4. AGENCY APPROVALS

CE: EN50270: 2015 and **EN6100-6-3:**2007+A1:2011

5. OVERVIEW

This ***Leak-Seeker*** brand **Combustible Gas Leak Detector (Model LSCG)** is designed for use by HVAC/R, Plumbing, Mechanical Contractors, Facility

Maintenance, Factory Technicians, and other Professional Trades that require ease-of-use features such as a large lighted display with digital information to more quickly pinpoint combustible gas leaks, and at lower concentrations vs. conventional analog ("Lighted LED") leak detectors.

The LSCG is **for use in residential, commercial, and light industrial environments** to quickly identify the presence of and isolate the location of at least 30 different combustible gases (see list on page 8-9) that have methane as a component.

The LSCG features **2 Sensory Alarms (Audible & Vibration), plus 3 Gas Concentration Alarms (a "Speedometer" PPM scale, a Digital PPM and Digital LEL% value)** to alert and guide operators in virtually any environment. It also features the largest backlit LCD display in its class, and a 20" (51cm) flexible probe for hard-to-reach areas. It has a High/Low Concentration key for locating leaks down to 10 PPM. It also features Auto Calibration, Auto Zero, Auto Off and a rechargeable lithium-ion battery.

COMBUSTIBLE GASES

Methane typically makes up 80 ~ 90% of Natural Gas, and usually also contains smaller amounts of Propane (C3H8), Butane (C4H10) and Ethane (C2H6). All four are colorless, odorless, and highly combustible.

SENSOR FUNCTION

To detect combustible gases, the LSCG heats a sensor at the end of the flexible probe. Internal electronics interpret sensor data and communicate results to the large LCD display.

HIGH/LOW CONCENTRATION SETTING

By pressing the "H/L" Key at any time, technicians can easily toggle between viewing PPM concentrations within either a **LOW Range (10 to 1,000 PPM) or a HIGH Range (100 to 10,000 PPM)**.

FIVE TYPES OF ALARMS FOR PINPOINTING LEAKS

1. **AUDIBLE ALARM**
   The LSCG keypad has a dedicated key for turning the **Audible (beep)** On or OFF. The audible alarm beeps faster as a technician encounters higher gas concentrations.

2. **VIBRATION ALARM**
   The LSCG keypad has a dedicated key for turning the Vibration alarm **On** or **OFF**. This alarm is particularly useful in noisy surroundings

where the audible alarm might be difficult to hear. Vibration frequency increases as gas concentrations increase.

3. **"PPM SPEEDOMETER" (ON THE DISPLAY)**
   At the *top* of the LCD display, there is an innovative analog "speedometer" display. If no gas is detected, only a "0" will appear at the top **LEFT** of the speedometer. But, if gas is detected, the speedometer will "sweep" to the right to reflect the PPM level being detected. This speedometer scale helps technicians (in their peripheral vision) to monitor the "rate of gas concentration change" as they move closer to, or further away from the source of a leak.

4. **"PPM" NUMERICAL DATA ON THE DISPLAY**
   When the LSCG detects a combustible gas (having a Methane component), it generates **numerical "PPM" ("Parts Per Million") values of Methane on the LCD display. A key benefit of this innovative digital display is that it gives HVAC/R technicians specific, real time, combustible gas concentration values.** Therefore, technicians don't need to remember what multiple LEDS represent as is commonly required on competitive analog leak detectors.

5. ***"LEL %"* NUMERICAL DATA ON THE DISPLAY**
   For any gas (with a Methane component) detected, the LSCG will also show an **"LEL" or "Lower Explosion Limit" value as a percent volume.** This reading lets technicians know if the gas being detected is close to, or well away from the point at which it might combust. More detailed information on LEL can be found on pages 13-14.

6. INCLUDED ITEMS

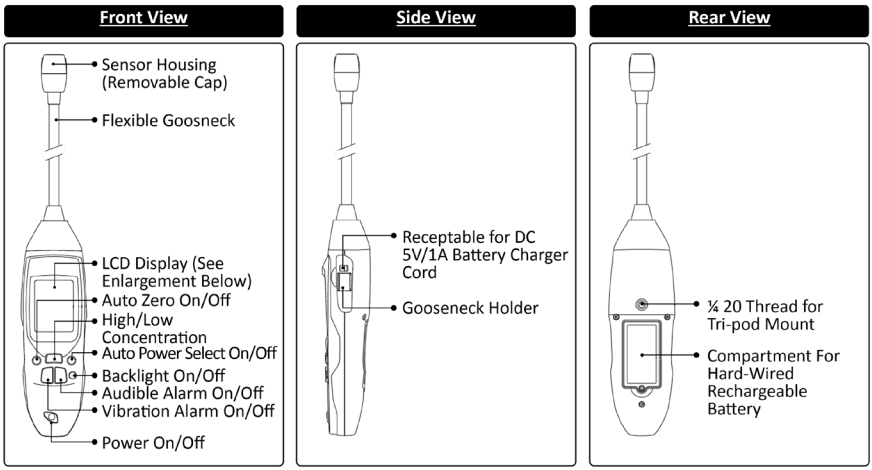
- LSCG Combustible Gas Leak Detector
- Gas Sensor (Replaceable)
- 5V/1A 2 Prong AC Plug with USB Port
- '78" (2m) USB cord
- Quick Start Guide (full manual available at **www.cpsproducts.com)**

7. COMBUSTIBLE GASES (HAVING A METHANE COMPONENT) DETECTED BY THE LSCG

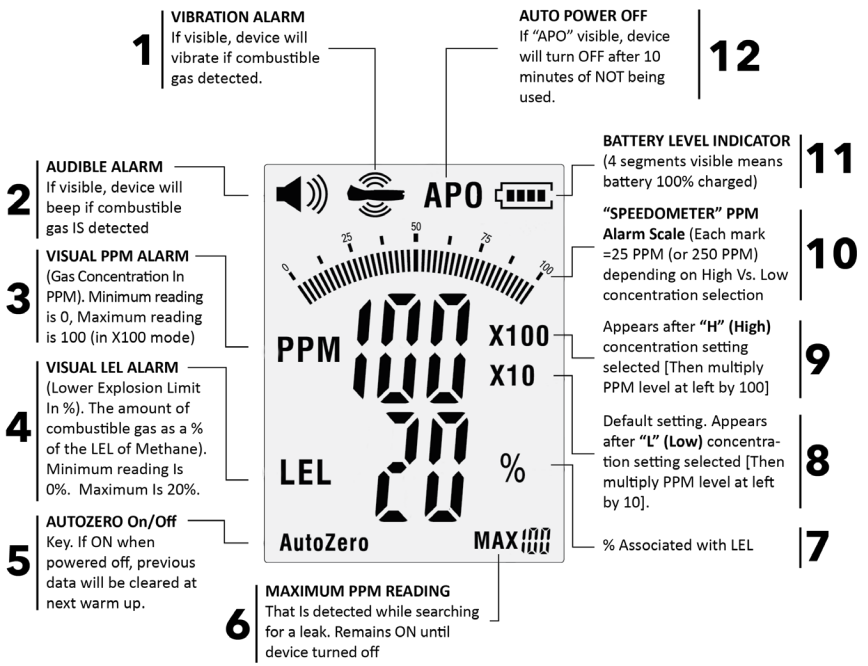
Natural Gas (4): Methane, Ethane, Propane, Butane. **Other Gases (26):** Ammonia, Acetaldehyde (Ethanal), Acetylene, Acetone, Benzene, Carbon Dioxide, Denatured Alcohol, Ethanol, Ethylene, Formaldehyde, Gasoline,

Hexane, Hydrogen, Isopropanol, Kerosene, Sulfide, Isobutane, Isopropyl Alcohol, MEK, Methanol, Mineral Spirits, Naptha, Paint Thinners, Paraxylene, Toluene, Xylene.

8. LSCG LAYOUT



9. LCD DISPLAY



10. CHARGING THE LITHIUM-ION BATTERY

⚠WARNING

DO NOT CHARGE THE ENCLOSED LITHIUM BATTERY IN THE PRESENCE OF COMBUSTIBLE GAS. Set up and operate the gas detector according to these procedures to reduce the risk of fire, explosions and serious injury and incorrect measurements.

1. **IF BATTERY IS LOW, CHARGE IT IN AN AREA KNOW TO BE FREE OF COMBUSTIBLE GAS)** by using the original 5V/1A plug and cord supplied.

11. INITIAL PREPARATION

⚠WARNING

1. Before each use, inspect the LSCG and correct any problems to reduce the risk of injury or incorrect measurements.
2. Ensure that all equipment has been properly inspected.
3. High concentrations of combustible gas(es) can cause explosions, fires and other hazards that could cause serious personal injury or death.
4. **Before entering a jobsite, identify/confirm, what gases are known or likely to be present on or around the jobsite.**
5. Advance information allows technicians to obtain and use any/all required safety equipment and better prepare to inspect for gas leaks. **Know the characteristics of the gas(es) you will be working with and use proper precautions to avoid hazardous conditions.**
6. **Due to the nature of confined spaces, it's imperative that technicians entering confined spaces exercise a high degree of caution and take extra steps to ensure their safety while working with or in the vicinity of combustible gases or combustible substances. Working safely in a confined space requires technicians to implement careful preparation, as well as an understanding of the potential hazards within the space being inspected.**

   Confined spaces present unique dangers when explosive or flammable gases may be present. Generally, the oxygen content in these rooms varies only slightly, **whereas a confined space traps combustible gases and vapors. Therefore, a slow leak can quickly reach an LEL required for combustion or to start a fire.**

Gas detection should begin *BEFORE* a technician enters a confined space where explosive or flammable gases may be present.

It's important to understand that jobsite conditions can change suddenly. **The LSCG sensor isn't able to discern what specific gas (or combination of gases) is being measured. Instead, the LSCG sensor is designed to detect a range of gases (see pages 8-9) that have "methane as a component".**

7. **Operate this device according to these procedures to reduce the risk of fire, explosions and serious injury and incorrect measurements**

⚠CAUTION

1. Ensure there is no dirt, oil, grease, or other petroleum products on the LSCG housing or covering the sensor area. Such materials could cause false or distorted readings. Use only a soft, damp cloth to clean. Do not use any detergents.
2. Check the LSCG for any damage, worn parts, loose connections or any other problems that might affect safety and normal operation.
3. **If replacing the sensor, ensure the LSCG is turned OFF.** This preventive safety measure can reduce personal injury and instrument damage problems.
4. Use only accessories recommended or supplied by CPS Products, Inc. for this device. Accessories suitable for one brand of equipment may become hazardous when used with other equipment.
5. Do not use any powered equipment if the power switch does not turn it ON and OFF. Any powered tool or device that cannot be controlled with an On/Off switch is dangerous and must be repaired or replaced.
6. After inspecting this device, and reviewing the Troubleshooting Guide, if any doubts, set this device aside and don't use for the time being.

12. QUICK START GUIDE

⚠WARNING

BEFORE WORKING ON A JOBSITE, CONFIRM WHAT COMBUSTIBLE GAS(ES) MIGHT BE (OR ACTUALLY EXIST) ON OR NEAR THE JOBSITE WHERE THE TECHNICIAN WILL BE USING THE "LSCG".

1. **IF STORED IN TEMPERATURE EXTREMES, ALLOW THE LSCG TO ACCLIMATE BEFORE FIRST USE.**

2. **IN AN AREA FREE OF COMBUSTIBLE GAS-** Press the ON/OFF key to turn the LSCG ON.

a. The LSCG will beep and vibrate once.

3. LSCG WILL AUTOMATICALLY CALIBRATE & START UP

a. **Display will Count Backwards From 40 Seconds-** During this time, the gas sensor will heat up and the device will automatically calibrate.

b. **After 40 Seconds-** LSCG will beep and vibrate once. The display will show:

i. **PPM Speedometer Scale (At Top Of Display): 0** PPM

ii. **PPM Readout: 0** PPM

iii. **LEL Readout: 0%** (Lower Explosion Limit value)

iv. **Max Readout: 0** (Lower Right Corner Of Display)

c. To Clear Any PPM & LEL Display Values On The Display During Each Warm Up.

i. **Press AUTOZERO Key**- This will return PPM, LEL readings to "0".

d. **Battery Icon (Top Right Portion of Display)-** Four "segments" within the icon outline mean the battery is 100% charged. Three segments mean the battery is 75% charged, etc.

e. **If Entire LCD Flashes & Beeps-** Sensor has failed and should be replaced.

4. AFTER INITIAL START UP

a. **Speaker & Vibration Alarm Icons Visible On the Display-** Both will be ON (visible in the upper LEFT) by default. These indicate that the Audible and Vibration alarms *will* operate if the LSCG detects a combustible gas. To turn either alarm OFF, press one or both keys on the keypad.

a. **APO (Auto Power OFF) Visible At Top Of Display -**APO is the default setting.

i. If "APO" Visible -The LSCG will turn OFF (to conserve the battery) if device has NOT been used for 10 minutes. To enable the LSCG to remain ON constantly, press the APO key so that "APO" is not visible.

5. SET GAS CONCENTRATION

a. **Use the Concentration Setting High/Low Key (H/L)**

i. **X10" (Low Concentration Scale: 10 To 1,000 PPM)-** LOW is the default sensitivity- "X10" will be visible on the RIGHT SIDE of the display. "X10" means that any PPM value visible (to its left) is to be multiplied by 10. 10 PPM is lowest PPM "resolution". Example: If "5" is visible, 5x10 PPM = 50 PPM being detected.

ii. **"X100" (High Concentration Scale (100 To 10,000 PPM))-**To change to this scale, press the YELLOW "H/L Key". Any value shown should be multiplied by 100.

6. TEST THE LSCG

a. In an area known free of combustible gas, test the LSCG to confirm it is working properly.
   i. Use a combustible gas (such as an unlit lighter), to confirm the LSCG detects gas.
   ii. If combustible gas is not detected with this simple test, do NOT proceed with testing for combustible gas on the jobsite.
   iii. If a defective LSCG is still under warranty, return it to the place of purchase for replacement or refund.

7. SEARCH FOR GAS LEAK(S) ON THE JOBSITE

a. In a piping system, slowly trace the system with the end of the LSCG. Stop at pipe joints (where leaks typically occur) to monitor gas levels.
b. If using the default X10 Concentration setting, the LSCG will alarm at 10PPM (or 100 PPM if using the X100 setting).

8. CLOSELY MONITOR DISPLAY READINGS OR ALARMS

a. **As gas concentration levels change, so will:**
   i. PPM Display (Always ON)- 1,000 PPM (when using the LOW Concentration Setting) Or 10,000 PPM (HIGH concentration Setting) is the maximum concentration that can be displayed for any gas the LSCG will detect.
   ii. LEL Display (Always ON)- 20 % is the maximum concentration the LSCG will display.
   iii. Audible Alarm Frequency- When **ON** this alarm increases in step with gas concentration.
   iv. Vibration Alarm Frequency- When **ON** this alarm increases in step with gas concentration.

9. WHEN GAS LEAK DETECTION IS COMPLETE

a. Press the ON/OFF key to turn LSCG OFF and store it in the protective case provided.

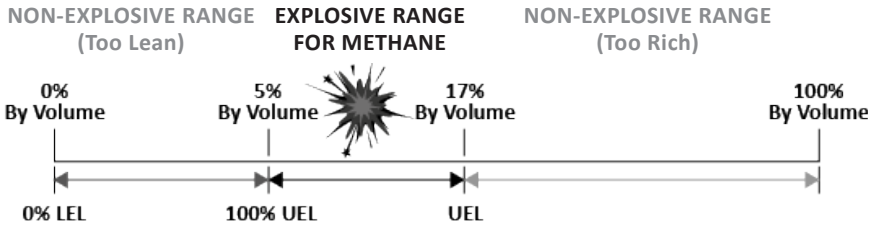
APPENDIX

1. LOWER EXPLOSIVE LIMIT (Defined)

The *MINIMUM* concentration of a combustible gas needed to support

its combustion in air is its LOWER EXPLOSIVE LIMIT (or "LEL"). And, **an LEL varies from gas to gas,** but most flammable gases are usually less than 5% by volume (but nearly never greater than 20%). See the full LSCG Owner's Manual at cpsproducts.com for more information.

2 . NON EXPLOSIVE / EXPLOSIVE RANGE DIAGRAM FOR METHANE



***BELOW a* specific LEL for a combustible gas, the mixture is too "lean" (not enough gas is present to burn).** See the above visual diagram that applies to Methane only.

3. EXPLANATION & EXAMPLE OF PPM, LEL FOR METHANE GAS

PPM (Parts Per Million)		LEL % (Lower Explosive Limit)	Notes
50,000 PPM Methane	=	100% Of The LEL For Methane	At 50,000 PPM (or 5% concentration), **Methane has reached its minimum concentration for combustion**
25,000 PPM Methane	=	50% Of The LEL For Methane	At 25,000 PPM (or 2.5% concentration), there isn't enough Methane for combustion
10,000 PPM Methane (MAX Value Possible On LSCG)	=	**20% (MAX % Possible On LSCG) Of the LEL For Methane**	**At 10,000 PPM (or 1% concentration), there isn't enough Methane for combustion**
1,000 PPM Methane	=	0.1.% Of The LEL For Methane	At 1,000 PPM (or 1/10% concentration), there isn't enough Methane for combustion

4. EXPLOSIVE RANGE (Defined)

The range between the LEL and UEL where a particular gas will combust.

5. UPPER EXPLOSIVE LIMIT (Defined)

The maximum concentration of a gas that will burn in air is the Upper Explosive Limit (UEL). **ABOVE the UEL value for a particular gas, there is too much gas present and not enough air (oxygen) so, the mixture is too "rich" to burn.**